Kiosk

A Library 2.0 Innovation

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Table of Contents

**EXECUTIVE SUMMARY** ................................................. 3

**1. INTRODUCTION** ..................................................... 4

**2. HCI METHODS AND ACTIVITIES** .............................. 5

2.1. **Ethnographic Observations** ................................ 5

2.2. **Card Coding and Sorting** .................................. 5

2.3. **Kiosk Conceptual Model** .................................. 6

2.4. **Storyboards** .................................................... 9

2.6. **Usability Testing** ............................................. 17

**3. ANALYSIS OF FINDINGS** ...................................... 20

**4. LIMITATIONS OF STUDY** ..................................... 24

4.1 **Data Limitations** ............................................. 24

4.2 **Participant Limitations** .................................... 24

4.3 **Technical Limitations** ..................................... 24

4.4 **Task Limitations** ............................................. 24

**5. CONCLUSION** .................................................... 25

**REFERENCES** ........................................................... 26

**APPENDIX A – GROUP AXIAL CATEGORIES AND CODES** .... 27

**APPENDIX B – INDIVIDUAL EVALUATIONS AND PICTURES** .. 28
Executive Summary

This report describes the iterative and user-centric design processes behind the collaborative creation of an innovative Library 2.0 kiosk with focus on usability and efficiency, as executed over the course of eight weeks. To better understand the current position of libraries in society, as well as their potential as an institution in the future, requires a careful observation and analysis of both existing practices in library usage, as well as beneficial arising trends in technology. Consequently, our team first discusses this transition or update to Library 2.0, in comparison to the emergence of Web 2.0, a dynamic, participatory, and rich community-focused transition away from static presentation of content. Library 2.0 embodies and borrows many of these Web 2.0 concepts and technologies, in hopes of tailoring library offerings to each individual patron, while eliciting his/her feedback in the process, and more importantly incorporating the input into all future progressions (Casey and Savastinuk).

With an understanding of desired improvements, as well as prospective technologies, this paper shifts focus to HCI methodologies, in first describing our experiences in the performance of five individual ethnographic observations of how individuals utilize libraries as existent today, while concentrating on the patrons in terms of activities, needs, and demographics. We then continue on to discuss how this array of qualitative data then provided the initial parameters for our card coding and sorting exercises, as well as the respective procedures themselves. The goal of these activities revolved around extracting meaningful trends in the observations and loosely defining functional requirements for the kiosk system. With this careful exploration completed and in mind, as addressed in a section on conceptual model development, we progress to detail the creation of system storyboards illustrating interactions with the physical system itself, followed by low-fidelity paper prototypes of the kiosk interface itself.

Having an initial design of both the physical interactive system itself and the user interface component only stands as a foundation for proper user-centered design. Much of our efforts allocated to evaluating this paper prototype with a sample of fairly representative users. The third section of this report addresses the user evaluation results and analysis, in leading to a critical redesign of kiosk interface elements as identified in having associated usability issues. Our group then considers a number of limitations of our kiosk ventures, in terms of potential participant, technical, and task shortcomings. Finally, we conclude with lessons learned and optimism for the interface as developed overall.
1. Introduction

"Library 2.0" remains a concept which does not have a precise meaning, but has become more an overall indicator of technical and user focused progression towards a "new version" or generation of the current embodiment of libraries. The general ambitions of “Library 2.0” essentially revolve around bringing the innovation, popularity, and success of “Web 2.0” technologies and techniques to a library setting. However, the confusing part of this transition revolves around the ambiguity of “Web 2.0” as a fairly generic concept encompassing various meanings. Nevertheless, the general message of "2.0" centers around truly catering to and involving users at every level -- from the design of new service offerings, to ongoing participatory content generation, while also promoting collective collaboration and discourse in order to grow immense “communities of interest” (Chad, Ken, and Miller, Paul). This initially spurred from Web “2.0”, but has now subsequently propagated to Library “2.0.”

The Library 2.0 phenomenon includes a few basic concepts, such as the idea of “community” – which describes a network of participating users who interact with some sort of “intelligence” from an application. This intelligence is based on something innovative for the community that uses it. Moreover, topics which relate to this notion might include interactive ways for users to communicate about a book for example. Blogs and Wikis have in many ways forged the pathway towards implementing Library 2.0 concepts for numerous branches. Collaboration takes center focus as the main idea, yet the hard part involves defining exactly the best and most efficient way to do so in a library environment. This concern stands as a critical driving force behind all Library 2.0 design decisions, especially a kiosk to bolster existing offerings. Ultimately, one must closely investigate how patrons interact among themselves and with the library as a whole, to then tailor Library 2.0 systems to the broad range of user needs and desires.

Over the last several weeks, our group has examined these Library 2.0 collaborative concepts. Through various activities including ethnographic observations, card coding and sorting, along with storyboarding and prototyping, we created a library kiosk interactive system, to help aid the transition into a Library 2.0 environment, while also improving existing informational offerings. Our kiosk facilitates an array of different ways to guide and assist the user in interfacing with services provided by the library. The offered features include essential library utilization actions, such as book checkout, in addition to simple ways for users to find what they need, efficiently and effectively. All of which emerged from careful evaluation of real users, iterative analysis of recurring usage trends and requirements, and user-centered design.
2. HCI Methods and Activities

2.1. Ethnographic Observations

During the week of April 22nd, the original five members of our team conducted individual ethnographic observations of local library branches in each of our communities. Visited branches include, the Richland County Public Library in Columbia, SC; the Blackwood Rotary Library in Gloucester, NJ; as well as the Walnut Street West Branch and two distinct studies of the Central Branch, both within the Free Library of Philadelphia. While conducting the exercise, we focused on general library uses from a patron’s perspective, as well as opportunities for Library 2.0 technology to improve the flow and efficiency of library utilization, primarily by supplementing the existing informational resources, as also examined. To better understand our target user group, we paid close attention to patron demographics and their activities conducted within the facilities. Ranging from ultra-modern, to historical in appearance, all five of the researched libraries produced interestingly similar trends in observations from a usage and resource offering perspective. Furthermore, such resources and services offered seemed refreshingly surprising in terms of modernization and sophistication, to a team of individuals with little recent library exposure. The most critical result of the ethnographic observation revolved around a redefinition in how our group viewed libraries as an institution, in demonstrating their maturation in this technology driven era, as well as indicating the possibility for future progression and adaptation, possibly in form of a Library 2.0 Kiosk.

All library branches observed had similar characteristics in form of departments for various book genres and multi-media categories, informational desks, and computer sections. Moreover, two of the libraries explored possessed existing implementations of self-checkout kiosks, in addition to the digital card catalogs as offered by all facilities. We found this a fairly unanticipated prior to commencing our outings. Our team also noted that all locations provided an extensive array of workshops, community outreach programs, and other events for members to participate in. We witnessed individuals locating, browsing, checking-out, and returning library catalog items, in addition to conducting research, either by aid of a library computer or a librarian. With these activities universal across all five observations, these usages became the underpinnings of our kiosk’s functional requirements, as iteratively elicited through the subsequent card coding and sorting activity. Furthermore, we all witnessed a diverse demographic breakdown of library patrons, which guided design efforts in the sense of catering to a wise subset of potential system users. A few group members had the opportunity to converse with library employees, and gather their technological desires upon explaining the purpose of the exercise. Overall, without the ethnographic exercise, our team would have begun the design process with an outdated set of assumptions regarding library activities and true user needs.

2.2. Card Coding and Sorting

Once each team member finished his/her individual card coding contributions, by generating a set of codes from his/her qualitative observational data, we created a shared Google Doc and combined all of the axial categories and codes identified. Initially we reviewed the collective efforts and highlighted terms representing identical or similar concepts across all five submissions. We decided to a two-column table to aid this process, with individually identified codes on one side, and the combined product on the other. This method worked well
in producing our final decision. We then noted that some form of “Using Library Resources” comprised everyone’s core category. We elected to use this as the team’s core category as well.

All members included an “activity” category, containing codes describing available library tasks. We decided to use this as our first category, and agreed upon appropriate codes such as check-out, return, and renew materials. Originally, we included locate materials, but soon moved it to an “assistance” category. With a kiosk in mind, we decided to eliminate some of the more manual tasks in the library, including wandering or reading. All members also included various information codes, which led us to creating an “information” category, containing location, hours, and maps. Likewise, everyone mentioned events or outreach programs offered by the observed libraries, to which we deemed worthy of its own category. Although we all included media and resources within the library, extensive consideration went towards categorizing it. Eventually we decided upon a “catalog” category for all media resources, as well as a distinct “facility resources” category housing codes such as tables and computers. We felt that this separation will aid in the kiosk development for tasks such as locating a book versus a computer, since we considered them of different natures. Of other entities within the library, we created a “people” category to include codes for librarians and support staff, as a critical part of the operations within the library.

One member’s coding result produced a very nice library assistance category, which we modified slightly into our “assistance” category. This represented all codes regarding information or resource seeking within the library, such as finding books, general questions, lending statuses, and recommendations. In a bit of a tangent we briefly considered the scope of the kiosk, in whether we wanted to replace all library computers with them, or just add them for non-traditional computer usage. We held this discussion to determine whether browsing and word processing should make the final list, but we felt this went past the feasible scope. Finally, our team worked to shape the “departments” category, to hold the nearly universally identified codes relating to physical sections within the libraries observed. We started with fiction, non-fiction, and children’s department, iteratively expanding upon each. With this, we decided that we had a fairly comprehensive list of axial categories and codes best representing and combining our individual thoughts.

Appendix A contains a list of all group axial categories and associated codes.

2.3. Kiosk Conceptual Model

Illustrated Summary of the Conceptual Model and Storyboard

Conceptual Model

In developing the conceptual model for the kiosk our group used some of the questions posed by the Johnson and Henderson article (Johnson, and Henderson) and the chapter in Preece/Rogers/Sharp (Sharp et al., 2007) to generate some of the core concepts that we wanted to convey in the kiosk.

What exactly are we designing?
We are designing a kiosk that will be used at a public library.

What types of interactions will the kiosk perform?
The kiosk will mainly be performing exploring, instructing, and searching activities.
Who will be using this kiosk?
The kiosk will be used by all library patrons, including children, students, and adults.

In what circumstances will the kiosk be used?
- To perform administrative activities such as checkout, returning, and paying fines.
- To get library assistance such as information or directions.
- Search the library catalog for resources including books, music, or movies.
- To reserve a library resource like a table or computer.
- To view and sign up for events like workshops or reading sessions of children.

What need does this kiosk fill?
The kiosk will perform library functions without the need of a librarian, in order to cater to larger volumes of patrons concurrently.

What are the design metaphors and analogies?
- Circulation Desk - To checkout, return, or reserve materials
- Sign-up sheet - To participate in events and outreach programs or reserve computers and tables
- Librarian - To find helpful information about the library
- Physical card catalog - This organizes all resources within the library
- Library resources - These are the traditional physical items in the library
  - Listen - for music or audio books
  - Watch - For movies and DVD's
  - Read - For books and printed material
  - Play - for games

What concepts will be exposed to the users?
- Catalog Items
  - Title
  - Author
  - ISBN
  - Due date
  - Publisher
  - Location (Department)
  - Status
  - Type (Books, magazines, periodicals, music, movies)
- Facility Resources
  - Name
  - Type
  - Location
  - Status
- Departments
  - Name
  - Location
- Library Users
  - Name
  - Materials Borrowed/Reserved
- Fines
  - Library User
What are the relationships between the concepts
- Catalog Items are located in various Departments
- Books, magazines, periodicals, and media comprise items
- Library Users can checkout and check in Catalog Items
- Library Users can reserve/use Facility Resources
- Library Users can reserve/use Catalog Items

What are the Mappings between the items?
- Each library user account corresponds to a physical library patron
- Departments map to a certain physical space in the library
- Every item maps to a resource on the shelves

Lexicon - What are the consistent names that will be used throughout the project?
- Items - Anything in the catalog (CD’s, Books, etc)
- Reservations - Anything that can be reserved within the library (Catalog Items, Facility Resources)
- User - A library patron
- Departments - Any library section
- Facility Resources - Computers, tables, etc.
- Events - Includes Workshops, Performances Community Outreach programs, Reading sessions, Meetings, and Conferences

Based on the information in this conceptual model our group came up with the following preliminary feature list to base our storyboard model:

- Main Window
  - Guest Account
  - Scan Library Card
    - Virtual Circulation Desk
      - Reservations
      - Materials
      - Facility resources
        - Check-out Materials
        - Pay Fines
    - Library Catalog
      - Find item
      - Recommendations
    - General Information
      - Location
      - Hours
      - Departments
  - Events
    - Signup Sheet
2.4. Storyboards

Storyboard Model

Once the conceptual model was developed, this enabled us to begin laying out the storyboard so we could see how our ideas might take shape. We needed to start thinking of how the library patrons would be using and interacting with the interface. We knew that we had a main window that started the interaction and five other main areas that the user could go to, so we focused on each one of the five sections for the storyboard. The screens below will reflect our interpretation of the conceptual model into a storyboard.

Figure 1 - initial interaction with kiosk
Library Catalog - Find an Item

Figure 2 - Person interacting with Circulation Desk

Figure 3 - User interacting with the kiosk catalog
From the General Information Menu the user has three options on the touchscreen for areas of information plus the option to return to the main menu.

Figure 4 - User interacting with the general information menu.

Events

Events organized by date with signup button next to each.

Figure 5 - User interacting with the events screen.
2.5. Paper Prototype
After developing the storyboard, the prototype was a natural progression in the development of the kiosk. The first step was to decide on the form factor and hardware that would be included in the prototype. We settled on a standalone kiosk with a simple design, which would only necessitate physical hardware including a touch screen, a barcode scanner, and small receipt printer. A rendition of the design follows:
For the actual prototype itself, we decided to produce it using PowerPoint because it would enable us to maintain consistency with our design and allow for electronically sharing amongst ourselves. The PowerPoint rendition would be convertible to paper form easily for our user testing. Conceptually we imagined that this type of kiosk would be placed in multiple locations throughout the library, ensuring easy access and availability for all patrons. The following screens will show how the original ideas discovered in the storyboard translated to the prototype.

Below is what was decided on for the initial screen that the user would see when they first approached the kiosk. This screen contains four out of the five main sections that we wanted to convey to the user. We decided that the Account Management screen would be accessed a different way.
Figure 8 - Initial login screen

Figure 9 - Circulation desk
Figure 10 - Three methods of browsing the catalog

Figure 11 - General information menu
Figure 12 - Events menu

Figure 13 - Account management
2.6. Usability Testing

Analytical Methods II - Usability Testing

With the prototype completed, the next step was putting it in front of some potential users or patrons of a library to test its functionality and usability. To complete this we needed to create a script to follow and a set of tasks that were to be performed using the paper prototype.

Script

The following script was read to each tester before they began the performing the tasks. We came up with this script to make sure that we were unified in what we told the testers and we wanted to be sure that the participants provided an honest assessment. We did not want the testers to feel that if they could not navigate or accomplish a task, then it was their insufficiencies, but rather a possible confusing portion of the kiosk and an opportunity for us to improve the design.

Hello [name], thank you for participating in the prototype evaluation for our library 2.0 kiosk. Through observing library patrons, we have determined universal uses of library resources and begun to design a system to simplify and automate the processes. During the evaluation of the paper prototype, I ask that you complete 3 activities using the system, while I act as the computer in response to your commands. Please click on items within the interface as you would on a traditional computer, using your finger as the cursor. I cannot assist you through the process to determine true usability; however, you should consider any mistakes on our fault and not yours. As you navigate through the interface, please think out loud and comment on any features of the design which you find beneficial, in addition any areas and actions within the interface which you have trouble with. This feedback will greatly help to improve this kiosk interface.

Tasks

The following three tasks were asked to be performed by each one of the participating users. We came up with these tasks to test the functionality and interface interactivity of each of the five main sections. We wanted to make sure that each tester could navigate to and perform a range of different tasks in each of the areas. We did not offer any assistance to the testers once the task began, so that they would have to use only what was available in the system to figure out how to accomplish each given task.

Task One

Update contact information, then find and sign-up for a Microsoft Word class

This task required the tester to perform two separate subtasks. Updating contact information required the user to find the account management button successfully and do some sort of update. The second part needed the user to find a certain class which was contained within the Events menu.

Task Two

Locate and reserve a book.

This task required the user to use either the catalog or virtual circulation desk menu to locate and reserve a book.

Task Three
Verify the library’s hours, check out a book (either *Slaughter-house Five* or the *Design of Everyday Things* or both), and reserve a computer.

This task divided into three subtasks. The first subtask expects the tester to navigate to the general information menu to find the library’s hours. The second subtask has the tester go through the circulation desk to check out their books. The last subtask has the tester again go to the circulation desk to reserve a computer. We felt that because of the complexity of the circulation desk we should include more than one task involving it. Furthermore, this might represent a scenario where a patron wishes to conduct research within the library, requiring knowledge of the hours plus a book and computer to conduct work.

Demographic of the Testers
We felt that in order to obtain more thorough information about our interface, we should try to obtain a variety of age groups. Older user at times might have issues with certain systems whereas sometimes younger user have different usability problems. We want to make sure that our kiosk is easy to use for everyone. The following are the demographics of the evaluators:

<table>
<thead>
<tr>
<th></th>
<th>Age</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>57</td>
<td>F</td>
</tr>
<tr>
<td>T2</td>
<td>25</td>
<td>F</td>
</tr>
<tr>
<td>T3</td>
<td>38</td>
<td>F</td>
</tr>
<tr>
<td>T4</td>
<td>24</td>
<td>M</td>
</tr>
</tbody>
</table>

Combined Results of Testing

The following are the combined results of each of the tasks. These are from each of the testers and the similar comments and interactions have been pooled together.

**Task 1**
*Update contact information, then find and sign-up for a Microsoft Word class*

At the beginning of the first task, each user needed to update their contact information. Some of the users had no problem finding the account management section to perform the update. However, there were some users who were not clear on exactly where the account management would be located, since it was not on the main screen. There was also some confusion as to which point they needed to scan the library card. Evaluators also commented that the location of the account management button seemed inconvenient.

When moving to the second part of the first task, which required the testers to sign-up for the Microsoft Word class, each one of the testers had the ability to find the class under the events section and register without any problem or hesitation. The only issues mentioned verbally pertained to the confirmation of the class.

**Task 2**
**Locate and reserve a book.**

At the beginning of this task, there was some confusion with the testers whether they were still logged in or needed to rescan to continue. There were multiple ways for the users to navigate to perform this task. Some users went through the circulation desk screen and some users went directly to the catalog screen, both ways can achieve the same result. The tester also had multiple avenues of find the book they were after. One person used the recommendations button, two people browsed by category and the fourth person found the book by searching, a good variety for evaluation purposes. Once each of the testers had found and reserved each of their books, one person appeared confused about the confirmation process, whereas the others did not comment. At this point, almost all the testers complained that they had no way to return to the book results (however they did get there), forcing them to return to the main home page. One tester also a criticized that the interface had no visible place to check for the status of the reservation just made.

**Task 3**  
*Verify the library's hours, check out a book (either Slaughter-house Five or the Design of Everyday Things or both), and reserve a computer.*

For the first part of the task, the testers needed to find the library's hours. Every single tester navigated to the library hours page contained in the general information section without any problem and proceeded back to the home page. One participant felt that the interface had too many button pushes to get back home (two in total) and that it should just require one.

The second part of the third task involved checking-out a book. The testers were advised at this point that the book they will checkout is one that they physically have in their possession. Navigating to the check-out screen did not prove an issue for any of the users. They all found it under the virtual circulation desk. One user had to stop and think for a few moments at the scanning portion, but was able to continue. The confirmation screen seemed to be liked by most of the testers, considering they liked having the option of what method to receive their confirmation: test, email, or printing. One tester did not want a conformation and was not given an option to say no. At this point, two of the users noticed that again they could not find a way to navigate from the circulation desk to the main screen.

The last part of the third task was to reserve a computer. Again, each one of the testers easily navigated to the proper screen to make the computer reservations. The layout of the screen and how to select the computer confused half the testers because they did not know what the "C" (for computer with key provided) stood for on the map or that they could just press the screen for the reservation. There was also an issue with proof of registration and exactly which computer they reserved in the library.
3. Analysis of Findings

Each step within the HCI methodology lead up to the culmination of the kiosk system paper prototype. From our starting ethnographic observations, we began to enumerate and code system functional requirements with the sole focus on the intended end users. Instead of diving directly into design, the conceptual model, with input from observations as well as card coding and sorting, enabled careful consideration on how our library 2.0 kiosk system will operate in focusing on the goals of library patrons (Johnson and Henderson 25-6). Ethnography and the codes produced, plus our existing knowledge of libraries as an institution informed which metaphors, concepts, relationships, and mappings would best work in this context. Furthermore, they also unlocked critical usage scenarios which formed the basis of our initial storyboard efforts. This allowed us to explore how a user would interact with the physical interface, prior to commencing interface design. Yet this storyboard brainstorming also later fed the important activities of which we desired to evaluate with real potential library kiosk users. In the meantime, an actual paper prototype bridged the gap in literally developing the interface once closely examined. The low-fidelity format of paper, and basic electronic drawing tools for collaboration, forced us to cautiously attend to usability as experienced through the lens of a library patron. The evaluations provided validity to these designs as well as priceless feedback on areas needing reconsideration.

In commencing the first task, a number of evaluators noted that they had difficulty in discerning whether or not the system required them to log-in, considering the first main menu prototype screen already mistakenly included a welcome banner listing a library user's name. Although discussing this process extensively in prototype deliberations, we shifted focus exclusively to the five distinct interface areas within the library kiosk, and neglected this critical authentication process. As ideally imagined, a library user would approach the kiosk and scan his/her library card to obtain access. This use of a personalized account would then stand as the foundation enabling personalized library 2.0 features, such as catalog item recommendations and patron specific customizations. However, any user not wishing to tie personally identifiable information to kiosk usage has the ability access system functionality via a guest account, at the push of a simple button. Furthermore, as a guest, one does not have the ability to access certain functionality, including the activity task of altering contact information.

Luckily for evaluation purposes, the remainder of our prototype showed the interface from a logged in user's perspective. This allowed the user to continue with the remainder of the task uninhibited, but certainly pointed out the criticality of the missing design element. The redesign focused on enumerating this intended initial access. Furthermore, one evaluator also expressed a concern in usage of a library card as the login credentials. Our kiosk provides the ability to view and edit contact information, which enables the possibility of a lost library card providing sensitive information to an unauthorized individual. To prevent such, our redesign has included a password or pin prompt following the scanning of a library card.

Similar to the beginning authentication process, once logged in, the initial prototype did not include a logout button, an extreme oversight that a number of evaluators pointed out. One specifically noticed the missing logout button, whereas another simply questioned whether or not she needed to login again to initiate the second activity. This particular evaluator suggested a system inactivity time-out period, in case a library patron accidentally departed from the kiosk
without logging out his/her current session. Although this system functionality does not tie explicitly into the prototype, the redesign included the missing logout button, in addition to an inactivity warning pop-up message. This message would allow a user to indicate their presence and extend the session, or conversely signal the automatic logout of a library user following a grace period.

Once surpassing the authentication usability issues with the prototyped interface, the evaluation unearthed ambiguities surrounding the placement and labeling of “Account Information.” Within the evaluated version of the prototype, the header persisted this button across all screen, yet all evaluators had trouble associating this button as the initial action to view and edit contact information. Many users defaulted to searching for this functionality within “General Information,” indicating that the redesign should include this feature nested within this section. Furthermore, from a terminology perspective, “My Account,” and “Account Management” topped the proposed renaming schemes for this feature. The former suggestion would then include the subcategories of “View Account” and “Modify Account.” Although possibly redundant, the revision includes this modified button will remain on the header, but also fall under “General Information” for those users who use this category as a penumbral fall-back. For one user without much experience with kiosk systems, she did not realize that this account information persisted kiosk wide, and would enable simplified activities from registering for classes to checking-out books. The redesign included an informational notice about such. To reiterate this persistence of information, we also elected to include a contact information confirmation screen prior to event registrations and computer reservations. We based this around the way in which existing e-commerce websites allow a user to verify saved shipping and billing information prior to placing his/her order, as a metaphor familiar to many patrons.

After identifying the evaluator’s struggles with modifying contact information, the remainder of the activity shifted focus to registering for an event, which raised a number of additional redesign considerations. Users located and signed-up for an event with extreme ease, thus all usability concerns with the event section categorized as post-registration difficulties in user understanding. Multiple evaluators expressed difficulty in knowing whether or not the registration transaction executed properly, considering although the kiosk interface displayed a confirmation message, it did not provide the options to provide a receipt to the user in confirmation of the patron’s request. In conformance with the check-out book confirmation page, we decided to maintain a kiosk-wide consistent confirmation page which displays success or failure in executing the action, as well as prompting the user to print, e-mail, or text message a receipt as proof of transaction. Moreover, evaluators also expressed interest in cancellation of event registrations in addition to waitlist capacities for full events. We addressed the latter in the prototype redesign by adding an additional button to the registration page entitled “Add to Waitlist.” Yet this functionality still hinges on the capability for a library patron to cancel existing registrations. Even if one accidentally clicks register, they do not have the ability to undo the mistaken action. Therefore, within “Account Management” section, the kiosk will now list the registered events for a particular user, much like it already did for loaned books.

Moving onwards to the second activity, it shared some confusion with the previous scenario in what a patron should do following the favorable event registration or book check-out. In a real library environment, a user would most likely either have a follow-up activity in mind or will conclude their usage of the kiosk. To this end, the hesitation aligned more with instructions as opposed the usability. We should have instructed evaluators to return home following the completion of the activities, as a blank slate to embark on the next scenario. Nevertheless, the evaluations exposed a few missing back buttons, which stood as an obstacle for a user to return to a previous interface. Furthermore, this also illustrated the reluctance to utilize the bread-
crumb trail displayed on the header throughout the prototype. We desired this feature to record the hierarchical path taken to the current screen, as well as an escape to any previous point in the kiosk interface. However, most of the evaluators did not initially consider this path as a set of clickable buttons. We feel that this partially comes as result of the paper medium used, but also used more consistent buttons within the redesign. Additionally, in allusion to a browser's “Home” button, we have decided to add a button enabling the patrons to quickly return to the main menu from any screen.

Interestingly, the evaluation participants identified a contested design consideration within our group. As a team we agreed on the importance of including book reservations within the kiosk's functional requirements. However, as observed in our own experiences and during our ethnographic endeavors, book reservations typically occur at the circulation desk with a librarian, after identifying the catalog item desired for reservation. Yet as an automated information system, our kiosk could simply incorporate reserve books and other media within the catalog directly. Nevertheless, we had an inclination that users would still skew towards the virtual circulation desk portion of our interface in attempting to reserve a book, so we included a button which essentially forwarded the user to the catalog. Nearly every evaluator chose this pathway, and expressed frustration in taking a longer than necessary path. For redesign purposes, we have decided to include labels on the main menu tile buttons, to better describe the feature set contained within each interface and kiosk area. Yet a user must find a book prior to reserving it, and traditionally would locate it then bring the information to a librarian. We still believe catalog best holds this functionality, with original guidance lacking. Furthermore, virtual circulation desk still needs a reservation feature for computers and tables, as one the catalog does not appropriately work for these items. Ease in finding computer reservations reiterated this analysis.

Following in pursuit of uncertainty in confirmation and then how to proceed, the evaluations illustrated the need for not only event registration confirmations, but also book reservation confirmations and instructions. Conventionally, a library would indicate the success in reservation with a receipt, and then contact the patron once the material became available. The first prototype draft did not properly capture this process, as recognized by all of the evaluators. Mirroring the original check-out book confirmation page, and then the redesign of the event registration confirmation page, the reserve books confirmation page will provide the aptitude to print, e-mail, or text a receipt proving the reservation of desired material. Furthermore, this screen introduces the instruction to the user, that the library will contact him/her once receiving the material, and that they can now return home. This redesign will prevent users from feeling uncertain about whether the kiosk accepted their request, as well as from feeling trapped following it.

A few minor diction troubles also arose during the second activity within the catalog portion of the kiosk interface, which seemed to bother the evaluators. When viewing the catalog listing of books, the term “pending” for unavailable items produced some turmoil with a few evaluators. One tester suggested the straightforward change of renaming this label to “0 available,” which would align closely with the other records displayed for books with actual copies available within the library. To clear up any ambiguity, we decided to cater to this advice and integrate the terminology change into the prototype redesign. Furthermore, in alignment with Library 2.0 and Web 2.0 topics, we wished to introduce a find books feature, which would display walking directions to a catalog item for a library patron. As a novel and unfamiliar addition to library actions, one evaluator disagreed with the labeling of this action as “Find.” We agree with this user and have renamed the button “Directions,” as a basic indicator that the feature will help users find their way to books and other resources within the library.
The final activity of verifying hours to check-out a book and conduct research at a reserved computer largely did not evoke any major usability issues other than previously identified, analyzed, and redesigned ones. Identical to book reservations, the evaluators desired a more formal and informational confirmation page following the reservations of computers or tables. Consequently, we applied the now universal confirmation page to this transaction as well, and also provided the ability to verify contact information prior to executing the action, in once again reiteration of the preservation and usage of account information kiosk-wide. One participant also informed us that “Account Status” within “Virtual Circulation Desk” essentially duplicates functionality contained within the now revamped “Account Management.” We decided to maintain this button as a shortcut to the status portion of “Account Management” for patrons with the mindset that they would contact a librarian to view their contact information, or inquiry about late fees owed. Lastly, we elected to use a digital and interactive map of the library to display available computers and tables for purposes of reserving them. This unique approach created a bottleneck for users to understand how to proceed. Gaging by feedback, a simple instructional animation and textual guide will make the process more efficient, to which we incorporated into our redesign. Furthermore, more clear icons within higher-fidelity mockups would also help. Ethnographic observations reminded our team that we needed to accommodate all ranges of users, and duplicate button and instructional failsafe components should hopefully alleviate any difficulty in usability.

Overall, the evaluations provided invaluable feedback, and lead to many fantastic suggestions for redesign with better usability in mind. Participants reacted very optimistically of the kiosk prototype and liked it extremely as a whole. They found the walking directions, book recommendations, and user specific personalizations very innovative and a good evolution of traditional library technologies and resources, as ultimately a very useful supplement to libraries. Moreover, many found the “Request a Librarian” button, as displayed in the ever present header, a welcomed feature, with the hopes that a human could at some point still help them with their library utilization. One participant suggested kiosk-wide navigation, to reduce the need to return to the main menu and follow the progression of screens for every action. Others could not think of any additional features they wished to see, besides the confirmation pages as addressed in our redesign. Evaluators found the system easy to interact with, with one equating it to the familiar self-checkout system at a grocery store. Evaluation went exceptionally well for all team members, and gathered great information from an set of evaluators showing extensive excitement for the system.
4. Limitations of Study

4.1 Data Limitations

Our study described within this report contains several limitations. The library kiosk design and functionality were designed based on the self reported ethnographic observations made by the team members. Our observations were limited to two hours per person conducted at different libraries. Considering that observations were conducted at various times and days of the week, although it provides a general view of libraries, our data is limited to a small window of observation.

4.2 Participant Limitations

The usability testing of our kiosk was also limited by the small sample size of 4 users. Although we made an effort to use diverse test subjects, our evaluators were at 3:1 female to male ratio, ranging from 24 to 56 years in age. Although the kiosk is designed for users of all ages, our testing did not include teenagers or young children.

4.3 Technical Limitations

Usability testing was conducted with paper prototyping method. Although a proven method of testing usability, paper prototyping does not provide much insight into the graphical design or the hardware for the kiosk. Further testing is required once initial errors are fixed and a basic software is created based on the results from the paper prototyping.

4.4 Task Limitations

Only 3 sets of tasks were tested in our usability testing, although each task had subtasks that enabled the testers to use more functionality of the kiosk. Due to the limitations of paper prototyping, advanced functionality of certain screens or functions were not tested. Further product placement research will also be required to finalize the location of the library kiosks.
5. Conclusion

The concept of Web 2.0 was prevalent throughout our research. The self-service library kiosk we developed is user-centric, allowing the library patrons to receive most services or administer their library account without having to depend on the library staff. Based on our observational data, a vast number of library users still depended on face-to-face services. Further research and studies are required to fully investigate the reasons behind their need for a personal service. Whether it is due to inefficiency of current self-service kiosks or a psychological factor of needing face-to-face interaction, library staff can be overwhelmed by simple requests. While fully automated to reduce such simple requests, our library kiosk also provides the option for requesting human assistance if needed.

In addition to expanding our knowledge on Web 2.0 technologies, ethnographic observation of libraries helped the team members to view the interaction of patrons with existing technology and usage of library services. Observing the users within the library environment also gave us a better understanding of their needs and how technology can be helpful in providing those services to them.

After conducting the individual observations, we were able to extract and sort the data we gathered from the ethnographic study into several groups using the card sorting technique. After multiple iterations of sorting and coding the data, main themes were identified and labeled. Using the axial coding, we were able to identify data that support the core categories we created. As a group, we discussed and refined these categories and identified the major theme that needs to be addressed as part of our library kiosk functionality.

Using the core themes, we created a conceptual model and a storyboard of our library kiosk functions. This helped us to identify and evaluate user-interactions with this kiosk. We individually tested our design using paper prototyping. Although using paper pieces to conduct usability initially seemed primitive, our testers provided valuable results about our kiosk. The use of low-fidelity methods in analyzing and testing our prototype helped us to achieve fast results with limited time and resources.

Overall, the concept and functionality we produced in our kiosk prototype was widely welcomed by our testers. Not only this user-centric kiosk will allow patrons to access critical services at their fingertips, it will also free up important time and resources for the library staff. We believe the functionality and design of our kiosk is ideal for all library users. Based on the research and testing we conducted, our prototype with simple to use interface via the touch screen technology will nicely incorporate into current libraries on the pathway to Library 2.0.
References


Appendix A – Group Axial Categories and Codes

Using Library Resources

● Activities
  ○ Check-out materials
  ○ Return materials
  ○ Renew materials
  ○ Pay fines
  ○ Reserve catalog items
  ○ Sign-up for a Library Card

● Assistance
  ○ Seeking Information
  ○ Getting Directions
  ○ Find a Book/Media
  ○ Research Assistance
  ○ General Questions/FAQs
  ○ Recommendations
  ○ Comments/Reviews Rating
  ○ Lending Status

● Catalog
  ○ Books
  ○ Periodicals
  ○ Newspapers
  ○ Magazines
  ○ Microfiche
  ○ Music
  ○ Movies
  ○ Video Games
  ○ Board Games

● Facility Resources
  ○ Tables
  ○ Computers
  ○ Copiers/Printers
  ○ Study Rooms
  ○ Board Rooms

● Information
  ○ Location
  ○ Hours
  ○ Map

● Departments
  ○ Children’s
  ○ Fiction
    ■ Mystery
    ■ Romance
    ■ Science
      Fiction/Fantasy
    ■ Suspense/Thriller
    ■ Horror
    ■ Young Adult
  ○ Non-Fiction
    ■ Newspapers and Microfilm
    ■ Social Science and History
    ■ Business, Science, and Technology
    ■ Education, Philosophy and Religion
    ■ Art and Literature
    ■ Law and Legal Study
    ■ Travel
      ○ Music/Movies
      ○ References

● Events
  ○ Workshops
  ○ Performances
  ○ Community Outreach programs
  ○ Reading sessions
  ○ Meetings
  ○ Conferences

● People
  ○ Librarians
  ○ Support Staff
Appendix B – Individual Evaluations and Pictures

Andrew Mulhern

Activity Based Feedback

<table>
<thead>
<tr>
<th>Task #1</th>
<th>Update contact information, then find and sign-up for an event</th>
</tr>
</thead>
</table>
| Participant Comments/Partial Transcript | ● “Okay I want to update my contact information, it must be under general information”  
● “I'd like to change a few fields, so I must have to type on the keyboard to change them”  
● “Let me hit done when finished, no problems there”  
● Participant asks for restatement of prompt  
● “Fine, now I'd like to find the Microsoft Word Class event, I should click events”  
● “Classes sounds like the closet event category that might have the Microsoft Word class”  
● “Oh, there it is, I will click register”  
● “How does that happen automatically, just by scanning
my library card it has my information? Do I get a confirmation e-mail or some sort of receipt. How do I know I really registered?"

| Design Issues and Recommendations | During this evaluation, it became quickly evident that we forgot to prototype a main menu screen which differentiates between an initial start interface, and a view of which a user who has already authenticated would see. Without scanning one's library card, he/she does not have access to modify account details, justifying the removal of the “Account Information” button from display. However, we intended to test an actual library user as opposed to guest. We must alter the design to clearly represent our intended login process. With this properly depicted, the “Account Information” button would distinctly display on the header and navigation plane throughout the interface. Nevertheless, the evaluation participant noted that she would not necessarily know to select “Account Information” to modify her contact details. Perhaps we should simply change this to “My Account” and have subcategories for “View Account” and “Modify Account.”

Even more broadly, did not become initially apparent to the user that their contact information persists system wide, specifically during the registration for an event. It appears that the kiosk should inform the user that it will utilize his/her stored profile to complete the actions automatically. In alignment with e-commerce web applications, we should consider displaying the library user's details during the registration processes, for confirmation and to also enable updating at that point as opposed to beforehand.

It seems that we must also redesign the registration confirmation screen, to more conspicuously set forth the acceptance of the user's request. Similar to the check-out books confirmation page, we could possibly prompt the user to select either a print, e-mail, or text receipt of his/her event registration. Furthermore, there seems to exist some desire for wait list capabilities within this event interface. A simple additional button could add users to a distinct list, should one of the event attendees decide to cancel his/her reservation. However, this also requires the additional requirement of event reservation cancellations. Either the events screen or the account section could contain a listing of events which the user has previously signed-up for, similar to how the kiosk displays loaned books. Overall, from a navigation standpoint, the evaluator had no errors in quickly finding the event and registering for it, simply questions on the
Task #2 | Locate and reserve a book
---|---
**Participant Comments/Partial Transcript**
- “I do not quite know whether I've been logged out, I wonder whether this kiosk has a time out”
- “Okay I'd like to reserve a book, let me go to 'Circulation Desk'”
- “I see 'Reservations' let me try this; alright, 'Catalog Item' that sounds straight forward”
- “I'll try browse: click category, type, and list all”
- “I do not know what 'pending' means on an individual book, but I like how it gives me where to find the other ones. Although, what happened to dewy decimal numbers? I do not see them.”
- “Let me reserve this book. Okay confirmed. I do not know whether I get some sort of receipt or proof of reservation.”
- “I do not see a back button, I do not know how to get back to the main screen from the reservations.”

**Design Issues and Recommendations**
This activity unearthed a number of design defects and considerations in our current prototype version. The first revolves around the multiple entry points to reserve a book. Initially, we believed a user would go to the electronic catalog to locate a book and then reserve it. However, the evaluator decided to navigate to circulation desk, then to reservations, and finally to the button which essentially directs the user to the catalog. Simply clicking the catalog initially would bring one to this same point. It seems that we must either simplify this process or make it apparent to the user that “Catalog” will assist him/her in finding and then reserving a book. A button label might alleviate this to a certain extent. Nevertheless, this risks the confusion of having reserve books within the catalog and reserve computers/tables still within the circulation desk. In keeping with the virtual librarian and circulation desk metaphors, maybe all reservations properly exist within the circulation desk interface, and we should just streamline the process to identify the desired book to reserve.

When viewing the catalog listing of books, the term “pending” for unavailable resources seemed to install quite a bit of confusion with the evaluator. After discussing this with the tester following the evaluation, she suggested simply changing it to “0 available,” which would align closer with the other rows.
displayed for books with copies in the library. Furthermore, similar to the ambiguous registration confirmation, the confirmation screen for reservations also left the user uncertain as to whether she truly completed the process. The evaluator noted that she does not know whether she should expect a call when the resource comes in, or what proof to show that she has actually reserved it. Once again, print, e-mail, and text receipts can provide a more concrete verification of the reservation. This should also apply to computers and tables, so a library user has some proof of his/her rightful reservation.

An overarching issue with the header arose due to a missing back button within the catalog reservation interface. The evaluator did not initially realize that the header, which displays the navigation path to the active screen, allows for interaction. Originally, we desired this to take a form resembling a directory structure, where one can click on any parent directory to return to it. This suggests that we should redesign how we present this current location to the user, in better showing it as navigable buttons.

**Task #3**

Verify the library's hours, then check-out Slaughter-house Five (which you already physically have) and reserve a computer to do research

**Participant Comments/Partial Transcript**

- “Okay let me first find the library hours, sounds like general information”
- “I see library hours, nothing confusing about that, let me go back and check-out my book”
- “It says to scan, so I'm going to scan Slaughter-House Five”
- “Okay the book comes up in the list, now let me hit check-out”
- “It looks like I get a receipt choice here, let me print out I don't have a fancy smart phone, but it's nice to have the options.”
- “Alright and you also wanted me to reserve a computer, I'll go back to circulation desk.”
- “Okay 'Reservations,' alright here are computers. Oh and tables too.”
- “It says to please select a computer, I'm not sure whether I just press this. I'll try.”
- “Alright, it wants a duration, I wonder how long I can have it for. Oh I see, a drop down box.”
Design Issues and Recommendations

<table>
<thead>
<tr>
<th>Design Issues and Recommendations</th>
<th>This scenario reiterates the issue revolving lack of a consistent confirmation notification system throughout the kiosk interface. Users desire some sort of proof or verification to the action they completed on the kiosk, in fear that someone else will lay claim to the book or computer which he/she reserved using the system. For purposes of a redesign, this can again resolve itself through print, e-mail, and text receipt button options on a clear confirmation page. Once sent or printed, we must also notify the user of the success in doing so. Perhaps we can unify this for all transactions, but indicate which transaction led the user to the confirmation page. Moreover, prior to the reservation itself, the virtual map for computer and table reservations initially confused the evaluator, who notes she does not have much experience with touch screen systems. To cater to all users, we should reconsider phrasing of instructions guiding usage. Transcending a simple text caption, the kiosk could display an animation instruction until the user begins his/her interaction.</th>
</tr>
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</table>

System Wide Feedback

In terms of system problems, a handful of terms appear to have a slightly ambiguous denotation in the user's mind, such as catalog versus circulation desk as well as the misconception between general information not including contact information. Although perhaps contrary to simplicity, the main menu could possibly display a description for each of the tiled items, to better direct library users on their interaction with the kiosk. Although we maintained consistency within the top navigation, it must more clearly show that it holds buttons which allow the quick return to a previous point in the system to prevent entrapment. The evaluator would also have liked to see a system help or FAQ section within general information. As per the positive aspects: events largely appeared perfect from the user's point of view, sans the receipt confirmation. Regardless, the quick traversal demonstrates the ease of use. Along with the check-out process, the evaluator found these two sections the best portion of the system. Ultimately, the evaluator said she likes the kiosk, and could not instantly think of any component that he interface misses (besides confirmations). In briefly exploring the remainder of the interface after the activities, she found the directions to a book and book recommendation system a nice addition to conventional library activities. The evaluator seemed to think that interaction and exploration would best teach new users, and equated it to a self-checkout system at the grocery store.
Initial Reaction
At the beginning of the test I noticed that there was no main screen as part of the prototype PowerPoint so the test had to be slightly delayed while I printed the page from another PowerPoint to make it complete. When the tester sat down and before she began the first task she was confused by the fact that the description at the top says to "Please swipe you library card..." when the picture of the kiosk shows that there is actually a scanner. So she was wonder if there was another device that separate from the scanner for just the card. This is clearly just a lack of using consistent vocabulary when describing actions with the Kiosk.

<table>
<thead>
<tr>
<th>Task #1</th>
<th>Update contact information, then find and sign-up for an event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant Actions</td>
<td>At the beginning of the task I gave the user a library card and told her to use this when she was prompted when using the kiosk. When she was given the first part of the first task, to update contact information, her fist step was to try and sign in. Because the first page gives the user the ability to just scan the card to log in we did not anticipate a screen for this. So, I had to correct the request and ask her to update contact information and go as far as she could until is forced her to sign in. We made the assumption that the user would go to the circulation desk first before signing</td>
</tr>
</tbody>
</table>
From the main page she noticed that there was no indication of where account information would be located. She figured it could be under general information or under the circulation desk. She guessed circulation desk which was correct. From this point she was able to proceed through and make the updates. She then navigated back to the main screen before completing the second part of task one, signing up for a Word class. She was able to navigate and find the class and sign up without any help and felt that it was pretty easy. She liked the fact that the conformation was printed right away for her to take but, she would have liked the option of having it emailed to her instead.

**Design Issues and Recommendations**

After completing task one the tester had some other comments and observations about the kiosk. First there was no indication that the user was logged in or not on the main screen, and second most importantly there was no log out button. This was a major design oversight. The third observation was that there is no password associated with the library card. This means that if someone drops their card and another patron finds it they will have access to some of the user's personal information. Although there is no financial information like credit card numbers they would have access to that persons email, address, and phone numbers. So, they recommended that the next iteration would include a password to access this information.

**Task #2**

Locate and reserve a book

**Participant Actions**

At this point I informed the tester that they should assume that they are logged in for the rest of the tests and the kiosk knows who they are. The second task required them to locate and reserve a book. This task could be performed in multiple ways, which is a good thing system wise, but hard to act out when you're doing it by paper. To find a book and reserve it can be done through the catalog or through the circulation desk. I made the assumption that she would go through the catalog and since it was not specific about how she would do it she went through the circulation desk to reservations and reserve catalog items. Besides the initial confusion of which way to go she did not have any other issues completing this task, it was just me fumbling with the papers to catch up. She ended up using the browse method to find a book to reserve.

After the task was completed and her reservation was confirmed the system forced her to go back to the homepage instead of letting her go back to the list that she brought up. She made the comment that what if she wanted to reserve more than one book.
<table>
<thead>
<tr>
<th><strong>Design Issues and Recommendations</strong></th>
<th>She would have to go through all the tasks again which would be inconvenient.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design Issues and Recommendations</strong></td>
<td>Some of the same issue were prevalent during this task such as not knowing if they were logged in or not. There are also some usability issues in the design such as where the user wants to go after they have reserved a book. We made the assumption that they were done but, we might want to build in more options of places they might want to navigate to.</td>
</tr>
<tr>
<td><strong>Task #3</strong></td>
<td>Verify the library's hours, then check-out Slaughterhouse Five (which you already physically have) and reserve a computer to do research</td>
</tr>
<tr>
<td><strong>Participant Actions</strong></td>
<td>Going through task three the tester started again from the main screen. They were able to navigate and find the hours without any issue. They thought at this point it took them too many button pushes to get back to the main screen (2). It forced them to go to the general information screen before they could go back to the main menu. The next part was to check out a book, I informed her that she was physically hold two books that she wanted to checkout. She was able to navigate to the checkout button pretty easily but was initially confused about the scanning portion. But after looking at the screen for a few second realized that she was just supposed to scan the books. I think this is due to the fact that we are using a low-fi prototype and that if this was an actual system there would have been no problem. She was able to check out the books with no problem and liked the fact that she had the option of choosing her conformation method, email, text, or printing. One thing she did notice was that there was no way to get from the circulation desk back to the main menu. This was just a small oversight on our part and we just need to add a main menu button on this screen. When completing the last part of this task, reserving a computer, she liked the layout of the screen and found that it was easy to do. She did not realize that she could choose different times on the computer reservation but, that again I think is due to the fact that this is a low fidelity paper prototype and that it would not have happened with the actual system.</td>
</tr>
<tr>
<td><strong>Design Issues and Recommendations</strong></td>
<td>She recommended that there should be some consistency on the buttons to get back and forth between the screens. But, she did like the layout of the reservation screen.</td>
</tr>
</tbody>
</table>

**Overall Comments about the System**

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35
One of the things that she would have liked to see would be the ability to navigate to each one of the four major sections of the system (Circulation desk, catalog, general information, and events) from any part of the system instead of being forced back to the main menus each time. This would make the navigation process much easier. In general the system was easy to use and she thought that it was easy to get around. She mentioned that there should be more consistent wording in some of the sections and that she liked the "request a librarian" feature that is present on all the pages. She did reiterate that there should be a way to log out of the system. It was not really clear to her if there was a way to log in and see what classes she was signed up for, which is something that could be added to the account status page pretty easily. The last recommendation would be to have all of the conformation screens be consistent in how they are displayed and how the conformations are generated, text, printout, or email.
Task 1: Update your contact information. Once completed, find and signup for the “Microsoft Word” class event.

When starting to use the terminal, the tester read the instruction at the top to swipe their library card, which would give them a personalized experience. Once doing this, the tester then saw a button appear next to his name with “Account Information”. Upon clicking this button, the tester was brought to an “Account Management” screen, which asked to scan their library card again to continue. The tester found this rather inconvenient, and also noted the terminology is not consistent. When “scanning” their card, they then proceeded to tab “Update Contact Information” which brought them to a screen where they could update their information. This page was rather helpful, and the tester had no problem updating their information. Once complete, they tapped “Done” which then notified them that their update was complete.

After tapping “Main Menu”, the tester tapped the “Events” button, tapped the “Classes” button, and found the “Intro to Microsoft Word” class. Clicking the “Register!” button gave them a confirmation that they have been signed in.

Feedback and Questions

1) Why isn’t the terminology consistent?
2) Upon registering for a class, how would cone cancel if they hit “Register!” by mistake? Why is there no warning that they clicked this?
3) Once I registered for an event... what do I do to “close” the system out? Do I just leave that screen on? How do I log out of my account as my library ID was logged in?

**Task 2:** Locate and reserve a book.

Starting from the main screen, the tester was not sure whether to tap “Catalog” or “Circulation Desk” to reserve a book. As the sub title to the “Circulation Desk” ultimately says reservations, the tester wondered why there was also a catalog button and thought perhaps these should be combined. After tapping on “Reservations” and then “Reserve Catalog Items”, the tester was brought to the Catalog. Tapping on “Recommendations”, the tester found the book “An alright book!” and tapped reserve, which brought them to the “Reservation Confirmed!” page.

*Feedback and Questions*

1) Upon reserving an item, I was kind of “hanging” on what to do next.
2) Why were there so many steps to reserve an item through the Circulation desk when I could have just clicked on the “Catalog”?
3) I never swiped me card... how was I able to reserve an item?

**Task 3:** Verify the library’s hours. Once completed, check out the book “Slaughter-house Five”.

The tester started out on the main screen by tapping on “General Information” to find the hours. Tapping “Hours”, the tester found the hours and took note. The tester proceeded to go back to the main screen. The tester “left” the catalog to go find Slaughter-House Five. Once they returned, the tester went to the “Circulation Desk” and tapped “Check-Out Books”. The tester “scanned” the book, and it appeared on the screen. Following this, the tester tapped “Check-Out” which prompted for an email receipt or a text receipt. The tester didn’t want either of these, and didn’t know how to say “No” as the only option was to “Send!” The tester wasn’t sure what to do next, so simply gave up.

*Feedback and Questions*

1) The tester didn’t think of looking up where Slaughter-House Five was on the kiosk and simply decided to find it as they thought that was easier.
2) The tester next logged in with their library card.
3) Why do I have to have a receipt sent digitally? I want a paper one to keep with my book.
The paper prototype user testing for the library kiosk was conducted with a 25 year old female. I briefly introduced the library kiosk project and explained the paper prototype testing procedures.

Prior to starting the testing, lack of main screen was realized and had to work around with an improvised hand-drawn main screen.

<table>
<thead>
<tr>
<th>Task #1</th>
<th>Update contact information, then find and sign-up for an event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant Actions</td>
<td>The user accessed the General Information button, but was confused since there was no link or button to update personal information on the main general information screen. After a few seconds, she noticed the Account Information button on the header and clicked on that button. This brought her to the Update Contact Information page after scanning the library card and was able to update the information without further issues. Back from the main screen, user clicked on Events and navigated to Classes page where a list of available classes was displayed. She clicked Register next to Intro to Microsoft Word and it sent her to the confirmation page with Receipt already printed.</td>
</tr>
</tbody>
</table>
### Design Issues and Recommendations

Account Management should be a button on the general information page or have a separate Account Management button on the main screen of the kiosk.

I noticed that there are no cancellation options for registering for an event. If I accidentally clicked on any of the Register button from the previous list, I will be automatically registered without an option to cancel that registration.

### Task #2

**Locate and reserve a book**

**Participant Actions**

From the event confirmation page, the user had to go back to Events page, and then to the Main kiosk page. She mentioned a Home button on every page would be easy to go back to the beginning. From the main page, she clicked on Catalog which took her to Search, Browse by Category, and Recommendations. She clicked on Search and typed to search for a specific book. She was not sure what the Find button was for, since she already searched and found the results. Upon clicking the icon, she realized it was directions and a map to get to the location of the book. She said that was an interesting idea and would be very useful in real life. However, once she was at this page, the only return button was to the main catalog page. This means the user would have to re-enter the search terms to get back to the results page. Once she got back to the results, she was able to successfully reserve the book. Although there was a confirmation page, it did not provide further details on next steps. Will there be some notification when the book is available? There was not a page to check the status of the reservations. To get back to the main screen, she chose to click on the home button and made a statement that the headers were not consistent across the screens since some had the home button and some didn't.

**Design Issues and Recommendations**

Rename or add further description on the Find icon under the search results page. Make consistent header buttons so all pages have the Home button. We need to add further instructions regarding next steps after a book is reserved.

### Task #3

**Verify the library's hours, then check-out Slaughter-house Five (which you already physically have) and reserve a computer to do research**

**Participant Actions**

To verify library's hours, the user clicked on general information from the main screen. The clicked on Hours and found the information. She clicked back on the general information button and got back to the main screen. To check out a book she clicked on Circulation Desk and Check-out Books. She also noticed that there was a button there for Account Status and stated she would not have expected to see that function under the circulation desk. She continued to check out a book and successfully completed the process. However again, there was no navigational buttons to get back to
the main screen once she emailed a receipt. To reserve a computer, she navigated back to the circulation desk and clicked on Reservations. Then to Reserve Computer or Tables. She had a hard time figuring out the layout map and the legends and how to select a computer. After few minutes of confusion, she selected one of the blocks marked as C. Then continued to selecting duration and received the confirmation. The confirmation only stated that a computer was reserved, but did not specify which one or where.

| Design Issues and Recommendations | Consider placing Account Status function under the Account Management page. Add navigational buttons for confirmation pages or include consistent headers as previously recommended. For reserving library resources, it would be good to separate out tables and computers to separate subsections to avoid confusion. Also providing on screen instructions on how to select a Computer or Table will assist the users. |
Appendix C – Individual Academic Honesty Statements

I certify that:
This paper/project/exam is entirely my own work.
I have not quoted the words of any other person from a printed source or a website without indicating what has been quoted and providing an appropriate citation.
I have not submitted this paper / project to satisfy the requirements of any other course.
Signature: John Lancaster
Date 6/9/2012

I certify that:
This paper/project/exam is entirely my own work.
I have not quoted the words of any other person from a printed source or a website without indicating what has been quoted and providing an appropriate citation.
I have not submitted this paper / project to satisfy the requirements of any other course.
Signature: Andrew Mulhern
Date 6/9/2012

I certify that:
This paper/project/exam is entirely my own work.
I have not quoted the words of any other person from a printed source or a website without indicating what has been quoted and providing an appropriate citation.
I have not submitted this paper / project to satisfy the requirements of any other course.
Signature: Benjamin Toll
Date 6/9/2012

I certify that:
This paper/project/exam is entirely my own work.
I have not quoted the words of any other person from a printed source or a website without indicating what has been quoted and providing an appropriate citation.
I have not submitted this paper / project to satisfy the requirements of any other course.
Signature: Saji Varghese
Date 6/9/2012