



Libraries in the Modern Age:

A Usability Test of the Mid-Continent Public Library Mobile App

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Abstract

The purpose of this report is to present the findings of the usability test of the Mid-Continent Public Library myMCPL app. Testing has been done to analyze the subject's ease of use of the app and compare the results with the subject's recent experience in a physical library. The following document outlines the methodology and findings of the study and presents several recommendations for improvement.

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Introduction

There is no doubt that public library use in today's society is rapidly declining. While the public library was once a vital resource for anyone conducting any scholarly research or simply desiring to learn more, modern equivalents such as websites, blogs, and mobile reference apps have taken over this once vital role. According to a Pew Foundation study, only 48% of Americans visited a public library during 2013 (the most recent publicly available study). This is down 5% from 2012 attendance (Zickuhr, Rainie, Purcell, & Duggan, 2013). It is without a doubt that library attendance is declining. Similarly, only 30% of those 16 and older visited a public library website or mobile app. Although this number is small, it is up 5% from 2012 (Zickuhr, Rainie, Purcell, & Duggan, 2013). This represents the massive shift libraries are seeing to a more technology-focused approach to their services.

As libraries move forward into the modern era, they must adapt and embrace changes in society and how society views technology. The public library is no longer merely a warehouse of vast stacks of books; it is now a resource for modern technology. This is the aim that many libraries are taking. Public computers, computer literacy classes, and online references are the way of the future. The Mid-Continent Public Library is moving to embrace these methods.

A project that is constantly under improvement is Mid-Continent Public Library's app. It allows users to access all the features of a traditional library at the convenience of their smartphone. This analysis serves to evaluate the usability and success of the library's efforts to embrace this technology. The results outlined below can help guide the library's app future development efforts.

The main purpose of the test was to compare the library experience within the myMCPL app to that of a standard, in-person library visit. Within this regard, the majority of users tested experienced positive results. The following report will confirm these results by first touching on the methodology of the study, followed by specific findings and analysis. Additionally, a few recommendations as to improvements will be included. Chiefly among these are changes to the arrangement of the book info page and specific improvements to both the camera/scanner and search interfaces.

Methodology

The testing procedures and methodology was designed to test a wide range of user cases and test subject backgrounds. As such, all aspects of the test were constructed to account for differences in user's bias and experience levels. This results in a wide data set that, when objectively analyzed, provides a detailed and comprehensive analysis of the myMCPL app.

Participants

The study examined the findings of 6 subjects, each of which was given an individual trial. Using approximately 5 trials has been proven to reveal most usability problems and using more subjects is merely redundant (Nielsen, 2012). It is worth noting that because the pilot test found no necessary improvements, it has been included in the resulting data sets to gather a larger sample size. The complete list of test subjects 1-5, along with the pilot tester can be found in Appendix F.

Before the test, each subject completed the screening questionnaire, which may be found in Appendix G. The screening questionnaire served to identify distinguishing traits about the user that would affect results. For the purposes of this test, a wide range of test subjects were chosen and this is evidenced in the screening questionnaire results. Ms. Cole, for example, had little experience using a smartphone.

Test Environment

Testing took place during the month of November, 2015. A complete timeline of the study can be found in Appendix D. The location of each test varied, but each was a consistently quiet environment. In general, tests took place in a quiet room in either the author's own residence or the subject's residence, at their convenience.

Pre/Post-Test

Prior to performing the usability test, the subject was asked to fill out a pre-test to evaluate their bias. Questions regarding the frequency of use and familiarity with library resources were asked. This helped to normalize users who may be more familiar with certain library systems and have a perceived easier experience using the app. A sample pre-test questionnaire may be found in Appendix I.

Next users were asked to recall their most recent library experience. They were then asked to fill out one post-test questionnaire with regard to their most recent physical library experience as best they remembered it. The questionnaire asked them to rank the ease of use of basic library tasks and overall feelings about the experience. A free response section was also provided for additional comments. A sample post-test questionnaire may be found in Appendix I.

Once the testing is completed, the user was asked to once again fill out the post-test questionnaire, that time regarding their experiences performing the same library tasks within the myMCPL app.

Test Procedure

For each test scenario, the subject was first read the rules and guidelines of the test. This can be found in Appendix C. Once ready, they were provided with the same Android smartphone with the myMCPL app preinstalled. In each case, the test was conducted on the Android platform, although there is an identical version of the app available for IOS. (Links to both apps can be found in Appendix A)

The subject was then be asked to complete a series of tasks within the app. The full task list can be found in Appendix B. In brief, each subject was asked to search the catalog for a book and provide details about its catalog entry, perform an inquiry as to basic library account information, scan a book with the app's *Booklook* feature, and register for an upcoming library program.

These features were chosen for as they serve to exemplify what the myMCPL app has to offer. For example, searching the catalog, and accessing account information is the bare minimum functionality one would expect from an automated library system. However, the ability of the *Booklook* feature to scan any book and instantly locate inside or outside of the library system was a feature that is unknown to many users. Additionally, access to library community education programs is something that most users are unfamiliar with. As such, these features were included in the test tasks.

Results

Upon completion of the testing, a comprehensive analysis of the collected data was performed. The following figures detail some of the most meaningful values from the test results. Both quantitative data figures and qualitative observations were considered.

Charts & Graphs

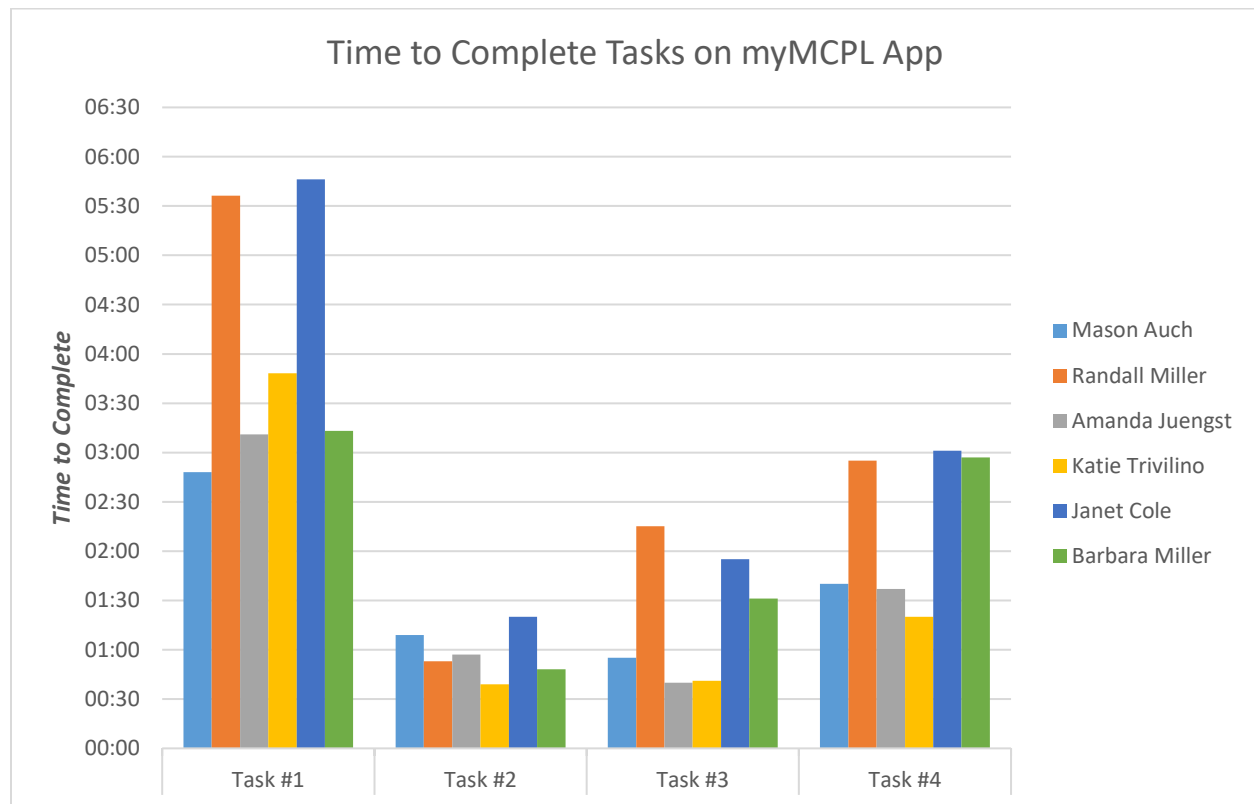


Figure 1: The recording of each test session was examined and the start and finish times of each task were marked. The difference was calculated for each subject and the results were graphed. As seen below, the results are fairly consistent for each task. Although Mr. Randall Miller and Ms. Janet Cole are slight outliers for each task, they remain consistently so throughout the task list.

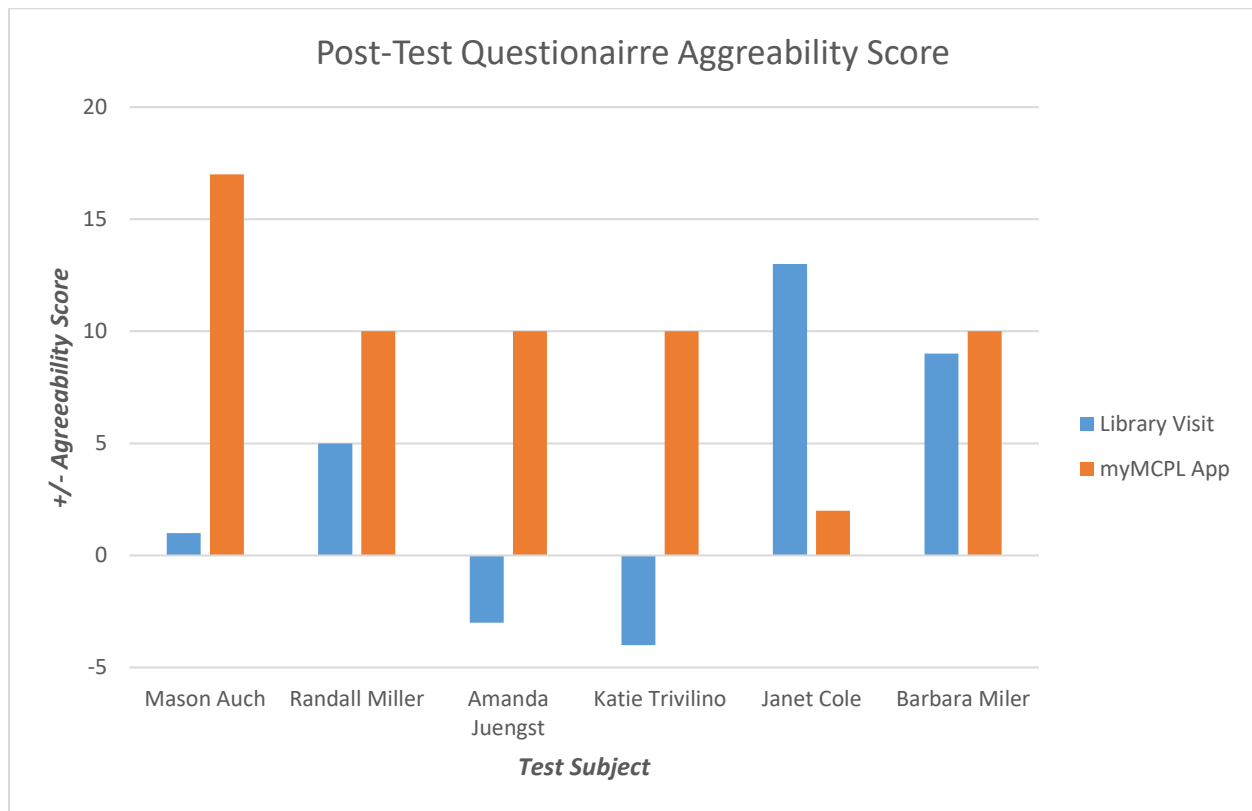


Figure 2: The Post-Test questionnaires of each participant were compiled and used to compute an average agreeability score based upon the number and strength of agree/disagree responses. The questionnaire from the users' recalled library visit was directly compared to the same questionnaire from performing library tasks on the myMCPL app. With the exception of Ms. Cole, who was not a native smartphone user, agreeability ratings went up after each test.

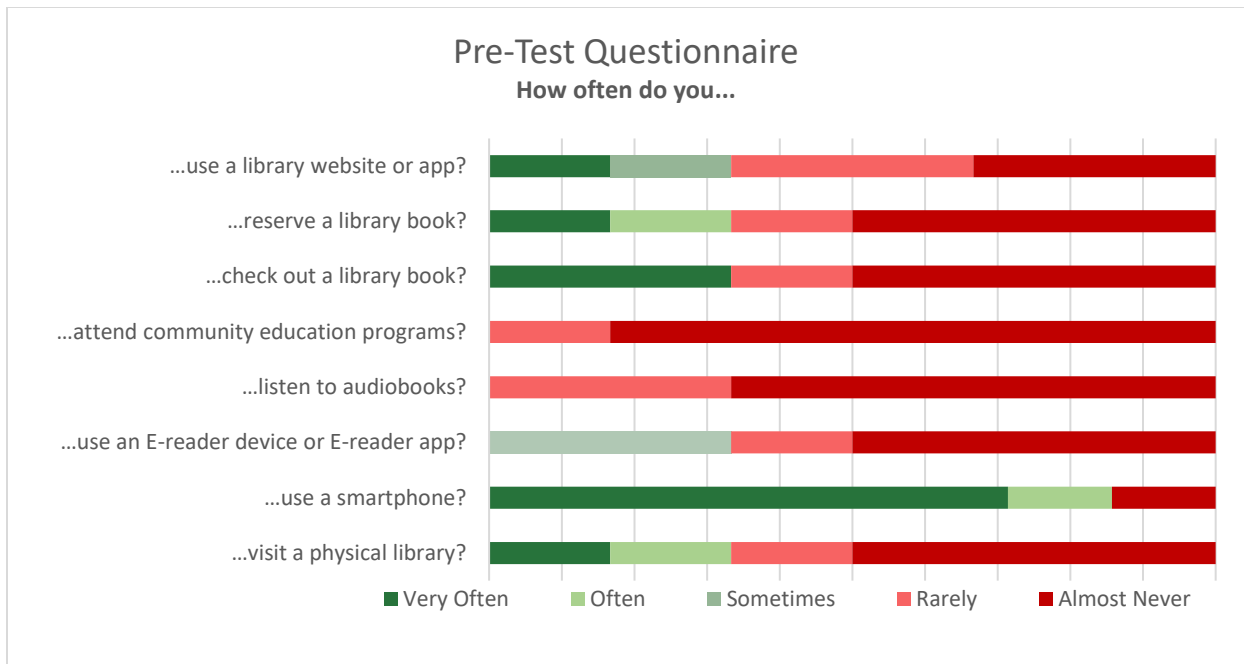


Figure 3: The Pre-Test questionnaires were aggregated and responses were broken down by question. A general consensus for each question is indicated by the color bias of the bar. Actions often taken appear more green and actions less often taken appear more red. It can be observed that in general, users were infrequent library-goers, but common users of smartphones.

Qualitative Observations

A common issue with the myMCPL app is slow loading times when opening pages and navigating through the various menus. However, it was observed that very few users found fault with this. Several users commented that it just seemed to be a slow Wi-Fi connection or issues with the phones itself, or even that they were used to all apps being about this speed.

A point of difficulty for many users was searching for catalog information regarding the requested book. Many subjects reported themselves as infrequent library-goers and were understandably unfamiliar with library cataloging systems. As such, when asked to read off the book's shelf location, they were unsure what to look for and often stumbled around the book information page guessing at information. While on that same page and asked to complete a hold, several subjects attempted to select the catalog entry at a particular branch rather than scroll up to the top to place the book on hold.

Many users struggled when asked to use the *BookLook* feature. They seemed confused by the camera interface and often took a significant amount of time attempting to locate the book's barcode in the camera viewfinder. Additionally, every single user attempted to find a "take picture" button once the barcode was located, then was surprised when the phone scanned the barcode on its own. However, each user expressed satisfaction at this feature and several mentioned that it was a feature they had not expected from this app.

Navigation within the app seemed to confuse many users. Although there is a home button in most screens, almost all users preferred to use the phone's integrated back button instead. There is also a link to search the catalog from some menus. This confused a few users who mistook it for a search feature within the current menu.

Finally, the programs page was confusing for all users. Each one hesitated when asked to locate program only at one branch. Only after some experimentation did each subject discover that the search box queries the branch location also. One user was unable to figure this out and unable to complete this portion of the test without explicit help.

Analysis

Overall, these results appear promising. As observed in Figure 2, agreeability when compared to physical library visits went up after nearly every use of the app. This is to be expected per the theory and objectives set forth in the introduction of this report. Technology is indeed taking a much more prevalent role in the modern library's existence.

The task times in Figure 1 are surprisingly consistent and point to a well-usable app. The fact that such consistent results can be obtained from such a wide customer base points to the pre-existing success of the app and sets forth the need for additional refinement to further perfect the condition of the myMCPL app.

It is also worth taking note of the Pre-Test scores in Figure 3. A fairly diverse customer base was sampled and very few of the reported being users who frequently used library resources, even merely to check out a book. This is clearly evidence of a changing library customer base. The increased prevalence of technology is clearly manifested in users' reports of significant use of smartphones. Even the use of E-Reader devices/apps ranks higher than visits to physical libraries.

Accordingly, a case worth particular note is that of Ms. Cole. Ms. Cole is a frequent library-goer, as evidenced in her Pre-Test questionnaire, but an infrequent smartphone user. While it was not without difficulty, she was able to accomplish all the tasks asked of her on the smartphone and seemed pleased with the experience. Even though her agreeability score went down, the fact that she still completed the test in decent time speaks volumes for the usability of this app. Penetrating the customer base of non-native smartphone users is a vital step to gaining acceptance and increased usability for the MCPL library system's technology initiatives.

Somewhat unsurprisingly, the lowest and most consistent times were obtained by Ms. Juengst, Ms. Trivilino, and Mr. Auch. All three reported themselves as college students in the Screening Questionnaire and named themselves frequent users of smartphones. As such, they are efficient and familiar with the device, leading to overall fast completion times, both in the test and in actions in general. These three subjects represent a common, but not unimportant demographic within the subset of library users.

Recommendations

The following is a prioritized list of prepared recommendations for improvement based on the findings of this study. Implementation of these specific changes along with retaining the mentality discussed throughout this report will help aid further development of the myMCPL app in a way that increases its usability and appeal to a wide customer base.

1. Clean up the catalog results page. Many users were confused here and didn't know what to look for or where to find this information. Because a key target of this app is to reach out to infrequent library-goers, the app should accommodate those who are unfamiliar with library cataloging systems. **Clearly mark the book's shelf location.**



Figure 4: Catalog entry for "Jurassic Park"

- Clarify the *Request / place on hold* option. Many users tried to select the branch shelf location to place it on hold instead. This is a natural tendency and need to be accounted for. **Make the branch shelf location a clickable button to place that item on hold.**

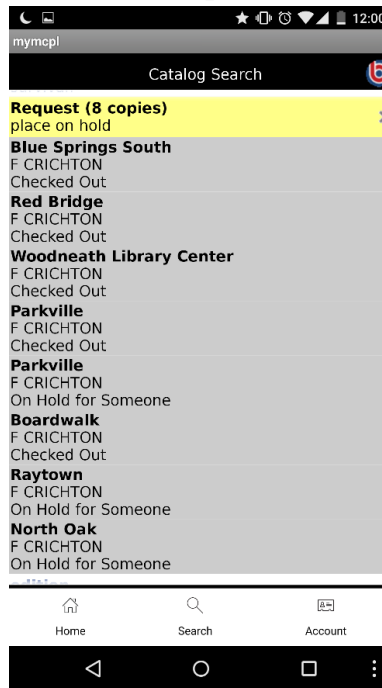


Figure 5: Shelf locations list for "Juassic Park"

- Remove the camera background when using the barcode scanner within *BookLook*. This is an attractive feature that really shows off the capabilities of the app, but it is marred by decreased usability with this background blocking its view. **Expand the scanner camera window to cover the whole screen and remove the background image.**



Figure 6: "BookLook" camera scanning a book's barcode

4. Clarify the search option within the calendar. Having a search bar is beneficial in that it allows users to search for topical events. However, there is no clear way to search within a particular branch. **Add a separate search field or option to specify a branch within the *Library Events* list.**



Figure 7: List of upcoming library events and programs

Qualifications

The author of this study is a highly qualified individual who was employed as a library page in the Mid-Continent library system for three years. A library page's duties include shelving and retrieving books as well as providing customer assistance during their duties on the library floor. As such, interactions with library patrons are a common occurrence. The author has years of experience familiarizing themselves with the nature of typical library patrons. The author's full resume may be found in Appendix D.

References

- Nielsen, J. (2012, June 4). *How Many Test Users in a Usability Study?* Retrieved from Nielsen Norman Group: <http://www.nngroup.com/articles/how-many-test-users/>
- Zickuhr, K., Rainie, L., Purcell, K., & Duggan, M. (2013, December 11). *How Americans Value Public Libraries in Their Communities*. Retrieved from Pew Internet: <http://libraries.pewinternet.org/2013/12/11/section-1-an-overview-of-americans-public-library-use/>

Appendices

Appendix A: Download Links

Google Play Store (for Android devices)

<https://play.google.com/store/apps/details?id=com.bredir.boopsie.mymcpl&hl=en>

Apple App Store (for IOS devices)

<https://itunes.apple.com/us/app/mid-continent-public-library/id507169738?mt=8>

Appendix B: Full Task List**Task 1**

- Open up the “myMCPL” app on the provided phone.
- Search the catalog for the provide book. For this test we will be using _____.
 - Jurassic Park by Michael Crichton
 - The Girl with the Dragon Tattoo by Stieg Larsson
 - Artemis Fowl: The Eternity Code by Eoin Colfer
 - Gone Girl by Gillian Flynn
 - The Da Vinci Code by Dan Brown
 - Ender’s Game by Orson Scott Card
 - A Game of Thrones by George R. R. Martin
- Is this book available in audiobook format? eBook? Any other formats?
- Where would you find this book in the library? (i.e. what is its shelf location?)
- Is this book available at a library near you? You live closest to the Riverside branch.
- Place a hold on this book. Choose to pick it up at any of the branches that you live close to.
(Facilitator will stop this task before user is allowed to complete the hold)

Task 2

- Navigate to the “My Account” page
- Determine what items are currently checked out and on hold
- Determine what the current fine is

Task 3

- Navigate to the “BookLook” feature
- Scan the barcode of a nearby book. (If the user does not have a book handy, the textbook “Technical Communication” by Mike Markel will be used)
- Is this book available in the MCPL system?

Task 4

- View upcoming Library events and programs
- Search for all events at your nearest branch. (Riverside branch)
- Find a more detailed description of the program.
- Register for the program. (Facilitator will stop this task before user fills out any actual registration information)

Appendix C: Facilitator Script

You are about to participate in a usability test of the Mid-Continent Public Library myMCPL App. The purpose of this test is to evaluate the usefulness and effectiveness of this resource as an alternative to traditional library systems, which would normally require one to visit a library in person. When completing these tasks, please keep in mind not only the usefulness of the app in and of itself, but also the effectiveness of it when compared to visiting a library in person.

You have already been asked to complete a screening questionnaire and a pre-test questionnaire. Before we begin the test, you will also be asked to complete a post-test questionnaire, keeping in mind how you would response after your most recent visit to a physical library. This may be if you have checked out books from the library on campus or in Rolla, or the most recent time you visited a library in your hometown. With this in mind, please take a minute to fill out the first post-test questionnaire now. Once you have completed the usability test, you will again be asked to fill out the post-test questionnaire, then regarding your experiences with the myMCPL app.

We will now begin the usability test. Remember, we are testing the app, not you. You cannot fail this test. I will give you tasks to complete and you will attempt to perform the tasks to the best of your abilities. If you get stuck or off-track, I may give you gentle guidance. Please also try to voice your thoughts and opinions out loud as you perform the tasks. This will later help in the evaluation of the app. Should you need to take a break, just let me know at any time and we can pause the test. If you are ready, we will now begin the test.

We have now completed the scripted portion of this usability test. If there are any other features you wish to explore, you are free to do so. If you have any comments about the overall experience of the app, now would be a good time to voice your opinion. Otherwise, you will now be asked to complete the post-test questionnaire once again, this time relative to your experiences with the MCPL app. Please assume, the phrase “my library” refers specifically to the app and its usability.

Appendix D: Timeline

<u>Task</u>	<u>Week</u>							
	10/12- 10/16	10/19- 10/23	10/26- 10/30	11/2- 11/6	11/9- 11/13	11/16- 11/20	11/23- 11/27	11/30- 12/4
Prepare Proposal								
Finalize Testing Procedure								
Perform Subject Testing								
Analyze Results								
Prepare Final Report								

Appendix E: Test Subject List

Number		Name	
	Pilot	Mason	Auch
1		Randall	Miller
2		Amanda	Juengst
3		Katie	Trivilino
4		Janet	Cole
5		Barbara	Miller

Appendix F: Author Resume**Stuart A Miller**<https://www.linkedin.com/pub/stuart-miller/b1/265/153>School Address

107 E 6th St, Box 7
 Rolla, MO 65401
 sm67c@mst.edu

Home Address

6110 NW Karen Rd.
 Kansas City, MO 64151
 (816)785-4105

Objective	To obtain a summer 2016 internship in the Computer Engineering field.		
Education	Missouri University of Science and Technology (Missouri S&T) B.S. Computer Engineering	May 2017 GPA: 3.9/4.0	
Experience	Missouri S&T I.T. Department Senior Student Technician, I.T. Help Desk	Rolla, MO Oct. '14 – Present	
	<ul style="list-style-type: none"> • Guide customers in solving computer issues in person and over the phone • Investigate computer related problems, determine the cause, and implement a solution or coordinate with the appropriate department to resolve the issue. • Operate and manage the 3D printers available to faculty and students • Repair laptops as a Dell-Certified technician 		
	Boeing Corporation IT Intern, Business Systems Data Warehouse & Analytics	St. Louis, MO May '15 – Aug. '15	
	<ul style="list-style-type: none"> • Worked closely with offshore resources to manage the transition of finance web portal code from Adobe Coldfusion to ASP .NET • Provided analysis on existing PL/SQL Queries and database structure • Used Tableau analysis software to create data visualizations 		
	Mid-Continent Public Library Library Page	Riverside, MO Mar. '12 – Aug. '14	
	<ul style="list-style-type: none"> • Guided customers in basic computer usage • Assisted customers in finding and checking out books • Worked in an organized, detail-oriented environment 		
Skills	C++ Programming HTML/CSS/JavaScript MySQL / PL/SQL	Embedded C Programming Assembly Language Programming Breadboard/Circuit Experience	Computer/Laptop Repair 3D Printing/3D Modeling 8051 Microprocessor Family
Honors & Activities	Chancellor's Scholarship Missouri Higher Education Scholarship (Bright Flight) James C. Grimm Electrical Engineering Scholarship Tau Beta Pi – National Engineering Honor Society Kappa Kappa Psi - National Honorary Band Fraternity		

Appendix G: Subject Criteria/Screening Questionnaire**Screening Questionnaire***Mid-Continent Public Library App Usability Test*

Name: _____

Participant #: _____

Please rate respond to the following statements to the best of your ability.

	Yes	Unsure	No
1. I am a college student.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I have been to a physical library before.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I recall my most recent experience at this library and can compare it with experiences in this test.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I conceptually understand how to use basic library systems. (check out books, reserve books, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I know my way around a traditional smartphone interface.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I am willing to dedicate some of my time, not to exceed 30 minutes, to complete this test.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix H: Pre-Test Questionnaire**Pre-Test Questionnaire***Mid-Continent Public Library App Usability Test*

Name: _____

Participant #: _____

Please answer the following questions to the best of your ability. The purpose of this is not to test your knowledge, but to determine any experimental bias.

<u>How frequently do you...</u>	Very Often	Often	Sometimes	Rarely	Almost Never
1. ...visit a physical library?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. ...use a smartphone?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. ...use an E-reader device or E-reader app?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. ...listen to audiobooks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. ...attend community education programs put on by a library?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. ...check out a library book?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. ...reserve a library book?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. ...use a library website or app?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix I: Post-Test Questionnaire**Post-Test Questionnaire***Mid-Continent Public Library App Usability Test*

Name: _____

Participant #: _____

Please circle: Library Mobile App

Please rate the following on whether you agree or disagree with the statement. Assume the phrase "my library" is referring to either your most recent physical library experience or your experiences with the Mid-Continent Public Library Mobile App.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I had no trouble finding the book I was looking for.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I am able to locate ANY book in the library quickly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Books are easy to find at my library.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. It is easy to determine at what other libraries the book I'm looking for is available.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Viewing my account information such as fines and holds is easy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I am aware of the community education programs my library has to offer.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Registering for a community education program at my library is easy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I accomplished my tasks at the library quickly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I am pleased with my overall library experience.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Using the library is convenient and timely for me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please provide an additional comments or concerns you may have with the mobile library app:

Appendix J: Consent Form**User Consent Form***Mid-Continent Public Library App Usability Test*

Name: _____

Participant #: _____

Please read the following carefully and sign below.

I hereby agree to complete this usability test of the Mid-Continent Public Library Mobile Library App. By participating, I will be helping the Mid-Continent Public Library System improve their use of modern library technology. I understand that this test will involve written and audible observations and that I will be asked to fill out several questionnaires during the completion of this test.

If I have any questions or concerns about the test, I know that I may stop or pause the test at any time and ask for a break or request clarification on a task. I may withdraw at any time during the performance of the testing tasks.

Audio Recording

I give consent for the test administrator to perform an audio recording of my completion of the testing tasks. I understand that this recording will be used solely for the purposes of evaluation the app and will not be shared with anyone outside this test.

Personal Information

I understand that my full name will be disclosed in reports stemming from this usability test. The report will refer to me by my first and last name.

Signature: _____

Date: _____