ABSTRACT

MOBILE TECHNOLOGY AND CIVIC ENGAGEMENT: HEURISTICS AND PRACTICES FOR DEVELOPING MOBILE APPLICATIONS FOR SOCIAL AND CIVIC CHANGE

by Kathleen M. Coffey

Many different non-profit organizations, companies, government groups, and individual developers have built hundreds of mobile applications aimed at improving environmental issues in communities, helping people change their actions and behaviors towards the environment, or raising awareness regarding environmental concerns. Applications supporting the environment are just some in a larger category of applications built to serve social and civic change. Although these applications are developed and designed with the best of intentions, oftentimes the standard usability practices and heuristics used to develop these applications do not accommodate the complexities surrounding applications for social and civic change. Therefore, this thesis uses qualitative research practices, interviews with developers and mobile action research with users, to build new research practices and heuristics for those developing user-focused mobile applications for social and civic change.
MOBILE TECHNOLOGIES AND CIVIC ENGAGEMENT: HEURISTICS AND PRACTICES FOR DEVELOPING MOBILE APPLICATIONS FOR SOCIAL AND CIVIC CHANGE

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Dedication

I want to dedicate this to my parents. As you’ve done my entire life, thank you for listening to me and encouraging me. Your love and support has meant the world to me.
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Chapter 1: Mobile Application Technologies and Civic Engagement

“A lot of the hard work today is not just about commercializing so we can rent a movie or so we can hold up our phone and see what music is being played at a bar [We will drive applications] to more and more meaningful parts of our lives...Things like energy...We can’t really rearrange the grid that easily...but you can build a shared layer on top of it through behavior and through the right contextual information that can shift the way we use those resources...We’re now trying to collect out of the periphery—a much richer set of what’s going on in the world—so we can learn as a society and optimize and evolve the right systems and services.”

—Robert Fabricant, 2012, Connecting

Scene 1:
Interested in healthy eating and finding food that is locally-sourced, a woman takes time before she plans her day to search through the Green Map application that shows her a map of the many farmers markets, local produce stores, and restaurants committed to local foods in her area before deciding upon a place to get food. She wants to know the people who grow her food. She wants to meet other people who are invested in her interests as well.

Scene 2:
Parents concerned with living a natural lifestyle for their whole family take the time to research cleaning products, food, and more using the GoodGuide application, which could give them information on the products they typically buy, along with the products they’re considering purchasing. While making purchases in their favorite stores, these parents use a scanning feature on the application to scan specific items for information on the product, as well as the company that makes the product.

Scene 3:
While taking the bus on his way home from work, a man checks on the amount of water he’s been consuming and conserving on his cell phone using the H2O Tracker application. Checking in on his water usage has become a habit he enjoys on his way home. When he gets home, he reflects upon the changes he can make in his typical uses of water in order to conserve water more effectively.
Developers and users have started to build and use mobile application technologies as a way to support social and civic change, and many of these applications allow users to directly engage issues that concern them in their own communities, as expressed in the scenes above. Because these technologies are being continually developed by organizations, companies, and concerned citizens, my concerns are specifically how do we design for civic engagement? What concepts and principles are useful for designing mobile, digital spaces for those attempting to make changes within their communities? How is engagement with civic issues in applications different from other digital spaces, such as websites? How should our usability heuristics expand and change given application technologies and environmental sustainability intentions? Digital interactivity is a concept that has prompted scholars to reinvent how they define and approach public rhetoric and engagement in and out of the composition classroom (Porter, 2009; Simmons & Zoetewey, 2012; Wysocki, 2001). Furthermore, what it means to interact with audiences has changed with the inclusion of tactics feasible through digital spaces and media, such as remote communication and wide-scale interactions, interactions with content, ideas, and other users that extend beyond local contexts. Mobile technologies and software—smart phones, tablets, and mobile applications—have continued to change the scope of how people can interact with media, other people, products, and ideas. Around 2008, many different kinds of developers—marketers, advertisers, non-profit organizations, scientists, government organizations, and more—began to invest in and build mobile technologies that could make people aware of and change their behavior towards larger social and civic concerns. Just a few of the mobile applications for social and civic good the United Nations foundation (2008) has examined have goals of connecting medical support to those in remote and impoverished locations, monitoring wildlife health in areas of risk, and facilitating food donations to those in need in Iraqi refugee camps (Kinkade, p. 4). These are just several of hundreds of different mobile applications that have been developed to support the health and wellbeing of people and the environment in specific communities. What I’ve found is that while many of the applications available now are built with the best of intentions, but have in ways followed models of commercial applications that may not be useful for the goals of making change within communities.
Introduction

If I am being completely honest, I became interested in considering mobile applications and interactive media as a whole in relation to civic engagement for entirely selfish purposes. I have worked for both non-profit organizations and market research agencies. In my time working as a grant writer at a non-profit, I could delve into my specific social concerns, which tend to revolve around environmental and conservation efforts. Fast forward a couple of years, and I was working at a market research agency. And in my time as a jack-of-all-trades at a market research agency (I think my title was actually a ‘social media strategist,’ but I often did a little bit of everything), I worked on many different projects, but the ones that piqued my interest were those that related to mobile and digital technologies. Although most, if not all, of the work I did during my market research days was for commercial purposes, I have yet to lose my passion for social and civic considerations.

All of my experiences working with community members to serve their needs in relation to some issue in the community—water usage, green spaces in the city, etc—were never mediated by mobile technologies, by mobile technologies I mean cell phones and tablets broadly. At that time, mobile applications did not, and still do not in many regards, work to resolve or change these complex, contextual, and locally specific issues that many of us, myself included, find ourselves concerned. Even though mobile applications—those that are invested in making some kind of social or civic change in a community—have not always been entirely useful for the people who want to use them, mobile application technology still has the potential to make change within communities. And many applications do have beneficial affordances: many applications succeed in terms of providing specific services, yet generally fall short in several key areas: distribution, direct human-to-human interaction, and informative details. For instance, many applications for civic engagement identify environmental concerns—chemical waste dumps, toxic sites, or vulnerable areas in regards to resource use—but focus less on getting users connected with one another, giving them information on how to change these problems, or prompting specific, contextual change within communities. As someone thoroughly encouraged by the benefits of mobile technology, yet frustrated in my attempts to find technology that suited
my needs, I began research in civic engagement and mobile technology, which quickly led me to examine different mobile applications\(^1\) that could serve to help or change social and civic issues.

Even though much of app technology is used for commercial purposes, within the last several years, in fact, there has been an outgrowth of mobile apps that serve more than commercial purposes: apps that specifically aim to inform users about specific social issues. Applications such as WWF Together, GoodGuide, Green Map, CreekWatch, SmallSteps, H2O Tracker,\(^2\) and others are just several of hundreds that allow for users to interact with information, products, other users, and businesses in visual, textual, and tactile ways for the support of social and civic issues, like environmental and natural conservation efforts. The organizations and companies developing, coding, and promoting these mobile apps are in many cases non-profit organizations, although other companies are involved in developing and producing these applications as well. Even though different organizations are promoting these applications, many of them have similar goals and motivations for tapping into mobile technologies.

While this examination of mobile technologies and civic engagement was initially born from a lack of fruitful and productive technologies that I was familiar with, it has really turned from that initial thought to a series of questions:

1) What can mobile application technologies afford communities hoping to make social changes? Why and when are mobile technologies useful for civic engagement?
2) How are some companies and organizations currently attending to users’ needs and concerns regarding social and civic issues through mobile technologies?
3) What do users want out of mobile application technologies that engage social and civic issues?
4) What heuristics/concepts would be useful in designing mobile applications for social change and civic engagement? What do you users want from mobile technologies?

\(^1\) I focused specifically on cell phone application technology and less so on tablet application or even web application technologies and software—these were referenced in different chapters but were not my major research sites—and these different platforms, too, shape the ways in which we use and understand information. Therefore, these applications may require different heuristics and testing methods.

\(^2\) The applications listed here are some of several of hundreds of mobile apps currently developed and promoted through Android and Apple mobile app stores/marketplaces. One resource that users and consumers have to find these applications (beyond the applications stores) is the EPA’s My Green Apps site (http://www.epa.gov/greenapps/). This website is one that I used to find many of the applications referenced in this piece. You’ll find that this website promotes just a cross-section of the mobile apps that exist currently that reference social and civic issues. Some of these applications were created by non-profits and some by for profit organizations. Therefore, some civic engagement applications have commercial goals, although not all.
In asking these questions, I’m calling that as compositionists, as technical communicators, and as users and designers of mobile technologies, that we can more critically consider the role mobile technologies have in the ways we think about, react to, and engage with social and civic issues—ultimately how these technologies shift and shape our literacies. I’m calling for ways to build better evaluative methods for testing when and why mobile technologies may (or may not) be useful in a given context. Lastly, these questions necessitate us to consider how mobile application technologies require new heuristics for design and development, the phases that technologies go through before they are made available to users.

Part of the impetus for my call is tied to my own experience with using standard usability methods for researching and testing applications. Prior to starting the study for this project—interviews with developers and mobile action research\(^3\) with users—I did conduct more traditional usability testing of a series of applications for social and civic change regarding the environment for one of the usability courses (ENG 514 Usability and User Experience) I took as part of a usability and user experience concentration at Miami University (for more information regarding this largely standard usability testing, refer to the appendix). This course required me to use traditional usability concepts and heuristics at the onset of the course to make sure that the applications I tested were functional and functioning in the ways they were intended, but what I found was that these standard methods of testing in usability did not provide thorough details as to the experiences users wanted to have with the applications. In other words, the standard testing allowed me to know when an error popped up on a screen or when someone found an application confusing—which is incredibly important—but not how the application could be more useful for the users’ lives. Specifically, the earlier testing I conducted was a heuristic evaluation and traditional usability testing:

- **Evaluation Heuristic:** I developed a heuristic analysis, which is standard in usability testing, to examine the various strengths and weaknesses of the applications in multiple key areas, including major categories such as presentation, participation, engagement, and malleability. This point-based heuristic system was employed first in the study because it provides a foundation for identifying potential problem areas in the application to be further analyzed in the proceeding usability tests. Typical evaluation heuristics,

\(^3\) Mobile action research practices are described in more detail in chapters 4 and 5.
including my own, test for concepts such as navigation, mapping, readability, learnability, and others, which are concepts made standard by scholars, such as Bruce Tognazzini (2014) and Jakob Nielsen (1995).

- **Usability Testing:** I conducted usability tests with a specific set of users to identify experiences using the applications. I asked participants in the study to join because of their familiarity with or frequent use of mobile applications. While it was not a requirement to join this early standard testing, participants were interested in environmental issues in some capacity.\(^4\) During these tests, I asked users to accomplished a series of tasks with the applications, while asking throughout the test what they were thinking as they accomplished the tasks, such as trying to find a specific page or bit of information on the application.

While users were generally able to use the applications and understood what the applications were meant to accomplish, they were less able to quickly understand the usefulness of the applications. More traditional usability qualities were typically met in the applications (navigation, visibility, mapping, consistency, etc), which is what is typically tested for in standard usability testing. Through this early testing, I found that standard usability methods—looking for ease of use in relation to concepts like navigation, readability, mapping, and others—did not allow me to efficiently, accurately, or thoroughly document users’ motivations and goals for using mobile applications for civic engagement. The early evaluation heuristic and usability tests showed that the applications I examined in this project met traditional usability principles: they were easy to read, easy to figure out, and generally easy to use, but because environmental issues associated with these applications are intimately tied to users’ lives and local contexts and communities, I found that to improve upon the design of these applications, developers must go beyond testing for standard usability principles. This finding led me to develop the main methods of this study: interviews with application developers and usability research with users.

**Civic Engagement and Mobile Technology**

These socially and civic-minded applications discussed briefly already are tied to ways in

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\(^4\) As discussed in chapter 4, for the mobile action research I conducted, I did ask in my recruiting email that participants be interested in social and civic issues the applications I tested engaged. However in this earlier standard usability testing, it was not a requirement (even though all the participants ended up having some interest in the specific social and civic issues the applications engaged).
which we define civic engagement. For the purposes of this project, I am using Thomas Ehrlich’s (2000) conception of civic engagement: “civic engagement means working to make a difference in the civic life of our communities and developing the combination of knowledge, skills, values and motivation to make that difference. It means promoting the quality of life in a community, through both political and non-political processes” (p. vi). And what I find useful about Ehrlich’s definition of civic engagement is that it is both focused on communities and the skills, knowledge, and motivations required to contribute to shifting change not within individuals but larger communities. Richard P. Adler and Judy Goggin (2005) quote David Crowley’s work on civic engagement who also emphasizes the importance of action in relation to building community change: “Civic engagement describes how an active citizen participates in the life of the community in order to help shape its future. Ultimately, civic engagement has to include the dimensions of social change” (p. 239, my emphasis). Although the term has been broadly defined as, at the very least, citizens acting upon governments, I find that definition reductive of the kind of real work that goes into making significant changes within community spaces (Adler & Goggin, p. 241). As Adler and Goggin quote of Michael Della Carpini:

Civic engagement is individual and collective actions designed to identify and address issues of public concern. Civic engagement can take many forms, from individual voluntarism to organizational involvement to electoral participation. It can include efforts to directly address an issue, work with others in a community to solve a problem, or interact with the institutions of representative democracy. Civic engagement encompasses a range of specific activities such working in a soup kitchen, serving on a neighborhood association, writing a letter to an elected official or voting. (pp. 239-240)

What I find valuable in these definitions is that civic action is a collaborative process that emphasizes the need for other kinds of literacies. To attempt to make wider changes within communities, these scholars argue that civic engagement cannot and should not always be defined by the individual choices that people make within their lives, but towards the actions that people can make together to meet a specific goal in mind. In order to start to accomplish these communal goals, these scholars are aware that community members need knowledge of a network of literacies: community members need to know the kinds of technologies that might serve them best and how to use them appropriately and effectively, community members need to know how to (potentially) make policy changes within their communities, and need to have a
working knowledge of the many non-political actions and information required to make a change within a larger community. The reason why I find the concept of civic engagement important in relation to mobile applications is because applications I’ve researched and discussed here typically focus on the individual choices people can make within their own lives, rather than building networks of information and support to make change. And community support is necessary because many of these issues of concern—emphasizing water conservation, supporting locally sourced foods, or identifying environmental and social issues in a community—cannot be influenced by individual actions alone. These issues are very contextually specific and localized issues that require communities to engage in them to make the changes that people want to see.

**Mobile Technologies**

Before discussing the specifics of the study, I want to briefly focus on a couple of questions: why study applications in the first place, and how are mobile applications different from web applications? Mobile application technology, particularly technology associated with cell phones and tablets, is certainly different from less mobile forms of technology found on laptops, desktops, and the like. And it is the ability to move this kind of technology quickly from place to place—the defining feature—that deserves more attention in our field, particularly because that feature is shifting the ways in which people not only use this technology, but engage with other people, content, and ideas. Mobile technologies are shifting our literacy practices and therefore important for our close examination, especially as these literacies relate to how we can better develop and design these technologies for engaging communities in social change. Mobile technologies are not only different from other digital technologies in regards to literacy practices, like the computer or the laptop, it is different, too, in the ways in which we define space, the ways in which we consider the concept metaphorically, and all of these elements inform and change our literacy practices with these technologies.

Mobile technologies have become notable research sites in contemporary scholarly work: “The functionality is startling enough itself [cell phones], but what really makes it revolutionary is that it is networked. If camera phones just allowed us to take pictures of our children, they wouldn’t be much different from Instamatics” (Spinuzzi, 2009, p. 256). Clay Spinuzzi nods to the citizen journalists that have cropped up since wireless technology has become more widespread due to cell phones, “give any citizen the ability to instantly and cheaply publish […]
pictures where they can be accessed by anyone with an Internet connection, and you get some startling shifts [in regards to journalism]” (p. 256). Spinuzzi primarily references changes in journalists’ dynamics due to wireless technologies, but the implications for the development of civic and social mobile applications are clear: the functionality of mobile and wireless technology not only allow for documentation and observation, but also allow for fast sharing of particularly kairotic issues.

Not only has mobile technology become a research site in many different fields, scholars have pointed to the importance of mobile technologies, cell phones, tablets, and the like, as distinct from laptops and desktops. Byron Hawk and David Rieder (2008) call this process a “de-centering of McLuhan’s human centered model,” meaning that ‘miniature’ technologies, like cell phones, break the concept that technology is an extension of humans and human functionality (p. xi). Instead, they argue that “Small tech […]including software, hardware, and cell phone technology] extends power to include the fragment, the individual, the corporation, and the network;” so mobile and wireless technologies are, arguably, not an extension of human capacity, but rather an extension into human and non-human elements and networks (p. xi). This kind of affordance of mobile technology is a huge one, but, they caution, “Power isn’t simply displaced into the system but is distributed across the system at all levels of scale […] Power in the era of the small tech is increasingly available, but it is also increasingly uneven” (p. xi). Hawk and Rieder point to many of the issues other scholars grapple with in regards to technologies: issues of power as they relate to access. Therefore, even though many people increasingly have access to cell phones, smart phones, and wireless capacities for uploading and sharing their work, not everyone does, and not everyone has access in the same ways. Essentially, this should remind scholars invested in mobile technologies that while there are incredible benefits of the technology, there are still many potential gaps and issues resulting from people having different levels of access and power in relation to these technologies, which is something to be keenly concerned with as we continue to research, invest in, and support mobile technologies.

Additionally, mobile technology, cell phones in particular, have been described as different from laptops in reference to our emotional responses to cell phones. Robert F. Potter (2011) comments on how people view mobile technologies as different from laptop technologies: "'You have a more personal connection with your mobile device than you will with a website
[...] One benefit of the mobile app is that you go, you get it and you download the app -- it's now yours. It may be a deeper level of interactivity” (Indiana University, para. 4). According to Potter and other scholars, mobile applications potentially inhabit a deeper level of interactivity because there is a level of ownership attached to applications. Potter argues that because people perceive ownership of a cell phone in a different way from a computer—his research points to the personal elements attached to the mobile phone—there is the potential for a deeper connection to cell phones and the services they provide (Indiana University, para. 4).

Although many scholars and I have acknowledged the benefits mobile technologies afford, the concept of wireless has taken on problematic roles, and many of the same issues embedded in the wireless are tied to mobile technologies. Much of what scholars like Amy Kimme Hea (2009), Melinda Turnley (2009), Nicole Brown (2009) and others pose is that the metaphors attached to wireless technologies—the ways we talk about them and then use them in the classroom, campuses, and elsewhere—mask issues of access. Wireless is often understood as being able to solve all kinds of problems in the classroom and education system as a whole. Additionally, Turnley explains that the metaphors we use concerning wireless technologies extend to city infrastructures and beyond as well. The issues of wireless extend beyond campus walls: “Creating wireless networks often is more cost effective than laying additional land lines for phone and internet access. […] Utopic framings of limitless ‘anytime, anywhere’ education, however, problematically assume that technology […] equates with all kinds of access” (p. 88).

Turnley and Kimme Hea put much of their focus on issues of access in regards to student populations and marginalized public groups, yet not only are people made less visible under ‘champion’ language associated with wireless technology. Mobile technology can fall prey to very similar kinds of language. The fact that everyone has these technologies is simply not true. Additionally, the education and promotion of these materials is often an uphill battle. Companies start with the idea, rather than focusing on what the user needs. Application development has become very much systems-oriented, diminishing the value of the technology itself. Applications are often treated like business cards. You’re expected to have one, so everyone has one, whether they need it or not.
Importance of Mobile Technologies

In their most basic sense, most mobile application technologies work to streamline information, content, activities, and services that would otherwise be available on a website or as software on a computer. Many of the earliest mobile applications focused on supplying cell phone users mostly with messaging and emailing services—the applications were very much a way to implement software typically found on a networked computer. Quickly, applications came to connect users to users, people to entertainment—games, music, pictures, etc—along with important services. Many businesses have capitalized on the efficiency, ease, and mobility that mobile applications afford. Perhaps the epitome of this kind of orientation towards mobile applications is the example of the mobile banking application. Many, if not all, of national banks currently have mobile applications for nearly the sole affordance of allowing people easy access to banking services. In an effort to make their services accessible to people on the go: traditional banking services, services that we’d typically access in brick and mortar buildings, have become mobile, the traditional infrastructure less necessary when using a mobile application. The phrase “on the go” is quite common in reference to mobile technology.

The phrase “on the go” combined with mobile applications has nearly six million hits on Google. It’s the trademark feature of mobile technology. And while it makes sense in some contexts that this kind of affordance would be useful for businesses, it can also be uniquely useful among different technologies for civic and social changes in communities as well. Although the idea of “on the go” technology is certainly useful, it also hides the real advantages of mobile technologies in relation to civic and social goals. “On the go” emphasizes the anytime and anywhere attitude towards mobile technologies in particular, which has its own set of problems attached to it regarding access. This phrase also obscures the affordance that mobile technology not only allows people to engage with issues outside of their homes or places of work (where they’d more regularly use a laptop or tablet), but it also shapes peoples’ behavior in the moment. These specific actions that happen as people invest or engage in patterns of behavior and thought regarding social and civic issues are not made more valuable when people can engage them anywhere or everywhere, but because people interested can continue to engage and commit to change as they’re thinking or acting through this behavior. Because of this focus on more commercial models of mobile applications and lack of attention to the complexities of affordances in regards to mobile technologies, the real affordances of mobile technology have
been overwhelmingly lost in applications that could use these affordances to their fullest potential.

For instance, two of the organizations researched and examined in this project, Green Map and GoodGuide, organizations focused on helping people find sustainability-supporting locations and build sustainable and ethical purchasing habits respectively, have both mobile applications and websites\(^5\) that appear to do very similar things, yet enact civic and social change in very different ways. Although the websites and mobile applications may be functionally similar, GoodGuide’s website allows you to access the same database of food and product ratings that the application does and Green Map’s website allows for users to access similar mapping technologies as the application itself, the difference in how people access the information—on the website or on the application—makes all the difference in how users conceptualize the information, use the information, and use the digital spaces as a whole.

\(^5\) Green Map specifically has a web application embedded in the website that acts similarly to the mobile application. (http://www.greenmap.org/) and (http://www.goodguide.com/)

Figure 1. GoodGuide website rating example: The figure on the left is an example of the ratings that can be found on the GoodGuide website, [http://www.goodguide.com/](http://www.goodguide.com/).

Figure 2. GoodGuide mobile application rating example: The figure on the right is an example of the ratings system on the mobile application.

In their website forms, both the Green Map and GoodGuide systems most heavily emphasize their research functionalities. What I mean by their research functionalities is the following:
GoodGuide and Green Map provide users with predominantly information services, the locations of green sites, and the health, social, and environmental impact of products. Both services allow users to research sites and products before engaging further with the sites or products by either attending or visiting said sites (green restaurants, parks, etc) or buying said products. The websites provide the same information on the sites, services, and products as the applications, but as websites they lose the capacity to shift behavior in the moment. On laptops or desktops, using these websites, users can no longer seek out information when they need it, nor can they use the information provided in the specific moments of decision: when they are considering purchasing a product or visiting a particular site. Mobile technology allows people to engage with content and ideas when they need it and in the moment of what I call necessary use. In regards to social and civic issues in communities, I find it vital that we put emphasis on necessary because it invokes that people are using their mobile devices and technologies in ways to support, engage, and motivate their commitment to social and civic concerns. From commercial perspectives, developers are most concerned with getting users to do what the developers want with the application itself; whereas, when we are considering applications for social and civic change, the dynamic must shift from what should be done or accomplished with technologies to what networks of information, content, ideas, people, and resources users need to solve or discuss or shape social and civic concerns. Ideally, this process should be a combination of user needs and desires and developer needs and desires; developers may not be able to attend to all needs and desires. By using more accommodating heuristics, it is my hope that developers will be able to incorporate a higher level of responsiveness to user needs within the development process, rather than relying mostly on incorporating user feedback in regards to ease of use after an application has already been developed.

Methods and Sites of Research

Central to this project are the goals of determining the current interfaces and core structure of the applications, along with the major emotions and experiences that users have while using the applications. In order to enhance the development, design, and use of these applications, such as the ones described previously, I relied on interviewing and usability

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6 Although many non-profit and for profit organizations and companies strive for this ideal, the reality is often that these companies and organizations, particularly the for-profit ones, may have commercial goals in mind for the applications.
research as the main methods of data collection in this project. The methods are described in more detail in their respective chapters, but to give you a preview here, I chose to incorporate interviews of developers of the applications I tested—Green Map, GoodGuide, and H2O Tracker—for the purpose of defining the goals and motivations of the developers in reference to the applications. What goals did this have for their mobile apps? Why use mobile technology to enact some kind of change in relation to the issue they found in their local community, whether it was water conservation or product consumption? I knew I needed the voices of the actual developers throughout this project in order to more accurately define what the mobile applications did, whom they targeted, and what the major goals were regarding the apps. The interviews were conducted over the phone or over Skype and typically lasted around 30 minutes to 45 minutes, wherein I asked each developer a series of questions that encouraged them to explain mobile technology’s role in their larger goals for their companies and organizations, along with their specific goals for the applications.

Additionally, I conducted usability research with nine users that met the general demographics of each of the applications. These 30 minute interviews were focused on encouraging participants to describe their specific, current uses of mobile technology and mobile applications: how did participants use these technologies in their lives currently? The usability research also focused on considering the experiences and scenarios that participants currently find themselves when using mobile applications, along with the ways in which they might use the applications in question. The research was conducted largely to understand the experiences, emotions, and conceptions participants had regarding mobile technologies. What can we learn from users’ prior experiences with mobile technologies, even applications that may not be oriented towards civic engagement? What kinds of experiences do users want to see in applications geared towards civic engagement in order to find civic and social applications valuable and productive? All of the mobile applications, and their respective companies and organizations that developed them, I chose to study dealt with social and civic issues of concern in specific reference to the environment: sustainability, sustainable and ethical purchasing, and water conservation, which are just a few of the many different kinds of issues that civic engagement applications hope to support or change. These applications were those that would allow me to examine what application technologies afford communities hoping to make social
changes, along with why and when are mobile technologies useful for civic engagement, based on both developer and user perspectives.

*Green Map*

*Figures 3 and 4. Green Map mobile application pages A and B:* The images above are examples of screen pages found in the Green Map mobile application. The image on the left appears whenever the application is open for a short window of time before the image on the right, the homepage of the application, appears.

The developers of the Green Map system have a long history of developing mapping technologies that were made in an effort to encourage people to use green resources and sites in their local communities (or wherever they are visiting). Their application invites users to build maps of ‘green sites’ (companies, places, etc) in their communities. Green Map users also have the option to view a blog run by Green Map to see specific uses of the Green Map systems around the world. I tested this application for many reasons: the applications works to engage specific communities, which I found unique among civic engagement applications, it also functionally engages GPS features in cell phones—GPS applications being one of the most popular downloaded applications—and the application was also developed by a non-profit organization, which represents a significant portion of developers of applications for civic engagement.
**GoodGuide**

*Figures 5 and 6. GoodGuide mobile application pages A and B:* The images above are examples of screen pages found in the GoodGuide mobile application.

GoodGuide is a company focused on building a system for rating products that help users and consumers buy products that are better for the environment in many ways. Their application is meant to provide information to consumers interested in buying products that are environmentally friendly in some capacity, whether that is through the ingredients/chemicals used in a product or even the environmental policies to which the company adheres. The application works by using a scanning tool through their phone, which pulls up database information for the consumer/user to read. I decided to include GoodGuide in my research because it is one of the most successful mobile applications aimed at civic and social action, reaching approximately 1 million users a month (B. Pease, personal communication, April 16, 2014). Additionally, a large portion of the application is dedicated to aiding users in making decisions in purchasing situations; therefore, I knew it would be an important application to test in reference to the kinds of actions users might want to complete when considering a social or civic issue.
In combination with the utilities company, Aurora Water, Halperin Creative, LLC constructed a mobile application, H2O tracker, to support water conservation in consumers of water in Aurora, Colorado. Frani Halperin of Halperin Creation, LLC, an advertising agency, who worked with Aurora Water Utilities Company to distribute the application, created the idea for the application. I decided to test this application because it was developed by an advertising agency: advertising agencies, marketing agencies, and product development agencies often develop mobile applications for other organizations. Overall, each of these applications was created in reaction to larger environmental concerns in context-specific areas.

In order to consider my research questions closely and provide developers, designers, and teachers of product and technology development insights into these matters, the project

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7 1) What can mobile application technologies afford communities hoping to make social changes? Why and when are mobile technologies useful for civic engagement? 2) How are some companies and organizations currently attending to users’ needs and concerns regarding social and civic issues through mobile technologies? 3) What do users want out of mobile application technologies that engage social and civic issues? 4) What heuristics/concepts would be useful in designing mobile applications for social change and civic engagement? What do you users want from mobile technologies?
works in this **first** chapter to highlight the unique affordances, properties, and literacies connected to mobile technology, while emphasizing its importance in civic and social change.

The **second** chapter considers the kinds of interaction afforded in mobile technologies and applications, along with the kinds of interactions for which standard usability test typically test. Pulling from theory and work from Human-Computer Interaction (HCI), User Experience (UX), rhetoric, composition studies, along with technical communication studies, the second chapter forwards how each field uses usability testing. Additionally, this second chapter examines how power dynamics associated with users and designers continues to inform how we design and develop technologies, such as the specific mobile technologies discussed in this project: Green Map, Good Guide, and H2O Tracker, and very much puts attention to the ways traditional usability concepts, while important, can be limiting for mobile technology development.

The **third** chapter focus strictly on what developers have explained their motivations and goals are of the aforementioned mobile applications, along with my own arguments about how those goals are being brought forth in successful and less successful ways within the applications. By examining interviews with the developers of Green Map, Good Guide, and H2O Tracker, this chapter gives a perspective of what developers seek to do with their mobile applications while considering their successes in these endeavors.

The **fourth** chapter details mobile action research, a hybrid approach to modifying standard usability testing practices in order to more thoroughly understand users wants out of mobile applications. This chapter highlights the major desires, needs, and wants of users with mobile technologies and civic engagement. This chapter emphasizes the major findings of these interviews, which allowed me to develop a more accurate heuristic in the final chapter.

The **fifth** and final chapter first summarizes the major findings from the entire project, emphasizing why these findings are important for usability research and how they can influence future methods of technology development and research, particularly when developers are attempting to build technologies to promote civic engagement. This chapter concludes with descriptions of heuristics and practices that are useful for designing mobile technologies that aim to shape or change behavior in regards to civic and social issues. Developers are encouraged to afford access to information, emphasize experience and emotion, create digital connections,
make features malleable, and build specific and significant actions, while using mobile action usability practices to support user-centered research.
Chapter 2: Interactivity, Usefulness, and Usability Testing

Mobile technologies, and other digital technologies, are rapidly changing the ways in which we communicate and interact with other people, ideas, information, and media. Interactivity as a concept in technology development and design is really at the heart of what technologies do and how we interact with and through them. In other words, the kinds of interactions that developers incorporate into technologies influence much of the functionality and eventual use of technologies. Although these technologies and many newer ones are currently being used and developed to allow people to interact and communicate in new and useful ways, there are and will continually be flaws in the technologies developed in regards to the ways in which they’re used and implemented. In this development process, principles and heuristics from Human-Computer Interaction (HCI) and User Experience (UX) studies are typically considered, putting emphasis on issues of navigation, mapping, content, and language. While standard usability principles for designing technologies are definitely useful and necessary in the development process, in this chapter I argue for the inclusion of other principles when considering designing technologies for civic engagement. I start with an overview of what interactivity looks like in mobile technologies, along with how the functionality of mobile applications can be useful for civic engagement. I follow the section on interactivity with a focus on the standard research and practices developers and designers use to build interactions in digital technologies, and consider the ways in which these practices do not address important components of mobile technologies for social change. I end this chapter with a call for the extension of these principles to develop and design more useful technologies for the highly contextual issues that technologies can be used to assist, change, discuss, or shift.

Interactivity as Useful for Mobile Technologies and Civic Engagement

Interactivity, as related to HCI studies is generally described as “a trend towards elaborating, designing and establishing more human-oriented, natural and intelligent forms of interaction, progressively addressing the needs and requirements of a wider, less experienced and more naive user basis” (Stephanidis, 2012, p. 1374); a “face to face conversation” mediated by a digital space or a computer (McMillan, 2006 p. 163). Sally McMillan (2006) argues that the
foundations of interactivity are as follows: “user-to-user, user-to-documents and user-to-systems,” and it is through auditory, visual, and tactile functions that apps can enable these types of interactivity (p. 166). Dag Svanæs (2000) disrupts the definition in order to not focus on what interactivity is, but how it can be experienced (p. 9). Overall, HCI studies emphasize naturalizing interactions between users and computers or smart phones and tablets in an effort to make interaction with others users, content, data, actions, and ideas more comfortable and human-like, or more natural. However, not all HCI studies scholars or designers agree that naturalizing is actually the appropriate terminology or that naturalizing is actually what is happening when

![Figure 9. World wildlife fund application:](image)

In a series of interviews with prominent interaction designers, Helen Walters explains that, “what we will see at some point is for someone to take the medium and do something that’s appropriate […] and enhances the experience” [my emphasis] (Kruzeniski et al., 2012). Walters implies that digital spaces must be considered differently from traditional print spaces. Figures 9 and 10, conceptualize what Walters means in regards to both interactivity as experience and digital interactivity as something different from print interactivity. The World Wildlife Fund Together application is a contained source of information and interaction with digital media that could only be possible on a tablet or smart phone given the application functions almost strictly through touch-screen technology. This application is set firmly in the realm of digital media, yet even with the vast array of information it contains and naturalized interactions/experiences it allows for, it does not live up the expectations of allowing for civic engagement in concrete ways. And this is entirely why I find the concept of interactivity especially enlightening when considering how best to design for civic engagement: putting focus on interactivity puts focus on the specific (naturalized or not) actions that can and should allow for when users wants to make social or civic change.
The *WWF Together* application for tablets is a self-described interactive application with the purpose of educating audiences (likely this application is aimed at younger children, based on the more simplistic activities the application asks users to accomplish, along with word choice, etc). Regardless of the audience of this application, the purpose of this piece is clear: educate users on endangered animals and their shrinking habitats. This particular app is banking on the fact that users will connect the information they’re learning with the goal to save the endangered animals pictured in the application. By simply viewing the [demo video](#) or playing around with the application, it is clear that this “eBook” is highly interactive in the ways interactivity is predominantly defined in HCI. With the ability to move specific elements around, which directly relate to the information given, this application is connecting cognitive understanding with natural, tactile movements. For instance, the fact that this application runs on movements with fingers rather than buttons is just one example of how this particular application is creating a more natural experience with the information of this app. And yet, even though this application not only contains a plethora of information, naturalized movements, and highly interactive play, it fails to provide users strategies for actually *doing anything* about conserving the habits of these endangered animals. It is not putting users *in* interaction with one another, and is relying on passion and interest to encourage social change. So, by looking at the *kinds of interactions* a technology affords, we can more accurately determine if they are the kinds of interactions users want, if they will be productive and valuable for users engaging issues, and if they will be interactions that allow users to engage in, what I touched upon in chapter 1 and will explicate more here, *necessary use* of mobile technologies. Lev Manovich (2001) points to the distinctions between these different forms of interactivity: interactivity as physical, tangible movements associated with making a

*Figure 10. World wildlife fund application information page:* The image above shows an example of one of the many information pages regarding endangered animal species found in the tablet application.
computer work—the clicking, highlighting, or touching—is not the important part of interactivity (p. 57). Manovich explains that, instead, **interactivity is more accurately defined when considered from a psychological angle, that interactivity is related to the fact that interactive media requires that users re-shape thoughts, ideas, and processes when engaging with media** (p. 61). It is this definition of interactivity that I find useful as a lens for analyzing mobile technologies for civic engagement.

Some definitions of interactivity are vested in top-down, designer-oriented approaches to technology design. Other scholars describe interactivity in different measures. William Verplank (2008), the scholar to coin the term ‘interaction design’, defines interactivity in a series of three steps: interactivity describes how users do something, feel about something, and know something in reference to an interface the user is manipulating or using. He explains:

How do you do: how do you affect the world? And I think a simple choice there is handles and buttons. So, I can deal with the world by pushing buttons or grab a hold of the world and manipulate it […] How do you know? […] As we design interactions with computers in them, it’s very difficult for the users of those products to know exactly what they’re going to do. […] So, those are the three basic things that happen in an interaction: a human, a person, we’re designing for does something, and we provide affordances. As designers, we design the way the machine gives feedback. Finally, it’s the question of what kind of knowledge can we expect from our users. Can we design good maps for them to hold in their heads? (Verplank, 2008)

Verplank implies that there is an inherent challenge in interaction design, specifically because it is based on the assumed expectations of others. For example, he mentions, “it’s a question of what kind of knowledge can we expect,” and implied in that is that designers are often judging their designs based on their own frameworks: on expectations on the designers’ part. It is this very definition of interactivity, often forwarded within the HCI field, which puts designers in the place of power in the designer-user dynamic, that may be aided by a rhetorical perspective so applications can be used effectively outside of commercial purposes (2008). As Svanaes (2001) notes, “Up until recently, there has been little focus on the “psychology” of context-aware systems (i.e., the way in which such systems are experienced by their users)” (p. 397).

Verplank’s conception of interactivity revolves around the relationship between the user, designer, and the medium. The designer must have some clue as to what to provide to the user,
or audience, in order for the application to actually succeed. Verplank’s discussion of interactivity breaks down interactions and interactivity in three main actions that users can have—doing, feeling, and knowing—rather than focusing explicitly on naturalized interactions or only the functionality or features that developers may want to input into a technology or application. But what Verplank’s definition of interactivity is missing—one that forwards a top-down approach to knowledge generation in that designers create experiences for users—is that users, designers, and anyone else in situation must be able to co-produce knowledge.

James E. Porter’s (2009) description of interactivity goes beyond Verplank’s in ways beneficial for defining interactivity in terms of civic engagement. Porter’s definition emphasizes users’ interactions not only with interfaces but also explicitly with other users. Porter describes interactivity on a continuum from least interactive to the most interactive: the concepts associated with the least interactive are access and accessibility, followed quickly by usability, and the most is co-production (p. 217). What I find most useful in Porter’s description of interactivity is that his definition relies on human-to-human interaction, whereas HCI definitions do not always emphasize that factor but rather focus on naturalization of interactions. Porter continues with, “I consider the term ‘interaction’ as a rhetorical topic pertaining (a) to how humans engage computer interfaces in order to perform various actions […] Thus, rhetorically, the writer needs to consider what kinds of designs will enable and encourage the kinds of audience interactions desired. Defining interactivity in terms of potential for audience involvement can help us imagine a broader range of human interactions with machines, systems, interfaces, and with other humans” (p. 217). And Porter confirms that much of what web 1.0 has done is to focus on access and usability, and it wasn’t until web 2.0 that HCI studies, etc began to focus on the potential for human-to-human interaction and the interfaces needed to support those kinds of interactions. Porter argues that web 1.0 focused more on “wow”ing users, which only allowed audiences to “consume or collect” information but didn’t allow for them “to do very much” (p. 217). As Porter, Verplank, and other scholars argue, interactivity as it is defined by web 2.0 is defined by the user. The definitions of interactivity that put the user at the forefront are those that focus less on naturalizing and more so on the actions that users want to make with technologies, which is especially important to technologies and applications focuses on civic engagement: users want to be able to actively engage with social and civic issues in ways that
allow them to feel as if they are making significant and actual change through whatever technology they’re using.

*Figure 11. Green Map website example*: The image above shows an example of the mapping features found on the Green Map website.
Figures 12-14. Green Map mobile application mapping features A, B, and C: The images above show examples of some of the different features on the mobile application, including the homepage, blog information, and a map legend.

As mentioned earlier, necessary use in mobile technology is defined by allowing people to engage with content and ideas when they need it, in the moment of need. For instance, take the example of Green Map into consideration, referenced in figures 11-14. Now, as I mentioned in the previous chapter, often mobile applications have a website version, and in fact this was why I wanted to incorporate these applications into the study. On the surface it would appear that the mobile application is the same as in the web version, that they have very similar features and functionality. For example, the Green Map website allows you to pull up functional maps of specific countries, states, and regions, where users have created and input data to find green locations in a specific area. If I input my own address, I should get some information on sustainable or environmentally sound locations, be they schools, parks, restaurants, or other spaces, in both the mobile application and the web application. If I described the kinds of interactions made available through the website, I could explain that the website allows users to interact with notions of sustainability by actively inputting data to create their own map or their own contribution to larger maps. Additionally, users can engage with visual representations of

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8 As mentioned in more detail in the third chapter, the Green Map mobile application is currently glitching on the main page when the application attempts to fetch GPS data, making information retrieval a bit difficult at the moment. When I started research on this project, the application worked, so much of my explanation refers to the research I started before the application broke.
places, in order to visually see the maps that they’ve created and the sustainable locations that the user and others have input. While the functionality is very similar on the mobile application, you can, too, create maps and input your own data. You can also research locations and businesses and organizations that are in a specific area that have been labeled by Green Map systems as ‘green’ or sustainable.

So, from a functionality perspective, the application does very much the same things as the website, but functionality does not exactly give a thorough perspective on the ways in which users interact with the ideas of sustainability, the information of locations, and the visual-nature of seeing maps in the website as in the mobile application. But if we also take interactivity into consideration, the specific complexities and distinctions of mobile technologies can be pursued. In other words, what I’ve found by focusing on interactivity is that the affordances provided by mobile application technology are not often highlighted in civic engagement applications. And these unique affordances provided by mobile technologies are not being developed and implemented because standard development and usability practices do not test for these factors.

Interactivity puts focus on the interactions that users can have with technologies, and also should put focus on the kinds of interactions users want from technologies. Users using the mobile application version of the Green Map systems will find that they can functionally do similar things on the app as on the website, but the interactivity shifts when those actions can be done on a laptop—typically in the home—or in different places, as afforded through mobile services, software, and devices, such as the Green Map application that can be used on cell phones. The ability to both use GPS services while being able to take full advantage of said services to visit sites allows users to not only see a visual image of a location based on the maps provided on the website, but allow users to visit the sites provided, purchase things from these sites, support these sites, and move beyond conceptualizing sustainable sites as places on a map, but as places in a user’s community and local context. Through the mobile application, an image and an idea on a phone becomes a place, which becomes a place in a specific community with specific needs and concerns that users can interact with physically: the connection between what users want to do with and at these spaces in regards to the larger issues of sustainability forwarded by Green Map systems can be more fully realized in by using the mobile application than the desktop or laptop version of very similar information. Interactivity, as defined by Porter and Manovich, becomes extremely valuable when considering technologies that require action-
oriented and user-focused experiences, thoughts, feelings, and motivations to be useful, like in
the case of civic and social issues, which are often contextually specific to certain areas and
defined as issues by the people who are affected by them.

**Usability Testing and Interactivity**

Usability, a kind of testing and research conducted on technologies and interfaces, has
been traditionally positioned as research aimed at helping designers make interfaces, products,
and technologies that are easy to use, easy to learn how to use, and easy to remember how to use
(Gould & Lewis, 1985, p. 300). So, the kinds of interactions and experiences that designers want
to create through technologies are often tested through usability testing. Traditionally and still
today, usability testing focuses most on identifying and fixing errors found in order to make
technologies, etc easier to use by people. As explained in John D. Gould and Clayton Lewis’s
(1985) work on usability—an article that continues to inform usability research and testing
today—usability testing should be done early in the process of developing technologies in order
to create “useful and easy to use” technological systems. Unsurprisingly, Gould and Lewis
specifically refer to computer systems in this article, and these same usability standards that
inform computer systems development and design continue to inform other technologies, such as
the mobile technologies discussed in this project. Gould and Lewis specifically explain that there
should be three major considerations of usability testing: 1) focus on target or end users early on
in the development project, 2) end users should be able to perform tests with prototypes of the
product, and 3) designers must fix problems when they find them, making the entire design and
development process an iterative one (p. 300). These seemingly simple and well-known
mandates were new in the 1970s, yet just as obvious to designers then.

Yet, even though these mandates seem obvious, simple, and easily implemented, Gould
and Lewis found that these principles were not being incorporated into the usability testing
phases in product and technology design and development. After asking designers to explain
major timelines for their projects, Gould and Lewis reviewed the designers answers for
indications that they were referencing the three major guidelines, what Gould and Lewis call
principles, or not. They found that only two percent of respondents used all of the principles they
forwarded in the 1970s and 80s. Lewis and Gould’s (1985) reasoning for the lack of attention to
what is ultimately more user-oriented usability testing was that the principles were simply not
fully understood by designers, and when the principles were not fully understood, they were not implemented into the usability and design process. Furthermore, they explained that as a result of survey answers, “people sometimes lack the ability to differentiate between what we recommend and what they do” in reference to design and development (p. 301). In essence, Gould and Lewis realized that many designers put more emphasis on developing technologies and systems than focusing on what users wanted—how technologies could better their lives—and how they wanted to use a particular technology, product, or interface. Even though Gould and Lewis called for designers to consider more user-focused approaches there still was and still is a heavy emphasis on systems-oriented usability testing where focus is put on the system or product or interface first, with attention to users and their needs coming later in the development process. Because users and usability testing that emphasizes users continue to be a later part of the development process even today, typically changes are made to make the system more easy to use, rather than testing for the kinds of interactions users might want to have with these applications and technologies.

Heuristics in Usability Testing

Examining specific principles to test for in usability is not new. In the late 1970s and early 1980s, interaction design researchers created lists of principles to follow when testing computer interfaces for errors. Many of these principles are still tested for today and are taught in usability courses. Some of the most popular principles taught and tested for are Bruce Tognazzini’s (2014) “First Principles of Interaction Design,” which provides a short list of, now considered standard,9 usability principles to test when searching for errors. These principles include concepts like “autonomy,” making sure that users feel as if they can change or modify an interface as needed, or feel as if they hold some kind of power over the interface, or “consistency,” making sure that specific choices made in content and design remain generally the same to avoid confusion in users. Tognazzini also argues for designers to consider concepts like “Fitt’s Law,” a kind of property that requires designers to consider the size of icons and buttons in relation to how fast designers wanted users to perform the actions associated with the icons, buttons, or whatever kind of actionable marker is used. Based on the knowledge that larger icons will allow for users to click them faster, Tognazzini points out that, “A single-row toolbar

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9 Tognazzini recently updated his article on his heuristics, hence the citation reading 2014.
with tool icons that “bleed” into the edges of the display will be significantly faster than a double row of icons [...] (Even a one-pixel boundary can result in a 20% to 30% slow-down for tools along the edge.)” (2014). Another major usability principle that came from Tognazzini and his contemporaries’ works is a focus on navigation. Tognazzini argues that most users “cannot and will not build elaborate mental maps and will become lost or tired if expected to do so;” therefore, testing for visible navigation has become a standard in usability (2014). These principles are just several of a list of principles that allow for designers to consider their designs in reference to errors in ease of use for users.

Jakob Nielsen, also well known for his work in usability, forwarded the idea of considering heuristics in usability in 1990 with Rolf Molich. In 1995, he updated his argument regarding usability heuristics. Essentially, what Nielsen’s work does is takes usability away from being defined by specific, and oftentimes narrow, principles, and requires designers to consider usability as a set of guidelines. Although similar to principles, Nielsen positioned his work as a heuristic in order to stress that his work did not forward hard or fast rules. I argue his work was an attempt to allow designers freedom to contextualize principles that formerly may not have fit every situation, even though Nielsen never explicitly argues that his work contextualizes the principles supported by Tognazzini and other researchers. Specifically, Nielsen (1995) points to a set of only ten heuristics for designers to consider as they develop and re-design their work: 1) **Visibility** of a system’s status, to make sure that users know what a system is doing, to offer feedback on what is happening, 2) Construct “matches” between system and the real world, by which Nielsen means that language, metaphors, etc should meet the expectations of users, 3) offer users **control** over the system, or at least encourage designs that make users feel as if they have control, 4) emphasize **consistency**, 5) incorporate **feedback for errors** in the system, 6) design for that users can **recognize** icons, objects, navigation maps, etc, rather than having to recall these details, 7) **consider users at different levels**, by which Nielsen is referring to what he calls novices and experts, 8) Nielsen argues for **minimalist designs** where possible, 9) make sure to **incorporate feedback and help** for when errors occur, and lastly 10) Nielsen includes a guideline that encourages the incorporation of **documentation**—instructions or help manuals—as needed (1995).

Although both Tognazzini’s work and Nielsen’s heuristic guidelines ushered in a wave of heuristic-focused testing that allow for usability tests to be potentially more contextually-
informed, both Nielsen’s heuristics and Tognazzini’s principles ultimately place more power in the development process with designers than users and assume that errors are to be found with users and their use of systems, rather than in the systems themselves. To explain this further, let’s take a closer look at the principles, heuristics, and the development process itself. Tognazzini’s and Nielsen’s work, while thoroughly useful and necessary in development and design processes, place emphasis on characteristics found in products, computers, and interfaces: navigation properties, mapping properties, language properties, etc. All of these characteristics are forefront in the development process and usability testing is designed to consider foremost: Where do users run into errors, confusions, or issues with these characteristics? The burden of confusion or misunderstandings or how something is supposed to be used, because the designer and developer typically have an idea as to how a technology, product, or interface is to be used, is put on the end users. When fixes are made in the development process, they are oriented ultimately towards attaining more closely the image of how the technology or product should be used, rather than how users might subvert, change, modify, hack, or otherwise use the product in a different way. Although traditional usability testing puts more emphasis on the ideas of the designer, the developer, or even the marketer, I do want to stress the value of all of these scholars, their fields, and their contributions to technological advancements and product development. These standard concepts, while they may not be enough for technologies attempting to resolve social and civic issues, are vitally important for building functional technologies.

**Technical Communicators, Composition, and Usefulness**

As researchers in HCI began to define the research practices of usability testing, Patricia Sullivan (1989), and others, called for the people using products and interfaces—the users—to be the central focus and basis for crafting and conducting usability testing. She explained in “Beyond a Narrow Conception of Usability Testing,” that “We remember our interest is in helping users learn, and we approach situating new materials within that general stance of advocating users and their learning” (pp. 256-257). As was called out by scholars in rhetoric and composition, the standard power dynamic seen in usability studies and testing is typically focused on the interface or system, along with the designer of such products, rather than the users themselves. As Robert Johnson (1998) writes of users and their power, in *User-Centered*
Technology: Rhetorical Theory for Computers and other Mundane Artifacts, “Users themselves have in many ways allowed the construction of the idea of technological idiocy through an acquiescence to the knowing expert and to the acceptance of the idea that technology is just too complex for the ‘average’ person to understand;” in other words, people using technologies are influenced by the power tied to those technologies, and people also influence the power held by certain technologies based on their own positions of power (p. 45).

Johnson offers standards for usability models—user-centered models—that continue to influence usability study today. His and Sullivan’s work persists in its relevance today in usability studies, but what really interests me in regards to their calls is that both of them focus on the ways in which technologies have been given power and how that power influences our uses of it in many different capacities. Digital technology and computer use have become a standard, an expectation, in many composition classrooms; in what ways are the power dynamics that Sullivan and Johnson point to enacted in our use and development of technologies? In other words, how has the construction of these technologies and the social, cultural, economical, and ideological concerns of designers continue to influence how we use and construct technologies?

Also important in their work is their construction of power in reference to the end user, the people that use the products, interfaces, and technologies designed and developed by others.

*Figure 15. Recreation of System-Centered Model:* The image above is a recreation of a figure in Robert Johnson’s work that shows an approach towards user-centered design that Johnson argues is ultimately a system-centered approach in usability research (1998, p. 30).

Johnson explains that traditional usability orients power in the development process towards the designer: “The designer has the task of designing the system from a model or his or her creation. This model becomes the image of the system that is then passed onto the user. The user, as the arrows demonstrate, has the job of interacting with the system,” in ways that match the image the designer or developer creates, and thus, “it appears that the system is driving the user, and once again it serves as the central focus,” as shown in *figure 15* (1998, p. 29). I’d argue that not only is
the image of the system the focus, but also what is behind that image: the ideas and conceptions of the technology, product, or interface are constructed by the designer or developer. Johnson explains that instead of the system as the focus for usability testing, developer, and design, the user should be the focus. Now, much like what Gould, Lewis, Nielsen, and Tognazzini argue, the user should be central, what I argue regarding Johnson’s work is that for the user to be truly central in the development and design process, the image of the designer or developer must not only be tempered but shifted towards the ideas, conceptions, and needs of users.

While the nature of meeting client, developer, and user concerns is complex and oftentimes structured towards the system, Johnson argues that by putting the user at the center of the development process means that the “system and the designer’s image of the system are replaced as the dominant features [of the development process] Instead, the model shifts the focus by concentrating on the user, and it adds another dimension—the user’s situation” (p. 31, Johnson’s emphasis). What Johnson means by the user’s situation is the complex of use wherein users may or may not use a specific technology to meet some kind of need, want, or make some kind of change in their lives or communities. Johnson further complicates the model of user-centered design and development by examining the concept of complex of use more closely.

Johnson explains that when we consider the complex of use—the contexts, situations, conventions, and expectations we have of technologies—we must reflect on the rhetorical practices tied to the contexts of use, which include considerations of culture, power, history of use, and the institutions and disciplines that form our conceptions of technologies (1998, p. 39). Johnson explains that usability testing, which as mentioned typically requires users to complete some of task with the technology, product, or interface in question, should foremost consider the kinds of tasks users would want to do or produce with the technology, interface, or product. Johnson’s call moves usability testing away from what the designers expects should occur with their creation towards what users would want to or need to do with the creation itself, which requires those in usability to radically shift their research and design practices.

Michele Simmons and Meredith Zoetewey (2012), too, explain that even if various best practices or guidelines circulating in usability studies are followed, websites, applications, print materials, and other kinds of objects could still very well be unproductive for users, especially when considering designing for civic work. The inclusion of civic engagement and action makes a big difference because that kind of work necessitates spaces for deliberation, collaboration, and
problem solving among both community members and experts (p. 251, 253). An emphasis on usefulness turns attention on people and shifts the approach of product development: as “Mirel (2004) noted that, ‘when design teams focus on ease of use, they strive to build the product right. When they emphasize usefulness, they strive to build the right product,’” for arguably the people who need it (p. 258).

After conducting interviews on community needs for civic websites, Simmons and Zoetewey concluded that participants desired several elements in civic sites: technical literacies, inquiry activities, space for the community to collaborate, and the ability to decide their identities when joining a site (p. 260). Technical literacies refers to providing participants with functional vocabularies to understand information and data on the site, but Simmons and Zoetewey do warn against “diluting” the information too much as interested members are capable of acquiring new literacies when motivated to do so (p. 261). Inquiry activities allow for citizens to ask questions and receive information from experts as needed: “science requires more investigation, as do the organizations that fashion it, and the organizations are not always eager to share the details” (p. 262). In order to create a productive space, do share the details (and while you’re at it, put people who are used to and happy working with other people as contact points—this wasn’t an explicit feature in the article, so we’ll call this my own addition). Creating a virtual community space for collaboration is essential given that town hall meetings and the like can be less productive for community members to voice a collective concern. Additionally, having a dedicated space or place for collaborating can bring community members and experts together in one space. Identities are also a very important part of making spaces better for community members and experts to resolve problems. Simmons and Zoetewey come to the conclusion that a “multiple-identities framework helps us compensate for [a] lack by making especially visible the varied user groups who might use the site and their differing agendas” (p. 265). Productive usability asks how and why community members want to use a space or technology, rather than simply checking if the information and data and options provided by experts on a site are easy to use.

Productive modes of usability and usefulness also play a role in shifting the power from developers to users. Anne Wysocki (2001) poses that images and visually oriented interfaces, such as multimedia web pages, (she focuses on web pages, but her work can still be valuable for application design) can make arguments—text or audio are not necessarily needed for such
media to mean something. She explains that the image/word dichotomy does not always exist, particularly in two visual art collections found on CD: Barnes’ collection and the Maeght collection. These collections are of the same artists and art pieces (largely, anyway), but are constructed in very different ways, and it is this construction of the interface that changes how users consider the pieces all together. Wysocki argues that the Barnes collection “is arguing that artists are not worth much attention or differentiation; instead, what is important is the art, the paintings by themselves, as collected things” and the Maeght collection “gives equal weight to artists’ lives, and to artwork—but is careful to help us see distinctions between artists even as it shows us how those artists shared places and times” (p. 152).

Wysocki’s preference for the Maeght collection is clear, but justifiably so in that the designers of the Maeght collection considered her as an *intelligent* user: “I feel respected by the Maeght CD in a way that I am not by the Barnes CD. Although, as I have been arguing, the Maeght CD builds a definite attitude it would like me to take towards art […] it is up to me to determine the relations between the parts [of the CD, the art, the artists, the context]” and “on the other hand, the Barnes CD hand me everything; all its information is circumscribed within the schematic I drew […] I am not encouraged to consider the visual structure of the CD; the structure is pre-digested for me” (p. 158). Wysocki seems to feel respected because see is considered as an intelligent viewer, user, art-appreciator, and creator of her own path on the Maeght CD.

Similar to Wysocki, Jane McGonigal (2011) in *Reality is Broken* considers users, particularly video game users, to be useful and active members of society, users that have special skills that can work to do good in the world. Because her ideas surrounding making change often deal with crowd sourcing of some kind, she emphasizes the usefulness of gamers in this way, “on the whole, gamers already spend more time compiling collective intelligence—and making effective use of it—that anyone else. They’re the most prolific users of wikis in the world” (p. 233). It’s users like these—ones who have practiced skills, literacies, and intelligences that McGonigal views as some of the most useful, largely untapped, populations in the world.

But what does all of this mean for mobile technologies? In many ways, the usability concepts forwarded by researchers discussed here consider the networked computer or laptop. Nevertheless, many are important for mobile technologies, particularly those that attempt to shift behavior or ideas in local contexts. Important to add to the usability testing standards is Huatong
Sun’s (2012) work on “user localization,” a process that she calls an active attempt on users’ parts to conceptualize how a technology fits into their local contexts, provides a way of acknowledging user input in the development and design process of technologies in concrete ways. She writes, “Users are designers (Norman 2004), who are actively redesigning, or—more accurately—localizing, an available technology into their local contexts […] user localization efforts are an important consideration in usability studies because they represent a way of culturally achieving product usability” (pp. 458-459). Specifically, she is studying the use and value of SMS/text messaging technologies in the US and other countries, but what I found important is that she was calling for a different way of researching users of different cultures. She provides a very detailed image of her users through long-term study of them. This long-term kind of work is not often what companies and organizations go to in their research, but it can be a way to develop both the user-oriented and contextual frameworks necessary for technology development and design when concerning issues of social action or civic engagement.

What I want to forward through Table 1 is that standard usability testing and concepts are entirely valuable and important in the design and development process: they support the functionality and ease of use, rather than putting emphasis on the specific, contextual interactions that users may want out of technologies.
Table 1

*Usability defined through different frameworks*

<table>
<thead>
<tr>
<th>Usability Frames</th>
<th>Standard</th>
<th>Productive and Usefulness</th>
<th>Interactivity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Standard usability concepts allow designers and developers to test for ease of use in products, technologies, and interfaces. Standard usability principles include visibility, consistency, accessibility, mapping, feedback, error feedback, track state, Fitt’s Law, recognition, metaphor.</td>
<td>Productive usability concepts allow designers and developers to test if the technologies and products they design allow communities specific sets of information, vocabularies, and identities that would help users achieve their wants and desires in scenarios when users are attempting to solve complex issues with other community members and experts.</td>
<td>Interactivity as a frame allows designers and developers to focus strictly on the interactions and experiences that users may want from technologies, which is important for civic and social issues in that users often want the opportunity to engage in specific actions in relation to an issue of concern.</td>
</tr>
<tr>
<td><strong>Findings</strong></td>
<td>Standard usability concepts and principles require that designers and developers focus on errors in ease of use. When certain features, such as the navigation or mapping, are difficult to use or result in specific errors, designers, developers, and programmers must work to resolve issues in design, coding, and functionality so that the technology, interface, or product matches the motivations and goals of the developers.</td>
<td>Productive usability concepts that revolve around the concept of usefulness allow for designers to test if their products, interfaces, and technologies give users the information, vocabularies, and identities needed to solve social and civic issues in their local communities.</td>
<td>Testing the interactivity of interfaces, products, or technologies, allows designers and developers to parse out the specific interactions available through the technology they develop while modifying prototypes or developed products based on the interactions users find most useful.</td>
</tr>
</tbody>
</table>

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10 This is not an exhaustive list of all of the usability principles used and consulted in technology design, but remain some of the most common.
These various concepts allow us to find different issues with technologies, find out different motivations for using technologies, and different ways to engage social and civic issues through technologies. But even though standard usability concepts are vital to attend to in order for technologies and products to be successful and useful, products and technologies that engage social and civic issues are also benefitted from user-focused frames, such as productive usability and interactivity, that put emphasis on the language, literacies, and interactions users want out of technologies in order to meet their specific, contextual needs in reference to social and civic issues in their communities. As I touched on in the previous chapter and detailed in this chapter, the development and design of mobile technologies, such as the applications I’ve researched, have been predominantly influenced by standard models of usability: even with good intentions of designing for making civic and social changes, these applications often follow design standards of commercial applications, applications that have completely different aims and motivations. And applications are often still developed by traditional standards of usability, but in my work, I have found that digital and mobile technologies constructed in service of civic and social concerns are entirely more useful for people who are invested when usability practices focus more on what users need and wants are with technologies, along with emphasis put on heuristics, such as Simmons and Zoetewey’s (2012) community space, McGonigal’s (2011) engagement economies, Sun’s (2012) user localization, and others that require designers and developers to consider the role users play in social and civic issues, the needs and desires of these users, and the ways in which their current technological habits can be mapped onto newer technologies to build new community practices. Furthermore, because mobile applications are different from web applications, as described by the Green Map system example earlier in this chapter, mobile technologies and applications require new principles and heuristics for development, design, use, especially as they relate to civic engagement. The following chapter details the ways in which mobile application developers, specifically those that helped or currently help develop GoodGuide, Green Map, and H2O Tracker, have defined their motivations for using mobile technologies to serve their social or civic issue of concern, along with what their focus is in the development process.
Chapter 3: Developers’ Perspectives

The development of technologies, along with the motivations and goals of using and developing specific technologies to suit certain needs, is often complicated and tied to different interests and agendas. This chapter illuminates the developers’ stories on their own development processes and motivations and goals for creating mobile applications of the Green Map application, GoodGuide, and H2O Tracker. Technologies, products, and interfaces are traditionally developed in four different ways: through the waterfall method, the agile method, the rapid-development, and the object-modeling method. While these are not the only methods that are used, they are commonly employed. The waterfall method refers to the process of project specifications, based on users, are set out at the beginning of the project, and the rest of the project follows these specifications (Barker, 2003, p. 203). Although this kind of development process is long-standing, one of the first kinds of development processes in software development, it also requires that end goals and end users be defined at the beginning of a typically long process, which does not account for the kinds of major changes that may be needed to most effectively meet user needs (Barker, 2003, p. 204). The agile method is an iterative process that requires developers and designers to continually re-evaluate their work based on user research, user response, and collaborative work with end users (Burpo, 2009, p. 24). The rapid-development method is based on user needs, incorporating usability testing and prototypes to test with users, but this process focuses mostly on ease of use and quality of products, rather than what users may actually want out of a particular technology. This method is most commonly used with mobile application development (Barker, 2003, pp. 204-205). Lastly, the object-modeling method combines the waterfall method and the rapid-development method by creating a series of steps or sequences while including usability measures. Thomas T. Barker (2003) explains that this method is typically characterized by research called a “use case” model, wherein designers and developers articulate a case for how users will use a particular product, application, technology, or interface (p. 206). While these are some of the more common development practices, often developers and designers do not consult these methods or the heuristics discussed in the previous chapter. In fact, the development process typically has challenges and complexities, especially technologies developed for social and civic change, which are not accurately articulated within these models of methods.
A central part of this study was to more fully document developers’ roles in creating mobile technologies regarding civic and social issues. Most importantly, the interviews I conducted with different organizations and companies were in an effort to understand the motivations and goals for developing the applications I tested, Green Map, GoodGuide, and H2O Tracker, along with how developers perceived their role in attending to social and civic issues through mobile technologies, like the mobile applications they created. The term developer is used in a variety of ways within different circles and fields. I am using the term to refer to those invested in and part of the formation and design of, in this case, mobile applications. Some scholars have slightly wider definitions of the concept, such as John D. Gould and Clayton Lewis (1985) who combined developers and designers together as a category of people “who have the responsibility and/or interest in creating computer systems (or any other systems) with these characteristics” (p. 300). Other scholars, predominantly in HCI studies define technology developers as those involved in programming or coding technologies. For example, Constantine Stephanidis (2012) writes, “[developers] were employed at the beginning to add more programming power to developers. By the end of the century, languages had been introduced specifically for the Web, such as Java, PHP, ASP, or Flash. This finally allowed developers to create applications for the Web that could match, at least to a certain extent, the interactive richness of standard software applications,” suggesting that the role of developers in this context revolve mainly around the coding and programming process of constructing applications and software (p. 1390). I am using a definition of the term to focus on people directly involved in the ideation process of the creation and design of a mobile application: my emphasis is on not only those interested and invested, nor only those involved in the actual coding or programming of the applications, but those involved in developing the concept of the application itself.

This study involved a series of different analytical methodologies in order to review the current interfaces and core structure of the applications, along with the major emotions and experiences that users have while using the applications. As mentioned in the introduction, the main questions in this study were the following: What goals did they have for their mobile apps? Why use mobile technology to enact some kind of change in relation to the issue they found in their local community, whether it was water conservation or product consumption? The stories and explanations from the developers were vital to my study in order to more effectively gauge the complex goals for mobile applications, along with the challenges of using that form of
technology to reach communities wanting to make change within their specific contexts. Although the usability research conducted with users was incredibly important as well, by interviewing the developers, I wanted to highlight the nature of technology development, especially when we are considering social and civic issues. Technology development is typically fraught with issues of funding, with finding people available to work on the design and coding itself, along with considering making mobile applications that users need within their communities. Developing an application, while it may seem simple given the sheer amount of them available to download, particularly for civic or social change, is not a simple process or without specific and contextual challenges. This section of the study provides a perspective into the developers’ roles in constructing mobile applications, along with their rationales for using mobile technologies, their future goals for their applications, and some of the challenges they faced while creating their work.

Methods: Interviewing Developers of Mobile Applications

The methods used in this section of the study consist of semi-structured interviews, which were implemented in order to flesh out the experiences, challenges, insights, and motivations regarding the use and development of mobile technologies in relation to social and civic issues. The following section details the specifics of the semi-structured interviews, including why this method was chosen over other methods, such as structured interviews, along with sample interview questions detailing the rationale and goals for each interview question I incorporated into the study. I found it important to not only detail what I did in the study, but specifically why I chose to use particular methods and questions into the study.

Semi-structured Interview

Throughout this study, I interviewed three application developers, the developers of Green Map, GoodGuide, and H2O Tracker. The interviews were conducted over the phone or over Skype and typically lasted around 30 minutes to 45 minutes. I did not record our conversations, but took notes on their responses, so, only phrases marked in “quotations” are direct quotes from the interviewees. Most of the description is summary or paraphrasing of their explanations. I asked each developer a series of questions that encouraged them to explain mobile technology’s role in their larger goals for their companies and organizations, along with their specific goals for the
These interviews were semi-structured in nature, meaning that although I did have a list of base questions I wanted to focus on, interviewees were asked slightly different questions, probing questions, and follow-up questions based on the context of the conversation itself. In some cases, such as my interview with Wendy Brawer, she answered some of my questions while answering others, hence why I wanted to make a note that these interviews were neither structured, unstructured, but semi-structured in order to guide our conversations, yet give developers more opportunity, freedom, and space to discuss the insights, motivations, and challenges surrounding their respective mobile applications. I found that semi-structured allows for a researcher to simultaneously guide interviewees towards the information the researcher needs, while allowing room for the contextually-specific responses, experiences, and insights different interviewees have during the interview process.

I pulled from several social science scholars’ definitions of semi-structured interviews when crafting my own interviews, including Silvia Rabionet’s (2011) work. She describes semi-structured interviews by explaining, “There are some specific topics that I would like to cover, but at the same time I want to hear their stories,” taking note of the differences between unstructured, semi-structured, and structured interviews, in that semi-structured interviews allow for researchers to uncover context-specific information—specific stories—when they, and interviewees, are allowed to veer away from specific questions during the interview (p. 564). Andrea Fontana and James Frey’s (1994) work on interviewing primarily influenced my interviews. Structured interviews follow a strict script and allow for fewer open-ended responses, questions are asked in the same order, and questions do not vary in different interview, and overall allow for little room to provide specifically context-based answers (p. 363). Fontana and Frey explain that semi-structured interviews are characterized as phenomenological: these interviews more effectively provide insight into interviewees’ experiences (p. 365). Semi-structured interviews ultimately allow for open-ended answers, probing questions, and follow-up questions, different ordering, and context-specific questions, which was vital to get at the kinds of information that is useful for determining how mobile technology is conceptualized and developed in different contexts for very different purposes.
Participant Selection

The application developers all had different kinds of roles within their respective organizations and companies, and what I found important, is that all of the developers had roles in different kinds of organizations: 1) Wendy Brawer is founder, director, and systems designer of Green Map systems, a non-profit organization, 2) Dr. Bill Pease is the head scientist at GoodGuide, a company focused on building a rating system to assess the environmental and social impacts of consumer products, and 3) Frani Halperin is the CEO of Halperin Creative, an advertising and design agency wherein she completed several projects that support her role as environmentally-conscious citizen in Aurora, Colorado. So, not only did all of these people, in part, help develop their respective mobile applications, they also provide a picture of some of the different roles and investments people in different spheres and sectors fulfill in reference to the many social and civic issues that permeate different communities and contexts across the United States. Additionally, all of the applications that were developed by these companies and organizations met my own criteria for this study: 1) the applications were mobile (cell phone, in specific) applications, rather than strictly web or tablet applications, 2) the applications work to identify issues in communities, and 3) encourage or support change in users through modification of behavior or actions in relation to social or civic issues. In other words, I was mostly interested in finding mobile applications that went beyond solely making users aware of problems by providing information, but encouraged different habits of behavior or action. Although there were hundreds of applications that met these criteria, I ended up attaining interviews with companies and organizations that were predominantly invested in environmental issues: attendance and support of environmentally friendly locations, restaurants, etc, support of consumer products that have positive social and environmental impact, and water conservation.

Sample Interview Questions

Although every interview was a bit different, each pulled from a series of questions that focused primarily on attaining information on the motivations and goals of interviewees for using mobile technologies, along with their longterm, future goals with the applications they’d already developed. The following list of questions is a sampling of the kinds of questions I asked the developers in this study:
1. Can you talk to me a bit about the history of your company, along with your role?
2. What has been your experience with developing applications?
3. Why did you want to develop an app? What were your motivations for developing this application?
4. What did you hope to accomplish with this app?
5. Who is your target audience for this application?
6. What problems have you encountered in users using the application? Have you worked to resolve some of these problems, and if so, how did you work to resolve them?
7. How many users have downloaded the application? How many users are actively using the application?
8. What can users do in regards to community engagement in your application? Do you have plans for new developments in the future?
9. What guidelines, heuristics, or application models did you use while developing your application?

I constructed each of these questions so that the interviewees were positioned as experts. Additionally, in my explanation of my study, along with my tone and conversational approach to these interviews, I attempted to give power to my interviewees. Because these interviews were conducted remotely—not face-to-face—I found it important to emphasize through my tone that I trusted these interviewees in order for them to feel comfortable to share their thoughts, feelings, and emotions tied to the experiences they had regarding developing their respective applications. Secondly, these questions revolved around a series of specific objectives for this portion of the study. I had overall objectives for the study, 1) what can mobile application technologies afford communities hoping to make social changes? Why and when are mobile technologies useful for communities? 2) What are organizations’ and companies’ goals and motivations for using mobile technologies to attend to social and civic issues? 3) What heuristics/concepts would be useful in designing mobile applications for social change and civic engagement? What do you users want from mobile technologies? The interviews with developers was a part of the study that was implemented in order to develop answers to primarily question 1: What are organizations’ and companies’ goals and motivations for using mobile technologies to attend to social and civic issues? Although these were the overall objectives for the study itself, I had specific objectives during the interviews. I wanted to understand the following:
1) What goals do developers have for their mobile apps?
2) Why use mobile technology to enact some kind of change in relation to the issue they found in their local community, whether it was water conservation or product consumption?
3) What insights and challenges did developers have during the process of developing the application?

All of the questions I initially prepared were an attempt to gather more information to answer these research questions.

The first set of questions was asked in order to give more power and control to the interviewee. I asked developers to explain their own personal role in their respective company or organization, along with their connections to their application. By asking these questions first, interviewees were allowed to express knowledge that they intimately knew, rather than start with questions that would inquire about specifics related to my own interests in their work. The following questions were those that I’m considering this introductory set of questions:

1. Can you talk to me a bit about the history of your company, along with your role?
2. What has been your experience with developing applications?

These questions also allowed me to gather information on the developers’ specific identities and roles, which were tied to their work with the applications and their companies in different ways. For instance, Bill Pease very much identified as a scientist (he specifically does work in informatics and risk assessment) and filled that role within the scope of his work in a variety of ways: he helped build and continues to oversee the major rating system from which GoodGuide’s website and mobile application is based. Whereas, Frani Halperin and Wendy Brawer are largely owners of their respective companies and organizations, and these identities influenced their role in the applications as well. Ultimately, my hope with these questions was to make the interviewees feel like they fulfilled the expert role in the interview session.

The second set of questions were aimed at understanding the developers’ perspectives and understandings of mobile technologies in relation to the social and civic issues the applications supported:

3. Why did you want to develop an app? What were your motivations for developing this application?
4. What did you hope to accomplish with this app?
Specifically, my hope was that these questions would encourage the interviewees to discuss, first and foremost, their understanding of mobile technologies in relation to the issue at hand. By asking them to explain ‘why’ they chose to make a mobile application, rather than asking for their definition of mobile technologies or mobile applications, I hoped that their answers were better fully contextualized by the specific purposes and goals for creating the applications. Additionally, these questions also allow me to get an understanding as to the specific goal developers have in their companies and organizations as they relate to mobile technologies. For instance, in some cases, developers were fully committed to continuing to rework their applications for continued use, whereas Wendy Brawer explained that she was hoping to put more time, energy, and funding into making web application versions of the Green Map mobile application.

Questions about audience were important in respect to the larger study as a whole. These questions allowed for me to more accurately define users for me to test in the other section of the larger study:

5. Who is your target audience for this application?
7. How many users have downloaded the application? How many users are actively using the application?

These questions also aided me in understanding the current use of these applications. In a way, a series of these questions allowed me to present a kind of timeline. These questions structured answers towards what was currently occurring with the application.

6. What problems have you encountered in users using the application? Have you worked to resolve some of these problems, and if so, how did you work to resolve them?
8. What can users do in regards to community engagement in your application? Do you have plans for new developments in the future?

The remaining others focused on the past challenges and revisions of the applications, along with the future of the applications within the developers’ goals for their companies and organizations. Again, these questions continue to contextualize the role of mobile technologies, while supporting the stories developers have to tell regarding their work.

Lastly, the final question was to gauge the developers’ specific work with different usability and design heuristics or guidelines. Because this study revolves around the construction of heuristics for design and development of civic and socially-concerned mobile applications, I
thought it imperative to understand what, if any, heuristics, models, or guides were being used by the developers I interviewed:

9. What guidelines, heuristics, or application models did you use while developing your application?

In my own research, I’ve found that different civic and socially-concerned mobile applications are very much modeled after commercial applications, applications that allow users to buy products through the application itself. Additionally, I hoped that this question would elucidate the different development processes that these developers took to construct their respective applications.

As mentioned earlier in this section, semi-structured interviews allow for differences in reference to the wording of questions, the order in which questions are asked, along with the pace, and many other factors. Because of this, not all questions were asked to developers directly. Additionally, these questions were often asked out of order to make the interviews take on a more conversational tone, so that I could ask a particular question or ask a probing question that would guide the interviewees into a direction that felt more organic within the conversation.

Coding the Interviews

As mentioned earlier, while not every single sample question was asked verbatim during the interviews depending upon the specific interview answers, I did use the questions and their respective responses as a way to parse out patterns among the different interview responses. While many of the responses were unique to the specific social or civic concern at hand, the developer, the company or organization, and the various contexts surrounding each situation, such as some of the larger challenges the companies and organizations faced while developing and implementing their mobile applications, there were also patterns that largely revolved around the following elements:

- **User dynamics** - The kinds of user dynamics developers see as useful for their purposes.
- **Use of mobile application technology** - The rationales for using mobile technologies to impart some kind of change regarding context-based issues of concern.
- **Goals for the applications** - The motivations and goals developers have regarding the technologies they produce and the issues with which they’re invested.

The following section breaks down the interview data by focusing on the three major categories above, user dynamics, use of mobile technology, and goals for the applications.
Interview Findings

I briefly introduced the mobile applications I analyzed, researched, and tested in the first chapter of this study. This section more thoroughly articulates the background of each application and developer I interviewed. Specifically, this section works to continue answering two key research questions, which began to be discussed in the previous two chapters: 1) What can mobile application technologies afford communities hoping to make social changes? Why and when are mobile technologies useful for civic engagement? and 2) How are some companies and organizations currently attending to users’ needs and concerns regarding social and civic issues through mobile technologies? To answer these questions, this section presents the variety of different stories the developers had to share: their motivations for using mobile technologies, their optimisms and challenges with developing mobile applications to make some kind of larger change in the world, along with their specific desires and goals for both their companies and the applications are discussed in the following section.

Green Map and User Dynamics

During the interview, Wendy Brawer, founder, director, and systems designer of Green Map systems, explained that Green Map systems, a successful, world-wide non-profit aimed at encouraging people to seek out the environmentally-friendly and sustainable locations and companies in their communities by creating visuals of these green locations on maps. Green Map systems’ motto “Think Global, Map Local.” is embedded in both the design of their website and mobile application, and also within the concept itself. As expressed in the organization’s mission statement, mapping is viewed as a kind of process or action that encourages people to explore and support the sustainable locales in their own communities: “Transforming local information into global interaction, the interactive Open Green Map platform invites the public to enhance the maps as well as explore them. Building leadership, networks and skills, Green Map teams have extended their impacts with sustainability initiatives that address directly challenges to community well-being” (Green Maps, n.d., para. 2).

Brawer explained that the organization was formed in 1995 with others that were interested in using maps as a way to meet their goals in encouraging the support of sustainability in whole communities. Through a large project that successfully mapped locations in New York City, Green Map systems was on its way to motivating the many invested users now
collaboratively building green maps around the world. Green Map system now works with 63 countries and hosts 893 mapping projects across the globe.

**Green Map and Mobile Technology**

In 2010, Green Map systems unveiled their mobile application, Green Map. This mapping application used GPS services on cell phones to mark sites that the Green Map databases had already tagged as sustainable or green in some fashion. Certain sites are marked with specific icons as recycling centers, energy resourceful-companies, or restaurants that have a sustainable agenda. The mobile application has the capability for users to input green sites within the larger maps created as well, inviting users to explore their communities and tag important sites as green to add to the larger database of information. Brawer commented that the development of application went through a series of challenges, including a broken log in page in 2010 and 2011, which required the log in element to be recoded, that still to this day has not been fixed. Additionally, Brawer quickly learned through user responses from emails that users wanted the application to be more robust: users wanted to be able to see reviews of locations and see pictures of the specific locations (W. Brawer, personal communication, April 1, 2014).

As of 2012, Brawer decided to put more of her resources into creating a web application version of the mobile application concept. Although Brawer is not currently putting her resources into the mobile application, other mobile applications inspired by the original Green Map application have been created, including a mapping system of Kauai, Hawaii in an attempt to give both residents and visitors a visual of different kinds of locations that were committed to green living and sustainable practices. The makers of the Kauai map printed out and distributed over 40,000 copies of their maps, but decided that a mobile application would suit their needs better and the mobile application was developed.

**Green Map and Goals for the Application**

Through my own research of Green Map, along with implications from my interview with Brawer, it’s clear that action, exploration, support, collaboration, and visual design are all tightly intertwined within the organization’s goals. These concepts permeate the motivations and goals for creating a mobile application in the first place. Brawer detailed the goals and intentions of the Green Map mobile application as such: the application encouraged what Brawer called
“participatory practice” and “sustainable community development,” by allowing users to engage with these practices and principles anywhere (W. Brawer, personal communication, April 1, 2014). At least, this was the imagined goal for the application. Currently, the application is experiencing coding issues, and Brawer explained that at this time she was putting more time and resources towards a web application version. Nevertheless, she explained that this application and the other technologies Green Map system is developing was a kind of “citizen information tool,” wherein users could have the opportunity to develop their own resources with the help of others in the community to suit their needs, whether if they needed to tag or mark a location that was damaged from toxic chemicals, locations that were being gentrified, or locations that supported the community and the environment positively (W. Brawer, personal communication, April 1, 2014).

Based on my interview with Brawer, along with some other research I did of the Green Map system organization, what I’ve found is that through the development of the Green Map mobile application, Brawer is connecting mobile technologies with civic and social change, wherein mobile technologies are perceived as a tool that allows for users to engage these issues whenever and wherever they need.\(^{11}\) Additionally, mobile technologies are defined as venues for participation, exploration, and tools that can take invested people from researching sustainability to enacting sustainable practices and support sustainable locations in physical landscapes. Mobile technology in this context is a transformative network that connects content, ideas, and motivations with physical actions and physical locations.

**GoodGuide and User Dynamics**

Founded in 2007 by Dara O’Rourke, a professor of environmental and labor policy at Berkeley, GoodGuide as a company was created to not only meet the needs of consumers concerned with the ways in which consumer products were created in regards to health and the environment, but was also created to shift the ways products are created in large scale ways. O’Rouke noted that oftentimes, consumers do not have adequate information about products or if there is information available, it is too complicated for most consumers. O’Rouke’s characterization of consumers is described thusly: “[O’Rouke] realized how little we know about

\(^{11}\) Although Brawer is not currently continuing to develop the mobile version of Green Map, which was the application I tested and researched in this project, based on my own research and the users’ reactions to this application, the mobile application version, rather than the web version, seems to be more useful for users.
the products we bring into our homes every day. Information was either unavailable, too complex to understand, or biased, as marketers make unsubstantiated claims that their products are natural or safe” (GoodGuide, 2014, para. 2). Namely, GoodGuide was created to provide consumers with reliable and credible information regarding all different kinds of products (health, food, cosmetic, etc). Although the company was founded to provide consumers with easily accessible information based on scientific research, the expression of this rating system has not been without its challenges.

Bill Pease, head scientist at GoodGuide and colleague of O’Rourke’s at Berkley, worked to develop and manage the rating system with GoodGuide that rates products with the underlying goal of both shifting consumer behavior and changing the ways products are developed. Pease’s work involves providing visual information and numerical data on consumer products, along with considering the health, environmental, and social risks of products. He explained that the GoodGuide mobile application itself was a “large-scale experiment to see if consumers want to shop by their values or not,” (B. Pease, personal communication, April 16, 2014). The work that he does and others do at GoodGuide is to really consider the kinds of information, tools, and technologies that allow consumers to shop by their values more frequently and easily, as expressed in their mission statement: “We believe that better information can transform the marketplace: as more consumers buy better products, retailers and manufacturers face compelling incentives to make products that are safe, environmentally sustainable and produced using ethical sourcing of raw materials and labor” (GoodGuide, 2014, para. 1).

GoodGuide and Mobile Technology

While it may sound like GoodGuide’s intention is to seek out every consumer based on the former quote, Pease clarified a couple of key features about the audience they targeted through their mobile application: consumers that GoodGuide wants to reach are those that first and foremost care about the environmental, social, and health impacts products make, these invested consumers want information on the products they buy, and lastly, these consumers are influential decision makers in their own communities, meaning that realistically GoodGuide only needs to reach approximately 20% of consumers to make a significant difference in the purchasing behavior of communities and the product development of consumer products (B. Pease, personal communication, April 16, 2014).
What I found most important in the interview with Pease was his attention to how mobile technology can work towards encouraging social and civic change through behavioral shifts in consumer purchasing habits. He explained that the mobile application was created in order for consumers to use the application while physically at the store. He noted that they thought it was important that consumers had access to information when they were actually in the store and attempting to make some kind of decision about the products they were considering purchasing. He explained that the application worked within the “decision-making process” as consumers were making “consumption decision[s]” (B. Pease, personal communication, April 16, 2014).

Although the application has had success: the application recently had a complete overhaul in its design and continues to pull in downloads. Currently, the application has approximately 1.5 million downloads, with 1 million users using it on and off throughout the month, conceptual challenges have come into play within the development of the application.

**GoodGuide and Goals for the Application**

I identified several different kinds of goals based on Pease’s account, including resolving research issues in determining user wants, along with how to achieve behavioral changes in order to make changes within the larger economy of consumer purchasing. Pease explained that it was a challenge understanding what information users wanted in the ratings, how much information they wanted, where they wanted the information, along with what issues are really concerning to users: do they want to know about the social and environmental impact of products? Are consumers more interested in health concerns? Additionally, even though the database of information GoodGuide has amassed, the functionality of the rating system combined with the mobile application does not currently allow for customization. For instance, users cannot currently build preferences of products like how preferences are built in other sites, like Netflix or Hulu; their consumer base is not large enough for them to build a system for preferences at the moment. Additionally, one of the continual challenges is that published information of all products is difficult and time-consuming to find, which limits the amount and variety of products in the databases from which the GoodGuide rating system works, but Pease explained that GoodGuide was working on ways to resolve these issues (B. Pease, personal communication, April 16, 2014).
**H2O Tracker and User Dynamics**

Frani Halperin, CEO of Halperin Creative, helped to develop the H2O Tracker application used in Aurora, Denver by Aurora Water utilities company’s consumers. To contextualize this application some more, Halperin explained that the application was pitched to the Aurora Water utilities company primarily because of the need for the residents of the city of Aurora to conserve water, especially during dryer and hotter months in the summer. Halperin detailed the specific problems that the application was made in reaction to: “finite resources” in reference to water and issues with “awareness” regarding the concerns of water usage, consumption, and waste in Aurora (F. Halperin, personal communication, April 18, 2014). The mobile application works by providing users with incentives for playing specific games related to water usage. The games included in the application are primarily quizzes, which give users points for answering questions about their typical water use, whether calculating the time someone takes to shower or when users typically water their lawn. As users answer questions, the application provides tips related to the question to reduce water use.

**H2O Tracker and Mobile Technology**

Halperin claimed that the application emphasizes sharing information about water use by making users aware of their water consumption. Additionally, she added that the games “[reinforce] the message” of reducing water usage through the game itself: the questions and tips both forward water conservation (F. Halperin, personal communication, April 18, 2014).¹² Halperin explained that the main goal of the application is educate users because, as she noted, most people just don’t know these problems exist and most consumers do not know where their water comes from: water sourcing and information on use were two of the main educational issues that Halperin sought to solve through the application (F. Halperin, personal communication, April 18, 2014).

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¹² Some scholars, such as Ian Bogost, explain that the use of games as users may feel that they trivialize important issues such as water conservation.
**H2O Tracker and Goals for the Application**

Specifically, in the interview, Halperin explained that the reason behind using a mobile application was because she wanted reach Aurora Water utilities company consumers, but many of these consumers were not getting a physical water bill anymore. She needed another way to reach consumers and decided that a mobile application would be a suitable way to reach users that no longer received paper water bills, while encouraging them to conserve water through games and tips. Much like the other developers, Halperin noted that one of the largest goals was simply getting users to use the application. She attributed the lack of success in users downloading and using the mobile application currently was due to a need for marketing the application (F. Halperin, personal communication, April 18, 2014).

**Conclusions**

What can we draw from these developers’ stories, motivations, and uses of mobile technology to solve social and civic issues? What can we draw from these interviews and the developers’ perspectives? What can we draw from their motivations and goals? How can we help non-profit organizations meet their needs and want to ultimately help people and their issues of concern? Overall, we can draw a series of insights from these developers interviews: what kinds of user dynamics do developers see as useful for their purposes, the rationale for using mobile technologies to impart some kind of change regarding context-based issues of concern (like the Aurora water conservation issue, for instance), the motivations and goals developers have regarding the technologies they produce and the issues with which they’re invested, and lastly, we can learn something about the challenges that are not entirely portrayed in the development processes discussed earlier in this chapter.

The different forms of development processes discussed at the onset of this chapter—waterfall method, the agile method, the rapid-development, and the object-modeling method—show the development processes of mobile technologies for civic change or social concern in part, but do not completely portray the realities, complexities, and challenges that that developers face when building and developing technologies to resolve or change people’s orientations towards larger social and civic concerns, like the environmental issues in the applications I tested. I found that the developers’ conceptions of their development processes were exemplified best through Pease’s statement about the GoodGuide application: “I would characterize our
application development process as one that is more organic, evolving out of iterative attempts to learn what works for our core audience of engaged shoppers. To the extent we had outside influences, it would not have been other model applications or guidelines as much as academic research in behavioral economics - about how people make decisions about risk and purchase” (B. Pease, personal communication, April 16, 2014). So, not only are these kinds of technologies being used in ways that are more complicated than the typical development processes suggest, but developers all have very different approaches to the development process as a whole.

Even though each application is different and the developers had different approaches to conceptualizing the applications, had different reasons for using mobile technologies, and had different methods of development, each developer, and I’m certain many others, are committed to the causes, issues, and concerns expressed in the mobile applications: sustainability, community building, responsibility for community surroundings, environmentalism, conversation, and productive and ethical product consumption. These developers appear to be driven by both users and the issues with which they’re concerned, and this changes the typical commercial models we see in mobile application design and even changes the development process as a whole.

User Dynamics

Based on their stories and challenges, it’s very clear that the issues that these applications are attempting to change or resolve in some way are complex and straddle different networks and matrixes of people, ideas, content, motivations, and actions, and much of these complexities start at the core of the development process, which for these developers is the social or civic issue.
Figure 16. How the social/civic issue influences developers: The image above is a visual representation of the influences on developers making social and civic mobile applications, with the outer circle representing the developer’s frame of reference/perspective.

Foundationally, it’s the issue—the contextually specific (or regionally or nationally) social or civic concern or issue—that is at the core of the development of these mobile application technologies: how do we fix this problem? How do we modify people’s behavior or buying patterns or water consumption in order to fix this problem. Inherently, the focus is not the users themselves, their concerns or definitions of problems within their communities, but what researchers, scientists, and extremely invested citizens define as problems with communities, as represented in figure 16. The developers frame the issue, conceptions of users, research on policies, involvement of the developers, and choices in technologies. I’m distinguishing invested citizens from average citizens, who may know of an issue or may be interested, but are not currently involved in any cause. The interviews conducted with users in the next chapter are those with users that are invested in the issues related to these applications, which is important for evaluative research in relation to technologies for civic engagement.
Use of and Goals of Mobile Applications

What I found to be one of the most important findings was that the civic or social issue was truly the core of the development process, and that very fact extended to change the ways in which developers perceived the role of users or people interested in the issues, along with the role of different technologies in modifying or resolving the core issue in some way. When the issue is the core, developers are less apt to research the various ways users want to use particular technologies to solve or modify some kind of issue or habit associated with an issue. For instance, if the main core is the fact that water use is too high in a region and developers consider how best to resolve this issue and reach the members of a region that need to be using less water, that is foregrounding the developers’ ideas and conceptions of the problem and foregrounding the issues before the users. When we’re talking about civic and social issues though, this should make sense. As people dedicated and committed to different social and civic concerns, it makes sense that the core of why we make a technology or why we invest in reaching a particular audience revolves around the larger problem we want to solve or highlight or modify. But when we take that same core and use it as the basis of technology design we are ultimately led in a systems-central approach to technology design: users and their definitions of issues, users and their specific contexts, users and their motivations for making changes in their lives are secondary to the developers’ frame of reference for the core issue at hand, which is ultimately why I found building a heuristic guide for developers would be valuable to field the complexities of building truly user-centered applications, which is a challenge when the social and civic issue is the impetus for creating the technology.

Because the issue is at the center, heuristics need to be used that focus on users and civic engagement, rather than the issue itself. These findings show that when building mobile applications, standard heuristics and methods of usability are not testing for civic engagement or the kinds of information necessary to make for useful and productive technologies. Making a switch from focusing on users when the social or civic issue is truly a major impetus can be incredibly difficult to accomplish, but that is why new heuristics that focus on doing just that are needed. These new heuristics, which I discuss in the final chapter, are not only useful but also necessary to accommodate user needs in relation to an issue, so that the issue stays a focus of development, but is not the core. Building these kinds of heuristics and using them in an iterative design and development process will help create more useful, productive, and necessary
applications for users, rather than applications that may have the best of intentions but lower use rates due to issues starting with how technologies are conceptualized, designed, developed, implemented, and marketed.
Chapter 4: Users’ Perspectives

Largely, the major challenges the developers I interviewed had in getting users motivated to use their application had less to do with marketing and stemmed from challenges with making users truly central while developing their applications. Additionally, mobile technologies require different heuristic design and development guides than websites by the very nature that the technologies are fundamentally very different: the ways in which we include or not include users to properly contextualize social and civic issues, connected with the design and development standards we may or may not follow impacts the success and regular use of mobile technologies. In recent years, scholars have called for the use of other terms than users to describe the people using technologies or products. For instance, Thomas Vander Wal (2007) and Liza Potts (2014) emphasize the use of people-oriented terminology: the humanness of people is highlighted, rather than the use of a particular technology or product, which defines people by their use, rather than anything else. Potts explicitly uses the term “participants” rather than users, noting that the use of participants to describe those that use the technologies and products we research, test, develop, and puts focus on the “activities taking place within a vacuum of computer-based interactions […] Participants now work across multiple systems, balancing activities on multiple technologies” (p. 20). Essentially, the underlying networked-emphasis in Potts’ work, her emphasis on Actor Network Theory (ANT), is potentially the rationale for this focus on the networked ways participants engage with different media and content in different technologies. Potts’ reasoning for participants is insightful and useful for her focus on networks, but the ways in which applications are designed currently puts less focus on networked communication, content, and interactions and more on individual actions with information within the application software itself. The design and development of applications is still defined by users, rather than participants. Applications are not designed for people to leave them easily and connect with the other applications and networked affordances on a mobile device. I found the term user to be a more accurate word to define the people who use the applications, rather than participants. That said, even though I am using a term that has been critiqued, I do not want to devalue or de-emphasize the experiences and insights users had regarding the applications I tested. By using the term users in this chapter as a way to describe the people who use technologies, I want to
point out the state in which technology development leans towards currently: users rather than participants.

Specifically, the following chapter examines the three mobile applications I’ve discussed throughout the study: GoodGuide, an application intended to promote the consumption or use of products that green and socially responsible, Green Map, an application that allows users to create maps of green or sustainability-focused locations in an area, and H2O Tracker, an application built to aid people in consuming less water. This study involved a series of different analytical methodologies in order to review the current interfaces and core structure of the applications, along with the major emotions and experiences that users have while using the applications. Before I began the research I conducted for this project, as I mentioned in the introduction, I began testing some of the same mobile applications (specifically GoodGuide and Green Map) and other civic and social engagement mobile applications in a usability course (ENG 514, Usability and User Experience) that required me to test them with primarily standard usability practices. This earlier testing I conducted for the usability course required users to complete a series of tasks in order to find specific errors in the technologies. As mentioned in earlier chapters, standard usability typically asks designers, developers, and researchers to test the ease of use of products and interfaces and technologies by looking at common concepts like navigation or mapping to make sure the item being tested is useable and functional. This earlier standard testing I completed for the usability course was incredibly useful in understanding the foundations of how the mobile applications were functioning in both positive and negative ways (or, rather, productive and less useful ways). But what this testing did not focus on were the experiences users had with mobile technologies, along with the kinds of experiences and interactions they would want to have in order to find the application useful and productive. This chapter details some of the useful information I found by using the standard usability testing, while focusing mostly on the research I conducted for this project in order to attain data on experiences users have and want to have with mobile technologies for civic engagement. In doing so, this research answers one of my key research questions, what do users want out of mobile application technologies that engage social and civic issues?

13 The original standard testing I conducted will be discussed in this chapter, but if you’d like more information on the specifics of those tests, refer to the appendix.
Methods

As mentioned in the introduction, the study for this project consisted of three major sections: an evaluative analysis of web vs. mobile applications, interviews of application developers, and usability research conducted with target/end users. The methods used in this section of the study consist of standard usability testing, which I used as a way to pilot test the applications, and mobile action usability research, wherein I used a hybrid form of semi-structured interview with usability research that focused on the motivations and experiences users might want to have with applications like Green Map, GoodGuide, and H2O Tracker. The following section details some of the findings from the standard usability tests I completed, specifics of the hybrid usability research I conducted with users, along with overall findings from both methods. As with the interviews with developers, I discussed in my detail why I chose specific questions to ask in order to give a more thorough picture of the hybrid usability research I conducted, given that it is different from standard usability testing.

Standard Usability Testing

The early standard testing I conducted included a series of specific and well-known usability concepts and heuristics that I wanted to test in the mobile applications, which included the following: Presentation - this category revolves around the use of and overall design of the application interface, including issues of accessibility, navigation, consistency, and functional literacy. Participation - this category focuses on features such as allowing for multiple identities within an interface, track status, and user input to emphasize the question of if user participation was an important factor in these applications. Engagement - this category emphasizes the experiences, emotions, and motivations that allow for users to come back to an application.¹⁴ Malleability - this category focuses on customization features in applications and the ease of such customization features, if they exist at all.

These tests included an evaluation heuristic and standard usability testing, wherein users were asked to complete tasks in order for me to note where users encountered errors in elements revolving around participation, engagement, and the other major categories I examined. The

¹⁴ I included a category devoted to understanding emotions and engagement (such as testing for McGonigel’s ‘engagement economies’), which is not typical in standard usability testing. I realized that I needed to extend my research on experiences and emotions extensively in my second round of testing in order to answer my research questions.
evaluation heuristic was used to examine the various strengths and weaknesses of the applications in multiple key areas, including the major categories discussed earlier: presentation, participation, engagement, and malleability. This point-based heuristic system is commonly employed first in usability testing because it provides a foundation for identifying potential problem areas in the application to be further analyzed in the proceeding usability tests. While I started the tests with hopes that I would identify experiences users have while using the applications and those like it, I found that standard usability testing did not allow me thorough data regarding much other than the design and functionality errors found in the mobile applications. While this information was helpful, it skewed responses towards concerns over the design, placement, or colors of the applications rather than larger concerns of when, why, or how users might find civic engagement mobile applications useful in their lives.

**Participant Selection**

These initial standard tests I ran in the usability course included three college-aged users. I recruited participants through email. In the recruitment email, I requested that participants in the study have familiarity with using mobile applications in general or the applications I tested. Although I found out during testing that while all participants were very familiar with mobile applications, none were familiar with the specific applications (GoodGuide, Green Map, and MyActions) I tested. Additionally, while it was not a requirement to join the testing, all were interested in environmental issues in some capacity. You will notice that these initial requirements were tweaked when I recruited participants for the mobile action usability research, which will be discussed in more detail in the mobile action usability research section later in this chapter.

**Standard Usability Test Findings in Summary**

The first step in the standard test was to conduct an evaluation heuristic, a typical test in usability testing that guides the study in that it is a first step in evaluating the strengths and weaknesses of an interface. The evaluation heuristic is used to inform the research questions for the in person usability research, where users are asked to complete a series of tasks. While focusing on four central categories, presentation, participation, engagement, and malleability, and many subcategories, this test found central issues in the applications being tested, along with
strong points in the interfaces. This heuristic served as a guide for the usability tests, which is why it was a vital first step in the overall study. Summaries of the evaluation heuristic findings are discussed in the following section; the full heuristic findings can be found in the appendix. What the initial heuristic evaluation and the usability tests showed is that while users were generally able to use the applications and understood what the applications were meant to accomplish, they were less able to quickly understand the usefulness of the applications. But it was harder to gauge what motivates users to continue using an application, especially when an application is requiring users to make changes in their lifestyles because the test focused primarily on traditional usability concepts. These standard usability tests very much informed my process in building this entire thesis project in that I quickly realized that I needed a new research plan that would allow me to more specifically and effectively pin point issues in relation to civic engagement. Even though I knew I needed a different research plan, the standard testing did help me understand that users took issue with the following elements in the civic engagement applications I tested:

- **Lack of information** connected to how the application works specifically – where does data come from and where does data that is input go? How does the application really impact the environment in a beneficial way?
- **Lack of motivation** fueled by a lack of connections to users’ personal lives, thoughts, feelings, emotions, and local contexts.
- **Lack of connectivity** in regards to being able to connect with other users, but most importantly, in regards to being able to connect with social networks that already exist for the user, such as social networks on Facebook, Twitter, or Tumblr.

While the earlier standard usability testing I conducted during my usability course was certainly useful, I also found it lacking in reference to the complexities that users noted when considering rationales for using (or not using) mobile technologies to resolve or change issues or modify their behavior or when considering the experiences users have most commonly with mobile technologies. Because of these factors, the proceeding research was designed as a hybrid of usability testing and semi-structured interviewing. I refer to this hybrid method as ‘mobile action usability research.’
Mobile Action Usability Research

Standard usability testing asks users to accomplish tasks in an effort to identify and document issues and errors in technologies, interfaces, and products in order to make them easier to use, but while the initial testing I did was very productive and valuable, I wanted to find answers to the kinds of experiences users want to have with applications aimed at civic engagement. I wanted to see if the ways in which users used mobile technologies in general could provide useful information for developers when they consider using mobile applications as a means for encouraging civic engagement and modification of habits. Therefore, I knew that standard usability testing could only get me so far in answering those questions. The hybrid method I put together was a semi-structured interview, coupled with a usability test that focused not on errors and issues with the applications, but how, why, and when users would be motivated to use such technologies, given their interest in the issues addressed in the mobile applications. I found that these kinds of questions typically allowed users to more thoroughly and freely discuss the actions they wanted to accomplish with mobile applications for civic engagement, what they wanted to do with mobile technologies to support an issue or concern; therefore, I decided to call this kind of hybrid testing ‘mobile action usability research.’

Participation Selection

Nine college-aged participants who were unfamiliar with the applications being tested were chosen to conduct usability testing. These participants were chosen primarily because of their relatively extensive experience with and use of mobile applications in general. When I recruited these participants through email, I asked them to be able to participate in the study that they 1) have knowledge of and familiarity with mobile applications in general (not necessarily the applications I tested given my experience in the standard tests wherein none of the participants actually had experience with the applications I was testing), and 2) an interest in social and civic concerns, especially those related to the three applications I tested in the study,

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15 I wanted to note that these discussions with users took place in different spaces, including offices, lounges, living rooms, and conference rooms. I was dedicated to finding spaces where people would be comfortable; hence, why these discussions did not occur in my own office or a lab.
GoodGuide, Green Map, and H2O Tracker. The reason these participants were chosen is because they could easily be potential new users of the applications and they had enough of a background with mobile technologies that they could provide insights into their common use of their technologies.

User Profiles

The following user profiles detailed below in table 2 are considered the two primary potential users for the applications. I developed these profiles based on my assumptions of typical users in order to help me better identify participants for my study.

Table 2

User Profiles for usability research

<table>
<thead>
<tr>
<th>Name</th>
<th>Jennifer Do-Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persona</td>
<td>College-aged advocate for the environment. Even though she moved to a new community when going to college recently, Jennifer reads her local news sources for ways she can help environmental concerns in an area that is new to her. She’s tech-savvy and uses her smart phone to schedule her days.</td>
</tr>
<tr>
<td>Age/Gender</td>
<td>18, female</td>
</tr>
<tr>
<td>Occupation</td>
<td>Student</td>
</tr>
<tr>
<td>Education</td>
<td>Some college</td>
</tr>
<tr>
<td>Personal Online Behavior</td>
<td>Like many of her friends, she is very comfortable with digital technologies and applications. She uses her phone throughout the day to complete different kinds of tasks, such as emailing on the go, scheduling her days, and communicating with friends. In her spare time, she likes to surf Facebook and news articles using specific applications.</td>
</tr>
</tbody>
</table>

16 I wanted to clarify that in the standard testing I did for my usability course, I tested GoodGuide, Green Map, and MyActions. I switched out the MyActions application for the H2O Tracker application because I was able to get in contact with the developer of H2O Tracker.

17 Testing users that already use an application may yield different kinds of information.

18 While these profiles may be the more typical users of the applications I tested, I do want to note that these are not the only kinds of users that may want to use applications. Therefore, it is important to also include less typical users in testing.
<table>
<thead>
<tr>
<th><strong>User’s Objectives</strong></th>
<th>First and foremost, she wants to make a difference in her community. She wants to know what specifically can be done in her community and wants different ways to resolve issues, especially if she can do so with some of her friends.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>My Objectives</strong></td>
<td>Make her feel that she is a valued user of the application. Give her information or ways of acquiring information regarding specific issues in her community, while allowing her ways to meet up with friends and tackle some of the issues she’s most concerned with in her local community.</td>
</tr>
<tr>
<td><strong>Name</strong></td>
<td>Terrell Try</td>
</tr>
<tr>
<td><strong>Persona</strong></td>
<td>Although Terrell isn’t opposed to influencing environmental concerns in his community, he’s more concerned with his own health and safety. He feels that by helping the environment, he is also helping himself and others. He’s less certain as to where to start helping though.</td>
</tr>
<tr>
<td><strong>Age/Gender</strong></td>
<td>20, male</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td>Student</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td>Some college</td>
</tr>
<tr>
<td><strong>Personal Online Behavior</strong></td>
<td>Familiar with applications and social media and networking websites. Terrell finds most of the time that he uses an application is to fill time in between classes.</td>
</tr>
<tr>
<td><strong>User’s Objectives</strong></td>
<td>Terrell is primarily interested in making healthy choices for himself, which may include helping out the environment around him. He’d like to learn more about the specific issues of concern that are related to his health in his community. Additionally, he’s focused on using applications that are entertaining in some fashion.</td>
</tr>
<tr>
<td><strong>My Objectives</strong></td>
<td>To motivate him to consider environmental issues a subset of concerns regarding human health. Additionally, I want to keep this user entertained, like many of the other kinds of application he or she might use.</td>
</tr>
</tbody>
</table>
Sample Usability Research Questions

Like the semi-structured interviews I conducted with the developers, this research allowed for a flexible conversation. Each discussion with users was slightly different, given that the order of the questions and the use of probing questions was different given the specific discussions. The following list is a sampling of the kinds of questions I asked the users in this study:

1. For how long have you owned a smart phone?
2. Do you use a smart phone frequently?
3. In what ways do you most often use your smart phone (for instance, what made you buy a smart phone)?
4. What are applications on your phone that you use frequently? What events or scenarios do you find yourself using these applications more frequently?
5. What do you like about the applications that you most frequently use?
6. Based on the main screen of the application, what would you consider to be the main function of the application?
7. When (during what time of day or during a specific event) would you might use this application?
8. What about these applications could be improved?[^19]
9. What do you like about it? What do you dislike about the app?
10. Did the application meet your expectations?

The first five questions I asked users were written in order for me to understand their use of mobile technology and mobile applications. Through this section, I was also attempting to tease out the specific affordances of mobile technology and applications by asking what users liked about the specific applications they most commonly used. These first five questions was the first phase of questions, while the second phase of questions—questions six through ten—focused specifically on the mobile applications.

[^19]: I got feedback from participants that was useful in reference to fleshing out what users wanted to do with the applications when they answered the ‘how would I improve this application’ question, but in the future I might ask a question phrased something like ‘what would you want to do with this application?’ ‘What would you like to do that is not readily apparent?’
Findings

This section discusses both answers to the first set of questions (questions one through five), along with answers regarding the specific applications. The initial five questions are discussed separately from the findings regarding each specific application. The responses have, in some cases, been slightly edited to remove identifying markers. Additionally, I developed categories, such as ‘Participant Use of Smart Phones,’ or ‘User Challenges with GoodGuide,’ to reflect the questions, sometimes combining questions in ways that made sense for reporting findings.

Participant Use of Smart Phones

All users in the study had a smart phone currently. Most users I tested had their smart phones for 1-3 years; there were several users that had their smart phones for 5+ years, but this was not the majority. Additionally, all of the participants expressed using their smart phones frequently in many different ways to accomplish certain tasks throughout the entire day whether to browse the internet in the morning as a way to wake up, message and communicate with others throughout the day, check on important information with applications, or play a game at night to help them sleep. As users expressed the frequency of their use of their smart phones, many mentioned some kind of disappointment over how much they used their phones: One user explained, which exemplified other similar responses, that the user’s smart phone was “always within reach. [The user] depends on it. [The user] basically has a relationship with [the user’s] phone.” Another user commented, “Yes. It’s sickening how much I use it. I’m checking my email constantly.” Overall, users explained that they had significant attachments to their smart phones.

All users explained that they used their smart phones to check email, to text message, and to check various social media site, including Facebook, Twitter, Tumblr, and Instagram. Additionally, users explained that they used their phones frequently to look up information that they needed quickly regarding topics like food and movies. Many users expressed the sentiment that they often used their phones in “replacement” of their laptops because they used their laptops for specific purposes, like to use Word and browse the internet. They explained that they used their phones in different ways than their computers and adhered to the phrasing that the cellphone had “replaced” the computer in many ways.
**Participant Use of Mobile Applications**

Users used their smart phones predominantly to check different messaging and mail applications, along with the various social media and networking applications that are currently popular: Facebook, Twitter, Tumblr, and Instagram. Many users expressed liking to use the applications because they allowed them to do something quickly and when they thought to complete whatever they needed to accomplish in that moment. Some of the responses invoke this note: “I google maps a lot. Before using the app, I would print off the directions or write them down. But I prefer the app because I like to get lost in local areas, so the GPS use is really useful for those situations, rather than paper copies of the directions.” Applications are “things that a part of my day. They are a habit for me,” so, these applications are tied to the user’s interests, but also have become a habit for the user. Some of the other applications like bill-paying help users to “do things on the go” or when they’re “on the move.” Additionally, the majority of users explained that they like using these applications--Facebook, Twitter, Tumblr, etc—when they had “downtime” or if they were waiting for a bus or an event to take place.

**Green Map Findings**

This section discusses the specifics of the findings in relation to Green Map. I developed categories to discuss questions, wherein related answers from different questions were combined for easier data reporting.

**How Users Want to Use Green Map**

Many users expressed that they would most likely use the app when traveling or visiting a new place. “If I was looking for green restaurants. I really like supporting local restaurants, so I’d like to do that in a new area, rather than eating at chain restaurants.” Several users explained that they didn’t think they’d use the application in reference to the locations in their own communities because “I’d already be familiar” with the spaces in his or her own community. “I wouldn’t need to use it much after one of two times, unless I was traveling a lot.” Most users explained that they would use the application when they moved to a new location or if they were vising a new location. One user in particular explained that “If [the user] wanted to plan a day trip with [the user’s] kids, [the application] would be great for finding green things to do and places to visit.” Several users expressed disinterest in the
design of the application. Some expressed that it look too simple or not sophisticated, yet many explained that they would use it once it was fully functional.

**User Challenges with Green Map**

Most users could figure out the main purpose of the application, but had a hard time tying the purpose of the application to what the developer’s explained to be the motivations and goals for the applications as a community-building kind of application. Many users had questions about what constituted a “green” location: “I’m not sure what ‘green’” really means. For instance, the Student Armstrong center is a “green” building, but also costs hundreds of thousands of dollars to run.” Predominantly, users explained that they would like more information on the specific green locations that the application found: “I needs more information, but I like that it is not giving the traditional “green space,” such as a park. I would like if it would give me some reasons for doing things there (other than typical park like activities).” Additionally, the criteria for labeling something as green was something that many users expressed wanting to see in the application. Lastly, many users were confused by some of the mapping icons. “What is an icon?” Or didn’t understand why a school was under a particular category and not another, so the categorizing system and some of the wording used in that categorizing system was confusing to many users.

**GoodGuide Findings**

This section discusses the specifics of the findings in relation to GoodGuide. I developed categories to discuss questions, wherein related answers from different questions were combined for easier data reporting.

**How Users Want to Use GoodGuide**

All users explained that the application could be used to scan products. Although many explained the application could also be used to browse/research products, there were a couple that did not know this feature existed. All users explained that they would use “this at the grocery store. [I] also liked that you can research the companies and products to research. [I] could see myself researching the products rather than always the scanning
element. The fact that you can browse information really helps sustain use.” Users expressed that they could see themselves using the application many times over.

Several users liked that the application provides alternative products. “I like that it is very easy to use and intuitive to use. I also like that I could go to a store and find a product that I might purchase; I can look at it at the application, so the alternative products is really useful (by brand or not by brand).” Other users explained that they liked the scanning option because, while they might not use it all the time in the store, they were curious as to the products they already buy and that environmental and social impact. One user explained that the user would be much more apt to changing purchasing habits if the user knew the ratings of the current items the user bought had in the application. Based on user reactions, the application overwhelmingly “did exactly what I thought it would do,” which users explained as being able to scan products at a store or at your home or browse products.

_user Challenges with GoodGuide_

One user explained that the application was set up for you to want to scan an item, but the user was more interested in browsing items, the user wanted to “browse with a purpose.” Many users expressed also wanting to share the app with their friends: “I would like to ‘compare notes’ about the products I found.” Beyond some of the difficulty finding the browsing feature, most users explained that they didn’t know where the ratings on the application came from and they were not sure if they could trust the application developers. Additionally, several users explained that if they clicked the ‘behind the ratings’ button that they expected a much more detailed explanation than given on the application. “I would like more information on the rating system. ‘Behind the ratings’ isn’t enough information. I assumed that there would be more extensive information on the ratings. I would like to have more information. I would hope they have the best intentions, but you never know.”

_H2O Tracker Findings_

This section discusses the specifics of the findings in relation to H2O Tracker. I developed categories to discuss questions, wherein related answers from different questions were combined for easier data reporting.
**How Users Want to Use H2O Tracker**

Many users explained that the application was meant to track the water use of the user and that the application also “probably teaches you” about water, given the “water 101” button on the application main page. Most users explained that they would not use this application because it seemed like a “use it once” and it is done application. The application requires users to answer quizzes for points and prizes, but because the application didn’t archive answers or provide contextual information, many users explained that they wouldn’t use this application.

“If there were just two options—inside and outside of water—and a call to action to explain the extra elements of the apps. I think of this as a “fun” app. If it was more tied to how the water conservation could save me money, that’d be great.” Other users explained that they wanted the application to take the issue seriously: “I want some facts about average water usage on just one page next to my own bar graph, then that would be more personally fulfilling. If I wanted to play a “mindless game,” I’d play angry birds.” Overall, users explained that the application did not meet their expectations and that they would not use the application. “The application reminds me of a game called Freddy the Fish and the fish would teach you educational things about sea creatures. It seems like the app is geared towards children—lots of exclamation points, lots of explanations as to what the app is and what it does. It’s not taking water conservation seriously.”

**User Challenges with H2O Tracker**

Users explained that the application seemed “gimicky” and “juvenile.” Although, most users used the term “cheesy” to describe the application, which was most often related to the following: exclamation points, the fish icon, the design, the color scene, the fonts, and the “loosy goosey” design, the “non-linear” design. Also, many users did not like the prospect of logging into the account: “Creating accounts on mobile applications can be a hassle.” One user explained that they would rather log in using another application, such as the Facebook application, to expedite the process of having to log into the application.
Many users took issue with the games in the app: “The game teaches me about water use, but it does not feel serious. It feels like you’re pretending to enact activism when you’re not. It’s not motivating you to change your behavior. I don’t feel like it guilts me into saving water (hundreds of people need clean water), which is good. It teaches things, but you have to realize and internalize and then change your behavior.” Others suggested that the game’s questions were the issue: “The game aspect is getting in the way. Answering mundane questions doesn’t make me feel like I’ve accomplished anything. And the tips are things that I’ve already thought of. This is trivial pursuit, not water conservation.” One user suggested: “I would want that information [the tips] archived and accessible. I would want to go back to the tips. For instance, six months ago, my water bill was high; I would want to go back to the tips, rather than answering the questions to see if I can make some changes now that my water bill is high, hypothetically,” which highlights how H2O Traccker was ill-fit for this user’s daily life and perceived use of the application.

Conclusions

The standard usability tests that I conducted earlier were useful in identifying some keys issues and errors within the mobile applications I tested, Green Map, GoodGuide, and H2O Tracker. I found that, generally, the civic engagement mobile applications I tested were easy to use and excelled when tested against standard concepts like navigation, mapping, Fitt’s law, track status, and error reporting and feedback. But more importantly though, the standard tests I conducted in the usability course allowed me to see that the standard usability test would not be enough to identify the experiences that users currently had with mobile technologies and applications and the motivations required to keep them coming back to applications, such as the ones I tested. Furthermore, I realized that the standard testing did not tell me enough about civic engagement and how that as a concept plays out in mobile technology and applications in specific. I found that users wanted different elements out of applications in reference to civic engagement but these tests also heavily emphasized the specific errors and issues within the applications, rather than the experiences users want to have with these applications as those experiences related to civic engagement, not ease of use.

Overall, through these tests, like with the developers, I found that many users were interested and cared about the environmental issues discussed in the applications. One user
explained, “all three are conceptually important. But, as an app, do all of these make sense? I’d rather something be an app that could sustain use. I’m not looking for information when I’m on my phone; I want something to do with the application.” The user explained that while Green Map and GoodGuide would sustain her, “the H2O tracker one only seems like a ‘one use’ feel—there’s not real activity there—I’d just rather look up the information online.” Another user had a similar sentiment that ties together what users want out of civic engagement applications: “[Applications] do something that I want done in my life.” What these responses point to is that users interact with their smartphones in ways dissimilar to their laptops. And furthermore, the ways in which they engage on their phones in regards to social and civic is very different. Whereas users expressed that they used their laptops more for research, writing, longer emails, etc, they used their phones to help them stay on task and accomplish some kind of action-based task in the moment of need: users want to fulfill what I’m calling a necessary action in relation to the social or civic issue. So often, people may feel that they cannot do anything to impact a social or civic issue, but applications give the impression that something can be accomplished in ways that researching or reading information about a social or civic issue (practices that users expressed doing) on their laptops does not fulfill. What I find important to reiterate is that even though there is overlap in the ways users use web technologies and mobile technologies, users appear to approach and conceptualize social and civic issues differently when using cellphones than when using a laptop.

I’ve found some specifics in relation to what a necessary action might look like. My conversations with users suggested that for them to feel motivated to use an application, they needed to feel like they have accomplished some kind of action, that what they’re doing in the application is worth their time and energy, which is potentially why so many of the users took issue with the H2O Tracker application, which emphasized games and child-like themes through bright colors and a cartoon fish. Tied to the importance factor is trust, or building a sense of trust in users by giving them enough information (generally, that is what users seemed to tie to trust in the tests I conducted). Users want enough substantial information so they can trust what they’re doing and using an application for, particularly in reference to social and civic issues. If users can’t trust the application, like the criteria for Green Map’s locations or the ratings on GoodGuide, then users may not be as motivated to continue using the applications. Users want a clear understanding as to the customizable ways they can accomplish these necessary actions—actions that they need to accomplish to impact or influence a social or civic issue—in an application. For example, when
one of the users explained that the GoodGuide application *forwarded* and implied that the initial, and therefore main or only, use of the application was to scan items made the application feel forced and less customizable to that specific user’s wants, which was to actually focus more on the browsing/research feature in the application.

The information given by users brings up many different ideas, issues, and considerations, but what I find overwhelmingly important in their responses is that mobile technologies, coupled with mobile applications inform the ways in which we engage with social and civic issues. Furthermore, users appear to have specific ways they’d be interested in engaging these issues using mobile technologies, ways that would allow users to accomplish the kinds of specific tasks needed in the contexts in which those actions and tasks are needed. For example, as I mentioned in the introduction, social and civic issues are very much bound by context: Aurora’s water conservation issue in the not the same kind of water issue in different states, even those suffering from water conversation, like many southern states in the United States. Because social and civic issues are heavily context-specific, our technologies for resolving these issues in different ways must allow for context-specific interfacing, functionality, and design so that users can make the context-specific actions that will suit their community’s needs best. The next and final chapter of this project will draw from these findings, as well as the ones from developer interviews in chapter 3 to inform heuristics that better accommodate necessary use and action in mobile technology affordances.
Chapter 5: Mobile Action Heuristics and Practices

“...Complex problem solving requires unique support. Not only must this support address large and complicated information spaces, it also must help users configure, negotiate, and coordinate resources in landscapes of activities that are both patterned and variable. That is, software support must accommodate the structured openness of complex problem solving” (p. 5).

–Barbara Mirel, 2004, Interaction Design for Complex Problem Solving

This project examined many different facets of technology development and design: the developers invested in these technologies and applications, potential users for these technologies and applications, the distinctions of mobile technologies, along with the different frames and research methods both used to develop technologies and those that are useful for technologies engaging social and civic issues. What I am arguing for is an extension of the concepts used when evaluating applications for civic and social change, along with arguing for modifying in-person testing to incorporate mobile action usability research as needed. Concepts and research practices that allow designers and developers to both test for and research user wants, desires, concerns, and contextual uses of technologies will allow those deeply invested and concerned with social and civic issues to use the right kind of technology to suit their purposes and then build and revise technologies and software that will be context specific and emphasize the kinds of interactions and actions users find valuable and productive. First and foremost, I want to start by summarizing some of the major findings from the study, starting with the importance and value of mobile technology and mobile application software in distinction from less mobile technologies: laptops, desktops, and some websites that are only functional on laptops and desktops, etc. As discussed in chapters 1 and 2, mobile application software and mobile technologies often afford users similar functions and features on applications and websites. To answer the first research questions for this project, I used GoodGuide and Green Map’s website and applications as examples to analyze. In both of these examples, GoodGuide and Green Map’s websites and mobile applications allowed users access to similar kinds of information: product ratings and mapping data. Both, in a sense, rated and categorized information—products

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20 What can mobile application technologies afford communities hoping to make social changes? Why and when are mobile technologies useful for civic engagement?
or locations, respectively (as sustainable or green or socially sound). So, while the applications and website-versions of the applications (or websites and application-versions of the websites) were functionally similar, the technologies allowed for vastly different uses. The mobility factor embedded in the mobile application software, as it is only available on mobile devices, changed the very use of the information and the conceptualization of social and civic issues as users use these applications. The websites emphasize engaging in social and civic issues in regards to research. Both GoodGuide and Green Map’s websites allow for users to access stores of information and data and because these websites are accessed through desktops and laptops, users are going to predominantly use these websites as sites of research: users will access information and then use said information in different ways away from the technological source, the laptop or desktop. The technological source does not bring users physically closer or psychologically closer to the social or civic issue, but focuses instead on giving users information, data, and motivations that they may use at a later time. The mobile versions of the same data and information—product ratings and mapping data—take on new meanings when used in the mobile forms. Similar content, data, and information, when used in the mobile applications, supports not only research practices, but also afford users to engage in social and civic concerns in the moment of need. Users are able to perform necessary actions, actions that not only allow users to engage civically on the go, but, more importantly, when they need to perform actions outside of the home or workplace in relation to the issue. Mobile technologies and mobile application software, as least in the ways in which they are designed now, appear to support and encourage significant action rather than primarily research and information gathering and storing.

Mobile technologies and mobile application software also allow users to not only perform actions—take pictures, track water use, record video of damaged environments, research a product in a store, etc—in the moment of need, but they also connect users with the civic and social issue in different ways than laptop and desktop technologies. As referenced in chapter 1, the Green Map system website gives users a visual map of areas in their communities or around the world that host sustainable and green locations. So, too, the application has similar functionality, but the application supports the action of supporting and visiting the locations because the mobile device allows for users to examine the data and information and use it directly to locate and visit the locations. So, by way of the mobile application software, the
mobile technology services, and the mobile device itself, users can then physically connect memories and experiences at locations by way of using the technology to find and locate and interact with the locations. While the affordances of mobile technologies and application software sound grand, application software has had some flaws associated with it, mainly revolving around the development process: the standards of technology testing and the system-centered focus of developers. Usability heuristics and testing do not accommodate mobile civic engagement and current mobile technology does not always use the affordances available for civic engagement even if that is their intent.

As examined in chapter 2, foundationally, standard usability practices and developer focuses tend to be system-oriented. In other words, the ways in which developers consider technologies and then develop technologies are not as focused on users as they may want to believe they are. Standard usability practices (in-person and task-based usability testing), concepts, and heuristics, those forwarded by Jakob Nielsen (1995), Bruce Tognazzini (2014), and other scholars, foreground concepts like navigation, mapping, accessibility, and readability, emphasize the errors currently in technologies that users might find, rather than the actual wants and desires from technologies that users may have. Realistically, the process is not so simple as asking users what they want from technologies. I am not arguing for developers and designers to take out standard usability principles or standard in-person testing practices from their development process, but for the extension and modification of current concepts and practices in order to better design for civic engagement specifically.

As referenced in chapter 3, what I found in regards to my second research question was the tendency of the developers I interviewed to put most focus on the social or civic issue. I also noted then and want to emphasize now that this should not be a surprise. The social or civic issue of concern is so often the impetus for wanting to create technologies to serve these issues, but what that does is put emphasis on the developer or designer’s perception of the issue, the problem, and the solution. The ways in which the technology and software is designed revolves around a developer or designer’s framework for the issue, rather than what users may actually need or want out of a technology. Although this was a major finding, I also found that while

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21 How are some companies and organizations currently attending to users’ needs and concerns regarding social and civic issues through mobile technologies?
inherently developers were creating technology from an ultimately systems-focused lens, every developer I interviewed was nevertheless invested in and committed to users.

![Diagram]

**Figure 17. Putting users at the center of design and development:** The image above is a visual representation of keeping the social or civic concern in mind, while putting the user at the center of technology design and development.

Although static images and graphs do not completely and thoroughly depict the complexities of these technologies, combined with the social and civic issues at hand, I contest that the relationships and focuses emphasized in figure 17 will allow for developers and designers to not only attend to the issue that they are concerned with, (water conservation or sustainable consumerism, etc) while putting most focus on the user. And in order to accomplish this kind of development process, we need heuristics that emphasizes the user, user actions, user wants, and user needs in the frame of how users position the social or civic issue is necessary when designing and developing technologies for civic engagement. In this kind of process, technologies and systems are integrally tied to the developer and the user, while becoming a kind
of aftermath solution. So, digital and mobile technologies do not become an automatic must in relation to solving social and civic issues, but instead are incorporated in reaction to users wants, needs, and uses of potential technologies.

**Mobile Action Heuristics and Practices for Civic Engagement**

Through this project, from researching different applications and technologies to interviewing both developers and users, I constructed additional heuristics, guidelines for application development and design, and in-person testing practices that do not undermine standard usability testing, but can be incorporated into common usability practices in order to make better applications to serve social and civic concerns. As mentioned throughout this project, standard usability practices, concepts, and heuristics are vitally important to make sure the products and technologies developers and designers construct are functional and easy to use. The heuristics that I am arguing for here extends beyond ease of use to focus on concepts that will guide developers and designers in more thoroughly defining what users want from technologies for civic engagement, along with if mobile technologies are most useful to serve developers and designers motivations and goals. What I found that many of the applications I examined had issues that revolved around the following elements:

- **Lack of information** connected to how the application works specifically – where does data come from and where does data that is input go? How does the application really impact the environment in a beneficial way?
- **Lack of motivation** fueled by a lack of making the applications tied to users’ personal lives, thoughts, feelings, emotions, and local contexts.
- **Lack of connectivity** in regards to being able to connect with other users, but most importantly, in regards to being able to connect with social networks that already exist for the user, such as social networks on Facebook, Twitter, or Tumblr.
- **Lack of customization** or malleability, within the applications to suit specific contexts.
- **Lack of significant actions** in the applications – users oftentimes felt games and gamified interactions with content and data did not match the perceived severity or seriousness of the issue.

These main issues that users noted in my interviews with them formed the foundation of the following heuristic, guidelines, for building more productive technologies and software for civic
engagement. Findings from all of my central research questions informed the following heuristics and mobile action research practices discussed in the sections below.

**Affording Access to Information**

Participants in this study expressed a desire for more information on several counts: data regarding how information was provided by the application and where that information was coming from, along with general information on the goals of the applications. Developers, too, struggled with the kinds of information that would be valuable for users. Bill Pease, associated with GoodGuide, explained that it was oftentimes difficult to know exactly what kinds of information users would want and how much they would want (B. Pease, personal communication, April 16, 2014). All of the developers expressed that the applications were, in a way, making users aware of the social and civic issues. For instance, Frani Halperin, developer of H2O Tracker, defined multiple times in our interview that the main issue of water consumption in Colorado was due to the fact that many people living in the area did not know when went into the process of attaining clean, drinkable water in the Colorado area. She explained that if only people knew more about the issue of water consumption and conservation, they would be more likely to practice environmentally sound habits, which puts more emphasis on educating users rather than motivating them through personal connections (F. Halperin, personal communication, April 18, 2014).

By affording access to information, I mean that users expressed a desire to have quick and easy access to what the application is meant to do upon download. Screens should quickly and concisely explain the basic purpose and functions of the application itself. Second, users should be able to retrieve the major goals of the application through an easily identified “info” tab on the applications. Users want to know who developed the applications, why, and how they can fit into the developers’ long-term goals for the application. Users want to feel both a part of the experience, while knowing that they are making a difference, so access to the developers’ goals (written in such a way as to invite the user into that process) is imperative. As discussed in chapter 2 and 3, when users are not entirely at the center of the development process, it shows. The kinds of information that users may want are not available because figuring out what users generally want and need is not a focus.
Emphasizing Experience and Emotion

Participants focused on their own motivations for using environmental engagement applications and explained that they would be more apt to use such applications if they the applications were tied to their local contexts. For instance, participants explained that incorporating images of local places, environments, buildings, and people would help them have an emotional attachment to the applications. Additionally, this emotional attachment would make users more inclined to make changes in their lives and continue to use the applications. If applications used games to encourage participation, participants wanted to see developers incorporate complex and challenging activities for users to accomplish in an application – they sometimes liked gamified aspects of the applications, but wanted more challenging tasks to complete in order to make changes in their lives. As mentioned in chapter 2, Anne Wysocki (2001) encourages designers to make visual media that treats users as intelligent, which is especially helpful when incorporating gamified aspects into applications such as the ones I research in order for users to feel like the application is not trivializing the issue. For example, turning off the faucet when brushing your teeth was a suggestion from an application, which most users already do and already know, was not perceived as useful information. Users wanted to be treated as intelligent and dedicated members of their communities. Therefore, offering challenges and ties to personal, local contexts would be imperative for these kinds of applications to succeed.

Creating Connections

Participants explained that they not only wanted more information from the developers regarding the information on the applications, but they also wanted to be able to give feedback to the developers easily. User input and feedback are important when building an application to suit the needs of local contexts; therefore, feedback and information tabs are useful features for allowing users to understand the application and add to its future development. By allowing users to connect with other people in their own social networks through Twitter, Facebook, Tumblr, and other spaces, users will be more likely to continue using the application.
Making Features Malleable

Participants pointed to the desire for the mobile applications to be contextual to their specific needs and concerns. What this points to is not so much a need for different content or information in specific: the databases of information that mobile applications often pull their content from would not necessarily need to be customized, but the application interfacing should at very least customizable or malleable for users to input their own data, images, and findings, or so that they can find information specific to their own context (rather than having to delve through generalized data). For example, users could be able to customize their specific location so that information, data, and visuals could be specific to that particular location. Most of the successes that the developers saw in their own work and that users picked up on were the functionalities to make the applications more customized to a specific user. Additionally, developers saw customization and malleability as general concepts that they were continually striving for in the development process of their applications.

Building Necessary and Significant Actions

As mentioned earlier, participants were expressly interested in not only completing some kind of necessary action, doing something through their mobile application and mobile device in the moment of use, and many of these actions were characterized by completing actions users deemed as important and significant. Participants explained that oftentimes gamified kinds of actions did not make them feel as if they were accomplishing anything of value in relation to civic or social concerns, so while this kind of application model might be extremely successful in other venues, in relation to social and civic concerns, users may very well find those kinds of interactions and actions less significant and therefore less important. So, while strictly gamifying elements of an application or turning social and civic concerns in games or quizzes may not always encourage or engage users in productive ways, there are elements of gaming that can be important and useful. For instance, Jane McGonigal (2011) explains that the productive thing about games, what makes them useful in the span of providing satisfying interaction, is that games (among many other aspects) “[make] it easy to take action and see your impact right away” (p. 222). Therefore, there is an element of feedback in relation to actions that is valuable and useful in making actions significant. Making actions into any kind of game will not
necessarily make the application-based actions any more satisfying or valuable to users. But by providing visual, textual, and potentially aural feedback cues, along with information as to how a users’ action is making an impact, developers and the technologies they develop can help users feel like their work on an application is valuable.

*Mobile Action Practices in Usability Research*

Just as standard usability practices very much overlap and feed into one another, so too do the heuristics explained in the previous section. As designers research the kinds of actions users would find valuable and productive and incorporate those into their technologies, users will become more motivated to use the products. So, too, if developers and designers make sure to incorporate avenues for access to information, users will have more opportunity to complete necessary and significant actions using these technologies. But what I want to make sure I emphasize is that these heuristics may not be as useful if it is implemented in the same kinds of ways as standard usability testing and research, meaning as task-oriented or task-based usability research. The following table explains how the heuristics in the prior section can work within usability research as mobile action research: putting focus on what actions users want to make and how designers and developers can make them feel significant.
Table 3

*Mobile action heuristics to develop/design civic engagement mobile applications*

<table>
<thead>
<tr>
<th>Heuristic</th>
<th>Description</th>
<th>Modified Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affording Access to Information</td>
<td>Affording access to information means that as a designer and developer, you actively engage users in helping you evaluate how much and what kinds of information users want and need in an application (information may refer to data, visuals, content, and the like).</td>
<td>After determining sets of information, data, visuals, and other forms of information that designers and developers find valuable pertaining to a social or civic issue, consult users to help evaluate what kinds of information and how much they would want and need to make the application useful and valuable in their lives.</td>
</tr>
<tr>
<td>Emphasizing Experience and Emotion</td>
<td>Emphasizing experiences and emotions means that actions, designs, and interfaces in applications should be informed by the personal and local contexts of users. By emphasizing the local contexts, users will feel more emotionally engaged in the application itself.</td>
<td>Oftentimes, standard usability testing will allow developers to see when an application is not motivating users. By emphasizing user experiences and emotions by focusing on asking users about the current experiences they want and like in applications, you can begin to not only determine what actions and emotions will be useful in encouraging users to continue using an application, but you will also be putting engaging actions from a user-centered perspective, rather than your own (which can be a struggle and issue in standard testing).</td>
</tr>
</tbody>
</table>

22 These heuristics were built from the perspectives of both users and developers. The developers, as discussed in chapter 3, all came from different backgrounds and career paths. Hence, the heuristics were designed for all the different people and researchers invested in mobile civic engagement work: technical communicators, marketers, for-profit entrepreneurs, non-profit organizers, usability researchers, and others dedicated to mobile technologies and civic engagement.
<table>
<thead>
<tr>
<th>Creating Connections</th>
<th>Creating connections in applications means, quite simply, allowing for connections among different websites and applications that users more frequently use. Additionally, civic engagement applications should take full advantage of these connections.</th>
<th>By encouraging the explanation of the kinds of technologies, applications, and devices that users use most frequently, designers and developers can evaluate how these connections can be made in an application to make it more useful for users.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Making Features Malleable</td>
<td>Applications for civic engagement should have the capacity for customization and specific malleability by individual users, while maintaining the general purpose or goal of the application itself.</td>
<td>Making features malleable within an application will require that developers and designing consult users as they create design interfacing to make sure that the features that users want to customize are changeable within the application interface.</td>
</tr>
<tr>
<td>Building Specific and Significant Actions; Building Necessary Actions</td>
<td>Building specific and significant actions is very much related to building upon the necessary uses that users have with current applications they use, along with the ways in which they may want to use a civic engagement application. Designing an action to feel significant means that it is an action that makes users feel like they’re making a difference in relation to the social or civic issue of concern.</td>
<td>To build significant actions, designers and developers should have users describe how mobile technologies, such as the application an organization or company wants to design or redesign, can support or help a specific social or civic concern. Users should be those that are affected by the issue, so that they can give designers the most context-specific responses.</td>
</tr>
</tbody>
</table>

By incorporating some of these heuristics and concepts into the development process, developers will likely realize that standard in-person usability testing and practices may not allow them to get at answers to the questions these heuristics ask. For instance, if you want to highlight building connections within a civic engagement application or building significant actions, standard in-person usability testing may not allow for the kinds of in-depth responses that you
may need. Therefore, I highly suggest involving users in semi-structured interview-based usability research, wherein users of applications (or users of the specific application being tested even) in general that have an interest in the civic or social issue can provide detailed responses, stories, and needs for designers and developers to pull from when designing an application. This kind of dynamic puts users at the core, puts context at the core, and puts emphasis on finding out what makes actions significant for communities. But in order to make those changes when focusing on the heuristics I provided in table 3 and the section prior means that hybrid methods of usability and interviewing will be more useful in getting responses from users than standard, task-based testing.

These questions, considerations, and guidelines should be incorporated early in the development process of technologies in order to evaluate the best and more effective kind of technology to suit user and developer wants and needs. These guidelines should also influence processes throughout development and after during revision of prototype technologies or software. That is the kind of development process that will start to support user-centered design over time, rather than focusing on system-oriented guides that are less useful for users and ultimately less useful in making real and significant change in relation to the social and civic issues in which we find ourselves concerned. I discussed these elements in chapter 2, but find them especially important to return to at this point. Many scholars in the recent past and current scholarship, including John D. Gould and Clayton Lewis (1985), Robert Johnson (1998), and others have explained that iterative development processes are, ones that continually engage users’ needs and wants and modify technologies based on that, may add time to the development process but have been argued to create more successful software and technologies.

Although I have been deeply invested in environmental issues since high school, the questions and challenges that come into play when technologies are tied to environmental concerns began to form nearly five years ago, when I was introduced to a casebook, *Boundaries*, on environmental ethics. In it, authors Christine Gudorf and James Huchingson (2003) explain, “Some earlier casebooks in environmental ethics […] strongly linked environmental, public policy, and business ethics […] But technological change has brought other areas of human life into contention with environmental ethics and broken down existing boundaries between ethical subfields” (p. ix-x). Gudorf and Huchingson’s casebook, written in 2003, predominantly revolved around cases where technologies were the tools of destruction in reference to habitats
and species: guns, saws, etc. But if revised for today’s landscape, a casebook questioning the boundaries of technologies and social and civic concerns, including environmental ethics, could include the very technologies and software examined in my study: mobile technologies, mobile devices, and mobile application software.

Mobile technologies and software, mobile applications and the like have started to become a kind of solution for some of today’s biggest issues and concerns. I started this project with optimism that I want to return to now, Robert Fabricant’s commentary in Connecting, a short documentary on interaction design, in which he was referencing mobile application technologies as a way to solve large energy issues:

A lot of the hard work today is not just about commercializing so we can rent a movie or so we can hold up our phone and see what music is being played at a bar [We will drive applications] to more and more meaningful parts of our lives…Things like energy…We can’t really rearrange the grid that easily…but you can build a shared layer on top of it through behavior and through the right contextual information that can shift the way we use those resources…We’re now trying to collect out of the periphery—a much richer set of what’s going on in the world—so we can learn as a society and optimize and evolve the right systems and services. (Kruzeniski et al., 2012)

Complex issues, like those Green Map, GoodGuide, and H2O Tracker tackle, issues of sustainability and support of sustainable-focused companies and locations, issues of purchasing environmentally and socially sound products, and the tracking and conservation of water, are all issues aligned with those Fabricant proposes mobile technologies can support. Fabricant’s answer to many of the future social and civic issues we will face revolves around digital and mobile technologies and the interfacing and subsequent designs that will come into existence to meet some of the issues, such as energy conservation and use, in context specific ways. Although digital and mobile technologies will not provide all the solutions, answers, or changes we need to see, and, in part, that is because currently the ways we design and develop technologies are not focused on the facets and complexities tied to civic and social issues. I wanted to end with the epigraph referencing Barbara Mirel’s note regarding interaction design and complex problem solving because in very similar ways, engaging and changing and hopefully solving social and civic issues—difficult considerations of resource use and conservation, fights for social rights and justice, challenges of shifting habits and behavior that would better our communities in
different ways—are complex problems that span different people, ideologies, habits of behavior, spaces, places, and technologies.

I have focused primarily on applications that deal with issues in reference to environmental concerns and the content and data related to those issues, but applications and technologies exist in relation to many different kinds of issues and concerns. Researchers should continue to document the ways in which researchers and users and communicators engage with environmental issues, but also on the other kinds of issues that other applications revolve around. Additionally, I focused specifically on cell phone application technology and less so on tablet application or even web application technologies and software—these were referenced in different chapters but were not my major research sites—and these different platforms, too, shape the ways in which we use and understand information. Therefore, these applications may require different heuristics. That said, what this project has both supported and encouraged is that mobile application software incorporated into these mobile technologies and their supporting devices (cell phones, tablets, etc) can be valid and useful ways to engage with social and civic concerns. But because social and civic issues are so often locally-specific and contextual, they require development processes, research, and methods that will allow developers and designers to both meet the needs of users while creating technologically-influenced solutions that will be effective, contextual, valuable, and productive given the community in question and the social or civic issue in question. My hope is that future research in civic engagement will continue to take mobile technology and mobile software into consideration, as they have become not only a common route that companies and organizations take to support or change social and civic issues, but they have become a unique and distinct route that primarily shapes the ways in which people conceptualize issues they are invested in and for which they use technologies.
References


Appendix

The following is the standard testing I completed in a usability course over several civic engagement mobile applications. The following includes a heuristic evaluation of some standard concepts (such as what I included in presentation – navigation, mapping, etc), as well as newer concepts.

**Application:** GoodGuide  
**Evaluation by:** Kathleen Coffey  
**Technologies:** iPhone 5

<table>
<thead>
<tr>
<th>Summary</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presentation</td>
<td>-2</td>
</tr>
<tr>
<td>Participatory</td>
<td>-6</td>
</tr>
<tr>
<td>Engagement</td>
<td>1</td>
</tr>
<tr>
<td>Malleability</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>-5</strong></td>
</tr>
</tbody>
</table>

**Major problems**  
The most major issues with GoodGuide are those that revolve around *functional literacy*, *data*, *input*, and the heuristics associated with creating a participatory interface. The application does not provide a description of how the application is ranking products and does not provide adequate information for the users of the application. Also, if a product is not in the app database, there is no indication that the company might add that product to the database.

**Major Successes**  
The application succeeds in being an application that provides information about how to use the application upon downloading it, while adhering to the rules and guidelines it discusses upon downloading. Additionally, one of the application’s major strengths is the overall aesthetic and design of the application. Upon a recent redesign, the application also has a clear target audience, which solidifies the users most likely to use the application, along with how said users would like to use the
Application: Green Map
Evaluation by: Kathleen Coffey
Technologies: iPhone 5

<table>
<thead>
<tr>
<th>Summary</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presentation</td>
<td>0</td>
</tr>
<tr>
<td>Participatory</td>
<td>-3</td>
</tr>
<tr>
<td>Engagement</td>
<td>0</td>
</tr>
<tr>
<td>Malleability</td>
<td>+2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>-1</strong></td>
</tr>
</tbody>
</table>

**Major problems**
While Green Map has a lot of successes in different areas (participation, input, and design), it also suffers in regards to user input and engagement. Because this application focuses on local areas, including real landmarks, photos, etc would add more emotional engagement to the application. Also, users need to be able to share their maps with one another so these sites are actually more readily used (which seems to be the entire point of the app).
Major Successes
With a minimalist design, Green Map allows users to input and customize their own map into the application. Additionally, the application is unique in that it creates a product for a user that they cannot create easily through other applications or tools.

Application: myActions/Small Steps
Evaluation by: Kathleen Coffey
Technologies: iPhone 5

Summary | Score
---|---
Presentation | -7
Participatory | -3
Engagement | +4
Malleability | -1
Total | -7

Major problems
myActions has a central aim towards participation, which is great, but the execution of the design, error feedback, and input—a general lack of information of how to actually use the application—makes the entire application’s purpose weak and confusing. Poor choices in design and metaphors also add to confusion in the use of the app.
**Major Successes**
This application allows users to upload images of their own ‘good actions’ to the application, while sharing their actions with others within the application. This allows for users to share their specific experiences, while motivating others to continue using the application by way of competition.

### Issues in Task 1

<table>
<thead>
<tr>
<th></th>
<th>Participant 1</th>
<th>Participant 2</th>
<th>Participant 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tab/link names didn’t align with user’s goal</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Icons didn’t match user’s goals for the application’s use</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Didn’t see icons on the application screen</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Expected instructions to explain the application’s main purpose, goals, or motivations</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Could not understand the usefulness of the application’s main purposes</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>
or goals.

**Expectations for objective**

<table>
<thead>
<tr>
<th>Expected for users to be able to figure out what the application allows them to do in approx. 2-3 minutes.</th>
<th>Users were able to figure out the specifics of how to use the application within 2-3 minutes – oftentimes less than that.</th>
<th>Basic usability principles—navigation, readability, learnability, etc—were met in all applications.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Users should understand why the application’s goals are important and significant.</td>
<td>Users were not able to understand the major motivations or goals of the application.</td>
<td>Participants were not engaged or motivated.</td>
</tr>
</tbody>
</table>

**Issues in task 2**

<table>
<thead>
<tr>
<th>Trouble figuring out what buttons to push to complete the main task of the application.</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>The information or data associated with completely the major take was insufficient.</td>
<td>X</td>
</tr>
<tr>
<td>Users would not be motivated to use the application for it’s main purposes again.</td>
<td>X</td>
</tr>
<tr>
<td>Users missed buttons non-vital buttons while initially completing the tasks (while not vital to completing the task, they added to the experience a user can have on the application) Blog buttons, actions, cards, etc.</td>
<td>X</td>
</tr>
<tr>
<td>Users did not understand the purpose of non-vital buttons.</td>
<td>X</td>
</tr>
</tbody>
</table>

**Expectations for objective**

<table>
<thead>
<tr>
<th>Expected users to complete the main task of any application within 5 min.</th>
<th>Yes, typically users were able to complete the major task of</th>
<th>The basic design and structure allowed users to</th>
</tr>
</thead>
</table>

97
<table>
<thead>
<tr>
<th>Expected users to feel motivated to continue using the application.</th>
<th>Users did not feel compelled to continue using the application.</th>
<th>The users’ personal motivations and local contexts were not specifically identified within the application, and therefore users were less inclined to continue using the applications.</th>
</tr>
</thead>
</table>

**Issues in task 3**

| Issue | 
| Trouble finding information on the application. | x | x |
| Trouble finding area for feedback. | x | x | x |
| Trouble finding the developers of the application. | x | x |

**Expectations for objective**

| Expectation | 
| Expected users to find information within 5 min. | Users did have some difficulty finding ways to contact developers. | The feedback or input buttons were not highly visible in most of the applications. |
| Expected users to be able to offer suggestions or user feedback on the applications. | More importantly, users felt the desire to add suggestions and feedback in order to make the application feel more personalized. | Users wanted the opportunity to customize the application to suit their specific needs. |