NEEDS ASSESSMENT, DEVELOPMENT, & USABILITY ANALYSIS OF SHOP LOCAL

WEEKLY: A WEB APPLICATION DESIGNED TO IMPROVE LOCAL ECONOMY

by

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ABSTRACT

This project examined the needs of local businesses and residents who are interested in shifting consumer behavior towards shop local for the benefits of their communities. These needs served as a basis for the development of Shop Local Weekly: a web application that was designed to boost local economy. The development process focused on user-centered design so that the final product is an effective tool for its users. The developed web application was tested for usability problems in order to provide recommendations for an improved future adaptation of the product. Add brief statement about findings and conclusions.

ACKNOWLEDGEMENTS

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INTRODUCTION

In today's economy, big-box retailers like Wal-Mart and Target rule and it is easy to see why. These behemoths are generally able to offer their products at a much lower cost than the Mom and Pop store around the corner and consumers like getting more bang for their buck (Kokemuller). Convenience is a key factor as well. If your grocery list includes bread, poultry, and dog food, it is hard to argue against the convenience of finding all of these items at one store rather than making the extra effort to visit a local bakery, butchery, and pet store. While the benefits of lower costs and convenience of big-box retailers prevail in the short term, there is evidence to suggest that shopping locally is advantageous to communities and their residents in the long run.

One benefit of supporting local businesses is the creation of good jobs within the community. While it is true that the arrival of a big-box retailer such as Wal-Mart brings in jobs initially, a 2005 study by the University of Missouri claims that the net gain of jobs within the community is virtually null within the first five years due to the downsizing of existing retailers (Basker, 2005). Since Wal-Mart employees tend to earn lower average wages and receive less benefits, the opening of a store essentially leads to the replacement of good paying jobs with jobs that pay less. Furthermore, the emergence of a Wal-Mart lowers wages for workers in competing industry segments, such as grocery stores, because they must compete with the big-box retailer's low prices (Dube, 2007). The long-term effects of big-box

retailers in communities were reported in a 2006 study in the "Social Science Quarterly." According to this study:

> The presence of a Wal-Mart store hinders a community's ability to move families out of poverty... After controlling for other factors that influence poverty rates, the study found that U.S. counties that had more Wal-Mart stores in 1987 had a higher poverty rate in 1999 than did counties that started the period with fewer or no Wal-Mart stores. The study also found that counties that added Wal-Mart stores between 1987 and 1998 experienced higher poverty rates and greater usage of food stamps than counties where Wal-Mart did not build, all other things being equal (Goetz & Swaminathan, 2006, p. 2).

The downward push in wages is felt statewide. When big-box employees do not earn a high enough living to make ends meet, states are left with the burden of providing healthcare and other public assistances (Massachusetts. Division of Health Care Finance and Policy, 2013). The cost is a strain on taxpayers and subtracts from other important public services, such as education. Big-box retailers are also associated with a greater demand for public safety services and higher road maintenance costs, which result in a net loss to taxpayers according to a 2002 study in Barnstable, Massachusetts (Tischler & Associate, Inc., 2002). Furthermore, the transportation needs of big-box retailers contribute substantially to greenhouse gas emissions, which is cited as a primary cause for climate change (Halweil & Prugh, 2012). A closer look at the downsides to big-box retailers gives reason to ask if the short term benefits of lower costs and convenience are truly advantageous.

Need for the Project

Most community leaders understand the benefits of shopping locally, but are stuck on how to get their residents to do so. Though short term, the perceived advantages of shopping at big-box retailers has proved difficult to overcome when urging residents to shift their consumer behavior towards local consumption. The development of the Shop Local Weekly (SLW) web application aims to aid this shift in consumer behavior by providing a platform for local businesses to reach their customers.

With SLW, local businesses are able to post promotions to attract potential customers. The web application is free for businesses to use, which is in stark contrast to services like Groupon, which takes half of all proceeds (Thomas, 2014). The minimal time and effort required to sign up and post ensures that business can use SLW as an easy, but effective marketing tool. Promotions on the site are loaded randomly and change with each refresh, which means businesses do not have to worry about a biased order.

Residents who sign up to receive Shop Local Weekly emails are exposed to businesses they might not have known about otherwise and money conscious consumers are able to support local business without the added expense. The SLW email, which includes deals posted by local businesses, are sent once a week so that they do not become a nuisance. Residents can feel good about supporting the local economy and saving money at the same time.

Sponsoring organizations, generally municipalities or chambers of commerce, absorb the cost to operate Shop Local Weekly through a small annual fee.

This nominal investment creates a sustainable awareness of the local business community and provides an incentive for residents to give local businesses a try. Furthermore, these organizations are able to quantify the return on their investment by the number of participating businesses and subscribing residents.

Shop Local Weekly benefits communities by bridging the gap between local businesses and residents.

Significance of the Project

This needs assessment study will determine what would motivate residents to shop local as well as the level of interest among residents and local businesses in the concept of Shop Local Weekly. This data will assist in the development of a web application that aims to shift consumer behavior by giving residents easy access to local business. Usability testing will ensure that the web application is a usable tool for both residents and local businesses. The successful development of this application will help to decrease the negative effects caused by the dominance of big-box retailers by creating a tangible incentive for residents to shop local.

Statement of the Problem

The objective of this study is to evaluate the interest in Shop Local Weekly, a web application that improves local economy, and to develop this concept into an effective, usable tool. To accomplish this objective, the study will attempt to answer to following research questions:

1. What prevents residents from shopping locally?

2. Are residents and local businesses interested in using Shop Local Weekly?

3. Is the developed web application a usable and effective tool for residents and local businesses?

4. How can Shop Local Weekly be improved in future adaptations?

Limitations of the Project

The duration of this project will span approximately 8 months. This time limitation will impede the study's capacity to carry out long-term testing and assess long-term goals. Furthermore, the ability to test the effect of Shop Local Weekly on local economy after its development is hindered by a limitation of resources.

Definition of Terms

a. Build System: Software tools, which are used to automate the program compilation process (Williams, 2009).

b. Concatenation: The performance of a website is improved by combining external resources to reduce the number of server requests (Hilaiel, 2012).

c. CSS (Cascading Style Sheets): A style sheet language that is used to describe the presentation of documents written in markup language (CSS, 2015).

d. <u>Demographics:</u> Characteristics of a target market, such as age, gender, education, and annual income (What Demographics and Psychographics Mean for Small Business Marketing).

e. <u>HTML (HyperText Markup Language):</u> A descriptive markup language that specifies the structure of a webpage (HTML, 2015).

f. <u>JavaScript:</u> A cross-platform, object-oriented scripting language that provides interactivity in a web environment (Introduction - JavaScript, 2015).

g. <u>Minification:</u> Minifying a file removes unnecessary white spaces, which decreases the file size and improves the performance of a website (Hilaiel, 2012).

h. <u>Mock-Up:</u> Very early, low-fidelity prototypes (Interaction Design Foundation).

i. <u>PHP (PHP Hypertext Preprocessor):</u> "A server-side scripting language for building web apps and dynamic websites" (PHP, 2015).

j. <u>Psychographics:</u> Psychology, lifestyles, and behaviors of a target market (What Demographics and Psychographics Mean for Small Business Marketing).

k. <u>Scope Creep:</u> Original goals which change and expand during the progress of a project (Scope Creep).

l. <u>Search Engine Optimization (SEO):</u> The process used to increase organic traffic on a website by improving its search engine results page (SERP) position (Strickland).

m. <u>Usability:</u> Refers to the quality of a user's experience in terms of effectiveness, efficiency, and overall satisfaction when interacting with products or systems (Usability Evaluation Basics).

n. <u>User Centered Design:</u> "The practice of creating, engaging, efficient user experiences…" (Garrett, 2011, p. 17).

o. <u>User Experience (UX):</u> A broad concept, which "encompasses all aspects of the end-user's interaction with the company, its services, and its products" (Nielsen & Norman, The Definition of User Experience).

p. User Interface (UI): The way in which a person (user) controls or interacts with an application or device (User Interface, 2009).

q. Version Control: Used to manage multiple versions by allowing users to lock files so they can only be edited by one person at a time (for team development) and tracking changes to files (Version Control, 2011).

r. Web Application: An online application that relies on interaction to display dynamically created content; often uses a database (Skillcrush, 2013).

s. Wireframe: "A two-dimensional illustration of a page's interface that specifically focuses on space allocation and prioritization of content, functionalities available, and intended behaviors… Wireframes typically do not include any styling, color, or graphics" (Wireframing).

t. XAMPP (Cross-Platform, Apache, MySQL, PHP, and Perl): An Apache distribution, which is used to set up a local web server for testing purposes (Mikoluk, 2013).

Summary

As community leaders look for a way to encourage residents to shop local, Shop Local Weekly aims to provide a tangible incentive. This web application will be developed to act as a platform for local businesses to post their promotions, which

are then emailed to subscribing residents. Further features may be included

depending what is discovered to motivate residents to shop local. Usability of the

developed application will be tested to determine its effectiveness and how it might

be improved. Limitations to this project include time and resources.

Shop Local Deterrents

In early 2009, retail consultant and professional speaker Cinda Baxter launched The 3/50 Project, which encourages consumers to choose 3 local businesses and spend $50 at each of them to boost local economy. The project received a lot of positive attention, but it also elicited consumers to talk about their negative experiences with local business via the Internet. Columnist Kim Crow (2009) assessed these comments and categorized them into three major points of contention, in addition to expense and convenience:

Hours. Comments from consumers regarding the hours of small businesses (Crow, 2009):

"I can't tell you how many times I've stopped by a women's clothing boutique in my neighborhood and it isn't open -- even though the posted hours indicate it should be open."

"I think most of these stores cater to the rich, or at least those well enough off to not work. I'd shop local more often, but the stores usually open after I go to work (like 10 a.m.) and close before I even leave the office (6 p.m.). And they're closed on Sundays. When am I supposed to get there?"

Guilt. Comments from consumers regarding the guilt associated with shopping at small businesses (Crow, 2009):

"The stores are small, and the clerks glom on to you with advice. But I'm not that kind of shopper. I just prefer the anonymity of a big store, where I can browse on my own and not feel like a jerk for being rude."

"The reason I don't shop local? I feel so bad walking into a tiny store and walk out without buying anything. I know it's tough for small-business owners, but I can't just buy something I don't like because I feel guilty."

Returns. Comments from consumers regarding the return policies of small businesses (Crow, 2009):

"Most chain stores will accept returns at least 30 days after the purchase, and often more. Most local stores won't take returns after a few days -- or if they do, they'll only offer store credit."

"Small stores don't stand behind their product. I got a pair of shoes at a local store, and the heel broke within months. They said they could repair it, but they wouldn't give me my money back."

Consumers are frustrated with the limited, inconsistent hours that are often

attributed to local businesses. The guilt that comes from leaving a small store

without buying anything is enough for potential customers to avoid entering the

store at all. If the consumer is able to get to a local store while it is open and is

willing to brave to a looming clerk, the limited return policy might still make them

think twice about making a purchase. These issues, in addition to money and

convenience, are the main reason people give for not shopping local.

Attributes of a Web Application

A web application is different from a website in that it relies on human

interaction to display dynamically created content (Skillcrush, 2013). People must

either contribute content, which is the case for social media applications such as

Facebook and Twitter, or they gather data based on a person's needs, which is the

case for banking applications and Google Analytics (Skillcrush, 2013). Web

applications are more complex than websites and require the use of programming

languages like PHP, Ruby, or Python in addition to the basic web programming

languages HTML and CSS and generally require a database (Skillcrush, 2013).

User-Centered Design

The user experience (UX) of a web application is paramount because user

satisfaction is a significant factor in determining if users will continue to use the

application and whether or not they will come back to use the application again

(Garrett, 2011). User experience expert Jesse James Garrett considers UX to be a

five-layered entity with each layer dependent of the layers below it; as such, user-centered design requires that these layers, or planes, are built from the bottom up (Garrett, 2011). The planes in chronological order[1]:

Strategy. "This strategy incorporates not only what the people running the site want to get out of it, but what the users want to get out of the site as well" (Garrett, 2011, p. 21). The user needs should be balanced against the product objectives.

Product objectives.

- Business Goals: The business goals are the internal strategic objectives of the stakeholders (or clients); the objectives' success should be clearly defined without defining the path to get there (Garrett, 2011).

- Brand Identity: Communicating brand identity is important because it gives stakeholders a say in how their users feel about and view their product and/or overall company (Kolowich, 2015).

- Success Metrics: Determining the success of a project is difficult unless there is some quantifiable change; success metrics provide a tangible goal. Which metrics determine success will vary depending on the business goals, but the following are common metrics to consider (The Key Metrics to Measure Your Website's Success, 2012):

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[1] Though Jesse James Garrett discusses the planes of user experience in terms of websites at times, they are equally applicable to web applications.

- Acquisition metrics: Number of visitors, both new and returning.

- Engagement metrics: Includes the number of pages per visit, amount of time spent on site, and bounce rate.

- Conversion metrics: Measure of visitors who complete a target action that corresponds with the overall business goals.

User needs.

- User Segmentation: The target audience is generally quite large and diverse, so it's useful to divide the audience into manageable chunks based on demographics and psychographics in order to better understand their needs (Garrett, 2011).

- Usability and User Research: User research methods, such as surveys and interviews, are based on the goal of learning about users, including their background, situation, needs, and more (Spencer). Usability testing on an early system prototype is a good way to see how people use the system and uncover usability issues before they get into code (Spencer).

- Creating Personas: A persona is a fictional character that represents a segment of the target audience (Garrett, 2011). "Personas help to focus decisions surrounding site components by adding a layer of real-world consideration to the conversation" (Personas). While the specifics of a persona might be fictional, they are based on the demographic and psychographic data collected during user research and are representative of real users (Personas).

Scope. Based on the strategy, the scope occurs when the user needs and product objectives are assessed to determine specific requirements for the content and functionality of the product (Garrett, 2011).

Defining the scope. Defining the scope of a project upfront and on paper (or screen) is valuable because it serves as a reference point for the work to be done throughout the project and helps to prevent scope creep (Garrett, 2011).

Content. The content of a site refers to the text, images, audio, and video. The content requirements should be defined in terms of purpose and format (e.g. word count or pixel dimension). How often the content will be updated and by whom should also be taken into consideration. The following checklist authored by content strategy expert Colleen Jones can be used to assess the quality of content (Jones, 2009):

- Usefulness & Relevance:
    - Does the content meet user needs, goals, and interests?
    - Does the content meet business goals?
    - For how long will the content be useful?
    - When should it expire?
    - Has its usefulness already expired? Is the content timely and relevant?
- Clarity & Accuracy:

- Is the content understandable to customers?

- Is the content organized logically & coherently?

- Is the content correct?

- Does the content contain factual errors, typos, or grammatical errors?

- Do images, video, and audio meet technical standards, so they are clear?

- Influence & Engagement:

  - Does the content use the most appropriate techniques to influence or engage customers?

  - Does the content execute those techniques effectively?

  - Does the content use too many or too few techniques for the context?

- Completeness:

  - Does the content include all of the information customers need or might want about a topic?

  - Does the content include too much or too little information about a topic for the context?

- Voice & Style:

  - Does the content consistently reflect the editorial or brand voice?

  - Does its tone adjust appropriately to the context—for example, sales versus customer service?

- o Does the content convey the appropriate editorial and brand qualities?

- o Does the content seem to have a style? If so, does the content adhere to it consistently?

- o Does the content read, look, or sound as though it's professionally crafted?

- Usability & Findability:

- o Is the content easy to scan or read?

- o Is the content in a usable format, including headings, bulleted lists, tables, white space, or similar techniques, as appropriate to the content?

- o Does the content have the appropriate metadata?

- o Does the content follow search engine optimization (SEO) guidelines—such as using keywords—without sacrificing quality in other areas?

- o Can customers find the content when searching using relevant keywords?

Functionality. The functionality of a site refers to the features of the software product (Garrett, 2011, p. 62). Functional specifications should be determined beforehand and written down with the following rules in mind (Garrett, 2011)*:*

- Be positive: Care should be taken to avoid describing a negative thing that the system should not do. Instead, describe what the system should do to prevent the negative thing.

- Be specific: Using clear, definitive language is necessary in order to later determine whether a requirement has been fulfilled.

- Avoid subjective language: Subjective language is open for interpretation. This ambiguity means that different people can interpret the same thing to have different meanings, making it difficult to determine whether or not the requirement has been met.

Structure. The structure plane is all about developing a conceptual structure for the site; main elements include interaction design and information architecture (Garrett, 2011).

Interaction design. According to the Interaction Design Association, this element of user experience is what defines the structure and behavior of interactive systems (IxDA Mission).

Conceptual models. The idea users have of how an interactive element will behave is referred to as a conceptual model (Garrett, 2011). Examples include shopping carts and calendars.

Error handling. User errors are inevitable. How the systems prevents and responds to errors are an important part of interaction design and overall user experience (Garrett, 2011).

- Prevention: The best way to deal with errors is to prevent them from happening at all (e.g. required form field asterisks). However, it's not realistic to prevent all errors.

- Correction: When an error is made, the system should do what it can to help fix it (e.g. helpful error messages).

- Recovery: When a system is unable to recognize a user action as an error until it's too late, it should provide some way for the user to recover from the error (e.g. undo function).

Information architecture. Information must be structured so that users can understand and use it (Garrett, 2011).

Structuring content. Categorization schemes should correspond with the product objectives, user needs, and content.

- Top-Down Approach: "Starting with the broadest categories of possible content and functionality needed to accomplish (product objectives and user needs) goals, we then break the categories down into logical subsections" (Garrett, 2011, p. 89).

- Bottom-Up Approach: "Starting with the source material that exists, we group items together into low-level categories and then group those into

higher-level categories, building toward a structure that reflects our product objectives and user needs" (Garrett, 2011, p. 90).

Architectural approaches. The nodes (generally pages or groups of pages) of a site can be organized in a number of different approaches.

- Hierarchical: A tree structure with parent/child relationship between nodes.
- Matrix: Users move from node to node along multiple dimensions.
- Organic: Free-form structure that doesn't follow any consistent patterns or structural rules between nodes.
- Sequential: Linear structure between nodes.

Language and metadata.

- Nomenclature: The language used for descriptions, labels, navigation within a site should be familiar to its users.
- Controlled Vocabulary: Using a standard set of terms consistently across the site helps to prevent confusion and frustration among users.
- Metadata: The "information about information" can be used to determine relationships between content (Garrett, 2011, p. 99).

Skeleton. "The skeleton is a concrete expression of the more abstract structure of the site" (Garrett, 2011, p. 20). In this plane, the placement of content

(such as images, text, and navigation) is determined and arranged visually - much like a wireframe (Garrett, 2011).

Interface design. User interface (UI) design is about choosing interface elements that make sense for the task that the user is trying to accomplish and arranging them in a simple, intuitive manner (User Interface Design Basics).

Navigation design. Good navigation accomplishes three goals simultaneously (Garrett, 2011):

- Give users the ability to get from one point on the site to another.
- Communicate the relationship between navigational elements.
- Communicate the relationship between navigational content and the page the user is currently viewing.

Navigation systems.

- Global: Main navigation that is usually on every page; provides access to the broad sweep of the entire site.
- Local: Provides access to what is "nearby" in the architecture.
- Supplementary: Provides easy access to related content that might be cumbersome to find through the global or local navigation.
- Contextual (or Inline): Provides access to related content embedded within the content of the page the user is viewing.
- Courtesy: Provides access to content that is not often needed.

- Remote: Tool, such as the site map or index, which users resort to when

  they cannot find what they are looking for with other navigation systems

  on the site.

Information design. "Information design comes down to making decisions

about how to present information so that people can use it or understand it more

easily" (Garrett, 2011, p. 124).

Wayfinding. Wayfinding helps users understand where they are and where

they can go.

Surface. "At the top of the five-plane model, we turn our attention to those

aspects of the product our users will notice first: the sensory design. Here, content,

functionality, and aesthetics come together to produce a finished design that pleases

the senses while fulfilling all the goals of the other four planes" (Garrett, 2011, p.

134).

Four principles of visual design.

Contrast. Using contrast to distinguish important elements from their

surroundings helps the user to know where to look first (Cox, 2011). Subtle

differences create conflict and can be seen as mistakes, so it's important that

contrast used is significant enough to come across as obvious and deliberate (Cass).

Repetition. The repetition of elements, such as color, typography, size, etc., helps to develop visual cohesion (Cox, 2011). Repetition should not only convey a sense of unity within the website, but within the brand as a whole.

Alignment. Alignment creates a visual connection between the elements of a composition; elements that are not aligned with anything else within the composition appear out of place (Cass). Good alignment also assists with readability (Cox, 2011).

Proximity. Using proximity by grouping related elements helps to organize content (Cass). This makes information easier to process and understand (Cox, 2011).

Heuristic Evaluation

A heuristic evaluation, introduced by usability experts Jakob Nielsen and Rolf Molich in 1990, occurs when an expert reviews an interface against a predefined set of principles or guidelines with the intention of uncovering usability problems (Sauro, 2011). Through his research, Nielsen found that individual evaluators find only 35% of the usability problems on average, but different evaluators tend to find different problems (Nielsen, How to Conduct a Heuristic Evaluation, 1995). Therefore, Nielsen suggests an aggregation of three to five evaluators to ensure a thorough evaluation (Nielsen, How to Conduct a Heuristic Evaluation, 1995).

Usability heuristics. In 1995, Nielsen defined a set of ten usability heuristics to evaluate user interface design, which is still valid and applicable (10 Usability Heuristics for User Interface Design).

Visibility of system status (Feedback). The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.

Match between system and the real world (Metaphor). The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.

User control and freedom (Navigation). Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.

Consistency and standards. Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.

Error prevention. Even better than good error messages is a careful design which prevents a problem from occurring in the first place. Either eliminate error-prone conditions or check for them and present users with a confirmation option before they commit to the action.

Recognition rather than recall (Memory). Minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.

Flexibility and efficiency of use. Accelerators -- unseen by the novice user -- may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.

Aesthetic and minimalist design. Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.

Help users recognize, diagnose, and recover from errors. Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.

Help and documentation. Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.

Rating problem severity. Determining the severity of the problems uncovered during a heuristic evaluation is an important step when allocating resources to fix these problems; priority should be given to the more serious problems (Nielsen, Severity Ratings for Usability Problems, 1995). A predefined severity rating scale gives evaluators a standardized method to express the severity of usability problems. Since evaluators do not discover all of the usability problems during a heuristic evaluation, Nielsen suggests sending out a questionnaire to the evaluators, which describes the complete list of found issues in detail (Nielsen, Severity Ratings for Usability Problems, 1995).

Usability Testing

Evaluating usability through usability testing gauges the quality of a user's experience while interacting with a web application (Usability Evaluation Basics). Usability is important because it can mean the difference between a visitor who stays and explores a site and a visitor who leaves within the first 10 seconds (Schrijver). When users encounter difficulty, their first instinct is to leave and move

on to an easier website; a website must have good usability to be effective. Usability focuses on the following basic factors (Usability Evaluation Basics):

- *Ease of learning:* How quickly can new users accomplish basic tasks?

- *Efficiency of use:* How efficiently can experienced users accomplish tasks?

- *Memorability:* After visiting the site, can users remember how to effectively accomplish tasks during future visits?

- *Error frequency and severity:* How often do users make mistakes while using the website, how serious are the errors, and how easily do users recover from these errors?

- *Subjective satisfaction:* How do users like using the website?

It's a common misconception that obtaining valid usability feedback is an expensive affair. Usability expert Steve Krug asserts that even do-it-yourself testing will provide valuable insight, especially if the cost of professional usability testing would otherwise bar testing altogether (2014). Testing the usability of a system merely requires that users are observed and recorded as they try to complete typical tasks (Usability Testing). Effective usability tests are preplanned, include realistic tasks, and use participants who are representative of the products user base (Usability Testing). Furthermore, the resulting data must be analyzed in order to recommend alterations to the current system (Usability Testing).

In addition to task-based observations, pre and post-test questionnaires can provide further insight into the demographics and psychographics of the test participants. Gathering this information helps to ensure that participants are truly

representative users. Further questions should focus on what they like and dislike about the system as well as overall satisfaction; questions should contain a mix of open and closed questions, such as Likert items (Online Surveys).

A Likert item is a commonly used method to assess an attitude or degree of opinion (The Likert Scale Explained). It consists of two parts: a stem, which is a statement or question, and a scale, which people use to express the degree of their opinion or attitude (The Likert Scale Explained). Strongly agree, agree, neutral, disagree, and strongly disagree is an example of the scale in a Likert item. The majority uses an odd-point scale to give the respondent a neutral or midpoint option. Others use an even-point scale, believing it is better because it forces the respondent to choose one side versus the other. Options on the scale are often coded with corresponding values. For example, strongly agree is coded with a value of 5, agree is coded with a value of 4, and so on. This method produces quantitative data[2], which can be analyzed statistically by comparing means, etc. (Hodgson, 2010).

Summary

Consumers resist shopping at local businesses for a number of reasons beyond expense and convenience, which include poor hours, inflexible return

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[2] There is some contention about whether data collected from a Likert item should be treated as quantitative. Opponents protest that you cannot assume equal intervals between points and that the data collected, therefore, is qualitative (Westland, 2014). Dr. Philip Hodgson and other proponents argue that qualitative data cannot be ordered along a continuum, as scale items can, or compared in terms of magnitude, deeming Likert item data to be quantitative.

policies, and the guilt associated with leaving a small store empty-handed. A web

application directed at increasing the rate at which consumers shop at local

businesses will need to address these issues in addition to following a user-centered

design process in order to fulfill the needs of both local business owners and their

consumers. Follow-up assessments in the form of a heuristic evaluation and

usability testing are essential steps to ensuring that the web application is truly

successful in meeting the needs of its users.

METHODOLOGY

Introduction

A positive user experience is paramount to the success of Shop Local Weekly's endeavor to improve local economy. Therefore, the development of this web application will closely follow a methodology guided by Jesse James Garrett's five planes of user experience. The usability of the resulting prototype will be assessed based on the work of usability expert Jakob Nielsen. This assessment will include a heuristic evaluation and further usability testing.

Strategy

Determining the strategy behind Shop Local Weekly will be the very first step to get the project started on the right foot. The strategy will incorporate the product objectives (what the people running SLW want to get out of the application) and user needs (what users want to get out of the application).

Product objectives. The business goals, or internal strategic objectives of the stakeholders, must be clearly defined. In addition, success metrics must be determined in order to assess the success of the project.

User needs. Two online questionnaires will be distributed via SurveyMonkey to learn about local business owners (see Appendix A), consumers (see Appendix B), and their needs. Not only will these questionnaires collect

demographic and psychographic data, but they will also help to determine what would motivate residents to shop local. Three personas, one business owner and two consumers, will be created based on the collected data.

Scope

The strategic information will be used to determine the scope of the web application, which includes specific requirements for its content and functionality. These requirements will be documented and prioritized upfront in order to serve as a reference point throughout the course of the project.

Content. Content strategy expert Colleen Jones's checklist will be used to cultivate quality content.

Functionality. The required functionality of the web application will be described in positive, specific, and objective language.

Structure

In this phase, the content and functionality requirements will be pieced together to produce a conceptual structure of Shop Local Weekly. Add visual in this section.

Interaction design. At this point, the way that the system responds to user interaction will be designed. The system will be designed to respond in a way that

the user expects, which can be anticipated with conceptual models. The system will also de designed to prevent errors as much as possible and to give users the ability to correct and recover from errors when necessary.

Information architecture. A card-sorting test will be administered to five participants in order to determine a logical and intuitive organization and labeling of content. An online tool, Gliffy, will be used to express the determined organization and labels as a visual site map, which will show the flow of the web application.

Skeleton

The conceptual structure will begin to take shape through interface, navigation, and information design. By the end of this phase, a wireframe will be produced in Adobe InDesign CC to show where elements, such as images, text, and navigation, will be placed.

Interface design. Interface elements will be designed and arranged in a way that is intuitive for users.

Navigation design. The navigation of the site will be designed to give users the ability to quickly get from one point to another, to communicate the relationship between navigational elements, and to communicate the relationship between navigational content and the page the user is viewing. A combination of navigation systems will be used to accomplish these three goals.

Information design. Information will be arranged in a way that is intuitive

to users.

Surface

Adobe Photoshop CC will be used to create desktop and mobile sized mock-

ups of three web pages. The mock-ups will be based on the predetermined skeleton

and will incorporate the four principles of visual design: contrast, repetition,

alignment, and proximity.

Development

Local development. The HTML that structures the content of the web pages

will be written in Sublime Text, a robust text editor. CSS will be used to style the

web pages so that they closely resemble the mock-ups developed during the

previous surface phase while CSS media queries will be used to optimize the web

application for use across various screen sizes. PHP and JavaScript will be integrated

to provide the interactivity of Shop Local Weekly. This web application will be

developed locally using XAMPP to set up a local web server and MySQL database. A

combination of Git and Bitbucket will be used for version control. A build system,

Grunt, will be used to concatenate and minify the CSS and JavaScript.

Firefox will be used to view the site through development because it

supports the use of two helpful add-ons: LiveReload, which updates the browser

upon editing code without having to manually refresh the page, will be used to speed up development and Firebug, which will be used for fine grain control of CSS rules.

Live browser and device testing. Using Flightplan.js, the Shop Local Weekly web application will be uploaded to a live test server so that it may be tested across various platforms. It will first be tested on the latest versions of the most commonly used browsers, which include Chrome (66.5%), Firefox (20.0%), Internet Explorer (6.9%), and Safari (3.8%) (Browser Statistics, 2015). The application will then be tested on the following devices: HTC Desire (smartphone), iPhone 5, iPhone 6, iPad (4th generation), 13-inch Macbook, and Compaq Presario with an 18.5-inch screen. Modifications will be made as needed before the web application is uploaded to the Shop Local Weekly live web hosting server.

Heuristic Evaluation

Three evaluators will perform a heuristic evaluation on the Shop Local Weekly web application while it is still on the live test server. Nielsen's set of usability heuristics will be used as the guidelines for the evaluation (Nielsen, 10 Usability Heuristics for User Interface Design, 1995):

- Visibility of the system
- Match between system and the real world
- User control and freedom
- Consistency and standards

- Error prevention

- Recognition rather than recall

- Flexibility and efficiency of use

- Aesthetic and minimalist design

- Help users recognize, diagnose, and recover from errors

- Help and documentation

A follow-up questionnaire, which will include a compiled list of the found usability problems in detail, will be sent to the evaluators. To rate the severity of the usability problems, the following scale will be used (Nielsen, Severity Ratings for Usability Problems, 1995):

1. Non-Issue; not a usability problem.

2. Cosmetic; need not be fixed unless extra time is available.

3. Minor; fixing this should be given low priority.

4. Major; important to fix and should be given high priority.

5. Catastrophic; imperative to fix this before the product can be released.

Modifications to Shop Local Weekly will be made as needed based on the feedback provided during the heuristic evaluation.

Usability Testing

Pre-test questionnaire. A demographic-based SurveyMonkey questionnaire will be distributed among potential Shop Local Weekly users. The responses

collected will be used to choose five representative users to participate in the
usability study.

Usability test. A standardized script will be written in order to conduct a
task-based usability assessment of the web application. Included scenarios and
correlating tasks will be decided based on the predetermined product objectives
and user needs. The usability test will be administered at Arizona State University's
usability lab at the Polytechnic campus in east Mesa.

Post-test questionnaire. A written questionnaire will be distributed to the
participants directly following each testing session. The included questions will
inquire about the opinions and attitudes toward Shop Local Weekly after they have
had the chance to use the web application.

Data analysis. The data collected during the usability test will be assessed
for patterns and common problems among participants. Based on this assessment,
suggestions to improve the web application in future adaptations will be made.

Summary

Following a process based on Jesse James Garrett's five planes of user
experience (strategy, scope, structure, skeleton, and surface) will give Shop Local
Weekly on a strong start. An initial prototype will be developed based on the
decisions made throughout the process and tested internally before it is evaluated

against Jakob Nielsen's heuristics. Further usability testing will help to determine

the steps necessary to improve the web application before it can be made available

to the public.

Strategy

Shop Local Weekly product objectives. <mark>- Work in progress.</mark>

- Establish X interested residents for one city by December 2016.

- Establish X interested local business owners for one city by December 2016.

- Increase business for X local businesses by X by December 2016.

- Sell Shop Local Weekly to X cities by December 2016.
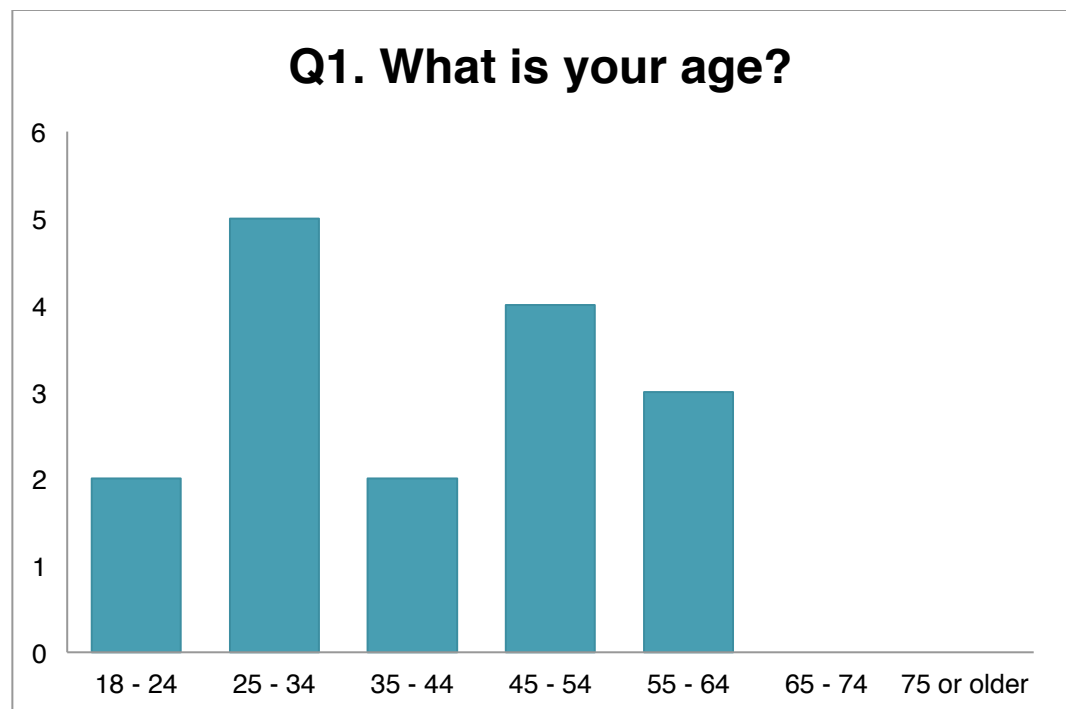
Consumer needs survey.

Question 1 results.

Figure 1. What is your age? This graph represents the responses to question 1 of the Consumer Needs Survey (see Appendix A).
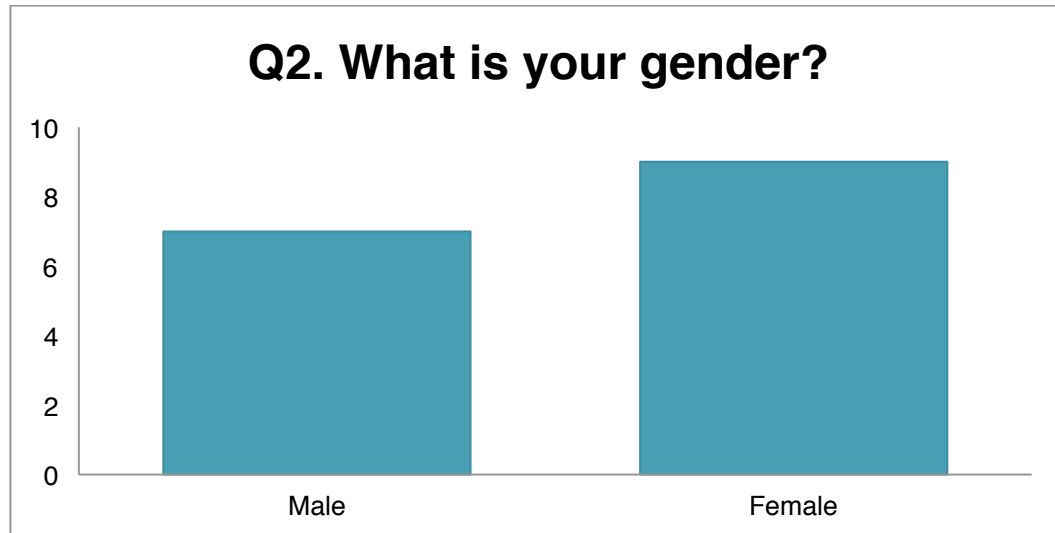
Question 2 results.

Q2. What is your gender?

Figure 2. What is your gender? This graph represents the responses to question 2 of the Consumer Needs Survey (see Appendix A).

Question 3 results.

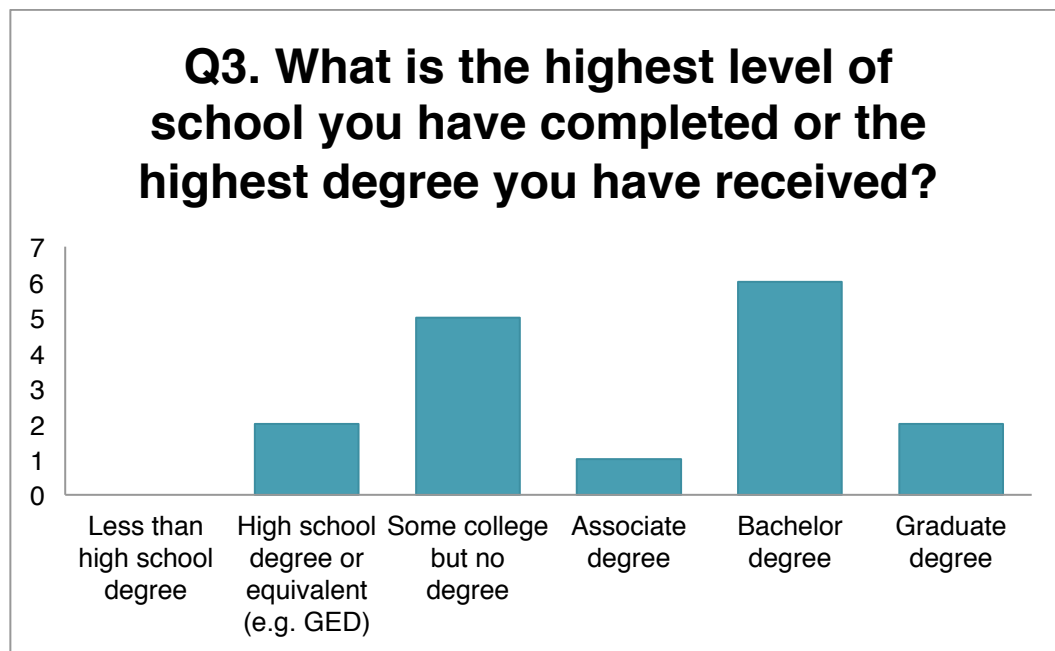**Q3. What is the highest level of school you have completed or the highest degree you have received?**

Figure 3. What is the highest level of school you have completed or the highest degree you have received? This graph represents the responses to question 3 of the Consumer Needs Survey (see Appendix A).

Question 4 results.

Q4. In what ways do you use technology to assist in your shopping habits? (Check all that apply)
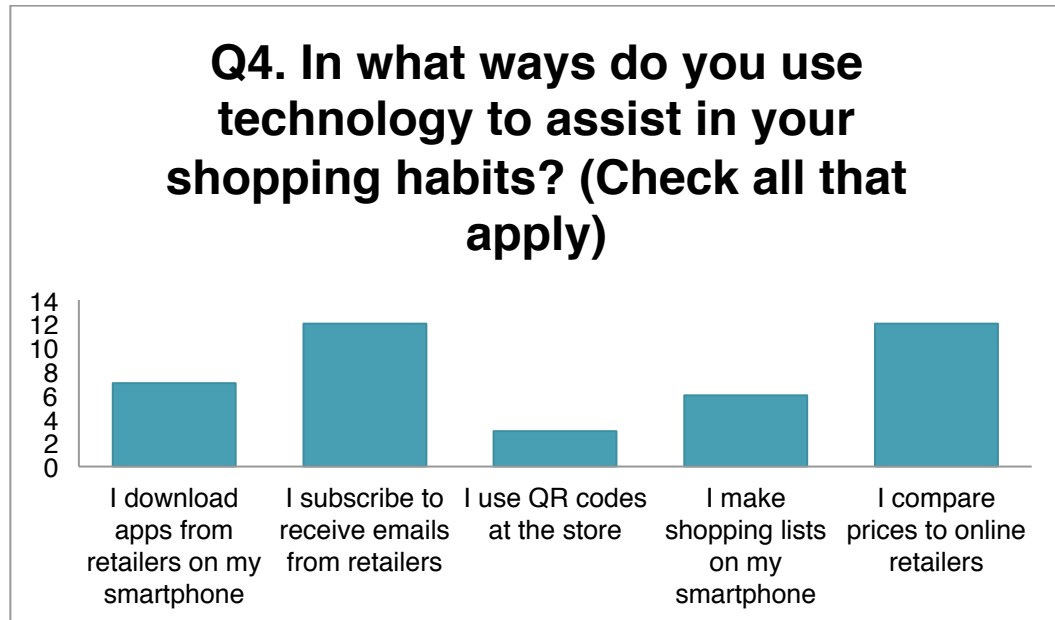
Figure 4. In what ways do you use technology to assist in your shopping habits? This graph represents the responses to question 4 of the Consumer Needs Survey (see Appendix A).

Question 5 results.

Q5. Which shopping method best describes how you shop most often during an average month?
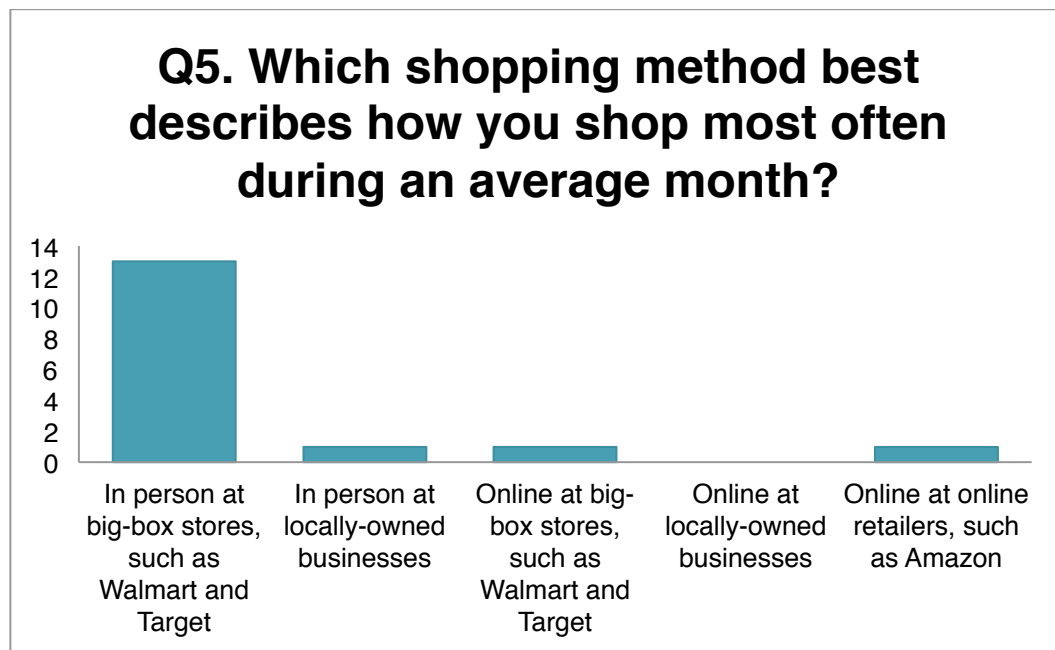
Figure 5. Which shopping method best describes how you shop most often during an average month? This graph represents the responses to question 5 of the Consumer Needs Survey (see Appendix A).
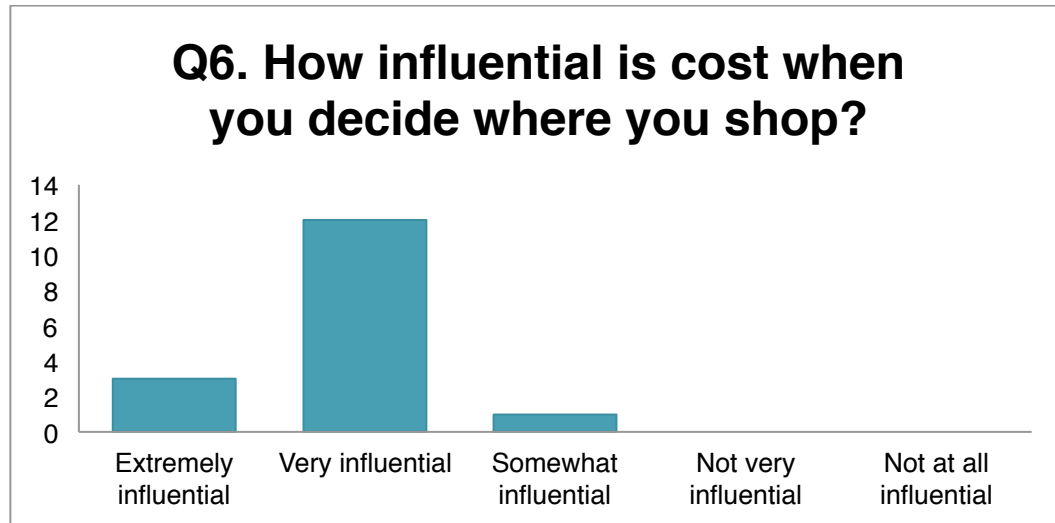
Question 6 results.

Q6. How influential is cost when you decide where you shop?

Figure 6. How influential is cost when you decide where you shop? This graph represents the responses to question 6 of the Consumer Needs Survey (see Appendix A).

Question 7 results.

Q7. What would prompt you to shop at locally-owned businesses more often?
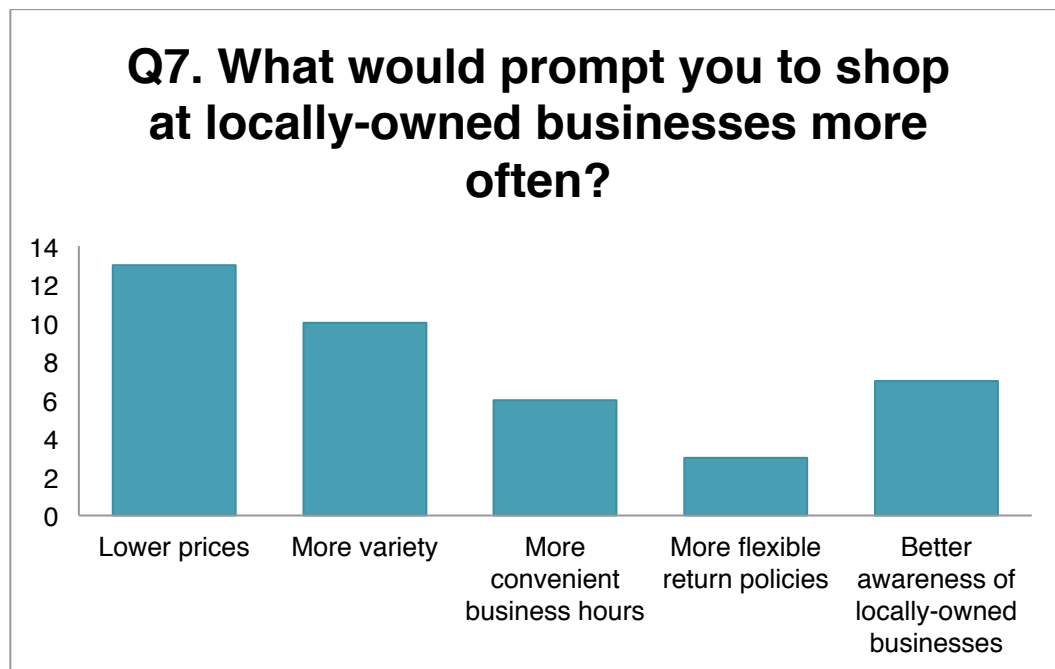

Figure 7. What would prompt you to shop at locally-owned businesses more often? This graph represents the responses to question 7 of the Consumer Needs Survey (see Appendix A).

Provided description of Shop Local Weekly (Product X). Product X is a free tool intended to connect consumers to locally-owned businesses. Local business owners use this tool to post discounts, which are available to nearby consumers. Consumers must sign up to have access to these discounts in one of four ways:

- To receive weekly emails

- Through social media sites, such as Facebook and Twitter

- Through an app on a smartphone

- Via a website

Question 8 results.

Q8. In which method would you prefer to access discounts to locally-owned businesses?

Figure 8. In which method would you prefer to access discounts to locally-owned businesses? This graph represents the responses to question 8 of the Consumer Needs Survey (see Appendix A).

Question 9 results.

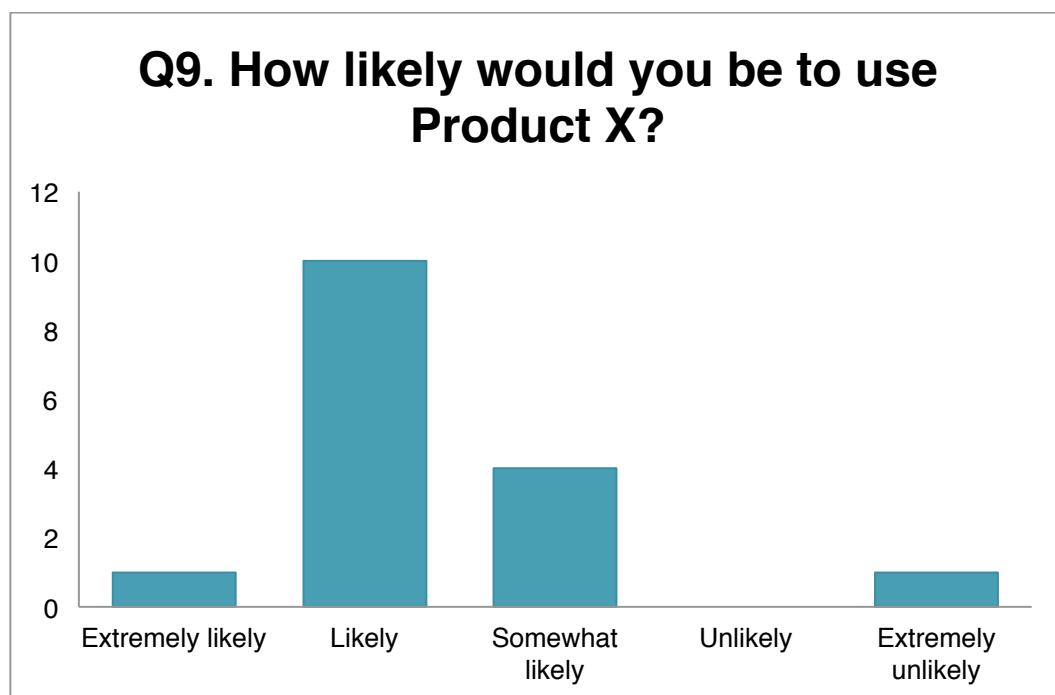## Q9. How likely would you be to use Product X?

Figure 9. How likely would you be to use Product X? This graph represents the responses to question 9 of the Consumer Needs Survey (see Appendix A).

Survey results summary. The respondents to the Consumer Needs Survey (see Appendix A) were between the ages of 18 and 64, with 25 to 34 being the common age bracket. Female respondents were slightly more common than males and there was a mix in levels of education with a Bachelors degree or some college with no degree making up nearly 70%. Subscribing to receive emails from retailers and comparing prices to online retailers were the two most common ways in which respondents used technology to assist in their shopping habits. The overwhelming majority said that they most often shop in person at big-box stores during an average month. Cost was big influence in where respondents choose to shop with over 90% marking it as either very or extremely influential. Lower prices and more variety were the two most significant factors respondents noted would prompt

them to shop at locally-owned businesses more often. Weekly emails was the preferred method to accessing discounts to locally-owned businesses and approximately 70% said they were likely or extremely likely to use Product X if they were able to access the discounts in their preferred manner.
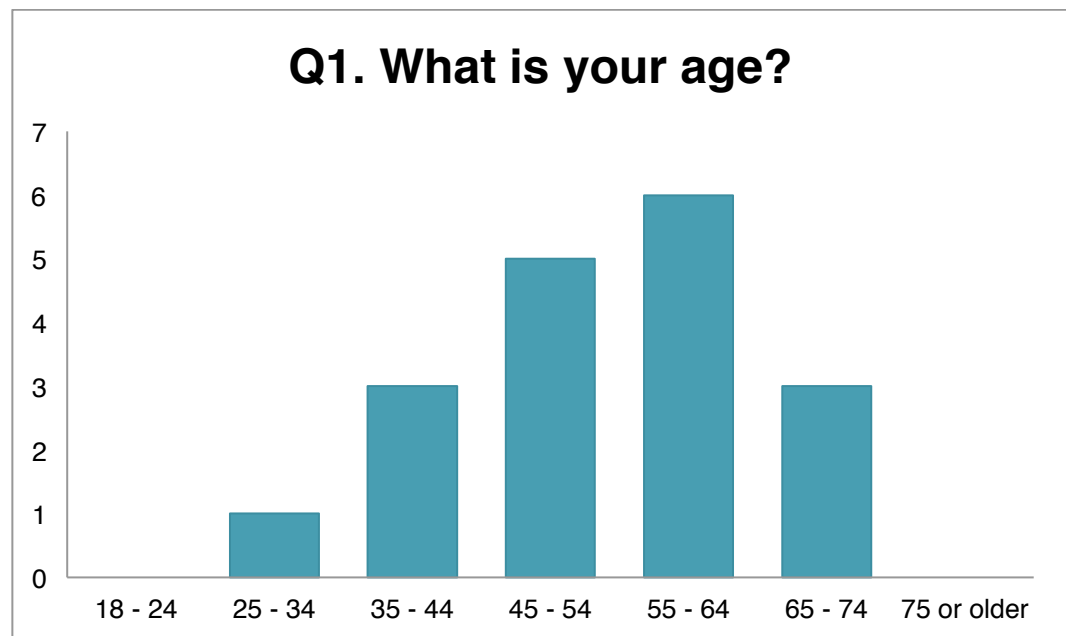
Business needs survey.

Question 1 results.

Figure 10. What is your age? This graph represents the responses to question 1 of the Business Owner Needs Survey (see Appendix B).

Question 2 results.
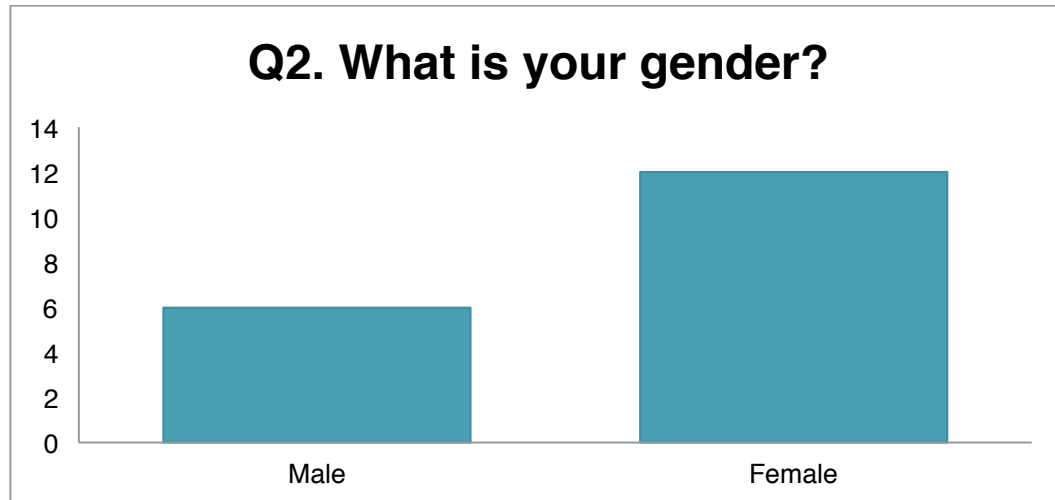

Q2. What is your gender?

Figure 11. What is your gender? This graph represents the responses to question 2 of the Business Owner Needs Survey (see Appendix B).

Question 3 results.

Q3. What is the highest level of school you have completed or the highest degree you have received?
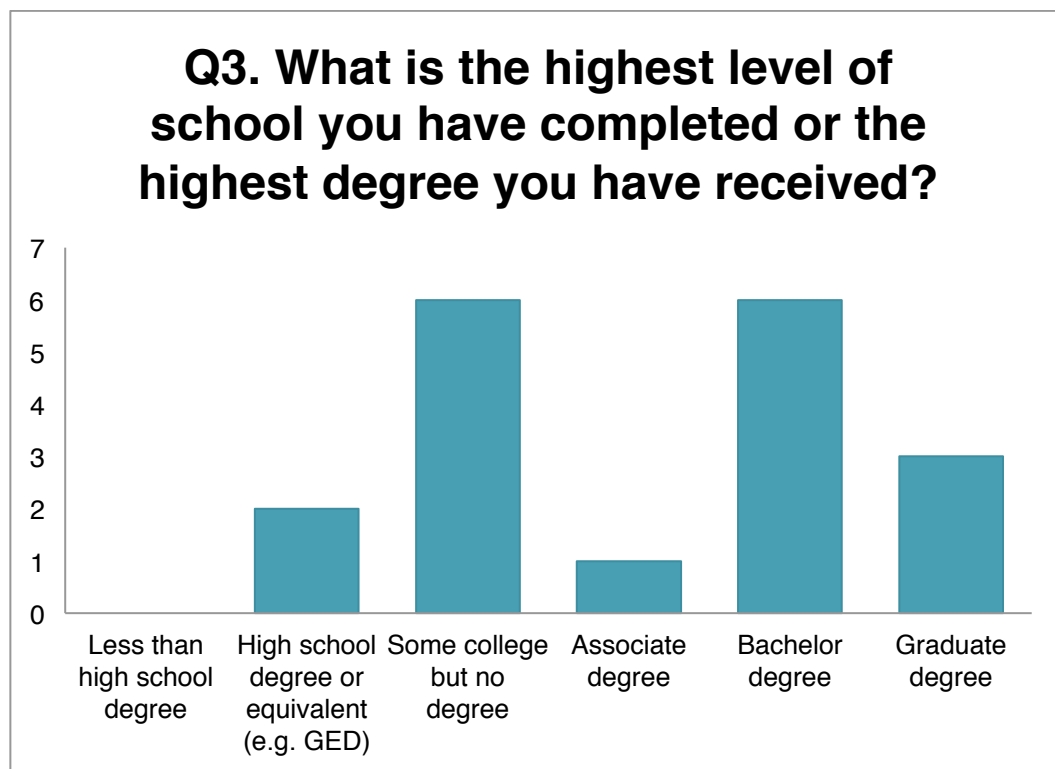
Figure 12. What is the highest level of school you have completed or the highest degree you have received? This graph represents the responses to question 3 of the Business Owner Needs Survey (see Appendix B).
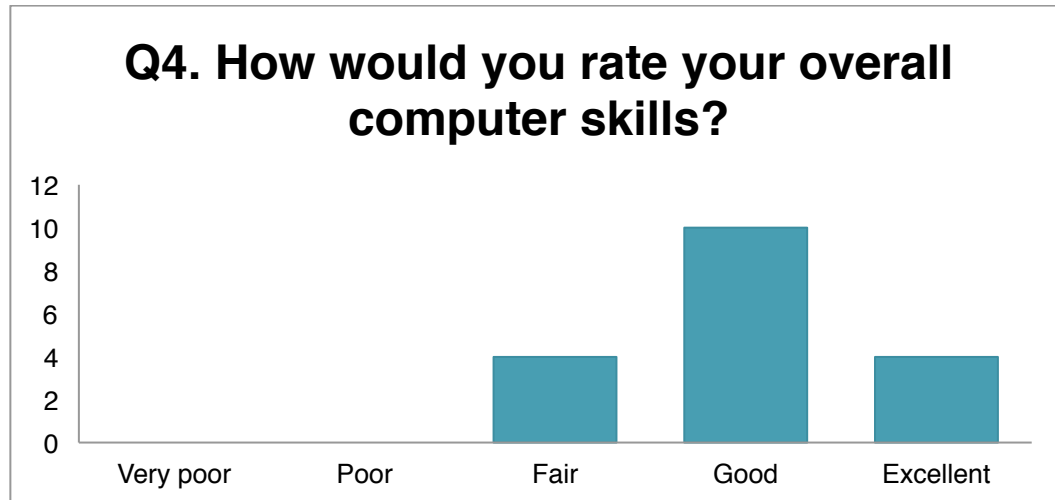
Question 4 results.

Q4. How would you rate your overall computer skills?

(Bar chart. Y-axis from 0 to 12. Categories: Very poor = 0, Poor = 0, Fair = 4, Good = 10, Excellent = 4.)

Figure 13. How would you rate your overall computer skills? This graph represents the responses to question 4 of the Business Owner Needs Survey (see Appendix B).

Question 5 results.

Q5. How frequently do you use the Internet?

(Bar chart. Y-axis from 0 to 14. Categories: Never = 0, Rarely = 0, Sometimes = 0, Often = 5, Always = 13.)
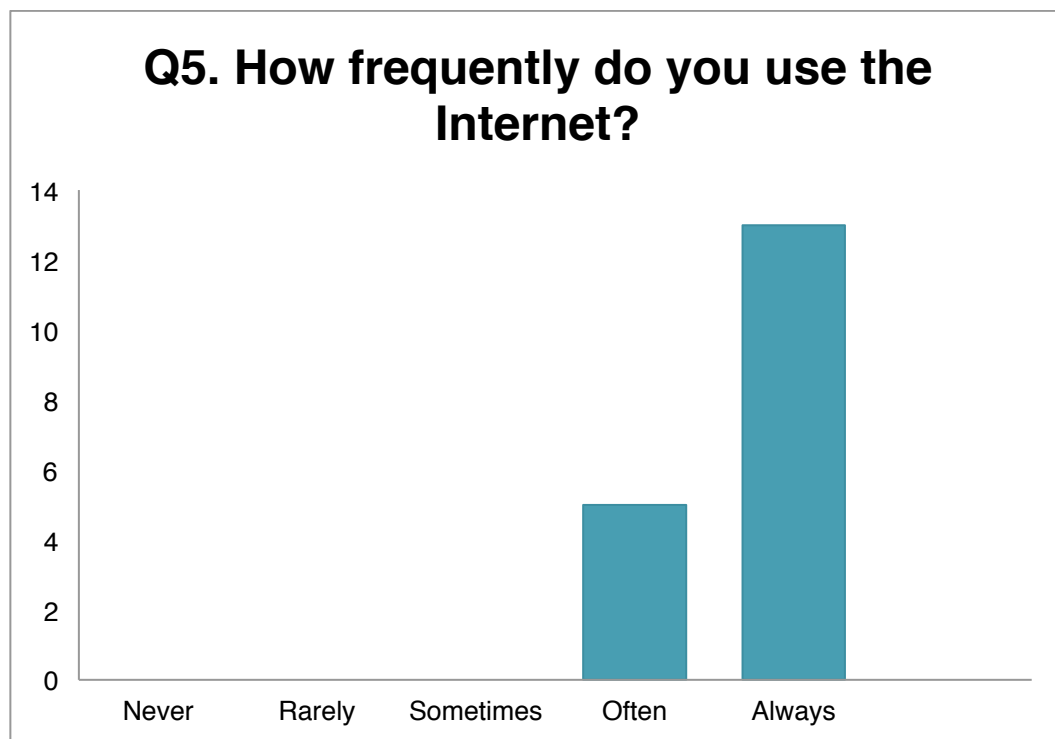
Figure 14. How frequently do you use the Internet? This graph represents the responses to question 5 of the Business Owner Needs Survey (see Appendix B).

Question 6a results.

Q6a. How effective is online advertising at promoting your business?

Figure 15. How effective is online advertising at promoting your business? This graph represents the responses to question 6a of the Business Owner Needs Survey (see Appendix B).

Question 6b results.

Q6b. How effective are newspaper ads at promoting your business?

Figure 16. How effective are newspaper ads at promoting your business? This graph represents the responses to question 6b of the Business Owner Needs Survey (see Appendix B).

Question 6c results.

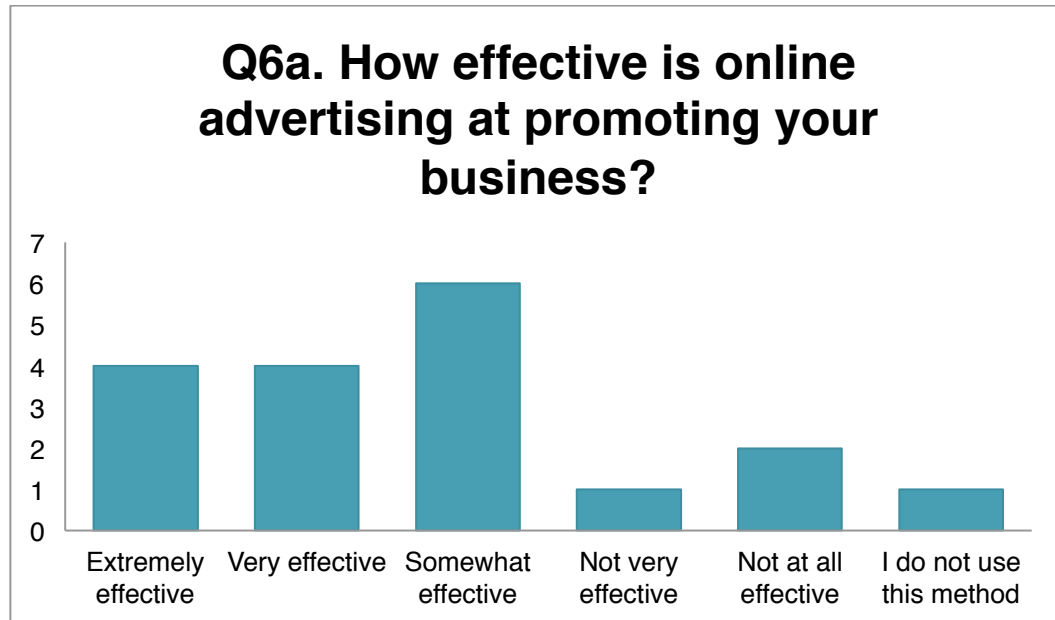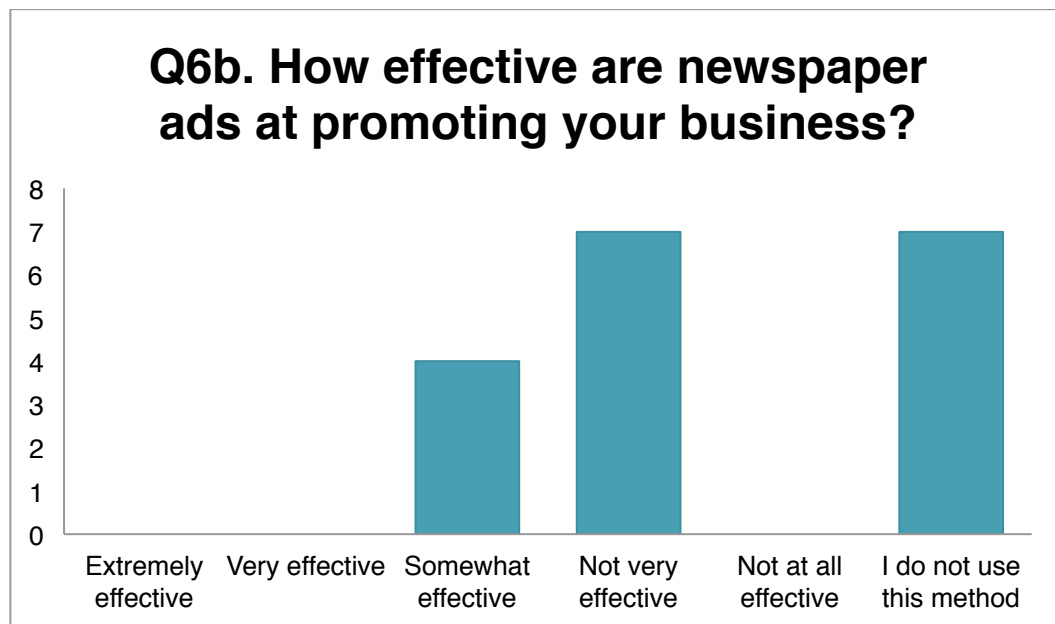## Q6c. How effective is radio advertising at promoting your business?

Figure 17. How effective is radio advertising at promoting your business? This graph represents the responses to question 6c of the Business Owner Needs Survey (see Appendix B).

Question 6d results.

Q6d. How effective is television advertising at promoting your business?

Figure 18. How effective is television advertising at promoting your business? This graph represents the responses to question 6d of the Business Owner Needs Survey (see Appendix B).

Question 6e results.

Q6e. How effective are flyers and door hangers at promoting your business?

Figure 19. How effective are flyers and door hangers at promoting your business? This graph represents the responses to question 6e of the Business Owner Needs Survey (see Appendix B).
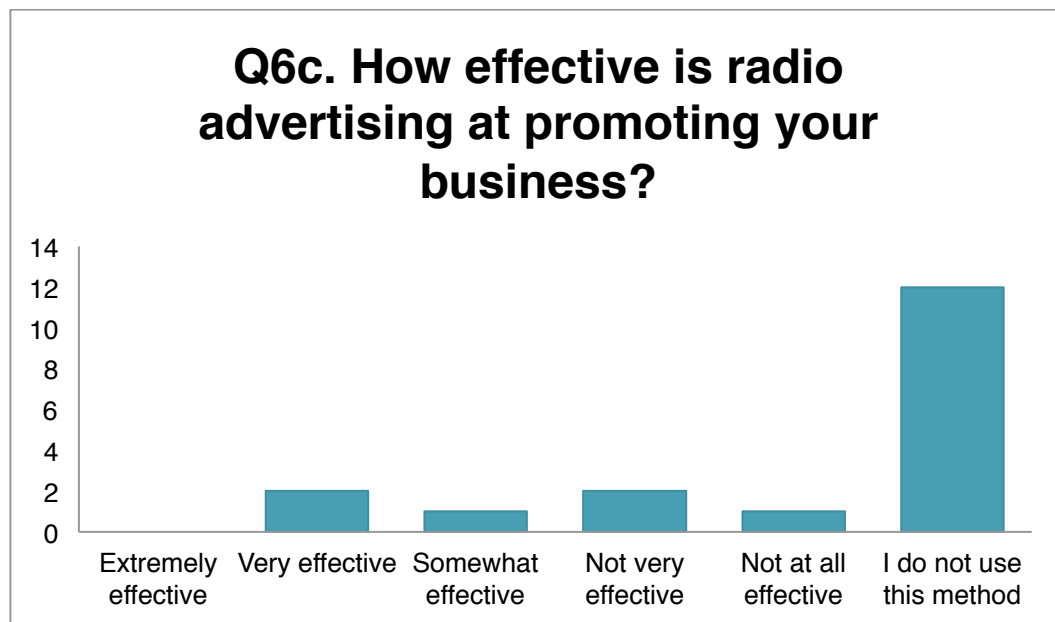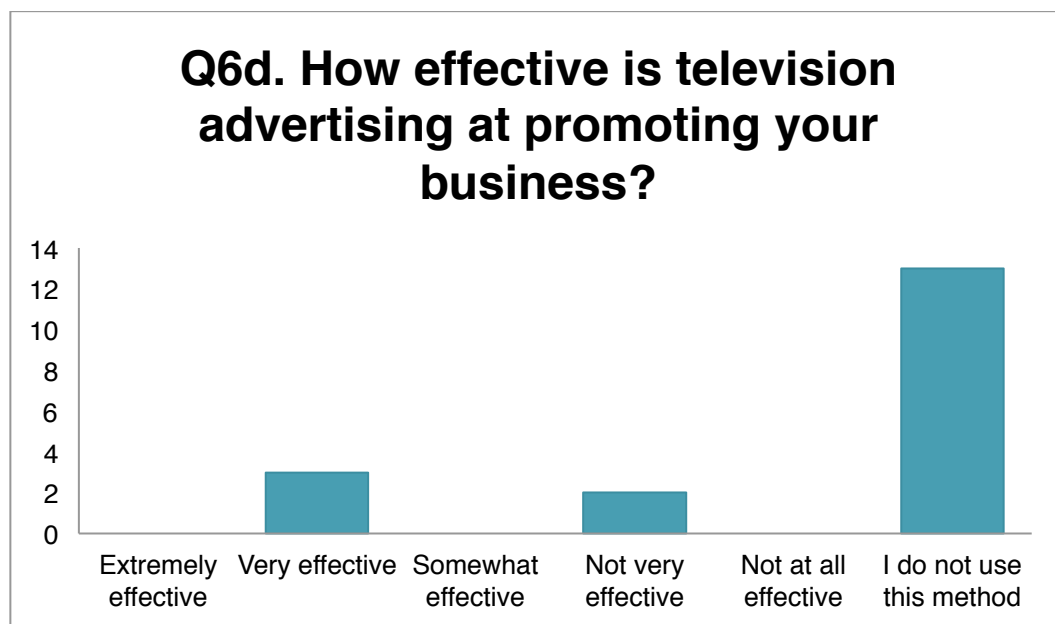
Question 6f results.

Q6f. How effective is event sponsorship at promoting your business?

Figure 20. How effective is event sponsorship at promoting your business? This graph represents the responses to question 6f of the Business Owner Needs Survey (see Appendix B).

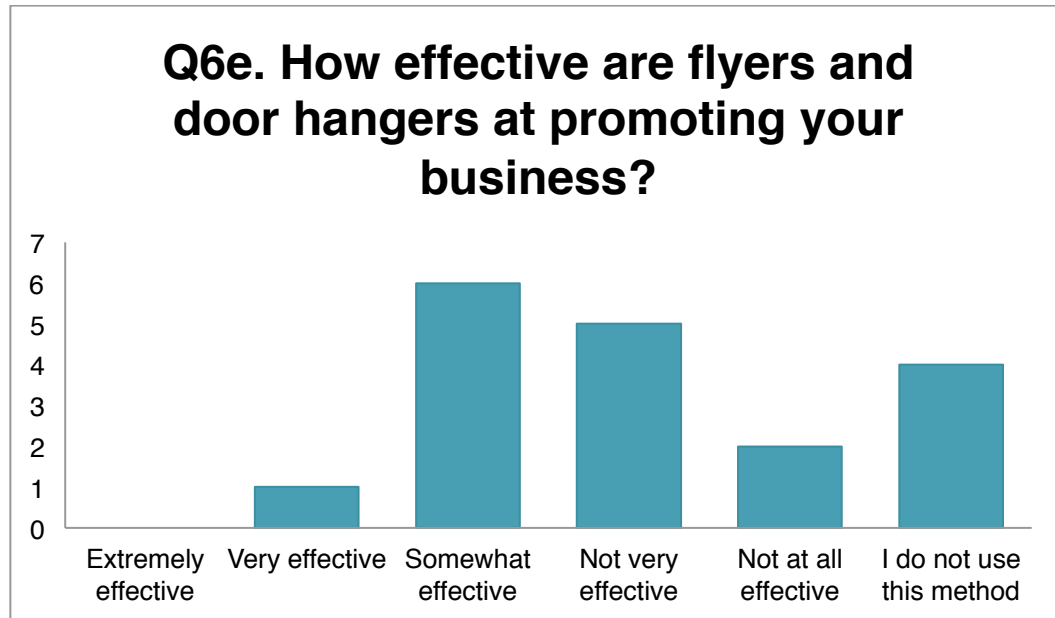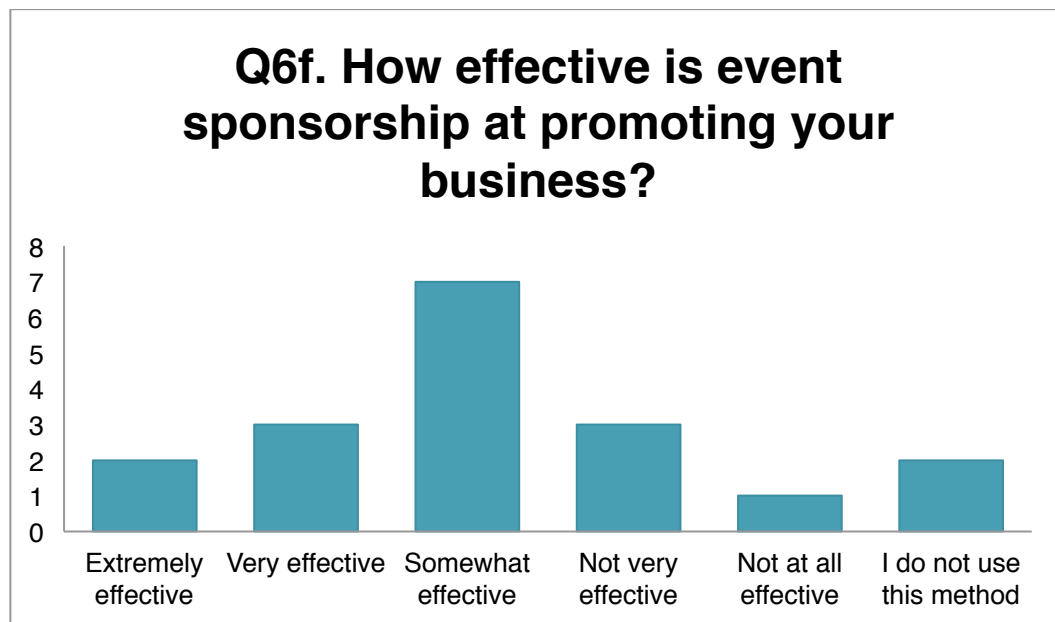***Provided description of Shop Local Weekly (Product X).*** Product X is a tool intended to connect consumers to locally-owned businesses. Local business owners are able to use this tool to easily post discounts, which are available to nearby consumers. Consumers must sign up to have access to these discounts. The tool is free for both local business owners and consumers.

Question 7 results.
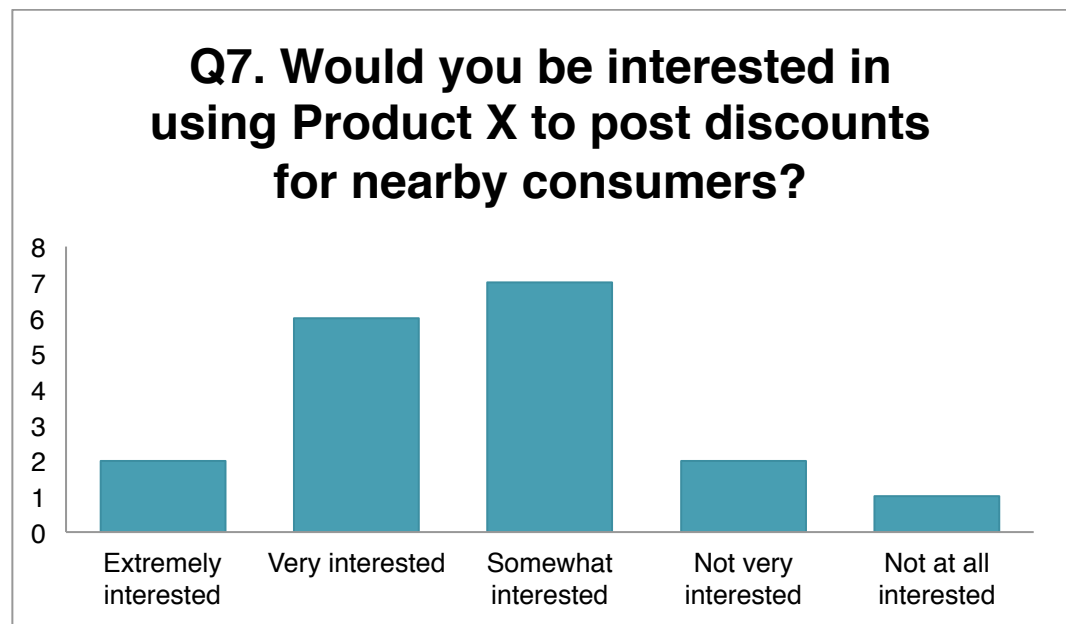

Figure 21. Would you be interested in using Product X to post discounts for nearby consumers? This graph represents the responses to question 7 of the Business Owner Needs Survey (see Appendix B).

Question 8 results. Q8. What do you like about Product X?

- "Exposure"

- "that it promotes the use of local businesses and products"

- "free connection"

- "Like that it is free."

- "free"

- "Finds my local consumer"

- "Local Free"

- "My business is about connecting. Locally owned means local buyers and sellers. Since I'm in real estate, its very relevant to my business."

- "Free tool to connect consumer with local business owners"

- "Free for both to use"

- "that it's free"

- "Of course the fact that it is free, but I would be curious as to what the target audience is."

- "Its free"

- "Free to consumer and business owner"

Question 9 results. Q9. What do you dislike about Product X?

- "most people never take advantage of promotions that we put out there on the websites"

- "not sure if they are defined by category"

- "don't know the client demographics"

- "Need to know how to market product X"

- "Local – my business is not just local"

- "Nothing"

- "As a Realtor I don't have a product I can discount"

- "not really our target market"

- "Many products already out there. Might be difficult to keep track of all offers or apps you use"

- "the sign up process for consumers"

- "I do not know enough about how product X works."

- "People might not sign up for it?"

- "that it would only be for discounts versus overall advertising"

- "I don't have any coupons or discounts to offer in the financial field."

Question 10 results. Q10. What additional features or improvements would make you more likely to use Product X?

- "true value that is distinct from other forms of advertising"

- "ROI tracking"

- "Plenty of exposure. People need to know and be excited about product X."

- "Ability to target multiple localities"

- "Make sure its mobile friendly"

- "not sure until I see more"

- "not sure"

- "An app that manages all the other apps and offers out there."

- "I assume this is an app, perhaps some add education and to associate the app with a traditional marketing medium could get better buy in."

- "Additional information on Product X."

- "Not sure."

- "Make it usable for both discounting and general advertising"

Survey results summary. Survey respondents were between the ages of 25 and 74, with just over 60% being between 45 and 64, and two thirds were female. One third of the respondents had some college but no degree, one third had a Bachelor degree, and the last third were mixed between having a high school degree or equivalent, Associate degree, or a Graduate degree. Nearly 80% of the business owners survey rated their computer skills as being either good or excellent and all reported using the Internet at least often. Respondents found that online advertising and event sponsorship were the most effective methods at promoting their businesses. Over 70% were either somewhat or very interested in using Product X to post discounts for nearby consumers. Business owners appreciated that Product X is free, but some noted the desire to use Product X as a tool for general advertising and not just discounts. Mobile friendly, ROI tracking, and the ability to target multiple localities were among the additional features that would make business owners more likely to use Product X.

User personas.

Edna the entrepreneur.

- *Age*: 58

- *Gender*: Female

- *Education*: Graduate degree

- *Narrative*: "I became an entrepreneur late in life and it took a significant effort to get my business off the ground. I work hard every day to keep it going and I'm always looking for ways to bring new customers into my shop. A significant part of my

Figure 22. Edna the entrepreneur. A visual representation of the Edna persona.

business comes from tourism and I think that tapping into the local market would really help to boost my business overall. I have found that online advertising is one of the most effective advertising methods at promoting my shop and I'm pretty comfortable with the computer and the Internet, so I would be very interesting in trying a new online advertising outlet. I like that Shop Local Weekly is an investment in time rather than money, but I would like to have the option to use it for general advertising instead of just discounts."

Polly the parent.

- *Age*: 45

- *Gender*: Female

- *Education*: Some college, but no degree

- *Narrative*: "I'm on the clock 24/7 as a stay at home mom with four kids, ages 11 to 17. My husband has a good job and makes decent money, but it can be a stretch to support a family of 6 on his income alone. It's my job to make sure we have

Figure 23. Polly the Parent. A visual representation of the Polly persona.

everything we need within an allotted budget, so cost is very influential when I decide where to shop. I subscribe to receive emails from retailers and compare prices online to support to assist in my shopping habits. I like the idea of supporting local businesses, but I find that big-box stores are more budget friendly and have more variety so that I can get what I need in one stop. I would be somewhat likely to use Shop Local Weekly if it provided a more cost effective option, but big-box stores would still win me over if it meant making only one stop. I would prefer to access discounts to locally-owned businesses via weekly emails."

Stan the student.

- *Age*: 27

- *Gender*: Male

- *Education*: Bachelor degree

- *Narrative*: "I graduated with my Bachelor degree last semester and am now going for a Graduate degree. I know that my education will be worthwhile when I graduate, but in the meantime, it can be difficult trying to make ends meet as a

Figure 24. Stan the Student. A visual representation of the Stan persona.

student with only a part time job. Cost is very influential when I decide where I shop, so I usually end up going to big-box stores like Walmart and Target, but I would much prefer to support businesses with more soul. I think I would be more apt to shop at locally-owned businesses not only if they were more cost effective, but if I was more aware of their existence. My smartphone is my lifeline – it's always with me. If Shop Local Weekly helped me find good deals at and make me more aware of locally-owned business via my smartphone, I would be likely to use it."

Scope

      Content. Content goes here

      Functionality. Functionality goes here

Structure

Structure goes here

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Conclusions Go Here

Recommendations

Recommendations Go Here

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APPENDIX A

CONSUMER NEEDS SURVEY

1. What is your age?

    a. 18 – 24

    b. 25 – 34

    c. 35 – 44

    d. 45 – 54

    e. 55 – 64

    f. 65 – 74

    g. 75 or older

2. What is your gender?

    a. Male

    b. Female

3. What is the highest level of school you have completed or the highest degree you have received?

    a. Less than high school degree

    b. High school degree or equivalent (e.g. GED)

    c. Some college but no degree

    d. Associate degree

    e. Bachelor degree

f. Graduate degree

4. In what ways do you use technology to assist in your shopping habits? (Check all that apply)

   a. I download apps from retailers on my smartphone

   b. I subscribe to receive emails from retailers

   c. I use QR codes at the store

   d. I make shopping lists on my smartphone

   e. I compare prices to online retailers

5. Which shopping method describes how you shop most often during an average month?

   a. In person at big-box stores, such as Walmart and Target

   b. In person at locally-owned businesses

   c. Online at big-box stores, such as Walmart and Target

   d. Online at locally-owned businesses

   e. Online at online retailers, such as Amazon

6. How influential is cost when you decide where to shop?

   a. Extremely influential

   b. Very influential

   c. Somewhat influential

   d. Not very influential

e. Not at all influential

7. What would prompt you to shop at locally-owned businesses more often? (Check
all that apply)

a. Lower prices

b. More variety

c. More convenient business hours

d. Less attentive clerks

e. More flexible return policies

f. Better awareness of locally-owned businesses

Please read this description of Product X and answer the following questions.

Product X is a free tool intended to connect consumers to locally-owned businesses.
Local business owners use this tool to post discounts, which are available to nearby
consumers. Consumers must sign up to have access to these discounts in one of four
ways:

- To receive weekly emails

- Through social media sites, such as Facebook and Twitter

- Through an app on a smartphone

- Via a website.

8. In which method would you prefer to access discounts to locally-owned
businesses?

a. Weekly emails

b. Social media sites, such as Facebook and Twitter

c. App on a smartphone

d. Website

9. Provided you were able to access these discounts in your preferred manner, how

likely would you be to use Product X?

a. Extremely likely

b. Likely

c. Somewhat likely

d. Unlikely

e. Extremely unlikely

BUSINESS OWNER NEEDS SURVEY

1. What is your age?

    f. 18 – 24

    g. 25 – 34

    h. 35 – 44

    i. 45 – 54

    j. 55 – 64

    k. 65 – 74

    l. 75 or older

2. What is your gender?

    a. Male

    b. Female

3. What is the highest level of school you have completed or the highest degree you

    have received?

    a. Less than high school degree

    b. High school degree or equivalent (e.g. GED)

    c. Some college but no degree

    d. Associate degree

    e. Bachelor degree

   f.   Graduate degree

4. How would you rate your overall computer skills?

   a.   Very poor

   b.   Poor

   c.   Fair

   d.   Good

   e.   Excellent

5. How frequently do you use the Internet?

   a.   Never

   b.   Rarely

   c.   Sometimes

   d.   Often

   e.   Always

6. How effective are these advertising methods at promoting your business?

   a.   Online advertising

      i.   Extremely effective

     ii.   Very effective

    iii.   Somewhat effective

    iv.   Not very effective

     v.   Not at all effective

vi. I do not use this advertising method

b. Newspaper ads

    i. Extremely effective

    ii. Very effective

    iii. Somewhat effective

    iv. Not very effective

    v. Not at all effective

    vi. I do not use this advertising method

c. Radio advertising

    i. Extremely effective

    ii. Very effective

    iii. Somewhat effective

    iv. Not very effective

    v. Not at all effective

    vi. I do not use this advertising method

d. Television advertising

    i. Extremely effective

    ii. Very effective

    iii. Somewhat effective

    iv. Not very effective

    v. Not at all effective

    vi. I do not use this advertising method

e. Flyers and door hangers

     i.   Extremely effective

    ii.   Very effective

   iii.   Somewhat effective

   iv.   Not very effective

    v.   Not at all effective

   vi.   I do not use this advertising method

f.   Event sponsorship

     i.   Extremely effective

    ii.   Very effective

   iii.   Somewhat effective

   iv.   Not very effective

    v.   Not at all effective

   vi.   I do not use this advertising method

Please read this description of Product X and answer the following questions.

Product X is a tool intended to connect consumers to locally-owned businesses. Local business owners are able to use this tool to easily post discounts, which are available to nearby consumers. Consumers must sign up to have access to these discounts. The tool is free for both local business owners and consumers.

7. Would you be interested in using Product X to post discounts for nearby consumers?

a.   Extremely interested

b.   Very interested

c.   Somewhat interested

d.   Not very interested

e.   Not at all interested

8. What do you like about Product X?

9. What do you dislike about Product X?

10. What additional features or improvements would make you more likely to use

    Product X?