

Using Crowd Sourcing to Change the Real Estate Landscape

by

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## Abstract

Buying a home is the single largest purchase a person will make in their lifetime and often the most difficult decision. In the past, new home buyers would rely on realtors to assist them in their home search. But as internet usage grows, more and more consumers are taking their home search online. There are now several websites on the market where consumers can view home listings and connect with realtors for more information. 90% of homebuyers start their home search online (National Association of Realtors, (NAR), 2013). In addition, during the home buying process, many consumers will go online to seek advice on topics such as mortgages, the real estate market, the best neighborhoods, and what details to look for during a showing. For many online tasks, users will go to crowd sourcing to help them make their buying decisions. For things such as choosing a restaurant or a book to read, or purchasing an appliance, many users seek online customer reviews or comments before making a buying decision. Websites such as Yelp, Amazon, or Glassdoor allow for customer reviews of their experiences. When it comes to buying a home, realtors and real estate experts have ownership of online listings and real estate advice. But consumers are looking for advice from their peers, and trust online reviews left by users in their community. When it comes to online listings posted by a realtor, the listing can be vague, and include misleading photos that have been photo shopped or use wide angle lenses, and important details can be left out. Advice from peers can be more trustworthy than those of professionals who may not have the buyers' best interests in mind. This thesis is about the research and design of a new, potential website that could change the way users views online listings. The website, which would also include a corresponding app, would allow for users to post comments and photos of real estate listings or neighborhoods in real time. The thesis will be a study of trust in online reviews and real estate professionals, homebuyers' personal experiences, and user testing for a new site.

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## Chapter 1: Introduction

Buying a home is the single largest purchase a person will make in their lifetime and often the most difficult decision. In the past, new home buyers would rely on turning to realtors to assist them in their home search. But as internet usage grows, more and more consumers are taking their home search online. There are now several websites on the market where consumers can view home listings and connect with realtors for more information. According to the National Association of Realtors, *The Digital House Hunt: Consumer and Market Trends in Real Estate* report, 90% of homebuyers start their home search online (National Association of Realtors (NAR), 2013). In addition, during the home buying process, many consumers will go online to seek advice on topics such as mortgages, the real estate market, the best neighborhoods, and how to choose the best house (NAR, 2013).

For many online tasks, users will turn to a method known as crowd sourcing to help them make their buying decisions. For things such as choosing a restaurant or a book to read, or purchasing an appliance or other good, many users seek online customer reviews or comments before making a buying decision. Websites such as Yelp, Amazon, or Glassdoor allow for customer reviews of their experiences. Users will also turn to their trusted social media circles to ask for recommendations on goods or services.

In preliminary research in preparation for this thesis, based on informal user surveying, it was found that home seekers also turn to crowd sourcing to help with their home search and decisions. Home seekers will read online testimonials before choosing a realtor or mortgage lender. They will also ask their social circles about different school districts or neighborhoods for personal, first hand experiences or ask for recommendations on trusted realtors.

This thesis is a study in online trust in real estate listings, and how trust in user generated reviews, or crowd sourcing, can improve that trust and improve the challenges in the online home buying experience. The thesis will explore the desire to leave user reviews and the desire to allow them to influence their decisions and how it can be helpful during the home buying process. The thesis will also develop a new website concept where users can submit reviews and information on home listings or realtors, and provide first-hand experience with neighborhoods and give advice on the process.

## Chapter 2: Literature Review

For this literature review, demographics and heuristics of the homebuyer profile will be reviewed as well as a look at the competitive analysis of current real estate sites on the market that homebuyers are already using.

Next, will be a study of crowd sourcing and trust in consumer reviews in order to determine if it could be beneficial to include online reviews in order to improve the home buying user experience.

### **Part 1: The Homebuyer Profile**

It is important to make note that there are different types of homebuyers that fall in different demographics and heuristics based on which stage the home seeker is in in their life. There are three main categories of homebuyers: First Time Homebuyers, Move-up buyers, and Move-down buyers.

According to the National Association of Realtors *Home Buyer and Seller Generational Trends Report 2015*, in the United States, the average age for a first time homebuyer is around 32-37 years of age (NAR, 2015). Based on the report, they are employed, college educated, and have a household income of about \$80,000. They have good credit and practice smart financial decisions which also plays a large factor in buying a home. Because this generation (Millennials) is comprised of such a large population, this is the largest group of potential home buyers. They desire an older, smaller house or condo, often in cities' central parts of town, and their main reason for purchasing is the desire to own property.

The First Time Homebuyer group is the Millennial (or Gen Y) generation and they are experienced in online skills and are heavy smartphone users. They are heavy social media users and are open to leaving and reading reviews online to make buying decisions or inform others of their experiences (NAR, 2015). According to the report "the first step in the home buying process [for this group] is looking online for properties for

sale. Gen Y is most likely among the generations to also look online for information about the home buying process.” (NAR, 2015)

The Move up- buyer is typically 5-10 years older than the first time homebuyer. These buyers are typically in the stage of raising a family, and Move-up buyers are looking for a newer, move in ready home with more space. They are not willing to compromise on their home choice and care a lot about functionality and energy efficiency in the home. According to the National Association of Realtors *Home Buyer and Seller Generational Trends Report 2015*, this group spends less time searching for a home than the first time homebuyer and makes their decision quickly. They will live in their move-up home for at least 10 years (NAR, 2015).

Again, this group of buyers is educated, employed, and has a household income of over \$100,000. This user is experienced on the computer and phone, though they do not use their devices as often as their younger Gen Y counterparts. While most home buyers in this age group are married couples with 1-2 children (68%), the next largest group is single females (14%), followed by single males (9%) (NAR, 2015).

The Move down buyer is typically 55+ in age and seeking a home that is smaller that will be enjoyed during retirement years. These users are novice- experienced computer and smartphone users. Though they are social media users, according to the report, when searching for a home, this group is less likely to go online to search listings and instead work with a realtor. Only 39% of this group begins their home search online (NAR, 2013). For these reasons, the new website will focus on the two younger demographic groups for the study.

## **Part 2: Heuristics and Search Patterns**

This study will focus on two similar demographic groups- the First Time Homebuyer- age 32-37 and the Move up buyer- age 37-42. Even though the demographic groups we are focusing on are highly educated and knowledgeable computer users, design considerations should still be kept in mind for those with physical

disabilities and cognitive limitations. Normal cognitive limitations such as memory and recall, patience, and emotion must be kept top of mind when designing this site. The home buying process can be frustrating, so the ability to move through the site smoothly and organize the information in a way that makes sense for the user is a must. According to Jeff Johnson's *Designing with the Mind in Mind*, "all of the design rules are based on human psychology; how people perceive, learn, reason, remember, and convert intentions into action". (Johnson, 2014). According to his book, perception is biased based on three factors: past experience, current context, and future goals (Johnson, 2014). A bad home search experience could cause frustration when moving through the site, especially if the user's goals are not being met causing frustration and impatience.

Memory and recall limitations are specifically important to consider with these groups. Younger Gen X and Gen Y users often multitask through their day and have a fragmented attention across various devices. There is constant interruption in their day from various sources such as advertising on TV and internet and social media distractions, plus work, personal and family obligations that would disrupt daily tasks. This fragmented attention must be considered when designing the functionality of this site. The site must assist the user in memory and recall making searching and task completion easy.

Last, the site should also be accessible to those with disabilities such as site or hearing impairment or compromised motor skills. Optimizing the site for accessibility can be done using alt tags, readable texts, and transcripts for any audio functions.

In addition, to provide a good user experience, studying the way in which home seekers search for real estate is also very important. The search feature will be the main functionality of the site. There have been several studies on how home seekers search for real estate and the keywords and search facets used. Research shows that home seekers will use local-based search terms when searching for a home. According to the National Association of Realtor's *The Digital House Hunt: Consumer Market Trends in Real Estate* report, "69% of home shoppers who take action on a real estate brand website

begin their research with a local term, i.e. “Houston homes for sale” on a search engine. 52% of actions on real estate brand site come directly from a local search on a search engine.” (NAR, 2013). A keyword analysis on Jumpshot confirmed this. When searching real estate keywords, many in the top 15 phrases included local terms (Jumpshot, 2015).

Studies using eye tracking software have been done on how users review home listings online. Michael Seiler, Poornima Madhavan, and Molly Liechty published their study in 2012. According to their research, when searching listings online, users will examine the photos first. Most of the user’s time is spent browsing through the various photos. Users will then review the basic description of the house, then the realtors’ remarks. (Seiler, Madhavan, Liechty, 2012).

The home search is very visual. In addition to photos, video media is also very popular during the search. According to the *Digital House Hunt*, 86% of users will watch videos to find out more about a specific community. 70% will view a video tour of the home. 30% will watch customer testimonials to help with their search. (NAR, 2013).

Lastly many home seekers choose to reach out to social media for further neighborhood information and realtor recommendations. Using social media and crowd sourcing allows for home seekers to get information from sources they trust rather than relying on the website which they may not trust. Further studying will be done during this project on real estate listing website trust.

### **Part 3: Real Estate Competitive Analysis**

There are several websites that provide information on real estate listings that home seekers use regularly and are quite popular in the market. Real estate search websites connect to the MLS- Multiple Listings Service. MLS is a generic term for the many real estate listings services across the country. When a house goes on the market, the listing agent enters the property information into the MLS. Specific home details are listed along with photos and descriptive information. A unique MLS number is assigned

to the listing for identification purposes. Home search sites pull the details from the MLS to easily display on their sites without much effort.

On the real estate search sites, users can view details and photos online, and additional information such as estimated tax and mortgage rates, neighborhood and school district details and realtor information.

In addition to national home search sites, home seekers can also see listings on real estate brokerage websites, or individual real estate office or agent sites. Many of the brokerage or individual office sites will also include helpful content and advice in the form of a blog or content section. Individual brokerage offices will also have their own site, in addition to the brokerage national sites. For example, Long and Foster as a brokerage has a site, [www.longandfoster.com](http://www.longandfoster.com). In addition, local offices such as Long and Foster *Columbia* or Long and Foster *Towson* also have their own individual sites. Going one step further, local agent teams will have their own site in addition to the office site—such as the Hubble Bisbee team of Long and Foster: <http://www.hubblebisbeegroup.com/>.

An agent's online presence and reputation is extremely critical to their success, as home seekers will determine choose a realtor based on their website and online testimonials. Most agents will have an agent page attached to their brokerage page, a Facebook page, a profile on home search sites, and in many cases, their own individual sites.

Most real estate web sites function in similar ways as far as the site structure and search capabilities. They typically allow for the user to search by list price, location, number of bedrooms, and number of bathrooms. Some have more detailed search criteria such as home type, and amenities such as air conditioning, or swimming pools. Some sites have a map-based search feature. The search results page may vary based on the site. Some sites use paid features to determine the order of the search results or will highlight specific listings at the top of the page. Following is a detailed analysis of a sampling of specific sites.

## Zillow

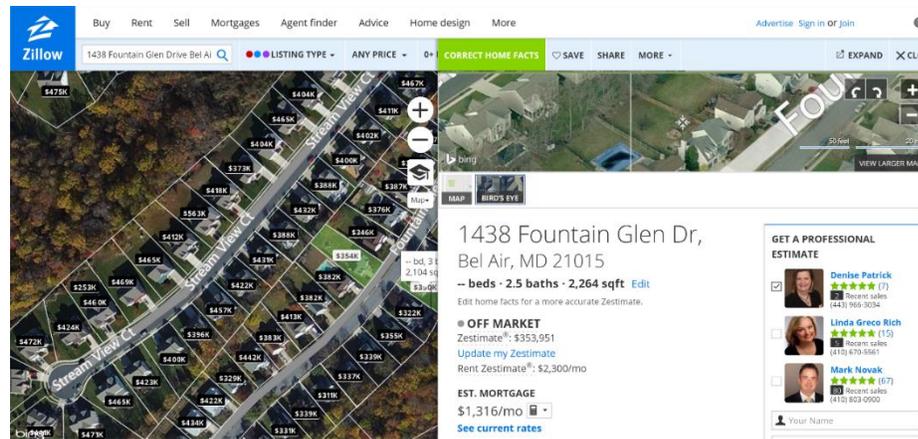


Figure 1. Zillow.com, example of a property page. Zillow.com is the most popular real estate search website.

Founded in 2006, Zillow is the number one real estate search website in the country with over 73 million unique visitors in December 2014, according to the Washington Post (2015).

Zillow is unique because rather than using a database of only properties for sale or rent in the MLS system for browsing and viewing purposes, there is a more robust databases of all properties, including those not currently on the market. This allows for the user to do in depth property research and analysis and compare with other homes around the community.

Zillow is most known for featuring property estimates- what they have branded as “Zestimates”, which they have marketed as their main feature. With this feature, a user can go online and see the valuation of their home, or a home they are interested in. Zillow uses a mathematical calculation to determine the homes’ value which they have made public and posted on their site. However according to The Washington Post’s article, it has been proven that there is a large margin of error with the Zestimates which has hurt the real estate industry- from a 12-19% discrepancy. Sellers have been forced to sell way below listing price based on what the Zestimate determines, rather than actual home values. Due to the high margin of error in any of the homes’ details, Zillow added a new

feature in which the home owner can add notes to the property page to correct errors to the listing details.

In addition to the Zestimate feature, the site also uses a map-based structure so users can immediately see home values or listing prices around the area. Homes that are on the market include photos, tax calculations, and home details. In addition to the basic home listing details, Zillow also lists the home's history whether it is on or off the market. The site shows when the house was last for sale, what the purchase price was, and what the tax amount was at the time.

Many other sites very similar to Zillow were also reviewed for this competitive analysis. Realtor.com, Trulia, and Redfin are all top real estate listing sites with similar design and features as Zillow.

## Homefinder



Figure 2. Homefinder.com homepage.

Homefinder is a top national real estate listings site that connects with the MLS system to show real estate listings. This site is unique because search results are based on realtors paying for “enhanced listings”. Enhanced listings appear on the search results page above listings from realtors that have not paid to be enhanced. Realtors can also pay to have specific listings highlighted. Enhanced listings also include more features on the property pages. Property pages that are enhanced will include more photos and more

detailed realtor information. Homefinder.com's paid structure changes the way the user experiences the home search process compared to other sites that do not have paid features. Because of their "enhanced listings" structure, the user is missing out on a large portion of listings. Research shows that a user typically won't go past page 3 on a search results page. This could cause frustration in the user if they are not seeing the results they are looking for.

### MRIS Homes

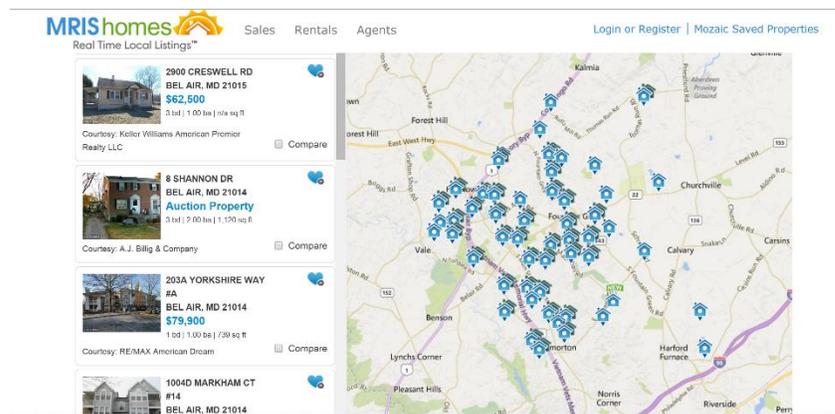


Figure 3. MRISHomes.com search results page.

MRIS stands for the Metropolitan Regional Information System and it is one of the nation's largest MLS systems, covering the Mid-Atlantic area, including Maryland, Washington, DC, Northern Virginia, and parts of Pennsylvania. MRIS' main function is to service real estate professionals with their listings entries, but MRIS Homes.com is a consumer-facing site that home seekers can visit to view all of the listings covered by this system. Its main goal is to provide leads to local agents. This site is unique because it is not a for-profit site specifically for area agents, so agents do not have to pay to have their listings featured.

The strongest function of this site that is different from others is the map-based browsing capabilities. When a user enters the search criteria, the results come back in map format. Users can browse through the map and click on a house icon for more

information. They can also search open houses in the area. However its search facets are not as robust as other sites and using the wrong combination of keywords can hinder the search results.

## Creig Northrop Team

([www.northropteam.com](http://www.northropteam.com))

The Creig Northrop Team is a Long and Foster real estate team in Maryland and an excellent example of a local real estate office. Creig Northrop is such a successful agent, that he has his own office with multiple locations and a team of several agents working under him. Creig Northrop is the largest, most successful real estate team in Maryland. The team includes dozens of realtors and hundreds of the state's most desirable real estate listings.

This particular website is unique because of its local feel and audience engagement. It has a very active local-focused blog that is very active and full of useful content. The design of the site is also very impressive. It uses beautiful, luxurious listings to highlight in a large rotating billboard across the page. It also uses the same color scheme as the Maryland flag to make a local connection with users.

This is also a good example to show how real estate agents enter information into the MLS and what information they choose to include which can affect users' trust in the agent. Details such as photo angles, number of photos, and missing information can play a factor in users' trust in the listings. In the image in the appendix for example, a wide-

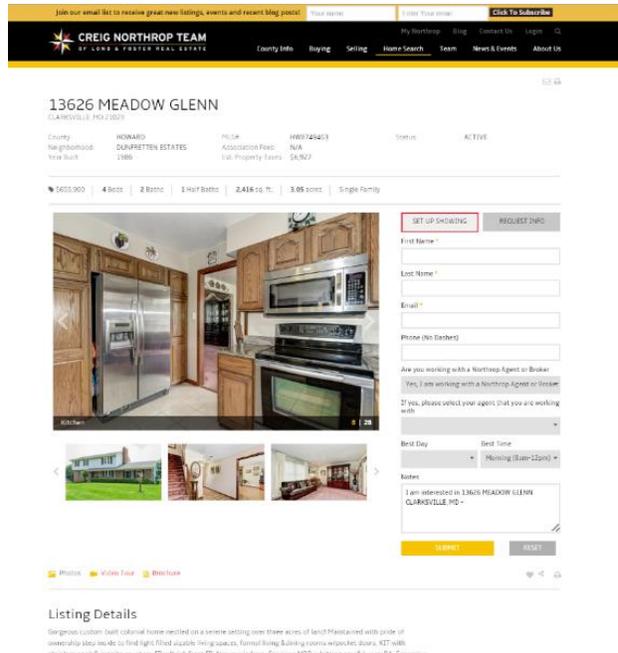


Figure 4. The Creig Northrop Team: Example of a property page on a local real estate office website.

angle lens has been used to make rooms appear larger in the listing. This could result in a frustrating home buying experience for the home seeker when the home tour is different than what they saw online.

These are just a few of the countless websites users can visit to search home listings. Other top listing sites include realtor.com and trulia.com which are very similar in function to Zillow. Almost every real estate office and large real estate team has a website that features listings similar to the Creig Northrop Team site. In the past, before the internet, many home seekers searched their local newspaper for home listings. Today, many newspaper and TV station websites also have real estate sections that show listings. BaltimoreSun.com embeds a Homefinder search widget and WashingtonPost.com has their own real estate section with a 3<sup>rd</sup> party listing feed.

#### **Part 4 : Crowd Sourcing and Trust**

Much of today's content on the web is now user generated, meaning anyone can go online and post photos, videos, blogs, and more. Many sites offer the ability for users to weigh in on topics by leaving comments, or review products or services. Any time a user goes online to look for answers to a question by asking other users, or make a decision by reading reviews or comments of others, it is known as crowd sourcing.

Users have shown to trust crowd sourcing when looking for answers even to complex problems- specifically among groups of small, like-minded communities. Users are also more than willing to participate in helping to solve a problem, especially when they have an emotional reaction to a situation, or there is an incentive involved. The act of leaving answers, or reviewing them, can form trusted social circles or online social communities.

Several studies have been done on measuring trust and community within crowd sourcing environments. In *Strength in Numbers*, Philip Ball writes about the earlier days of crowd sourcing, when a mathematician posted theorems online and used incentives to encourage users to help prove them. Not only were the theorems solved, but it helped

create an online mathematics community: “[the] online challenge was a radical suggestion for mathematics — a field that is often viewed as the domain of lonely, secretive figures who work for years in isolation. And it went against the grain of the wider academic culture, which tends to encourage researchers to share their ideas only by publishing them” (Ball, 2014). The project is still going on today, and is now called Polymath. Today, several websites across different types of interests and industries include online forums for users to form communities.

Online communities around the web can and often will make a difference in a business’ success or effect change. In Clay Shirky’s book, *Here Comes Everybody: The Power of Organizing without Organizations*, he states, “anything that increases our ability to share, coordinate, or act increases our freedom to pursue our goals.... Never have so many people been so free to say and do so many things with so many other people” (Shirky, 2008). Most crowd sourcing online includes individuals leaving comments and reviews on products and services. Users are willing and ready to write reviews on their experiences in restaurants, stores, their apartment buildings, dentists, auto mechanics, and more. This willingness is tied to an emotional response after an experience- most often a negative experience. Many users will leave reviews after feeling anxiety or anger after a bad experience. “Consumers now talk back to businesses and speak out to the general public, and they can do so en masse and in coordinated ways” (Shirky, 2008). However those who are searching reviews for answers have shown in studies that “reviews containing anxiety were considered more helpful than those containing anger, despite having the same objective content” (Yin, Bond and Zhang, 2014) However, users are motivated to leave reviews after a positive experience as well *Evil By Design* lists many reasons for users to be motivated for positive reasons: “It is in our nature to feel more charitable toward the gift giver, and therefore more likely to do something for them in return- in other words, to reciprocate”, meaning, if a user has a positive experience, they will feel thankful enough to share the positive experience with others and help the business. (Nodder, 2013).

Users looking at reviews or comments to make buying decisions trust these reviewers, especially if they are in the same social circles- even if they don't know each other personally, if they are shown to have the same interests, live in the same town, or have like values, users will base their decisions on the reviews. "Social trust relationships, derived from social networks, are uniquely suited to speak to the quality of online information; recommender systems are designed to personalize, sort, aggregate, and highlight information. Merging social networks, trust, and recommender systems can improve the accuracy of recommendations and improve the user's experience" (Golbeck, 2009).

Businesses have now made it a part of their online marketing strategy to monitor and respond to online comments and reviews. They will interact with users who ask questions about their product or who share their experiences. A negative experience can influence others' decisions, so a business has to keep track of these negative reviews and offset them with great customer service by replying to these users. According to Shirky, "groups are capable of exerting a different kind of force than are individuals, and when that force is turned against an existing institution, groups create a different kind of threat" (Shirky, 2008).

It is for these reasons above that a site that allows crowd sourcing on real estate listings and neighborhoods would be helpful for the homebuyer, and home seekers would be motivated to leave reviews to help others. New home seekers are already reaching out through their social circles for questions on neighborhoods and leaving and reading reviews and testimonials for real estate offices and realtor professionals. More research through surveys and interviews will be needed to determine what factors would motivate a user to leave reviews on listings and how helpful and trusting they would be. Based on preliminary research, the hypothesis would be that as long as the site utilizes a controlled vocabulary using local keywords, and users knew that those leaving the reviews were local (similar to Yelp, described below), the new site could see success.

## Part 5: Crowd Sourcing Competitive Analysis

There are several sites that allow for online user reviews, comments, and forums. As mentioned earlier, while some sites are made strictly for leaving reviews, now almost all retail store websites have a user review functionality. For this paper, three review and forum based websites are examined.

### Yelp

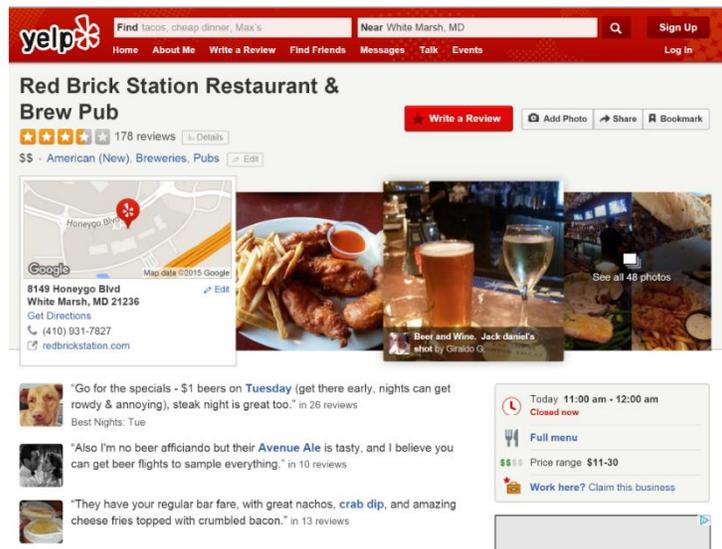


Figure 5. Yelp.com: Example of a business review page.

Founded in 2004, Yelp is the largest website for online user reviews for local businesses or individual business locations. The site receives an average of 89 million unique visitors monthly and over 90 million reviews has been written by users. Users can rate and leave a review, check in to a location with their phones, and upload photos of their experiences. It includes all types of businesses including restaurants, auto mechanics, retail stores, dentists, and even real estate offices.

In order to post a rating or review, Yelp requires the user to open an account on the site and make a profile. Yelp users can also add followers and form social circles with other members to closely follow the ratings and reviews that they post. Yelp uses

social media integration by showing members other people they may know that are also Yelp members such as their friends from Facebook.

Having a positive, active presence on Yelp is very important to a business owner- in particular a small business owner. Negative reviews can hurt a business so online reputation monitoring has become a standard part of a business' online marketing strategy. Business owners cannot have negative reviews removed from their business profile unless they are able to prove inaccuracies. Instead, business owners are encouraged to participate in the reviews and engage with their customers by responding to negative reviews, and encouraging customers to write reviews hoping for a positive outcome.

Business owners will often use Yelp to grow their business by offering incentives or special offers through the site. They will also often use incentives in order to motivate users to leave reviews. For example, some apartment management companies will offer first month rent free if they leave a review of their living experience.

## Glassdoor

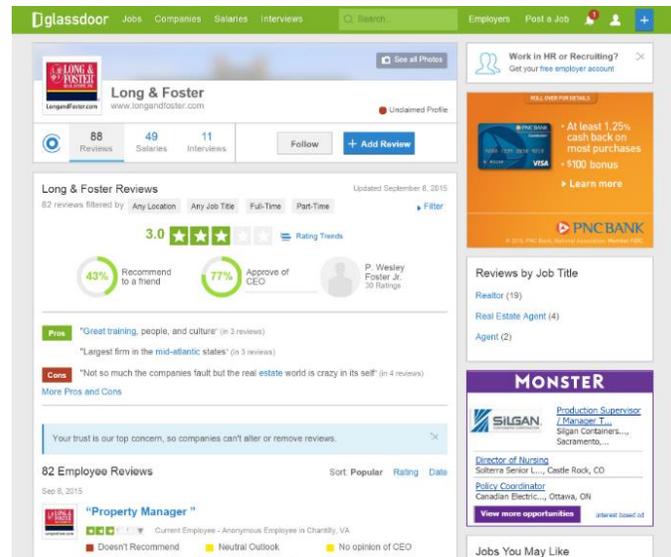


Figure 6. Glassdoor.com: Example of an employee ratings page for a business.

Glassdoor is a jobs and recruiting site that allows the user to not only search for jobs and post resumes as a job seeker, but it also allows for users to anonymously rate their former or current employers and leave reviews and their experiences for potential employees to review. Users can post on the quality of the company, job position, supervisors, and salary. Members can post their job titles and salaries for other job seekers in similar fields to compare amongst different companies.

Glassdoor is the fastest-growing job website and over 8 million reviews, ratings, salary reports, and interview reviews have been submitted. The site design is bright with large imagery, yet elegant and sophisticated.

However, the site uses a difficult member structure. Users can only read a limited amount of reviews before they are asked to create a profile to access further content. Once a user sets up an account, more content is released, but is still limited until they are willing to provide further profile information such as their job title and salary. Mobile

users also can only access limited content before they are prompted to download the app to access additional reviews.

## Apple Support Communities

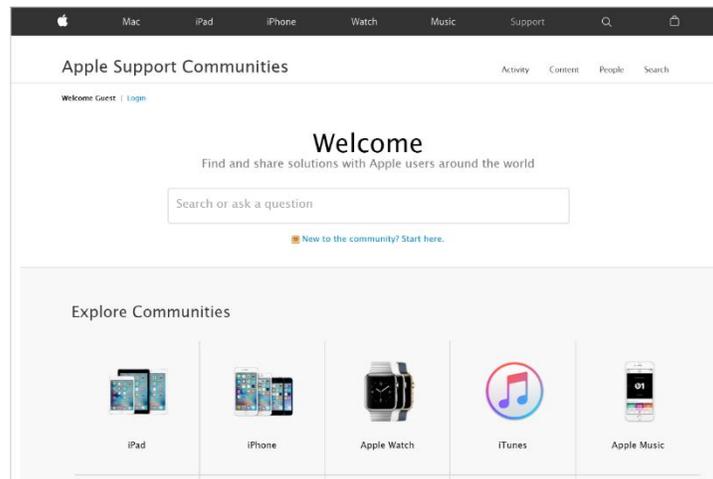


Figure 7. Apple Support Community homepage

Apple Support Communities is an online forum where Apple users can get help with their devices- mainly with trouble shooting, or to ask about certain features of a device. The community members can post both questions and answers to problems. This site is different than other online crowd sourcing sites because rather than users just posting online ratings and reviews, users can have online discussions with one another as they help each other out with their problems. For example, a user can ask how to disable an app on their Apple Watch. These questions are not answered by Apple, but by other Apple users. Users can engage in lengthy discussions and share ideas with multiple other members.

The design of the Apple Communities site is very clean with minimal content or imagery using Apple's normal clean, white background. Searching is based on entering keywords or asking a question. Asking a question will result in the site finding other posts with a similar question. If you cannot find where the question has already been

asked, you can post a new question. The search results will show which questions have been answered in order to browse answers quickly. The language and vocabulary used for the forum questions is all user generated, so there are similar questions with slightly different wording to search through.

**Additional ratings and review systems-** In addition to sites like Yelp and Glassdoor which are specifically used for online reviews, many retail sites have incorporated rating and review systems to their site. Amazon has a very robust review structure for not only its books, but also products as well. After purchasing a book or item, Amazon will often email the user asking to leave a review. Many large retail store sites such as Target, Best Buy, Walmart, and many more also incorporate online ratings for users to review before deciding to purchase an item and to compare similar items based on users' experiences. Online ratings and reviews are so common that basically any retail based site will incorporate them.

The travel and service industry also relies heavily on user reviews. Sites such as Trip Advisor and Hotels.com allow for users to rate and review hotels, rental companies, airlines, and any other part of travel. Hotels rely heavily on online reviews to grow their business and will use incentives to encourage users to leave a review.

## **Part 6: Conclusion and Next Steps**

The literature review findings show that users trust crowd sourced information both on a large scale, and locally, and that users are willing to participate in online reviews and opinion sharing. Research also shows that new home seekers do a lot of online research when purchasing a home, and seek out advice on the process.

However, there is currently not a site that ties in crowd sourcing or user reviews to assist with the home buying process through real estate listings or home buying information. Based on the research of how helpful online user reviews and crowdsourcing has been with other decision making processes, a site that allows for users

to read or submit user generated information on real estate listings, agents, neighborhoods, or home buyer advice should be accepting and welcoming in the market.

While there are various social media websites across the web where users can ask their social media circles for advice, and certain real estate sites allow users to leave agent ratings, there is not a single place to go that allows users to share their experiences or input information on listings, neighborhoods, agents, or the process itself.

Real Estate agents are currently the gatekeepers to real estate listing information and they are the only ones able to share the information by entering it into the MLS. Users are forced to trust that the agents or sellers are putting in accurate, trustworthy, and complete information.

But allowing a user to also submit information on a listing that may have been missing from the MLS, or inaccurate or to be able to share opinions or upload photos based on their experience, would essentially change the entire home search process as we know it. It would change attitudes and trust toward the home buying experience entirely.

The next step to this study is to survey recent home buyers and ask questions about their online home search experience and how helpful it was to their home search and how accurate the online listings were and what their experiences were like when comparing the online listings to the home tours. Questions will be asked regarding if they trust the online home listings and realtors and how a crowd sourced based system would help or hurt their trust in the home buying process, and if they would welcome a user generated real estate site and participate in one as well.

### Chapter 3: Home Buyer Surveys

In order to learn more about the online home search experience, it was arranged for a short survey to be completed to gather information from new home buyers. The survey was conducted for two reasons. First, to find out how home seekers used the home search websites- what features or pieces of information drew them to different sites and why and what challenges users had with the sites. This will help determine what will need to be included on the new site and how it can be different and an improvement from other home seeker sites currently on the market. The second reason for the survey was to find out home seekers' challenges with online listings vs the home visits and if the need exists for a crowd sourced based website and if there is desire to participate in leaving comments or helpful information online for other home seekers.

#### **Methodology:**

The survey was made up of 14 questions and was completed by 37 users. The survey was done online and completed with the free survey tool, Survey Monkey. Users were recruited through posts on various social media groups and also shared within social circles on Facebook and Twitter. Requirements for taking the survey was users must have purchased a home in 2015 and used the internet to assist with their search.

Due to not wanting to lead the users' answers in any way, survey takers were not told of the goal of the project or about the new site's potential features or functionality. They were only told that information was being collected to study the effectiveness of existing home search sites. A portion of the introduction of the survey follows.

“You are taking this survey because you bought a house in 2015 and used the internet to assist in your home search. The purpose of this survey is to collect opinions on the features and effectiveness of real estate websites- specifically home listing search sites. Please be as honest and open as possible- there are no right or wrong answers. This survey is not to test you

or your abilities, but to test the websites themselves in order to help with the design of a new site as part of a thesis project.”

Search questions were a mix of open questions where users could leave paragraph descriptions, questions where users chose from a list, and questions in a matrix format. Three questions were general demographic questions. A final 15<sup>th</sup> question asked users to leave their personal information if they would like to participate in prototype testing.

In general, users were asked about home seeker site features, the helpfulness and accuracy of the listings, and their thoughts of involving social media and user reviews into their search. The 14 survey questions were as follows. See the appendix for the full list of questions and responses.

1. Which of the following websites did you visit during your search for a home?
2. What features of the websites did you find the most helpful?
3. Is there any information or features you wanted to see included on the sites?
4. What was the most difficult part of searching for a new home?
5. How did you find the home you eventually purchased?
6. Did you find that the online listing information was a good representation of the home?
7. If you did not answer ‘yes’ to question 6, what were some of the issues you experienced comparing the online listing with the home visit?
8. Do you wish you could leave feedback on home listings or neighborhoods for other home seekers?
9. Have you ever left a review or gave others advice on realtors or neighborhoods online or in your social media circles?
10. What other home buying information did you research online?
11. What is your age?
12. Gender Identity
13. Marital Status
14. How many homes have you owned prior to this purchase?

**Participant Demographics:**

Of the 37 survey participants, 27 were female and 10 were male. 21 users purchased their home as a married couple or in a relationship while 16 were single. 16 participants were purchasing their first home. 11 had owned one other home before, and 5 had owned two other homes previously. 5 users had owned three or more homes previously. Survey participants' ages ranged from 23-62 with the average age being 36.5.

**Results:**

Of the 37 survey participants, 94.44% of users visited Zillow to help with their home search, making Zillow the most visited website of participants. Trulia.com was second, with 58.33% of users visiting, followed by Realtor.com with 50% of users visiting. Other sites used were Redfin.com (38.89%), MLS.com (13.89%), MRIS Homes.com (13.89%), Remax.com (13.89%), ColdwellBankerHomes.com (8.33%), and Homesnap.com (8.33%).

As found during the literature review research, online listing photos were the most helpful features of the home search websites. This was confirmed during the survey as well. 14 survey participants mentioned the photos specifically and over half of those described in more detail the helpfulness of the quantity, size, and resolution of the photos being particularly helpful as well as the ease of access to several photos and easy to use photo scrolling features and virtual tours. It is imperative that the new site allows for all photos included in the MLS to be viewed as well as the ability for users to upload high resolution, large photos when leaving information.

The second most helpful feature according to the survey were map features- the ability to view listings laid out on a map and narrow down by a certain geographic radius and see listings by neighborhood and location. 11 users mentioned the map features as the most helpful feature and the additional capabilities of the map features. For example, Zillow.com shows property values of surrounding homes laid out in a map format. This site will allow for users to search using a map and will be able to view listings within a

radius of the map. The mobile geo locator function will also be used for ease of use locating nearby properties specifically as users are on location and wish to leave a user comment.

Other helpful features specified in the survey were the ability to filter listings by size, price, number of beds and baths etc. Sorting by school zone was also mentioned as helpful and several users (4) mentioned that the tax history of the property was helpful as well as mortgage estimators and property sale history. For this site concept, pulling property sale and tax history will be included in the new site as it has shown to be helpful to the user, however it is important to note that research has shown that this information is often inaccurate or not up to date on other popular sites based on data that the sites are given (Bruce, A. 2013). A mortgage calculator is also a very helpful feature to include in the advice section of the site that would also link from each listing. However, steps must be taken to ensure the accuracy of the mortgage payment, such as the ability to have the user add in insurance and appropriate tax information. Seven survey participants specifically mentioned that tax information, and mortgage estimators were inaccurate and often did not take into account information such as up to date property tax amounts and mortgage insurance rates.

When asked what features users would like to see included or improved on the home listing websites, while accurate tax history and mortgage calculators was the most popular feedback, users also mentioned they would like to see additional home features listed such as parking information (3 users), age of the infrastructure of the home and last renovation as well as information on the age of utilities and any infrastructure damage such as flooding, mold, etc. (3 users). Two users wanted to know the reason the owner was selling. One user wanted to know how many other home buyers viewed the property. One user wanted information on utility costs. Information on ground rent, tax information and school zones were also mentioned, as well as the speed in which websites update the information on the listing was also mentioned as needing improvement.

When asked what was the most difficult part of searching for a new home, survey participants left detailed information that was in line with the purpose of the project. This was an open ended question where users were asked to leave as much information as possible. Many users described their frustration with the accuracy of the listing. One user said: “The photos were rarely true representations of the property itself.” Another user said: “People and agents are NOT honest about details in homes which was a waste of my time and frustrating!” Also mentioned: “Going to the house to find out it looks different from the pictures or having enhanced pictures on sites that covers flaws” was the most difficult. Said another user: “Lots of houses look good on the web but not in person. The house we ended up buying was one of the few that looked better in person.” Other users mentioned that the most difficult part was information that they did not realize until they visited the home, such as the safety, and cleanliness of the neighborhood. Users noted littered streets, safety concerns, and overall neighborhood vibe and city life being information that they would have liked to see. Other users mentioned the general inaccuracy of the listing information as the most difficult and non-matching homes not being filtered out in the search. One user mentioned they had difficulty finding a home with their accessibility needs.

Surprisingly, even after the feedback from the question above, when asked if the users found that the online listing was a good representation of the homes, 45.95% said “yes”. 0% said “no”, and 51.35% said “somewhat”. When asked to provide more information, 13 survey participants left feedback. One user said: “Wide angle lens photos are oh so deceiving...photos in general are. It sucks when you go into a house that looked good online to realize it is actually in need of a good gut.” Another user said: “photos often make the homes appear more spacious than reality.” One survey participant said: “In one case, the listing indicated that the home had been recently rehabbed, but in fact, the plumbing and HVAC was not complete or up to code.” Four additional users mentioned the misleading photos and one additional user mentioned that the lack of property upgrades were not mentioned in the listings.

Even though no users said the listings were not accurate representations of the homes, this feedback shows that while home listing websites do offer advanced and helpful features, some information is still needed, particularly the property information that the realtor is responsible for including or should include. This shows that there is a need for a website that provides more truthful information to users that can only be seen on site or that is not required of the realtor. Crowd sourcing for online user reviews and comments could fill the gap with information on things like neighborhood safety and cleanliness, integrity of infrastructure and utilities, actual home size, more realistic photos, and property upgrade information.

Survey participants showed they are willing to participate in leaving information on a listing. 55.6% said they would have left helpful feedback on listings or neighborhoods for other home seekers. 5.56% said they would leave information, but only if they had a bad experience that they would want to warn others about. 27.78% said they most likely would not leave reviews due to time, or they just don't like leaving negative comments. Four users said they don't like leaving feedback. When asked if they have given advice for other home seekers, 7 participants said they left a realtor online review. 15 users said they have referred a realtor or gave neighborhood advice within their social media circles. 50% of survey participants have not done either. One user noted that they are too private to want to leave advice.

Participants searched the internet for other home buying information as well, in addition to home listings. A range of 25%- 28.13% did Google searches to find information on mortgage types and lenders, credit and financing advice, and home maintenance information, showing that users needed to find a source on their own for the information. Users relied on Zillow (23.53%) and social media circles (29.41%) for information on the neighborhood. Users also relied on Google (36.36%) and social media circles (21.21%) for safety information. Only two users each used online reviews for mortgage types and lenders and home maintenance suggestions, showing that crowd

sourcing is just not available for things like safety information and neighborhood details and school reviews.

Of the 37 survey participants, 59.46% said they found the home they eventually purchased from an online listing. 32.43% said they found the home from their realtor. One user said they bought a home that their family member or friend told them about. One user said they saw a sign on the property, and another user said they eventually went with hiring a home builder.

### **Conclusion:**

Overall, survey findings showed that while current home search sites are innovative and helpful, the home seekers that participated are still looking for additional and more accurate information beyond what the sites can provide. The details they seek is not information that could be provided by Zillow or Trulia, but rather by the realtors who enter the listings into MLS or information that their peers could provide. Realtors are tasked with showing the best representation of the home for the seller to attract buyers, but home seekers are looking for honest and accurate details. Viewing a home and finding that the listing was less than honest or omitted useful information is a frustrating experience for home seekers that are already stressed with a difficult home buying process and housing market. Turning to their social community for answers on a single website that also provides listings, tax estimates, mortgage calculators, and general advice, could prove to be a valuable tool.

For example, if a listing shows that a home was recently remodeled, but a prospective home buyer sees the electrical was insufficient, that user could alert other home buyers to the issue to alert others and help them decide whether they want to view the home anyway, negotiate the issue with the seller, or move on to the next listing. Or as another example, if a listing does not mention parking options, a neighbor could leave a comment on the conditions of the street parking or opportunities to rent.

## Chapter 4: Site Design and Information Architecture

The main purpose of the new real estate search website is to enable users who are searching for homes to not only view the home listings, but also to enable home seekers to leave a comment or advice on homes they have toured or neighborhoods that they have experience with and give the ability for other users to read those comments as they are searching for listings. Users will also be able to get advice on neighborhoods, realtors, and lenders, all left by users.

It is important that the site functionality and navigation is easy for the user, so that he or she may focus on the unique content of the listing details, photos, user generated content, and articles. In *Designing With the Mind in Mind*, Johnson explains that “when we go somewhere we have been to many times before, or do something we have done many times before, we do it almost automatically, without much conscious thought.... When people want to get something done- as opposed to challenging themselves mentally, they prefer to use methods that are automatic or at least semi- automatic to save time and mental effort, and to reduce the chance of error.” To give users the ability to focus solely on the unique content of the site and not have to think about functionality, all features will be standard, for a familiar user experience for automated operation. For this particular site, users are experienced and advanced web users, but will be new to this site, as the home seeking process is something done rarely for the user and a short term process. By using functions that many websites today also use, this enables the user to see similar functionalities and move through the site automatically, allowing them to focus only on the unique content that brought them to the site. Johnson explains: “if they use an interactive system frequently, familiarity develops quickly. Most user interface designers are well aware of this, and therefore design applications, appliances, and online service differently depending on whether people will use them casually and rarely or intensively and often.” Because users will be going to this site for the first time when they are doing their home search, it will be made very easy to use with standard features

with structure and hierarchy: “interactive systems that display information in structured ways allow people to extract the desired information more easily and quickly.” (Johnson, 2014). This will all result in a positive experience for the user as they work through their home buying process which can be an overwhelming or difficult experience.

### **Navigation and Search:**

The website has 4 main sections- Homes, Neighborhoods, Realtors and Advice. These 4 sections are easily accessed from the main navigation.

The Homes tab is not only a tab on the navigation, but the prominent feature of the site. Users are able to begin their home search immediately from the homepage. Users are able to filter their search through the standard criteria- location, price range, and number of beds/ baths. From the Homes section front, users can access additional filters such as home amenities and additional features such as air conditioning, pool, etc.

Also featured prominently of the homepage is the option to leave a comment about a listing. This search feature enables the user to type in an address or use their current location. The ability to leave a comment is also accessible through each individual listing page. User testing will determine the best way to handle the usability of this feature.

The Neighborhoods tab enables users to search neighborhoods and gather user comments to review information that they would not be able to get from an MLS listing. This is information that would only be available with a person’s individual experience. Details such as neighborhood cleanliness, crime, parking, noise, walkability, culture, and vibe could all be left by neighbors and even home sellers. For this section, a map feature is important for users to select the neighborhood that interests them. Users can see exactly where the comments came from. One issue with leaving comments on listings, is that listings come and go quickly depending on the market. A user may not get the information they are looking for if a listing in the neighborhood sells too quickly. Whether there are listings in the neighborhood currently or not, users can still see the

neighborhood information to assist with their research as they decide where they want to live.

On the Realtor tab, users can search for a realtor, see their listings and history, and view or leave user reviews. Realtors have the option of creating an account to the site in order to control and change their profile information.

The Advice tab is used for general home seeker information. It is a mix of both professionally written content sourced from 3<sup>rd</sup> party publishers, and user comments to add value to the information. Users can select advice on taxes, mortgage lenders, mortgage types, rates, insurance policies and providers, and home maintenance. This section is particularly helpful for the first time homebuyer who searches for mortgage information online in addition to home listings.

The site also includes a utility navigation with web site facts and history (About) contact information and a realtor login section.

#### **User Accounts:**

Prior to being able to leave comments, users are asked to create an account in order for anyone leaving a review to be held accountable for that comment. This enables the ability to track comments left by that user and easily identify the user if there is misuse, false comments, harassment, trolling or any other situation that would result in a poor experience for home seekers and damage the website's reputation as a helpful tool to real estate buyers and sellers. Users are asked to provide their name, email address, and phone number and create a username and password. Privacy is of a concern to many, so comments would only show the username to protect the identity of the commenter.

Realtors are also be given the option to create a realtor account so they may add or change any profile information they would like to include. There is also be a section on their profile to add advice of their own.

### **Search Results and Property Pages**

After entering facets into the search, the search results page will appear where users can click or tap on a listing to view the property page. The search results page has a list of results going down the left-hand side of the page with a thumbnail image, basic property information, and the latest user submitted comment. On the right-hand side of the page is a map showing plot points of other listings nearby. Users can navigate around the map at this point to locate and select more search results and property pages.

The property page is very visual, with large, bright images of the property supplied through the MLS. Prominently below the MLS photos are the user submitted photos. Property details are listed below the photos. This includes property type, square footage, details on bedrooms, bathrooms, and a list of amenities. Below the details are the user generated content on the listing and the neighborhood. This layout is consistent with most e-commerce sites that include product photos at the top, with product details and specifications below, and user comments below the product details, such as sites like Amazon and Best Buy (2016).

### **Mobile Format:**

Mobile browsing has grown significantly over the past few years. In 2014, mobile browsing accounted for 60% of all internet traffic (Hessinger, 2014). Many sites are now based on responsive design, where the website is functional and automatically adjusts for any device size. Mobile apps are also very relevant. Fifty-one percent of the mobile traffic is from a mobile app (Hessinger, 2014).

Having a positive mobile user experience is particularly important for this site, as the majority of users will be leaving comments on location at a listing as they are forming opinions and taking photos of the homes with their phones. The site will be responsive with geo location technology included.

When determining if the site would have an accompanying app, the home buyer process was factored in. Because the process of searching for a home is typically quick,

an app download will not be necessary and may not be successful. Accessing the site quickly through the browser would be the best option for home seekers, though user testing will determine if an app would be helpful. Several real estate sites also have accompanying apps.

For the mobile version of the site, the option to leave a user review or comment is the most prominent feature and asks users if they want to leave a review for the listing where they are located. User testing will determine if home seekers are willing to leave a comment right on location.

Similar to the desktop functionality of the site, the mobile structure is standard, with geolocation, Facebook login process, and hamburger navigation, all are standard for the user to move through automatically as they do with many sites with responsive design today.



Figure 8. Concept sketch, homepage.



Figure 9. Concept Sketch, search results page



Figure 10: Concept sketch, property page



Figure 10. Concept sketch, mobile view

## Chapter 5: Prototype Development and User Testing

### **Prototype Design**

A technical prototype of the site concept was developed using the prototype software Axure RP Pro version 7.0. The prototype was designed by scanning the hand-drawn sketches of the pages and dialogue boxes into the program and developing hot spots and dynamic panels to build into a working prototype. The decision to follow this technique was based on research that shows that testers respond well to hand drawn prototypes. Sketched prototypes allows for the users to not be distracted by design and “focus purely on functions and user interactivity” while leaving the design aspects “to their imagination”. (Adobe, 2016)

Some challenges of the prototype are that it did not function correctly on tablet or mobile device and was not responsive. Users had to be given direction on the prototype functions in order to experience the different pages, dynamic panels and capabilities. Three main pages of the site were developed into the prototype- homepage, search results page, and property page. Dynamic panels were made for the user login dialogue box, navigation menu, and dialogue boxes to submit a comment on the listing.

### **Users**

The prototype was tested by eight individuals who fell into the target demographic of the audience. Testers were adults ranging in age 30-50 who either recently purchased or were about to purchase a home. Four males (three married home owners and one single renter with intent to buy), and four females (all single, new home owners), reviewed the prototype. All testers were volunteers who donated their time and declined compensation for testing. Each test took approximately twenty minutes.

*Table 1. Prototype testing volunteer demographics*

	Age	M/F	Race	City/ State	Homeowner Status	Technology Experience	Social Trust
Tester 1	35	M	Caucasian	Catonsville, MD	Recently purchased 2nd home	Advanced user. Educated and work experience in web technologies including Google Analytics and dfp.	Advanced social media expertise including social media management for businesses.
Tester 2	36	M	Hispanic	Baltimore, MD	Currently seeking 1st home	Experienced technology user and experienced in web browsing and online shopping, though uses social media rarely.	Believes in relationship building and traditional sales and customer service. Believes users should rely on their realtors to help with home search.
Tester 3	45	F	Caucasian	Baltimore, MD	Recently purchased 1st home	Experienced technology user and heavy social media user.	Relies on social circles within her community for recommendations on products and services
Tester 4	46	F	Caucasian	Baltimore, MD	Currently seeking 1st home	Advanced user. Educated and work experience in social media technologies, blogging, online writing and public relations	Trusts user reviews online and relies on reviews to make informed purchasing decisions.
Tester 5	31	F	Caucasian	Baltimore, MD	Recently purchased 1st home	Advanced experience in software systems, specifically healthcare record related systems. Advanced and heavy social media user on the newer social media platforms such Snapchat and Periscope.	Heavy user in sharing information and often leaves reviews, and shares stories publicly without prompting or incentive.
Tester 6	50	M	African American	Reisterstown, MD	Recently purchased 3rd home	Novice internet user. Enough experience to navigate basic sites to read information. Does not use social media often.	Considers online user reviews before making purchasing decisions. Uses reviews for product recommendations to decide which product to buy.
Tester 7	34	M	Caucasian	Baltimore, MD	Currently seeking 2nd home	Experienced user for browsing websites, playing games, and reviewing information. Does not spend a lot of time on social media.	Relies heavily on online user reviews to make buying decision and it is one of the few things he uses social media for.
Tester 8	33	F	Caucasian	Owings Mills, MD	Recently purchased 1st home	Experienced user for browsing websites and social media	Does not always trust user generated content online and uses only her social circles from those she is close with

## Methodology

Three testers viewed the prototype on a mobile or tablet device, and five reviewed over a desktop computer. Testing took place at an office location for three users, a public location for three users, and a home setting for two users.

Users were told of the purpose of the site and the testing. They were told that neither they nor their abilities were being tested, but rather the website prototype itself for its ease of use and content. Users were told that this was completely voluntary and three testers gave permission to have photos taken.

The prototype operator navigated through the site for the user, as the user responded to questions about the navigation. The test operator gave the users the following tasks or questions:

1. Identify the location of the main navigation
2. Identify the location of the login and show how you would log in to the site.
3. Show how you would search for a home on the site.
4. Show what you would do if you were on location at a listing and had an experience that made you want to leave a comment on the site.
5. Show how you would interact with the search results page (filter the listings, scroll through the listing search results, or interact with the map)
6. What are the strongest features of the site?
7. Did you find the site easy to use?
8. Would you use the site for searching for a home or leaving feedback?
9. Would you visit this site instead of other sites?
10. Is there anything that would make you not want to visit the site?

## **Results**

Overall, feedback on the prototype was very positive. Users liked the easy navigation and the standard layout, including the hamburger navigation menu, and standard icons. Popular features such as allowing a user to login via social media, and geo location capabilities were both specifically mentioned as helpful tools that made the user say they would use the site.

1. Identify the location of the main navigation
  - a. All users recognized the hamburger menu as the location for the navigation drop down list. Two users suggested for it to go on the left side of the page rather than the right side based on other sites that they have used. One user suggested that the label “Homes” on the navigation be changed to “Listings” or a similar word. The user said, “I am not sure if that goes to a page to view listings, or if it takes you back to the

- homepage. If I am in a rush, or distracted, I would not read the label entirely, and mistake ‘Homes’ for ‘Home’. Perhaps ‘Listings’ would be a better option” (tester 1). Another user commented, “I like that there is a hamburger menu. That seems to be where most sites are going in design. The problem is sometimes they are hard to find. I typically see them on the left more than the right” (tester 4).
2. Identify the location of the login and show how you would log in to the site.
    - a. The login button was easily located and the login screen was found easy to use. Five testers recognized and mentioned the ease of use with the option to login using social media without being prompted by the test operator. One user said that the Login button should disappear if a user is already logged in, in order to let the user know that they are still logged in. She said “I always forget to log out of sites, or try to complete a task when I am not logged in. Make sure the site shows when I am logged in at the top, and a clear button showing I need to log out” (tester 4).
  3. Show how you would search for a home on the site.
    - a. The location of the home search was easy to locate. Most users said they would search by using the map feature rather than the filters. Users suggested for the map to have the same interactive properties and icons as Google Maps. Three users wanted the geo-location tool for the home search to be included, in order to search for homes near them. A user said, “Location is a top priority for me. I am flexible on number of beds and baths as long as it’s in the right neighborhood, so I would gravitate towards the map feature, and find a way to skip the search fields entirely” (tester 7). Another user asked, “Will this map be fully interactive? It should use standard plot point icons and when I hover over a plot point with my mouse, it should have the listing summary pop up. I should also be able to draw a radius on the map to search within” (tester 1). One user who recently purchased a home said “these search fields are easy to understand. They are similar to the other real estate sites I used during my search” (tester 3).

4. Show what you would do if you were on location at a listing and had an experience that made you want to leave a comment on the site.
  - a. Users were able to easily identify the “Submit Feedback” feature on the home screen. Users demonstrated how they would most likely do this from their phone on location by using the geo-locator tool. Two users said they would wait until they returned home to leave feedback. One user said they would not use this feature. Users liked how the ability to leave a comment was available in multiple locations. The feedback submission dialogue box was found easy to use with standard icons and functionality. All testers recognized the camera icon to upload photos and demonstrated correctly how uploading photos would be done. One user thought that the dialogue box should be a form with specific fields to fill in, while another user said they would not fill out fields due to time, and liked the open-ended dialogue box. The user said, “If I am very emotional about a house or neighborhood I just saw, fields would annoy me. I just want to express my experience quickly in a paragraph format.” Regarding the functionality, one user said “It is kind of like Snapchat. You take a photo from your phone wherever you are, and add a comment. Very easy. I am used to stopping to take pictures wherever I am when I feel compelled” (tester 5).
5. Show how you would interact with the search results page (filter the listings, scroll through the listing search results, or interact with the map).
  - a. Users were most intrigued by the interactive map and said they would use the map feature the most. Three users said they would search by zip code first to narrow the search, then use the map. Two users said they would fill in the filters with the number of appropriate beds, baths, and price filters to narrow the search before using the map. One user said you should rely on your realtor to find home listings due to the inaccuracy and lag time of the MLS. He said, “These sites have a lag time, and many times a home seeker asks a realtor to see a listing, but it already has sold or is under contract. What will this site do to make sure the search results are accurate?” (tester 2). Another user said “If I move the map, and draw a radius, the search results on the

- left should change automatically. I should not have to filter the search by putting in new fields or start a new search” (tester 1).
6. What are the strongest features of the site?
    - a. Four users commented that the neighborhood feedback section could be the strongest feature of the site. Listings come and go quickly off the MLS, but the ability to see details on a neighborhood at any time proved to be valuable to the user- specifically because there is not a website with this feature that exists already. One user suggested eliminating the listings comments and MLS feed altogether and focus solely on the neighborhood. Two users said that the user photos were the strongest feature. Another user said the strongest feature was its ease of use and standard navigation. Tester 7 said, “The neighborhood insights is what I think is the most useful part of this site. Identifying a good neighborhood was the most difficult part of buying a house for me. I care about street cleanliness, quality of the neighbors, noise level, and all around vibe. Even residents who aren’t in the market to buy or sell can contribute to the site to help build their block. I really like that idea.” Feedback from Tester 2 included, “Homes sell so fast. By the time a home seeker leaves feedback on a listing, the house could be gone. The Neighborhoods section is where the value is here.” Regarding the photos, Tester 1 said, “User submitted photos are the strongest aspect of this site. They need to be higher on the page and more noticeable. It’s okay to have the photos separated from that users comment. On Yelp, the photos are at the top of the page near the business’ details. I think the photos should be directly underneath the MLS photos.”
  7. Did you find the site easy to use?
    - a. All users found the site easy to use. Tester 5 said, “I love how every piece of this site are functions that I’ve seen before from other sites. I don’t have to worry about not knowing how to use it. Even when submitting a comment, which is a new feature, I still recognize the icons such as the current location geo tool, and the photo upload icons.” Tester 2 said, “Even though I don’t like the concept, and wouldn’t use the site,

- I do find it easy to use. I am not having any trouble finding information. Good job.”
- More feedback included: “This is very easy. I like how I can be in a distracting situation, and still navigate around” (tester 8), and “I like how the mobile version adjusts to being centered on leaving feedback rather than the home search. I like that it knows if I am on my phone, it is most likely because I am currently at a listing” (tester 4).
8. Would you use the site for searching for a home or leaving feedback?
    - a. Five users said they would use the site for both searching for homes and leaving feedback. Two users said they would only search for homes and read the user feedback. One user said he would not use this site and would rely only on his realtor to search for homes. Two users mentioned trust issues with the user feedback such as leaving false reports. One user worried about their privacy when leaving feedback. Feedback included: “I really wish this was around when I was searching for my house. I would have saved a lot of time. (tester 3) and “I would be on this site every day searching for homes” (tester 1). Another user said: “Even if I weren’t in the market, I would go on this site to give information on my block for other potential neighbors” (tester 7).
  9. Would you visit this site instead of other sites?
    - a. Five users said they would use this site but still use Zillow due to the Zillow home estimate features. Two users said they would visit this site and still visit Trulia for the price history, trends, and walkability score. One user said “It doesn’t replace Trulia, but it’s a great add on to include in the home search” (tester 3).
  10. Is there anything that would make you not want to visit the site?
    - a. One user mentioned that he would not use this site due to the inaccuracy and slow timing of the MLS. This individual feels as though a user should rely on their realtor to find the best listings for home seekers- however, this user was not only a new home shopper, but also a realtor. Two users said that while they would use the site, they would take caution on the accuracy of the user reviews. One user said, “You

really have to watch for trolls. It's hard to tell what's true on the internet these days. People have more time on their hands than you would think. Make sure there is transparency, and that users are held accountable for their comments and that everything is well tracked. At the same time, if my first and last name were exposed, I wouldn't leave a comment. There needs to be that balance between privacy and accountability" (Tester 5).

Table 2. Task Analysis

	Task 1	Task 2	Task 3	Task 4	Task 5
Tester 1	Move to left side of page. Rename some labels on the navigation	Reacted positively to social login option	Map. Use Standard icons	Wants form	Search by zip only, then use map.
Tester 2				Would not use	Would not use
Tester 3			Map	Return home to use	
Tester 4	Move to left side of page. Rename some labels on the navigation	Reacted positively to social login option. Make sure users know when they are already logged in.	Map. Use Standard icons. Geo Locator		Search by zip only, then use map.
Tester 5		Reacted positively to social login option	Map. Geo Locator		Search by zip only, then use map.
Tester 6				Return home to use	
Tester 7		Reacted positively to social login option	Geo Locator		
Tester 8		Reacted positively to social login option	Map		

	Task 6	Task 7	Task 8	Task 9	Task 10
Tester 1	User submitted photos		Read and leave reviews	with Zillow	
Tester 2	Likes the neighborhood info		Would not use this site	Would not use this site	Would not use this site
Tester 3	Likes the neighborhood info		Read and leave reviews	with Zillow	
Tester 4	Standard navigation		Search only. Privacy concerns.	with Zillow	with caution
Tester 5	User submitted photos		Read and leave reviews	with Trulia	
Tester 6	Likes the neighborhood info		Read and leave reviews	with Zillow	
Tester 7	Likes the neighborhood info		Concerned about false reporting	with Zillow	
Tester 8	Undecided		Search only. Concerned about false reporting	with Trulia	with caution

Key:  
 Completed Task Successfully  
 Completed Task Unsuccessfully

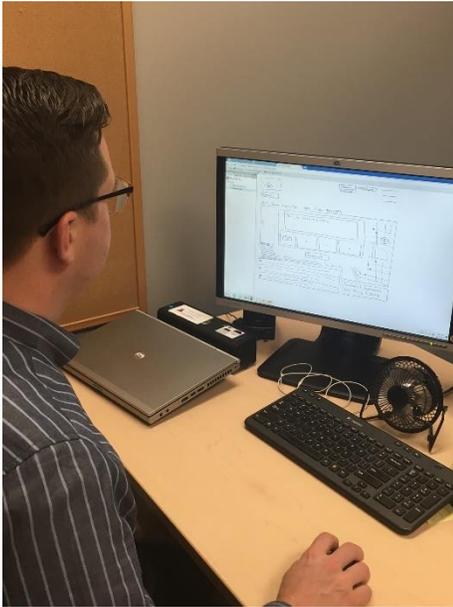


Figure 11. Prototype test, tester 1

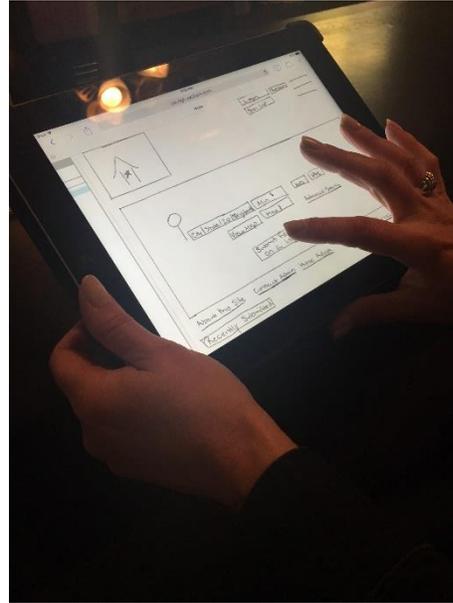


Figure 12. Prototype test, tester 4

### Prototype Revisions and Retesting

The following revisions were made to the initial prototype based on user feedback.

1. Move the hamburger menu from the right to the left side of the page.
2. Change the label “Homes” on the navigation menu to “Listings”
3. Adjust login button so that the site specifies when a user is logged in.
4. On the property page, make the user submitted photos more prominent and closer to the MLS photos.
5. On the map, use a standard pinpoint icon to show homes for sale. Allow for a user to hover over the listing on the map to see more information and be able to go directly to the corresponding property page.
6. Make the Neighborhood information feature more prominent on the homepage rather than hiding in the menu.

The new, revised prototype was tested again with four users- three repeat testers and one new user. All testers responded well to the new prototype, and commented that it was easy to use, that it was an innovative idea, and that they would use the site for their home search. They commented on its ease of use based on standard login, icons, navigation, geo locator technology, and responsive design. Testers navigated through the structure of the site automatically, allowing them to focus only on the unique content such as the user generated content and home advice, and they were able to easily and quickly complete the task of adding their own content. Tester 1, who also viewed the first prototype said, “This version is perfect. I like the new map icons, and I notice the hamburger menu more now that it’s under the logo.” The new tester said “I just moved in to town, so we are renting while we learn the area. I love the neighborhoods feature. It will really give you a sense of the culture of each area, rather than just statistics.”

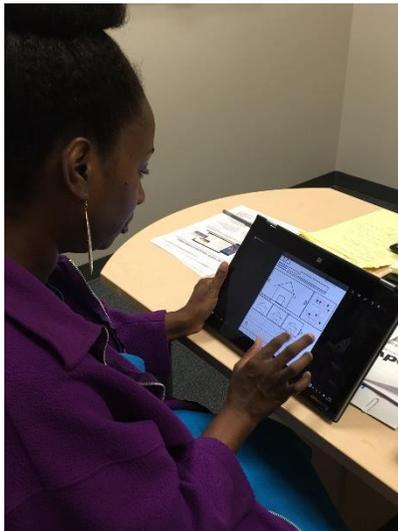


Figure 14. Prototype test, revised, with new tester.

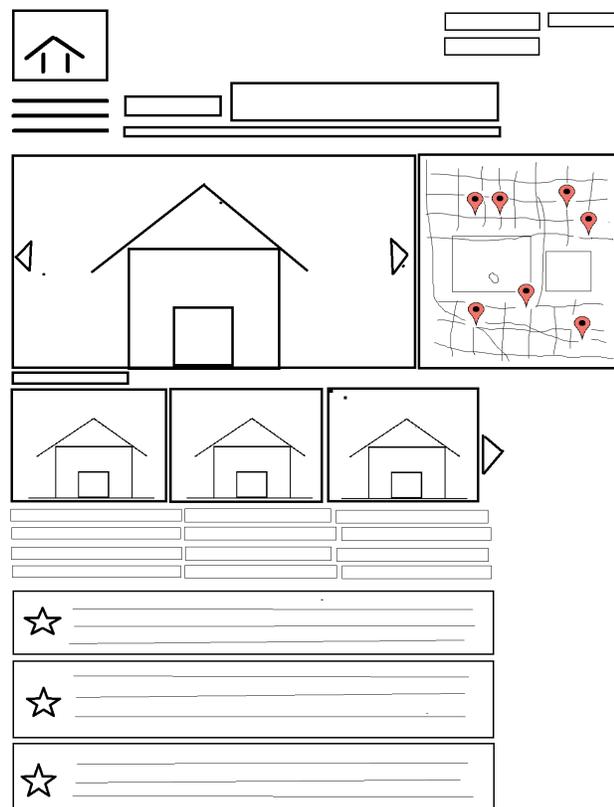


Figure 13. Revised prototype: property page

### **Next Steps**

In conclusion, the user testing showed a positive response for both the concept and functionality of the site. Users that tested the site were excited about the concept of being able both leave comments and review others' comments on listings and neighborhoods. They were excited about bringing user generated content into the real estate industry and change the way in which both home seekers and realtors approach and respond to online listings in a similar way online reviews have changed both the automotive and travel industries.

Users mentioned the ability to see information that the realtor cannot provide would be helpful in their search as well as the ability for users to reach out to their peers for first-hand accounts of neighborhood information

The ease of use using standard layout, responsive design, navigation menu, icons, social media integration and geolocation features made the site function easy to use, resulting in a positive user experience. Users were able to easily flow through the familiar elements of site automatically, as stated in *Designing with the Mind in Mind*, allowing the user to focus only on the content and features of the site, and not on the technology, functionality, or navigation. Because testers had seen certain features before, such as the hamburger navigation, logging in through Facebook, geolocator enabling, upload photo prompts, scrolling features, and map navigation, they become experts in those tasks, and they therefore have the capability to navigate through the site easily, and have their attention only on content such as viewing the listing photos, user comments, and neighborhood information.

Users responded that there was not a need for mobile app integration. Because the home buying process is short term, using the mobile browser was sufficient and effective, especially since the responsive site operated well on mobile, though an option for a shortcut icon for the phone was recommended.

The results of the user testing confirm the facts from the National Association of Realtors and the user survey research. Users found were within the appropriate age range

and demos for home buyers. 87% of testers used the internet to help with their home buyer search, in line with the NAR's fact of 90% of homebuyers. All testers had experience with some form of crowd sourcing for their buying decisions and all testers understood what crowd sourcing was. Users expressed their desire to have the site move forward into design and beta stage, as many of the testers shared their difficulty with the home buying process and online listing accuracy and agent trust. Like the surveyors, the testers confirmed there is a need and desire to incorporate a crowd sourcing tool in to the real estate search landscape.

## Chapter 6: SEO and Marketing Plan

In addition to the site design and user testing, an SEO and Marketing Plan was developed to outline a strategy to bring the site to market. The SEO plan was developed using the following steps: define site goals and target audiences, outline site content, identify competitors, develop a site structure for both desktop and mobile platforms, outline a SWOT analysis to define project strength, weaknesses and opportunities and challenges, outline an onsite SEO strategy and keyword analysis, and estimate a timeline and budget.

The SWOT analysis was important to define the strengths, weaknesses, and opportunities of the site in order to identify clear goals and develop an SEO strategy.

The strengths of the site are that it is the first of its kind to incorporate crowd sourcing into real estate search. The mobile, geolocator, and social media integration of the site allows it to be used easily and quickly, from any device encouraging a high rate of engagement and usability. The site also contains a high volume of content that changes daily which is ideal for Google crawlers and the site's Quality Score.

These features allow for the opportunity of unlimited potential for growth and success. Local listings allow for incorporating multiple meta tags using local keywords, which is in line with how users search for real estate. Crowd sourcing on the local level is also a great opportunity for the site to succeed, as it will gain the users' trust.

Weaknesses of the site that will challenge the SEO strategy is that it is a new site and it will take time to build up in recognition. There will be few links pointing to the site in the beginning as it grows in visitors. There is also the potential for a negative response from realtors and home sellers who may not like that there is less control over their home listing.

All of these facts found in the SWOT analysis will be kept top of mind when building the SEO strategy and what type of on-site work and timeframe is built in to the planning.

Table 3. SWOT Analysis

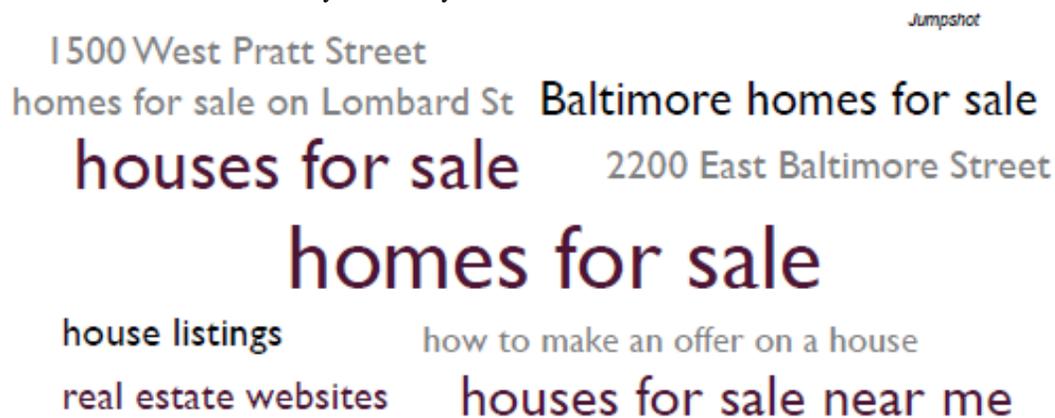
<p><b>STRENGTHS</b></p> <ul style="list-style-type: none"> <li>• First website to incorporate user reviews for individual listings and neighborhoods</li> <li>• Uses app integration for users to complete tasks with their phone such as upload photos and rate listings</li> <li>• Includes social media integration for sharing</li> <li>• Contains a high volume of content that changes daily</li> </ul>	<p><b>WEAKNESSES</b></p> <ul style="list-style-type: none"> <li>• Brand new site and app</li> <li>• Not well known at this time</li> <li>• Could contain design flaws</li> <li>• Few inbound links</li> </ul>
<p><b>OPPORTUNITIES</b></p> <ul style="list-style-type: none"> <li>• Unlimited potential for growth and success</li> <li>• Incorporation of metadata, tags, and links</li> <li>• Use of crowd sourcing and searching at the local level can build trust</li> </ul>	<p><b>THREATS</b></p> <ul style="list-style-type: none"> <li>• Potential for backlash and anger from realtors and sellers</li> <li>• Potential for bad reputation for fake reviews</li> <li>• Already established competitors could adopt same capability</li> </ul>

The onsite SEO strategy will be based on the way in which home seekers search for new homes. Based on the keyword analysis using Jumpshot, home seekers will often include local keywords in their search, for example, popular key phrases include, “Baltimore homes for sale”, “homes for sale on Lombard St.”, and “2200 East Baltimore Street”. The most popular keyphrase was “homes for sale”, “houses for sale”, and “homes for sale near me”. Based on this analysis, it is important that the site incorporate title and header tags with these keywords, alt image tags, and URLs that include the property address for each listing. Local keyword metatags and image alt tags will also be used.

In addition, to keep the site relevant and at the top of search engine organic results, content incorporating high ranking keywords will be implemented in the advice sections including a blog element with Google Plus profile implementation.

This SEO strategy will take at least 6 months, with months 1 being a keyword and controlled vocabulary discovery and metadata strategy. Months 2-3 will include implementation such as content creation, tag and header keyword implementation, and image alt tag implementation. Remaining months will include content updates and continued growth in organic search results and continued user generated content including photo uploads, user feedback, and outbound links from social shares.

Table 4. Real estate search keyword analysis



## Chapter 7: Conclusion

This project found that users have a strong desire to seek the help of other online users when making buying decisions and that assistance is highly trusted, regardless of the fact that online user feedback goes beyond closed social media circles. Not only are users willing to read and trust this user generated content, but they are also willing to help other users out by posting their experiences for others on public websites.

The user survey study showed that there is a need to incorporate this practice into the real estate landscape. New home buyers fall directly into the same demographic that uses the internet to search for new homes and relies on crowd sourcing for buying decisions. This demographic wants to have control over the real estate listing content, rather than fully trusting the real estate industry alone. They want additional information and first-hand experience that the listing cannot provide and they want this information online before seeing the listing in person or discussing with a realtor. They have shown that they will trust online feedback more than the realtor or home seller.

In addition, users have shown that they want a website with a standard layout with responsive design that is easy to use across all platforms and uses standard icons and language along with standard social media integration. Users have a fragmented attention span with many tasks throughout their day. Using standard formatting allows for the user to move through the site quickly and automatically without thinking, based on using the same actions across the web, which adds to a positive user experience. The user will be able to focus on the content of the site rather than the functionality of moving through the site and learning an unfamiliar layout and navigation.

Users have shown that they are willing and able to use and contribute to this site, potentially changing the way in which home seekers approach search and buying and changing the industry landscape as a whole. This concept gives control to the user and in the end, the home buying process becomes a more positive experience with this site being a helpful tool within the landscape.

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Appendix A: Literature Review

A. Persona- Move Up Buyers

**Bill and Anna**

**Demographics**

- Both 36 years old
- Married 2 years
- Both completed college degree
- Combined HHI \$135,000

**Primary Goal**

To purchase a home in Baltimore County and start a family

**Additional Goals**

- 2<sup>nd</sup> home- Move up buyer
- Larger home with 4-5 bedrooms
- Considering school district and neighborhood safety
- Quiet, suburban neighborhood

**Behaviors**

- Both smartphone users
- 2 laptops and 1 tablet in the home
- Bill searched online on laptop to find a realtor. Focused on realtor profiles and user reviews on Facebook and Zillow.
- Anna browses home listings by tablet or cell phone in the evenings while watching TV, but does so casually without bookmarking or comparing homes.
- Anna has browsed realtor.com, Coldwell Banker.com, and the Creig Northrop Team website to browse as well as Facebook community pages.
- Both have completed online forms to request more information for two listings

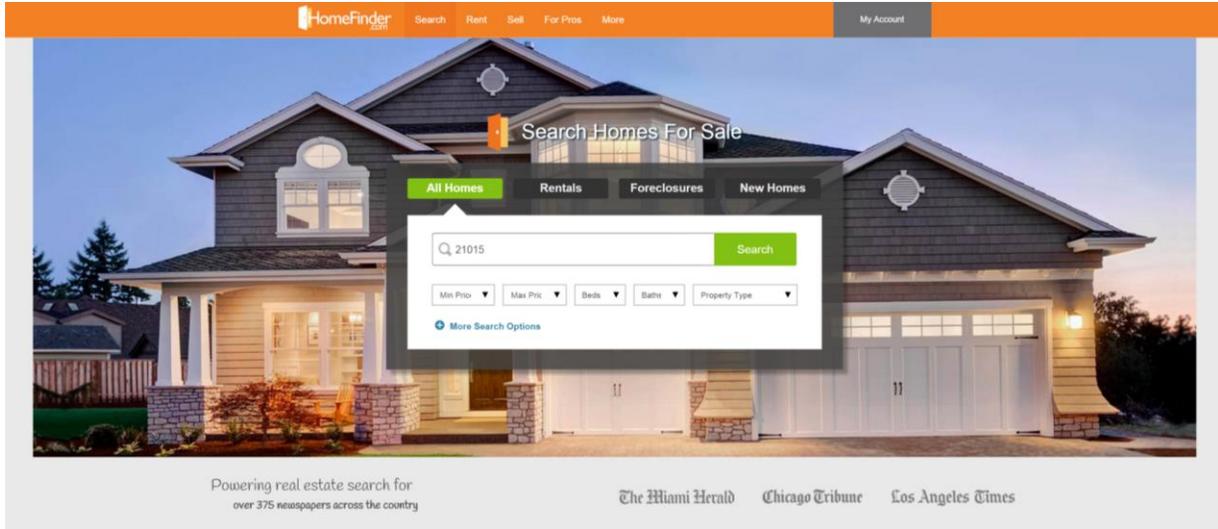


(Getty Images)

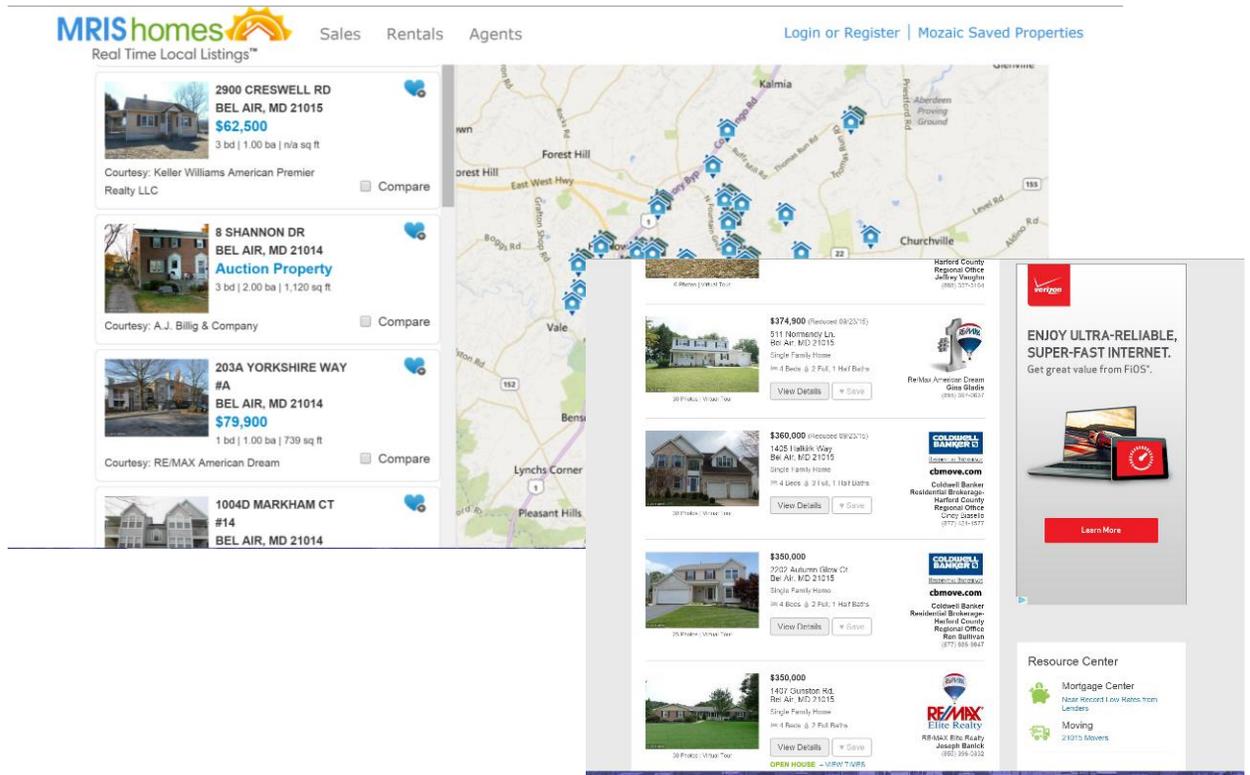
B. Zillow.com property page

The screenshot displays the Zillow.com interface for a property listing. At the top, navigation links include 'Buy', 'Rent', 'Sell', 'Mortgages', 'Agent finder', 'Advice', 'Home design', and 'More'. The search bar contains the address '1438 Fountain Glen Drive Bel Ai'. Below the search bar, there are filters for 'LISTING TYPE', 'ANY PRICE', and 'CORRECT HOME FACTS'. The main content area is split into three sections: a map view on the left showing surrounding properties with price tags, a 3D aerial view of the property in the center, and a text-based listing card on the right. The listing card includes the address '1438 Fountain Glen Dr, Bel Air, MD 21015', features like '2 beds · 2.5 baths · 2,264 sqft', and a status of 'OFF MARKET'. It also shows a Zestimate of \$353,951 and a mortgage estimate of \$1,316/mo. A sidebar on the right offers a 'GET A PROFESSIONAL ESTIMATE' service with three realtor profiles: Denise Patrick, Linda Greco Rich, and Mark Novak.

C. Homefinder.com homepage and search results page



D. MRIS Homes.com search results page with map view



### E. Creig Northrop Team of Long and Foster Realty property page

Join our email list to receive great new listings, events and recent blog posts!  Your name  Enter Your email

**CREIG NORTHROP TEAM**  
OF LONG & FOSTER REAL ESTATE

My Northrop Blog Contact Us Login

County Info Buying Selling Home Search Team News & Events About Us

#### 13626 MEADOW GLENN

CLARKSVILLE, MD 21029

County:	HOWARD	MLS#:	HW8749463	Status:	ACTIVE
Neighborhood:	DUNFRETEN ESTATES	Association Fees:	N/A		
Year Built:	1988	Est. Property Taxes:	\$6,927		

\$655,900 | 4 Beds | 2 Baths | 1 Half Baths | 2,416 sq. ft. | 3.05 acres | Single Family

First Name \*

Last Name \*

Email \*

Phone (No Dashes)

Are you working with a Northrop Agent or Broker?  
Yes, I am working with a Northrop Agent or Broker  
If yes, please select your agent that you are working with

Best Day  Best Time

Notes  
I am interested in 13626 MEADOW GLENN  
CLARKSVILLE, MD -

Photos Video Tour Brochure

#### Listing Details

Gorgeous custom built colonial home nestled on a serene setting over three acres of land! Maintained with pride of ownership step inside to find light filled sizable living spaces, formal living & dining rooms w/pocket doors, K&T with granite countertop, granite counters, SS w/hidden front panel, newer kitchen, granite MBK w/hidden glass, bronze BA, Executive

### F. Yelp.com

**yelp** Find tacos, cheap dinner, Max's Near White Marsh, MD

Home About Me Write a Review Find Friends Messages Talk Events

## Red Brick Station Restaurant & Brew Pub

★ ★ ★ ★ ★ 178 reviews

\$\$ · American (New), Breweries, Pubs

8149 Honeygo Blvd  
White Marsh, MD 21236  
Get Directions  
(410) 931-7827  
redbrickstation.com

See all 48 photos

Beef and Wine, Jack daniel's shot by Giraldo G.

"Go for the specials - \$1 beers on Tuesday (get there early, nights can get rowdy & annoying), steak night is great too." in 26 reviews  
Best Nights: Tue

"Also I'm no beer afficiando but their Avenue Ale is tasty, and I believe you can get beer flights to sample everything." in 10 reviews

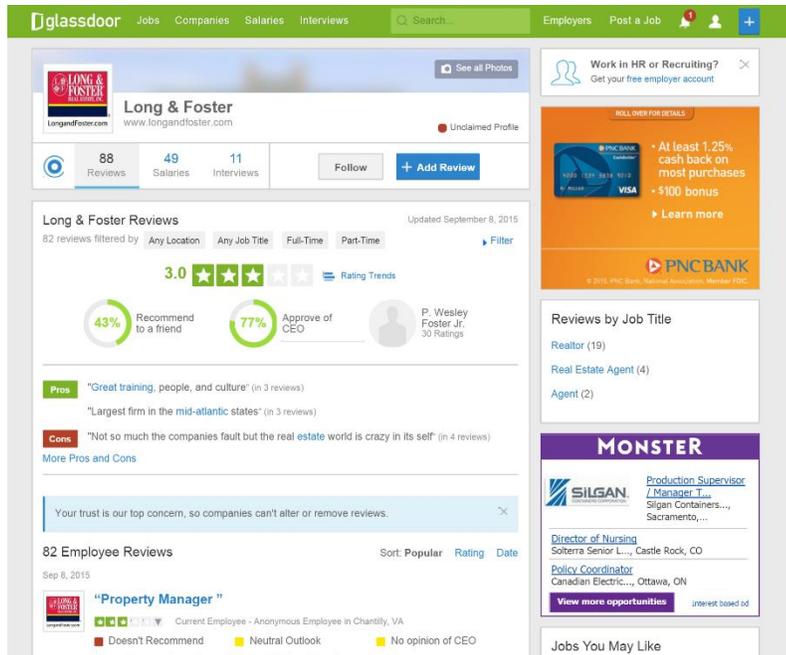
"They have your regular bar fare, with great nachos, crab dip, and amazing cheese fries topped with crumbled bacon." in 13 reviews

Today 11:00 am - 12:00 am  
Closed now

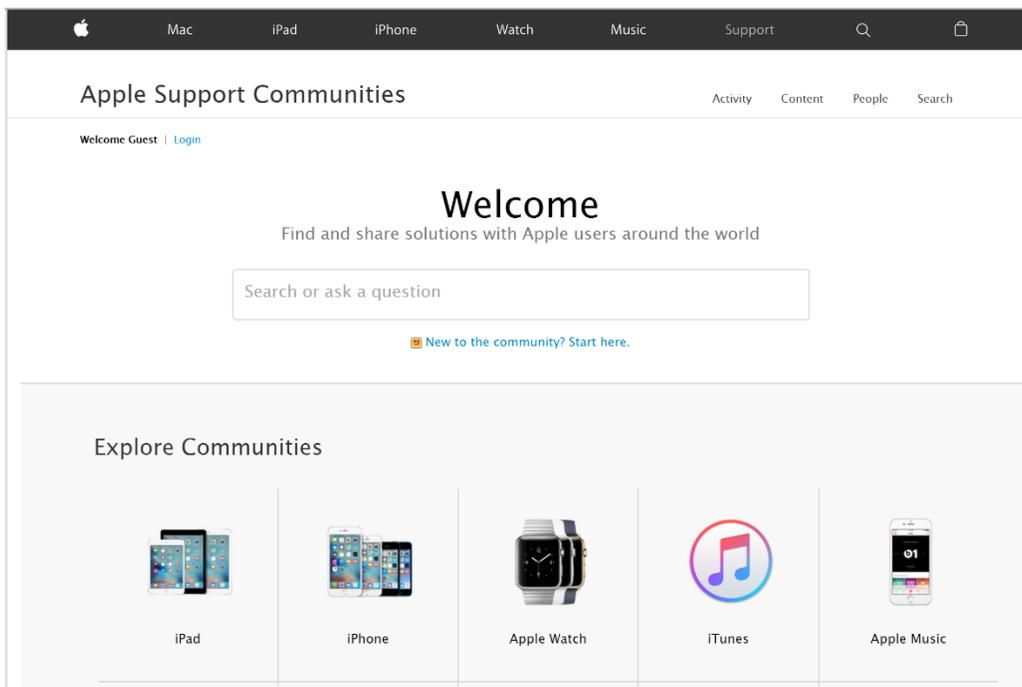
\$\$\$ Price range \$11-30

**PAY EARLY**  
FOR A 15% DISCOUNT

### G. Glassdoor reviews page



### H. Apple Support Community



Appendix B: User Survey and Prototype Development and Testing

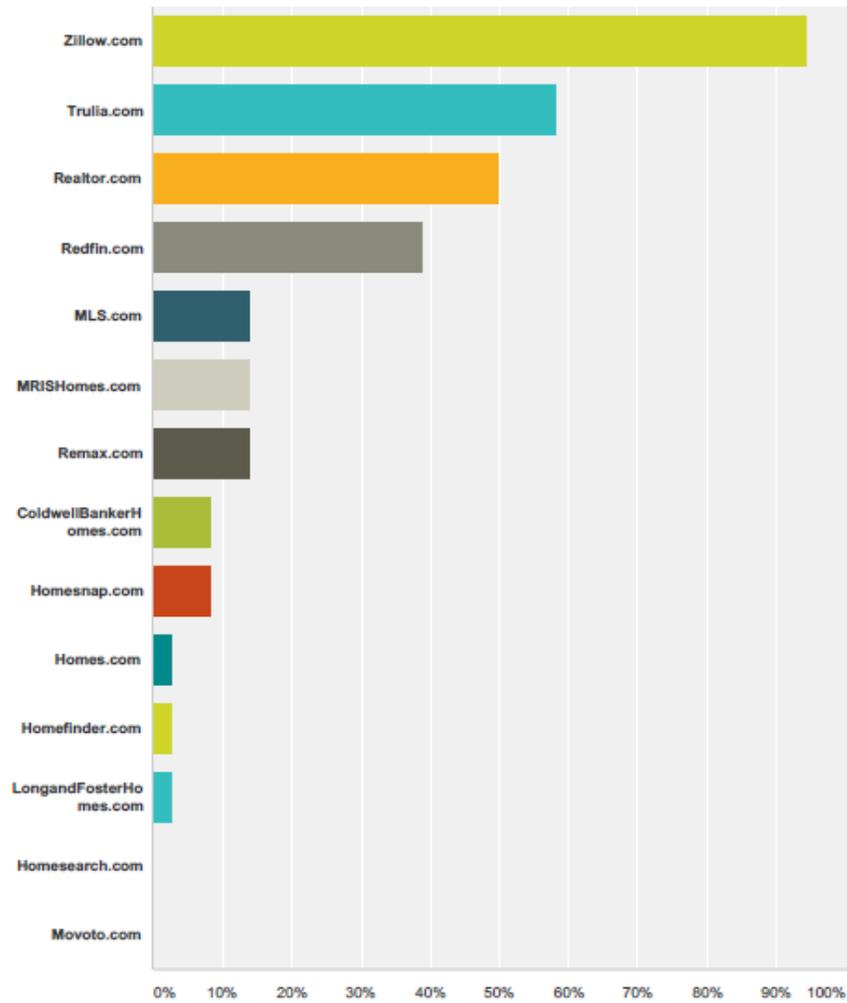
I. User Survey Results

Home Seeker Survey

SurveyMonkey

**Q1 Which of the following websites did you visit during your search for a home? (Check all that apply)**

Answered: 36 Skipped: 1



Answer Choices	Responses
Zillow.com	94.44% 34
Trulia.com	58.33% 21
Realtor.com	50.00% 18

1 / 21

Home Seeker Survey

SurveyMonkey

Redfin.com	38.89%	14
MLS.com	13.89%	5
MRISHomes.com	13.89%	5
Remax.com	13.89%	5
ColdwellBankerHomes.com	8.33%	3
Homesnap.com	8.33%	3
Homes.com	2.78%	1
Homefinder.com	2.78%	1
LongandFosterHomes.com	2.78%	1
Homesearch.com	0.00%	0
Movoto.com	0.00%	0
<b>Total Respondents: 36</b>		

#	Other (please specify)	Date
1	just used a realtor. RMLS website	2/16/2016 11:23 AM
2	ziprealtor.com	2/7/2016 2:35 PM
3	Themisonline.com	2/7/2016 2:11 PM
4	kellerwilliams.com	2/5/2016 1:30 PM

Home Seeker Survey

SurveyMonkey

## Q2 What features of the websites did you find the most helpful?

Answered: 34 Skipped: 3

#	Responses	Date
1	Pictures, maps, detailed listing specifics, comparable homes	2/16/2016 10:10 AM
2	Ability to easily locate houses in a specified geographic region. Quantity and quality of photos available.	2/15/2016 3:33 PM
3	Having the map to give precise location as well as views of the street.	2/15/2016 3:30 PM
4	property tax history, sale and price history, detailed advanced search options	2/12/2016 11:37 AM
5	Being able to narrow it down to the houses for sale by a map	2/12/2016 4:11 AM
6	Price and realtor, pictures	2/10/2016 10:18 PM
7	Pictures and mortgage estimator	2/10/2016 2:26 PM
8	I liked that the dots on the Zillow map would be grayed out when you'd viewed them already.	2/9/2016 11:52 AM
9	Pictures	2/9/2016 9:29 AM
10	Maps and pictures.	2/9/2016 9:21 AM
11	Ease of use and ability to see compatible home for sale and what was sold	2/9/2016 9:08 AM
12	The cost of the previous real estate transaction was posted for the property.	2/8/2016 10:46 PM
13	Specs, comps, pictures	2/8/2016 9:02 PM
14	sorting	2/8/2016 8:41 PM
15	I like the aerial views and or maps so I can quickly see A location after I had narrowed it down to a few square blocks	2/8/2016 7:21 PM
16	Easy access to listing history, and ability to sort by multiple criteria (price range, location, etc)	2/8/2016 7:01 PM
17	Filters on price, number of beds/baths, and house type (condo/townhome/single family)	2/8/2016 6:56 PM
18	Zillow had a lot of great info: very easy to identify home prices within your range, through a map of the area overlaid with prices of the homes for sale; listed recent tax history, and level taxes could make/break a potential purchase; could flip through about 2 dozen photos for each house, making it easy to rule out/follow up on options.	2/8/2016 6:30 PM
19	Large pictures and being able to save favorites or exclude ones you no longer want to see.	2/8/2016 6:26 PM
20	Map with location / price info / easily accessible pictures.	2/8/2016 6:21 PM
21	Property tax, price history, alerts on new homes, photos	2/7/2016 3:36 PM
22	Separating price and size of the home	2/7/2016 2:35 PM
23	Being able to choose the price, square footage and other features of the house to narrow down the search.	2/7/2016 2:11 PM
24	Map search, update emails	2/7/2016 1:56 PM
25	The maps and school zones/rankings. Loved it when houses had a floor plan included in the listing.	2/7/2016 1:53 PM
26	Photos, ability to see properties on maps and move around easily fro neighborhood to neighborhood.	2/7/2016 1:30 PM
27	Automated search emails	2/7/2016 1:29 PM
28	Sale history of home	2/7/2016 12:24 PM
29	Previous home sales with value was very helpful. I wanted to make an educated offer.	2/7/2016 12:07 PM
30	I liked the mortgage calculator, the pictures and that it listed rooms and type of houses in the listings. Zillow made it really easy to search.	2/7/2016 11:28 AM
31	Redfin was my favorite to use. One of my main concerns was finding a house in a particular school district. Redfin was the easiest to use as I could put the school district on the main page and found the results to be the most accurate.	2/7/2016 10:58 AM
32	having numerous pictures of homes, virtual tours, ease of search options	2/5/2016 1:30 PM

Home Seeker Survey

SurveyMonkey

### Q3 Is there any information or features you wanted to see included on the sites?

Answered: 28 Skipped: 9

#	Responses	Date
1	None that I can think of.	2/15/2016 3:33 PM
2	More detail on each listing so you can search for exactly what you want.	2/12/2016 12:03 PM
3	1. There were times where a home with a parking pad would not be listed as having off street parking as the options were limited to "1 car garage" "2 car garage" "car port" etc. so it is not designed for city rowhomes. 2. The mortgage estimator is not accurate and a bit tricky to use as it does not take into account the property tax rate which is significantly higher in Baltimore City than other jurisdictions. This seem especially strange when they have access to the most recent property taxes levied. It would make sense that they pull the tax history from the listing to calculate that.	2/12/2016 11:37 AM
4	Being able to specify that I want a house with a parking pad	2/12/2016 4:11 AM
5	More close up pictures	2/10/2016 10:18 PM
6	A calculator that accurately tells you how much you'd need to put down and what your mortgage would be. Zillow's was way off. It would also be great to be able to input your downpayment limit and your desired monthly mortgage payment and search that way. The house I ended up buying was a much higher list price than my search criteria--my realtor found it and noted it had a CHAP tax credit, which put it back in my price range.	2/9/2016 11:52 AM
7	Price, taxes	2/9/2016 9:29 AM
8	Pictures of the inside of previously sold homes. I know they are probably deleted for privacy reasons though.	2/9/2016 9:21 AM
9	Competition intel on other buyers looking at my house :)	2/8/2016 9:02 PM
10	Prices of sold homes in the area	2/8/2016 7:21 PM
11	Age of major infrastructure ( roof, hvac, windows, large appliances, etc)	2/8/2016 7:01 PM
12	If there was a way to filter on the last renovation	2/8/2016 6:56 PM
13	Can't think of anything in particular	2/8/2016 6:30 PM
14	No	2/8/2016 6:26 PM
15	Realistic mortgage calculators (all sites projections seemed significantly off from actual offers)	2/8/2016 6:21 PM
16	Ground rent, floor plans, year of property tax assessment	2/7/2016 3:36 PM
17	pictures	2/7/2016 2:35 PM
18	Important disclosures about the property (former or current water damage, mold, etc).	2/7/2016 2:11 PM
19	Difficult to search for some features (e.g., parking)	2/7/2016 1:56 PM
20	More accurate taxes and school zones. Neither were correct for the house we ended up buying.	2/7/2016 1:53 PM
21	I felt there was enough information for my needs.	2/7/2016 1:30 PM
22	Some were slow in updating their listing information	2/7/2016 1:29 PM
23	More accurate mortgage estimators to include taxes	2/7/2016 12:24 PM
24	Current owner ? Reason for selling?	2/7/2016 12:07 PM
25	I wished that the MRIS listings were more user friendly in the way Zillow is.	2/7/2016 11:28 AM
26	Some sites, particularly Zillow seemed to have information that was not correct or up to date (e.g. number of beds/baths).	2/7/2016 10:58 AM
27	Past energy bills for the home.	2/5/2016 10:29 AM
28	Photos, tax records, listing history.	2/4/2016 1:19 PM

Home Seeker Survey

SurveyMonkey

### Q4 What was the most difficult part of searching for a new home?

Answered: 31 Skipped: 6

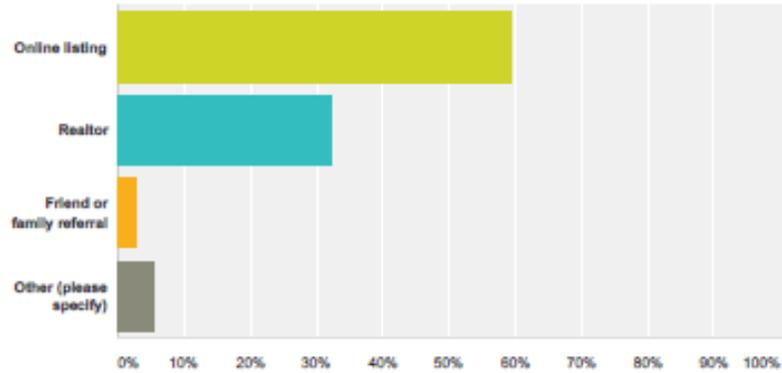
#	Responses	Date
1	Finding the time to see them in person	2/16/2016 10:10 AM
2	Locates a home within my price range in desired neighborhood.	2/15/2016 3:33 PM
3	Scheduling the times to see the properties in person.	2/15/2016 3:30 PM
4	Finding a home that met my requirements in the area I wanted that was in my price range. There were many homes that were large and more expensive than I was looking for.	2/12/2016 11:37 AM
5	Finding what I wanted in my price range	2/12/2016 4:11 AM
6	Waiting to be contacted by a realtor	2/10/2016 10:18 PM
7	The photos were rarely true representations of the property itself. Also, I initially used the Live Baltimore site to find a realtor that specialized in working with first-time homebuyers. The one I worked with at first was AWFUL. No idea why he was recommended.	2/9/2016 11:52 AM
8	Safety concerns, neighborhood vibe, city life	2/9/2016 9:29 AM
9	Inaccurate websites-Trulia gave us some inaccurate information, which was frustrating.	2/9/2016 9:21 AM
10	Some of the properties were listed for sale when in fact were actually sold.	2/8/2016 10:46 PM
11	Understanding the loan process	2/8/2016 9:02 PM
12	pricing just appears to be all over the place right now. I would walk in to one home that was a mess and it was priced moderately and then I would walk in to a lovely home and it was low. People and agents are NOT honest about details in homes with was a waste of my time and frustrating!	2/8/2016 8:41 PM
13	Visiting homes that fit criteria on paper/Internet but had major downfalls when we actually saw them	2/8/2016 7:21 PM
14	Finding sites that catered towards what I wanted...something newly renovated	2/8/2016 6:56 PM
15	Just finding a home that fulfilled what we were both looking for -- though we looked at about a dozen in-person, which I don't feel is excessive. What reduced difficulty was having my father-in-law attend each of our home visits, since he's a contractor and could help look for the negative aspects we wouldn't have known to look for.	2/8/2016 6:30 PM
16	Pictures can be deceiving for the better or worse	2/8/2016 6:26 PM
17	Finding the right # of beds and baths in the price range.	2/8/2016 6:21 PM
18	Stress of making such a big choice that included dozens of smaller but still important decisions	2/7/2016 3:36 PM
19	Going to the house to find out it looks different from the pictures or having enhance pictures on sites that covers flaws.	2/7/2016 2:35 PM
20	Finding a home that met our accessibility needs	2/7/2016 2:11 PM
21	Understanding finances	2/7/2016 1:56 PM
22	Lots of houses look good on the web but not in person. The house we ended up buying actually was one of the few that looked better in person.	2/7/2016 1:53 PM
23	Inaccurate or misleading descriptions of the properties.	2/7/2016 1:30 PM
24	Filtering through the large number of homes that didn't match my criteria	2/7/2016 1:29 PM
25	Finding a smaller home that had a finished basement	2/7/2016 12:24 PM
26	Is the neighborhood viable? This was an investment propert	2/7/2016 12:07 PM
27	Figuring out the financing!! I also wished my realtor had gotten more involved. I did the searching myself, which was nice, but I wished she'd picked some out to recommend to us.	2/7/2016 11:28 AM
28	It was actually pretty easy...from search to closing it took 2 months.	2/7/2016 10:58 AM

Home Seeker Survey

SurveyMonkey

**Q5 How did you find the home you eventually purchased?**

Answered: 37 Skipped: 0



Answer Choices	Responses
Online listing	59.46% 22
Realtor	32.43% 12
Friend or family referral	2.70% 1
Other (please specify)	5.41% 2
<b>Total</b>	<b>37</b>

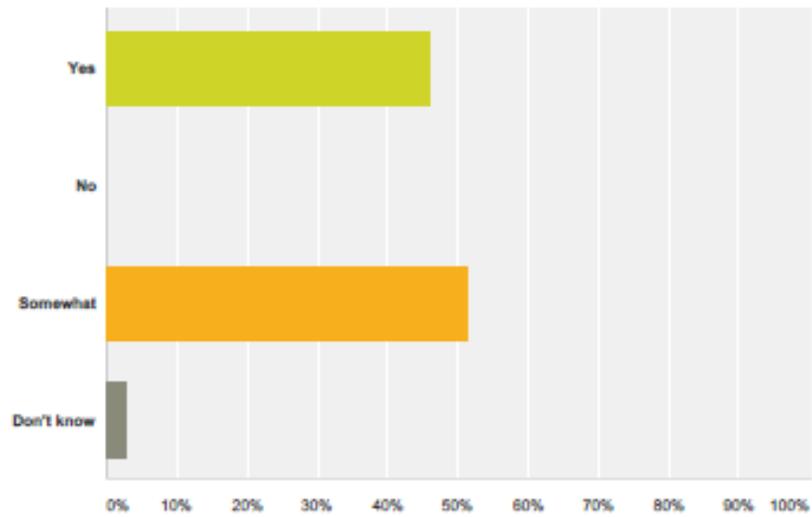
#	Other (please specify)	Date
1	Builder/rehab company	2/9/2016 9:29 AM
2	Sign posted on property!	2/7/2016 12:07 PM

Home Seeker Survey

SurveyMonkey

**Q6 Did you find that the online listing information was a good representation of the homes?**

Answered: 37 Skipped: 0



Answer Choices	Responses	
Yes	45.95%	17
No	0.00%	0
Somewhat	51.35%	19
Don't know	2.70%	1
<b>Total</b>		<b>37</b>

Home Seeker Survey

SurveyMonkey

**Q7 If you did not answer 'yes' to question 6, what were some of the issues you experienced comparing the online listing with the home visit?**

Answered: 13 Skipped: 24

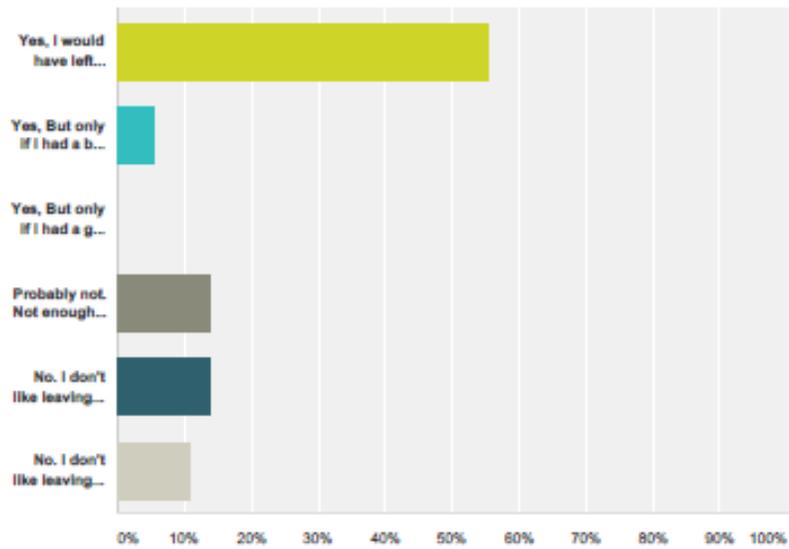
#	Responses	Date
1	Wide angle lens photos are oh so deceiving...photos in general are. It sucks when you go into a house that looked good online to realize it is actually in need of a good gut.	2/18/2016 10:10 AM
2	Photos often make the homes appear more spacious than reality.	2/15/2016 3:33 PM
3	Some of the photography angles lead me to believe the space was much larger than in real life. Some photos were very deceiving	2/15/2016 3:30 PM
4	Some houses were listed with SF including below grade basement and some did not include.	2/12/2016 12:03 PM
5	I had my house built and online it seemed that it came with more updates than the base model did	2/12/2016 4:11 AM
6	Picture were horrible, home was nice.	2/10/2016 10:18 PM
7	The photos were sample photos of the property, as the one I purchased was still under construction.	2/9/2016 11:52 AM
8	Better than the pics actually	2/8/2016 9:02 PM
9	Hard to determine some factors such as lot size, floor layout from listing	2/8/2016 7:01 PM
10	In one case, the list indicated that the home had been recently rehabbed but, in fact, the plumbing and Hvac was not complete or up to code.	2/7/2016 1:30 PM
11	Photos typically made rooms look larger than they were in person	2/7/2016 1:29 PM
12	This home had no upgrades. Online didn't give info in condition of property.	2/7/2016 12:07 PM
13	see comments above	2/5/2016 1:30 PM

Home Seeker Survey

SurveyMonkey

**Q8 Do you wish you could leave feedback on home listings or neighborhoods for other home seekers?**

Answered: 38 Skipped: 1



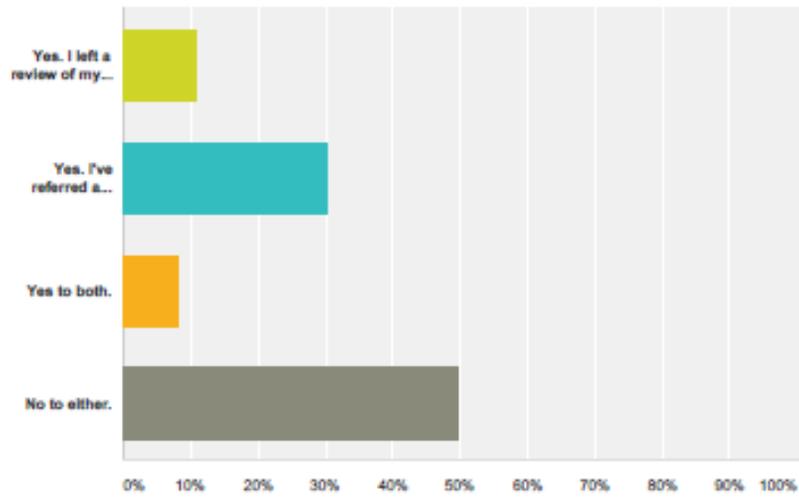
Answer Choices	Responses	Count
Yes, I would have left helpful information	55.56%	20
Yes, But only if I had a bad experience	5.56%	2
Yes, But only if I had a good experience	0.00%	0
Probably not. Not enough time.	13.89%	5
No. I don't like leaving negative comments	13.89%	5
No. I don't like leaving feedback	11.11%	4
<b>Total</b>		<b>38</b>

Home Seeker Survey

SurveyMonkey

**Q9 Have you ever left a review or gave others advice on realtors or neighborhoods online or in your social media circles.**

Answered: 38 Skipped: 1

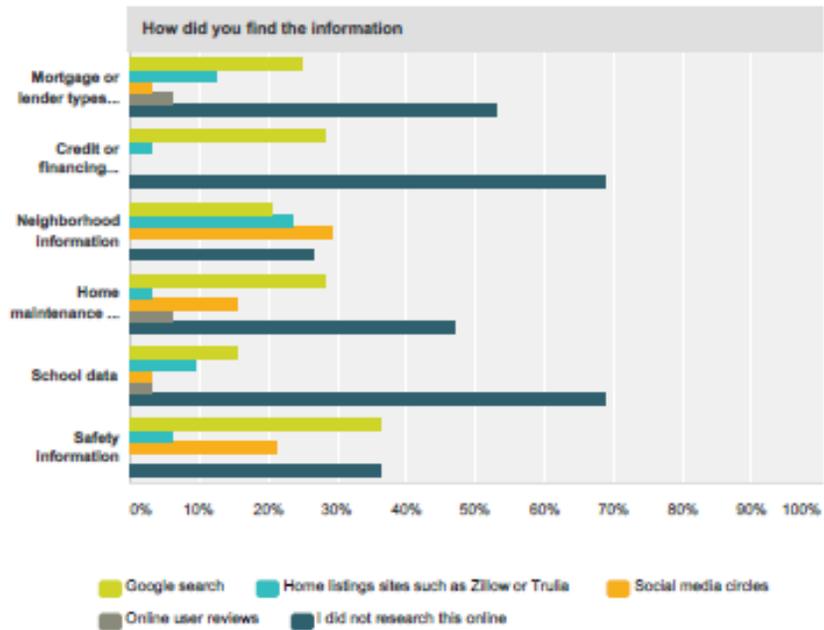


Answer Choices	Responses
Yes. I left a review of my realtor on a website.	11.11% 4
Yes. I've referred a realtor or gave neighborhood advice on social media	30.56% 11
Yes to both.	8.33% 3
No to either.	50.00% 18
<b>Total</b>	<b>38</b>

#	Other (please specify)	Date
1	I am a private person.	2/7/2016 12:07 PM

### Q10 What other home buying information did you research online?

Answered: 34 Skipped: 3



How did you find the information						
	Google search	Home listings sites such as Zillow or Trulia	Social media circles	Online user reviews	I did not research this online	Total
Mortgage or lender types or advice	25.00% 8	12.50% 4	3.13% 1	6.25% 2	53.13% 17	32
Credit or financing advice	28.13% 9	3.13% 1	0.00% 0	0.00% 0	68.75% 22	32
Neighborhood information	20.59% 7	23.53% 8	29.41% 10	0.00% 0	26.47% 9	34
Home maintenance or improvements	28.13% 9	3.13% 1	15.63% 5	6.25% 2	46.88% 15	32
School data	15.63% 5	9.38% 3	3.13% 1	3.13% 1	68.75% 22	32
Safety information	36.36% 12	6.06% 2	21.21% 7	0.00% 0	36.36% 12	33

Home Seeker Survey

SurveyMonkey

**Q11 What is your age?**

Answered: 37 Skipped: 0

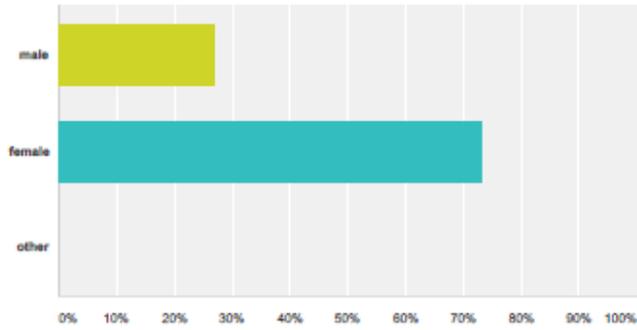
#	Responses	Date
1	34	2/18/2016 11:23 AM
2	35	2/18/2016 10:10 AM
3	44	2/15/2016 3:33 PM
4	30	2/15/2016 3:30 PM
5	35	2/12/2016 12:03 PM
6	28	2/12/2016 11:49 AM
7	30	2/12/2016 11:37 AM
8	23	2/12/2016 4:11 AM
9	34	2/10/2016 10:18 PM
10	30	2/10/2016 2:28 PM
11	29	2/9/2016 11:52 AM
12	55	2/9/2016 9:29 AM
13	35	2/9/2016 9:21 AM
14	50	2/9/2016 9:08 AM
15	39	2/8/2016 10:48 PM
16	34	2/8/2016 9:02 PM
17	34	2/8/2016 8:41 PM
18	62	2/8/2016 7:21 PM
19	34	2/8/2016 7:01 PM
20	29	2/8/2016 6:56 PM
21	32	2/8/2016 6:30 PM
22	44	2/8/2016 6:26 PM
23	26	2/8/2016 6:21 PM
24	29	2/7/2016 3:36 PM
25	34	2/7/2016 2:35 PM
26	43	2/7/2016 2:11 PM
27	35	2/7/2016 1:56 PM
28	34	2/7/2016 1:53 PM
29	53	2/7/2016 1:30 PM
30	29	2/7/2016 1:29 PM
31	33	2/7/2016 12:24 PM
32	47	2/7/2016 12:07 PM
33	33	2/7/2016 11:28 AM
34	35	2/7/2016 10:58 AM
35	46	2/5/2016 1:30 PM

Home Seeker Survey

SurveyMonkey

**Q12 Gender Identity**

Answered: 37 Skipped: 0



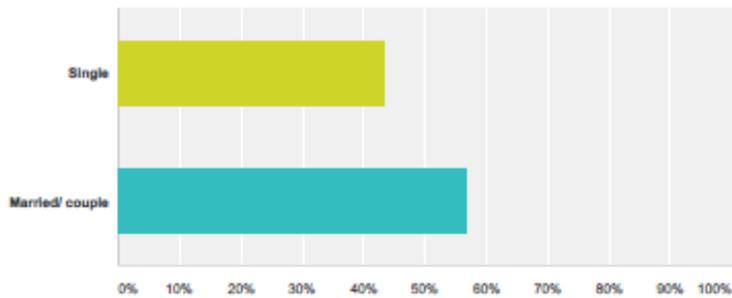
Answer Choices	Responses	Count
male	27.83%	10
female	72.97%	27
other	0.00%	0
<b>Total</b>		<b>37</b>

Home Seeker Survey

SurveyMonkey

**Q13 Marital status**

Answered: 37 Skipped: 0



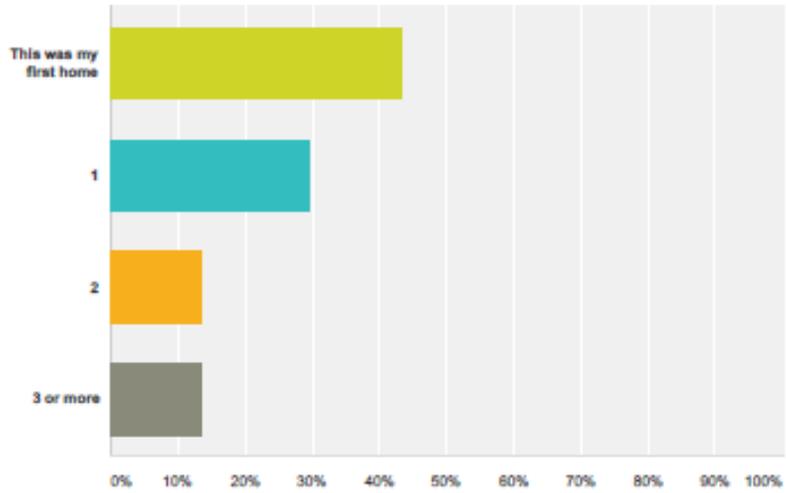
Answer Choices	Responses	Count
Single	43.24%	16
Married/ couple	56.76%	21
<b>Total</b>		<b>37</b>

Home Seeker Survey

SurveyMonkey

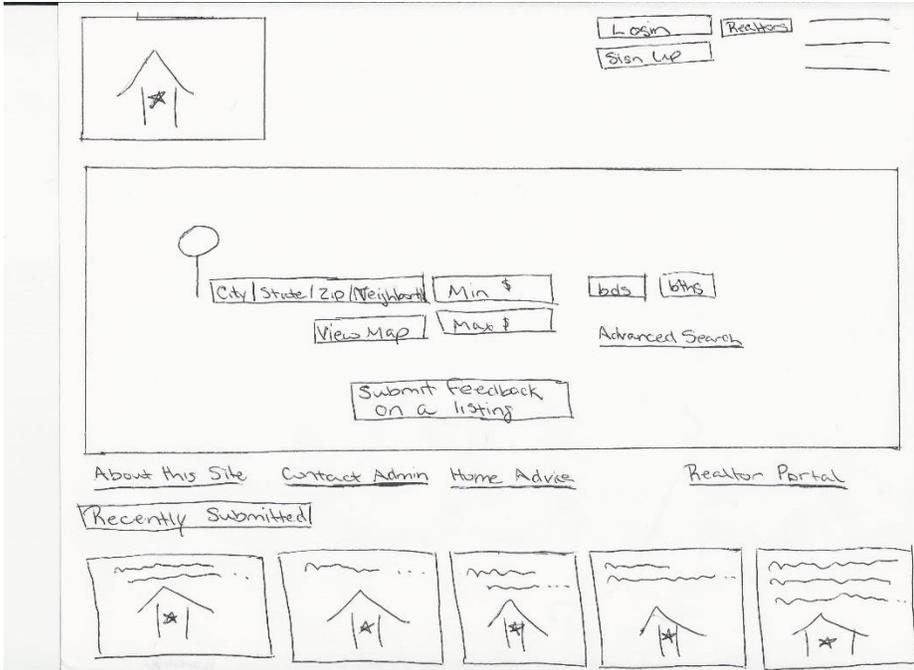
**Q14 How many homes have you owned prior to this purchase?**

Answered: 37 Skipped: 0

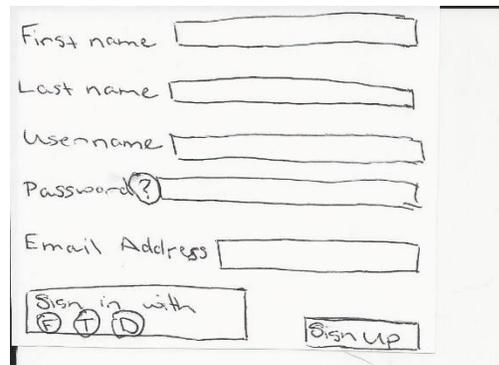
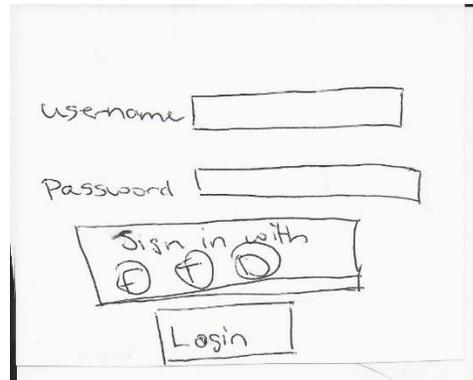
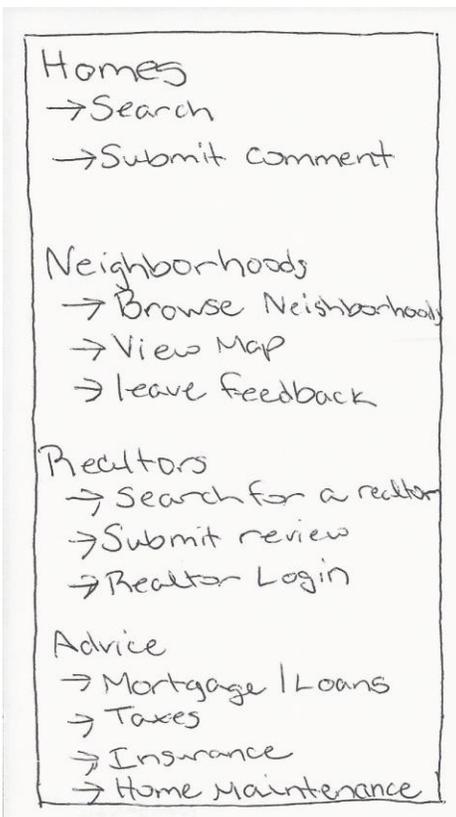


Answer Choices	Responses
This was my first home	43.24% 16
1	29.73% 11
2	13.51% 5
3 or more	13.51% 5
<b>Total</b>	<b>37</b>

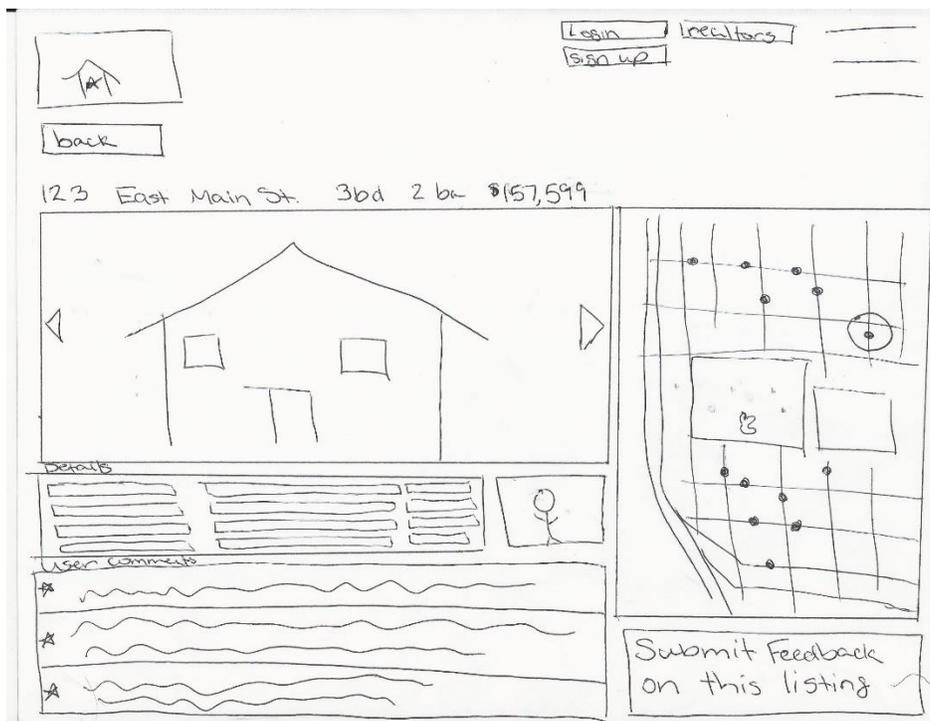
J. Concept Sketches- Homepage



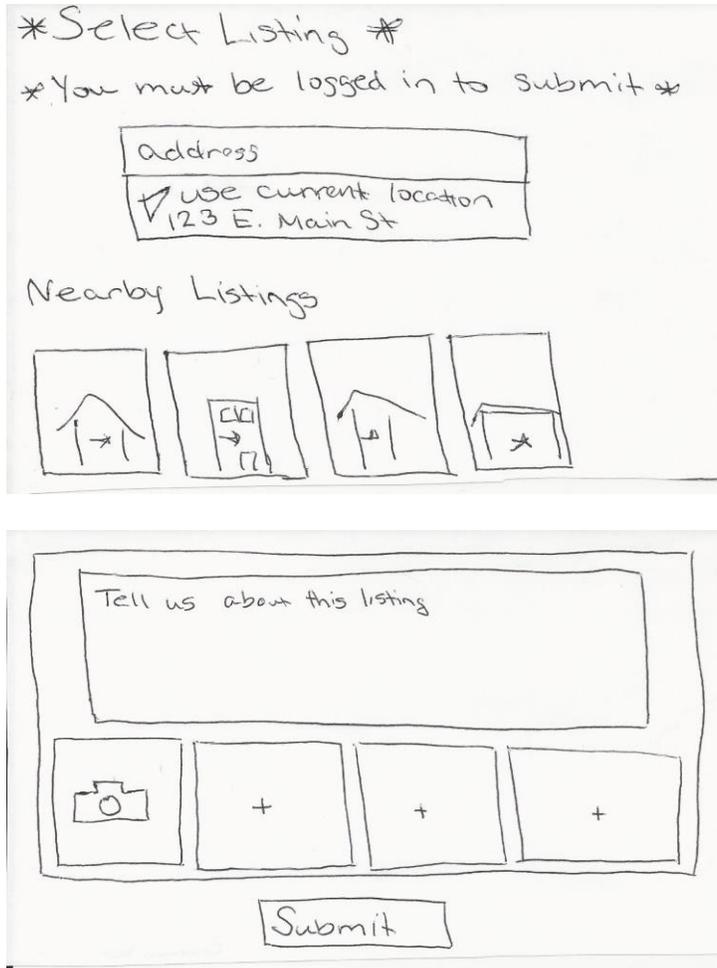
K. Concept Sketches- Main Navigation drop down, Login and Sign up Screens



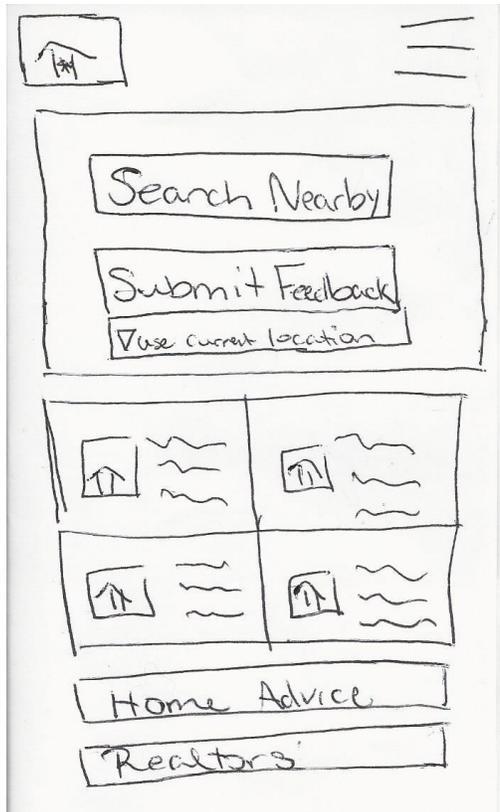
L. Search Results Page and Property Page



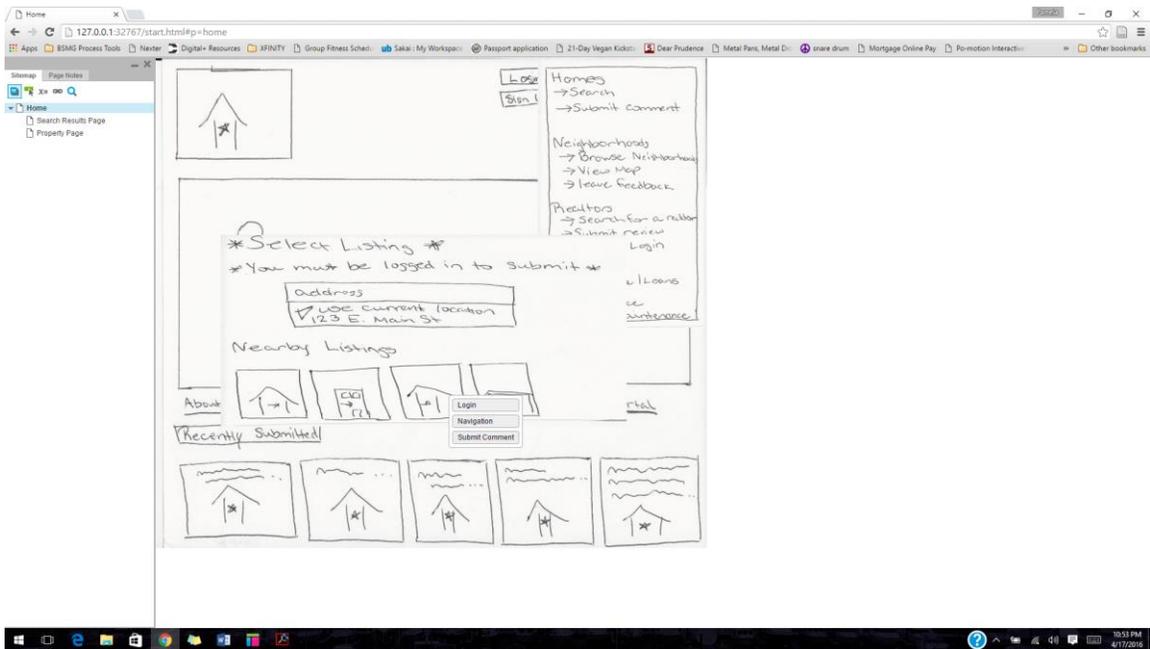
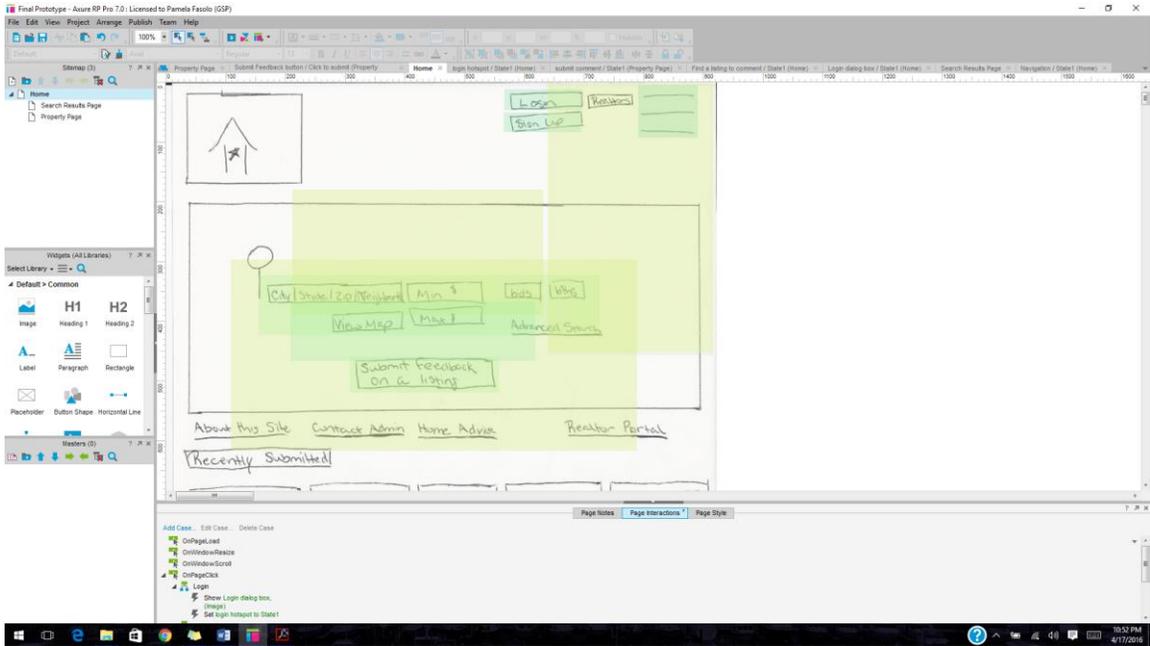
M. Submit Listing Feedback dialog boxes



N. Mobile View



### O. Technical Prototype



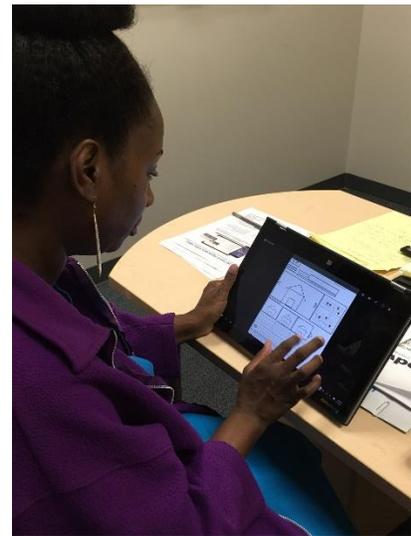
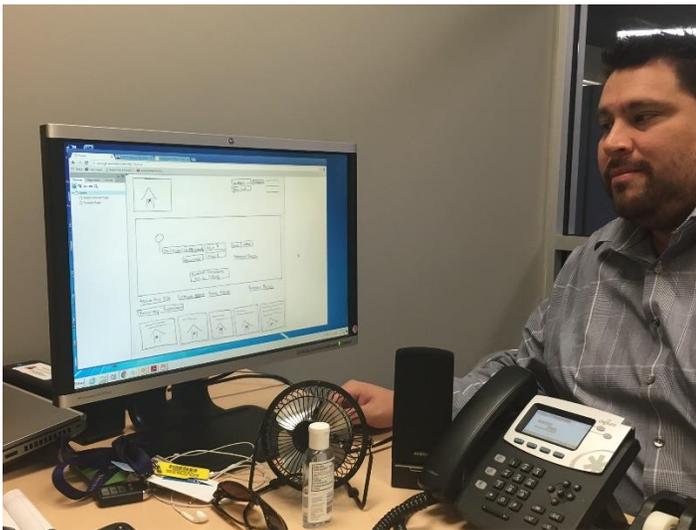
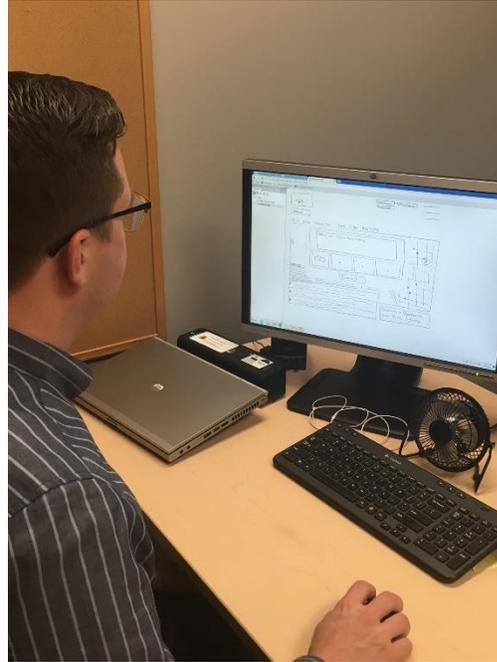
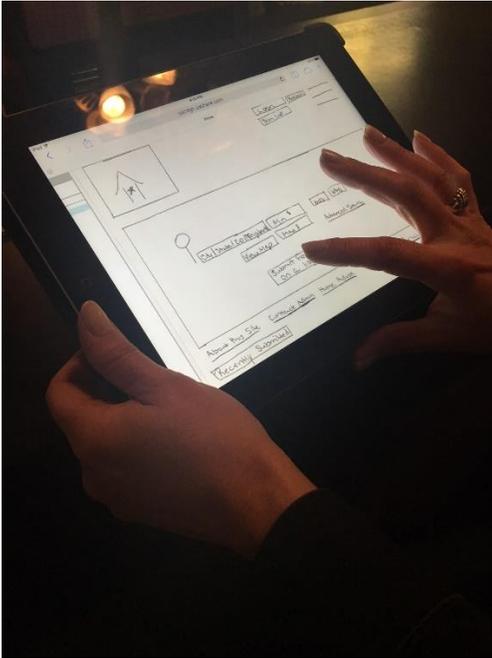
## P. Prototype user demographics

	Age	M/F	Race	City/ State	Homeowner Status	Technology Experience	Social Trust
Tester 1	35	M	Caucasian	Catonsville, MD	Recently purchased 2nd home	Advanced user. Educated and work experience in web technologies including Google Analytics and dfp.	Advanced social media expertise including social media management for businesses.
Tester 2	36	M	Hispanic	Baltimore, MD	Currently seeking 1st home	Experienced technology user and experienced in web browsing and online shopping, though uses social media rarely.	Believes in relationship building and traditional sales and customer service. Believes users should rely on their realtors to help with home search.
Tester 3	45	F	Caucasian	Baltimore, MD	Recently purchased 1st home	Experienced technology user and heavy social media user.	Relies on social circles within her community for recommendations on products and services
Tester 4	46	F	Caucasian	Baltimore, MD	Currently seeking 1st home	Advanced user. Educated and work experience in social media technologies, blogging, online writing and public relations	Trusts user reviews online and relies on reviews to make informed purchasing decisions.
Tester 5	31	F	Caucasian	Baltimore, MD	Recently purchased 1st home	Advanced experience in software systems, specifically healthcare record related systems. Advanced and heavy social media user on the newer social media platforms such as Snapchat and Periscope.	Heavy user in sharing information and often leaves reviews, and shares stories publicly without prompting or incentive.
Tester 6	50	M	African American	Reisterstown, MD	Recently purchased 3rd home	Novice internet user. Enough experience to navigate basic sites to read information. Does not use social media often.	Considers online user reviews before making purchasing decisions. Uses reviews for product recommendations to decide which product to buy.
Tester 7	34	M	Caucasian	Baltimore, MD	Currently seeking 2nd home	Experienced user for browsing websites, playing games, and reviewing information. Does not spend a lot of time on social media.	Relies heavily on online user reviews to make buying decision and it is one of the few things he uses social media for.
Tester 8	33	F	Caucasian	Owings Mills, MD	Recently purchased 1st home	Experienced user for browsing websites and social media	Does not always trust user generated content online and uses only her social circles from those she is close with

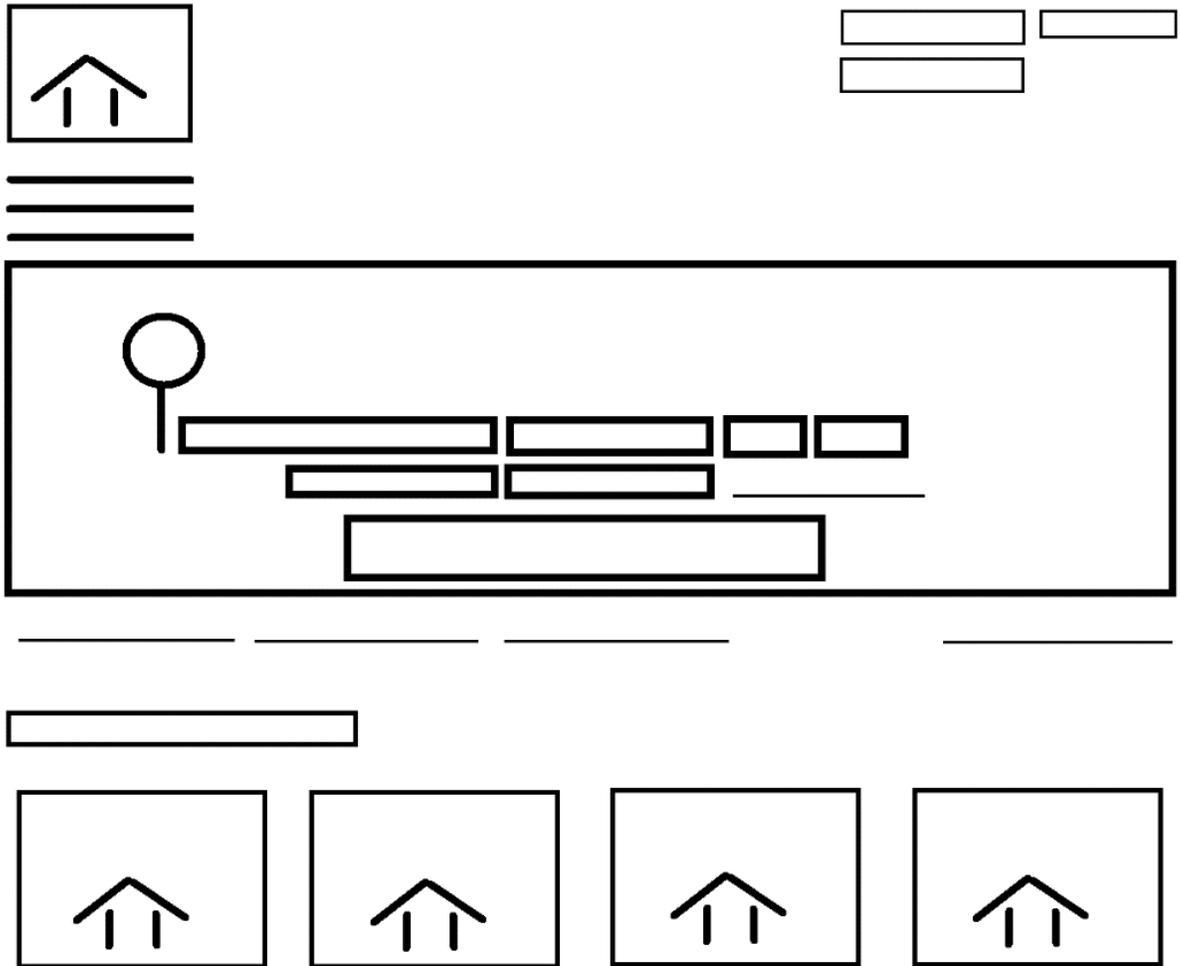
Q. Prototype Task Analysis

User Testing Task Analysis					
	Task 1	Task 2	Task 3	Task 4	Task 5
Tester 1	Move to left side of page. Rename some labels on the navigation	Reacted positively to social login option	Map. Use Standard icons	Wants form	Search by zip only, then use map.
Tester 2				Would not use	Would not use
Tester 3			Map	Return home to use	
Tester 4	Move to left side of page. Rename some labels on the navigation	Reacted positively to social login option. Make sure users know when they are already logged in.	Map. Use Standard icons. Geo Locator		Search by zip only, then use map.
Tester 5		Reacted positively to social login option	Map. Geo Locator		Search by zip only, then use map.
Tester 6				Return home to use	
Tester 7		Reacted positively to social login option	Geo Locator		
Tester 8		Reacted positively to social login option	Map		
	Task 6	Task 7	Task 8	Task 9	Task 10
Tester 1	User submitted photos		Read and leave reviews	with Zillow	
Tester 2	Likes the neighborhood info		Would not use this site	Would not use this site	Would not use this site
Tester 3	Likes the neighborhood info		Read and leave reviews	with Zillow	
Tester 4	Standard navigation		Search only. Privacy concerns.	with Zillow	with caution
Tester 5	User submitted photos		Read and leave reviews	with Trulia	
Tester 6	Likes the neighborhood info		Read and leave reviews	with Zillow	
Tester 7	Likes the neighborhood info		Concerned about false reporting	with Zillow	
Tester 8	Undecided		Search only. Concerned about false reporting	with Trulia	with caution
<b>Key:</b>					
	Completed Task Successfully				
	Completed Task Unsuccessfully				

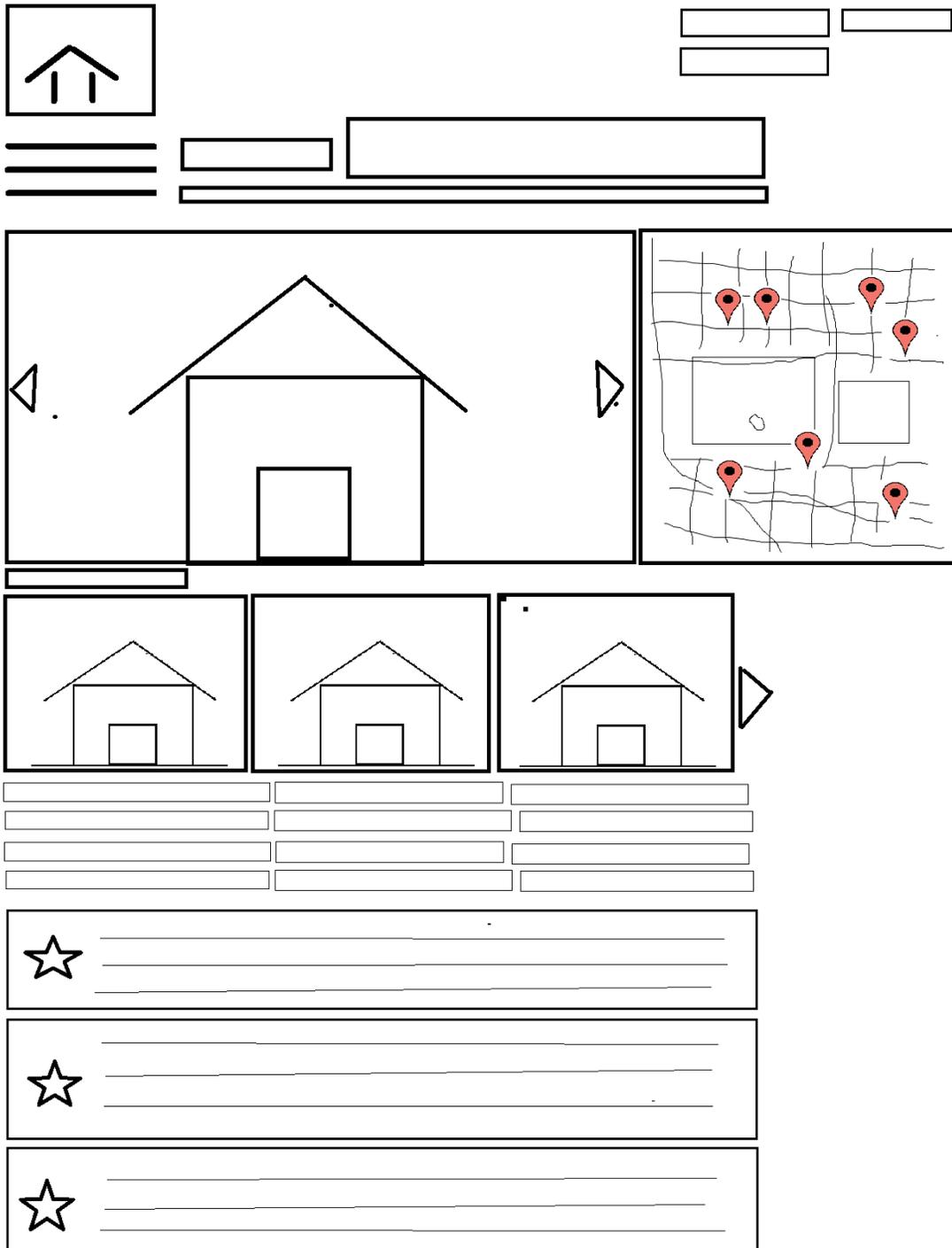
R. Prototype user testing



S. Revised Wireframe- homepage



T. Revised Wireframe- Property Page



## Appendix C: SEO and Marketing

### U. SEO/ Marketing Plan



- Goals
  - **To forever change how consumers search for real estate**
  - To launch a brand new website and app into the market
  - To become the leading website for searching real estate listings
  - To quickly gain popularity and rise to the top of Google searches
  
- Target Audience
  - Real Estate seekers
  - Adults age 30-45, educated, median HHI of \$80,000
  - Experienced-Expert computer and smartphone users
  
- Site Content
  - Real Estate listings automatically pulled from the MLS database
    - Includes standard home data- type, list price, beds, baths, photos, etc.
  - User generated content- comments, experiences, photos, etc.
  - Useful content such as home buying advice and marketing information

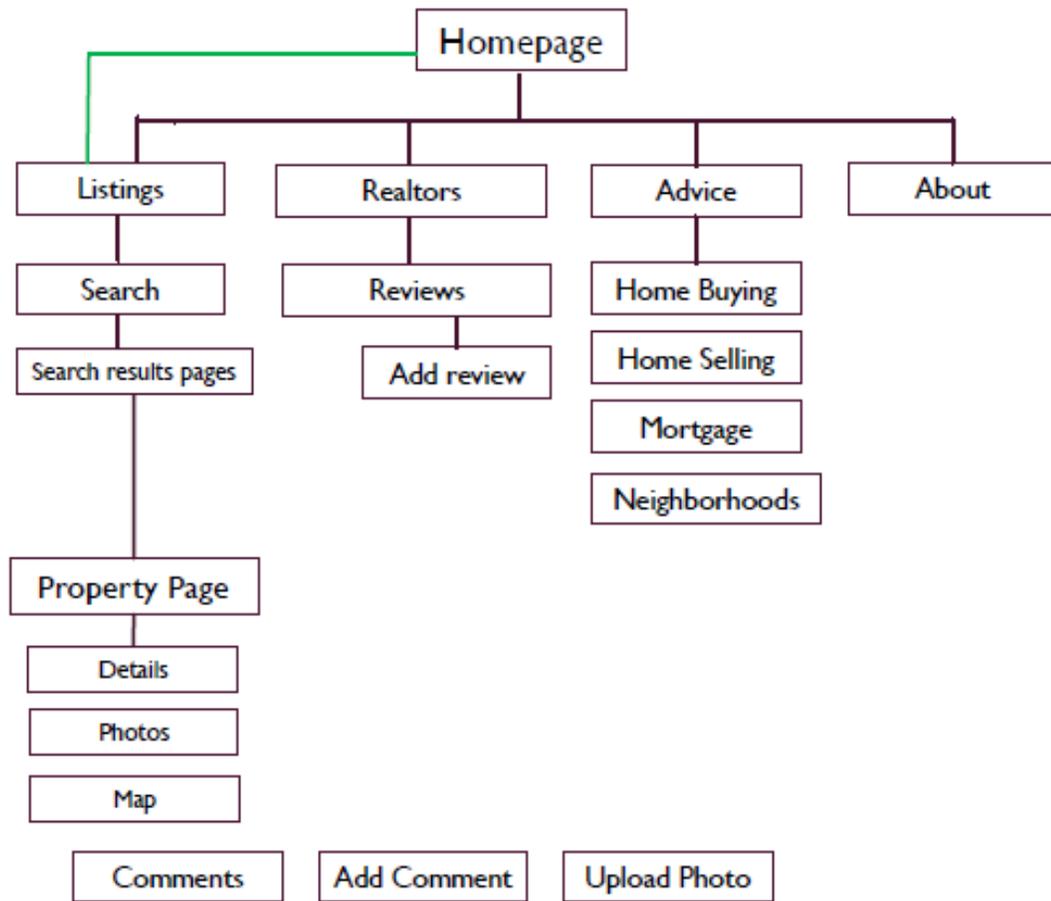
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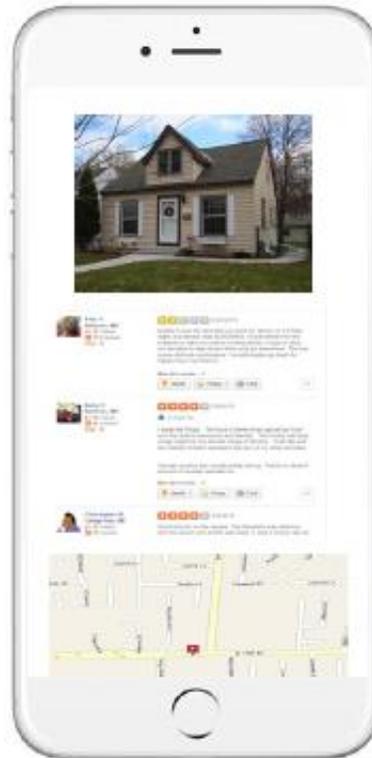
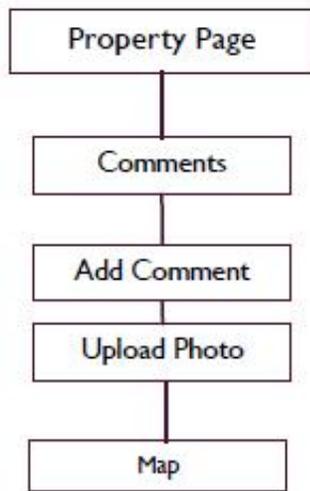
## PLAN (CON'T)

- Competitors
  - Zillow
    - Largest real estate website already well established
    - Site is mainly used to view home value estimates as well as search real estate and realtors, but it also allows for home owners to add information or make corrections.
  - Realtor.com
    - Well known real estate seeking site already established in the market
  - Trulia
    - Top real estate website already well established
    - Gathers data to show neighborhood statics like school rankings and crime reports
  - Nextdoor
    - App for neighbors to network together and leave neighborhood information
  - Neighborhood Scout
    - Gathers data to leave a detailed account of neighborhoods such as home value, crime, culture, demographics, and more
  - Yelp
    - Any business can be added on Yelp including real estate offices and housing complexes

# SITE STRUCTURE



# SITE STRUCTURE- MOBILE APP/ SITE



## SWOT ANALYSIS

### STRENGTHS

- First website to incorporate user reviews for individual listings and neighborhoods
- Uses app integration for users to complete tasks with their phone such as upload photos and rate listings
- Includes social media integration for sharing
- Contains a high volume of content that changes daily

### WEAKNESSES

- Brand new site and app
- Not well known at this time
- Could contain design flaws
- Few inbound links

### OPPORTUNITIES

- Unlimited potential for growth and success
- Incorporation of metadata, tags, and links
- Use of crowd sourcing and searching at the local level can build trust

### THREATS

- Potential for backlash and anger from realtors and sellers
- Potential for bad reputation for fake reviews
- Already established competitors could adopt same capability

## ONSITE STRATEGY

- **Goals**
  - To engage readers with an easy to use platform with high findability and useful content.
  - To optimize the HTML source code and site content in order to be visible and highly ranked on search engines.
- **URLs**
  - When searching for real estate online, users will enter location based keywords.
    - Example: Homes for sale Baltimore
  - When developing URLs for the various pages- include **location-based terms** so that these specific search inquiry results can appear on search engine results pages
- **Title and Header Tags**
  - Consistently include appropriate and **high ranking keywords** within title and header tags
- **Image Alt Tags**
  - Site will have multiple photos per page. Include necessary alt image tags to make images findable.
- **Blog**
  - **Updated content** is important to both **engage with users**, increase credibility, and increase SEO rankings.
  - Blog will be updated with **real estate related** useful content on a bi-weekly basis.
- **Authorship**
  - Google looks for authors attached to content to determine if the content is **credible**.
  - Blog postings will incorporate the authors and link to their Google+ page in the search results description.
- **Content**
  - Develop a keyword strategy. Include content incorporating the **keywords**, but be as natural as possible.
  - Home listings will consistently feature descriptions and a **controlled vocabulary** to improve SEO

# KEYWORD STRATEGY

## Top 15 Organic Keywords

RANK	KEYWORDS (540)	CLICKS (34,947) ▾	CLICK % ▾
1	homes for sale	3,186	9.12%
2	houses for sale near me	531	1.52%
3	homefinder	260	0.74%
4	houses for sale	179	0.51%
5	homefinder.com	179	0.51%
6	real estate websites	150	0.43%
7	house listings	150	0.43%
8	bossier city foreclosures	136	0.39%
9	homes for sale on baby road in laurel run pa	119	0.34%
10	rental homes in san antonio tx 78250	119	0.34%
11	manchester ny homes for sale	119	0.34%
12	1920 winnebago trail, fern park, fl	119	0.34%
13	how to make offer on a house	119	0.34%
14	2150 n highway a1 a unit: 210, melbourne	119	0.34%
15	warner realty	119	0.34%

Jumpshot

1500 West Pratt Street  
 homes for sale on Lombard St Baltimore homes for sale  
**houses for sale** 2200 East Baltimore Street  
**homes for sale**  
 house listings how to make an offer on a house  
 real estate websites houses for sale near me

## TIMELINE, MAINTENANCE, AND BUDGET

### SEO IS A LONG TERM STRATEGY AND COMMITMENT

- **SHORT TERM- First 6 months**
  - Month 1: Discovery and auditing
    - Keyword analysis development
    - Controlled vocabulary development
    - Metadata strategy
  - Month 2-3: Implementation
    - Content creation
    - Tag and header keyword implementation
    - Image alt tag strategy and implementation
  - Months 4-6: Continual growth in search rankings
    - Blog updates
    - Paid Search
    - Link building
- **LONG TERM MAINTENANCE**
  - New content
    - Blog updates 2x per month
    - Continued updates of new listings on a daily basis
    - Continued user generated content including rankings, comments, and photos
- **BUDGET- \$70,000**
  - Analysis and implementation- \$20,000
  - Monthly SEO maintenance- \$3,000- \$5,000

## REFERENCES

- "How To Plan And Budget For SEO." *Forbes Entrepreneurs*. Forbes Magazine, 23 Apr. 2015. Web. 6 Dec. 2015. <<http://www.forbes.com/sites/joshsteimle/2015/04/23/how-to-plan-and-budget-for-seo/>>.
- "Design II: Structure Comes before Design." - *Intranet Design, Intranet Consultant, Social Intranet, Website Planning*. Prescient Digital Media. Web. 8 Dec. 2015.
- "The Definitive Guide to Real Estate Search Engine Optimization (SEO) - 29doors." *29doors*. 29doors, 21 Mar. 2013. Web. 6 Dec. 2015. <<http://www.29doors.com/real-estate-seo/>>.
- "The 9 On-Page SEO Elements You Need In 2014." *Forbes Entrepreneurs*. Forbes Magazine, 20 Feb. 2014. Web. 10 Dec. 2015. <<http://www.forbes.com/sites/jaysondemers/2014/02/20/the-9-on-page-seo-elements-you-need-in-2014/>>.
- "Keywords Research." *Jumpshot*. Web. 10 Dec. 2015. <<https://insights.jumpshot.com/>>.

## Appendix D: Annotated Bibliography

**Ball, P. (2014). Crowd-sourcing: Strength in numbers. *Nature*, 422-423.**

Crowd Sourcing can be an effective and efficient way to save time when needing to solve a problem. This particular article uses how crowd sourcing helps mathematicians solve a problem and brings like minds together. For solving larger problems, a user must think about what will motivate others to contribute. Incentives are often used to get contributors. Incentives such as cash, prizes, or just recognition are good motivators to tempt users to contribute work.

**Brown, B. (2012). Beyond Recommendations. *ACM Transactions on Computer-Human Interaction ACM Trans. Comput.-Hum. Interact. TOCHI*, 1-24.**

Performing local searches is very common for users and often use local search terms. Users are typically looking for local establishments such as restaurants or stores. “Web sites such as Yelp, Tripadvisor, and UrbanSpoon, allow users to go beyond listing services (such as the classic “Yellow pages”) to obtain reviews, discussions and social networking, centered around establishments and businesses.” This text examines not only how users use these sites to make decisions, but how establishments use them to interact and engage with their customers through online incentives and responding to customers’ needs.

**Bruce, A. (2013, January 24). Zillow Home Value Forecast: Methodology - Zillow Research. Retrieved December 1, 2015, from <http://www.zillow.com/research/zillow-home-value-forecast-methodology-2-3740/>**

In this article Zillow reveals the formula for how they determine their home estimates and forecasting.

**Creig Northrop Team - Homes for Sale in Maryland & Real ... (n.d.). Retrieved December 1, 2015, from <http://www.northropteam.com/>**

The Creig Northrop Team of Long and Foster Real Estate is Maryland’s leading real estate team in Maryland and the top Long and Foster office in the US. This website is an example of a Real Estate brokerage office. It focuses on showing their newest listings first and users can search listings right on the site. The website has a local Maryland focus, highlights team leaders, and includes informative content and blog entries.

**The Digital House Hunt: Consumer and Market Trends in Real Estate (2013). National Association of Realtors.**

This report shows how consumers use the internet when searching for a home and how they get their real estate advertising compared to traditional media. It goes in detail how the internet is used for search, home listings search, and display advertising and

video. It compares online searches to TV, radio, and newspaper. It also goes into detail the effect of online video, mobile, and keywords.

**Gelman, I., & Wu, N. (2011). Combining Structured and Unstructured Information Sources for a Study of Data Quality: A Case Study of Zillow.Com. 2011 44th Hawaii International Conference on System Sciences.**

“In response to home owners’ complaints about the quality of the data that Zillow extracts from public archives across the US, Zillow added tools that enable home owners to edit facts and add information about their property. Zillow also offers listing services for home owners and real estate agents, which enable these users to edit and add information, both manually and through automated data feeds. These tools are becoming increasingly popular. At present, nearly 20% of the records in this store have been edited through such tools.” This paper analyses the accuracy of user generated content on Zillow when they enter in information about their home.

**Glassdoor – Get Hired. Love Your Job. (n.d.). Retrieved December 1, 2015, from <https://www.glassdoor.com/index.htm>**

Glassdoor is a website first published in 2008 that allows users to rate and leave reviews of their jobs. This can be a former job, current job, or a job they interviewed for. They can also search job listings. It allows for potential job seekers to get recommendations on future employers.

**Golbeck, J. (2009). Trust and nuanced profile similarity in online social networks. ACM Trans. Web ACM Transactions on the Web TWEB, 1-33.**

This text analyses how researchers can take advantage of user data to measure trust by looking at what users reveal online such as what information they are willing to share and with whom. “By using information that users are already expressing, there is little over head to gathering trust data which can then be analyzed and used to create socially intelligent systems.”

**Golbeck, J. (n.d.). Tutorial on using social trust for recommender systems. Proceedings of the Third ACM Conference on Recommender Systems - RecSys '09.**

“Social trust relationships, derived from social networks, are uniquely suited to speak to the quality of online information; recommender systems are designed to personalize, sort, aggregate, and highlight information.... Merging social networks, trust, and recommender systems can improve the accuracy of recommendations and improve the user’s experience.” This text reviews trust in recommender systems and how trust improves the user experience.

**Harney, K. (2015, February 6). Zillow Offers Estimates of Your House's Value. but the Error Rate Can Be High. *The Washington Post*. Retrieved December 1, 2015, from <http://www.highbeam.com/doc/1P2-37650250.html>?**

Zillow is the most popular real estate website with 73 million unique visitors in Dec 2014, according to this article. One of the unique features of Zillow which stands it apart from other sites is the posting of home's estimates. But the Zillow estimates can be inaccurate. This has become an issue offline, because Zillow users are challenging seller's prices and putting pressure on them to come down. The discrepancy is high- from 12-19%

**Hoffmann, C., Lutz, C., & Meckel, M. (2014). Digital Natives or Digital Immigrants? The Impact of User Characteristics on Online Trust. *Journal of Management Information Systems*, 138-171.**

This text investigates how web experience and demographics influence online trust. A survey analysis revealed "significant differences" in trust among similar groups. Businesses must have trust from their customers to thrive online, and it is important to study how trust is determined in users. Many web users were surveyed for this in-depth analysis and they found that less experienced web users had more online trust in companies they knew offline, and less trust in online only services, whereas more experienced web users had trust in online only services and less trust in businesses that also existed offline.

**Home Buyer and Seller Generational Trends Report 2015. (2015). National Association of Realtors.**

Annually published report lists the characteristics of homebuyers in different demographics and their home search and buying behaviors. The report goes into detail about how home buyers searched for listings and what tools were used. It provides information on what is important to homebuyers as far as neighborhoods and house types. It also discusses how they finance the home purchase and plans for home ownership in the future.

**Homefinder.com - Homes for Sale, Real Estate Listings ... (n.d.). Retrieved December 1, 2015, from <http://www.homefinder.com/>**

Homefinder.com is a real estate listings website that generates revenue by realtors paying to "enhance" their listings- which pulls the listing to the top of the page results above similar homes that aren't enhanced. Realtors can also pay to have their listing featured or focused in a single property website. This paid model is slightly different than the other sites where revenue relies only on display advertising. It also has tools for agents to use to track their listings' page views and leads.

**Johnson, J. (2014). Designing with the mind in mind: Simple guide to understanding user interface design guidelines (2nd ed.). Waltham, MA: Morgan Kaufmann.**

This book explains the cognitive reasons for user's behaviors online specifically when dealing with memory and recall, emotion, patience, cognitive limitations, vision, reading issues, and images and color. This is a good tool and tips to keep in mind when designing a site for particular target audiences that may have limitations or for a set of tasks that may bring out an emotional response.

**Kavanaugh, A., Ahuja, A., Gad, S., Neidig, S., Pérez-Quñones, M., Ramakrishnan, N., & Tedesco, J. (n.d.). (Hyper) local news aggregation: Designing for social affordances. *Government Information Quarterly*, 30-41.**

Using local searches is extremely important for web users in online trust and decision making and for getting information and news (most use local search terms when searching real estate). Those in smaller communities are looking for more tools to search and connect locally and technology is helping to make those connections. However there are now several resources to get local news and information and relevant information is often scattered across the web. "To try to address this problem of the wide dispersion of sources for local information and citizen discussion, various computer mediated systems and data mining techniques have begun to collect and update content automatically from diverse sources and to build in social affordances in 'news aggregation' websites." This paper defines social affordances- such as tagging, clicking, sharing, and how to best design for these affordances.

**Kim, Y., & Srivastava, J. (2007). Impact of social influence in e-commerce decision making. *Proceedings of the Ninth International Conference on Electronic Commerce - ICEC '07*.**

Getting recommendations on a product or service is extremely important to consumers before making buying decisions. They often want to discuss with those that have used the product or service first before trusting in it. Now with social media and web 2.0, users can go online to get those recommendations within their social circles, especially before making an online shopping decision. This text reviews "the impact of social influence in E-commerce decision making to provide guidance to researchers and companies who have an interest in related issues." It also describes how user data can be collected to measure the impact and form conclusions for businesses to improve.

**Matsuo, Y., & Yamamoto, H. (2009). Community gravity: Measuring Bidirectional Effects by Trust and Rating on Online Social Networks. *Proceedings of the 18th International Conference on World Wide Web - WWW '09*.**

In addition to using social media and recommender sites to leave opinions, user opinions and reviews are also posted online through blogs. Many of these blogs have loyal followers who trust the bloggers on their opinions of products and services. This paper studies how bloggers influence their followers and the impact it has on online shopping and services.

**Morville, P. & Rosenfeld, L., (2008). *Information Architecture for the World Wide Web* (3rd Edition ed.). O'Reilly.**

This book is a great guide for organizing the information architecture of a site for the best user experience. It describes how to organize a site for users to complete tasks easily without effort. It goes over labeling and taxonomies, navigation systems, use of controlled vocabularies and data. In addition to reviews how to test controlled vocabularies and labeling through research methods such as card sorting and contextual inquiry. These research methods will be used during the site testing.

**Munson, S., Avrahami, D., Consolvo, S., Fogarty, J., Friedman, B., & Smith, I. (n.d.). Attitudes toward online availability of US public records. Proceedings of the 12th Annual International Digital Government Research Conference on Digital Government Innovation in Challenging Times - Dg.o '11.**

The sale/ purchase of real estate is public information and anyone is entitled to access the records. Information such as date of sale, purchase price, property tax assessment, and basically the entire property's history is all public. As real estate seeking moves online, this information is easily accessed on the internet. Sites like Zillow will publish these records for anyone to access for any property whether or not it is on the market. This report studies attitudes towards the public records being so accessible. While users are happy with the ease of access, many users also have privacy concerns and wonder what should be made public and what does not need to be posted.

**Nodder, C. (2013). *Evil by design interaction design to lead us into temptation*. Indianapolis, IN: John Wiley & Sons.**

In the Anger section of this book, it is discussed how anonymity is a way users can be encouraged to share more online- specifically when leaving reviews- more so than they would if they were forced to identify themselves. Sites like glassdoor.com allows users to say how they really feel without consequences. This can backfire on some businesses though, by users posting false information. This book discusses many ways that you can use your web design and architecture to manipulate users to take the action you would like them to take whether that is from anonymity, or incentives. This book looks at user's emotions and how your design can bring out those emotions to take action.

**Real Estate, Apartments, Mortgages & Home Values | Zillow. (n.d.). Retrieved December 1, 2015, from <http://www.zillow.com/>**

Zillow.com was founded in 2006 and it is the leading real estate search website. It is "dedicated to empowering consumers with data, inspiration and knowledge around the place they call home, and connecting them with the best local professionals who can help."

**Rodriguez, M. (2011). *Making Social Media Effective in Real Estate*. Keller Center Research Report, 1-5.**

Consumers are using social media for both their social circles and to engage in businesses which will increase trust. Many businesses are on social sites such as Facebook and Twitter to engage in consumers. This should also apply to real estate agents as they search for leads and customers for real estate listings. Real estate agents should be using social media to engage with potential customers and so customers can search and get to know them as they search for an agent. This text discusses the importance of realtors using these tools to grow their business and best practices for using the tools and engaging with customers.

**Seiler, M., Madhavan, P., & Liechty, M. (n.d.). Toward an Understanding of Real Estate Homebuyer Internet Search Behavior: An Application of Ocular Tracking Technology. *Journal of Real Estate Research*, 34(2), 211-241.**

It is very well-known that real estate seekers go online to search home listings. This text studies exactly *how* a user searches by using tools such as eye tracking software during user testing. Based on the large amount of information online, the study focuses on answering questions such as how much time is spent on a listing, what information is read, and how users narrow their search.

**Shirky, C. (2008). *Here comes everybody: The power of organizing without organizations*. New York: Penguin Press.**

This book analyses the modern phenomenon of how groups can come together online to make a difference. It examines incidents of online users seeking to expose, or find justice in a particular event or issue. The book is an examination of how our modern technology has helped with social change and action and the speed and range in which it does. It asks the question has technology changed people's feelings and desire for change, or is technology just a tool to more effectively do so, and if we did not have the technology would these changes have occurred.

**Tang, J., Liu, H., Gao, H., & Sarma, A. (2012). ETrust: Understanding Trust Evolution in an Online World. *Proceedings of the 18th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining - KDD '12*.**

It is a common to hear many people say that trust is something earned over time as you get to know someone. So it would make sense that online trust is also something that takes time to develop. This text studies the evolution of how trust is formed in an online world. Experiments were used to evaluate trust in search and recommender situations. It was found that trust evolves faster in closed social groups and those in which the user has things in common.

**Trulia: Real Estate Listings, Homes For Sale, Housing Data. (n.d.). Retrieved December 1, 2015, from <http://www.trulia.com/>**

Trulia is another leading real estate listings site that is known for being more visual than its counterparts. It is also more mobile focused with a mobile site and app.

**Yelp - Official Site. (n.d.). Retrieved December 1, 2015, from <http://www.yelp.com/>**

Founded in 2004, Yelp is the largest website for online reviews for local businesses. It receives an average of 89 million unique visitors monthly and over 90 million reviews have been written by users. Users can rate and leave a review, check in with their phones, and upload photos of their experiences. It includes all types of businesses including restaurants, auto mechanics, retail stores, dentists, and even realtors.

**Yeung, C., & Iwata, T. (2011). Strength of social influence in trust networks in product review sites. Proceedings of the Fourth ACM International Conference on Web Search and Data Mining - WSDM '11.**

One of the features of online shopping sites that allow reviews, is it allows users to set up social networks where they can review and rely on their recommendations and product reviews. These networks indicate who users trust online- it also assumes that the users in the network circles have similar preferences and interests in particular products. Sites can exploit these by advertising specific products to users that those in their networks have purchased or viewed. This text is to answer the question- just because a user is in a network, is it correct in saying that they have similar preferences. “For example, two users may establish a trust relation simply because they know each other, thus treating the trust network as a more general social networking function. In addition, two users can share similar preferences in one area (e.g. sports) while have totally different tastes in another area (e.g. reading).” This paper studies these possibilities.

**Yin, D., Bond, S., & Zhang, H. (2014). Anxious or Angry? Effects of Discrete Emotions on the Perceived Helpfulness of Online Reviews. *MIS Quarterly*, 38(2), 539-560.**

This paper focuses on the connection between the emotions of the review and its helpfulness. It studies how anger or anxiety and its impact in the effort in which the review is written. Negative reviews tend to be more influential as anger is a much stronger emotion. “Negative reviews have the potential to influence the attitude and behaviors of future customers to a greater extent than positive reviews (Cao et al. 2011; Chevalier and Mayzlin 2006). However, it should not be assumed that a more negative review will be perceived as more helpful... ranting about a bad experience may be counterproductive for reviewers seeking to positively influence the choices of other customers.”