

Final Report

Title: BulletinBoard

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Problem:

During the pandemic, people were all locked up in their houses, away from their work or school friends, and sometimes even family. Neighbors played an important role in helping out their sick neighbors, sending home cooked meals and groceries, or even having socially distanced outdoor gatherings to enhance the sense of community. The user problem we are trying to solve is having trouble communicating to the people that are physically close by creating a simple, fun, and focused interface. Our target demographic is adults in neighborhoods, specifically suburban. This can be used by children or teenagers, but they might not be the most interested in it. The main tasks are establishing the connection between neighbors, learning about your communities needs in a non-invasive manner, helping out, finding things you are interested in, and also having a way to talk about your events or needs. In a post-pandemic world, we do not need to rely on a virus to have these neighborhood connections. If you have an event that you want to tell your neighbors about or want to sell your sofa, you can simply add a virtual post-it to the bulletin board.

Design:

The final design of our interface was changed through many reiterations. When we first started thinking about the project, we had so many ideas but not all of them were feasible due to either or lack of skills or how it may impact the design. We had many ideas that we did not put together into a design that we could implement. When we first started to make the paper prototype, we had to decide on what was truly important to the design. It took us some time to decide how the interface looked in the first place when we presented it to a user. After thinking about what would be a great way for neighbors to share information, we made our prototype to look like a bulletin board. Our paper prototype consists of multiple layers with different paper cutouts for the board, buttons, and navigation bars. This was so that we could try different variations on how the buttons that would allow a user to add a post or delete a post will be arranged. We also added post-it notes so that whenever a user wanted to post something, they would add a post-it note to the board. We quickly tried different variations and doing the actual testing allowed us to see the flaws of the design.

From paper prototyping, we were able to try out our idea and see someone actually interact with our interface in its most basic form. Since the interface was in paper format, we had to make sure that things were easy to differentiate between in our prototype. However, when we first tested out the paper prototype with primary users, the responses we got were a little mixed. Due to the black and white nature of our paper prototype, the testers had a hard time differentiating between buttons and finding links. Paper prototyping could not replicate how a user would interact with an interface on a computer as mentioned by Amy Rogers[1]. The lack of color made it harder for them to understand what was going on. Specifically, the testers had a lot of trouble with the switching of boards and where to post. The problem with where to post lies in the description of the tasks which did not explain how there were multiple boards for different categories such as events and advertisements. We changed the way our navigation bar looked due to this feedback. Previously, on our paper prototype, we had a menu button on the top-left corner of the board[A]. In the next prototype, we made sure to have a bar up top with the title of each board to make it easier for users to pick a board. We learned to adapt our interface based on the challenges the user faced when using our paper prototype, and keep the things that seem to work well.

After the feedback from our paper prototype, we started implementing our interface as a website. The website pretty much followed the idea of a bulletin board with a navigation bar at the top to switch boards and three buttons at the right for adding, uploading, and deleting a post. The website had no back

end which meant that other than the posting functionality there was no way for a user to see someone else's post. We had users try four different tasks live in front of us. From the usability testing, we learned that there are a lot of things that are intuitive to a user so they may expect an interface to act in a certain way due to their previous experience with other interfaces. There were problems with how the buttons and boards were labeled as they led the users into believing that they had different functions from what we made them to be. For example, we labeled one of our boards "Casual Chat" which led testers to believe that this board should be one where they should be able to text and reply to other people's posts when it was just another bulletin board that was just for posting[B]. Also, from usability testing, we learned that users may choose to complete a task in a totally different way from what you might expect them to do. One of our tasks asks for a user to advertise their bake sale. Due to the lack of details in the description of the tasks, instead of uploading the canned response of a flyer, they would instead add a post instead of upload and add their own title and description. From this, we learned that we must describe tasks properly and make it clear and that the interface itself should be clear and intuitive.

After usability testing, the heuristic evaluations that the tester's gave us are what really helped us make some important design decisions. One of the most important lessons we learned from the evaluations was that others can see what we cannot see in our own interface. Everyone has completely different opinions on what an interface should be and sometimes the evaluations can oppose each other. Due to these opposing ideas, we had to make a choice on what we believed was the best to implement in regards to the time and resources we had. A lot of our design changes stemmed from how easy it would be to implement with the time we had. There were so many changes that we would have liked to add to our design but we did not have the time for it. We tried to update the interface by changing the code of the previous interface without affecting other functionality. One of the biggest design decisions we made had to do with how a calendar link was provided to people who were interested in an event post on the event board of the interface. Before, we had users click on an interested button before another sticky-note would pop up with a google calendar link[B]. Our testers believed that this was too much of a hassle as it violated the design principles as mentioned by David Benyon[2] and that we should just have the google calendar link generated immediately when an event post is posted. This would make it easier for users to access. Another important design decision we made had to do with our "Casual Chat" board. Although it would have been nice to implement a chatting and reply function into our interface, it was not something we were able to design with the time constraints we had. Instead, we decided to rename the board into something that would not be misinterpreted. We also made a lot of little design changes such as changing the colors of the buttons for better differentiation between them, and creating a navigation bar so that it is clear that a user can navigate through different boards[C]. All in all, the entire process from first thinking about the design to implementing the final changes led us to realize how users are unpredictable and we must always change the interface depending on their actions.

Implementation

We implemented the posting system as well as the navigation bar that allows users to change between boards without losing their posts using HTML, CSS, and Javascript. This was necessary because we did not implement any back-end, so there was no clear way of saving posts and progress. We had to make important design decisions from the start, based on what we were capable of doing based on our skill set and time constraint. As mentioned before, we focused on the posting features as this was one of the most important parts of the interface. You can add, delete, edit posts or even upload an image as a post. Since we did not focus on the back-end aspect, such as accounts or saving posts, the posts disappear if you refresh. The posts are not exactly linked to a specific account and you cannot see any posts posted by other users. This does not necessarily affect the usability of the interface since you can still add and delete posts, but you can not interact with other users, which is the main purpose of this interface.

Status:

We did not solve the usability issue to do with the general board, aka "casual chat". We were given feedback on how we should add a reply function to post-it notes so that neighbors can for example,

provide answers to questions or ask more questions about the post. We had gotten so lost in the idea of posts and of having similar features across the entire interface that we had forgotten to think about how people talk to each other- not in disconnected posts but in chains of replies to and from each other. Task analysis based off of Benyon's writing [3] had been more concentrated on posting than talking. Unfortunately, finding out we had made this mistake during class testing led to a big technological challenge. This ended up being a feature we couldn't fix for our final interface- but it was one of the most important items we learned. If we had taken the time to do even more paper prototyping, talked to more people, undoubtedly we would have been introduced to these issues ahead of time. Fixing this issue would have to do with changing our meta approach as outlined in our reflection, and then also in implementing a reply feature in our board.

Another piece of feedback we were given and did not evaluate was that the interface should have a way for people to search for what they need from the post it notes and a way to manage all the post-it notes that may appear. Therefore, there needs to be an admin and even a search bar when there are too many sticky notes on the board. These two features aren't small in concept or in coding, but it would be a big improvement to give users the option to search and to create an admin perspective and role in the interface.

A piece that came up a little in feedback, but also an initial idea for our project that didn't make it to the final execution was limiting the number of posts and having event posts expire after an event has occurred. While this wasn't something that we could accomplish, our group understands the importance of a clean interface- and we believe that testing out and implementing limits to our application's posting features would be helpful to reduce overload for users.

Unfortunately, we were not able to change our edit function to affect events differently than other posts- meaning the current implementation does not allow you to change event date or times. This was simply a lack of time- we understand that this functionality would be invaluable to implement given a bit more time.

Our last important usability issue has to do with back-end and this is something that has not been implemented yet. There is no way for a person to choose the neighborhood they belong in and be able to log in and out of the website. So, our next steps here would be to design the login and neighborhood management process. We would have to design the user flow to log in and would also likely look at creating the admin role adjacent to this process.

Evaluation:

As mentioned in the evaluation chapter, "the most important people in evaluation are those who will use the system" [4], this means that ideally the next steps we would take would be to ask a large group of adults (our primary stakeholders) from a neighborhood to use our interface. We would then monitor the board activity during the trial to see if the board is useful, utilized, and valuable in helping with communication and establishing connections. We would also interview the users before and after the trial to learn more about their experiences using the interface. However, this would not be the most feasible approach due to its high cost and large time frame. Nielsen recommends 3 to 5 users as a sample, and since it can be harder to user test the large neighborhood group mentioned earlier, this can instead be performed in a more focused setting with less users. The aims of each test session should be clear, measuring the objective usability of the interface through different tasks. The sessions can be done in a short period of time, around 30 minutes, where 3 to 5 users all use the interface at the same time, so they are all "online". However, all the users should be in separate rooms to evaluate the effectiveness of communicating online through the interface. The tasks should be written on a piece of paper, and they can ask questions about the task. For different sessions, you can use only a laptop to access the interface, or you could also have the addition of the eye-tracking technology to have a better understanding of what catches the users attention, and what the hotspots of when asked to complete a certain task. The users must complete specific tasks that are given to them and we observe the success rate of the tasks. We can also measure the time taken to complete tasks, the error rate, which are all usability metrics [5] that can help give a measure of the usability. These can be measured using stopwatches, or even record the user to

study the footage and obtain specific measurements such as the time taken to complete the task and if they succeeded. Interviews can be conducted before and after the trial to have a better understanding of how the user feels about the idea of the interface and if they would ever use the website.

Reflection:

When we began our work on Bulletin Board, we never could have imagined the design process we were beginning; it was not a small idea, nor a simple project, but a thorough and reflective process into the ways we create and think about creating for humans. It is because of the hard work and effort pulled from this project that we now have the perspective to be able to look back and see the changes in methods we could make if we were to begin this project again.

As we started to think about our interface to connect neighbors, we leaned on PACT [6]. We developed a wide range of perspectives that allowed us to look at incredibly diverse viewpoints to help us create an idea that could apply to the different people who might live in a neighborhood. But, as we developed our view of the neighborhood- from Joanne to George to Johnny- we did not take enough time to extract the functions of our system from the personas and situations we were creating. While Michael's need to sell his daughter's girl scout cookies solidified our advertisement board as a concept, we needed to take more time to examine the smaller scale interactions we were creating. These could have allowed us the opportunity to set out and define the individual functions we needed for our board. Having a precise set of functions we wanted to implement would have been better for setting goals during development. While understanding we wanted a posting functionality helped drive our project, taking more steps to evaluate what users would do could have helped us realize we wanted a reply feature earlier on. While our paper prototyping walked us through users completing some tasks, we could have also leaned on cognitive walkthroughs [4] to make our evaluations more thorough.

Working through our project idea before implementation was not a short process- we went through rounds of personas, discussion, and paper prototyping that helped us tweak and improve the project before we moved on to implementation. But, looking back on all the time spent, we still wish we had spent more time on concept development before moving forward. It would have been invaluable to have gotten more feedback- especially that from professors- in all forms before the high fidelity prototype so that we could have sorted out what we truly need for the interface before we coded it.

One of the important points in prototyping was giving other students the ability to test an initial version of our application. For this prototype, our group had spent time relearning and building the interface at the same time. If we could go back, we wish we would have reviewed the languages we were implementing the interface with before we started to code it. There could have been a better way to code it so that it was simpler for us to implement the usability of the interface. This step could have allowed us to relocate more time towards the development of the look and feel of our interface instead of focusing on learning how to implement just the features we knew we wanted.

Appendix

References:

- [1] A. Rogers, "The downfall of paper prototyping", *Medium*, 2020. [Online]. Available: <https://uxdesign.cc/the-downfall-of-paper-prototyping-aaef53db4c68>. [Accessed: 23- Apr- 2021].
- [2] D. Benyon, *Designing User Experience*, 4th ed. Harlow: Pearson Education Limited, 2019, pp. 113-123.
- [3] D. Benyon, *Designing User Experience*, 4th ed. Harlow: Pearson Education Limited, 2019, pp. 270-285.

[4] D. Benyon, *Designing User Experience*, 4th ed. Harlow: Pearson Education Limited, 2019, pp. 239-265.

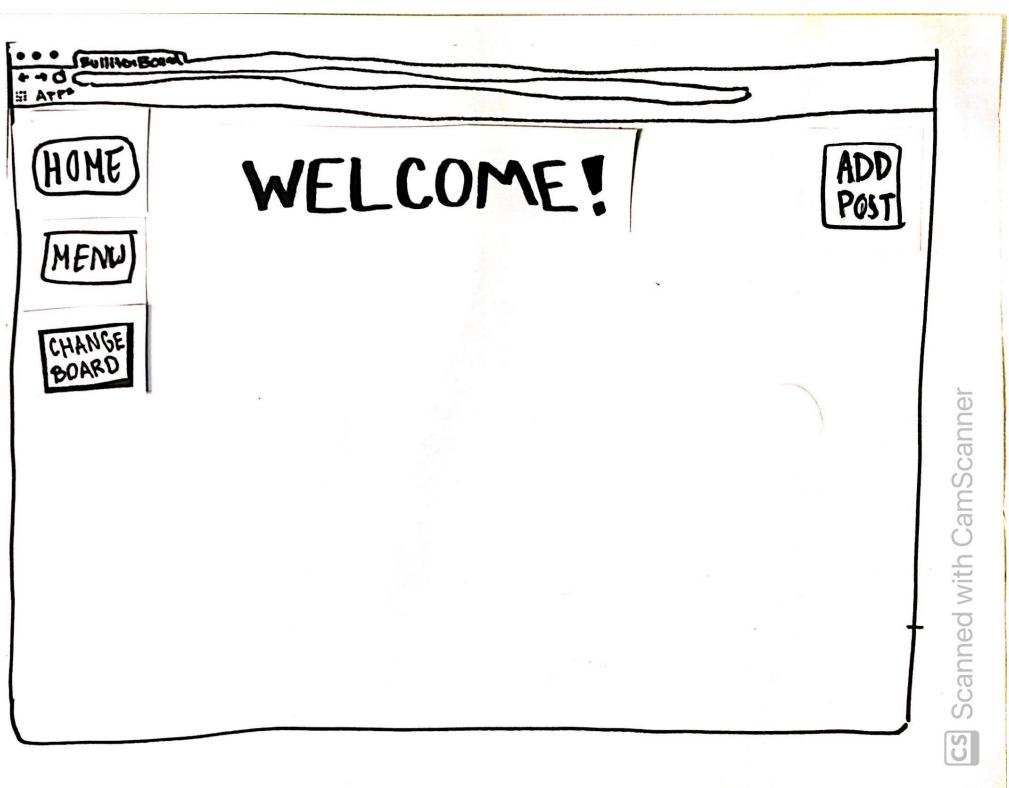
[5] "Usability Metrics", *Nielsen Norman Group*, 2021. [Online]. Available: <https://www.nngroup.com/articles/usability-metrics/>. [Accessed: 24- Apr- 2021].

[6] D. Benyon, *Designing User Experience*, 4th ed. Harlow: Pearson Education Limited, 2019, pp. 26-45.

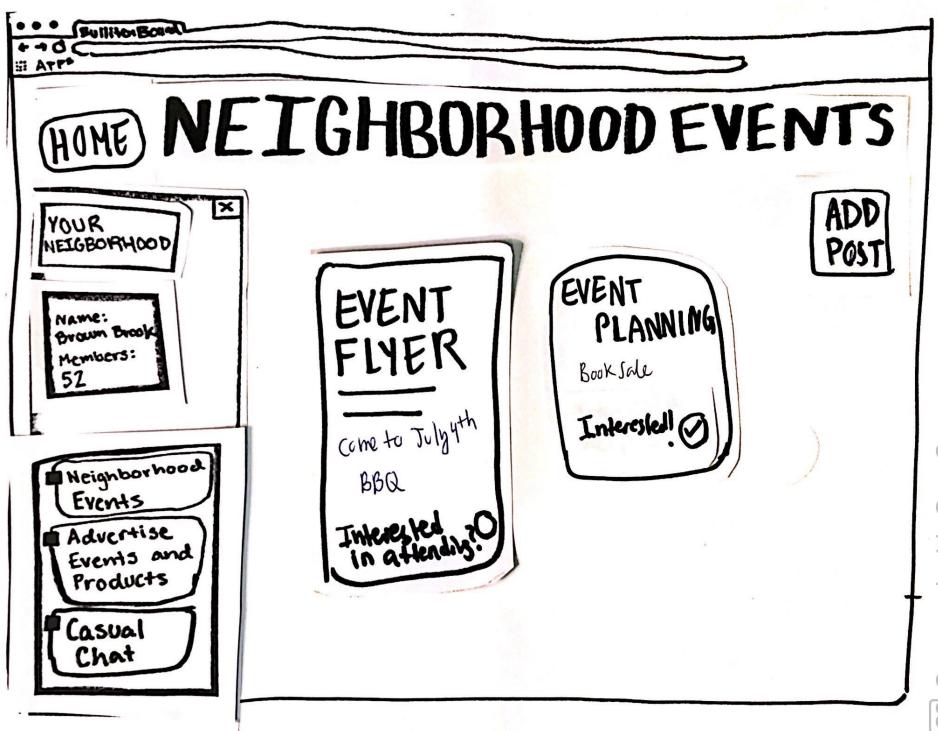
Images:

➤ *Exhibit A*



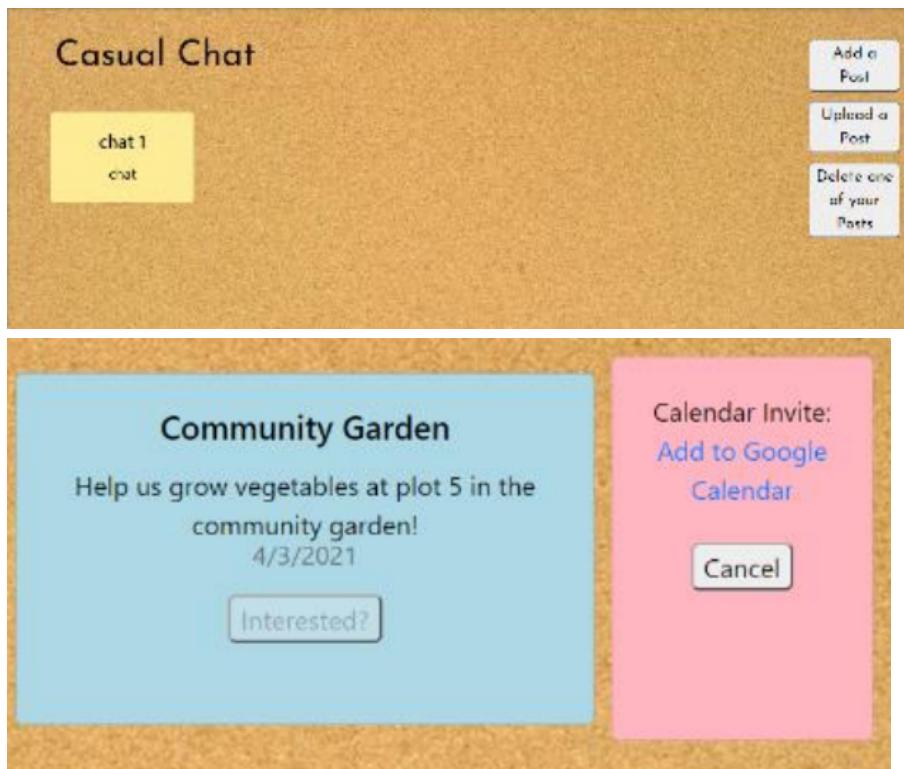


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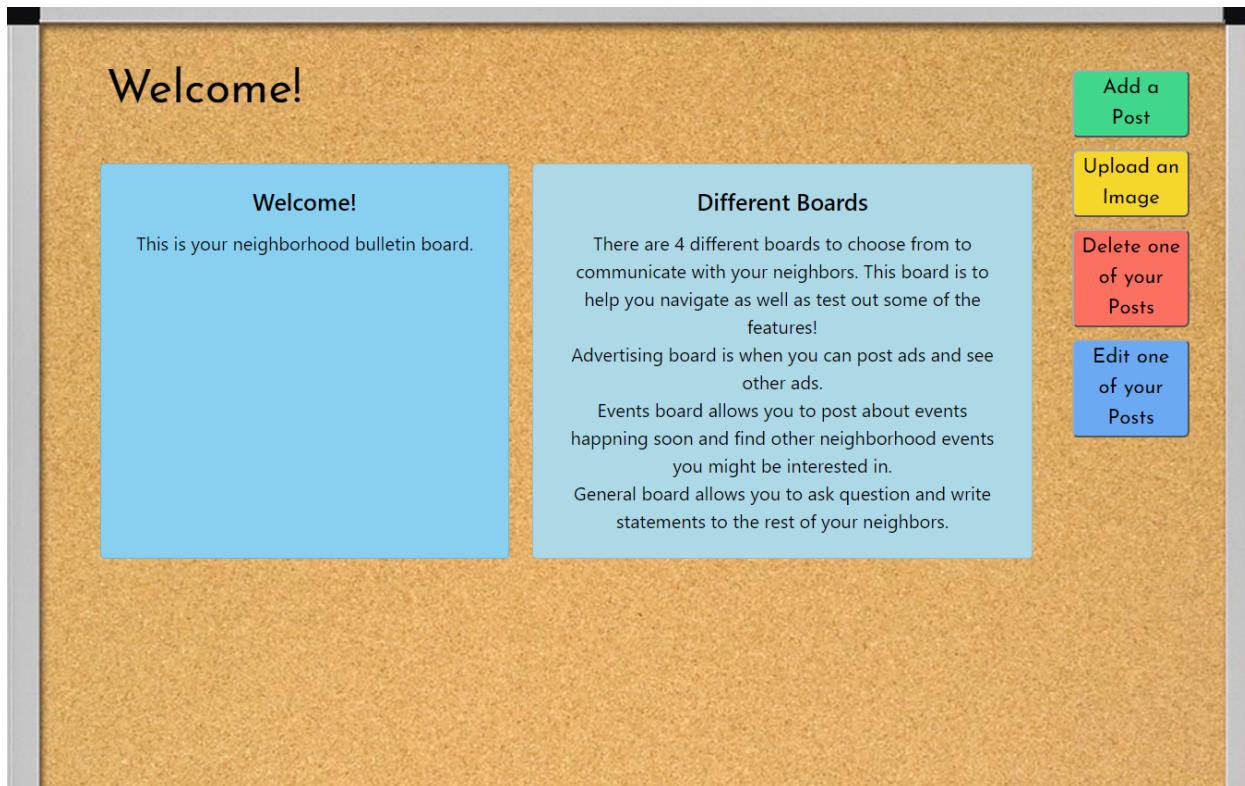


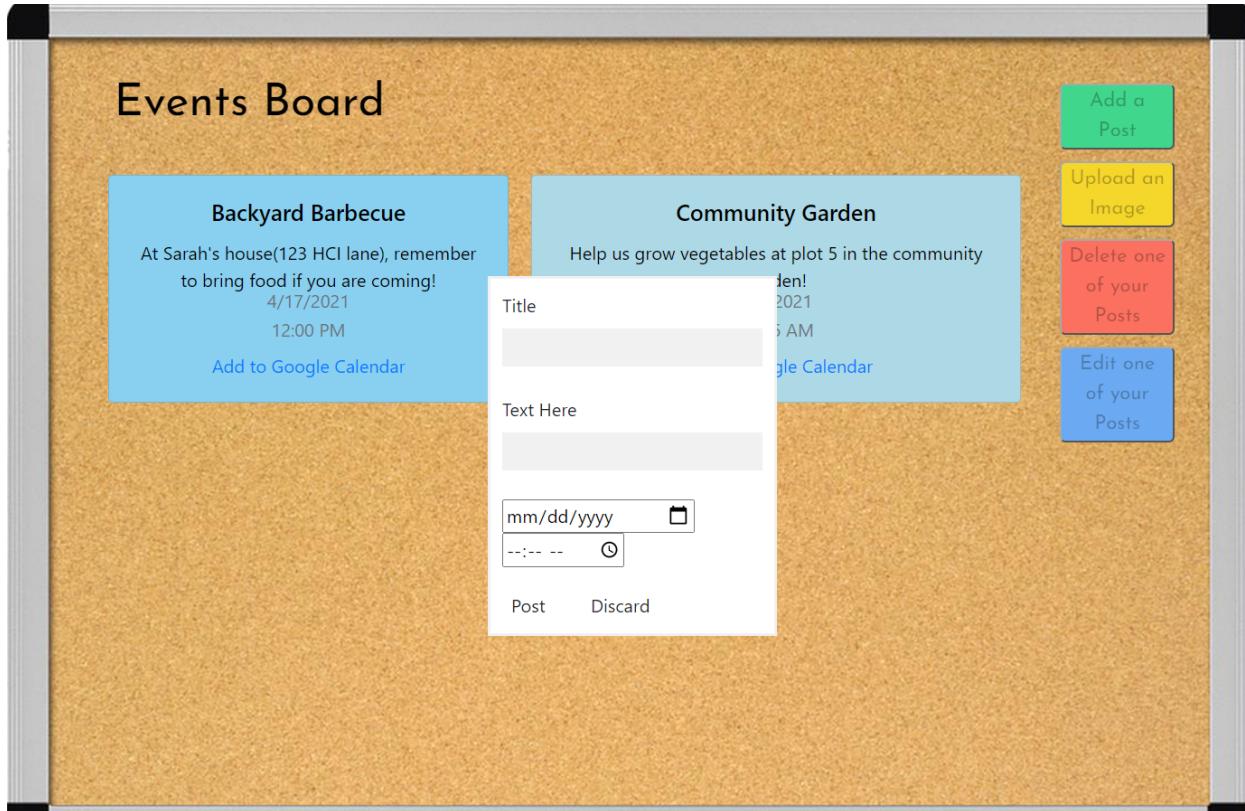
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➤ *Exhibit B*



➤ *Exhibit C*





Instructions:

Click the link to this website, <https://BulletinBoard.abbyccarr.repl.co>, to get to the interface on a laptop or a computer. Preferably, the website should be opened on Google Chrome. The website should be ready to use.

Briefing:

Bulletin Board is a website that allows for people to connect with their neighbors. You can post notes on electronic bulletin boards and either leave information to be contacted or just leave information for your neighbors to see. Depending on the type of board, you can ask questions or you can find out about neighborhood events you might be interested in. You can also upload images and advertisements for all your neighbors to see. This is a website without any backend. Therefore, refreshing the page will lose all the changes you may have made to the page. The link will start out at the home page with a welcome board. You can navigate and interact with it as a regular website.

Stakeholders(Primary):

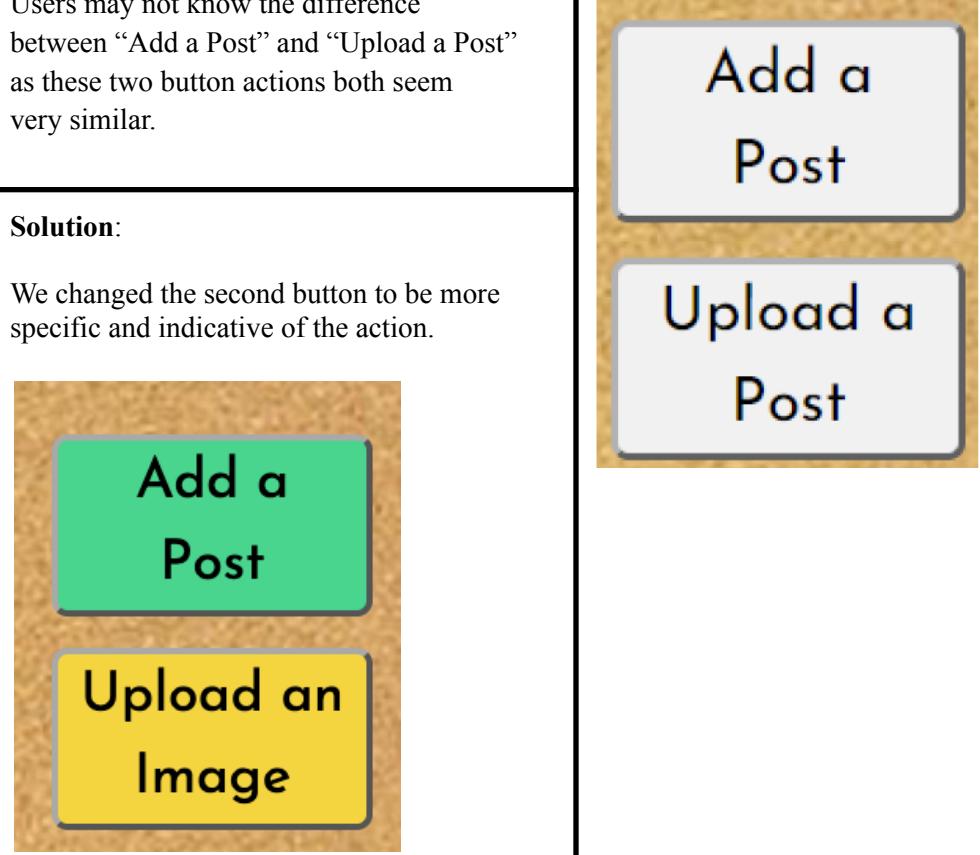
Neighbors in small subsets of suburban neighborhoods. We target most demographics although we expect smaller children would interact with our product more through their parents than by themselves. We'd like to allow any ability of a neighbor to use the product that has, at a minimum, the ability to access and use a website. We expect this product to be most prominent in the social lives of our users and should appeal to the motivation to connect with neighbors.

Tasks:

- Delete the welcome post on the Welcome board!
- Advertise your bake sale poster on the bulletin board by uploading it!
- Find a neighborhood event you can get involved in and get the calendar link
- Ask a question to everyone: "When does the trash go out?"

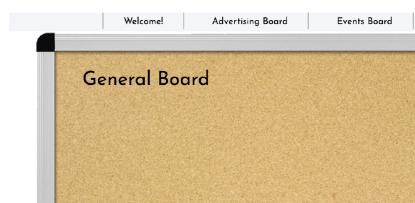
Heuristic Evaluations:

Heuristic Evaluation #2:

Rank #6	Problem: Familiarity with actions on bulletin board
Minor	Principle: Nielsen's Heuristic #3: Familiarity
	<p>Users may not know the difference between “Add a Post” and “Upload a Post” as these two button actions both seem very similar.</p>
	<p>Solution:</p> <p>We changed the second button to be more specific and indicative of the action.</p> 

Rank #7	Problem Understanding the function of what the general board is used for and lack of ability of respond to post
Minor	Principle: Nielsen's Heuristic #3, 5: Consistency, Control

When trying to post a question you might have for the community/neighborhood for an upcoming event, the user might get confused as to where to make such a posting. The name general board might not be interpreted as the place where such posts can be added. Furthermore, since the look of the page is highly similar to that of the other boards, the user might not think that it is where they can post their questions to the community. Since the functions of the event board and general board are somewhat different, the user might get confused since their designs are practically identical. What's more, is that since there's no indication to respond to another user's post, the page seems even further away from what it's purpose is.

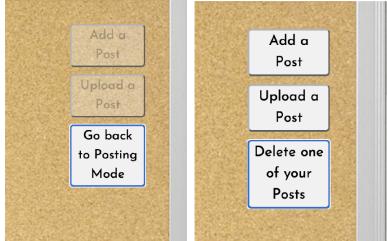


Solution:

We previously had the “General Board” be called “Casual Chat” but changed it since we had not yet implemented replies (and we eventually were unable to). The General Board serves as the “other” board for posts that do not have to be a specific category. We decided not to change the name again since this was the best name for our current implementation.

Rank #8	Problem Familiarity/Navigation of Advertising and Event bulletin boards
Minor	Principle: Nielsen’s Heuristic #3, 5: Familiarity, Navigation
	Users may not know the difference between each of the bulletin boards, and would not know where to post something.

	<p>They may also not be able to find certain posts if they are looking at the wrong category.</p>	
	<p>Solution: We decided to keep the categories the same as before since they do have different purposes with different post types. The advertising board is more about profiting, and the events board is more about broadcasting activities. In the future we might consider changing the categories of boards, but based on our current resources and understanding of our boards, we decided to keep it the same.</p>	

Rank #5	Problem Visibility of what mode (delete/post) you're on	
Minor	Principle: Nielsen's Heuristic #1: Visibility	
	<p>The Main issue user's might find here is that once they click on the "Delete one of your posts" button, users might not notice that they need to toggle off the option to go back to regular viewing.</p>	
	<p>Solution: We added a darker background when in delete mode to help the user be aware of the different mode they are in. This can help them know that they should exit it before going on to try to do other things on the board.</p>	

Heuristic Evaluation #1:

Rank #9	Posting in different categories is not very clear
Cosmetic	<p>Principle: Nielsen's Heuristics error #3: Navigation and Freedom</p> <p>If the user needs to post in different categories, it is not very clear on how to do that. The navigation buttons look like text and are not clickable.</p> <p>Solution: We added a vertical bar between the tabs so that it can be easily differentiated. If a user hovers over the text, the text will lighten indicating that the user can click on it.</p> 

Rank #1	The “Casual Chat” board does not allow us to reply to the posts which was confusing as we cannot “chat” in the posts.
Major	<p>Principle: Heuristics error: Match between system and the real world</p> <p>The person posting on the Casual Chat board would like to receive replies to his post. But a user cannot reply to a post.</p> <p>Solution: We have changed this board name to “General Board” so that it does not indicate that people can chat on this board. Although it would be great to add a reply function to a post, we were unable to do that with the time and resources that we had.</p> 

Rank #3	The events do not have time, they only have a date. It makes sense to have both a date and a time of the event.
Major	<p>Principle: Nielsen's Heuristics error #2: Speak the user's language</p> <p>The creation of a post for an event does not mention entering a time which can be confusing for a user. For ex: A party date is given, and no time is specified.</p> <p>Solution: Now, our posts also include a time and when someone creates a post on the event</p> 

board, they can include both a date and a time.

Rank #2	There was no status change when we are interested in an event. There is no way to understand if we have shown interest in an event.	
Major	<p>Principle: Nielsen's Heuristics error #1: Feedback</p> <p>When “Interested” button is clicked for an event, there is no change in status to interested.</p> <p>Solution: We no longer have an “Interested” button. Before, when the interested button is pressed on the original post, a new sticky note would show up with the Google Calendar link. Now, the Google Calendar link appears on the original post and is created when posted instead of the interested button. A user can click on it to access the event and after they click on it, the color of the link would change showing that they interacted with it.</p>	

Rank #4	When an event is added to the google calendar, calendar opens in the same page.	
Minor	<p>Principle: Nielsen's Heuristics error #4: Consistency and standards</p> <p>When we open the google calendar link, it opens the link in the same tab and takes us away from the application.</p> <p>Solution: Now, when the Google Calendar link is pressed, it opens on a new tab without affecting the website.</p>	