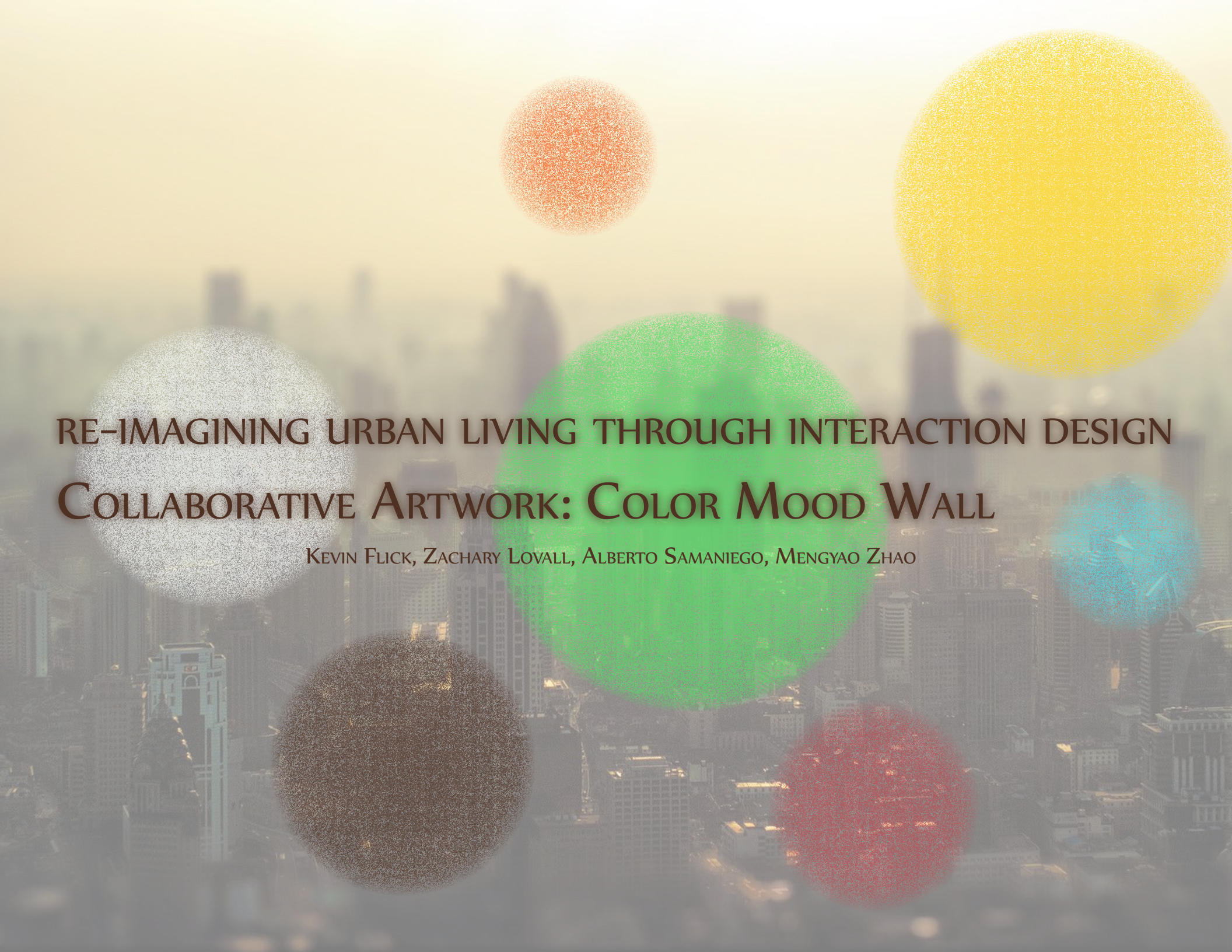


Re-imagining urban living through interaction design

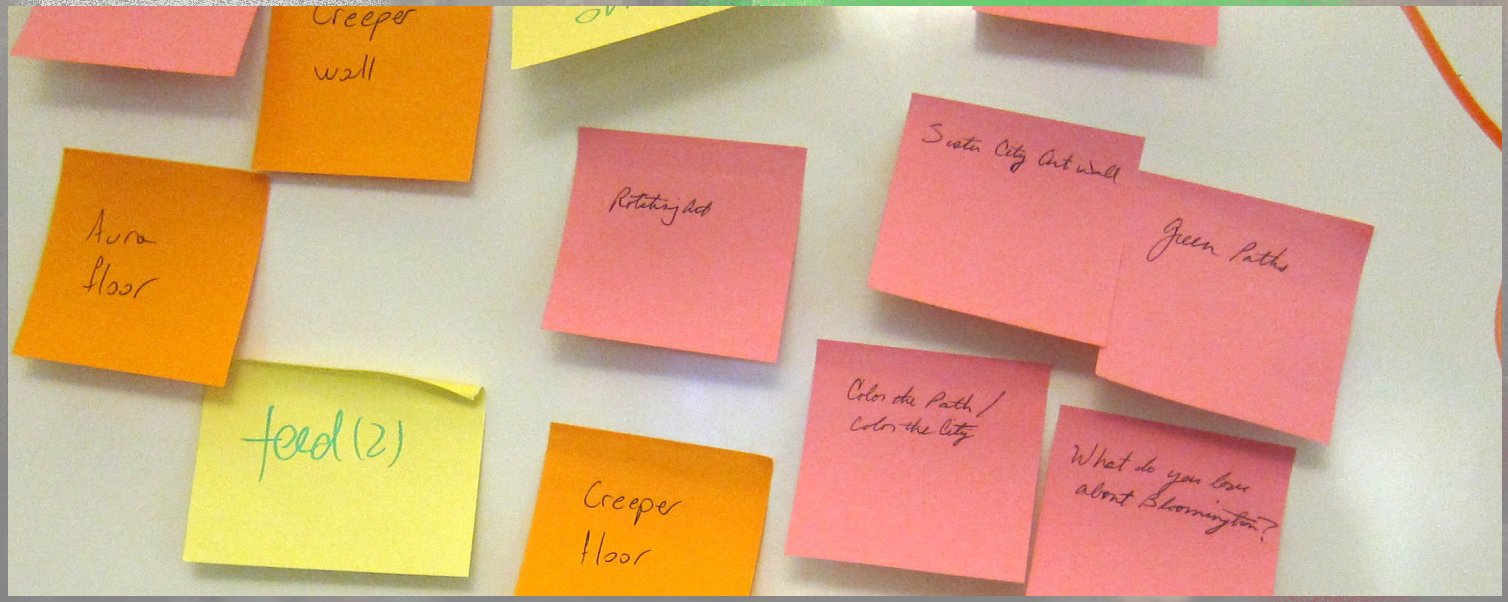
Collaborative Artwork: Color Mood Wall

Kevin Flick, Zachary Lovall, Alberto Samaniego, Mengyao Zhao

Problem Space and Narrowing

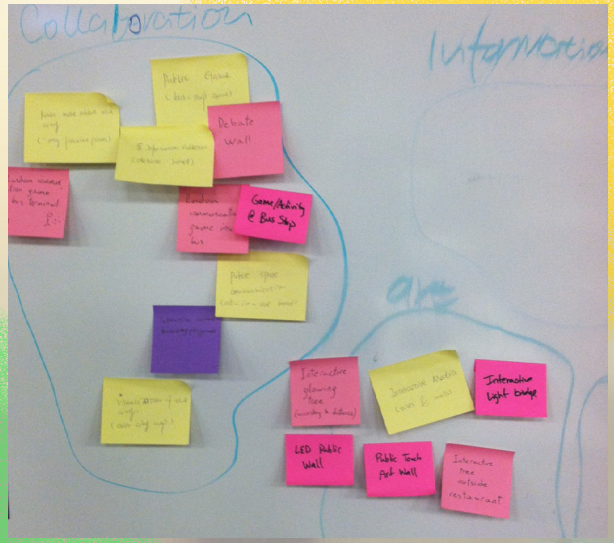
Initially, we met as a group to discuss what areas were of most interest to us within the space of urban living. After our initial round of writing down ideas, we narrowed down to four main domains that were of particular interest to us. They were as follows: Transportation, Public Spaces, Social Life, and Education. We wanted to keep our space fairly broad in the beginning in order for us to be able to go off in a few different directions to take pictures for observation.

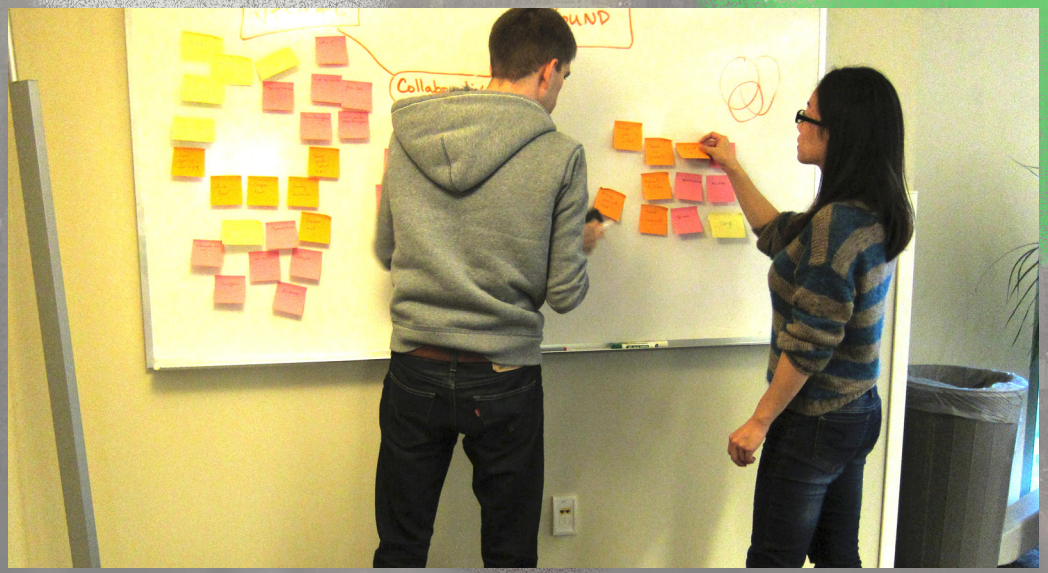
When we were deciding on where to go for the observations, we picked a fairly broad topic of Public Spaces and decided to go off in different directions for this. We brainstormed about 8 ideas in this space and ultimately settled on the final four topics of Walkways, Bus Stops/Terminals, Parks, and Bars/Restaurants. Each of us picked one of these areas and went out and observed these locations, taking lots of pictures along the way in order to come back and pull insights from our observations.



Research Methods

A lot of what we did for research was individual. Throughout the class we were shown a lot of different Arduino projects as well as some other existing ideas where spaces were utilized in an urban setting. Our individual brainstorming sessions focused a lot on what we were interested in within the space of urban interactions. We did look at a few different exemplars on our own, but primarily what we focused on was thinking critically about problems or issues that we had seen in Bloomington. We thought critically about each of these areas on our own and came together as a group to discuss some of the common areas that we appeared to be gravitating towards. We wanted our research and focus area to be in something that we were all interested in and could rally behind to design something for.





Design Exemplars

Amsterdam Mood Wall[1]

We loved the interactivity of this design. The design is made up of about 2500 LEDs. The ridged nature of the design makes it very hard for any graffiti to be recognizable on the surface. One aspect that we didn't like was that the mood wall was just supposed to help to cheer people up as they went by and made them less grumpy. Aside from walking by the wall and sensing people and following their path, it doesn't offer any sort of other input. We wanted to give people a sense of ownership in our design. Allowing for a sense of pride that people are able to contribute to the beauty of the design and artwork. The design also doesn't really allow for any reflection. It's kind of stagnant, and we assume it will eventually be passed over by people going by it day-by-day.

Interactive Music Wall[2]

We also really could appreciate the interactivity of this music wall. You could have multiple people interacting at once. People also get enjoyment out of making music and seeing their shapes that they made bounce around the screen. The barrier to entry of this design is also incredibly low; all you have to do is go up and touch the screen, and you are using the design. We, again, didn't particularly find this design to offer much permanence or sense of ownership. It just appears that you can come up to the wall and make a bit of music and play with the shapes you created. Aside from that, you really don't get any sense of ownership for what you are doing. Your song is not going to be saved and played later for others, nor do your shapes stay around.

Programmable Painting (Dandelions)[3]

The ability of this painting to allow a user to interact with certain sections is something that we really liked. It's a really interesting use of the Arduino as well. We feel like there isn't much else going on with this prototype, though. It's really beautiful and dynamic with the way the flowers and seeds work, so we definitely wanted to incorporate that into our final Arduino solution, but aside from that, we assume that is loses much of it's "wow" factor early on. It also doesn't have much of a deep reflection or thought provoking nature, which we really wanted to instill in our prototype.

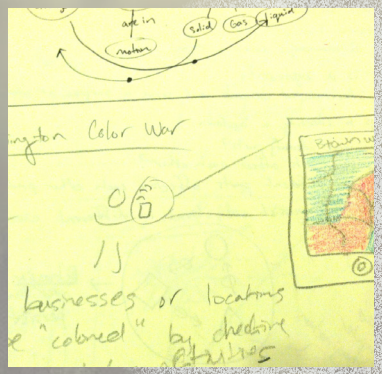
Digital Wallpaper[4]

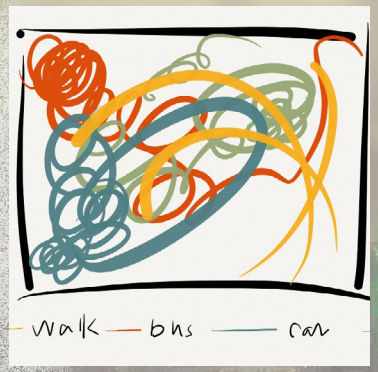
An Austrian company wanted to create a night-time display in their office that would provide passersby with a light show that would encompass the nature and persona of their company. This design is really awesome. We really enjoyed the visual and beauty of the piece. It definitely will stop people who are passing by to look at it. They even demonstrated a PacMan-eqsue video on the wallpaper as well to demonstrate the full reality of their design. We liked the visual and eye-catching elements of this design, but the fact that it wasn't really at all interactive was what we found to be least impressive about the design. It definitely looks pretty to passersby, and it may even get them to think of what the colors mean to the company, but other than that there really isn't much interactivity in the design.

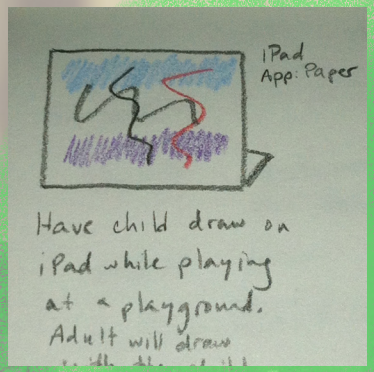
Digital Graffiti Wall[5]

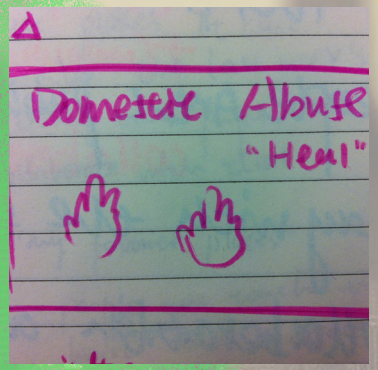
This concept is probably the closest amount of interaction that we like compared to what we are looking for our final concept. This allows you to digitally "spray" a wall in a huge array of colors, creating digital graffiti. This solution is really green in that it doesn't require the use of aerosol cans, and there is also an unlimited amount of paint that you are able to use. We aren't sure if it is collaborative, but it could be used by trading off the digital spray paint can. We really like the fact that people can use this and create their own individual (or group created) piece of artwork to display. We assume that you can also save the images you create as well. This concept could also be abused in a public space, though. You could write profanity or vulgar images if it was unmoderated. Otherwise it's a really great concept for doing "green" graffiti.

Observations and Concept Generation





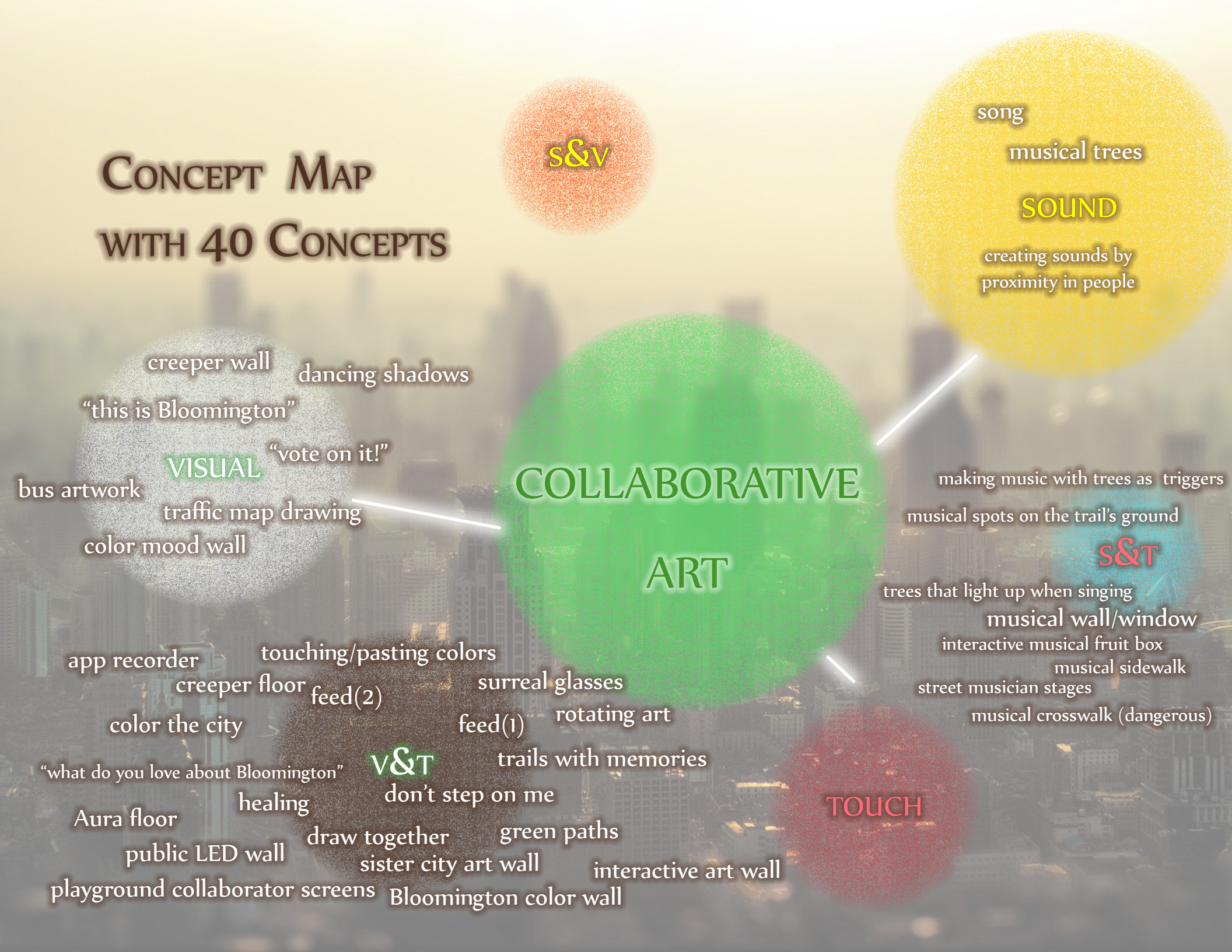




After each of us went our separate ways, we went through and took pictures in the various locations that we observed. We met briefly on a Google Hangout in order to share our findings with each other. We talked a lot about what we observed and common patterns or problems that we saw within the space. We tried to take a lot of pictures of various things in our location in order to make observations that might not be so apparent. After we discussed each of our individual observations, we started a small discussion about some of the concept areas that we saw might be potential spots for creation of concepts within the space.

When we went to class the next day, we were able to come up with right around 40 concepts, 10 each in our individual area. We soon realized that our areas were too disconnected to really validate using a concept map, so we used these 40 concepts that we came up with in order to pick a more solidified area to focus on and concept in. The area that we finally ended up in was Collaborative Artwork. Each of us had seemed to gravitate toward something in this area already and were interested in it, so we decided to focus our energy in this space. We split up again and began coming up with 10 more concepts each in this space. We met right before Thanksgiving break to talk about our concepts and place them into a concept map.

Concept Map with 40 Concepts



Narrowing and Testing/Evaluation

From our concept map, we each picked two concepts that we wanted to create low-fidelity prototypes for. Over the break, we constructed our prototypes separately and tested them with the target population. We then individually compiled our information about the test and pulled out some insights and take-aways from each of the prototypes. We then had to brainstorm together which of these concepts that we wanted to narrow down again to. This time we were to select our four best concepts and use these four to create one final strong concept that would fit into our problem space appropriately.

Ultimately, we decided on a Color Mood Wall concept. We really wanted something that would have low barriers to entry. We also wanted many people to be able to contribute to a public piece of artwork. Our concept is one that has the potential to be different every time that you see it, so the visual interest of the piece over time should stay pretty high (especially when paired with the low barriers to entry). We also wanted the concept to be pretty abstract, allowing for people to critically reflect and ask themselves questions when trying to look at and interpret the design.

Low-Fidelity Prototyping: Collaborative Screen

The playground collaboration screen concept is to have interactive touch- screens at playgrounds. As children are playing on these screens, they see a video of another child from a local playground. On the screen they see what the other child is drawing, and together they can construct a drawing.

To construct the prototype, we affixed two heavy stock paper sheets together and slid transparent sheets in between to simulate the interaction.

We tested the prototype on a three-year-old girl. We asked her to imagine that we were at a playground and she saw a video of another girl. we then drew a smiley face on a transparent sheet and slid it into the prototype.

She clearly understood that the drawing was a collaboration of our efforts. We are not certain she understood that another girl would have been at a different location, but the test did show that she valued the collaboration efforts, and understood that we drew the picture together. The fact that she wanted to hang the drawing on the wall showed that it was a meaningful interaction.

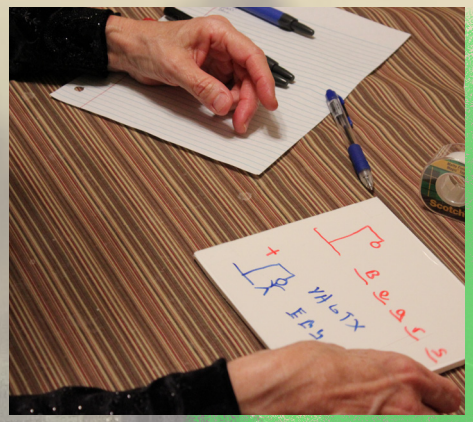
Low-Fidelity Prototyping: Growing Wall

In order to test this concept, we played two different video clips (screen shots are shown on the left) to simulate the scenarios when people meet in front of the public wall in the city (the TV screen). When they get closer to each other, they can see the growing of the plants.

User Feedback:

1. They would like to stay in front of the screen and play with the animation for a while.
2. This concept can enhance their awareness of the others.
3. The animation doesn't have a strong urban feeling, they may prefer other visual contents like advertisements for business purposes or public issues.
4. It's better if this idea is implemented on the ground, because they can see their feet interacting with the ground and generating animation.

Low-Fidelity Prototyping: Public Touch Wall

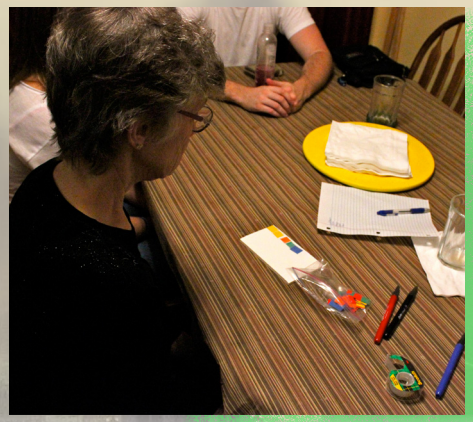


This prototype was for a concept that involved a very scaled down version of what our proposed prototype would be. This is intended to be a giant wall that people could come up to and draw whatever they wanted on it. Think of something like a giant graffiti wall but completely activated by touch, allowing people to use the wall in any way that they like.

We tested 4 people with the foam core and transparency paper prototype. We explained what the idea was about and then let them have their freedom to do as they pleased. As you can see from the pictures, they primarily decided to play Hangman on the prototype.

They liked the idea that people could just come up to the wall and write whatever they wanted on it. They especially liked the fact that they would be able to collaborate with others at a time. They were a little concerned about the fact that anyone could come up and wipe over what they had just written or worked on. They also mentioned the fact that this could potentially be abused, which we had a bit of a discussion about.

Low-Fidelity Prototyping: Public Mood Wall

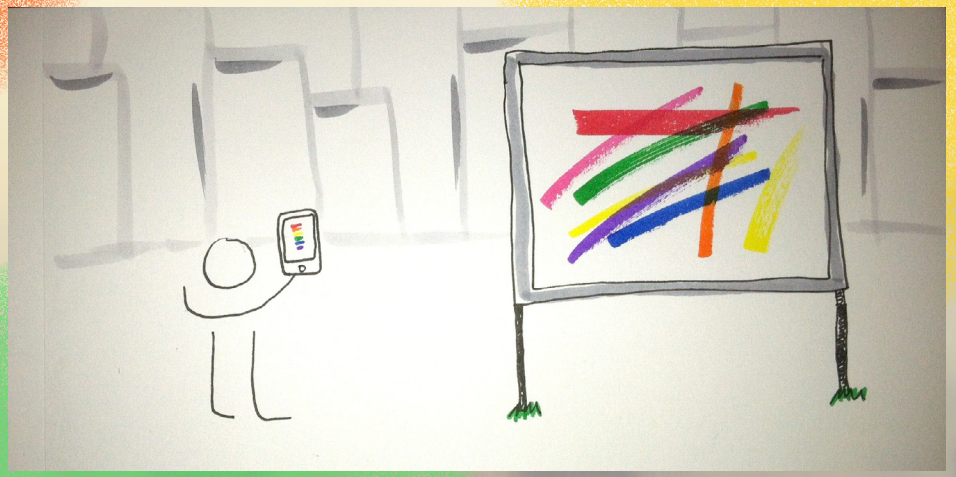


This prototype was a smaller version of a concept that revolves around a large LCD screen placed in Bloomington. The prototype was created using just a foam core board cut down, construction paper, and tape. We instructed subjects to write down the color that they would associate with the day today and gave them no other notion of what the colors would be for.

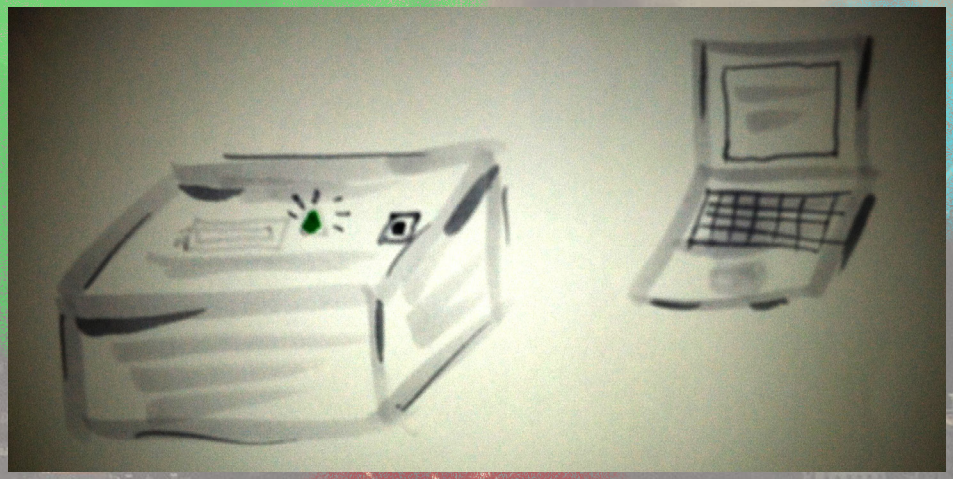
After they wrote the colors down, we taped the colors onto the foam core board in order to start to "populate" the "screen" with colors. We then explained how the actual prototype would work in the "real world" setting and got their feedback.

They really enjoyed the simplicity of the design and they recognized the fact that the wall would be different colors every time that they looked at it. The older people that were tested said that a button to push would be a little better for them not having a smart phone. That way, they could come up to the wall and pick their color out, allowing them to make a manual addition of their color to the wall each time they passed it. This would also allow people to take part with little to no effort in a public art piece. They really liked the fact that it was so simplistic and there wasn't a lot of stuff that was necessary to participate with the wall.

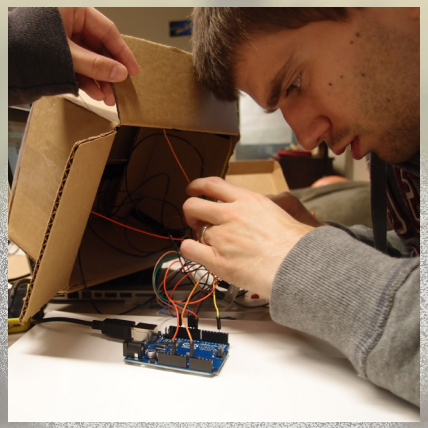
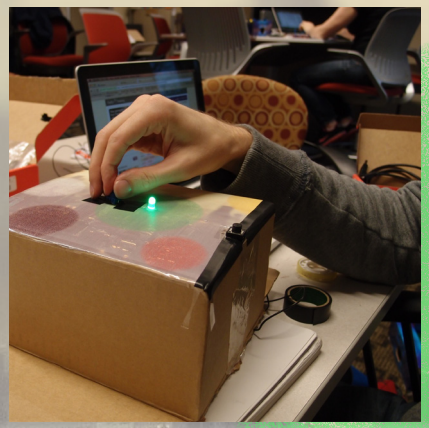
Final Concept
Public Mood Wall

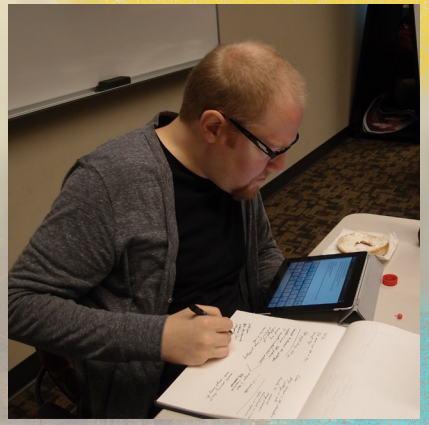


For our final concept, we decided to move forward with our public mood wall idea. We wanted to give users a chance to do something participatory without having too much of a barrier of entry. The real design would be situated in a downtown area of a city. The prompt would be to pick a color of the day. Users would be able to pick a color on their phone and pick a spot to place their color on the wall. This would allow people to create this public piece of art and have a sense of ownership of the piece. The piece would change constantly as more people add their colors. Also, since the colors wouldn't be directly associated with a particular emotion, users could pass by and attempt to evaluate for themselves why the colors are turning out the way that they are. This could also be used by city council or other people in the town to gauge the current state of the town. The piece is meant to be easy to use, but we hope that it will cause a bit of reflection on the part of the observer.



Final Concept Construction

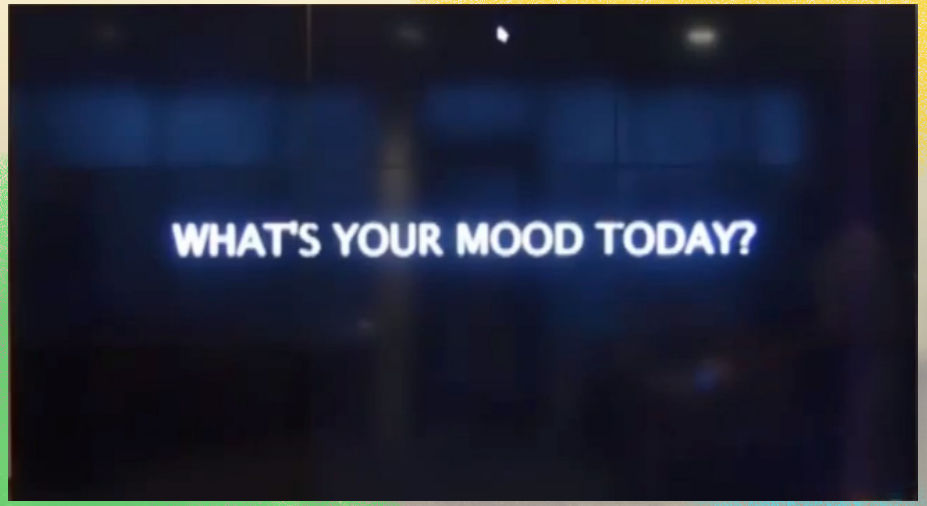


To construct our prototype, we first started with determining what we were going to use as inputs. Ultimately we were going to use a SoftPot Membrane Potentiometer, but we soon realized that the way that our concept needed to work to pick a color that this was going to be far too unstable to select a color. We instead focused on the regular knob potentiometer to give more precision for selecting a color to place on the board. We felt that the easiest way to display our "wall" would be to use Processing to create the output. We decided that the Arduino would be best suited in this project to act as the link to our Processing. We would use the Arduino to obtain the inputs for the color and to reset the screen (because of limited processing power of our laptops this was necessary).

In order to simulate a cell phone interface for picking colors, we decided to place the potentiometer, button, and the RGB-LED on a box that would hide the Arduino. This way we can simulate a more realistic experience. We used small cardboard box as the base and placed a decorative piece of paper on top to hide the plain brown of the box on top. Since the pins and leads on the potentiometer and the button are so small, we decided to use the conductive thread in order to keep the integrity of the button and potentiometer. Soldering the pieces would have given the best connection, but we didn't have this at our disposal, so we used the thread. We decided to use electrical tape to keep the thread in place and to keep it from touching other thread to avoid shorting out the circuit. We also needed to use 22 gauge wire to connect the LED back to the breadboard.

Final Concept
Why This?

We sought a concept that was both engaging as well as something that passersby could enjoy. We feel that this concept is accessible to people within a town as well as people who may just be visiting. Events in a town can often times influence people's mindsets and behaviors on particular days or over extended amounts of time. For example, in Bloomington a big basketball or football game may invoke more red/crimson colors to populate the wall because they are excited about the game happening. Other political events may also encourage red as a bout of anger. Colors can be a very effective way of conveying one's emotions, and we feel that leaving them arbitrary and individually user-defined helps people to think critically not only about what color they decide to pick for the day but also when taking a look at the wall to get a general feel for the town. It's a way to allow people to express their opinions in an anonymous and completely safe way. By this we mean that vulgarity and public mischievousness are nearly impossible with our app. Since this is public-facing we wanted to obtain a design that would be safe for all audiences to view. While being able to draw shapes or present words allows for more explicit and concrete meaning, this also increases the likelihood that people will abuse it and write inappropriate things. We feel our design has very low barrier to entry and will continue to be something of interest, since it is dynamic and always changing.



Final Concept Testing with Users

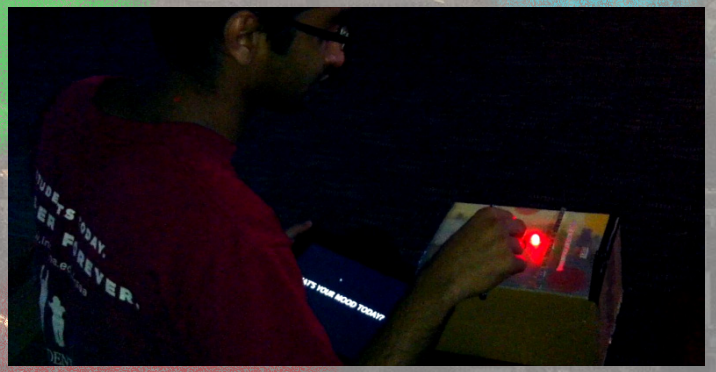
We tested our design with eight total different users in a couple of different rounds of tests. Since this prototype was indoors, we didn't really have the benefit of passersby coming up to us wanting to try out the design. We did, however, test both younger children as well as college-aged users. We felt that the feedback that we got was pretty positive.

The younger children that we tested didn't appear to really completely understand exactly what was expected out of the design. They were mostly interested in being able to pick their own colors and see them immediately put up onto the wall. They seemed to be the most engaged at this point as far as excitement for the design and the colors go. We definitely feel that we acheived something with a very low barrier to entry, especially after teaching the kids how it worked. They seemed to understand and played with the design for quite some time. Granted, our prototype didn't fully act like our final design would ultimately act, but they seemed to enjoy it and worked collaboratively to populate the screen.

The older users who were better able to understand our reasoning for being a bit abstract with our colors and the designs seemed to understand where we were coming from. A few of the users thought that it might allow you to draw on the screen, which is functionality that we ultimately didn't allow for. We explained that we wanted to prevent abuse of the system, and they seemed to understand our rationale from that point-of-view.

Users also seemed to really like the simplicity as well as the ability to pick their own colors from a spectrum. They liked that they were able to pick a very specific color out, rather than being restrcited to just a palette of color swatches. Some users inquired about a lack of color and emotion pairings. We told them that we wanted people to come up and be able to interpret for themselves what each of the colors meant to them. Also, people picking colors would also have the freedom to determine what color they wanted by placing their own meaning into it. This way everyone that experiences our design will come away with something different. Thus, hopefully keeping the lasting value of this public art piece.

Final Concept
User Testing Pictures



Future Iterations

Users had really amazing input for suggesting other ways of having the design function. For example, many users would have liked to have been able to draw something in their color on the prototype. This way it becomes more of an art piece and a bit more concrete, rather than abstract. We did think of this idea eariler, but we ultimately had decided against it in order to avoid people abusing the design by writing inappropriate things on the wall. Since this is public-facing, we wanted to make it pretty impossible to abuse.

Our choice of pattern (the "particles") is also something that we didn't feel would probably ultimately end up being in a final version of the design. As it stands right now in our prototype, the processing power required to create the images gets pretty intense as the amount of taps on the screen increases. Ultimately we would like some sort of a colored line or something similar that might require less processing power. We did like the fountain effect of the particles, though, because it seemed to really attract people to the beauty of the design. If this can be achieved (or something similar) with something that is less taxing on the processor of a computer, then we think this could be a really effective design.

People also seemed intrigued by our choice of not assigning specific colors with specific emotions. It's an interesting venture to try in the future and would definitely give a more concrete understanding of how a city is feeling that particular day. That being said, we wanted to try and create something that was a little more abstract. Different colors may have different connotations for different people, and we didn't necessarily want to force someone into a particular way of thinking about colors and how they associate them. We wanted to offer people the flexibility to critically think about their color choice and also to give viewers of the board a chance to draw their own conclusions and interpretations of the mood of the town.

Lessons Learned

For this project, we learned a lot about how getting technology to play nicely with you can sometimes be complicated. As far as the prototyping is concerned, we also learned that if we were going to test children that we should make sure our prototype can stand up to heavier wear and tear. It wasn't anything that couldn't be fixed, but using the conductive thread made our prototype a bit less sturdy. That being said, the conductive thread gave us a lot more flexibility and ease with getting certain pieces mounted off of the breadboard. This was something that would have really come in handy for the first prototyping project. We really would have liked to have tested this in-situ outside in the middle of a busy street, but we didn't feel this was possible with our current resources. We did end up getting a good number of people that came up and tested the prototype out, and it seemed to generate good responses!

We also loved that during testing there was a plethora of different alternate ideas that came out of the project. People were curious about certain aspects of the functionality and made really great suggestions for possible future directions. Everyone who approached the prototype really seemed to understand the concept. We really wanted to achieve a low barrier to entry, and I think we achieved that pretty successfully. This is intended to be used and paired with a phone, so being able to use the iPad for input helped to really make the experience feel a lot more genuine.

References

[1] Amsterdam Mood Wall, http://www.ubergizmo.com/2009/03/mood-wall-boasts-2500-leds/ @ 12.05.2012

[2] Interactive Music Wall, http://www.momentfactory.com/en/project/walls/Interactive_Musical_Wall @ 12.02.2012

[3] Programmable Painting, http://hlt.media.mit.edu/?p=2286 @ 12.05.2012

[4] Digital Wallpaper, http://www.home-designing.com/2010/08/awesome-interactive-wall @ 12.03.2012

[5] Digital Graffiti Wall, http://thisisluma.com/?s=graffiti @ 12.04.2012

All other images were taken/created by Mengyao Zhao, Kevin Flick, Alberto Samaniego, or Zachary Lovall