Community Garden: Designing for Connectedness in Online Museum Exhibits

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Abstract

We present Community Garden, an interactive museum exhibit designed to promote connectedness both at the museum and online. To interact with the exhibit, participants draw and share flower petals which are displayed on a communal field, blooming with flowers of other participants. The exhibit's drawing interface is accessed online, allowing for live participation and inclusion of people who cannot physically visit the museum. This paper describes some of the design principles that shaped the development of the exhibit prototype, as well as the technology that allows the exhibit to function, requirements for demonstrating, and future plans to evaluate the exhibit.

Author Keywords

children's museum; interactive art; internet art; participatory art; social interaction

CCS Concepts

•Human-centered computing → Collaborative and social computing systems and tools; Collaborative content creation; Web-based interaction; •Applied computing → Media arts;

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Figure 1: Community Garden online exhibit viewed on iPhone

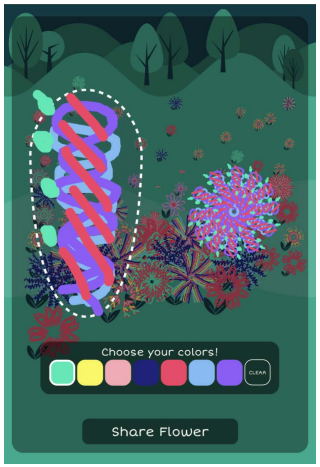

Figure 2: Exhibit's drawing interface

Introduction

Many art museums provide online access to objects in their collections. While these online collections have sometimes been evaluated for their usability and aesthetics [6], museums have also been concerned with reaching more diverse audiences and opportunities for their online visitors to be more active participators [7]. To reach broader audiences, researchers have developed browser-based versions of museum exhibits that were originally developed to be experiences in the museum [1]. Other museum exhibits have been developed as iPhone apps, hoping to satisfy visitors' desires to take home a copy of the work they see, just as they purchase postcards or posters of exhibits [4]. Children's museums provide unique opportunities for children to socialize with other visitors their age through engaging with exhibits together. What social interactions may an online exhibit designed for children foster? In our current situation of social distancing where physical museums are being forced to close, inquiry about designing for connectedness online is necessary.

We present Community Garden, an interactive exhibit designed to facilitate new connections by drawing flower petals to share onto a public field, blooming with the flowers drawn by past and current participants. Participants interact with this exhibit by visiting the exhibit's website on their own computer or mobile device, where they would draw and share a flower petal. The image of this shared flower petal appears on the screen displayed in the museum, where it flies through the field and blooms into a complete flower. In addition to this hybrid format where viewing the exhibit requires being in a physical space and joining online, we have developed a version of the exhibit that can be experienced entirely online (see Figures 1 and 2).

Design Principles

Early conversations with the Children's Museum of Pittsburgh revealed that in addition to their exhibits in the museum, they create pop-up exhibits for satellite spaces such as the Pittsburgh airport and the children's hospital. This led to our inquiry of how digital media can be used to facilitate unique social interactions while interacting with exhibits outside of a traditional gallery or museum setting. In this exhibit, participants engage by drawing flowers and sharing them for others to experience. Because we hope participants will focus on the act of sharing and experiencing other's flowers, we designed the exhibit to encourage drawing several flowers quickly, rather than spending significant time drawing a single flower petal.

Designing participatory art concerns the tension between agency and structure [5]. Our exhibit exits in the middle of the spectrum, where participants are allowed to expressively and creatively contribute, but the structure of the exhibit is predesigned. Participants use their finger or mouse to draw in the canvas and are limited to just one line weight and seven colors available in the color palette. We opted for a simple button that allows a participant to clear their drawing rather than including an eraser. We initially prototyped an interface where the participant would draw both a petal and a base for the petals. We eliminated the ability to draw a separate base to simplify the drawing process and promote quicker drawings, but participants can still create the appearance of a base by drawing in the lower section in the canvas used to draw the petal.

Interactive installations have proven to be more successful when they allow for engagement of different levels, allowing a participant to quickly and easily have a positive experience while leaving the opportunity for deeper exploration and engagement [3]. We designed the exhibit with

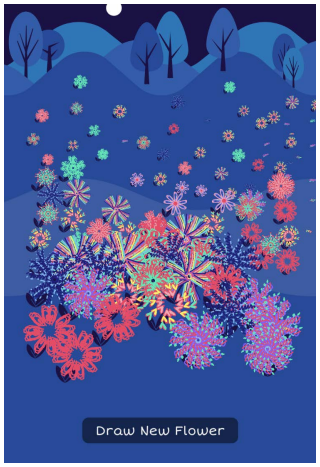

Figure 3: Night portion of exhibit's cycle

this design principle in mind–even quick scribbles are transformed into flower-like images. While drawing their flower petal, participants are able to see a preview of the entire flower which is constructed from rotated copies of this petal around a center point. By constructing the flowers all in this daisy-like shape, participants can experiment with different techniques for drawing a flower petal while the entire field preserves some visual unity. We anticipate this will make the exhibit enjoyable for participants of all ages and drawing abilities. Participants can continue to draw new flowers, iterating on their own approaches or being inspired by those who are simultaneously participating with them. While the role of participants in influencing bystanders to engage with interactive systems have been studied in physical exhibits [8], we plan to study how this translates to an online exhibit where participants are not colocated.

Initially flowers that bloomed in the field had a timed life cycle where at the end the flower would disappear. Based on the importance of attractors in encouraging visitors to participate [2], we believe that keeping a certain number of flowers in the field was important. In order to prevent the field from being empty, flowers would only disappear if the field reached a certain capacity. In addition to keeping flowers on the screen, we added movement to the field in order to attract attention. The field cycles between day and night and wind blows through the field (see Figure 3).

Technology

The exhibit runs in a web browser and was written with HTML, CSS, Javascript, and the p5.js and Socket.IO libraries for Javascript. A server built with Node.js facilitates the communication between the browsers that access the web page. When a browser accesses the exhibit's website, it automatically joins the websocket server. When a participant is drawing, they are updating an offscreen graphics buffer that gets rendered onto the canvas on their screen. When the participant finishes their drawing, this buffer graphic is sent via a websocket to the server and added to a JSON file that stores the flower petals. The petal graphic is then forwarded to the other user's browsers who are simultaneously participating.

Demonstration

This exhibit was designed to still be fully enjoyed in a virtual setting. Because the exhibit runs in a web browser, it can be viewed on any computer or mobile device with access to the internet. For demonstrating to conference attendees, the field of flowers could be streamed on the same platform that would be used for any other live paper presentations, mimicking how it would be displayed in a public space like a museum. Participants would access a separate webpage to draw their own flower petals to share to this collective field. Alternatively, a version of the exhibit was also developed that shows the content of the field on the individual's device. Participants can click a button to toggle viewing the drawing interface and the live field of flowers. A video of Community Garden can be viewed here.

Conclusion and Future Work

We plan to test the exhibit at the Children's Museum of Pittsburgh in their cafe. There is a large projection screen above the registers that will display the field of participant's flowers. Patrons of the museum will be able to easily access the website to draw their own flower on their phone via a QR code on a tabletop sign. We plan to observe participants and learn about what social interactions occur in groups who actively participate together, as well as the role of online users in shaping interactions with the system.

Through designing and evaluating our exhibit, we hope to learn more about issues in designing online and online-

facilitated in person exhibits designed for children. This audience is unique because they are growing up after the development of interactive content online and social media and have varying levels of experience being a digital citizen.

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