Research through Design, Documentation, Annotation, and Curation

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Abstract

The practice of research through art and design can pose challenges in terms of evaluating contributions, formalizing methodologies and generating extensible principles. Creating a middle layer of critique and interpretation between the generated artifacts of research through art and design and the foundation of general theory provides a viable space for exploration. We propose integrating artifact description, process documentation and participatory annotation as a useful approach in this intermediate critical area. We introduce a multimodal documentation framework for capturing, annotating and presenting the activities, processes and generated artifacts of research through art and design practice. We describe findings from our experience documenting a series of research through design workshops, and illustrate our annotation and presentation approach in the form of a curated exhibition.

Keywords

Documentation, research through art, research through design, experience design, exhibition

Introduction

The practice of *research through art and design* extends beyond the creative arts and is becoming an established presence in fields such as planning and human-computer interaction. With this development, thorny questions arise about measuring impact, understanding contributions to different disciplines, and developing a coherent theoretical and critical interpretive framework. As researchers working across disciplines (design, art, HCI and computer science) our praxis approach produces multiple outcomes including methodologies, installations, online applications and scholarly texts. A recent proposal for presenting such outcomes is an 'annotated portfolio', a term used to describe a collective body of work assembled into a considered and 'marked up' whole, which is encountered in such diverse forms as monographs, exhibitions, digital archives and performances [8]. The selected works and their accompanying annotations can be understood as occupying a middle or intermediate generalizable ground between the discrete originating design or art artifact(s) and a formalized, extensible theory [13].

The conceptualization of annotated portfolios to date relies primarily on retrospective annotation of artifacts from a relatively singular perspective. Integrating a documentation approach throughout the entire creative process provides an opportunity to combine the production and consideration of knowledge into an accessible and comparable set of research practices evolving over time. Opening this reflective documentation process to a diversity of participants (e.g. team members, external experts, clients, students, general public etc.) further allows for the broader type of sensemaking and connectivity referenced in [13]. Supporting this type of research practice requires the development of comprehensive documentation protocols and a flexible computational framework structuring the storage, annotation and presentation of collected material.

A series of design workshops held during the 3-day international *Emerge* symposium hosted at Arizona State University in 2012 provided us with the opportunity to develop and put into practice our own multimodal documentation framework. The symposium brought together theorists, practitioners and researchers from the arts, design, sciences and humanities to create and reflect upon "what it means to be human in today's world" [3]. Working closely with the symposium organizers and the nine workshop leaders, we developed a documentation approach appropriate for the planned activities and the 250 invited participants. The workshop organizers anticipated using a variety of design methods including speculative strategies such as *design fiction, sci-fi prototyping,* and *scenario planning.* The goal of our documentation approach was both to support the presentation of the workshop outcomes during the symposium, and to create an open, 'intermediate level' annotated record of the event activities for broader participants and audiences.

In this paper we present our hybrid multimodal framework for capturing, annotating and presenting the activities, processes and generated artifacts of research through design practice. After surveying prior work, we describe the implementation of our data collection and presentation approach during the Emerge symposium, and the subsequent integration of the captured content into a 3-month participatory exhibition at the ASU Art Museum in Phoenix, Arizona.

Prior Work

Research through art and design

Art and design research explorations within technological and scientific domains have generated a rich understanding of 21st century contemporary aesthetics [16]. A growing body of work across multiple disciplines extends the integration of art and design techniques with established research practice, towards a comprehensive formalization of *research through design* as a discrete endeavor in and of itself. Building on Christopher Frayling's inquiry based distinction between research *into*, *through*, and *for* art and design, practitioners and researchers to date have primarily focused their efforts on exploring the realm of research through art and design [5]. This approach is particularly evident within academia in the UK, Europe, and Australia/New Zealand, where there is a strong tradition of practice based research in the arts and design [15], in addition to a substantial body of work aimed at analyzing, evaluating and understanding such practices [2].

The primary contributions of research through design approaches are typically encountered as artifacts or systems that seek to encapsulate the thinking and ideas of the production team within their material form [7]. From the manifestos of the Critical Engineers [10] to the speculative design work of Dunne and Raby [4] or the design fiction practice of the NearFutureLaboratory [1], the past 15 years have witnessed a growing body of provocative work aimed at instigating broad social discourse. While this is of course valuable, much less attention has been directed in describing the *process* by which these future-oriented artifacts are conceived and created. This lack of documentation, highlighted by Zimmerman et al. [17], makes it difficult to formally compare and evaluate the diverse outcomes generated by research through design. There remains a relative lack of formalized procedures or systems for capturing the tacit knowledge evident outside of the presented artifacts themselves. The recent proposal for "annotated portfolios" provides a framework for coherently presenting a collection of artifacts as "a systematic body of work", annotated according to a variety of features such as perspectives, relationships and implication shaping [13].

Our work seeks to extend the notion of annotated portfolios by creating a hybrid physical/digital documentation framework for capturing, annotating and presenting both the *products and the process* of research through art and design initiatives. Presented as an integration of mediated experience capture and management, our approach is guided by insights gained from analog and digital documentation and presentation methods.

Event Documentation and Presentation

Pioneering documentary filmmaker Ricky Leacock described his filmmaking practice as 'the search for the feeling of being there' [12]. For Leacock, significant moments are captured for later arranging as meaningful audiovisual sequences running after one another. From this realm of professional documentary making, we now have a multitude of integrated capture devices and representation media enabling us to record, summarize and share significant events. Documenting the 'feeling of being there' no longer just encompasses a singular team capturing physical presence. It now involves distributed individuals and groups generating and sharing content, together with a dynamic set of virtual activities associated with 'being there'.

This new era of documentation is ripe for tackling the mediated complexity of contemporary art exhibitions, international conferences, biennial expositions and summer festivals. In addition to professionally produced content (e.g. the large archive of TED talks), there are growing collections of captured amateur and social media content expanding event representation on outlets such as Twitter, Flickr, Facebook and Pinterest. Creating an integrated and diverse record of an event allows for the emergence of multiple perspectives and enriches the potential for the continuation of post-event discourse.

Museums and galleries have been at the forefront in adopting new technologies and tools for archiving, presenting and navigating exhibitions. Mobile applications and adaptive guides have proved useful in personalizing experiences for visitors [11]. Attempts have also been made to motivate reflection on exhibits and encourage communication both between visitors and with the host institution [9]. Our approach is to marry findings from the above in creating a hybrid physical/digital exhibition that encourages conversation and contribution in a playful, creative, and research-focused environment.

Documentation Capture Framework

Building on this prior work, our multidimensional documentation framework was developed in collaboration with the overall event organizers to minimize disruption and ensure that the presence of recording instruments and documentation team members was integrated as well as possible into the planned workshop activities. Our framework provided a distribution of capture techniques ranging from passive to interrogative, public to private, analog to digital, and situated to online. Details of the integration of content captured by social media activities, passive recording devices, a custom design probative installation and a trained documentation team are described below.

Passive Capture

To gain an overall sense of general participant movement and collaborative group interactions during the workshops, we installed passive web-cameras in all nine internal workshop locations and at several key outdoor locations. Imagery from these cameras was collected at a rate of one image per second, capturing general activity in the space from

preparation, through the event, and subsequent tear down. Image data from these spaces was streamed in real-time to a custom-designed application displayed on a screen in an entrance hallway to the main presentation spaces.

Social Media

Prior to the event, we established groups on Flickr and Vimeo and promoted their use to all upcoming participants. During the symposium we prominently displayed information promoting use of these platforms for casually collecting media. We also invited all participants to use the Twitter platform as a commentary space and encouraged the use of the event hashtag. For participants either unfamiliar with or non-users of Twitter, we modified a Twitter public display application previously developed by the authors. This application provided attendees with a dynamic glanceable interface displaying tweets annotated with the event hashtag and encouragement to contribute.

Design Probes

Traditional documentation techniques emphasize the role of third parties in preserving a record of proceedings. However, attendees at events are increasingly key to its communication and curation, particularly through social channels. As part of the experimental approach, we sought to engage attendees in actively contributing to the documentary effort. The first was a variation of Gaver's cultural probes [6] designed to enable the participants to document how their workshop unfolded. Each symposium workshop was provided with a kit containing a variety of artifacts to facilitate first-person documentation (e.g. two disposable cameras; a USB drive; sketch sheets; and a series of comment postcards. As many of the workshops would mix both discussion with digital production, the USB drive not only facilitated the exchange of digital content within the workshop, but also provided us a record of that content. When the workshop was completed, the artifacts were returned to the probe kit and collected.

Figure 1. The exterior of the *Probotron.*

In addition to examining the in-the-moment evolution of the workshop through collective curation by its participants, we developed a second capture method that explored the individual participant experience from a broader frame. An installation, named the *Probotron*, was created and situated in the primary venue of the symposium (see Figure 1). Appearing similar to a photo booth, the Probotron blends technology and a large physical structure to deliver a space for reflective contribution. Each visitor to the booth was asked to choose one question from a larger set of future-themed prompts developed by the event organizers and record a short one-minute response. Questions included: "What kind of future do you want to make?"; "What is going on in your workshop at the moment?"; and "How can innovation be responsible?" This offered participants an opportunity to record their personal perspective on the proceedings, or provide a reflection on the significance of the event as whole.

Documentation Teams

Documentation teams were formed from the student cohort of a 7-week course (co-developed by the authors and two anthropologists) for social science and digital culture students. The students received training in ethnographic methods and observational media documentation, logging and annotation. Each workshop was assigned two dedicated documenters who captured events using hand written field notes, digital photos, digital movies and audio recordings.

Emerge Symposium and Workshops

The Emerge symposium was focused around the topic of artists and scientists redesigning the future. The nine event workshops focused on different themes, led by experts in areas such as design fiction, sci-fi prototyping, archaeology, the arts, gaming, and technology studies, Each workshop had between 20 – 25 registered participants, with a relatively even distribution of theorists, designers, artists, makers, scientists and engineers per grouping. Over the course of two days, the workshops would engage participants in a variety of activities including - writing letters to their future selves, sculpting and 3D printing futuristic artifacts, fabricating material evidence of a former civilization, envisioning possible energy scenarios, and writing and producing a design fiction movie.

At the beginning of the workshops, the documentation teams introduced themselves to the participants and invited them to open and examine the documentation probe toolkit. The team also directed attention to the *Probotron* and the variety of associated social media platforms available for sharing and tagging content. At the end of each day, the documentation team members met to transfer material to a main server and lightly annotate the content using categories such a location, participant names and activity type.

The final day of the symposium was open to the general public and included presentations from the workshop leaders as well as keynotes by speakers such as Bruce Sterling, Neal Stephenson and Stewart Brand. The event finally concluded with an hour-long immersive outdoor performance piece. The performance included 3D video projections across multiple buildings, with an immersive 3D audio environment triggered by the movement of the audience. Improvising actors moved through the crowd enticing the audience to engage with interactive sculptures and animations. Three interactive installations were thematically related about the idea of a futuristic circus, with novel takes on fortunetelling, magic mirrors and a carnival organ. The documentation teams spent the day in designated locations capturing all of these events using Flip cameras and still image cameras.

Figure 2. Actor interacting with the crowd during the final performance. Photo by Robbie McCarthy.

Data and Annotation

The documentation team produced over 1 TB of audiovisual data, including 1,173 photos and 1,498 videos. Ninety usable video clips were created in the *Probotron*, while the documentation kits were used extensively by two workshop groups, and in particular one group who spent a whole day collecting material for their presentation on the USB stick. Building on the rudimentary metadata associated with the captured media content during the event, we expanded our annotation framework to specifically encompass features related to design activities and practice. These categories included: Discussion; Research; Planning/Strategy; Introductions; Summarizing or Conclusions; Argue/Debate; Analysis; Synthesis; Making; Prototyping; Refining. In addition, during this primary stage of analysis, all recorded content was annotated according to its level of fidelity (i.e. poor quality/unusable; reasonable quality; high quality). Content of the highest quality from each of the workshop categories was selected by the authors for richer description, whereby annotation of participants, locations, summary details or thematic labels was attached. This data was derived from the public schedule, review of the cap-

tured data and in consultation with the documentation team members assigned to each workshop.

Exhibition as Annotated Portfolio

The purpose of designing a curated exhibition using the event findings and outcomes was multifold. Together with the symposium and workshop organizers, we were interested in exposing the foundational ideas, methods and practices engaged in by the invited participants to a more general public audience. While the final workshop presentations were attended by approximately 300 members of the public, and edited online videos of the presentations garnered several hundred views, creating a more refined and accessible presentation format had the potential to greatly extend the reach of the work. In addition, we wanted the exhibition to be both an encounter with this form of design research and a direct invitation to participate.

Working closely with the symposium organizers and the curators of the ASU Art Museum, we developed a multi-level annotation and summarization schema identifying common representative themes and features across the collected data. While some of the generated artifacts were obvious and self-explanatory (e.g. well edited movie), others required a more nuanced, translational or indeed transformative approach in developing an appropriate surrounding context. We also identified key workshop activities (e.g. writing letters to the future, sculpting futuristic objects, contributing video responses) that translated well to a conception of an exhibition space as open, participatory and inclusive.

Figure 3. The main exhibit room containing the View-Masters, iBook, 3D printed objects, letter writing station and comic. Photo by Craig Smith.

Reeves et al. proposes a taxonomy for spectator experience design that accounts for the relationship between visitor as performer and observer [14]. Our target audience would include regular visits by mid-size groups (10 – 30 people), which necessitates consideration of processes such as turn-taking, waiting and public performance. The interactive installations created for the original public event contained both 'secretive strategies' such as the *Probotron* where the input and feedback interaction takes place in private, and 'expressive', such as the fortune telling *FutureSphere* (see Fig.11 later), where performers and spectators alike are privy to all aspects of the interaction. Our intent was to build on these different experience modes by

creating exhibit elements for private/public use and for individual/collaborative interaction in order to maximize engagement and reflection. The overall framing of the exhibition was categorized as "Redesigning *the future*", within which audiences could view, contribute and annotate three curated content collections (see Fig. 3 for photograph of the main exhibit room).

General commentary

To introduce exhibit attendees to some of the primary content themes and design practices of the event, we presented a variety of quotations at the main exhibit entrance (Fig 4). To select the quotes, we both mined the event tagged Twitter data for evidence of quoted phrases from the keynote speeches that the original audience tweeted about, and also searched through the video content for ideas and phrases that propagated from speaker to speaker throughout the event. Using the quoting and re-commenting features of social media data functions helpfully as an initial filtering mechanism for ascertaining selective public interest in a dataset.

Figure 4. Introductory panel displaying significant quotations from the design symposium speakers. Photo by Craig Smith.

Workshop Summaries

We categorized the workshop documentation and outcomes into three collections based on their inter-related themes and topics: *Embody the Future; Envision the Future;* and *Design the Future*.

The *Embody the Future* collection was the smallest in scope (photos and a large infographic, see infographic in Fig. 5) as it represented 3 workshops that were primarily discursive and ended rather inconclusively. As a result, we focused mainly on expanding the aim and reach of the tangible insights gained from the other more design-oriented workshops. The two resulting collections contained multiple activity sites inviting visitor contribution, annotation

and commentary and demonstrate use of a range of summarization approaches at varying levels of abstraction.
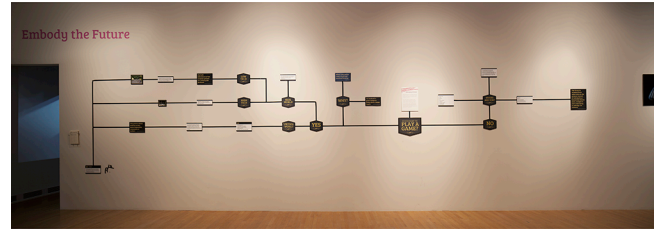

Figure 5. The infographic wall. Photo by Craig Smith.

The *Envision the Future* collection presented visitors with both designed artifacts and a window into the design process behind their creation. A bound book of annotated imaginary artifacts was presented as a form of future history book. The genesis of this artifact was introduced through a series of framed 'letters to the future' written by the workshop participants. Attendees were invited to write and contribute their own letters to the future at a nearby writing desk. This open-ended, long-form activity was complimented with a more constrained platform for contribution at the sci-fi prototyping workshop installation. Here the workshop participants had used storyboarding as a method for considering future health scenarios. We selected one of these scenarios and produced a graphic comic, with a final blank whiteboard panel for participants to complete (see Fig. 6). A time-lapse camera was placed above the exhibit to capture the creation, removal and re-creation of multiple possible endings. This form of quick, directed annotation provided visitors with a less time consuming way to contribute, and proved popular with children.

Figure 6. A child contributes an ending to the comic panels.

A workshop on future energy solutions produced a relatively dense final Powerpoint presentation requiring considerable expert or insider knowledge to decipher. In this instance, our curatorial approach was to depict the findings through various levels of mediated abstraction. First we created simplified short story statements representing each of the proposed energy scenarios (e.g. "Green Silicon Valley" or "Hippies and Cowboys"). We then illustrated these

stories using images mined from the Flickr creative commons archive. These images were accessed using a fun and familiar analog View-Master device (one device and set of 7 images for each story), and visitors were invited to contribute pithy responses on post-its for posting around the View-Master stand (see Fig. 7).

Figure 7. A child engages with the View-Masters, in the background contributed suggestions are seen on the wall.

This particular facet of the exhibition could be viewed as almost entirely an annotation in itself, as little of the originally produced material was used to illustrate the workshop event. The various presented components functioned more as indexes soliciting further high level 'tag' annotation.

The *Design the Future* collection presented artifacts and documentation from the three workshops that addressed design fiction directly. One workshop produced a high-quality movie about the convenience store of the future, which was directly presented in the exhibit, along with a curated selection of the fake future products (e.g. panda jerky) featured in the movie. The creation of the artifacts could be understood by examining them to hand, while the short 5-minute movie demonstrated their use in context, thus requiring little additional description. A workshop focused on 'archeology from the future' resulted in the creation of clay and 3D printed future objects, which were inspired by the development of imaginative personal narratives by workshop participants.

Figure 8. Attendees create future oriented clay objects and then leave them for display at the museum.

We selected four of these clay/3D model sets for inclusion, annotated with a summarized text version of their original inspirational story. In addition, we created a collaborative

clay making and display space for attendees to *contribute and annotate* sculptural contributions to the archive, by creating their own future objects annotated with descriptions (Fig. 8).

One of the workshops adopted a highly improvisational design approach, punctuated and directed by multiple episodes of collaborative group decision-making. The group created two large-scale outdoor sculptures, and gathered a rich collection of media materials for their final presentation, which illustrated (falsely) how these sculptures came into being.
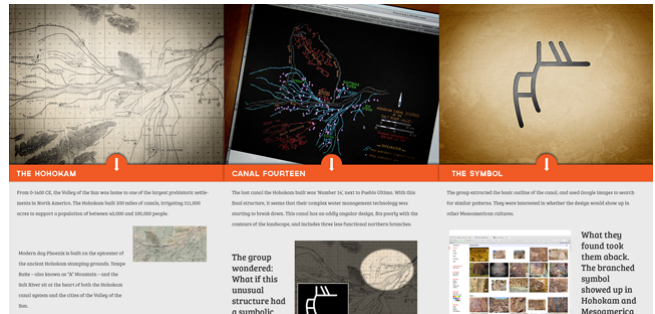

Figure 9. A reduced excerpt from the digital book.

Beginning with materials culled from the documentation kit USB drive, we created a chronological mediated story in close collaboration with the original workshop leads. Presented as an interactive iPad book, this exhibit sought to reveal the process behind-the-scenes while maintaining the integrity of the original subterfuge intent (Fig. 9).

Performing the Future

The second room of the exhibit aimed to summarize the immersive festival performance on the last night of the event.

Figure 10. The performance space included projected footage from the event, costumes and two interactive installations

We selected three costume heads from the animator performers and installed two of the interactive exhibits, one a take on futuristic magic mirrors and the other a future fortuneteller. We also created an edited 9-minute video of the one-hour performance that was projected on one entire wall of the exhibition space (Fig. 10)

Exhibition Outcomes and analysis

The gallery hosted over 20,000 visitors during the 3 months of the exhibition which was well trafficked and drew a large and diverse audience. In particular it attracted many school tour groups. In one special family day alone, over 2,500 children visited the gallery and a comparable number of students from local schools visited the exhibition. To ascertain the efficacy of the 'exhibition as research' approach we reviewed the contributed content (e.g. over 500 *Probotron* videos, 700+ objects, letters and post-it comments), and consulted with the museum's knowledgeable staff and curators. Given the high volume of tour groups, we conducted an in-depth interview with the education curator responsible for these visits. We now outline four primary findings highlighted by the curator.

Duality of Interactivity

Within the exhibition, the most popular elements were those that were interactive and tangible (the marble voting, the *Probotron* and the *FutureSphere*). Higher levels of interactivity seemed strongly coupled with popularity and appeal, particularly with tour groups. While this does appear to enhance engagement with the content there is a duality to this.

The level of interactivity on entry was immediately distracting for the younger audiences. "*I had to get them away from the opportunities to engage before they understood what they were looking at,*" explained the curator, who ultimately found that introducing the exhibition prior to arriving in the space was the best way to mitigate against this. Engagement was at times a barrier to fully understanding not just the themes present within the exhibition, but also within the installations and areas it contained. High levels of interaction led occasionally to playful exploration rather than deep consideration. On some level, and particularly for younger audiences, it may be more important to give them a compelling experience that engages and excites, rather than ensuring the completeness and coverage of their understanding. As the curator noted: "*do they really need to understand the scientific basis for everything, sometimes magic is awesome!"*

Catalyzing interaction

Only a small number of visitors were initially bounded by *"traditional gallery behavior"*, and students were reported to immediately engage with the rich space. Many of the exhibits needed no explanation, such as the *FutureSphere*, however others required an individual to initiate the group to converge upon it and catalyze others to participate (Fig 9). The *Probotron* was designed to be a private, reflective space where activities occurred behind a closed curtain. As a result, its function or appeal was not immediately evident. The curator explained that once one person explored it, and they deemed it to be *'cool'* or fun, it became of immediate appeal to the others in the group. Similarly it was noted that the infographic "*had limited appeal*" but "*once

someone engaged with it they did start to interact with it more*." Given that contribution may be affected if interaction is not catalyzed, it is necessary to afford opportunity for that process to be initiated.

Mixed opportunities for engagement

Within the tour groups, marked differences were observed between the children and those supervising them. The adults were seen to gravitate towards the more involved, complex content, such as the infographic, avoiding heavily interactive pieces. The curator explained that this was not because this content appealed more to the older audience, but instead, teachers and chaperones wanted to "*make sure the kids had a really good experience, so they would go look at the things the kids weren't as fascinated with*".

Interplays between non-interactive and interactive components of the exhibition were also noted in the performance area. The *FutureSphere* (shown in Fig. 11) was extremely popular within this space, often having considerable lines. The presence of the projected performance movie offered them an alternative attraction, which could be readily consumed while maintaining their position in line. The exhibits 'cooperated' in this way.
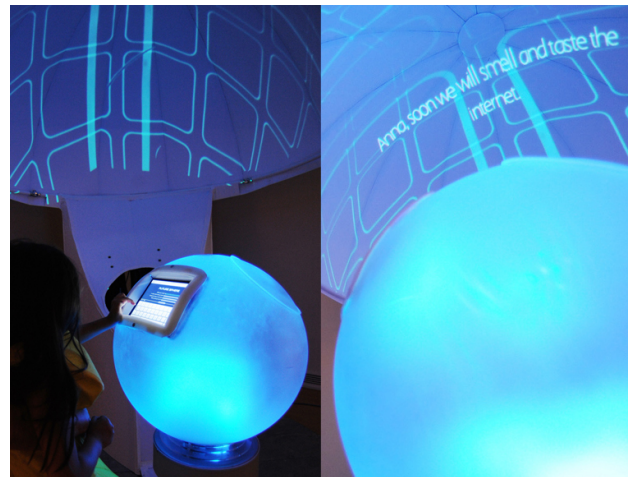

Figure 11. The *FutureSphere* in use

Both observations reveal that opportunities for engagement may be encouraged in how complex and lightweight, interactive and non-interactive elements are situated and juxtaposed with one another. Leveraging such interplays in representing experiential content appears particularly fruitful in designing for diverse audiences.

Involvement & Contribution

When introducing the exhibition, the museum guides also took particular care to explain that it represented on-going research into design fictions of the future, and that they would have the opportunity to contribute to these investigations. The curator commented that this was an exciting prospect as *"everyone likes to become part of the research."* This interest in contributing to research was evi-

dent in the effort invested in the contributions created. The activities individuals engaged with in this regard varied. The greatest number of contributions (over 500) were seen with the production of future objects activity. The creation of the clay objects was particularly popular with the children who visited and the curator noted that many of them invested a great deal of time in considering and producing these: "*I saw people spending 20-30 minutes working on their objects."* It was casual visitors who most deeply engaged with the more contemplative letter-writing task. Several individuals were remarked to have spent in excess of 45 minutes giving these compositions highly considered production.

"Everyone loved the concept of leaving an object in the Museum… Especially with the children, a lot of kids like to take things home. We gave them the option to leave it here or you can take it home. It's up to them. We were all astonished at the number of kids who decided that it was better to leave their art in the museum… Usually the majority take it home, but not on this project, even really little ones…Everyone who heard that this was part of research, really wanted to help the researchers... I think that was really appealing"

Overwhelmingly, visitors opted to leave contributions. The premise of their created work being incorporated and considered in a much broader effort was particularly compelling. In choosing to contribute in this way, it gave visitors agency and involvement in a much broader discussion and this considerably changed the relationship between them and the ephemera they produced.

Conclusions

Our work extends the concept of an annotated portfolio to propose the use of a considered documentation approach throughout the design process. Of particular value for capturing, organizing and annotating the artifacts and practices of research through design, our framework adopts an open contribution and annotation model to include diverse curatorial perspectives. Explored through a curated exhibit and developed as an online platform, our approach supports the presentation and dynamic re-presentation of annotated content at both personal and community filtered scales. Conceived to illuminate the methodologies and processes of research through design, our work has impacted the original event participants, our own design practice and the exhibition visitors. Our ongoing and future research includes creating an open source version of the online portfolio platform to support design researchers, practitioners and audiences in presenting, interpreting and validating diverse design contributions.

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