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Design futures in action: Documenting experiential futures for participatory audiences

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ABSTRACT

The futures field demonstrates a willing openness in embracing methodologies, approaches, and influences from a diversity of disciplines and perspectives. This plurality of practice is evidenced in a growing body of work that increasingly embodies futures thinking in the design of everyday material and networked experiences. The intersection of design and futures produces artifacts, applications and interactions created to provoke dialog in an accessible manner. As part of the Futures special issue on the *Emerge: Artists and Scientists Redesign the Future* event, this article describes the documentation and public representation of the creative outcomes from nine *Emerge* design futures workshops. These workshops provided a rich opportunity to study how designers and futurists collaboratively engage, implement and communicate alternative futures. The goal of the documentation effort described is to capture the experience of creating experiential futures and extend the capacity for developing social foresight through a participatory exhibit and online social platform.

1. Introduction

The practice of futures studies has a rich history of integrating models and methodologies from diverse disciplines in exploring, forecasting and envisioning possible futures. The past decade witnessed an emerging interest in theoretical, contextual and practice-based plurality (Schultz, 2012), while the concurrent extension of foresight practice to accommodate materials, methods and approaches from design and the arts (Candy, 2010; Davies & Sarpong, 2013; Dunagan, Jeffery, Fidler, & Maguire, 2011) indicates an enriching of the procedural and representation framework for emergent futures. Epitomizing this development, diegetic prototypes, design fiction movies, alternate reality games, and speculative design artifacts serve to embody and embed futures thinking in the material and networked world of everyday experience (Bleecker, 2009; Dunne & Raby, 2013; Hand et al., 2010; Kirby, 2010).

The *Emerge: Artists and Scientists Redesign the Future* symposium hosted at Arizona State University in March 2012, purposefully united artists, designers, social scientists, futurists and engineers in an integrated series of foresight workshops and activities. Over an intense 36-hour period, these diverse participants worked in nine different groups to imagine, design, produce, and present a rich assortment of embodied future-focused artifacts. Tackling diverse topics ranging from energy scenarios to the convenience store of the future, healthcare robots to cataclysmic social destruction hoaxes, the participants created movies, 3D printed objects and multimedia performances as commentary and provocation. The activities engaged in

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these workshops exemplify the burgeoning method of inquiry defined as research through design, whereby design practices are invoked to tackle complex, intractable problems beyond the scope of individual disciplines or singular approaches. The outcomes produced also represent an amalgamation of experiential futures – vignettes of possible worlds mediated through a rich variety of formats and presentations (Candy, 2010).

The symposium provided a prime opportunity to document and analyze this form of integrated design futures research in an authentic practice setting. Of interest to us here is not just revealing the content-focused 'what' of experiential futures, but also the procedural and methodological 'how' of such multidisciplinary futures work. A noted challenge of this type of design research is the overt focus on the final end product, with less attention paid to illuminating the iterative process of prototyping and creation. This omission makes it difficult to comparatively evaluate outcomes generated by this approach, and can potentially limit the ultimate value of such research contributions (Koskinen, Binder, & Redström, 2009; Zimmerman, Stolterman, & Forlizzi, 2010). While design researchers have in response developed strategies and tools (Dalsgaard & Halskov, 2012) to help designers reflect both in the moment, and after the fact (Bowers, 2012), opportunities still exist for considering the value of documentation and synthesis for expanded audiences and needs. In addition, from a futures perspective, concerns have also been expressed about the risk of design futures "producing visually rich, but analytically impoverished, outputs" (Raford, 2012, p. 34). Thus, our goal in developing a documentation platform for design futures work is to support collaborative interpretation of alternative futures by diverse stakeholders as a potentially emergent form of social foresight (Slaughter, 1996).

In this paper we describe our approach in developing a mixed-media framework for chronicling the products, processes and surrounding discourse generated during a series of design futures workshops. The approach mixes elements of traditional recording apparatus (e.g., videography, photography and audio recorders), social media contributions, and custom-built capture technologies (e.g., time-lapse video and experience capture installations) to create a rich description of events as they unfold. This documentation strategy was implemented in a multi-stage process (prior, during and after the workshop events), and with an expanding group of stakeholders and target audiences (workshop attendees, local public participants, online audiences). The first iterative analysis of the collected data quickly summarized the primary outcomes and provocations from each workshop and presented them to the broader public in the form of a participatory gallery exhibition. A secondary analysis presents the entirety of the mixed-media dataset within an online computational framework that extends the initial event reach to an even broader audience.

The paper makes several contributions to the study of futures practice as well as more broadly to the area of inquiry defined as research through design. First, it proposes a systematic approach to capturing, organizing and disseminating mediated documentation of *design futures practice*. Second, it provides an *online resource* for futures researchers to observe and input reflections on their activities in practice. Finally, it proposes a series of *guiding documentation principles* for futures practitioners operating in multiple domains of inquiry.

The paper is organized in five main sections. We begin with an overview of prior work and art in a diverse set of areas including design research, design futures, mediated experiences, and multimedia documentation. We then present the design and implementation of our mixed-media documentation approach. Next, we present results and findings from documenting the symposium and workshop events, together with a description of the initial formal analysis and synthesis of the captured data into a participatory public exhibition. We then describe the online implementation of a social media platform, and our long-term strategy in sustaining discourse around documented design futures activities. Finally, we conclude by proposing guiding documentation principles for futures practitioners and educators.

2. Background

2.1. Design research

Christopher Frayling first broached the topic of design research by distinguishing between three modes of inquiry into, through and for art and design (Frayling, 1993). While the former is well understood, and the latter remains controversial, it is the middle area of research through design that situates our current approach. In this context, research through design can be understood as an active form of reflective inquiry by interdisciplinary teams engaged in creating and considering a novel product, system or experience. This approach has been co-opted most recently by researchers in interaction design and in human-computer interaction, who identity the potential of this practice in tackling intractable 'wicked problems' such as climate change and social injustice (Rittel & Webber, 1973). Within the HCI community, research through design is commended for orienting researchers to focus on a preferred future (Zimmerman et al., 2010), exemplifying Herb Simon's famous action-oriented definition of design as the "transformation of existing conditions into preferred ones" (Simon, 1996, p. 55).

In addition to traditional product, service, and communication design, futures-oriented design practice has generated a rich body of speculative work integrating ideas and influences across the arts and sciences. Noteworthy approaches include ludic design, ambiguous design, critical design, and experience design (Dunne, 2006; Forlizzi & Battarbee, 2004). Extending the critical design practice of creating culturally provocative artifacts aimed at generating social dialog, design fiction has most recently been presented by a diverse group of engineers, designers, authors and futurists (Bleecker, 2009; Hand et al., 2010). Popularized by cyberpunk author Bruce Sterling, design fiction tethers embodied design practice with, what Sterling calls, the imagineering of science fiction (Sterling, 2009). All of these speculative practices approach the representation of alternative futures as purposefully intending to "engage audiences in considerations of what might be" (DiSalvo, 2012, p. 109).

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While both traditional and speculative design futures approaches have generated a multitude of exploratory products, services and systems, concerns remain about the ability of these experiments to generate new theories or forms of generalizable knowledge. There is a lack of formalization both within the documentation of the research itself (Agnew, 1993) and in the methodological production and dissemination of generated knowledge. Understanding the entirety of the design process requires consideration of the dynamic interactions between the designers, the studied problem, and the design context (Dorst, 2008), which when codified and encapsulated can help improve the final produced artifact, the actual process itself and the skills and insights of design team members (Shipman & McCall, 1997).

The *Emerge* event produced an array of traditional and speculative design research outcomes positing diverse visions of the future. Our approach to capturing and summarizing this event represents an attempt to codify the process by which these futures came into being, for purposes of comparison, evaluation and interpretation.

2.2. Design futures

The integration of design and futures is an exciting and relatively recent phenomenon, championed by individuals and organizations from a wide variety of perspectives (Bhatti, Kimbell, Ramirez, & Selin, 2014; Bleecker, 2009; Candy, 2010; Dunne & Raby, 2013). Stuart Candy and Jake Dunagan are leading pioneers in the field, developing a critical mass of exhibitions (Candy, Kornfeld, Dunagan, & Nichols, 2010), toolkits, online writings (http://futuryst.blogspot.com) and texts (Candy, 2010; Dunagan et al., 2011). Candy's doctoral dissertation provocatively describes a melding of design and futures to create experiential future scenarios, which can be encountered as performances, place based interventions or media simulations. He calls for the creation of futures that move away from a strict allegiance with texts or charts, and instead use formats that render improbable events "richer, more accessible, and immediate." (Candy, 2010, p. 86). Positing the possibility of futures supported design, along with design supported futures, he advocates for the latter, whereby "the design 'output' is not the end in itself, but rather is used as a means to discover, suggest, and provoke" (Candy, 2010, p. 188).

Interaction designers are also embracing future studies, with particular emphasis on the field's ability to help designers consider a distribution of research horizons. For example, Mankoff et al. examine synergies between human–computer-interaction and futures studies as a means to explore implications of sustainability research (Mankoff, Rode, & Faste, 2013). In addition, futures workshops, as pioneered by Robert Jungk are also gaining popularity as a key component in participatory design practice (Jungk & Müller, 1987). Our work seeks to extend this integration of design and futures by including non-expert participants and audiences in revealing and extending the documented processes by which making and prototyping can produce future visions.

2.3. Documentation and annotation

The conception of documentation as socially formed and culturally mediated can reasonably be first attributed to the librarian and pioneering information scientist, Suzanne Briet (MacDonald, 2009). Her seminal treatise (Briet, 2006) proposed a dynamic interplay between the production and documentation of knowledge, where the creation, combination and use of documents comprise an open and ongoing network of cultural activity. Briet's model allowed and indeed welcomed the future introduction of new technologies for capturing, indexing, sorting, and presenting documentation. A recent innovation in this domain is the concept of "annotated portfolios" which proposes the use of annotations as a way of presenting design thinking, comparing artifacts within a collection, and ultimately communicating the value of research through design (Bowers, 2012; Gaver & Bowers, 2012). The annotated portfolio brings together "individual artifacts as a systematic body of work" which can encompass diverse material forms including monographs, exhibitions, databases and performances (Bowers, 2012, p. 71). These annotations can be interpreted as providing a level of abstraction that while not reaching toward full-blown theory, nevertheless provide a more general knowledge account than that encapsulated in just the artifact itself (Löwgren, 2013).

Our work seeks to extend the originally conceived notion of annotated portfolios to include collaborative documentation and annotation, and dynamic organization of portfolio content. To facilitate and examine this in depth, we developed a participatory real-world exhibition portfolio and an online social platform that both directly allow for the type of collective working and reworking of content meaning as proposed by Briet.

2.4. Mediated experiences

Our documentation approach described above builds on prior work in understanding, capturing and designing media experiences. The integration of computation and mediated information into everyday interactions has transformed how humans experience and make sense of the physical world (Rikakis, Kelliher, & Lehrer, 2013). Deriving models and frameworks for understanding these mediated experiences requires input from diverse disciplines (e.g., anthropology, social science, engineering, art, business) and is of critical consideration for multiple professions, including of course design. As computational media become more and more integrated into everyday experiences, there is also an increased amount of hybrid physical-digital information and knowledge available to human society (Rikakis et al., 2013). Developments in sensor networks, mobile computing and cloud storage provide multiple opportunities to capture and understand diverse forms of

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human activity at a variety of scales and dimensions. The emerging field of experiential computing provides one systemic model for recording and analyzing events (Jain, 2003), however, as noted in (Sellen & Whittaker, 2010), a key issue in the utility of collecting such experiential collections is the size, complexity and integration of the dataset gathered.

This multifaceted issue thus presents challenges in terms of data storage, annotation, retrieval and presentation. Through projects like the Flickr Commons, museums, libraries and archives are now turning to online social platforms to make their curated content available to diverse audiences (Kalfatovic, Kapsalis, Spiess, Van Camp, & Edson, 2009; Vaughan, 2010). The participatory nature of online media platforms additionally supports social curation. At the forefront are sites like Pinterest, which allow their users to collect and annotate sets of content stored elsewhere on the web, adding descriptions, evaluative judgments and personal commentary (Hall & Zarro, 2012). This process of reflective consideration and judicious selection is continued in other experiential contexts. DataPrism (Fouse & Hollan, 2010) presents a timeline-based visualization for the interactive annotation of multimodal experiential data. Similar to our approach, the Lomen project enables the exploration of highly curated multimodal archives through a rich variety of theme-based paths (Mauri, Pini, Ciminieri, & Ciuccarelli, 2013).

Documenting the enacted design activities engaged in by the diverse workshop participants at the Emerge symposium provides us with rich material to examine design futures research using a variety of lenses and viewpoints. We can explore the emergence of meta-process levels of design practice, as participants move from ideation, through design, construction and process summarization over a condensed period of time. As a documented record of futures practices, this multimodal approach also extends (as Candy calls for earlier), the typical text-based descriptive approach with an enlarged media framework depicting, for example, room dynamics, group interactions and time-stamped iterative development of digital and physical artifacts.

3. Mixed-media documentation approach and implementation

Our participatory design futures approach employs integrated elements created to move discussion and exploration beyond situated experts, toward both a local and global community of engaged individuals. It aims to deepen the conversation posited by practitioners by involving diverse perspectives, which may challenge these positions or lend new insights. This approach affords multiple value propositions including instructional experience for novices in the community; communication utility for those outside the futures field; and coordination support for dialog between practitioners. As such our documentation methods, detailed below, emphasize both the process and artifact(s) of design futures practice.

The implementation of our documentation strategy leveraged existing media technology expertise (at Arizona State University), to formally document the scheduled public events held during the *Emerge* symposium (e.g., public keynotes, research presentations, panel discussions). In addition, we seeded and promoted event-related groups and tags on social media sites (e.g., Facebook, Twitter, Flickr and Vimeo) to all invited event participants prior to and publicly during the event. These relatively obvious approaches would serve to create a straightforward record of formal events, while the majority of our efforts focused instead on documenting the more spontaneous and ad hoc activities of the workshop groups. To enable this, we enlisted (and trained) a 12-member documentation team for capturing photos and movies of each workshop; 3 roving documenters capturing photos and movies of interstitial activities and general symposium events; one video recording booth to allow participants to contribute short reflective accounts, and 9 time-lapse cameras in each workshop location.

Each event workshop was assigned two dedicated documenters and one ethnographer who remained throughout the designated work times (the outcomes of the ethnographic study are described in (Davies et al., 2014)). The ethnographers used traditional note-taking as their capture method, while the documenters were provided with a field notebook, still camera, audio microphone, Flip video camera and a dedicated laptop. IRB approved consent forms were distributed to all workshop participants at the beginning of the event, describing the purpose of the documentation approach and the rights of all participants to agree or not agree to be recorded. From this point on, the documentation team was directed to adopt a mild intervention approach, endeavoring to interrupt the workshop flow as little as possible. The combined teams remained primarily in observation mode, capturing people, process, artifacts and dialog. Finally, a video diary booth (viewable also in Fig. 1) was positioned at the entrance to the main symposium/workshop building where any participant could record short audiovisual responses to displayed prompts such as "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?"

At the end of each day, the documentation teams archived and lightly categorized all captured content according to workshop name, location and session/event/activity time. In addition, several documentation teams collaborated with the workshop leads in identifying and preparing captured media content to incorporate in the reporting sessions on the final day of the *Emerge* event. Overall participant posting on social media sites such as Twitter and Flickr was brisk during the event and tailed off approximately one week afterward. In total, over 500 GB of event related documentary data was collected, including 1498 workshop videos, 90 video booth entries and over 2000 photographs.

4. Findings, analysis and synthesis

Immediately following the *Emerge* event, work began on the initial formal phase of data analysis to facilitate sensemaking and organization. As part of this analysis, all captured media content depicting workshop activity was categorized using a set

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Fig. 1. The main room of the gallery exhibition containing the marble voting; ViewMasters; letter writing station; graphic comic; video diary booth, iBook and sculpture; 3D printed objects and clay sculpting station. Photo by Craig Smith.

of annotations describing various possible stages in the design futures process. These categories included: *Making; Discussion; Research; Planning/Strategy; Introductions; Summarizing or Conclusions; Argue or Debate; Analysis; Synthesis.* High-quality content from each of the workshop categories was then selected for richer description, whereby annotation of participants, locations, summary details or thematic labels was attached.

Our primary initial goal was to explore the viability of introducing design futures to an expanded audience. Shortly prior to the *Emerge* event, the symposium organizers were approached by a prominent art museum in Phoenix, Arizona, with an invitation to use upcoming available gallery space to present outcomes and findings from the event. Because of programming constraints, the lead-time on developing an exhibition was approximately five weeks, with a scheduled exhibition run-time of three months. Despite this condensed timeframe, the opportunity to synthesize and present preliminary insights from the symposium to a broad audience was deemed valuable enough to warrant an accelerated development pace.

Working in consultation with the event organizers, the ethnography team leader, and museum administrators, the authors designed and curated a two-room interactive museum experience which both conveyed the high level themes of the *Emerge* symposium and the intent behind each corresponding workshop. Each of the workshops was allocated a dedicated area within the larger exhibition space and a summary representation of the process and outcomes from each workshop was synthesized from the data gathered (see Fig. 1). To maintain the integrity of the methods and outcomes expressed by each workshop, distinct representational forms appropriate to the intent of each workshop was required. A purposeful mix of physicality, interactivity, and creativity enabled us to epitomize the respective activities, personalities and perspectives involved.

The projected primary audience for the museum during the exhibition runtime was comprised of family groups and school tours, prompting us to consider both how to present the captured material in an accessible way, and how to engage participation and community contribution. A key concern for our team was to make the materials and activities explored during the symposium (e.g., design fiction, alternate reality gaming) intelligible to a broad age range. This expected target audience enabled us to explore the translation of design futures methods for a diverse and non-expert audience. Our approach was to adopt a mixture of representational depth and breadth, presenting some event activities in rich detail, with others receiving a more generalizable presentation. A second underlying motivation was to ensure that the exhibition supported the extension of the futures conversation as a form of social foresight, by including the opinions, perspectives and thoughts of the visiting public. To this end, we instrumented the exhibition installations with a variety of analog and digital input mechanisms to record and archive visitor input.

To illustrate our strategy for creating accessible representations of the design futures process, we describe the design and development of the exhibition installation depicting a performative experiential futures workshop. Led by Stuart Candy and Jake Dunagan, this wide-ranging workshop represented one of the more challenging components in the exhibition design. To wit, the workshop leads and participants had created a fictive historical narrative using a combination of outdoor sculptures, iconography, and doctored visual images to draw attention to a possibly preordained cataclysmic future. The wealth of materials created by the workshop participants, and that recorded by the documentation team provided a rich opportunity for deep exploration of the simulated hoax after the fact. The generated workshop materials also challenged us to reframe much of the documentary media in order to faithfully present the 'discovery' of the faux-historical account. To ensure both the accuracy and the accessibility of the final exhibit, we worked closely over a number of weeks with the workshop leads and the museum curatorial team iterating through a variety of designs. Our ultimate response was to create an interactive iBook (Fig. 2), which allowed individuals to navigate the entire 'experience' of the workshop participants as they initiated, narrated and retold their speculative narrative (Figs. 3 and 4). Visitors to the museum could examine the doctored material 'as if' it were possibly real – as it had originally been presented by the workshop participants. Alternately, within the book, they could also view an edited movie version of the final public workshop presentation, with the option of listening to additional behind-the-scenes explanatory commentary from Candy and Dunagan.

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Fig. 2. The installed iBook for the Stuart Candy and Jake Dunagan workshop. A user taps to begin reviewing the simulated narrative.

As with that workshop, we adopted a similar approach with the other eight workshops, whereby we sifted through the captured media to identify material that best encapsulated the intent and overall experience. Working with the workshop leads and collaborative experts, we sought guidance in selecting both the best elements to represent their process, as well as in developing the surrounding explanation and exposition. Careful consideration was given to the rendering of this content in a manner and form with broad legibility to diverse audiences. This required a fine-balancing act between explicit representation of expert or known formal methodologies and the translation of such into novel, and at times, greatly simplified formats.

Each workshop installation either directly integrated or was accompanied by an activity space soliciting visitor input. For example, a writing desk and materials were provided to write letters to the future, and sculpting clay was laid out to encourage the creation of futuristic objects. An empty whiteboard and marker set placed alongside large comicstrip panels

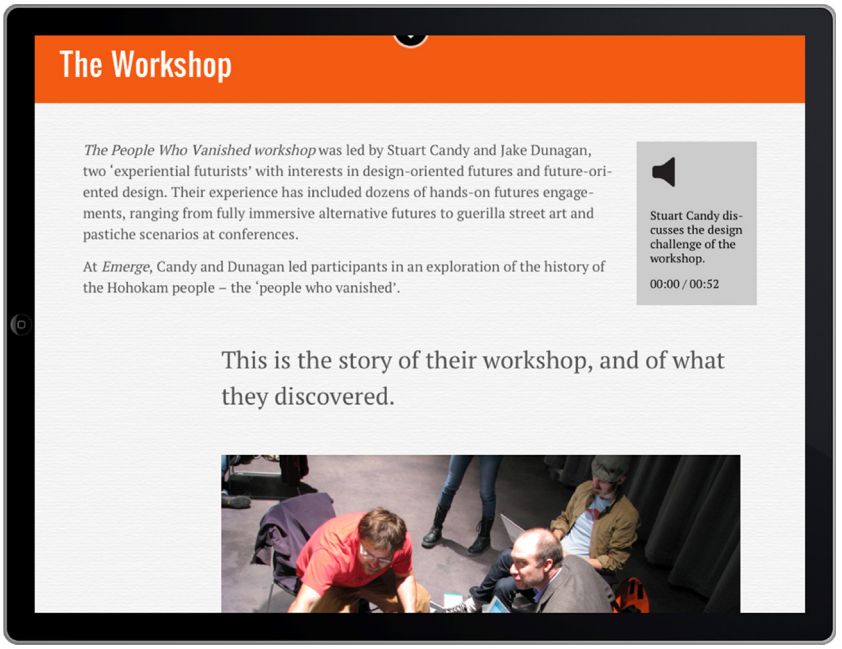

Fig. 3. The iBook's narrative presented the workshop hoax and the documentation of its creation, through repurposed audio, video and image data.

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Fig. 4. An overview of the full representational structure.

invited visitors to complete the presented visual story, while a camera recorded drawings, erasures and re-drawings. Participants could send text messages in response to projected prompts about design, the future and the *Emerge* exhibit, or they could create audiovisual answers to questions posed in the repurposed video diary booth. All of the physical and digital material created during the three-month exhibit was saved and archived for subsequent analysis and incorporation into the online platform, described in the next section. All told, the gallery hosted over 20,000 visitors during the 3 months of the exhibition, which was well attended and drew a large and disparate audience. Visitors created several hundred physical sculptures, over 250 letters, and contributed 537 future-themed audiovisual responses via the video diary booth.

5. Extending the reach of design futures

Leveraging insights from the documentary effort and gallery exhibition, we next developed a mediated online platform for enriching the captured content. Incorporating findings from prior work and our exhibition experience, the online tool is designed to address multiple opportunities with the *Emerge* symposium content. First, it facilitates the wide dissemination of this process-oriented content to both the design futures community and the general public. Next, it fosters engaged participation through community discourse and collaborative meaning-making. Finally, it seeks to provide an extensible, freely available resource to diverse researchers, practitioners, educators and the general public, in considering alternative futures. The archive and platform is currently being piloted in an exploratory study as a resource support tool for a graduate Design Fiction class at Carnegie Mellon University.

Developed in Ruby on Rails, the Emerge Data platform is a custom solution to the representation of event-centered documentary content. It is available at: http://emergedata.vpl.design.cmu.edu and currently hosts all of the *Emerge* documentation data, including content captured during the symposium as well as the data contributed by visitors to the *Emerge* gallery exhibition. The tool is designed to provide an end-to-end solution for the organization, presentation and dissemination of content to communities of interest.

The online platform organizes media files as a series of hierarchical and lightly curated collections of artifacts, which can be sorted by topic, activity or event (see Fig. 5). A typical workshop collection initially presents general or high-level content (e.g., time-lapses, final presentations, edited content) before revealing the entire selection of that workshops' attributed media artifacts. Collectively, these work together to document the evolution of initial workshop ideas toward final outcomes. To elicit and capture tacit knowledge, each item is described through a flexible annotation structure that considers temporality, media quality, community interest, and semantic and thematic descriptions (see Fig. 6). However, the power of the platform lies in its support for socially constructed documentation, which can be dynamically re-contextualized through iterative participatory action. To explore this further, the key platform features are discussed in more detail below.

5.1. Organization and import

The platform organizes the gathered documentary content as an iterative hierarchy from general to specific activities. The content and collections can be richly described by labeling with titles and detailed text descriptions indicating associations to other content within the archive, and annotation with contextual information including the time and date information, semantic descriptors, and process annotations. Process annotations are unique to the platform. We developed seventeen labels that broadly survey the spectrum of activities observed during the workshops. These include *research, analysis, synthesis, prototyping, refining, planning, debating*, etc. These process labels are used to annotate content and collections to create process oriented representations within the online tool. In addition to offering visual and inline content editing, annotation, and upload through the frontend, the platform also provides facilities for the rapid import and organization of content. Using a folder of semi-structured documentary content, the tool will assume the desired hierarchy follows the nested folder structure and import accordingly. The importer additionally transforms the raw documentary content for presentation online by: down-sampling large video or audio files; encoding raw video formats to those suitable for web viewing; extracting thumbnail images for content including PDF and Office format documents; extracting metadata and temporal information for each file; and selecting an appropriate cover image for each collection.

5.2. Collaborative meaning-making

In addition to enabling rapid archive importation, description, and presentation, the platform leverages strategies from social media to support user engagement. As an item is viewed or interacted with, measures of community interest are

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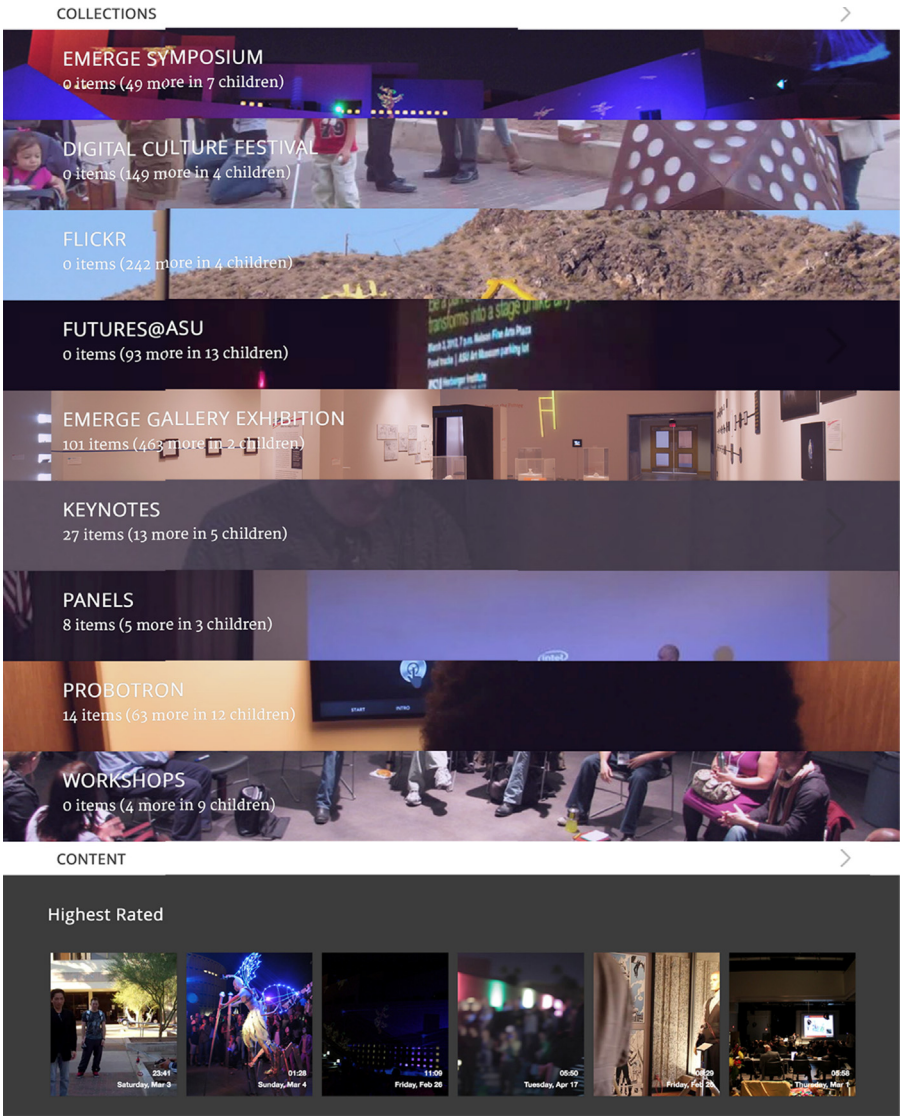

Fig. 5. Collections view of the Emerge workshops archive.

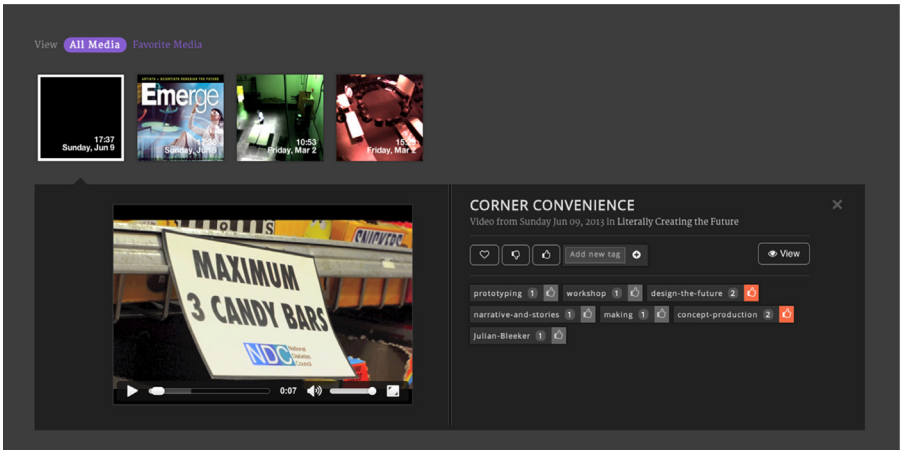

Fig. 6. Annotation interface for a single media artifact, including up- and down-vote and favoriting functionality.

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gathered. The platform supports the curation of content using the heart icon (as seen in Fig. 6) as well as through the download of content (all under Creative Commons Attribution ShareAlike licensing) for reuse elsewhere. User actions such as viewing, favoriting or downloading are all tracked and collated. The user perceived value of each media artifact may vary, which can be indicated by user up- or down-voting any item. Finally, collaborative tagging is employed to classify each item. Users can contribute to a growing folksonomy (Ames & Naaman, 2007) around the archive by contributing new tags, and can also specify the importance of particular tags by endorsing them. Similar tagging action can be taken to highlight elements of process reflected in the artifacts (see Fig. 7). This user-contributed metadata supports the social construction of refined understanding and insight into collected archives.

5.3. Adaptive representation

The overall context and structure of the archive is inherently dynamic. The platform leverages content metadata to deliver a summary overview that serves as an entry point to the entire archive. The Media View (see Fig. 8) is responsive to the community driven context, and uses applied metadata to determine inclusion and priority in the visual presentation. The proportions of content are adjusted to visually communicate content importance and community interest to afford an at-a-glance overview. Dynamic filtering allows the displayed content to refocus, creating presentations that explore particular collections, themes, timeframes, methods or content types of interest. Through exploration, users can then adapt the representation of the archive to their particular needs, allowing them to examine and compare the diverse methods employed within workshops. Finally, selecting any item within the presentation provides an inline panel that allows a user to review multimedia content (e.g., play a video) or annotate the content without leaving the summary screen.

5.4. Discourse and interpretation

The platform supports commentary through social action, and through the addition of text-based discussion. For example, by favoriting content, users can save their own curated collections in the archive. Text-based discussion can be associated both at the individual artifact and overall collection level. Aggregating discussion in this way is designed to direct community users toward content of current interest and to draw participants into dialog. Formal interpretations can also be developed. By juxtaposing a small set of media fragments with descriptive text, users can articulate their personal perspective on some component of the process, outcomes or methods featured within the archive.

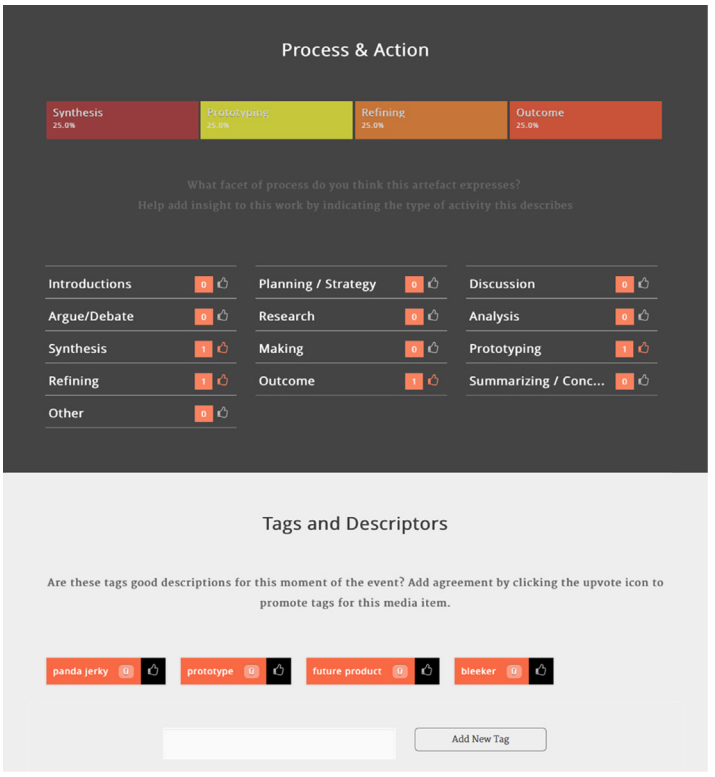

Fig. 7. Each item of media presents opportunities for collaborative annotation. Users can add tags and endorse process or semantic labels by clicking on the 'thumbs-up' icon.

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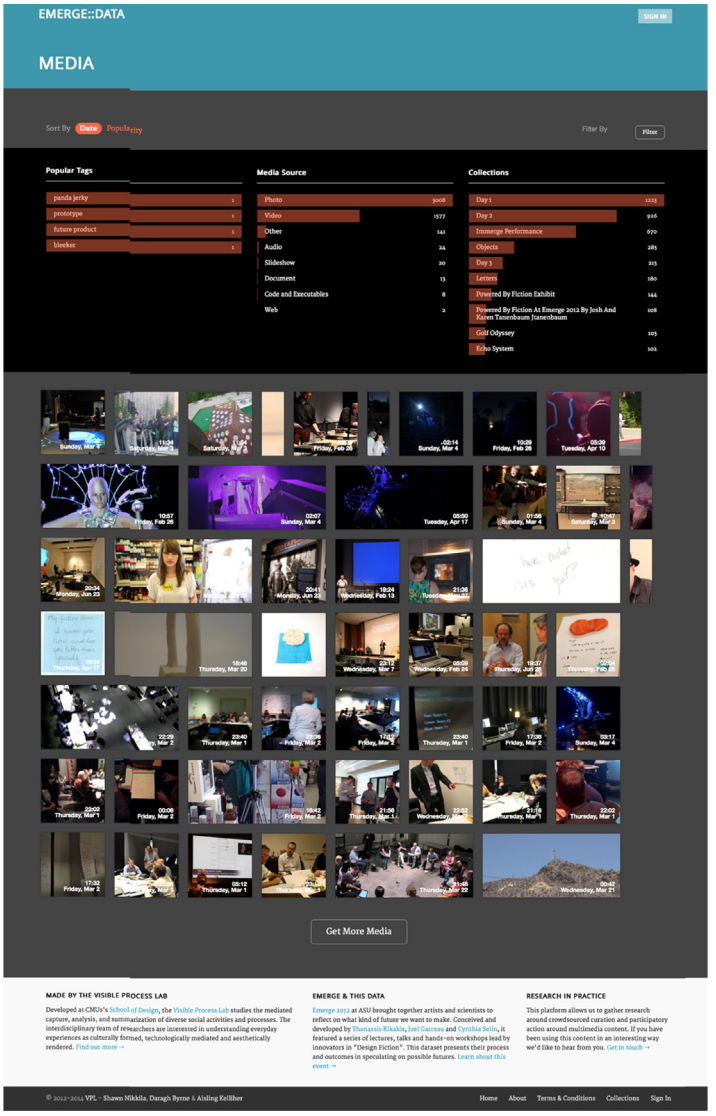

Fig. 8. The media view provides an at-a-glance overview of the collection as a whole. Content is visually weighted to indicate items of importance. Dynamic filtering options allow the view to be quickly re-oriented around collections, content or themes of interest.

5.5. Extension and reuse

All of the content presented within the archive is available for download and reuse through a Creative Commons Attribution ShareAlike license. The platform itself is publically available, and can easily be extended and redeployed to other event contexts and scenarios.

6. Documenting design futures: discussion, replicability & guidance

Our documentation approach seeks to build direct engagement between diverse stakeholders engaged in consideration of possible, probable and preferable futures (Amara, 1981). The strategies and distribution technologies presented as part of this framework are broadly replicable and available for deployment and extension by any interested party. In this section we provide some guidance and suggestions in conducting similar efforts.

6.1. Capturing the process of design future experiences

Adopting a holistic approach to process documentation can include pre-capturing planning and organizational content and/or the design and development of novel materials prior to the event. A complete capture of the experience itself can additionally be further supplemented with meta-coverage of the analysis and synthesis carried out after the event.

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6.2. Complement social media activity with external documentation

Social media platforms such as Twitter and Facebook are particularly useful during structured events such as presentations, when participants are collectively engaged in a focused activity and it is considered socially appropriate to briefly divert attention for online commentary. However, an external documentation approach using non-participant observers can ensure comprehensive coverage of both structured and unstructured events in a manner that is both unobtrusive and socially appropriate. This holds particularly true for fast-moving and highly involved workshop events, where disengaging from participation to document can be disruptive, distracting and potentially considered rude.

6.3. Diversity of media capture formats

Process-oriented documentation efforts should consider employing a diversity of approaches to ensure both ample and quality coverage. Video and audio documentation of making, research, and discussion capture seminal moments in development and application of design futures methods. Photographing and digital scanning of physical 2D and 3D artifacts can ensure that the entire development process from back-of-an-envelope sketching to final 3D printed artifact is captured. As part of this process, effort in managing and syncing timestamps across the devices employed is strongly recommended. In this regard, smart pens (e.g., LiveScribe and Inking) can greatly facilitate the digital, time-stamped archival of physical inscriptions.

6.4. Passive to direct recording intervention

Adopting a distribution of capture techniques from human-operated devices to passive time-lapse systems ensures a combination of basic coverage with intelligent and timely intervention. The general dynamics of a space can be captured and analyzed via cheap time-lapse or motion capture cameras, while a well-trained documenter can move graciously from observation to interjection mode depending on context.

6.5. Periodic reflection-in-action

Creating a workflow for periodic capture, archive and categorization during documentation efforts allows for distributed documentation teams to quickly get a sense of emerging themes and foci. This type of reflection-in-action allows for assessment of performance during the fact that can generate suggestions for immediate improvement and facilitate later content structuring (Schön, 1987).

6.6. Scale of annotation from light-weight to focused depth

Progressing from light-weight general annotation to guided in-depth rich descriptions helps distribute effort load when dealing with large datasets. Using quality fidelity metrics (e.g., good audio, focused composition, etc.) throughout to eliminate poor content can increase efficiency over time. Developing a custom process-annotation labeling schema can help cleanly identify exemplars of successful activities or interventions for later re-use in teaching, training or presentations.

6.7. Target audiences and participation

Generating appropriate representational and summary formats for various target audiences requires careful consideration of framing strategies. Different approaches are necessary if the intention is simply to inform, rather than to solicit participation or invite co-creation and adaptation. Careful study of successful prior work (Candy, 2010) and case studies in developing participatory experiential futures for social foresight (Slaughter, 1996) is of benefit here.

7. Conclusions

Expanding futurist discourse across disciplinary boundaries and integrating it within everyday online experience has the potential to greatly diversify the perspectives and opinions informing ideological, empirical and applied domain research. Creating an accessible body of evidentiary data, and novel physical and virtual interfaces demonstrates the utility of our approach in reaching new audiences and providing an exploratory platform for practitioners and researchers. Continued development, evolution and evaluation of the documentation approach with diverse collaborators will serve to expand the educational and societal reach of design futures activities.

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