The Physicality of Digital Museums

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We report on the first of a series of workshops, discussions and events investigating space, narrative, and digitality in the museum of the future. The whole series, under the title "Discursive Formations" was convened by the Cambridge University departments of Architecture, Computer Science and the Fitzwilliam Museum. The Discursive Formations project was funded by the Arts and Humanities Research Council, and included public and online discussions from February through to April 2007. Three practical hands-on workshops took place at and around the Fitzwilliam Museum during March.

The objective of this first workshop was to explore the design opportunities that will arise, in the museum of the future, through the conjunction of two factors. The first of these factors is the physicality of the museum itself, as manifested in the collected objects within the museum, the structure of the exhibition environment, and the bodies of the visitors themselves. The digital offerings of most museums today are typically divorced from the physical museum – websites, catalogues and online guides only present photographs of objects rather than physical objects, they present maps and textual descriptions of exhibition space rather than physical space, and they offer interaction mediated by a keyboard and mouse rather than by the physical encounter with a museum.

The second factor is the increasing physicality of the digital world, through the scientific and commercial advance of ubiquitous computing, sensing technologies and tangible interaction. Interactive digital devices are routinely carried in the hands, pockets or clothing. Computer vision and other sensing technologies can be used to make computers sensitive to their environments, and to movements of people and objects within those environments. Researchers in Human-Computer Interaction increasingly work with product designers and artists to explore the new ways in which miniaturised digital devices can be given new physical forms within "smart" objects, homes, surfaces and other designed products.

In this one-day workshop, we explored this conjunction through a design studio approach, using sketching, individual critique, and group discussion of exhibited work, in order to experiment with the expression and discovery of interactive concepts through physical form. The day started with a presentation of recent research prototypes exhibiting the variety of ways that "tangible user interfaces" can modify the established relationship between physical and digital devices. This included an opportunity for workshop participants to have hands-on experience of several tangible user interface prototypes developed in Cambridge, in addition to a slide presentation illustrating the work of other leading research groups elsewhere in the world, and an introduction to the main technical and theoretical concerns that have informed and been developed in the field.

Workshop participants were then invited to visit a popular gallery of the Fitzwilliam, the Armoury, in which display cases hold collections of armour and weaponry. Participants explored the collection with the assistance of the eGuide, an advanced handheld interactive guide that has been developed by the Fitzwilliam. The eGuide presents audio narrative, navigation and other information, and can be triggered by location devices in a specific display case. Participants then returned to the studio, where a collection of actual armour and weapons was made available from the Museum collection. Participants could touch, hold, heft and even wear these objects, reflecting on the ways in which these physical experiences supplemented the physical experience of the handheld eGuide with its touchscreen and headphones, used in the context of objects being viewed within glass display cases.

The workshop included some experience of contrasting collections (porcelain, for example), and of further digital technologies (demonstration and explanation of various sensing devices), but the largest part of the day consisted of making, discussing and presenting three-dimensional design concepts. It employed a facilitated sketching process previously developed by our group for tangible user interface design, in which readily available art supplies are used in playful exploration of physical forms[1]. These forms are related to digital interaction through a structured critical framework that is offered to participants by expert tutors in individual

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[1] Blackwell, A.F., Edge, D., Dubuc, L.M., Rode, J.A., Stringer, M. and Toye, E.F. (2005). Using solid diagrams for tangible interface prototyping. IEEE Pervasive Computing, Oct-Dec, 18-21.

discussion of the sketches[2] [2]. Rather than presenting the whole framework in its abstract form, tutors are able to focus on the design aspirations of the workshop participant, using the available physical form to draw out the abstract implications of using that form to manipulate or navigate and information structure[3] [3].

After several rounds of refinement, production of alternative designs, collaboration with neighbours around the work table, and experimentation with the sketch prototypes, the final session of the workshop consisted of a "pin-up" presentation of the work. A photo stage and digital camera had been used throughout the day to capture high quality photographs of the prototypes, and enlarged prints had been pinned to the studio wall for inspection by the whole workshop. Each participant briefly presented their design concept and findings to the group, in the context of this range of work.

[2] Edge, D. and Blackwell, A.F. (2006). Correlates of the cognitive dimensions for tangible user interface. Journal of Visual Languages and Computing, 17(4), 366-394.

[3] Blackwell, A.F., Morrison, C. and Edge, D. (2007). A solid diagram metaphor for tangible interaction. Paper presented at CHI 2007 workshop on Tangible user interfaces in context and theory.

Conclusions

As an exploratory conceptual workshop, this approach was highly successful, with all participants becoming highly engaged with the studio-style design research approach. Those previously unfamiliar with tangible user interfaces were, by the end of the day, competent to initiate new design experiments. Participants developed a new collective understanding of physical/digital interactions, and several concepts that arose during this day were in fact applied immediately afterward, as starting points for the design explorations of later workshops in the series.

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Further Information

Findings and discussion related to the project "Discursive Formations - Place, Narrative and Digitality in the Museum of the Future" can be found at ExpressiveSpace.org:

      http://moodle.expressivespace.org/