

Architales: physical/digital co-design of an interactive story table

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Abstract

Many research efforts today explore how digitally augmented tables enable face-to-face interaction with digital content and applications. Yet the design of digital tables is still largely driven by the constraints and requirements of the underlying sensing technologies and digital systems. In order to move digital tables into real-world physical spaces, researchers need to work closely with architects and industrial designers in order to engage the knowledge and skills from a long history of physical design and fabrication. Architales is an interactive story table for gallery exhibition developed as an experiment in the physical/digital co-design of the physical table and environment with the digital story system and content.

1. Introduction

Tables are historically mechanisms around which people gather and around which space is organized. Yet in our increasingly digitally connected world, the physical materiality of the built environment recedes when we dive into digital spaces through the limited set of interaction portals available today (desktop PCs, mobile devices). Our research addresses the separation between the physical/digital realms by engaging skills and knowledge from design fields that relate to the human and social use of media and architectural spaces. Rather than foregrounding the creation of specialized interfaces and devices to access digital information, we equally explore when and how digital and computationally-driven media can be drawn back into the physical environment and built architectures. This in parallel informs the design of the digital systems that underlie these physical and social spaces. We refer to this approach as physical/digital co-design.

Architales is our first experiment in physical/digital co-design, focusing on narrative experiences around tables. Narratives are a starting point because they

relate to our shared expertise in designing and constructing tabletop storytelling systems. They also build on a long history of tables as physical and social constructs that can engage people in shared informal storytelling in both work and play. Architales is an interactive table for shared story engagement that draws on a specific social situation and setting: conversational public/transitional spaces. The piece was designed for gallery exhibition (see Figure 1) through a process of physical/digital co-design in which the design of the table, environment, tangible storytelling system, and story content evolved together.



Figure 1. Architales at a public gallery exhibition.

2. Related work

Architales builds on a long history of table design. Tables tell us stories through physical characteristics: height, shape, legs, size, location, arrangement and materials. Many tables also tell us stories about art movements and industrial progress. With the impact of technologies, the way tables and objects around tables are conceived has changed: information physically and functionally shapes the way we interact with products. As such, to design a table is to design behaviors. Beyond function and structure, the fundamental worth of tables now lies in their rhetorical properties, the communication of meanings, attitudes and values, and the experience they embody and facilitate.

Architales also builds on past work on tabletop storytelling and media browsing, extending it to explore how stories can be expressed and experienced not only through digital media content on (and user interactions around) the table, but also through the design of the table, its environment and the interactive tangible artifacts manipulated on its surface. Examples of past tabletop storytelling systems include Tangible Viewpoints [1] and the Personal Digital Historian [2].



Figure 2. Participants dig for story content on the table.

3. Architales design and exhibition

Architales is an interactive story table for shared engagement with cinematically-inspired narrative expressions that unfold on its surface and throughout its space. Designed for public and transient spaces, the physical structure evokes the interest of the passing user, and the digital applications support short interactive experiences around the tabletop. Users first experience the broad story themes and concepts as they approach the piece, through the physical form of the table and surrounding space which reflect the threaded structure of the story content. The environment invites users to its center, where they can dive into the digital story material through tangible and touch-based interactions on the surface of the tabletop display.

The piece was designed in an interdisciplinary class in digital media, architecture and industrial design at Georgia Tech. Students were challenged to re-mediate content from the film *Fast, Cheap and Out of Control* (Errol Morris, 1997), which was selected for its thematic and visually evocative nature, and for its multi-threaded and layered story structure that weaves the stories of four different characters and their shared themes. Students worked in teams to develop a unified concept for the table and environment, along with different tangible storytelling applications written in Flash/Actionscript and XNA. The physical/digital co-design process was iterative, and the design of physical, digital and storied components informed each other from concept generation to production. This involved exploring the film's themes, structure, and

visual content, and reshaping it for tabletop and tangible delivery, e.g. through the development of new kinds of tabletop tangible story objects and interactions to navigate the story material. Some interactions include: digging to traverse story layers through quick rotation of a rounded tangible object (see Figure 2), stamping graphical story elements with different kinds of physical stamps to re-weight the underlying story system, and rolling a large global modifier piece to bring an element of randomness to the unfolding story.

Architales was shown at Listening Machines 2008 at the Eyedrum Gallery in Atlanta and was well received by visitors. We observed that visitors generally proceeded from viewing the environment and using the seating areas for casual conversation, to studying others interacting at the table, to moving into a central position to try out the interaction, and finally to stepping back to let others approach the table. They discovered story interactions both through observation (looking at others interacting) and exploration (improvising new interactions on their own).

4. Conclusion

As designers of tabletop systems, we must not forget that the table and environment are critical elements of the user experience. There are many exciting possibilities for enriching the table form factor through thoughtful consideration of the history, functions, and future of tables. Integrating content with table design can add to individual and social group-level possibilities for interacting with the content, both on the table and off, such as spaces for initiation into the story and reflection. We hope our experience will inspire others in the tabletop community to practice the physical/digital co-design of tabletop applications.

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6. References

- [1] Mazalek, A., Davenport, G., "A Tangible Platform for Documenting Experiences and Sharing Multimedia Stories", *Proceedings of ACM SIGMM 2003 Workshop on Experiential Telepresence (ETP '03)*, ACM, 2003, pp.105-109.
- [2] Shen, C., Lesh, N., Vernier, F., "Personal Digital Historian: Story Sharing Around the Table", *Interactions*, Vol. 10, Issue 2, ACM, March/April 2003, pp. 15-22.