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1 Introduction

Product designers have a need to experience the environment where their product will be used. Such a sense of presence is conventionally achieved by hanging pictures and sketches on the wall or creating larger scale moodboards or collages of the intended audience or environment (Kolli, Stuyver, Hennessey, 1993). As the interaction and possibilities of products become more and more complex, designers also use more narrative tools to experience the user environment such as scenarios and storyboards (Verplank, Fulton, Black, Moggridge, 1993). These artifacts play an important role for inspiration and reference, as they allow the designer to experience the atmosphere of the product's use.

New tools and techniques provided in computer interaction and visualization can provide a much more efficient and flexible way to provide a sense of presence in the user environment. However, advanced VR systems lack the flexibility and ease of use that the designers appreciate in their pictures, sketches and collages (Stappers, Hennessey, 1999).

This paper reports experience in constructing video collages to elicit the feeling of presence in a product's use context.

2 Research context

Presence is a person's ability to experience a certain location or context. From the perspective of designers seeking presence, aspects of 'atmosphere' are more important than any realistic or geographic location. This is similar to the use of the term 'presence' in cinema or theatre (<u>Laurel, Strickland, Tow</u>, 1994, Naimark, 1997).

This research is part of the IDEATE project, which studies tools that support designers in the conceptual phase of product design. The conceptual phase of design (or ideation phase) is the initial phase where designers discuss, visualize and explore their ideas, using different possible methods to visualize them (McKim, 1980). One of the research areas explores the tools to improve the interaction with visual information in the design process.

In the conceptual phase of the design process the feeling of presence in the environment in which a product is used can be very useful. For example, when designing an interactive cookbook, getting an overview of what tools and products can be expected in a kitchen provides important information on size, shape and materials to use in the new product. Moreover the atmosphere of being there with the end user in the kitchen environment can provide inspiration for solutions that would not be thought of behind the office desk.

Current computer tools used by designers are able to provide information such as height, color or dimensions of a possible user environment, but they are not well equipped to convey the atmosphere of the context where the product will be used. In our research we are building an experimental setup to explore and experiment with tools that do support the sense of presence useful for designers.

3 Three Ranges of Interaction setup

The experimental setup TRI, "Three Ranges of Interaction", is a body scaled interactive medium to support the designer in the conceptual phase. The term "Three Ranges of Interaction" refers to three scales in which the people interact with their environment: atmosphere, layout and precision.

These ranges can be best illustrated by looking at the way product designers interact with their work environment. For atmosphere designers hang pictures, collages and sketches of the environment of use on the walls around them. For layout sketches and models are laid out on desks to compare and organize possible solutions and use them in discussions and presentations. Lastly, for precision the designer uses paper, pens and models to create more detailed sketches.



- Vertical projection area (large range)
 Curved projection area with surround projection of video collages. The large range is used to create a sense of presence.
- Horizontal table projection (medium range)
 Table with projection for arrangement of physical and virtual objects. The medium range is used for organization, presentation and discussion of ideas.
- Wacom tablet with integrated screen (small range)
 Direct pen input on LCD screen for computer supported sketching. The small range is used for visualizing ideas.

Figure 1. Mockup of the physical TRI setup

The TRI setup supports all these ranges with an interactive environment that provides atmosphere (large range), virtual and physical organization and presentation (medium range) and computer supported sketching (small range). In this paper we focus on the applications of the large range in the TRI setup. Figure 1 illustrates how these different ranges are physically supported in the TRI setup.

Context and atmosphere, the large range, are visualized by a projection on a curved vertical projection area. For the medium range the TRI setup uses a table with a vertical overhead projection. On the table the users can arrange and interact with combinations of real physical objects and projected virtual objects. The small range is supported by a Wacom tablet with integrated screen on which the user can draw, doodle and manipulate in relative detail. The combination of these three ranges allows for an atmosphere fit to the assignment where designers can collaboratively arrange, discuss and visualize ideas.

To promote the designer's participation and suspension of disbelief, the TRI setup promotes the same sketchy aesthetics as those in paper-and-pencil sketches, cardboard mock-ups and collages. This is supported by the physical setup and the authoring tools to create the environments on the large range. To invite the user to participate in the large range we experimented with many different materials, such as cloth, foam and paper, to project our environments on. The current setup uses plain white cardboard plates for the vertical projection area.

To make the TRI setup a usable tool, it allows the designers to quickly and easily create their own environments. To accomplish this the environments can be created using 2D authoring tools such as Macromedia Director instead of more complex programming tools. This low-tech approach makes it easy for the designer to focus on the content and quality of the experience, without having to communicate these ideas to a programmer or developer.

4 Sketchy aesthetics in video collages

As an experiment to create an atmosphere in the TRI setup, a video collage has been made of a user context: the kitchen. The video collage conveys the atmosphere of cooking a meal in a kitchen environment. The video collage uses photographs of a woman in a environment.





Figure 2. Stills from the video-collage

As shown in figure 2, the collage does not show a true representation of the actions in a kitchen but has the aesthetics resembling those in conventional sketches and collages. The composition of the kitchen background is created from different pictures placed together to match the visual field on the TRI setup. This creates a somewhat distorted view on reality similar to the photographic collages of David Hockney. The composition allows the designer to fill in the gaps of reality and expand her creativity on the atmosphere.

The different actions in the kitchen (such as cutting, baking, washing) are displayed as sequences of still photo inserts and recorded sound. The selection of the photo inserts highlights the actions, cutting out many irrelevant parts of reality such as the legs or head of the woman in the kitchen. In this way the kitchen stays completely clean and unchanged at all times with only a relevant change in the area of the woman's actions. This method of animation provides a clear focus of attention on the actions of the woman in the kitchen.

The use of stop motion allows the author of the video collage to balance the timing of the different actions in the kitchen. Sounds that accompany the actions serve as a continuous and ubiquitous reminder of the context even when the attention is not focused on the projection.

The video collage is an example of a tool that can be used in the TRI environment to provide a sense of presence in the kitchen environment on the large range, while sketching and organizing drawings and products in the small and medium range. The different activities in the kitchen serve as a

basis of discussion for the designers using the TRI setup.

The sketchy aesthetics of the video collage encourages the same participation by the designers as conventional sketches and collages do. The designer's willingness to suspend disbelief allows for a participated sense of presence.

5 Discussion, conclusions and future development

Computer tools can provide a sense of presence that is useful for designers. To allow the designer to suspend their disbelief these tools will focus on easy way to create a sense of the environment in an abstraction such as a video collage. These collages offer possibilities for abstraction and expression that designers have learned to appreciate in their pen and paper based ideation tools (sketches and collages). The TRI setup provides the tools to create sketchy representations of a user environment in video collages.

The possibilities of dynamics, interactivity and the use of digitized sounds makes these virtual environments more engaging and flexible than the current conventional methods such as making conventional collages or filling the walls with sketches and photographs (Stappers, Adriaanse, Keller, 2000).

Our example of a kitchen environment only provides the atmosphere of a particular kitchen with a predefined use scenario. However, with the abstraction and sketchy aesthetics used in the video collage the designers are able to translate this atmosphere and scenario to their general idea of a kitchen environment and its use.

In future research these animations and new collages of other environments can be more tightly integrated into the design phases providing a context for target group analysis, consumer research, interaction design testing and interactive concept testing.

References

- 1. Kolli, R., Stuyver, R., Hennessey, J.M. (1993), "Deriving the Functional Requirements for a Concept Sketching Device: a Case Study", Proceedings of Vienna Conference on Human Computer Interaction '93, Vienna.
- 2. Laurel, B., Strickland, R., Tow, R. (1994), "Placeholder: Landscape and Narrative in Virtual Environments", ACM Computer Graphics Quarterly Volume 28 Number 2
- 3. McKim, R.H. (1980), "Experiences in Visual Thinking", Wadsworth, California.
- 4. Naimark, M. (1997) "What's Wrong with this Picture? Presence and Abstraction in the Age of Cyberspace" Consciousness



Reframed: Art and Consciousness in the Post-biological Era Proceedings, Newport: University of Wales College, Ascott, R. ed.

- Stappers, P.J., Hennessey, J.M. (1999) "Towards electronic napkins and beermats: Computer support vor visual ideation skills."
 Paton, R.C. & Neilson, E. Visual Representations and interpretations. Proceedings of VRI'98, Liverpool, September 22-24, Berlin-Springer
- Stappers, P.J., Adriaanse J., Keller, A.I. (2000) "User-centered Conceptual Design with and for Virtual Reality Environments", Submitted for special "User Centered Design and Implementation of Virtual Environments" issue of the International Journal of Human-Computer Studies
- 7. Verplank W., Fulton J. Black A., Moggridge, W. (1993)

 "Observation and Invention: The use of Secenarios in Interaction Design", CHI Tutorial, ACM

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Last modified on [97.11.25] by Ralph Stuyver | Albert Vos
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