ROLE PLAYING AND COLLABORATIVE SCENARIO DESIGN DEVELOPMENT

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ABSTRACT

Collaborative design activity can provide creative design solutions as well as be a source of enrichment for all participants. Nevertheless, instantiating collaboration among team members coming from different disciplines and with diverse levels of expertise can be difficult. Because of this situation, methods and tools that promote dialogue and reflection can be valued items. In our paper we describe a collaborative scenario-building method that we have been developing. The method takes as a starting point the user-centered design paradigm and makes use of role-playing and props as boundary objects for collaborative design building.

Keywords: Boundary objects, collaborative scenario design, embodied interaction, role-playing, user-centered design, user experience

1. INTRODUCTION

In this essay, we report our work and initial results with collaborative design scenario development. We have used role-playing and other techniques featuring embodiment as a way of bringing together the practices of different knowledge landscapes, namely those of art, design, and engineering. We focus mostly on the experiential knowledge in which meaning is constructed through interaction. As something that is closely tied to practice, this type of knowledge varies from one field to another.

The work was done in the context of the HandsOn project (http://www.tml.tkk.fi/Research/HandsOn/). It is a Finnish Funding Agency for Technology and Innovation (TEKES) funded 2,5-years' project involving the following research institutions: Helsinki University of Technology (Department of media Technology), University of Art and Design Helsinki (Media Lab) and the Tampere Technical University (Laboratory of Virtual Design), as well as industrial partners from heavy industry, film and post-production, and science education.

According to the project plan, the general aim was to develop a two-handed interface for a virtual reality 3D modeling and animation system in which "the user is able to sketch, manipulate and transform objects directly with the movements and gestures of their hands". Our role was to come up with new metaphors and concepts of interaction for 3D graphic systems, to perform user studies, and to create case studies for testing the system.

2. A FRAMEWORK

The work is based on a user-centered design (UCD) paradigm, where the focus remains with people, their artifacts, cultural practices and the environments they inhabit. Interaction is regarded as meaningful human action embodied in the context in which it is experienced.

User experience is something that covers an understanding that is brought together through all of the senses. The concept is well characterized by the idea of embodiment with an emphasis on the social and cultural component: how different people perceive systems and products and how their experiences come together. The intervention occurred mostly in the realm of user experience design where there is a great need into researching the function and flow of user interaction with 3D systems. Through our intervention, we also sought to bring to the project an art and design perspective.

Whereas the elements of the method are described in the first part of the essay, the second part is devoted to describing how the resulting data form the workshop is woven together to produce scenarios that are output in a comic book format. As a long-term objective, we aim to develop a

framework that is tested and tools that can be used to better understand user experience in human computer interaction.

3. METHOD ELEMENTS

Role-playing and props as boundary objects were the prime elements used as part of a workshop where the aim was to collaboratively develop scenarios to describe new user interface concepts and metaphors. Boundary objects are a class of artifacts that have been theorized to facilitate communications among diverse communities and promote the externalization of tacit and experiential knowledge [2][13][15]. In complex trans-disciplinary endeavors like filmmaking, boundary objects or visual representations in the form of sketches and storyboards for example, are routinely used as tools of communication to coordinate the workflow, as well as promote a common understanding, or shared context.

Looking at a storyboard of an animation sequence for example, a computer programmer can understand how to create a software tool to perform a special effect. Whereas the production manager examining the storyboard might be able to determine the complexities in scheduling and the expenditures needed to produce a film sequence, the camera operator shooting the live sections might be able to determine the placement of the camera equipment. Examples related to the use of representational objects need not be limited to the creative practices such as filmmaking. The use of Gantt charts and workflow matrices as a means to clarify dependencies between diverse actors using the same resources is a widely known practice in management as well as in research and development planning.

Boundary objects seem to provide an interface that affords the emergence of common understanding. They seem to facilitate collaborative processes whereby individuals both avow and learn about their differences whilst focusing their knowledge into the objective of the activity or task at hand.

Our hypothesis has questioned whether this notion of boundary objects can also be used to create artifacts that 'stand for' representation and meaning when performing design activity. Among the key points of inquiry in our work, is whether this is a condition that can be brought forth intentionally and used in the search for new design solutions. Or stated more succinctly, under what conditions, can representations be accepted as standing for a real thing?

Elements and techniques of other UCD methods such as bodystorming, informance, and experience prototyping, were also used to support the activities of the workshop. It was theorized that knowledge to be gained from a first-hand embodied experience through role-playing could be a real advantage for the method.

2.1 Role-playing and props as boundary objects

The process of role-playing entwines around the ideas of imagining and performing. By pulling out from our mundane roles, conventional ways of thinking and behaving, examination of agency becomes possible. To facilitate this separation from the everyday during the workshop, roles were assigned, costumes and props were distributed and a brief that contained a narrative and some tasks, were introduced. The objective was to build bridges among different types of knowledge and fields, brainstorm about new design ideas, and get a feeling for use of new concepts as they were emerging. Ultimately, we sought to extend the scope of scenario methodology further.

Whole-body interaction for example, was possible for one person who wore an overall and acted as a group leader. Other possibilities for interaction included the use of gloves enhanced with color-coded fingers. In our opinion, the use of the props with the story, helped to create a context in which to support imaginative and creative thinking. The props were selected through the use of visual and physical analogy and partly also through serendipity: Some objects with forms that seemed to afford particular behaviors were chosen [12]. For example, as shown in Figure 1, we conjectured that a piece of colored elastic rubber could be imagined to be a measuring instrument, or that a pipe cleaner might be used to represent the curved splines needed to construct a 3D model.
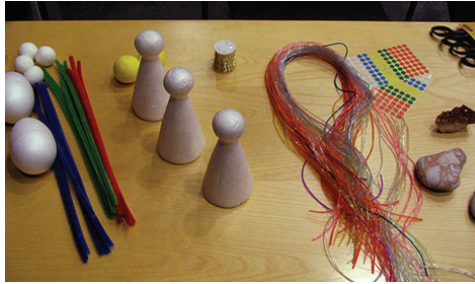
Figure 1. Among props used were pipe cleaners, colored plastic strings, foam shapes and textured stones.

At the same time, some objects, such as stones that featured a variety of beautiful textures were simply chosen because of their inspirational quality and sense of uniqueness with regards to the sense of touch.

2.2 Collaborative scenario building and claims analysis

In the context of user-centered design, a scenario is a narrative description of a system, using visual or textual format or a combination of both. Scenario narratives can be told from diverse points of view, describing how activities are organized around a system and how they unfold in time. [9][10] Two scenarios in the form of comic books were built collaboratively in a collaborative design workshop session by performing out behaviors, and writing them cursorily down on a whiteboard. Whereas one of the scenarios described interaction with a Gesture-based interface, the other followed a Tangible interface paradigm. Videotaping and photography were also part of the documentation strategy.

A layer of representation in the form of Claims Analysis argumentation was also added to expose weaknesses of particular design ideas that were proposed in the scenarios. Claims analysis is a structured form of dialogical "What-if?" reasoning used to highlight the causal relationships between system features and system responses as experienced by the user and described in the scenario [7][8].

We have incorporated these dialogues in the final publication, or catalogue of ideas, of the workshop results. In our work the scenario worked as a starting point, or a type of generative score allowing for subsequent iterative development, where multiple layers of representation were created to capture the interaction and design proposals produced by the project's participants

2.3 Storyboarding

Storyboarding is a technique used in filmmaking, advertising, computer games and theater but is also adapted to the field of design and lately to science as well. [1] A storyboard can be defined as a manuscript in pictures. Storyboards can capture characters' important moments such as encounters, emotions, moves, expressions, gestures, sounds, utterances, thoughts, words, environments and artifacts. They are also used to represent the episodic structure and main units in a narrative. In our framework, storyboarding was an intermediate step used to represent the design ideas obtained in a spatio-temporal 2D drawing format. These storyboards were given to an illustrator who used them when further creating the final images for each of the scenarios.

2.4 Bodystorming and informance

Bodystorming is a method that is sensitive to embodied aspects of interaction. Oulasvirta et al. refer to bodystorming simply as brainstorming out in the wild, outside the office that usually bears little resemblance to the intended context of use [16]. In the workshop, participants were encouraged to perform actions with their whole body, and to think in embodied ways in a multimedia laboratory. This is a context that responds well to the proposed setting for an immersive 3D graphics system.

Though we did not perform an ethnographic study but based our role-playing performances on our understanding of the subject matter, aspects of *informance*, or informative performance were also employed in the process of developing our idea for the workshop. According to Johnson informance includes the following steps: ethnographic study of a chosen group of people in their everyday context, interpretation of collected data through empathy and in the end informance. [5]

In the end, our way of generating ideas is possibly closer to design improvisation as proposed by Laurel, since we did have a separate audience but were performing to each other. [14]

2.5 Experience prototyping

Elements of Experience Prototyping as described by IDEO [4] were also used. Participants experimented with the props and quickly built low-fidelity prototypes that were then incorporated into the role-playing. It could be said that learning occurred from imitation and enactment of the intended experience.

3. COLLLABORATIVE SCENARIO DESIGN WORKSHOP

In the autumn of 2007 we had the opportunity to carry our workshop with the research partners in our project. There were twelve participants that included people from all the research institutions involved in the HandsOn project. The professional backgrounds were varied, including anthropologists, designers, and engineers. The engagement lasted for three hours.

For the occasion one of the designers acted as an independent coordinator presenting the workshop brief, switching between groups supporting their work and taking care of the course of time. The remaining two designers took on the role of facilitators, being one in each group. There was also an assistant taking care of video and audio recording.

The participants took on the activity of performing the hypothetical use of a 3D system. First the role-playing occurred among each group, with the facilitator gathering important issues to consider on a whiteboard. After working separately for a period of 1.5 hours, each group created a summary and presented it to the whole group.

3.1 Planning

When planning a role-playing session, Buxton has suggested that all the details, including the presence and composition of the audience and whether the act is a performance or a rehearsal should be thought out in advance [5]. Table 1 shows the different stages involved in compiling the data for the scenarios.

Table 1. Sequence of stages in our work

Role-playing for Collaborative Scenario Building
• Planning
• Collaborative scenario design workshop
• Extraction, analysis and representation
• Storyboards, comic books

Could the engineering workspace be re-configured? Could an atmosphere encouraging open performative practices such as those of the theater be created? How would improvisation activities with the participants be propitiated? These were some of the questions considered.

With these concerns in mind, a brief and a script were created as part of the planning strategy. The objective of the brief was to promote the emergence of activity, or bootstrap the workshop into action. The brief contained tasks to be completed as a member of one of the two possible scenario groups, the Gesture-based scenario group or the Tangible Interfaces scenario group.

3.1.1 A brief

The brief also included suggestions regarding the possible roles and treatments of space, as well as a story or narrative to offer examples of potential roles and modes of interaction. The narrative told a story about how archaeologists who find a piece of an ancient clay pottery, are given the task to create a digital three-dimensional replica of the item as it was originally. This story was presented to the group and everyone was asked to try to envision themselves in the roles of the archaeologists using the two imaginary 3D graphic systems to achieve this goal.

The objective was to entice and encourage the participants, who were not accustomed to engaging in this kind of practice. In providing this story to the group, we also sought to ensure that the context was unfamiliar to all the participants. The idea behind this was to remove the practitioners from the context of their everyday working activities and get them to reflect about the system from different perspectives.

3.1.2 A script

In a theater performance, scripts are routinely used to describe and keep track of all the elements and minute details, such as the scenography and the placement of the props, the state of the lights, and the movements of the actors on the stage. However, a script can also be an open structure to be filled with the participant's own knowledge and experience. As an example of this is certain forms of avant-garde Latin American theater where improvisation and plot change are key feature [11]. A key challenge for the designers when envisioning a script for such collaborative activities is how to construct an open enough structure that can also secure the meaningful content generated by the participants.

3.1.3 Collaborative scenario design workshop

More than reflection design activity involves a deliberate transformation of the environment [2]. However, when planning we were not completely free from thinking about already existing technology. For example when considering the possibilities of optical tracking—a common technique employed in 3D user interfaces for perceiving the user's action in space—as part of the props available, we designed special gloves with different color-codes for fingers and a bright colored overall that would be easy to visually distinguish from a dark background.

Other examples of the props that we distributed were badges that we thought could be used as a remote control of the system. We also gave colored stickers and sticky tapes that we thought could be used for color-coding. Similarly as can be seen in Figure 1, we provided foam board shapes that seemed to mimic items such as a joystick. Lastly, in order to facilitate thinking on materials stones of different shapes, sizes and textures were made available. These were found to be aesthetically pleasing and a source of inspiration. The participants utilized them when designing a tool to copy and paste 3D textures.

Video and still photography were used to document the activities and actions of the participants in a way that would not interfere with the tasks being completed.

Figure 3: A sequential diagram of screen captures taken from video recording of tangible interface scenario.

3.3 Extraction, analysis and representation

After the workshop the video recording was converted into a timeline representation of screenshots. As is shown in Figure 3, key moments of the scenarios were captured into still images so that six hours of video (three hours for each scenario) were compressed into nine dozens of images. The pictures were laid out on a word processing document and annotated with a one-line textual description of the activity. This document was printed and attached on a wall so that it could be studied spatially. Each group was dealt with separately.

3.4 Storyboard, comic books

An illustration artist was hired to render the two scenarios developed in the workshop in the format of two comic books. (See Figure 3.) The comic book format was chosen for its accessibility, playfulness, and rich set of visual means. Comic book art provides the designer with a rich set of tools including both iconic and schematic representations. The iconic representations allow for illustration of both realistic and symbolic visuals: Items can be portrayed as they are, but it is also possible to insert semantic components. It is important to underscore some of the rich onomatopoeic (or auditory) effects possible through this genre: Scale through size, tone through shape, and presence through an audible reference point. It is also possible to visually indicate states such as emotion (through the use of color) or even reflection and thinking (by changing the shape of the pointer. In addition, speech balloons can be used to bring together text and image, depict a dialogue or even operate almost like a soundtrack. Also the comic book genre seems to have a certain appeal for presenting scientific information. [17]

In the discussions with the illustrator, storyboards in the form of rough sketches were used. According to the artist these rough drawings were an essential aid throughout the course of the process of illustration. Their primary benefit in this case rested on the fact that they were already representations translated into a visual mode that allowed for discussion. In addition to these drawings, video recordings of the scenarios were also provided to support the work.

The artist was basically given free hands in terms of the drawing technique. However, it was made clear that the final outcome should be art, not proof-drawings of the documentation. The stories include all the characters that took part in the workshop, with their drawn counterparts strongly resembling the existing actual people.

Figure 3: Comic book representation of the scenario

Even though the whole basic system functionality was described in the recordings the artist had to come up with a comprehensible visual proposition that would not be a mere system description but a story with believable characters, settings and drama. The artist infused and additional layer of life and vision to our story.

4. PRELIMINARY FEEDBACK

After the workshop we used a questionnaire to survey the opinions of the participants regarding the experience. In the form we asked about the participants' familiarity with scenario design methods, their experience with collaborative and multi-disciplinary idea generation, expectations before the workshop, their fulfillment in terms of learning, teamwork and roles. We also inquired about the limitations of our arrangements and suggestions for improvement. Six out of ten participants replied. The participants had a reserved but positive attitude towards the workshop.

From their responses the participants seemed inexperienced with scenario-design methods, though some had previously used them when creating concepts for new products and services and when validating designs. Expectations before the workshop were varied: one member mentioned being nervous, whereas others had specific goals related to their own area of work in the project. Among the positive items mentioned as a result of the workshop was the generation of new ideas and ways of working and also loosening up of the social situation. One participant wrote that the workshop seemed to create a common vocabulary and understanding. Among the suggestions made were the reduction of number of props used for the gesture-based interface group and additional time for idea development in the beginning of the workshop. Also, it was not easy to relate to the topic of archaeology presented in the brief.

5. DISCUSSION AND CONCLUSIONS

We believe that it would have been important to further iterate with the scenarios and design claims with the participants and collect more feedback. A key question, however, is when to stop generating materials and how to gain insight out of them.

As a result of this work, we have produced two comic book specimens that bring together the different design proposals elaborated in the workshop. We are incorporating them into a catalog of ideas on the topic of 3D user interface design that will be printed as a separate volume.

However engaging and productive it might be, to collaboratively imagine and perform the ideas that one is envisioning is not an easy endeavor but rather a time and resource intensive process requiring education, guidance and assurance of the stakeholders. It is possible that the shared understanding achieved through the collaborative scenario-building workshop is quite ephemeral in nature. Also, testing and further validation of these methods is a pressing issue. We propose that our method can be used when there is a need for cross-disciplinary groups to engage in creative activity away from the prosaic everyday work situations, and to create shared understanding.

As artificial, virtual and augmented reality begin to be used as parts of everyday work tasks, the need for quality user experience increases the requisite of user participation in the design process. Bringing the whole body into information and multimedia systems design becomes imperative.

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