“Psst”-ipatory Design: Involving artists, technologists, students and children in the design of narrative toys.

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ABSTRACT
The aim of the Narrative Toys project is to develop new concepts for toys/play environments that support children in reformulating stories, through a combination of physical artifacts and digital media. The focus of the project is how toys are used as a storytelling medium – and how the exchange between stories inscribed in the toys by toy manufacturers, and the stories invented by children during play. The project is also typical for its aim to accomplish “creative research” – using artistic means to create and convey knowledge.This paper describes two prototypes, Psst and the AudioTheatre, and how they relate to research aims and artistic creation.

Keywords
Interactive toys, play, narrative, design

The Narrative Toys Project: Background
Play and narrative are closely connected in children’s development. Bruner [2] and Schank [7] have described the importance of stories as carriers of patterns for behaviour, ethical and social values, and in general how shared stories are fundamental to communities. Children’s play is nourished by all sorts of stories — within play the stories are tried out in a improvised manner between telling and enacting.

The tight connection between toys and stories is also visible in any toy store. The shelves are filled with characters from other media: Harry Potter, X-files, Star Wars and so forth. Toys today are a mass medium, a channel where stories get published in parallel to film, comics or computer games.

Media stories play an increasing role in childrens’ play. Where an older generation of children sought inspiration for play in genre scenarios like pirates or cops/burglars, today’s kids tend to base their play on “authored” stories from films or TV shows.

This dynamic between massmedia, narrative and play is the backdrop of the Narrative Toys project. We want to explore the cross-breeding between the stories inscribed in toys and the stories invented by children during play. How can toys help the understanding of narratives by giving children the tools to unfold them both in time and in physical space? Can we design new kinds of toys or play environments that combine narrative information with physical artifacts, and that support children in staging, enacting, retelling and modifying stories?

The two prototypes we present both explore the interplay between authored stories and stories invented by children during play. The first one, Psst, is more of an artistic “piece”, and it carries a lot of communicative intentions on behalf of the designers and artists involved. The second one, the AudioTheatre, is based on the work in Psst and on some of the lessons learned from having children play with it.

Method
The aim of our prototypes is to stage a process of collaboration, in two successive steps. In the first phase, the collaboration includes project partners from different strands – artists, designers, engineers, toy manufacturers, students, guest researchers. The process at this point is characterized by a large degree of creative freedom given to the participants. In the first phase we do not aim to include the users, i.e. children, in the process. In the second phase, the prototype is used to test play concepts practically together with children. Our prototypes are designed to be flexible and easily updated with new media or play formats.

We have also been working together with children – making interviews, drawings, or through organized play around a theme related to the design. In this respect we draw on earlier work on participatory design with children by Druin [4] and others.

Related research

The StoryMat project by Cassell and Ryokai [3] deals with supporting children's storytelling through a computer system that records stories connected to a physical interface; a mat and soft animals. The EU FET I3 KidStory project [1] has dealt with the development of storytelling technologies for children in a school setting using participatory design. The EU FET- I3 Pogo project [6] has similar aims as KidStory, but a decidedly design-driven approach. Earlier research at Interval resulted in the Zowie products: a combination of physical toys and cd-rom games. The physical toy represents the setting of the game (garden, pirate ship) and is also use as a tangible interface to navigation and gaming. The Zowie technology was bought by Lego and is not available at the market at present.

PSST! – THE PROGRAMMABLE SOUNDSCAPE TOY

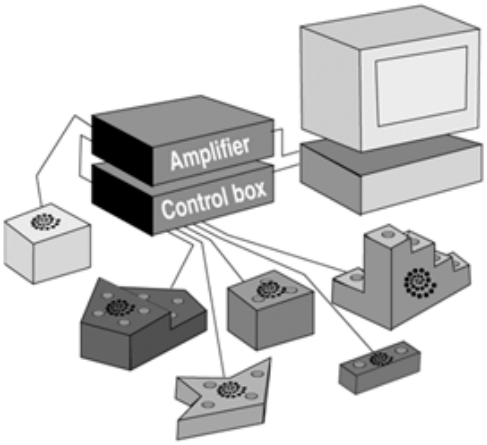
The work leading up to Psst started with a series of design sessions with children in a daycare center in Malmö. To each session we brought different stuff (cardboard, colours, clay) and some low-tech prototypes in order to map out play opportunities around sound and physical artifacts.

In order to go further in trying out toy ideas around sounds and stories, we implemented the Psst platform. Our aim was to enable iterative development of play concepts around character and sound. The Psst platform is designed to answer to the following requirements:

- It supports experiments with objects and sounds
- Children can play with it without too much supervision or instructions
- It is easily updated with new media, tagged objects or play formats
- It takes advantage of the physical space where it is standing
- It is robust and safe

The Platform

The technology is based on the use of ID-tags (I-buttons). In order to achieve flexibility, the setup is run from a



central computer where play formats and media can be updated easily. The different parts of the platform are:

- six play boxes with loudspeakers and contacts where toy characters can be placed.
- a control box which gathers data about characters' positions and forwards the information to the computer. Via the control box one sound channel can be switched out to one or several play boxes.
- nine toy characters with unique ID-tags
- a sound database
- a number play formats using the assets above for game-like or story-like activities. The programming of play formats is done in Macromedia Director.

The Creative Content of Psst

We designed the characters ourselves through a series of rapid brainstorming workshops. The actor Niels Bender recorded utterances in nonsense language for the nine Psstian characters, according to a systematic grid where each character has a set of phrases expressing joy, fear, anger, sadness, questions etc. In defining the voice for each character Bender used the dolls as a starting point. Each voice is rich in gestural quality, and it matches the body posture suggested by the dolls.

The parts of the sound database that comprises event and environment sounds was designd by sound artist Hanna Hartman. She worked closely together with us, and the style of her sounds and her way to combine sound elements into stories had a large impact on the first generation of play formats.

Evaluation

The Psst platform has been tested in families and in child day-care centres in Malmö and Copenhagen. We have tested it with children age 4 to 6. The Psst platform has on the whole matched the initial requirements. It has been tested in child day-care centers at several occasions. Although children sometimes have had difficulty to place the characters on the contacts, the platform has been surprisingly resistant also to heavy use. We have been able to add and modify play formats easily.

With Psst we started out with an idea of non-linear narrative, in the sense of creating a sphere of action for the user within the story. But play observations gave negative results in certain cases. What seemed to be most interesting to the children was to understand the system. The rule-based scenarios where the sound output is directly related to a character and a fixed position worked better than the scenarios relying on sequences of sounds.

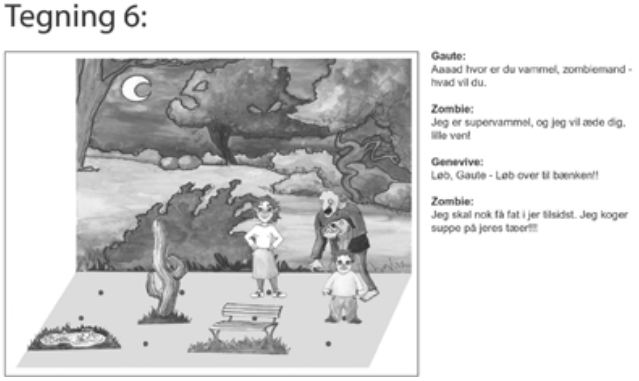
These observations from Psst caused us to re-evaluate our initial idea of non-linear narrative in favour for simpler structures.

THE AUDIO THEATRE

The AudioTheatre is a continuation of the ideas in Psst!, and it uses the same basic technology. Based on the observations in Psst we wanted to reduce the complexity, and create a more coherent system to be explored in the toy. We also wanted to strengthen the "do it yourself"-side of the toy. The concept was inspired both by the Lego Studio set, which lets children record and edit films, and by classic toy theatres in paper.

The physical set-up of the AudioTheatre consists of a "stage" with twelve contacts, and a number of painted backdrops. The "actors" are paper dolls cut in foam, placed on a plastic plugs with a small switch. Both paper dolls and backdrops have ID tags that can be read by the computer. The stage box contains a loudspeaker.

In the AudioTheatre there are two play modes, one for playing out prewritten stories, the second one to create your own stories. The two modes can be combined. The "playback mode" is designed to take children through a relatively complex series of manipulations, also serving as the instructions for how to use the "creative mode".



The contacts at the bottom of each actor: an audio plug connected to an ID tag, and a pushbutton to record or play back a recorded phrase.

There are two types of actors – readymade actors for the prewritten piece, and recorder actors tho which new lines can be recorded by the players. The stage bow also contains a loudspeaker. The prewritten piece is presented in a booklet that explains the moves of the characters on the stage.

Preliminary Evaluation

Small groups of children (one to three children, age 5 to 12) have tried out AudioTheatre. At first, we invited them to play through the prewritten piece. When they had played it through, we demonstrated how they could use the recorder actors.

All children that tested the AudioTheatre started to create stories of their own, involving a sequence of utterances and several characters. They had no problem to identify which actor that was being recorded, and say the lines for that specific actor. This had earlier been a problem in Psst.

The AudioTheatre comes closer to being a "narrative toy" than our earlier prototypes, in the sense that the narrative structures provided are visibly and audibly used by the children to build new stories for the platform. However, all children had difficulties to remember the position of the character relative to each utterance. Some of them resolved this by creating a chart over characters and positions during the play. In future prototypes, we would like to go further exploring how the timeline can be represented spatially.

CONCLUSIONS

Although Psst and the AudioTheatre are closely related in content matter and technology, they represent different ways to combine artistic creation and research.

In retrospect, Psst is to a high extent a "piece", a creative production that carries significance on many levels. The AudioTheatre on the other hand is more useful as a prototype: it is designed to explore a specific dynamic, it is split up between concept and content – which makes the observations more easily generalisable.

In Psst, research considerations and artistic design were mixed up. This has made a prototype that is rich in ideas but hard to evaluate or test. On the positive side, there are new and exciting ideas in the prototype – one of them is the combination of close-range sound recordings and small loudspeakers distributed in the room. On the negative side, the ongoing negotiation between different artistic temperaments – which does not come to a conclusion within the prototype – ends up as a system that lacks consistency, and thus gives poor opportunities for children users to learn and use the system.

The AudioTheatre is in this sense easier to apprehend. The designers have been asked to create content to a preexisting context. They have had a large amount of freedom to write and illustrate, but within the limits set by the concept. The AudioTheatre is also better suited to explore the research issues in the project, since its stages the reformulation of stories.

What I have tried to do here, a comparison between Psst and the AudioTheatre, is not completely fair since the prototypes are in fact iterations on the same basic theme, and the shortcomings of the first one are the starting point for the second one. The reason that I have chosen to make the comparison is that I think it tells something about the differences between the qualities necessary to an art piece and to a prototype in a research project. If a prototype is made to test a concept, it is almost an advantage from a research point of view that the prototype does not present too much interest in itself. On the other hand, as an inspirational tool, when it comes to raising questions instead of answering them, the art piece can be useful as a catalyst and battlefield for creative collaboration.

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