
Interactive Storytelling for Children

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Abstract

This one-day IDC 2010 workshop will bring together researchers from a wide spectrum of disciplines who share a common interest in understanding the challenges of interactive storytelling for children. Our goal is to explore the design, development, and evaluation of interactive storytelling for this target group from different perspectives, in terms of: i) the different technologies and interaction paradigms, and their benefits; ii) the different profile (e.g., age, needs) of children and the different contexts of use (e.g., school, home, museums, therapeutic settings; iii) the different roles of children in relationships of interactive stories (authors, consumers, or technology designers)

Keywords

Interactive Storytelling, Children, Design, Evaluation

ACM Classification Keywords

H5.2. Information interfaces and presentation (e.g., HCI): User interfaces

General Terms

Design, Experimentation, Human Factors

Introduction

Storytelling, meant as the process of creating narrative structures or of engaging with them, is pervasive in many aspects of children's life. In early childhood, e.g., at kindergarten or at home, storytelling is a means to support children's development, to help them express and assign meaning to the world, to develop communication, recognition, recall skills, and to enforce the relationships between peers and between adults and children. From primary to high school, storytelling activities are proposed to students in order to improve their linguistic and literacy skills, and to foster their ability of interpretation, analysis, and synthesis. In therapeutic contexts, the storytelling paradigm is used in different forms to engage disabled children and to support the development of a wide spectrum of cognitive functions and skills. Theme parks and museums often offer storytelling opportunities to engage young visitors and make their visit more educational and enjoyable.

Storytelling has received increasing interest on the HCI and IDC fields, where a variety of technologies and design approaches have been explored to foster new forms of children's creativity and to increase, through interactivity, engagement, enjoyment, fun, as well as the achievement of educational, cognitive, or interpersonal benefits. Today technology makes possible a wide range of interaction options, depending on whether children want to engage with stories

created by others (e.g., listen, read, look at, or interact with them), or create a story of their own.

Commercial software applications offer a variety of options for children as story "consumers": from speaking toys and dolls such as Microsoft Actimates Barney, to storytelling-based computer games, to interactive books. Despite their popularity, children's creativity in the story experience is usually limited by having them to choose from libraries of predefined actions and speech.

In contrast, the development of technologies for children storytelling resulting from academic research has tended to favor free expression, creativity and fantasy play by engaging children as story authors [5]. The value of this process has been assessed by a series of studies, drawing attention to the benefits associated with several paradigms of storytelling, from collaborative authoring in large group or classroom settings [7, 9], to authoring in playful environments [5, 8]. Few studies have also pinpointed the role of children as design partners of storytelling technologies and experiences, proposing different methods for this partnership and highlighting the benefits they gain from this process [12, 14, 16, 23].

Still, a large proportion of existing works assessing storytelling technologies or design and evaluation methods are characterized by a low number of participants. While exploratory user studies of this kind are necessary, the time seems right to discuss and validate the strong claims put forward regarding the positive effects for children in relationship to interactive storytelling, as well as the effectiveness of design and evaluation approaches.

In addition, when it comes to actual usage, the application of interactive storytelling technology in real contexts remains in most cases small-scale. If we want to have an impact of our work in the “real world”, it becomes more and more important to investigate interactive storytelling from a socio-contextual perspective, and to explore the conditions for its massive, long term use in real settings. While the evidence of benefits is an important trigger for promoting adoption, other ingredients must be taken into account when we attempt to achieve it on a large scale, and to make it sustainable in the medium-long term in the intended contexts of use. Such factors include the actual characteristics of all involved stakeholders, the environmental conditions and constraints of the situation in which interactive storytelling is going to be adopted, and the compatibility with the current practices in which this technology is meant to be integrated with.

The goal of this one-day IDC 2010 workshop is to discuss interactive storytelling for children along multiple dimensions, improving the current understanding of the domain and paving the ground for methodological and technical innovations in the field.

A look at the current state of art

In the following, we look at a series of projects involving the use of different technologies and interaction paradigms for children storytelling and highlight the benefits of each approach.

Physical spaces, as well as familiar objects are used in interactive storytelling experiences especially for their potential of engaging very young, pre-literate children

[1, 5]. Immersive interactivity in physical environments is investigated in room-sized environments such as KidsRoom [4], where children can explore a story through camera-tracked bodily movements. StoryRooms is an interactive environment meant not only for active exploration, but also authoring and sharing of stories [1]. Tangible objects such as stuffed toys can be used as tellers for child-written stories, combined with pre-defined or child-designed expressive behaviour. Examples are the Personal Electronic Teller of Stories - PETS developed by the University of Maryland [13], Rosebud [17], or MIT Media Lab's SAGE [3].

Several empirical studies have emphasized that substantial benefits are associated with the process of authoring interactive stories in collaborative contexts [7, 9]. Existing authoring tools and environments can support collaboration in authoring in a shared physical space or in virtual environments. KidPad [11] is a tool involving children in synchronous collaborative story authoring, by using drawing, typing and hyperlinking functionalities optimized for synchronous collaborative input (e.g., multiple mice) on a 2-dimensional zoomable space. Playful collaboration in the creation of stories using the playground metaphor is also explored in StoryMat [22] and POGO [8]. Distance-based collaboration for authoring stories in 2D and 3D virtual environments has been exploited in FaTe2 [15], or MyStoryMaker [21]. PUPPET [18] is an example of a virtual environment used for teaching basics of drama production and enactment to children.

Though research in the direction of creating active tools for supporting interactive storytelling seems to go in promising directions, real world contexts have as yet

little benefited from these advances and new tools. Their use might remain constrained to a context known or familiar for the researchers, or restrict to one-time efforts of extended usage, but lacking continuity. Few projects made it out of the time and space constraints and managed to achieve both wide applicability and continuity. An analysis of such wide-scale adopted tools or environments brings interesting insights into the factors contributing to a project's wide adoption.

PoliCultura is a contest launched in Italy in 2006, involving the participation of pre-school children to high-school students in the development of interactive stories using 1001stories authoring tool [9, 10]. The contest has now reached its third year of implementation, with an increasing number of participating classes (414 classes registered in 2008/09). The authoring process is based on a collective, whole-class effort, fostering collaboration among children and in-depth exploration of a common theme for the story. Some of the features facilitating wide adoption of 1001stories regard the simplicity of the tool; ease of access— the tool is web-based; versatility – it can be used for authoring any theme and accommodates varied types of collaborative patterns in story creation. Evaluation studies indicate that teachers are likely to enter the PoliCultura contest considering the substantial learning benefits that a class of students can draw from authoring with 1001stories [9]. If 1001stories facilitates collaborative creation of stories in school settings as whole-class or group efforts, StoryBuilder [2], produced by CBC4Kids (Canadian Broadcasting Corporation) is a web-based tool which enables children to create stories by distance-based collaboration. The tool enables the creation of multimedia comix-style stories in three modalities:

contribute to an on-going story by adding the next page; use pre-existing elements to create a story from scratch; collaborative page-by-page creation of a story among friends by editing and sending it by email. The project encountered wide success, with over 150,000 visits to the site and 2,200 submissions during the four months pilot phase. In this project, wide adoption was facilitated by a series of factors ranging from the simplicity of the tool (balancing the aim to leave space for creativity and the constraints of using ready-made story elements), easy access (log-in was required only after a submission was created), an easy-to-appropriate storytelling style based on comic-books conventions, flexibility, as well as the existence of various modes of contribution and various types of collaboration.

One important paradigm of research regards the involvement of children as design partners for developing new interactive technologies that adequately support their needs and foster socio-cognitive development. This approach has been investigated in the storytelling domain. For example, the Cooperative Inquiry method [12, 14] has been used for having children design their own browsing and searching functionalities to the International Children's Digital Library [24]. The Library is meant to offer children easy and widespread access to important children books, in their maternal language. Now it includes thousands of digitized books in 48 languages, and since the website has been launched in 2002, of has had over 1 million visitors from 166 countries.

Finally, at the level of fostering academic cooperation for research in interactive storytelling, it is worth mentioning the major academic forum of discussion of

interactive storytelling, i.e., the ICIDS Conference (International Conference on Interactive Digital Storytelling), launched in 2008, after two previous European conference series, TIDSE (“Technologies for Interactive Digital Storytelling”) and ICVS (“Virtual Storytelling – Using Virtual Reality Technologies for Storytelling”). Still, the ICIDS community *does not specifically address children*. They are more aimed at exploring interactive storytelling for a more general target. Most of their works focus on redefining the experience of narrative through interactive simulations of computer-generated story worlds (e.g., for interactive entertainment) or enrichment of virtual characters with intelligent behavior, involving concepts above all from Artificial Intelligence. They also aim at making interactive storytelling technologies more accessible to adult authors and content creators of different media backgrounds (e.g., scriptwriters, storyboarders, game designers). At European level, many members of the ICIDS community participate in the IRIS Network of Excellence “Integrating Research in Interactive Storytelling” [6, 20], a recent EC funded large initiative. Some partners of IRIS have agreed to participate in the Program Committee of this workshop. Our hope is that this event will offer an opportunity to promote collaborations among the ICIDS and the IDC communities and, through this synergy, foster innovation and research in the field of interactive storytelling for children.

Topics for Discussion

Keeping in mind that children are our target, the following broad areas to be addressed during the workshop include:

- *Novel Technologies and Interaction Paradigms* for interactive storytelling *authoring* and *consumption* (including web based systems, artificial intelligence environments, tangibles, mobiles, virtual reality)
- *Contexts for Interactive Storytelling*: formal educational settings (e.g., regular school environments), semi-structured educational settings (e.g., homeschooling), informal learning settings (e.g., museums, cultural institutions), entertainment environments (e.g., theme parks), therapeutic contexts (e.g., hospitals, rehabilitation centers)
- *The different roles of children* in relationships of interactive stories (authors, consumers, or technology designers)
- Interactive story “*genres*”, e.g., Story-based Game, Comics, Fantasy, Novel, Essay, Fiction, Drama
- Storytelling in relationship to *children’s profile* (e.g., age, special needs)
- *The creation process*: Individual vs. collaborative storytelling
- *The benefits* we expect storytelling to provide to different targets
- The “social” value of storytelling, e.g., for preserving memory, or for promoting civic involvement, social awareness of

environmental, ethical, historical or cultural issues

- The conditions for widespread, long term, sustainable adoption of interactive storytelling technology and applications in real contexts.

The above issues will be discussed through contributions of different types, which are preliminarily classified as follows:

- Innovations in Technology and Interaction
- Design methods
- Evaluation methods
- Case studies as well as completed or ongoing projects
- Evaluation studies
- Theoretical and pedagogical frameworks
- Controversial issues in (and critiques of) the current state of the field.

Expected Participants

We aim at bringing together researchers from a wide spectrum of disciplines - technologists, empirical researchers, HCI designers, educators, pedagogists, psychologists, artists - who work in interactive storytelling for children or are interested in exploring the challenges of this domain. Our purpose is to collect participation that integrates different views and ideas,

findings and experiences, and to promote an interdisciplinary exchange.

Expected Outcomes

From the submitted papers and the live discussion during the workshop we aim at:

- obtaining a good picture of what technological solutions we can offer for interactive storytelling and which benefits we expect them to provide for children, classifying them along different profiles of children and different contexts of use
- establishing what is the current empirical evidence to support such claimed benefits (or what is missing)
- identifying novel design concepts that extend the boundaries of what interactive storytelling can offer to children
- motivating appropriate design and evaluation methodologies
- identifying requirements and constraints for a wide-spread, long term, sustainable adoption
- paving the ground for creating a multidisciplinary community in the domain of interactive storytelling that specifically address children as target group
- outlining directions for future research and collaborations in the field.

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