Interactive Storytelling for Children

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ABSTRACT
Since the nineties, storytelling has received increasing attention in the HCI, IDC, and AI communities, exploring the potential of interactivity and multimedia as a means to promote engagement, enjoyment, fun, to foster new forms of children’s creativity, and to increase the educational benefits of traditional storytelling for this target group. The time seems right to look at the field with critical eyes and validate the claims put forward regarding the positive effects of interactive storytelling technology for children, as well as the effectiveness of existing design and evaluation approaches. The purpose of this full-day IDC 2010 workshop is to bring together researchers from a wide spectrum of disciplines who share a common interest in understanding these challenges and to create a research agenda that can orient application and theory in the domain of interactive storytelling for children.

Categories and Subject Descriptors
H5.2. [Information interfaces and presentation (e.g., HCI)]: User interfaces

General Terms
Design, Experimentation, Human Factors

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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, and recall skills, and to enforce their relationships with peers and adults. 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. For disabled children, the storytelling paradigm is used in different forms 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.

Since the nineties, storytelling has received increasing attention in the HCI, IDC, and AI communities, exploring the potential of interactivity as a means to promote engagement, enjoyment, fun, to foster new forms of children’s creativity, and to increase the benefits of traditional storytelling for this target group. Today, from academia or industry, a wide range of technological solutions, interaction options, and design methods are available depending on whether children engage with stories created by others (e.g., listen, read, look at, or interact with them), or create a story of their own.

The time seems right to look at the field with critical eyes and validate the claims put forward regarding the positive effects of interactive storytelling technology for children, as well as the effectiveness of existing design and evaluation approaches. This is a prerequisite to understand how interactive storytelling can move from the small-scale short-term use that characterizes it in most contexts, to a massive, long-term adoption. Finally, it is equally important to identify new directions of investigation – paving the ground for the creation of a research roadmap that can orient application and theory in this field.

The purpose of the full-day IDC 2010 workshop “Interactive Storytelling for Children” (http://hoc.elet.polimi.it/ide/2010/) is to bring together researchers from a wide spectrum of disciplines who share a common interest in the above challenges. The rest of this paper provides a short background of the current state of the art in the field, provides an overview of the most significant contributions received, and outlines the key topics for discussions.

THE STATE OF THE ART AT A GLANCE
Today’s technology makes possible a wide range of interaction options for interactive storytelling, either for supporting children’s engagement with ready-made stories (e.g. listen, read, active exploration) or for involving them as active story authors. Commercial software applications...
and devices offer a large gamma of options for children as story “consumers”: from speaking toys and dolls and storytelling-based computer games, to interactive books. Despite their popularity, children’s creativity in the story experience is usually limited. By 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 [2].

The value of engaging children as active creators of stories 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 [4, 6], to authoring in playful environments [2, 5]. Existing authoring tools and environments can support collaboration in authoring in a shared physical space or in virtual environments. Examples of tools and environments supporting on-location collaborative story authoring are KidPad [9], StoryMat [2] and POGO [5]. Distance-based collaboration for authoring stories in 2D and 3D virtual environments has been exploited in FaTe2 [10], or MyStoryMaker [12]. Some 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 [7, 8, 11, 13]. For example, the Cooperative Inquiry method [7, 8] has been used for having children design their own browsing and searching functionalities to the International Children’s Digital Library [14].

Still, a large proportion of existing works assessing storytelling technologies or design and evaluation methods are characterized by a low number of participants. In addition, 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 to 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 (e.g. [1, 6]). 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. Such factors may 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 interactive technology is meant to be integrated.

Finally, at the level of fostering cross-country cooperation for research in interactive storytelling, it is worth mentioning two initiatives (even though not specifically addressing children): the EC funded IRIS Network of Excellence “Integrating Research in Interactive Storytelling” (http://iris.scm.tees.ac.uk/) [3] and the major academic forum of discussion on interactive storytelling, ICIDS – the International Conference on Interactive Digital Storytelling.

CONTRIBUTIONS FROM THE SELECTED SUBMISSIONS

Twenty two papers were submitted to the workshop, authored by researchers from a wide spectrum of disciplines - technologists, empirical researchers, HCI designers, educators, pedagogists, psychologists, artists. Among the many excellent submissions received, the Program Committee selected thirteen works for being presented during the event, leaving space for interactive discussion and informal knowledge sharing. The selected contributions explore the domain of interactive storytelling for children from different perspectives, and provide contributions along multiple dimensions: Education and learning

The paper by N. Di Blas and L. Ferrari, “Kids Create Multimedia Stories at School. An “Authentic” Educational Value?” addresses the educational benefits associated with authoring interactive narratives in formal education, leaning on empirical data resulting from a large-scale project running for the past four years in Italian schools. Q. Burke and Y. Kafai (“Programming & Storytelling: Opportunities for Learning About Coding & Composition”) explore the relation between storytelling and programming, bringing evidence of how children can develop narrative skills by programming interactive stories. In their paper, “The relevance of storytelling in learning and memory”, S. Henriques and Z. Fidalgo take a more theoretical stance, tackling the influence of different expression formats – verbal narrative and verbal script vs. non-verbal – on processes of memorization and recall in school children.

Two papers focus on the use of interactive storytelling for supporting the balanced development of children with special needs. N. Verigakis et al. (“Educational Interactive Storytelling for Narrative Comprehension and Recall in Dyslexic Children: Employing a Mythic Narrative Structure”) take up an interesting perspective for fostering the development of literacy skills in dyslexic children: building on a parallel with the structure of the monomyth in oral tradition, they propose a framework for the design of an interactive storytelling system meant to foster narrative comprehension and recall in dyslexic children. In “Stories, Drawings and Digital Storytelling: a Voice for Children with Special Education Needs”, L. Botturi and C. Bramani present results from the implementation of a story authoring project with children with special needs; their approach is based on the valorization of the expressive potential of children using a mix of low technologies and traditional illustration tools.
Social issues in interactive storytelling

Approaching interactive storytelling as a social process can bring into evidence issues related to the context in which storytelling experiences take place, to the dynamics of participation and collaboration, as well as shed light into the effects associated with storytelling activities spanning participants’ attitude towards social issues, their relation with the community or their contribution as critical thinkers.

F. Decortis (“How can children use the image in their narrative activity?”) show how an existing social context – intercultural computer clubs – can support interactive storytelling activities; they report from a case where an intergenerational group – caretakers and children – have been involved in the development of a common interactive story by using video technology and MIT’s visual programming environment Scratch. Through their comparative analysis of two projects carried out in two far away and significantly different countries – Switzerland and Israel, E. Rubegni and N. Sawhney (“Supporting Digital Storytelling among Children: Experiences from Projects in Lugano and Jerusalem”) showcase how digital storytelling can be supported by different tools and approaches in formal and informal education settings, each engendering different collaboration and engagement patterns. The paper by C. Ritter et al. (“A Critical Reflection on the Use of Storytelling and Game Technology to Motivate Children to Deal with Socio-Critical Issues”) makes an overview of state of the art technologies and approaches in storytelling and gaming with a social purpose, focusing particularly on their role in motivating children to deal with socio-critical issues. G. Wilson and S. McCrickard (“Collaborative storytelling as a tool for participatory design with children”) take a different stance to the interplay between creativity, storytelling and design: they show how children’s creativity can be exploited for participatory design of technology, and exemplify through a proposal in which children are involved in authoring comic books.

Thinking beyond the desktop

Interactive storytelling experiences do not restrict to the keyboard/mouse/desktop screen paradigm; especially in informal settings, interactive storytelling can be supported by a wide array of technological solutions for capturing, editing, exploring and sharing narratives, from mobile phones and camcorders to pinhole cameras and multi-touch technology. The use of different tools incurs differences both in the dynamics associated with the creative process, as well as in the associated effects. A. Batillono Tillon and F. Decortis (“How can children use the image in their narrative activity?”) explore interactive storytelling with a focus on the role of the image in narrative construction, and exemplify with two cases where different technologies supported storytelling experiences for mixed-generation groups: pinhole cameras and mobile phones. Two papers explore, from different perspectives, issues related to mobile storytelling. J. Fails et al. (“Interactive Storytelling: Interacting with People, Environment, and Technology”) describe Mobile Stories, a narrative system designed in cooperation with children, which enables the collaborative creation of narratives using mobile devices. Mäenpää et al. (“Mobile storytelling - community, collaboration and context in different age groups”) explore the mobile storytelling paradigm with a focus on collaboration and community engagement; they draw on two cases where mixed-generation groups have been involved in authoring short stories using their mobile phones. Haipeng Mi et al. (“RoboStory: A Tabletop Mixed Reality Framework for Children’s Role Play Storytelling”) present RoboStory, an interactive tabletop storytelling system which enables children to create stories in collaboration, based on a framework which combines multi-touch technology, camera tracking, and digitally-augmented everyday objects.

DISCUSSIONS AND RESEARCH AGENDA

The core of the workshop will be collaborative live discussions: discussions about each paper, discussions about general issues, and, most important, discussions about the “research agenda” - which research questions appear to be interesting today, and which approaches seem more promising to pursue?

The discussion will evolve dynamically as the workshop will proceed, through short presentations of selected submissions in a panel-like format, soliciting the interactive involvement of all participants. We can anticipate here some broad themes that we will try to focus on:

- Interaction and technology. What new technologies and interaction paradigms are emerging as relevant for the field of storytelling for children, and what difference can they make? For example, are smart phones or iPads (or any emerging delivery platforms) capable of triggering new forms of storytelling experiences, or will they remain yet another delivery platform? What are the implications of emerging interaction paradigms like those supported by Wii or multi-touch technology? Which of them better support storytelling experiences involving children, in which context, for which goals?

- Innovative narrative genres. Are we putting the “old fashioned stories” on (new) digital platforms, or are these platforms supporting the development of truly new narrative genres for children’s storytelling? I.e., something that retains the value and the charm of “traditional” stories, but also exploits technology in a full sense by means of new narrative paradigms and new forms of engagement?

- Context, impact, and evaluation. In which contexts is interactive storytelling for children likely to play more effectively? At home, at school, at a museum or theme park or other outdoor settings? How can we promote widespread long-term adoption of interactive storytelling in these contexts, and what are the factors that may prevent it? Can interactive storytelling become part of a formal education curriculum? In informal education settings (e.g., in a
museum, an exhibition, an archeological or natural site), how can interactive storytelling move from adding fun to children’s experience to promoting authentic learning? In these different situations, is interactive storytelling better supported as an individual or as a group activity? Can we envision expected impacts of storytelling experiences that adequately integrate considerations related to the implementation context? How do we evaluate such an impact, and define any scientifically grounded but practically viable measures?

**Value.** From a broad perspective, what is the overall “value” of developing digital stories for and with children? Does children’s engagement in design, creation, or consumption of interactive narratives result into personality and cognitive growth, or does it bring a value in the social and ethic sphere? For example, can it become a means for “inclusion”, integrating individuals with diverse needs in a community or integrating a minority in a larger community?

As final contribution to the IDC community, the workshop participants will attempt to build together a research agenda, identifying the 10 most relevant questions for future activities in the field of storytelling for children, and, in relation to them, but also independently, the 20 most interesting approaches to pursue. Approaches may cover design and/or evaluation methods, interaction paradigms, contexts which are specially challenging for investigation, and sets of guidelines for specific situations or for target groups with particular needs.

The output of this exercise will provide a preliminary reference framework for interactive storytelling in relationship to children and can contribute to orient present and future activities of researchers, practitioners and PhD students in the field. Not everyone will necessarily agree with the whole agenda in all its aspects, but confronting with it will help those who are active in this domain or start investigating it to sharpen ideas, argumentation schemas and methods. Equally important, working together on a research agenda will pave the ground towards building a true international community in interactive storytelling for children.

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**REFERENCES**


