Designing a children's digital library with and for children

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ABSTRACT
This paper describes preliminary work carried out to design a children's digital library of stories and poems with and for children aged 11-14 years old. We describe our experience in engaging children as design partners, and propose a digital library environment and design features to provide an engaging, successful learning experience for children using it for collaborative writing.

KEYWORDS: Digital library, design partners, collaborative writing environment.

INTRODUCTION
Many of today's digital libraries (DLs) are not designed for children [1]. To design good, usable DLs for children, one requires the knowledge about who will use them, what they will be used for, the context and the environment in which they will be used, and what is technically and logistically feasible.

Although subject-based DLs are beginning to emerge on the Web, and promise us opportunities we never had with traditional libraries or even the Web, DLs in general have not taken up in a "big" way compared to, say the Web. One reason for the Web becoming popular almost overnight is the introduction of Mosaic, the graphical user interface to the Internet, making it "very easy" for anyone to publish and retrieve information [4]. In contrast, the majority of current DLs is mainly repositories of information, hence, users' experience in DLs is passive and less engaging compared to the Web. Therefore, if DLs are to be popular with children, they need to be fun, easy-to-use and empowering them both as readers and authors.

Using a concrete example to demonstrate our design philosophy and research approach in addressing these two observations, we describe preliminary work in the design of a DL of stories and poems for children aged 11-14 years old.

Our DL illustrates two distinctive objectives: (a) *engagement of children as design partners* to ensure that the DL is designed with and for children; and (b) *engagement of children in the use of the DL* to ensure a successful learning experience for children in collaborative writing.

ENGAGING CHILDREN AS DESIGN PARTNERS
Designing for users is a well-established design principle. Recognising that children's engagement is important in the success of our project, we invited a class of twenty-three 11 years olds and their English teacher at a secondary school to be our design partners [1, 3]. The teacher was consulted on the proposed activities and schedule of the project. Two sessions were conducted in November and December 1999 during a one-hour-ten-minute English lesson to gather children's ideas on the design of the DL.

In the first session, we introduced the concept of DLs to the children. We explained our research project and objectives. The students felt important at being invited to be design partners in our research project, an approach encouraged by [3]. We wanted the children to work in teams to brainstorm design ideas for the DL environment with as little input from us as possible. Teams of five or six children were formed. The teams had two weeks to think about the design features. To help them with the assignment, they were provided with URLs to browse sample DLs and kids' websites. The children were to submit their design ideas before the second session.

What the children wanted in the digital library was entertainment and fun. The teams made useful suggestions and gave us enlightening insights into the likes and dislikes of children of this age group. One suggestion was that the library could be divided into different areas: (a) study area to allow reading or browsing; (b) librarian area to make enquiry; (c) games area to play games; (d) dictionary library to search for meanings of words; (e) actual library to search for books. Another suggestion was to provide different forms of help such as having a librarian at the "front desk", a search box and a random book selector. However, some suggestions were not easy to implement and did not seem to serve any purpose. One suggestion was to have books falling from the shelves and only the relevant book would be opened and "caught" to be read. Please refer to http://www.cs.mdx.ac.uk/dl/St.Albans/ for ideas submitted

by the [1]four teams.

The second session took place three weeks after the first session. It started with the children browsing the [2]New Zealand School Journal. The children were then brought together to discuss what they liked and disliked about the New Zealand School Journal. The aim was to tease out children's likes, dislikes, curiosities and needs. Each team also presented the design ideas proposed for the DL environment, which they discussed in their groups after the first session. At the end of the second session, a list of design features the children liked to be included in the DL collaborative writing environment was formed, which we will describe in the next section.

ENGAGING CHILDREN IN THE USE OF THE DIGITAL LIBRARY

Ellington *et. al.* propose four basic factors to match the natural learning processes of humans, and thus ensure successful learning experiences of learners by [2]: (F1) making materials stimulating and interesting enough to make learners *want to learn*; (F2) incorporating sufficient activities to help learners experience *learning by doing*; (F3) providing sufficient channels of *feedback* to learners; and (F4) enabling learners to *digest and relate* what they have learned to the real world.

Applying the theory proposed by Ellington *et. al.* and using inputs from the children as well as drawing upon design guidelines highlighted by other researchers working with children [e.g., 1, 3, *etc*.], we highlight in subsequent paragraphs the proposed DL environment and the main design features (see Figure 1) with the aim to provide children with an engaging successful learning experience. The intention is to create a dynamic DL collaborative writing environment empowering the children to be both readers and authors.

DL environment

In this DL environment, children can query and browse stories and poems written by other children (applying F2). The distinctive feature in this DL environment is that it also allows the children to create and submit their stories and poems to a temporary workspace permitting others such as their teachers and peers to read and give feedback by annotating their stories and poems (applying F2, F3, F4). The temporary workspace contains collections of annotated drafts and improvements made to the children's work. It also includes references the children authors collected to help them in the writing process. Only stories and poems approved by the teachers can be submitted to the DL, thus ensuring the quality of documents. Resources to help the children authors include links to: (a) other related DLs; (b) helpful on-line dictionary, thesaurus, and spell checker; and (c) relevant computer-based training packages to teach them

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1 The four teams were monkeys, whales, eagles and tigers.

2 URL for New Zealand School Journal is http://www.nzdl.org/cgi-bin/schooljlibrary?a=p&p=about&c=schoolj.

skills on, for example, how to write better (applying F2).

Design features

When designing technologies for children, designers can also make things that ask for laughter, excitement and creativity [3]. The activities and screen layouts are presented as an adventure story engaging users in a treasure hunt for books (applying F1; see Figure 1). In addition, as suggested by the children, the DL environment also provides: (a) a display of the top ten stories/poems (applying F1); (b) information about the authors (applying F1); and (c) message board to post and discuss ideas (applying F3, F4).

CONCLUSION AND ON-GOING WORK

We described initial work designing a children's DL of stories and poems addressing the need to engage children as design partners, as well as, providing a dynamic DL environment to encourage active engagement of the children. We hope the project will highlight useful insights and forge new research directions for work with children and DLs. On-going work involves conducting one-to-one evaluation sessions with the students and building the DL environment on top of the New Zealand Digital Library software (http://www.nzdl.org/).
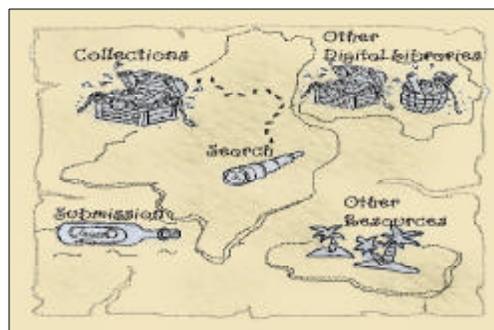

Figure 1: Preliminary design of the menu interface

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