Merging Physical and Digital White Canvas to Unleash Children's Creativity

Cristina Sylla
University of Minho
engageLab/CIEC
Guimarães - Portugal
sylla@engagelab.org

Ana Carina Figueiredo
University of Minho
engageLab
Guimarães – Portugal
ana.carina.figueiredo@
engagelab.org

Ana Lúcia Pinto
University of Minho
engageLab /CIEC
Braga - Portugal
aluciapinto@engagelab.org

Pedro Branco
University of Minho
algoritmi-engageLab
Guimarães-Portugal
pbranco@dsi.uminho.pt

Nelson Zagalo
University of Minho
engageLab/CECS
Braga-Portugal
nzagalo@ics.uminho.pt

ABSTRACT

This workshop aims at stimulating children's creative thinking, involving them on drawing their own original graphic-narratives. We propose to challenge children to create and draw a story for an empty book as well as the corresponding digital content, which will be triggered through the interaction with the physical book. The task involves imagining a story, thinking and reflecting about it, discussing it with a peer, take decisions, develop a storyboard, and finally bring it to life on the physical book as well as on the tablet device. After the presentation of the task by the workshop organizers, children will be given all the material they need to concretize the proposed task and develop the content all by themselves. As revealed by previous research involving in the creation of graphic-narratives is a powerful task where children take over multiple roles, becoming authors, directors, scripters, performers and narrators, thus creating multiple layers of interaction.

Author Keywords

Tangible Interfaces, Hybrid Books, Graphic-narratives, Storytelling, Drawing, Children.

ACM Classification Keywords

H.5.2 **[User Interfaces]**

INTRODUCTION

Rich contexts and situations stimulate children's natural need for exploration and discovery [15], and research has shown that well-designed technology has the potential to create rich environments, providing challenge and adventure, while encouraging exploration and imagination [15, 7, 11]. Indeed, technology has the potential to provide new experiences and interactions that go beyond what is possible in the real world [15]. Research has also highlighted the importance of interacting with the right materials, which promotes a "creative thinking spiral" [12]. By doing so children "*imagine* what they want to do, *create* a project based on their ideas, *play* with their creations, *share* their ideas and creations with others, and *reflect* on their experiences" [12]. Digital manipulatives [10] also referred to as tangible interfaces - TUIs [5] or tangible systems have emerged as powerful challenges to the way users interact with digital technology. Recent technological developments in this field try to extend the user's interaction experience, empowering them to craft or customise their own digital manipulatives. In this workshop we propose to give children the tools for creating their own physical / digital storybooks.

RELATED WORK

There are numerous tangible systems where children can engage in narrative creation, some examples are [9, 14, 3, 8]. Jabberstamp [9] allows children to add audio to their drawings by pressing a special rubber stamp onto the page; when children touch the marks of the stamp with a small trumpet, they can hear the sounds playback, retelling the stories they created. t-words [14] consists of a set of rectangular blocks, which can be used to record and play sounds, words, sentences or stories. Children can customize the blocks by drawing on top of their surface. Users can record audio in one or more blocks; the blocks can be arranged and rearranged creating different audio sequences.

The Electronic Popables [8] is an interactive pop-up book that explores paper-based computing, integrating traditional pop-up mechanisms with thin, flexible, paper-based electronics, combining interactive elements such as sound, lights and mechanical movement. The Bridging book [3] is a children's mixed-media picture book that blurs the line between printed and electronic books. The Bridging book consists of a printed book and a digital device, placed side-by-side, with synchronized content. The printed illustrations on each page of the physical book are extended into the device's screen, offering further interaction. Inspired by these systems we developed an interface that combines a physical book that interacts with a tablet device. However, differently from the above-described approaches, children can develop and create their own personal content. In the following section we describe the process.

WORKSHOP AIMS AND SCOPES

As previously stated, this workshop proposal aims at empowering children to create their own stories for a physical book, as well as for a digital device, in which the content of the physical book will be extended.

General Overview of the Workshop

The workshop will be carried with a group of ten children, aged between eight and ten, and involves four phases: imagining, planning, developing, and implementing. The organizers will begin by introducing the activity and the materials to the children; afterwards children will be proposed to work in groups of two. Each group will get a large format drawing block, drawing material, a book with blank pages with embedded magnets, an iPad, and a stylus. From then on children take over the command. In the following hours participants are proposed to think about a story they want to create, and draw a storyboard (fig. 1), taking into account the kind of interaction they want to create between their drawings on the book and the digital content that will be displayed on the tablet device.

Figure 1. Storyboard fragment.

When all the details are thought over, each group can start drawing their story on the book and on the tablet device.

In the last part of the workshop each group will be proposed to present their story to the others, and change opinions about each other's work.

Technical Description

Each page of the book has a magnet embedded that allows the tablet device to detect and identify it, displaying synchronized content (fig. 2).
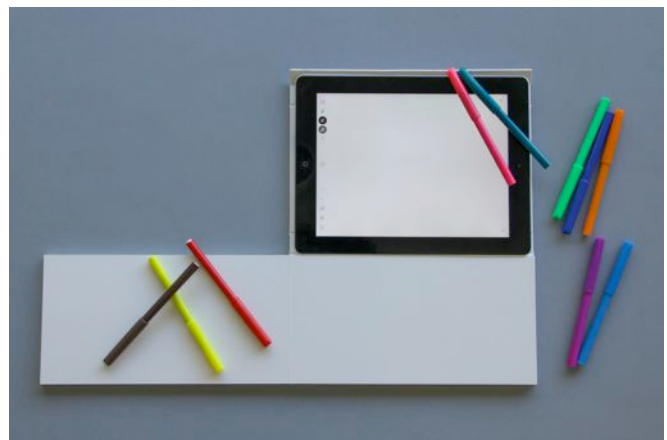

Figure 2. iPad displaying the drawing app, digital device with empty book, synchronized page (from top).

During the workshop children draw their stories on each page of the book. A dedicated drawing app allows them to draw the digital content on the iPad, which will be associated to each page of the book. Thumbing through the book will trigger different digital content, according to children's storyboard. Additionally, children can record audio, into each page of the book and link it to the digital content.

WORKSHOP EXPECTATIONS

This workshop aims at proposing children a new storytelling experience, by actively involving them on the creation of their own graphical narratives.

Studies on children's early exposure to narratives have disclosed that involving in storytelling (be it hearing, telling, or drawing stories) has a major influence on the development of children's early literacy skills, being a creative and playful way of linguistic exploration [2, 6, 13]. Moreover, storytelling is a social activity [1], which helps children to develop their ability to imagine alternative possibilities and work out their implications, while learning to handle contributions made by their peers, and responding to them adequately [4]. However, the importance of narratives also encompasses other developmental dimensions, such as helping children to learn about the world and create their own identity [6, 16]. When children think about a story, plan the storyboard, thinking about all the details, and finally draw it, bringing it to life, they go beyond just telling a story. As the authors of their own graphic-narratives [16] children embody the narrative, taking over multiple roles, becoming authors, directors, scripters, performers and narrators [16:1], thus creating multiple layers of interaction.

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