# Books Beyond Print

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## ABSTRACT

We present 3 projects on interactive books. The **Singing Book** is an illustrated children book augmented by audio of songs, which are activated via web cam.  The **Interactive Aunt Pepper** encourages to understand the content of these songs by requiring manipulation of the accompanying illustration by mouse, or by life hand gestures via Kinect. In the **TERENCE** EU project the goal is to provide an interactive environment to develop text comprehension of children, via offering stories to read and games used in-between reading tasks to test text comprehension success.

## Author Keywords

Interactive book, interactive illustration, augmented book, multitouch, Kinect

## ACM Classification Keywords

H5.2 User Interfaces

## INTRODUCTION

In the recent years hand-held devices with touch screens – tablets, smart phones – are proliferating. One of the surprising experiences is the ease and curiosity with which kids and even babies handle these devices – urging manufacturers to market cheaper and kid-safe tablets  [4].

Somewhat lagging behind is the content development for these devices. Particularly, we are interested in how the traditional, illustrated book genre can exploit the interactive capabilities of these devices. In our lab  - being part  a reputed art and design university, where creativity, aesthetic appeal, social sensitivity are "in the air", -  one of the research themes is the interactive book, in its broadest sense.

## SINGING BOOK

A book was designed with characteristic illustration on the left and verse and music on the right, for 6 pieces from the well-known  Aunt Pepper series for kids. We used IN2AR [2], an Adobe Flash AS3 Library that allows to detect images by using standard webcams, in poor lighting conditions and partial visibility too. Once an image is recognized, the corresponding song is played. The recognition and audio run on a server, allowing the usage anywhere via net connection and a web camera or the camera of a handheld device (phone, tab).



**Figure 1. Children listening to a song from the book. In the right corner a pile of small take-away images which also activate a song.**

## INTERACTIVE AUNT PEPPER

The illustrations designed for the Song by Page Turn project were turned into Flash animations, containing subtle idle animations (planets moving, eyes blinking) as well as actions to be performed by the child. The Flash image is visible while the corresponding song is played. The child has to perform the action according to what the song is about (e.g. cleaning the face of the Moon, giving apples to a small bird). In other cases, some location is to be found by moving the visible part of the image (rooftop with a garden).  This Flash application, written in ActionScript 3 can be interacted with via the web, from a web browser.

We also experimented with mapping the Flash mouse events to gestures, to be recognized by a Kinect. We used the OpenNI library, mostly because of the Primesense NiTE

middleware [1]. For reasons of efficiency we don't track the whole body, only one hand of the user. This application informs the Flash app about the motion of the hand and the recognized gestures through a local TCP connection.

In this version children could perform actions by hand gestures (sweep, push, circular motion). The type of gesture to be performed was hinted by a small animated icon, being part of the projected illustration.



**Figure 2.  A child turning the mill wheel in Interactive Aunt Pepper by hand gesture.**

We tested both versions with 22 children of age 9. They liked the idea, they were very motivated to interact with the illustrations, especially in person. We also found some issues to be  improved:

- the free activities were not as motivating as the goal-oriented ones for the children,
- with some actions, the repetitive motion (both by mouse and by gesture) were too tiring,
- situations without visible feedback of the hand (in case of the gesture-based activation) were  hard to understand and master.

### TERENCE

In this ongoing EU FP7 STREP Project  [5], the goal is to provide software to help poor comprehenders of 7-11 years to develop text comprehension skills. The key idea is to offer short stories according to the level of the child, and test the text comprehension via so-called smart games. In our team we designed illustrations and smart games, as well as avatars representing the child through the entire learning process.

For the special target group we had to make illustrations which primarily serve as motivation for usage, and not

providing redundantly information also conveyed by the text which is a subject of testing comprehension.



**Figure 3.  An illustrated  page with the line of small images serving as reference for progress in the story.**

The design of games to test comprehension of e.g. temporal relations and facts mentioned in the text poses also a challenge. The games should be generated on the fly, according to some game template and content (textual, and graphical).
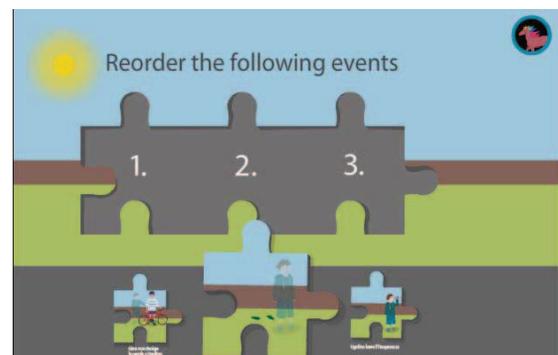


**Figure 4.  A puzzle-like game to test the comprehension of temporal order of events.**

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