Augmented Toy Environments: Shareable Tangible User Interfaces For Edutainment

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Augmented toys and smart toys are traditional toys or game pieces that are equipped with sensing technology, computing power, and communication capabilities, allowing designers to incorporate novel gaming elements previously available only in video games into traditional "real world" objects [5, 6]. They attempt to retain the benefits of computer-supported interaction without diminishing the social aspect: children play together by sharing the playset and their stories, which consequently defines an augmented toy environment as a (set of) "shareable" tangible user interfaces, which allow and encourage simultaneous and co-present interaction (see Fig. 1) [4].

Playing games has always been an important and essential part of human culture. Not only does playing serve the purpose of recreation and amusement; it also improves psychomotoric skills, and can often be considered as a common ground for socializing [1, 3]. While video games greatly enhance the capabilities of game design, thus potentially improving both the entertainment value and learning experience of a game (often summarized as "edutainment"), their rather solitary nature of interaction has often been criticized for lacking the social benefits of traditional games.

Figure 1: Children playing with the Augmented Knights Castle.

We developed the Augmented Knights Castle, a Playmobil Middle Ages playset that realizes such a shareable environment [2]. The AKC utilizes RFID technology to unobtrusively and unambiguously track the play figures (see Fig. 2). It moreover gives tactile, visual and audible feedback to the children based on this tracking: if, for example, a dragon knight is placed close to a king's knight, the background music becomes more dramatic and battle sounds are played.
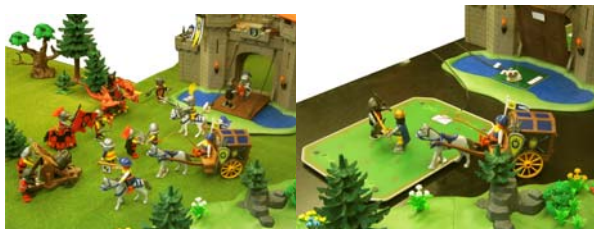

Figure 2: A scene from the AKC playset (left); the same scene with disclosed RFID antennas (right).

We furthermore integrated "smart toys" such as the magic potion bottle or the magic book into the environment (see Fig. 3): the magic bottle, for example, allows the children to administer a "reviving" potion to wounded figures (the potion must be "activated" by shaking it first), while the magic book provides the interface to configure the AKC environment in a playful way; it is also an essential part of the educational scenarios.

Currently, we are conducting a user study to evaluate the benefits and acceptance of this shareable pervasive computing environment. By attending this workshop, we hope to receive valuable feedback through discussions and comments, as well as meeting researchers working on similar topics and projects.

Figure 2: The magic potion is administered to wounded soldier during the play (left), and the magic book used for displaying information and configuring the playset and scenarios (right).

References

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