Fairy-tale NIMaH, a digital educational tool for girls of age 3-6 years old

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1 Introduction and Motivation

While the requirements for IT specialists are growing more and more every day, the numbers of students choosing STEM (science, technology, engineering and mathematics) fields to continue their education have dropped since last decade. Furthermore, one of the major problems concerning STEM fields nowadays is underrepresentation of women, which are currently a minority group, especially in Computer Science. Non-profit foundation Code.org, dedicated to growing computer programming education, published the above info and the video “What most schools do not teach”, in order to rise concern for this gap in representation, which poses an alarming problem [Code.org 2013].

Inspired by the activities of this organization and the quote from Frederick Douglass: “It is easier to build strong children than to repair broken men.”, was initiated the idea of educating children attending nursery-school, with specific focus on girls. Moreover, since the ineluctable approach of digital era led to the involvement of young children as “digital natives”, teaching skills of utilizing efficiently technology (e.g. a computer) at a very young age is becoming a necessity.

This project suggests the creation of a digital game to educate children (2-6 years old) with computational thinking skills before the attendance of primary school. It aims to develop skills that will act as an intervention for more natural inclusion of this minority in the digital era. Through play, children will further develop linguistic and cognitive skills like: reasoning, problem solving, planning and remembering. Based on research in child development, psychology, education, and technology, it was concluded that digital story-telling would act as a driving force for a highly interactive experience [Garzotto et al. 2010]. Through story-telling, children will foster their imagination and encourage their creative capacities.

This learning tool is based on the following short fictional story: ‘NIMaH is a girl name of arabic origin meaning devotion. NIMaH is a very smart little fairy, who likes a lot fairy-tales. She has many friends and she enjoys spending time with them. She is characterised by the devotion (as her name suggests as well) to help her friends grow up and develop different skills. Narrating short stories that she either learned from her parents, read on books or created with her imagination is her favorite hobby.’

2 Technical Approach

The target of NIMaH (Natural Interface of Machines and Humans) is to give children the opportunity to communicate solely with the computer using their real life toys to enable tangible game play. This way, the classic play idea is preserved and children are playing actively rather than sitting passively in front of the screen. The communication with the computer is realised through their individual smart toys, which accommodate RFID Tags or QR Codes in order to be identified either by the dedicated reader or the digital camera of the computer. RFID and QR Codes are relatively cheap technologies, thus the tool would be affordable by every child in the world. Children will be able to create their imaginary world through the combination of real-play with digital-play.

The main idea of NIMaH is to connect together tangible play and storytelling. The tool tends to avoid text-based interaction with the computer, since most of the pre-schoolers have limited knowledge and literacy. The best way to communicate with children is through virtual and audio literacy, thus NIMaH is combining together images and audio recordings to create stories.

Parents and educators have the opportunity to build a digital collection of the children’s toys making modifiable content to adjust to the child’s level of development. Digital stories will then be made-up by using characters of their choice from multi-media and real toys from the collection in their house or school. So the tool is highly customisable and effective for children of different age and level of development. It can also be used to perform treatment for children with disabilities and learning difficulties.

As it can be noticed, parents and educators are not excluded from the tool, since we find it significant and effective the support of adults in pre-schoolers development [Downey et al. 2004]. So, the tool was designed to be simple and efficient in order to be used by people of any level of technical computer knowledge and to achieve universal accessibility. NIMaH follows the “design for all” principal of ICT tools and can help to achieve equality and social inclusion of all children around the world.

NIMaH is a learning and teaching tool composed of two different sub-games that children can play with. In the first game, parents or educators choose among the toys to record a short story or a fairy-tale. Then the child will listen to the story being transmitted in the computer and will have to choose the relevant toys from the bag of the real toys and sort them in the particular order in the basket. In the second game, the toys of the digital collection are shuffled, and four of them are picked up randomly. Then the kid is asked to create a story with the four items and tell it to her/his parents or educator.

3 Further Work

The tool is currently in the final stage of implementation using Java as programming language. As soon as the tool will be developed completely and a stable version of it will exist, we aim to collaborate with experts with solid knowledge background from different disciplines like: technology, psychology, education, research, pedagogy, HCI design, and art. Their feedback will help us make the final necessary changes for developing a suitable and effective tool for pre-schoolers. In a later stage, the tool will be introduced to real users for testing in a research school in Thessaloniki, Greece. Educators and children will be observed while playing to get feedback about the benefits and the drawbacks of Fairy-tale NIMaH.

References

[Code.org 2013]. What’s wrong with this picture. Online, December.


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