

# Exploring playful language education through co-creation with children

Miriam REITENBACH<sup>a\*</sup>, Dick VAN DIJK<sup>a</sup>, Marieke HOCHSTENBACH<sup>a</sup> & Emilie RESINK<sup>a</sup>

<sup>a</sup>*Waag Society, The Netherlands*

\*miriam@waag.org

**Abstract:** This paper gives an insight into Waag Society's research and design approach on the development of educational games for children, illustrated by a description of the project StoryBOX. The innovative pilot StoryBOX stimulates the development of language in the form of intuitive play. Tangible, technologically enriched objects enable children, aged six/seven, to learn by serious gaming. By addressing creative, collaborative and spatial skills a playful approach to language learning is developed that connects to an existing educational format used in Dutch primary schools. A key aspect of this project was to involve pupils and teachers in the design process to assure that the final product will suit the real needs of the end-users.

**Keywords:** Playful learning, co-creation, language education, serious gaming

## Introduction

In this paper Waag Society and its design approach are introduced. One of Waag Society's core themes is Creative Learning. Within this theme Waag Society works on a number of projects that involve the design of tangibles for children. To illustrate Waag Society's view on the design process in which iterative prototyping and user involvement is central, the case study StoryBox is described. In StoryBOX tangible objects are used for language learning within the context of the Dutch educational system. The target group consists of pupils aged six/seven. Using auditive and tangible senses they can recognize characters, construct small words and experiment with language structures in a playful way. Playing, after all, is one of the most natural ways to learn and may be an important enrichment of the existing teaching methods [1].

## 1. Waag Society's Design Approach

### 1.1 Background

Waag Society is an Amsterdam based media lab, researching and developing creative technology for innovative applications in the field of education, healthcare, culture and society, bridging virtual and real world experiences. The foundation was established in 1994 and continues to empower people to both express themselves and connect to other people, being now one of the biggest independent media labs in the world. Its research agenda includes tangible interfaces, narrative structures, gaming principles, semantic web, mediated collaboration, locative media and design methodologies.

Waag Society employs creative research: experimental, multi-disciplinary research that puts artists, makers and users at the heart of development, giving them an active and equal role in the end result. This method is called ‘users as designers’ [2].

### *1.2 Users as designers*

‘Users as Designers’ is the main design philosophy of Waag Society. Basis of this philosophy is the involvement of a select number of users in every stage of the project, from first investigations and design inspiration to pilot testing, and a strong relationship of the developers with those exemplary users. This philosophy relies strongly on empathy, subjectivity of interpretation, personal intuition, human interaction and trust, with research integrated in the development process and development being the focus of its research. By involving prospective users in the design process, the results are likely to bring meaningful perspectives and options into the hands of people.

‘Users as designers’ is a combination of existing and customized participatory and empathic design methods that help to facilitate the dialogue needed to illicit personal and contextual information that helps define the user’s needs and wants [3]. Waag Society’s methods have a qualitative nature and are drawn from art and social science: varying from probing, to interviews, to observation, to prototyping. When more challenging user groups are involved, such as special needs children (e.g. children with dyslexia), the ‘users as designers’ approach tends to be particularly successful. The technical development process is supportive to this design process, which allows iterating quickly from idea to prototype, combining techniques from rapid prototyping, physical computing and tinkering.

## **2. The case study StoryBOX**

### *2.1 Need for new ways of learning*

StoryBOX (<http://storybox.waag.org>) focuses on language education for primary school pupils. Good quality of language education is of general interest. The latest survey within the Periodic Survey of Quality of Education [4] states that results in the field of language education are disappointing, in particular the non-technical aspects of language education, such as comprehension. Current methods provide insufficient didactical guidance for teachers on qualitative and effective teaching.

Young children like to play, but formal education, from approximately the age of six and upwards, focuses for a large portion on cognitive development. Up to the age of six children are allowed to play inside and outside the classroom, but that suddenly changes in group three, which can create difficulties for some children. Playfulness, multisensory stimulation and affective and social activities become less free and less prominent within school. Learning through playing becomes learning by being taught.

### *2.2 StoryBOX*

StoryBOX consists of a number of tangible, technologically enriched blocks. Every block contains a sound (vowel and consonant sounds) that can be listened to individually or in a series, using a ‘stethoscope’. Pupils are challenged to form words out of the sounds. For example, when the ‘v’-sound is linked to the ‘i’- and ‘s’-sounds, one hears ‘vis’, Dutch for

‘fish’. When the combined sounds do not form a word, the user hears nothing but the separate sounds. The children examine language on the level they’re capable of at that moment, bringing sounds, characters and words together. Because of the audio and the tangible quality of the interactive blocks, the exploration of the language is experienced as playing, rather than learning. They build, change and combine out of their curiosity, using various senses. Part of the process is to stimulate children to create and (re)tell their own stories. This way StoryBOX creates an accessible and intuitive method for processing language and creativity.

### **3. Exploring playful learning**

#### *3.1 Playful learning*

In her book “Play in Child Development and Psychotherapy” [5], author Sandra W. Russ states that gaming environments provide a safe and relaxed place to experiment and explore the world. By playing games, cognitive and affective processes are practiced such as problem solving, vocabulary, social skills and empathy.

Physical play can enhance the learning experience, as is for example shown in research on embodiment and gestures in mathematics education and on embodied media learning environments [5]. Especially playing with blocks can stimulate the brain for language learning as children learn to play with structures [6].

To enrich the interaction with StoryBOX the use of the game and play elements have been researched in relation to an existing educational format. Four children, two children with good reading abilities and two children with indications of dyslexia, of ages six-seven were observed while playing with the first StoryBOX prototypes: a set of blocks that play sounds and connect to other blocks in order to create words, and a stethoscope that gives pupils auditive feedback. During the observations, no specific game rules or competitive elements were introduced, and the interaction was not goal-oriented. With this open approach it was possible to let the children engage in play by themselves. After the observation, the children were asked to give feedback and bring in their own ideas. All four children were highly enthusiastic about StoryBOX and enjoyed the playing. Both groups understood the principle of it and managed to create words. The children with indications of dyslexia needed more guidance to create words and often placed the blocks in the reverse order. In addition, a group of experts provided feedback. The experts were teachers, researchers of language education and special needs teachers.

Based upon the observations, four areas of interest have been identified within the children and the group of experts:

- 1) Making words from sounds, by listening to the sound and connecting blocks to create a word.
- 2) Creating stories together (in groups of two), by building words out of the blocks.
- 3) StoryBOX itself needs to give more (auditive or visual) feedback in order to guide the children to make words or sentences in the correct way.
- 4) Special needs. The group of experts where immediately enthusiastic about the StoryBOX, especially for special needs children. Pupils who learn ‘differently’ or suffer from dyslexia may benefit from these new forms of learning that address more senses.

### **4. Design Methods**

The core of Waag Society's research and design process are three phases that are passed through in a cyclic and iterative way. These three main phases of the development process are described below.

#### *4.1 Questioning the question*

In the initial stages of projects it is important to challenge the question at hand. For this, involvement of users and other stakeholders is crucial, as a basis for inspiration, as a way of gaining insights and as a sounding board for initial ideas. The nature of this dialogue allows you to step into the shoes of the people you are designing for and see the context you design for from the perspectives of the people that will use the applications and services to be designed. Conversations can take the form of research into the context of the future users of the services, but conversations can also be a workshop with more members of the design team and future users. Within StoryBOX, interviews and workshops with a sounding board of experts were held on a regular base in order to reflect on the various concepts and challenge ideas.

#### *4.2 Thinking through making*

Prototyping is an entry point to go into dialogue with users and other stakeholders. By testing prototypes you can get direct feedback on the functionalities as well as user experience aspects, in 1-on-1 sessions, expert panels and user groups. Different from traditional design processes, materialising ideas and thoughts needs to start early on in the process. By materialising concepts instead of merely talking about potential design directions, creativity and playfulness is triggered and possible language barriers are overcome. In addition, during the making process new ideas will develop that would not have come up in a purely verbal process. Waag Society's Fablab [7] is an example of a rapid prototyping lab, which can be used for off-the-shelf fabrication, sharing and learning. Fablab is a place for engineers to work on real life design problems and bring technology to communities that otherwise would not be able to create consumer items. Within StoryBOX first ideas were visualized and quickly prototyped within multi-disciplinary design teams, based on the input of experts and pupils. Accordingly, initial ideas could be tested early in the design process. Especially, when involving young children in the design process, receiving feedback from visual and tangible objects is far more likely to give valuable results than merely talking about ideas.

#### *4.3 Testing and evaluating*

Prototypes are tested and evaluated with users to make sure it meets their needs. The aim is to investigate whether a product or service can be successful for a (larger) user group. At the same time the product/service/practice is refined and enhanced. Different approaches are viable to reach this goal. At the start of the evaluation process, tests are carried out with smaller user groups, iteratively, in every step more users are involved. Depending on what you want to investigate and the complexity of the product/service to be tested, you focus the research questions. The research question defines the group size, time and money needed. At every stage in the design process of StoryBOX several tests with children are/were carried out and based on their reactions the design was adapted. In the first test series in spring 2011, four tests with four kids were carried out. According to their feedback a new prototype was built and tested in summer 2011. Based on the insights of these tests, last

improvements of StoryBOX were made and translated into a third prototype. A pilot study on this final prototype will be carried out in autumn 2011 in order to measure the effect of StoryBOX.

## **5. Discussion**

### *5.1 Expected results*

This paper gives an overview of the design process of StoryBOX up until now, halfway through the development process. Creative Research involves an iterative process, alternating between prototyping and user testing. Through testing the prototypes the design team has been able to observe how children handle the blocks, and how they interact with StoryBOX. Having an expert group was very important for the development of StoryBOX. They helped to move the design and its functionalities forward. The results of the first and second testing phase have been used for the design of the final prototype. This prototype has more functionalities with the audio blocks still being central. This prototype is created as a small eco-system that refers to a factory, challenging pupils to be the producers of their own content, rather than consumers of pre-produced content. This prototype will be tested in autumn of 2011. In these user evaluation sessions the development team will focus on game and educational logic, tactility and materials and logistics of the factory metaphor. We expect the results to show that special needs children, especially those with dyslexia, who find it difficult to distinguish between different word sounds learn language with StoryBOX easier and better than the children who only learn from pure textbook methods. Until now, the effects of StoryBOX seem very promising. An important aspect for the success of StoryBOX in our view is the involvement of various experts and pupils throughout the whole design process.

## **Acknowledgements**

The authors would like to thank the project team members for their contributions; Betty Bonn, Carien van Leeuwen, Astrid van Roij-Lubsen, Bas Withagen, Raoul Wissink and Ron Boonstra. This research is being supported by the GATE project, funded by the Netherlands Organization for Scientific Research (NWO) and the Netherlands ICT Research and Innovation Authority (ICT Regie).

## **References**

- [1] Kennedy, A. & Barblett, L. (2010). Learning and teaching through play. Research into Practice Series. 17 (3). Early Childhood. Australia: ACT.
- [2] Lubsen, A. (2009). Exploring Playful and Affective Remote Communication Objects for Hospitalized Children. CHI 2009.
- [3] Dijk, D. van, Kresin, F., Reitenbach, M., Rennen, E. & Wildevuur, S. (2011). Users as Designers. A hands-on approach to Creative Research. Amsterdam: Waag Society.
- [4] PPON (2008). Periodic Survey of Quality of Education. Retrieved from: <http://www.cito.nl/onderzoek%20en%20wetenschap/onderzoek/ppon.aspx>
- [5] Russ, S. (2004). Play in child development and psychotherapy. Toward empirically supported practice. Mahwah, NJ: Lawrence Erlbaum Associates.
- [6] Nieuwstadt, M. van (2010). Brabbelen met blokken. Newspaper article NRC
- [7] Gershenfield, N. (2010). Fablab. Retrieved from: <http://fab.cba.mit.edu>