

Babble, exploring how digital technology can enhance children's understanding of multilingualism and its value

Annalisa Casati, Mafalda Samuelsson-Gamboa, Oscar Nygren, Sebastian Sylvan

Department of Applied IT
Chalmers University of Technology
Gothenburg, Sweden

{annalisa.casati@gmail.com, mafaldagamboa@gmail.com, oscar.nygren@chalmers.se,
sylvans@student.chalmers.se}

ABSTRACT

An increasing part of the global population is migrating into diverse locations and generating a wider amount of third culture children that face not only different habits but also the complexity of dealing with multiple languages on a daily basis. The focus of this research is to create a digital application for multilingual children between ages 3 and 7. The concept developed is Babble, a digital game where children collaborate using their different languages. This paper is a document of the development process, including research and evaluation through three workshops, where 8 children participated. The results presented will point at some promise for using digital technology to develop a deepened appreciation of the children's own language skills.

Author Keywords

Children and technology; learning game ;

ACM Classification Keywords

K.3.1 [Computers and Education]: Computer uses in education

INTRODUCTION

As Sweden's population is becoming more diverse there are new groups of people to consider in design. One of these groups are multilingual children. People immigrate to Sweden for a variety of reasons and the group of children, who will grow up with more than one mother tongue, is constantly growing. It is important to take in consideration these third culture kids [1] (children that, during an important stage of development, grow up in a country that differs from the original culture and language of their parents) and how their social development is affected. The target group in focus in this study is children aged 3-7 who grow up with more than one language in their close environment. In this age group, language skills are in early development and, at most, basic reading and writing skills have been acquired. The study attempts to shed some light on how digital applications can be designed for multilingual children, considering the challenges and unique aspects, regarding language and its relation to social factors. How do these children learn language, both Swedish and their native language and how does this affect them on a social, cultural and emotional level? Can we affect their perception

of language as a valuable skill? The aim is to present a design that can enhance these children's understanding of the great value in their multilingualism, as well as promote interactions with other multilingual children.

Research question

How can a digital application help multilingual children to appreciate the benefits of them knowing multiple languages?

The study

The concept developed was Babble, a collaborative game for children who know different languages, of which they share only some or none. It was realized as a low fidelity prototype in the borderland between physical and digital. The research and development was conducted through a series of workshops with eight children and their parents. All the subjects participating were brought up with two or more languages being used in their home environments. Other methods were applied to gather information in preparation for the workshops, including literature studies and surveys.

BACKGROUND

Theory of Mind (ToM) is a popular construct within the field of psychology describing the ability of humans to attribute mental states to the self and other individuals. Children's ToM develops a lot during the early years of their life [2], making them aware of others mental states but also connects children to a network of others mental states allowing them to explain, predict, and interpret behavior of others, both physical behavior and speech acts. ToM and language are viewed as co-developing, meaning that progress in one creates a leap in the other, during children's preschool and the surrounding years ToM is supported by language used in social interaction and later internalized as a pre-representational device. By participating in conversation children become aware of mental states and the children's own syntactic and semantic abilities are formed to support met representational interpretations of human behavior.

METHOD

Most of the methods were used to deepen the understanding of the environment and of the normal behavior of children

aged 3-7. The majority of the observations and encounters with the user group took place during three workshops.

Questionnaire

In order to build an initial understanding of the target group, a questionnaire was sent out to parents who were contacted via a Facebook group for parents in Gothenburg with an international background. The aim was to identify which consequences multilingualism had on their children as well as other general questions.

Results

The answers gave some interesting insights. At this age, these children reportedly were very aware of the fact that they can speak different languages and the parents generally reported that they would adapt to their surroundings with little or no problems. Mostly, parents did not report any difficulties at all related to language to their children, the one common difficulty that some of these children were facing seemed connected with having different skill levels between the languages used - especially if the child was less proficient in Swedish.

Workshops

Three workshops were organized with children within the target group. They took place once a week for three consecutive weeks and the purpose was to do observation, evaluation and participatory design respectively. Parents who had answered the questionnaire were contacted and inquired regarding further participation in the study. Planned activities as well as unstructured observations and interviews were conducted, primarily with the children but the parents were also involved in the study. Common practice was followed when in the presence of the children: the researchers avoided be in their presence without another adult present in the same room, picture and video taken had been masked not be made recognizable or taken from an anonymous perspective.

Workshop 1 - Observation

The main objective of this workshop was for the children to get familiar with the design team and the environment in which upcoming workshops were to take place. Four children participated in this workshop, all of them accompanied by one of their parents.

- **Show and tell**

The parents were encouraged to bring with them the children's favorite book to present to the group as a way of getting familiar with the other children and the design team.

- **Figure to flag game**

The children were presented with different stickers with monster figures on them to color and later put next to a flag representing the languages they could speak in order to gather some understanding of the level of knowledge that the children had of ability to speak multiple languages.

- **Complete the drawing**

Semi complete shapes were printed and the children got to complete these drawings in any way they wanted. The purpose of this activity was simply to see what the children would do given an initiated piece of paper.

Results and learning

The children showed a high level of creativity and initiative when facing simple tasks that they perceived as fun. When facing more complicated or less fun tasks, like describing their favorite book, they were assisted by their parents. The team learned valuable insights that were used when organizing the following workshops: what topics the kids found interesting, what level of complexity and active interaction could be triggered, and that the presence of the parents could affect the results of the tasks performed.

Workshop 2 - Evaluation

The aim of this workshop was to get some feedback on a few different game concepts that had been spawned from the previous encounter. Also, an activity to get some input and ideas from the parents was conducted. Eight children took part in this workshop.

- **Drawing multilingualism**

This was a warm up activity; where children were asked draw what their experience of speaking several languages was like. The workshop aimed to start a discussion with the children on the topic and to observe if they would think differently about multilingualism after the workshop with another exercise alike.

- **Superheroes of Language-game**

An interactive tangible game experience was set up, where the children got to put themselves in the role of superheroes tasked with saving a dinosaur. There were three different game stations, where they would have to solve language related challenges. The children were divided into teams of two or three for the game. The language challenges were set up so that the children within the group would have to collaborate and use all their languages to solve them.

Parents' brainstorming

A brainstorming session was arranged for the parents in order to get their perspective on possibilities in the field this generated discussion, mainly concerning language training and issues.

Results and learning

The 'drawing multilingualism' exercise turned out to be very difficult for the children to relate to, because of the task being very abstract. They were generally confused by the concept and would not know what to draw or simply draw something unrelated. This highlighted some limits of what kind of content could be included in the final design. The games evaluated were no success either. When inquired about the activity afterwards, some children described it as 'boring' and they did not enjoy having to talk to solve the game. The most interesting aspect of the game was the theme of superheroes and that they were

awarded with pieces of equipment, which pointed to the importance of framing the game. The one game that seemed the most enjoyable, from observation of the children playing it, was the last one where they had to translate different words to defend the dinosaur. This was the game that was most tightly tied to the theme of the game and the children seemed excited when their answers resulted in the attacking researchers taking a step forward or back.

The brainstorm got somewhat off track from the theme of social and emotional implications of multilingualism, but the ideas could be used to understand what areas that might be troublesome for children socially in connection to language. Another obstacle for the brainstorm was that there were frequent interruptions by children needing the assistance of parents. Thus the brainstorm was more like a large-scale informal interview with several participants.

Workshop 3 - Participating Design and Evaluation of first prototype

After having drafted an application/game to test with the kids the team aimed to playtest it with in order to gather insights on how to further develop it. This last workshop was also aiming to co-create components of the game with the kids. Three children participated in this workshop.

- **Playtest 1**

To start the game, a tale was narrated together with the projection of some pictures related to the world created for the game settings. Then the game began. A table was set with the card game the design team has elaborated for the playtest, each child would get a set of 10 cards placed face up in front of them and in the middle of the table a hidden speaker would give instruction to the children in how to proceed the game. The speaker was representing the voice of the Babel Fish from the narrated story, and it was controlled using a Wizard of Oz-technique with pre-recorded phrases.

- **Co-designing cards and second playtest**

After playing a first round of the game we gave some empty papers and crayons to the children and ask them which ingredients they would like to give to the Babel Fish in order to produce more spells to play the game. A second round of playtesting then followed, with the cards that the children had just created added to the game. This second round was planned in order to adapt the rules from one play test to the other and to introduce co-designed elements. To insert the newly designed elements we used the aid of Google translate to be able to generate different language outputs.

Results and learnings

The storytelling showed to have a key role during this workshop. The kids were more engaged than foreseen and it allowed them to keep focus at the game all the time. It was also easier to give directions and instructions as the tasks were all related to the Babel Fish's world and had a clear

purpose within it. This seemed to make the rules of the game easy to grasp for the children, as opposed to the games evaluated during the previous workshop. The narrative turned out to be so successful that the children wanted to hear the end to the story when the game was over, which was not expected. Not only did the game result in a fun and engaging activity for the kids, but it naturally encouraged the children to come up with their own rules. This hints at flexibility being an important aspect of a game like this, that the players can use the game components for other purposes.

DESIGN

The resulting design is the game Babble, a continuation of the collaborative game evaluated during the third workshop. In this section, the lo-fi prototype evaluated during the workshop will be presented. The input from the evaluation session will be covered and finally, an idea of a digital implementation will be presented.

Babble - The story of Babel

In Babble, the children playing take on the parts of young wizards with the special power that they all know different languages. Their goal is to recreate the spells spoken by the magic Babel Fish in order to restore order in the Tower of Babel. This is done by putting the ingredients that the Babel Fish names in the magic cauldron - the only problem is that the Babel Fish keeps talking in different languages!

Every player has access to her own 'magic station' where ten different ingredients of a certain category can be found. One player may have the category colors, while another has clothes items in her station. The ingredients are cards with pictures depicting the ingredient. These are placed face up on the table, so that all players can see what things are in all magic stations. When the Babel Fish speaks an ingredient, the corresponding card has to be put in the cauldron at the middle of the table. The Fish may not always speak the ingredients from one category in a language which the player at that station understands. But someone else at the table will! This means that the players need to collaborate in order to recreate the spells and complete the game.

Every spell contains ingredients from all categories in play. In total eight spells are required to complete the game, and after every two spells completed the players rotate, so that all players get to use every 'magic station'. The digital version of the game (figure 1) is a co-located app where each player has an assigned tablet where the languages of the players can be selected at the beginning of the game. The next step is to select one of the themes available, the theme is related to a deck of cards/ingredients that the player will put into the game together with the other tablet/players connected in the common app environment. The game rules are the same as in the tangible card prototype tested, the players have to listen to the Babel Fish spell's words and find in collaboration with the other players the ingredients to add in the common cauldron.

Play testing

Evaluation of the game took the form of participatory observations during play testing. After the play session, unstructured interviews were conducted. Though simple, all children participating reported that they enjoyed the experience playing the game very much. Particularly, they appreciated the fact that they got to create their own cards, which were incorporated in the game during a second round of play testing. The children quickly got engaged with trying to solve the game, listening when the Babel Fish spoke and waiting excitedly for the next instruction. Soon they invested themselves in the lore of the game, by starting to speak to the paper fish with the hidden speaker, even though they all knew it was made up. The children filled out the gaps of slow responsiveness, caused by the Wizard of Oz-technique applied. Rather than losing interest they were talking to the fish, using these interruptions as opportunities to play within the fantasy world of the game, waiting for the next instruction.

After the second play session, unstructured interviews were conducted. One participant was interviewed using a technique of having him explain to the Babel Fish. The boy reacted positively to the game and to the part where he could decide and draw what the Babel Fish would need in the spell, he found also no problem understanding the different part of the spell because “when there was a world I didn’t know, someone else knew it and they helped me”.

DISCUSSION

Result

The game Babble was created as a synthesis of the research, findings and inspiration from the first two workshops. The playtest resulted into an appreciated and stimulating activity for the children. However, in order to answer our research question, a wider research time frame would be needed. While successful at this one instance, to investigate how such a game can affect the children’s relationship to language and their social or emotional development, a longer project would be required.

Generalization and transferability

The prototype of Babble is a tangible board game that incorporates digital elements, acted out through the Wizard of Oz method. We believe that this combination was a strength; the physical components meant that the children

could interact with the game very freely, without digital constraints, while the digital elements contributed a sense of magic (especially when the Babel Fish would speak out the children’s co-created game pieces).

Trying to maintain both these aspects would be an interesting challenge of making the game digital. Some of the merits of the physical aspect of the game could be lost in a direct translation of the concept to a digital platform, such as pointing and physically moving game pieces. An implementation using a tablet computer (as the cauldron and Babel Fish narrator) in combination with some sort of Near Field Communication devices (as the cards to put in the cauldron), could be an interesting solution to keep the physical interaction both with the game and between players intact. By keeping the physical aspects of the game, we also believe that the collaboration between players is maintained, steering clear of having all players staring down on their own tablet. The importance of maintaining a collaborative environment is the key for the social development aspects we want to focus on, it’s important to underline that the focus of the game is not to know as many languages as possible, nor collecting individual points but rather to work together.

Methodology

The participants of the study were recruited via an active group for international parents on Facebook. This was a good way to get in contact with parents without an intermediate communicator, but it also meant that all planning had to be done in direct communication between the participants and the design team. This was both good and bad, good since the design team had full control over communication on the counterpart there was no gathering entity that made sure that the participants were at the same place at the same time.

For all of the workshops the parents were present and involved in the activities to varying degrees. This might have influenced the study in some ways since children will probably behave differently when their parents are nearby and not. Adjusting techniques of how to interact with the children and how to play with them was also important, abstract thinking for example proved to be very hard for this age group. Developing trust and a comfortable environment for the children was also a challenge that played an important part in this study.



Figure 1. A mockup of how the game could look in a digital interface.

CONCLUSION

This study has merged two topics that are both becoming increasingly interesting in today's society: Children's technology and children brought up with multiple mother tongues. The results point at some promise for using digital technology to develop a deepened understanding of the implications of knowing different languages for children in this early stage of language development. By encouraging collaboration in simple tasks, where language is boiled down to graspable things like pictures, and framing the activity in an engaging theme, children can get great enjoyment from a language focused game like Babble. It would be highly interesting to build on these ideas by incorporating further ideas from research on language development and multilingualism.

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