

# Co-designing game narratives and dynamics with first grade children

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This short paper reports the development of a Participatory Design workshop with first grade children, framed at the Making step of a larger PD project which seeks the creation of a tangible user interface educational video game. Co-designing with children has gained relevance over time, especially in the field of interactive technology. Even though the basis of PD with children and with adults can have many common aspects, the way in which PD activities are developed in each case might be radically different (Fails, 2012). These have led to the exploration of a wide variety of methodologies that focus on facilitating children's participation. We explored how gamified dynamics in PD workshops foster constructive decision making among children, in this case, by designing a character to inform the design of a TUI to learn language through a digital game.

## 1. INTRODUCTION

This research team has previously created CETA (Ceibal Tangible), a tangible interaction device with a mathematical game developed for tablets distributed in the first years of school in Uruguay. [1]. Also, we developed iCETA, an educational TUI, through participatory design with children with visual impairments to train basic mathematical skills.

Besides the fact that educators were avid to use these systems, we detected some difficulties regarding the adoption of the provided solution in public schools. The present project seeks to foster user appropriation by following a Participatory Design (PD) methodology. We conducted a series of interviews and workshops with teachers and children. In this paper, we discuss the development and results of one of the design workshops with children aimed to facilitate children to collaboratively create characters and their universe.

### 1.1 The present project

The aim of the project is to develop a tangible interface educational app for children in the first grade that could be used in their own devices provided by *Plan Ceibal*. Our goal is to provide the community with a versatile and adaptable tool that can be appropriated by users. Its use will allow the development of different types of educational activities that exploit the interaction with real objects and the potential of digital tools.

We are currently organizing two different workshops with teachers and first-grade children, to build a more complex picture of classroom context and technology usage, with a special focus on the outcomes of the interviews, as well as nourishing the decision-making process with the main user's participation. Interviews and workshops with teachers allowed us to detect two topics of major concern at first grade: language and mathematics. Given that our previous development Bruno was a videogame addressed to aid in math learning, for the present project we decided to focus on language. Thus, we informed children that the game was related to learning letters.

The first session consisted of a gamified dynamic, where some children roleplayed as researchers, having to use game boards to register their impressions on other classmates, who will be playing with existing video games which include the use of TUIs. In this paper, we present the second of the children's workshops in which we

allowed children to participate as designers who imagined and sketched a character that would help them in the language learning process.

## 1.2 Background

One of the threats when carrying out PD activities with children lies in the inequity between the roles of the researchers and the children. That is, researchers arrive at schools with their own agendas typically aiming to fulfill a set of design requirements, whereas children are exposed to activities whose objectives could not be clearly understood. In a similar vein, communication problems could arise, given that researchers' needs are not easy to explain to children. These issues can limit the possibility of the children's contribution to the design and restrict the possibility of PD to impact on the usability of the product. [2].

Importantly, participants are expected to contribute with their own creativity and interest, both individually and as a group [3, 4]. Specifically, research involving gamified activities seems to succeed in overcoming the mentioned difficulties. The aim of these activities is usually the elaboration of low-fidelity sketches or prototypes that provide relevant information for the design process. We used what is known as "fictitious research" where children are invited to play "to be researchers" as part of the design process[5, 6, 7].

## 2. METHODS

### 2.1 Participants and consent

The study protocol was approved by the Ethics Committee of the Faculty of Information and Communication of Universidad de la República in Uruguay. Participants' parents were asked to give signed informed consent. The workshop had two sessions developed with the same dynamic, where two groups of 20 first graders participated. Only one of 40 children presented motor skills impairment and was accompanied by a special teacher during the workshop.

### 2.3 Procedure

For each session, children were divided into four teams in which they would have to follow the same proposed gamified dynamic. Seven researchers participated in the sessions, one in each station, two registering notes and one moderating the activities. The dynamic was based on Dodero's guideline on game participatory design in primary schools [8]. It consisted of children having to complete a set of missions while composing a narrative and character for future video game development; specifically, children were asked to suggest how the character would discover the letters, providing us valuable insights when designing game mechanics. Each mission theme was suggested by the videogame design expert of the research team, following a typical video game narrative design structure. Every time a team completed a mission, a sticker medal was given to them. At the end children received a "Researcher Diploma". To complete each mission, the teams were expected to achieve agreement among their individually proposed ideas by discussing their pros and cons regarding the mission objective. Each station researcher was in charge of moderating the discussion and enabling every child to participate. We recorded the discussions between children at each station.

- Mission 1. Create a character who is "discovering letters". What does it look like? Is it a person/monster/animal? Is it young or old?
- Mission 2. Create the universe that the character inhabits. What is the place where it spends its adventure like? What things does it have? Are there other characters?
- Mission 3. Imagine a problem that the character has to solve. How does it discover the letters? Does it have any trouble while discovering the letters?
- Mission 4. Sharing with the rest of the classroom

### 2.4 Materials

Every time a mission was introduced, the researcher gave children an illustrated sheet (Figure 1) with the mission objective and some triggering questions so they could have it on their stations and consult when needed. Each station also had a set of materials for the missions, such as markers, white sheets, pre-cut coloured cardboard shapes, glue and googly eyes (Figure 1).



Figure 1. From left to right, workshop materials, First mission sheet: Create character, Second mission sheet: Character Universe and Third mission sheet: Challenge How does he discover the letters?

### 3. FINDINGS

After the workshop, researchers wrote notes on their impressions of children's creations, as well as quotes from the recordings into post-it and drew an affinity map on a wall [9]. We cluster the data on the wall into game features categories such as Narrative universe, the main character, second characters, accessories/functionalities and character challenges. In addition, we commented on how the co-design dynamic worked in each mission. The findings were arranged in the missions which gave structure to the workshop. In each mission, narrative outcomes are stated as well as some of researchers' impressions on how the gamified PD dynamic was happening.

#### First mission:

##### *Main characters*

Being the starting point, the given making materials serve as ice breakers when children start to think out loud about their ideas. Shapes and colors facilitated expressing the thoughts of those who seemed shyer. Among the most common, we found misshapen fantasy characters which had multiple body parts such as ears, eyes and mouths and often included antennas. They said: *"It has to be weird"* or *"Let's give him a squarehead"*. Multiplication of body parts, mainly eyes, was a feature related to the character's imposed ability to discover letters and the excitement of having 3D plastic googly eyes to use *"3D eyes glued together to discover letters"* *"He [the character] has 4 eyes... With two he discovers letters and with the other two, he sees everything else"*. In the beginning, some children tend to create their characters by replicating famous people, which went from Messi to Salvador Dalí or Santa Claus, but they were soon discouraged by their mates when asked, *"How is Messi supposed to discover letters?"*. One of the stations during the first session put together their character among all (Figure 2). Each one chose a part of the body to draw, one contributed with the head, another with the legs, body and the other with an alien that the character carried in the other hand, here making collaboratively flowed almost naturally.

##### *Second characters*

Regarding the second character, we found friends with the main character, guides, helpers or enemies. Their shapes and colors were diverse as well as their fantastic nature. Animals were often assisting the character storyline, an owl or a turtle helped to get somewhere and prevented it from being caught by an enemy. Enemies vary from a crocodile who chases the main character to eat its letters, ghost, worms or again, zombies. When children mixed their ideas with the letters' discovery plot, some additional characters appeared: *"A unicorn who throws letters from its horn"* *"A lion protecting a letters volcano"*. In order to head to the second mission, children were encouraged to seek agreement between the characters they have built, and find a common storyline that could integrate them. Some, who have built their characters collaboratively didn't have trouble, but other groups in which children were working individually had a hard time deciding, when some of them asked, *"why is your character best?"* one of them answered, *"just because it is mine"*. Here the most open and demonstrative children ended up excluding the work of those who weren't. In this case, the moderators suggested voting, and it worked.



Figure 2. From left to right, Children crafting one of the characters, One of the characters, Children drawing

### Second mission:

#### *Universe*

At this stage, more groups were working collaboratively to build the imaginary landscape where their characters would develop. Despite having fantastic characters, at the beginning of the mission, most of the universes they inhabited were known realistic scenarios, such as the beach, a local shopping mall, a school or a supermarket. As they were mostly expressing their ideas out loud, some would draw what others say and they ended up adding the fantasy ingredient to the well-known places and created a school with an island and volcano inside, a zombie apocalypse or a supermarket under the sea.

#### *Accessories or functionalities*

In almost every story, characters have totemic objects they carry-out, which help them go through the plot. In this case, many have a school bag or a book where they collect the letters they discover, and other elements such as a lens or a magnifying glass to help them see the letters. Accessories that didn't have a clear relation with letters but served the storyline were spaceships, cars and special sneakers.

### Third mission:

#### Challenges

As the first mission proposed the character should discover the letters, most of the children lean over challenges which include letters hiding in different scenarios *"You can find them under the table or inside a drawer!" You have to find them in a letter soup*". Besides, others imagine the enemies were trying to steal the letters or were impeding the character to find them. Relating to the medals stickers incentive, some groups were not paying too much attention to it, while others were completely moved by the competition of which group had more stickers thus far, it was one of their main motivations for completing all challenges.

### Four mission:

The final mission had the purpose of sharing what each station had come up with. We did not focus on analyzing the outcome of this mission as the main objective was to explore creation activities. However we noticed there were differences on how children reacted to this stage. As in previous missions, the most extroverted children were all over the place and excited to share their ideas, while the most quiet and introverted did not want to expose their creations.

<b>Universe</b>	<b>Character</b>	<b>Other characters</b>	<b>Accessories</b>	<b>Problems</b>
Very diverse: a forest, a volcano, underwater, another planet.	Mutants (random things). Overloaded (i.e.: many eyes) Magnified senses.  The character evolves. The character incorporates things/accessories throughout the game.	Guide, pet, enemy, ambiguous	Ingenious features of the characters or the universe: Backpacks, books. cars, spacecrafts, tools, vehicles, sensors, magnifying glasses, etc.	Discover, find, create, eat letters. Compete for the letters. Someone steals the letters). Identify letters through objects. Letters are a reward. Obtain letters through letters

Table 1. Outline of the main findings

## 4. DISCUSSION

Regarding the researcher's impressions on whether the development of the workshop was successful or not, we ask if the research objectives were met and if real collaboration between children happened. In relation to the research objectives, we agree the outcome was as expected, creativity flourished among children as the characters and storylines were varied but still had connections that can surely be translated into abstract categories and particular features to inform the design of a language learning video game.

We found crafting materials significantly boost children's creativity [10]. All children were actively engaged with creating a character and had made at least a drawing. On the other hand, having the children work on a character that would represent them all was perhaps a little ambitious for first graders who may not be used to having a clear group decision making and showed in some cases stubbornness. Maybe the first mission dynamic should have been, as it happened with one of the groups, having each child create a body part of the character to ease the final common agreement. As the rest of the missions went ahead, collaboration flowed better, both

when chatting and when creating. As said above, the medal incentive kept some of the children engaged, but at the cost of having them compete with each other, which was not what the premise intended.

## 5. FUTURE WORK

Ongoing with the project, we expect to have further iteration with teachers, children, designers and education experts seeking the development of the language learning video game. One of the next steps would be the formulation of new workshops with blind, low vision and deaf children whose teachers have been involved in the primary teachers workshops and interviews.

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