Exploring the use of an interactive storytelling toy to engage Ukranian child refugees in learning Italian

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We report on an ongoing user study about the use of an interactive storytelling toy to engage child refugees in learning the language of their host countries, motivated by the scarcity of research regarding the design of technology for this understudied user group. We conducted three workshops with Ukrainian children aged 6-10 years old in the context of an after school activity, exploring how children reacted to different kinds of storytelling activities facilitated by an adult reader, with paper books and digital prototypes. We used the qualitative data gathered from our first two workshops to inform the design of a revised prototype, that was presented to the children in the final workshop. Our contribution consists in preliminary insights and design recommendations for technology specifically tailored to the needs of child refugees who are learning a new language.

CCS Concepts: • **Human-centered computing → Empirical studies in HCI**.

Additional Key Words and Phrases: storytelling, children, interactive toy, refugees, second language

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1 INTRODUCTION

In recent years, several humanitarian crises have led millions of people to leave their homes and take refuge in surrounding countries; according to the Swiss State Secretariat for migrations, over 75.000 refugees from Ukraine applied for asylum in Switzerland in 2022, many of them children [5].

Ukrainian children in Switzerland are enrolled in school and expected to learn both the local language - Italian in the case of Ticino - and another national language, usually French, while being supported by local associations such as the Red Cross, that runs an after-school activity to help the children integrate in Swiss society and learn the local language, as well as helping them socialise and share their experience of being away from their home country. We collaborated with the Lugano chapter of the Red Cross and held three workshops with Ukrainian child refugees aged 6 to 10 years old, to explore how different storytelling activities - both traditional and digital - encouraged them to speak Italian.

After a brief overview of the related research, we describe the design of our study and the three sessions we conducted. Finally, we will end with a discussion, including the limitations of our study and possible directions for future research.

2 RELATED WORK

The global refugee crisis has affected millions of families in recent years. As families have been displaced and settled in new countries, they have had to deal with various issues such as bureaucracy in the new country, keeping in touch with

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loved ones and learning a new language. Technology can play an important role in helping refugees in their daily lives, e.g. by supporting them in interacting with non-governmental organisations (NGOs) and volunteers [1] or helping them communicate both with family abroad and in their new country [2].

When they settle in English-speaking countries such as Scotland, the children usually learn the new language faster than their parents, and they act as language mediators and communicators for their families [2].

However, child refugees come from many different countries and often face major challenges such as language and cultural barriers and lack of support from teachers or parents, especially in developing countries [12] such as sub-Saharan Africa, where - as 2020 - most child refugees lived. Even in countries where there are special programs to support refugee children, such as Turkey, local children and refugees have different educational outcomes, with the gap only closing completely for children who arrived in Turkey before the age of 8 [8].

For children, displacement affects their memory and abilities, and also negatively impacts retention and development of their mother tongue [19].

Research addressing the particular challenge of facilitating language acquisition among child refugees in their host countries is scarce, with most studies on second language acquisition focusing on technology to learn ESL (English as a second language) in a school context, such as [4, 7, 11, 13, 16].

However, storytelling has been shown to be not only a fundamental stepping stone in children's language development [3], but also an effective pedagogical tool for children and adults learning a second language, by motivating them to participate in the learning process and facilitating comprehension through the use of non-auditory cues such as illustrations and body language [10].

With our study, we aim to fill this gap and explore how an interactive storytelling toy can engage child refugees and motivate them as they learn their host country's language in an informal, after-school context.

3 STUDY DESIGN

Our study took place in the context of an after-school activity organised by the Lugano Red Cross on Wednesdays afternoons; we worked with the children, whose age and number are reported in Table 1, during three afternoons over the course of two months. The sessions were held in a quiet room, equipped with tables, chairs and a rug in which children could sit during the activity.

After an ice-breaking activity, such as introducing ourselves or drawings, we had one or two storytelling activity per session. During the first session, we introduced the children to our first prototype, ROBIN, a storyteller plush toy that had previously been co-designed with young children [18]. During the second session, we conducted two storytelling activities with paper books: an interactive gamebook and a wordless book. In both activities, a researcher acted as the adult reader. During the third session, we presented a redesigned digital prototype which addressed some of the problems encountered in the first session, and was used to read a story to children together with an adult reader. In the following section, we will go into more detail about each activity. Activities and participants are recapped in Table 1.

All the stories selected for the workshops were chosen among commercially available children's books. Specifically, both gamebooks and the wordless book were marketed as being suitable for children aged 4 and older, while the stories used during the third workshop were popular children's stories by Italian author Gianni Rodari [14].

While children were not compensated for participating in this study, as all activities took place during their regular after-school activities, we donated the books used in the study to the Red Cross to use during their after school activities in the future.

Session	Participants	Activities
1	12 children (9M, 3F)	Interactive story with prototype
2	11 children (8M, 3F)	Interactive story with paper book; wordless book
3	8 children (5M, 3F)	Traditional story with prototype

3.1 Child Participants

There were 12 children (9 boys and 3 girls) who participated in the first workshop, 11 children (8 boys and 3 girls) in the second workshop, and 8 children (5 boys and 3 girls) in the third workshop; all children were between 6 and 10 years old, and enrolled in a local primary school; as participation to the after school activity was voluntary, the same children did not participate in all the sessions.

3.2 Adult participants

Two researchers and at least two Red Cross volunteers, who acted as facilitators, and a Ukrainian interpreter attended each session. One researcher took notes while the other acted as the adult reader during the activities.

3.3 Data collection

We recorded each workshop - both audio and video; a researcher also took notes during the activities. We then analysed the data qualitatively, looking at children's reactions and behaviour to gauge their engagement.

4 SESSION 1

During the first workshop, we used a Wizard of Oz prototype of a storytelling toy named ROBIN, which had been previously co-designed with children [18]. The prototype verbally told an interactive story about a dragon, in which the children decide how the story proceeded by verbally answering questions, in the style of a gamebook. It was a plush toy around 30 cm tall, with a speaker and a LED matrix used to represent emotions related to the story (see Figure 1) such as happiness or sadness, commanded through a smartphone app.

Children sat in a circle together with the adult storyteller, who held the paper game book with the same story as the prototype, so that the children could look at the pictures during the activity.

At the beginning, the prototype asks the children their name, and whether they like to read stories. Children introduced themselves with their name without hesitation, and the researcher who acted as adult reader introduced themselves as well. Then, the prototype asks the children whether they would like to help them tell a story, and they answer positively as well.

By requiring each child to respond in turn, the Red Cross facilitator imposed turn-taking and allowed each child to have an impact on the story; while the story was originally meant for children 4 years old and older, we noticed that the vocabulary used in the story was often difficult for the children, and the interpreter had to support them several times.

During the activity, children showed significant interest in the expressions shown by the prototype, to the point that sometimes they had to be reminded that the toy had also asked them a question; children who sat closer to the prototype also touched it often. We also observed several instances of pointing behaviour, children often looked at the pictures in the book to better understand new words, and then repeated them in Ukrainian. Children spoke a lot during the activity, both in Italian and Ukrainian, with many of them laughing and touching the prototype, petting it and squeezing it.

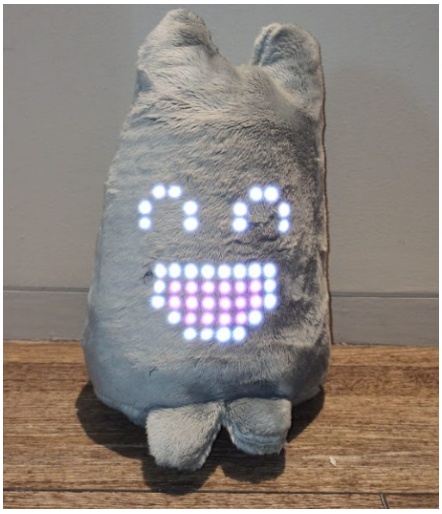

Fig. 1. First Prototype

Overall, all children seemed to enjoy the prototype's expressions, and asked about them, laughing when the expression was a cheerful one - such as smiling or having heart-shaped eyes. After the activity ended, they asked to see all the emotions that the prototype could display. When asked what they liked about the activity, they all had different answers, ranging from "the dragon", "the expressions" and "everything".

However, as ROBIN had originally been designed for one to one interactions, it was equipped with a small speaker, which was not loud enough for a group; in addition, children seemed to enjoy the touch aspect of the toy, but as it has no recognisable limbs, they seemed unsure while doing so and did not know if and where they could touch it. We decided to address these issues and designed a new prototype, which we presented to the children in Session 3.

5 SESSION 2

The aim of the second session was to better understand children's needs and inform the redesign of the prototype. To do so, we held two reading activities with the children: the first was a paper gamebook, with a different story than the one they had listened to in Session 1, to understand the impact of the story on children's reaction. The second was a wordless picture book, to gauge the level of engagement that such an activity could generate. During this session, the children sat on chairs, in a circle around the adult reader.

5.1 Activity 1 - Paper Gamebook

The first activity consisted in reading a paper gamebook with a story about a spaceship. In this book, children begin by choosing a main character, and then they turn pages according to their choices in the story. We began the activity by asking children questions about space and spaceships, such as "How do astronauts float in space?". While sitting in the chairs, children seem quieter and more attentive than in the previous session; then, the adult reader started reading the book, while showing the book to the children. With the help of the facilitators, they took turns answering the questions to advance the story, while the adult reader turned the pages of the book. They also needed help with some terms with which they were not familiar with.

Fig. 2. Second Prototype, Octopus

Halfway through the exercise, the Red Cross facilitators explicitly told the children that they could get up and get closer to the book to see better; the majority of the children did so, while a small minority remained in their chairs and seemed disinterested in the activity.

When asked whether they had preferred the gamebook read by the human reader, or the prototype who had read them a gamebook in Session 1, all children answered that they liked the prototype better, thus confirming the need for a digital prototype in our redesign.

5.2 Activity 2 - Wordless book

The second activity consisted in "reading" a wordless book called "Trip to the Moon". Wordless book do not have any written words, and they rely only on pictures to tell a story. The adult reader turns the pages, asking the children what they see in the pictures, and what they think is happening.

Since the children had to describe the pictures in their own words, they could use the vocabulary they had already mastered, while only needing little help from the interpreter when there was something in the pictures that they did not know how to describe. During this activity, children spoke a lot more than both in the previous activity and in Session 1, and even previously uninterested children began to show interest in the activity. When asked which activity they had preferred, almost all children answered that they preferred the picture book. The combination of the feedback provided in Session 2 confirmed the children's preference for a story in simpler language, divided in smaller chunks and read at a slow pace, which we implemented in our redesign of the prototype.

6 SESSION 3

During the third session, we presented the children with a revised prototype, in the shape of an octopus (see Figure 2), whose design was informed by the technical issues emerged in Session 1 and by the preferences expressed by the

children in Session 2, such as their inclination towards simpler and shorter stories and interactive storytelling. The second prototype was equipped with a bigger speaker who could play sounds at a higher volume, and had LED strips mounted in the four frontal tentacles, that lighted up with different color palettes to attract children's attention and let them touch it during the reading activity.

As the previous prototype, it has a LED matrix used to display emotions, however instead of telling an interactive story, the prototype told two regular stories chosen from an anthology by a famous children's author named Gianni Rodari. This was also a Wizard of Oz prototype, controlled through a smartphone app used by a hidden researcher; to adapt it to the needs of children learning a second language, the story was read at a slower pace and was split into chunks which could be played again or back and forth, with the adult reader asking the prototype if they could repeat or go back or continue telling the story. Between chunks of the story, the adult reader asked children questions about the story, according to the dialogic reading process [15], which the children answered promptly.

While at first the children were shy about the new prototype, they soon began familiarising with it, petting it and playing with the tentacles. They laughed and pointed at the different expression, linking them to the story - for example, noting that the prototype showed an angry face because one character in the story was angry. They also commented on the different colors that the LED strips showed on the tentacles. Overall, younger children seemed to be more captivated with the prototype, staying at the front and touching it more than the others.

When asked, all the children except one reported that they liked the second prototype better than the first.

7 DISCUSSION, LIMITATIONS AND FUTURE WORK

In our sessions, we explored the use of both digital and traditional forms of storytelling with child refugees who are learning the language of the country in which they settled, at least temporarily. As we only conducted three sessions with a small number of children, gathering only qualitative data, we obtained only preliminary insights, that could be a starting point for the design of technology specifically tailored for the needs this vulnerable user group.

- **Fun as a dimension**: We observed that, while children engaged in both digital and traditional storytelling, they showed more curiosity and interest for the digital prototypes, which they regarded as "more fun". Moreover, children enjoyed the the digital storytelling activity regardless of the difficulty in understanding a new language; even when the story was hard for them to understand, they still described the experience as "fun" and, when asked, could remember both elements of the story and of the prototype. Fun has been shown to have a positive effect on children's learning [17] and motivation [6]. We argue that this should be an important dimension in the design of technology for refugee children who - unlike their peers - are not learning a foreign language at school but are trying to learn the language of the country they live in, showing that it is necessary for them to engage in language learning activities in an out-of-school context.
- **Non-auditory cues in storytelling**: Children also showed interest in the expressions shown by the prototype, pointing at them and commenting them during both Session 1 and Session 3, and they were fascinated by the different colours of the tentacles in the second prototype, grabbing and squeezing them. While this aspect could be due to the novelty effect of interacting with a prototype, we hypothesise that it could also be due to the fact that, as the children were not Italian native speakers, they concentrated on the visual elements of the storytelling activities, such as the expressions and the lights in the prototypes, in accordance with [10]. This suggests the need for multi sensory storytelling tools, with features such as representations of emotions and facial expressions, lights and music.

- **The role of the adult reader**: The presence of an adult reader was critical for the success of all the activities: both in the case of the digital and traditional storytelling, children often needed additional help or explanations that a book or a toy could not provide. In our case, we also worked with an interpreter that could help children when they knew a word in Ukrainian but not in Italian. This is consistent with the idea that, during adult-child storytelling activities mediated by technology such as virtual agents, parent-driven interactions still make up the majority of the conversations [9]. We believe that technology designed for refugees children should still put people at the centre, as an aid for volunteers and caregivers and not as a tool to be used on its own.

However, our study has significant limitations, starting with the small number of participants and the short duration of the study, that do not allow us to generalise our findings. Moreover, we did not measure the effectiveness of our prototype on vocabulary size or fluency, but only gathered qualitative insights on children's engagement and usability of the prototype.

Nevertheless, as the global refugee crisis continues unabated and the number of displaced children increases every year, the need to facilitate their acquisition of the language spoken in the host country becomes increasingly important. We argue that designing customised technologies and evaluating the effectiveness of existing ones are both essential aspects in addressing this challenge, as these children face very different circumstances compared to native speakers or students learning a second language in school.

8 SELECTION AND PARTICIPATION OF CHILDREN

Children were recruited through the Lugano Red Cross, who organises a weekly after-school activity for Ukrainian child refugees who are enrolled in school in Switzerland and learning Italian. We prepared a written description of our work and a consent form for their caregivers, both in Italian and English; they also had the help of an Italian-Ukrainian interpreter that could help them understand the form; the Red Cross facilitator circulated the consent form among parents and obtained consent. All children whose caregivers gave consent participated in the study.

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REFERENCES

[1] Asam Almohamed, Dhaval Vyas, and Jinglan Zhang. 2018. Designing for refugees: insights from design workshop. In *Proceedings of the 30th Australian Conference on Computer-Human Interaction* (Melbourne, Australia) *(OzCHI '18)*. Association for Computing Machinery, New York, NY, USA, 92–96. https://doi.org/10.1145/3292147.3292196

[2] Valentina Andries and Sabina Savadova. 2021. Understanding the Role of Digital Technology in the Transitions of Refugee Families with Young Children into A New Culture: A Case Study of Scotland. In *Proceedings of the 20th Annual ACM Interaction Design and Children Conference* (Athens, Greece) *(IDC '21)*. Association for Computing Machinery, New York, NY, USA, 493–497. https://doi.org/10.1145/3459990.3465185

[3] Françoise Decortis and Antonio Rizzo. 2002. New active tools for supporting narrative structures. *Personal and Ubiquitous Computing* 6 (2002), 416–429.

[4] Min Fan and Alissa N. Antle. 2020. An english language learning study with rural chinese children using an augmented reality app. In *Proceedings of the Interaction Design and Children Conference* (London, United Kingdom) *(IDC '20)*. Association for Computing Machinery, New York, NY, USA, 385–397. https://doi.org/10.1145/3392063.3394409

[5] Swiss State Secretariat for Migration SEM. 2023. *Asylum statistics for 2022.* https://migration.swiss/en/migration-report-2022/asylum-and-protection-status-s/a-few-figures?lang=true

[6] Nina Iten and Dominik Petko. 2016. Learning with serious games: Is fun playing the game a predictor of learning success? *British Journal of Educational Technology* 47, 1 (2016), 151–163.

[7] Hayeon Jeong, Daniel Pieter Saakes, and Uichin Lee. 2015. I-Eng: an interactive toy for second language learning. In *Adjunct Proceedings of the 2015 ACM International Joint Conference on Pervasive and Ubiquitous Computing and Proceedings of the 2015 ACM International Symposium on Wearable Computers* (Osaka, Japan) *(UbiComp/ISWC'15 Adjunct)*. Association for Computing Machinery, New York, NY, USA, 305–308. https://doi.org/10.1145/2800835.2800857

[8] Murat Güray Kırdar, İsmet Koç, and Meltem Dayıoğlu. 2023. School integration of Syrian refugee children in Turkey. *Labour Economics* 85 (2023), 102448.

[9] Grace C. Lin, Ilana Schoenfeld, Meredith Thompson, Yiting Xia, Cigdem Uz-Bilgin, and Kathryn Leech. 2022. "What color are the fish's scales?" Exploring parents' and children's natural interactions with a child-friendly virtual agent during storybook reading. In *Proceedings of the 21st Annual ACM Interaction Design and Children Conference* (Braga, Portugal) *(IDC '22)*. Association for Computing Machinery, New York, NY, USA, 185–195. https://doi.org/10.1145/3501712.3529734

[10] Claudio Rezende Lucarevschi. 2016. The role of storytelling on language learning: A literature review. *Working Papers of the Linguistics Circle* 26, 1 (2016), 24–44.

[11] Ornella Mich, Elena Betta, and Diego Giuliani. 2004. PARLING: e-literature for supporting children learning english as a second language. In *Proceedings of the 9th International Conference on Intelligent User Interfaces* (Funchal, Madeira, Portugal) *(IUI '04)*. Association for Computing Machinery, New York, NY, USA, 283–285. https://doi.org/10.1145/964442.964506

[12] Placidius Ndibalema. 2023. Barriers to accessibility of learning among minority refugee children: A systematic literature review. *Children and Youth Services Review* (2023), 107261.

[13] Emmy Rintjema, Rianne van den Berghe, Anne Kessels, Jan de Wit, and Paul Vogt. 2018. A Robot Teaching Young Children a Second Language: The Effect of Multiple Interactions on Engagement and Performance. In *Companion of the 2018 ACM/IEEE International Conference on Human-Robot Interaction* (Chicago, IL, USA) *(HRI '18)*. Association for Computing Machinery, New York, NY, USA, 219–220. https://doi.org/10.1145/3173386.3177059

[14] Gianni Rodari. 2024. *Biography*. https://100giannirodari.com/en/biography-timeline/

[15] Elisa Rubegni, Rebecca Dore, Monica Landoni, and Ling Kan. 2021. "The girl who wants to fly": Exploring the role of digital technology in enhancing dialogic reading. *International Journal of Child-Computer Interaction* 30 (2021), 100239. https://doi.org/10.1016/j.ijcci.2020.100239

[16] Thorsten Schodde, Laura Hoffmann, Sonja Stange, and Stefan Kopp. 2019. Adapt, Explain, Engage—A Study on How Social Robots Can Scaffold Second-language Learning of Children. *J. Hum.-Robot Interact.* 9, 1, Article 6 (dec 2019), 27 pages. https://doi.org/10.1145/3366422

[17] Gabriella Tisza, Kshitij Sharma, Sofia Papavlasopoulou, Panos Markopoulos, and Michail Giannakos. 2022. Understanding Fun in Learning to Code: A Multi-Modal Data approach. In *Proceedings of the 21st Annual ACM Interaction Design and Children Conference* (Braga, Portugal) *(IDC '22)*. Association for Computing Machinery, New York, NY, USA, 274–287. https://doi.org/10.1145/3501712.3529716

[18] Sveva Valguarnera and Monica Landoni. 2022. ROBIN - Designing a ROBot for Interactive Narratives to engage preschool children. In *6th FabLearn Europe / MakeEd Conference 2022* (Copenhagen, Denmark) *(FabLearn Europe / MakeEd 2022)*. Association for Computing Machinery, New York, NY, USA, Article 8, 5 pages. https://doi.org/10.1145/3535227.3535235

[19] Özlem Yeter, Ebru Evcen, Hugh Rabagliati, and Duygu Özge. 2024. Understanding cognitive and language development in refugees: Evidence from displaced syrian children in Turkey. *Cognitive Development* 69 (2024), 101412.