

# FROM PAPER TO SCREEN: DECISIONS TAKEN TO DESIGN A STORY APP FOR INTERCULTURAL DIALOGUE

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**Abstract:** We present a descriptive case study of the decision-making process during the development of a set of interactive story apps designed to promote intercultural dialogue directed to young children. We address: (i) the decisions made in the development of the story apps; and (ii) how the development process may contribute to informing new developments. Our results corroborate but also amplify the importance of core aspects in the development of story apps: (i) interdisciplinarity; (ii) multimodality; (iii) meaningful approach to interactivity; (iv) inclusion of complementary elements to the story. We argue that this study brings concreteness to theoretical claims, informing developments regarding the addressed dimensions.

**Palavras-chave:** Interactive Story Apps; Intercultural Dialogue; Case Study.

## Do papel ao ecrã: decisões tomadas na concepção de uma aplicação de histórias interactivas para promover o diálogo intercultural

**Resumo:** Apresentamos um estudo de caso do processo de tomada de decisão para o desenvolvimento de aplicações de histórias interactivas concebidas para promover o diálogo intercultural. Abordamos (i) as decisões tomadas no desenvolvimento deste conjunto de aplicações para crianças; e (ii) as possibilidades deste processo informar novos desenvolvimentos. Os resultados corroboram e amplificam a importância de aspectos centrais no desenvolvimento de histórias interactivas: (i) interdisciplinaridade; (ii) multimodalidade; (iii) abordagem significativa à interactividade; (iv) elementos complementares à história. Argumentamos que este estudo dá concretude a reivindicações teóricas, informando desenvolvimentos que incluem as dimensões abordadas.

**Keywords:** Aplicações de Histórias Interactivas; Diálogo Intercultural; Estudo de Caso.

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## INTRODUCTION

Reading is an enjoyable and formative activity, and picture books particularly play an important role in childhood, helping children to develop a series of competences, and contributing to their understanding of the world. In recent years, and mostly after the launch of touchscreens, e-books have gained in popularity, gradually becoming part of the children's literature universe, often providing them their first contact with written literature (AL-YAQOUT; NIKOLAJVA, 2015). Specifically, among young children, the use of interactive story apps is increasingly popular (RAMOS, 2017; ZHANG; KUDVA, 2014). This is not surprising given the availability and widespread use of mobile and touch screen devices, and the appealing combination of multimedia resources with elements from traditional printed picture books (YOKOTA et al, 2014). This new combination extends the potential of printed books, creating a new type of narrative in digital format. While traditional printed books already afford different types of physical interaction, such as page manipulation, pop-ups, or other mechanisms, children's interactive story apps provide new ways to actively interact with the narrative (MENEGAZZI, 2018). The interaction with the multimedia elements is triggered by the users, through the performance of certain gestures, such as touching, sliding, or squeezing the surface of the device to activate sounds, animations and to access extra contents during reading (SERAFINI et al., 2016). The hotspots, this is, the areas that demand active interaction from the reader to be triggered (MENEGAZZI, 2018; KUCIRKOVA, 2017; CHRIST et al., 2019), are linked to at least three stimuli modalities: visual, aural, and haptic. These stimuli extend the visual narrative, through the inclusion of e.g., animations, music, sound effects, embedded videos, and locution.

Research investigating interactive features in story apps for children has highlighted that these can potentially contribute to children's literacy development (BUS et al., 2015), when they are congruent with the narrative. Also animated illustrations that are well matched to the text are important for understanding the story (TAKACS; BUS, 2016), and have a beneficial impact on reading, since the cognitive cost of switching between the interaction and the reading itself is small (TAKACS et al., 2015, p.701). On the contrary, these features, especially if they

are not connected to the storyline, may interrupt the story flow, or draw away children's attention (TAKACS et al., 2015:700). Investigations have shown that most young children are not yet able to control and deploy their attentional resources effectively in multitasking scenarios, so although they enjoy playing with apps full of stimulus, the activities may no longer support and expand literacy skills and experiences (BUS et al., 2015). Overall, research on interactive apps has concluded that, when well-designed, interactive story apps have the potential to contribute to emergent literacy and numeracy skills (SARI et al., 2019). However, with the rapid growth in the production of digital books and story apps there is an urgent need to keep theory up to date (AL-YAQOUT; NIKOLAJVA, 2015).

This paper aims to contribute to the body of work on story apps by presenting and discussing aspects of the decision-making process that were central to the development of a set of pedagogical interactive story apps designed to promote intercultural dialogue. We present a descriptive case study (MERRIAM, 2009) of the design and development of the story apps discussing the multiple layers involved in the process. Despite its situated and particular nature (STAKE, 2007), we argue that the analysis of this particular case can inform the decision-making process of future developments of interactive story apps for young children, especially the ones approaching similar themes.

We begin by briefly discussing the concept of intercultural knowledge, which is a key dimension to this study. We then present the methodology followed by the description of the story apps' development process, highlighting the decision-making process.

## **INTERCULTURAL DIALOGUE**

Cultural diversity is a key dimension of 21st century societies, in which preserving and promoting human rights is essential. A first step to do so is to expand the concept of 'culture' beyond the boundaries of nation states, since global developments above and below the level of the nation state have undermined the scale and comprehensiveness of a nation's 'imaginary' (HALL, 1999, p. 9). Therefore, an understanding of culture as sets of practices experienced by individuals (GEERTZ, 1983; LIDDICOAT, 2004), continuously

adapting to the realities lived and perceived by its members, as well as evolving and being shaped in interaction with others is needed.

As defined by Hall (1999, p.16), culture is “not a question of what our traditions make of us so much as what we make of our traditions [...] We are always in the process of cultural formation. Culture is not a matter of ontology, of being, but of becoming”. In such a context, there is a need to foster an intercultural pedagogical approach to cultural diversity, focusing both on the recognition of individuality and on cultural plurality, establishing a dialogue based on equal dignity and shared values (COUNCIL OF EUROPE, 2008). This is also aligned to the Agenda 2030, which make a pledge to foster “intercultural understanding, tolerance, mutual respect and an ethic of global citizenship and shared responsibility” (UN GENERAL ASSEMBLY, 2015, p. 10).

A strategy proposed to address this need is the establishment of ‘intercultural dialogue’, which is understood as an “open and respectful exchange of views between individuals, groups with different ethnic, cultural, religious and linguistic backgrounds and heritage on the basis of mutual understanding and respect” (COUNCIL OF EUROPE, 2008, p.10). Therefore, it is necessary to adopt different policy approaches to the promotion of intercultural dialogue, which includes strategies for learning and teaching intercultural competences. The design and development process detailed in this paper was conducted aiming at addressing this need.

## METHODOLOGY

This paper sets out to answer two main questions, namely: which decisions were made in the development of a set of interactive story apps for young children to foster intercultural dialogue avoiding reinforcing cultural stereotypes? To what extent and how do these decisions may contribute to informing new developments?

Considering the posed research questions, we developed a qualitative case study since, as suggested by Yin (2002, p. 7), for answering “how” and “why” questions a case study has distinct advantages over other approaches. We understand a qualitative case study as “an in-depth description and analysis of a bounded system” (MERRIAM, 2009, p.43). Some characteristics of this kind of study are: (i) it is used to search for meaning and understanding; (ii) the researcher is the primary instrument of data collection and analysis; (iii) it is an inductive

investigative strategy; and (iv) the end product is richly descriptive (MERRIAM, 2009).

To better address the needs of the end users, the development of the materials has followed a design-based research methodology and a user-centred approach, undergoing several iterations, in a cyclical process of designing, testing, and redesigning (ANDERSON; SHATTUCK, 2012). As part of the design process, we carried out user studies with primary school children to understand how to design the navigation in the story apps (AUTHORS, 2018), focusing on (a) the icon's content, (b) their visual representation, (c) and their location. A detailed description of these studies is not within the scope of this paper, so for detailed information see (AUTHORS, 2019, 2020). In the following, we present the materials and discuss the design decisions that were made.

## **DESIGN DECISIONS IN THE DEVELOPMENT OF THE INTERACTIVE STORY APP**

The set of story apps is part of the x-materials<sup>3</sup>, a kit of digital and manipulative tools for storytelling that aims at fostering early-literacy development. The kit is composed of a digital manipulative (DM), a storyMaker and a set of story apps. The central tool is the digital manipulative, which is composed of physical blocks with embedded computational properties that serve as an interface for manipulating the digital content (AUTHORS, 2019). The storyMaker is a fully digital version of the DM. Both are authoring tools, in which the story elements are grouped in cultural sets that represent elements from a certain culture. Each cultural set is composed of a landscape, a girl and a boy protagonist, an animal, an antagonist, a musical instrument, and a magical object. All the elements can be mixed across cultures. The authoring tools are complemented with story apps; each app displays an interactive story situated in a specific culture, contextualizing the elements that are displayed and manipulated in the DM and in the storyMaker (AUTHORS, 2019). Currently there are four interactive story apps, namely: x-materials in India, x-materials in Brazil, x-materials in Cape Verde, and x-materials in Portugal. Although the cultural context changes from story to story, its scope and structure are the same through all the apps.

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The apps aim at creating a playful environment that favours the development of early-literacy practices and competences in a context of intercultural dialogue. Each story app presents a children's story in written and oral form. Although related to the authoring tools, the interactive story apps can be read autonomously, offering themselves as full animated narrative texts for children's meaning making. The apps also help to give context to the visual universe of the stories presented in the DM and the storyMaker, nurturing the children's imagination and provoking their curiosity about the different featured cultures, potentially stimulating understanding and acceptance of diversity.

To better explore each dimension and illustrate our claims, here we focus our analyses on the app: "x-materials in Cape-Verde". The Cape-Verdean set is composed of a boy, a girl, a turtle (the animal), the *thief* (the antagonist), a *cavaquinho* (the musical instrument), a *pano di terra* (the magic object), and a landscape inspired by its coastline. The elements were chosen to inform the reader about Cape Verde geography and to represent the diversity of the country and aspects of its culture, and the information is conveyed by accompanying the protagonist in a treasure hunt in Cape-Verde.

Here, we discuss the decisions made during the design process, also presenting their theoretical basis. To do so, we detail four dimensions of the story app's development, namely: (i) motivation and challenges; (ii) the story itself; (iii) personalization and interaction; and (iv) features that complement the story. We understand that these are core dimensions to answer the proposed research questions.

### *Motivation and Challenges*

The initial motivation to develop the story apps was to convey information about the cultures represented in the DM, resulting in the development of the first story app, the "x-materials in India". However, confronted with questions related to stereotypical representations, the research team realized that instead of just presenting a story for children created around the elements portrayed in the DM of the respective country (as we did on the first story app), the apps could be a means to tell a children's story while presenting geographical and cultural information about the represented country/culture in a way that would be appealing and relevant to the children, as well as would show the diversity within the countries. As part of the development process, we then began to look for representative places and cultural manifestations of the

respective country, trying to select elements that display the diversity within the cultural group, and situating such diversity through the inclusion of different geographic settings, tools, objects, music, etc., trying to provide a more comprehensive view of the country while avoiding stereotyping due to decontextualization, as suggested by Leite and Rodrigues (2001). To extend the information woven in the story, we included a glossary, which enabled us to further detail the information about the cultural elements, as the glossary contextualizes and gives information to key themes presented in the story.

One of the challenges of the design of the story apps was a meaningful articulation of different themes, i.e., culture, literacy, technology, and digital tools. This was only possible by working with an interdisciplinary research team that contributed with their different expertise in the different phases of the design and development process. Besides joining researchers in Child-Computer Interaction, Literacy Education, Linguistics, Design, Illustration, Animation, Sound Design and Computer Science, a member from each represented country was consulted regarding the choice of the cultural elements represented in the stories.

The development comprised five phases with discussions involving the whole team, with different areas playing a leading role in each phase. Here, we highlight which decisions were made in each of them.

The first phase was dedicated to the choice of the elements and started with a brainstorming session involving the whole team. Cultural information was discussed, and a preliminary list of places, habits and elements was created to be further investigated. In the following sessions, the geographical information and the cultural elements were discussed with a Cabo-Verdean, and the elements that would compose the story were chosen, as well as the elements that compose the glossary and the mini-game.

Regarding the geographical information, since Cape Verde is an archipelago composed of ten volcanic islands, we set the story in five islands: Fogo, Boa Vista, Sal, São Vicente, and Santiago, avoiding focusing only on the most popular ones. The represented natural elements included the volcano in Fogo Island, the turtles that visit Cape Verde beaches to spawn and wait for new little turtles to be born every year, and the reefs. Habits, food, and natural elements were selected according to their representativeness. The *Tabanka* festival, *Morna*, and *Batuque* were chosen as illustrative cultural manifestations;

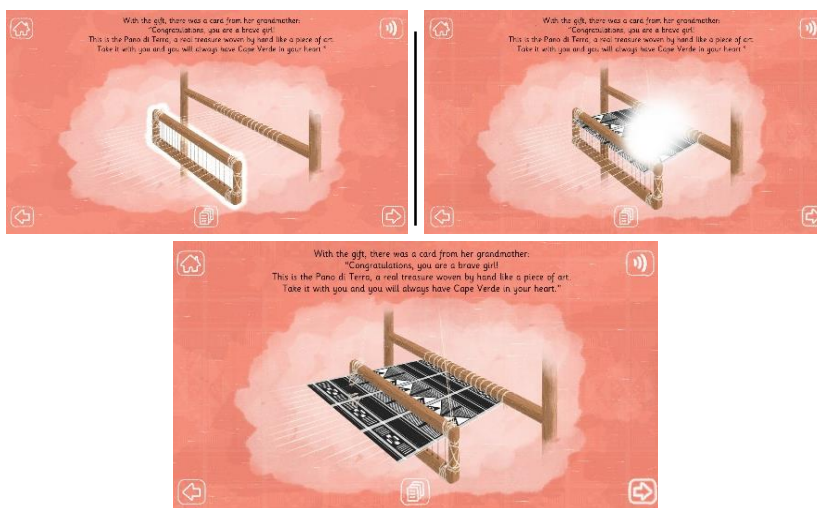
all of them are listed as Intangible Cultural Heritage items, being part of the Cape-Verdean imaginary. To represent traditional Cape-Verdean food, the *Cachupa* was chosen, a dish prepared with meat or fish, beans, corn, and cooked vegetables.

The second phase was dedicated to the creation and writing of the text and was led by the linguist and the literacy education researchers (see next section to a detailed analysis of the text). Once the first version of the verbal text was written, it was discussed within the team, and the integration of non-verbal text elements was defined (i.e., static and moving images, sounds, interactions). During this process, the verbal text went through several iterations to accommodate all elements and create a meaningful multimodal text. A relevant decision in this phase was to create a story in which the cultural elements were adequately represented in the chosen settings, so the *Tabanka*, for instance, was situated in Santiago Island, where it is very popular.

The third phase was the creation of the illustrations. Departing from the sketches elaborated in the previous stage, the illustrator created the final versions of the visual elements. This phase took around two months with weekly meetings with the whole group to discuss the illustrations and (re)define the visual elements. Defining the style of the illustration was a core decision of the visual development phase. To do so, visual references for the big landmarks, such as the volcano of Fogo Island, as well as for the topology of the islands, the inner streets of the cities, the dynamic of the festivals, the inside of a common house or the everyday fashion of different people were analysed and selected.

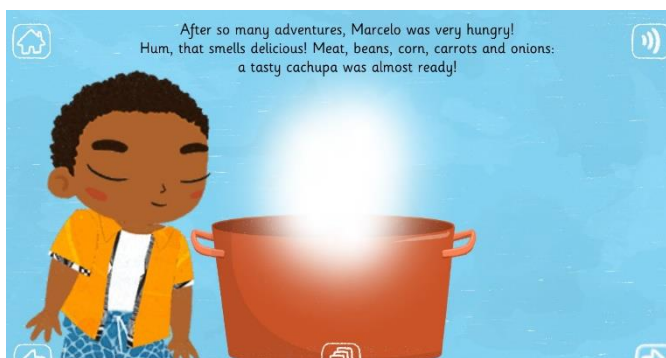
The images were chosen to add on the text's meaning and expand it, thus creating new reading layers. This is a well-known design convention, called counterpoint (NIKOLAJEVA; SCOTT, 2006), generally applied to printed picture books, where children are encouraged to learn how to read both the verbal text and the image. This strategy was used to enrich and add further depth to the narrative (SARGEANT, 2013). On the page in which the *Pano di Terra* is revealed (Fig. 1), for instance, the verbal text says "With the gift, there was a card from her grandmother: Congratulations, you are a brave girl! This is the *Pano di Terra*, a real treasure woven by hand like a piece of art. Take it with you and you will always have Cape Verde in your heart", while the illustration shows the weaving loom and the process of woven the *Pano di Terra*.





**Figure 1.** Page about the Pano diTerra.

The visual style of the characters was defined to be neither too realistic nor over-stylized, aiming at inviting the children to a world of play and make believe. The protagonists' design is cartoonish in proportion and there is a prevalence of round features, which are more appealing and make the characters perceived as being friendly (SÁ et al., 2019). Figure 2 shows a close-up of the protagonist. Another choice was to have a constant frontal angulation pattern and a variety of presentations of the protagonist according to the narrative moment. This design decision aims to generate a high sense of involvement with the character, providing a sense of intimacy between the reader and the character. This is a key



**Figure 2.** A close-up of the protagonist

contribution of the visual mode to the intention of fostering an emphatic reaction to the events presented to the reader.

The fourth phase was to create the animations and the sound design, which involved creating all the ambience sounds and the sounds of the characters, the composition of the *morna* and batuque tracks, as well as the recording and editing of the spoken story. Finally, the last phase was the programming of the story app, which followed the same architecture as the previous apps (Authors, 2020).

### *The Story*

As referred in the introduction, interactive story apps offer multimodal reading. Multimodality plays a central role in current conceptualizations about digital meaning-making (KRESS, 2010; NEW LONDON GROUP, 1996). It considers that people make meanings not only through words, but also with images, space, objects, body, sounds, speech, and the written and oral modes of verbal language, as well as through the meaningful relationships that are established among modes to make coherent and cohesive meanings (KRESS, 2010).

A decision taken during the creation of the interactive story apps was to structure the text in a way (i) in which the verbal text conveys its communicative intention, and (ii) the static and moving images, colours and sounds are significant meaningful units (KRESS; VAN LEEUWEN, 2006), fitting together to create a set of powerful intermodal situated meanings, which are a key feature for the promotion of a multimodal reading experience.

Considering the intention of fostering intercultural dialogue, we chose to use the structure of an anecdote in our apps, since this is a genre from the family of story genres that presents an unusual sequence of events, and concludes with the protagonists' reaction to the events, with the intent to share an emotional reaction (MARTIN; ROSE, 2005, p.56). This genre is traditionally composed by four phases: (i) orientation, in which usually the setting is presented; (ii) a remarkable event, where one central event or succeeding events are described; (iii) a reaction, in which the characters' reaction to the event(s) is presented; and (iv) a coda, which is optional and presents a final comment or interpretation. In sum, the overall anecdote pattern is an event and reaction sequence, and its function is to create empathy with the characters, their feelings, and reactions (MARTIN; ROSE, 2005). The meanings shared throughout the story are established (i) by complementary relationships between modes, in which the

images extend and amplify the meanings of the verbal text, (ii) and by concurrence between modes, in which one mode relates to the content presented by the other mode emphasizing different aspects. On the first page of the Cape Verde story app, the setting of the story, for instance, is established by a complementary relationship between verbal and visual modes, as the images amplify the meanings conveyed through the verbal text. Moreover, the disruption in normality that introduces the remarkable event is both announced by the verbal (through the focus on a gift from the grandmother) and the visual modes (a zoom in the box and the map triggered by the user's interaction, as well as the representation of the symbols of the places to be explored along the treasure hunt). Figure 3 displays a sequence of three frames which depict how the focus is shifted from the whole room to the map. This visual meaning complements the presented verbal information.



**Figure 3.** First page of the story app.

Another strategy used to promote empathy towards the portrayed cultural elements was to outline the visual elements in a way that fosters an interpersonal dimension. For instance, the way characters are depicted in picture books can be loosely categorised into three broad styles, namely: minimalist, generic and naturalistic (PAINTER et al., 2012, p.30). In the verbal text, this level of detailing is represented through descriptive and attitudinal linguistic resources. In our story apps, the visual representation of the characters is more detailed than its verbal description. While few descriptive or attitudinal linguistic resources are used; the

visual depiction of the characters is done in a friendly way, leading to an empathic reaction by the reader. According to Painter et al. (2012), a visual style with some level of details, but not too realistic, like the characters in this story app, creates characters of the everyman type that invites the child readers to see themselves in the protagonist role and to be/act like them. In other words, this kind of representation invite an empathetic stance, where common humanity is recognised, and the reader can stand in the character's shoes. This is an important aspect of the design of this set of story apps, since it contributes to the accomplishment of the communicative purpose, inviting the reader to share an emotional reaction with the characters.

The analysis of the story illustrates how the multimodal meaning-making process was designed as a core feature to establish the setting for some rich reading practice aligned to intercultural pedagogical approach to cultural diversity.

### *Personalization and Interactivity*

The first personalization feature in the story app is the possibility to choose the protagonist of the story. In the Cape-Verdean story, readers can choose Luana, the girl, or Marcelo, the boy, as the main character. This is important, because, as highlighted before, we aim to foster an empathy with the story and the protagonist's emotions. The oral narration is another dimension of personalization, children have the possibility to (i) listen to the story being read by the default narrator (which also functions as model reading in Portuguese or English), (ii) read the story on their own, (iii) or record their own (or someone else's) personalized reading, using an integrated recording function that supports several audio files, which are stored in the app. These recorded narrations may be used to substitute the adult reading to the child, whenever convenient.

The option to record children's reading was envisioned also to create opportunities to foster active reading, as it is an important strategy to promote engagement with and empathy towards the portrayed elements. In this sense, interactivity is a central aspect of the design. As referred to in the Introduction, interactive features are a common element in story apps, and the interactive hotspots present in the story are part of the meaning-making process.

In the Cape Verde story app, on the page in which the turtle is introduced, for instance, the meaning making process demands from children the articulation of the verbal text, the static and moving images and children's interaction with the app. The verbal text introduces the context: "Luana continued her journey and

went to Boa Vista Island. Suddenly, she saw something moving under the sand! What could it be?"; the soft pulsing glow indicates the interactive area; and the interaction triggers the animation that reveals the turtle. This is an example of how interactivity was integrated into the meaning-making process (Fig.4).



**Figure 4.** Introduction of the Turtle

The 360° environment is another feature that promotes interactivity and a high level of embodied engagement: the illustrated environment can be explored by turning the device in any direction, thus prompting a sense of exploration and discovery that may foster children's immersion into the story world. The 360° also offers a divergence regarding focalisation, that is, there is a third person narrator in the verbal text coupled with a first-person position in the visual mode. In other words, the reader stands temporarily in the shoes of the character to see the story world through his/her eyes (Fig. 5). This strategy provides the reader with two points of view simultaneously, fluctuating between internal and external perspectives of the story, potentially generating a feeling of complicity and empathy in the reader. Finally, this is a design decision that reinforces the multimodal reading, calling the reader to actively decode and integrate the represented meanings (PAINTER et al., 2012).

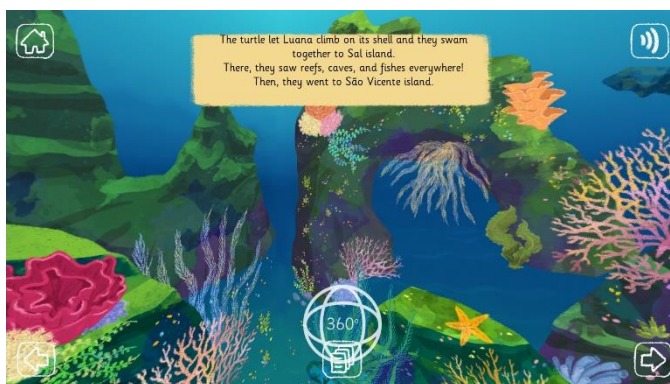


Figure 5. The 360° environment

### *Beyond the Story*

Besides the story, the app provides a mini-game, an augmented reality (AR) experience, and a glossary, which were carefully considered to guarantee they relate to the core narrative and to ensure that, through them, the users would discover further information relating to the overall story, thus promoting a fulfilling and coherent reading experience (SARGEANT, 2013).

To use the AR function, the readers have access to a printable pdf that contains four markers, each representing a character of the story. Printing the pdf and guying each character to a cardboard cut-out allows the children to manipulate the virtual characters and visualise them as if they were part of their physical world. The mini-game, in the Cape Verde app, is a memory game, in which some visual elements portrayed in the story are shown again. These two extra-features work as a reinforcement of the visual representation of key cultural elements. The glossary, on the other hand, goes beyond the visual aspects of the culture and presents contextual and more detailed information about elements mentioned in the story. The main goal is that this information combined with the story act as a trigger to historical, political and human-rights education, which are key-aspects of an “education for democratic citizenship” (COUNCIL OF EUROPE, 2008).

In the Cape Verde app, nine terms were included in the glossary, they are: Cape Verde, *Batuque*, *Cachupa*, Cape Verdean Creole, *Chã das Caldeiras*, *Morna*, Reefs, Sea Turtles, and *Tabanka*. Figure 6 shows the entry about Cape

Verdean Creole that brings linguistic information, as well as a historical contextualization.



Figure 6. Glossary

## CONCLUSION

As aforementioned, the growing popularity of story apps among young children asks for investigations and practices to understand possible opportunities, benefits, and drawbacks of its use. Our findings provide a contribution towards understanding aspects involved in the design and development of interactive story apps targeting young children. We discuss our finds according to our research questions.

Given the aim of designing interactive story apps that may foster intercultural dialogue avoiding reinforcing cultural stereotypes, we highlight three dimensions: (i) decisions guided by the formative objective of the app; (ii) a cyclical development with constant reviews/reformulations involving a multidisciplinary team and a consultant from the portrayed country; (iii) careful definition of the layers that compose the story app (i.e., the story itself, personalization and interaction, and the inclusion of features that complement the story).

Our results corroborate but also amplify the importance of what has been already pointed out previously as fundamental aspects to consider in the development of story apps, namely: (i) interdisciplinarity; (ii) multimodality; (iii) a

meaningful alignment of interactivity with the story; (iv) introduction of complementary elements to the story for presenting additional information.

Regarding the first aspect, we claim that pedagogical interactive story apps combine several expertise areas, such as Design, Illustration, Child-Computer Interaction, Early Childhood Education and Literature. In this context, the establishment of an interdisciplinary team becomes fundamental (Menegazzi, 2020). The design process described in this paper evidences how such articulation occurred in practice and, therefore, gives concreteness to this claim, strengthening it. Considering multimodality, it is well known that children's literature is increasingly multimodal, therefore it is fundamental to consider the different levels in which multimodality is revealed in the stories (MORAES, 2015). By describing how different modes were articulated for the meaning-making process, this case study illustrates the potential of story apps to provide an effective and multimodal approach to meaning-making (AUTHORS, 2021). This is a core characteristic of interactive story apps, since such a dimension is central to the development of literacy skills needed in contemporary society (NEW LONDON GROUP, 1996).

A main concern in the development of the story apps is the introduction of interactivity, which may negatively influence reading, when the interactive resources are not meaningfully integrated in the narrative. In this sense, our case study describes how interactivity was used to create meaning inside the story, representing a concrete example of how interactivity can have literary congruence. Lastly, and yet related to this aspect, we described how the elements beyond the story were designed to complement the narrative, acting as an opportunity to introduce additional information related to the story app's pedagogical goal.

Finally, we acknowledge the punctual nature of our study, however, given these findings, we argue that the descriptive case study reported here brings concreteness to theoretical claims, informing future developments regarding the addressed dimensions. We have already begun studies to evaluate the user experience with this set of story apps. Since they are still exploratory, we cannot assert whether the decisions we made achieved their goal in practice, but the initial sessions have shown promising results and both the students' and the teachers' feedback has been very positive.



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