The final publication is available at Springer via:
http://dx.doi.org/10.1007/978-3-031-42293-5_27

StoryCarnival: Inspiring Play with Stories and an Enhanced Puppet

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Abstract. As developmental barriers to children's access to technology have lowered, dark patterns in apps geared toward children encourage privacy invasions and compulsive use of technology. With StoryCarnival, we use a web app with e-book and printable stories and an adult-operated voice agent to encourage the opposite: mindful and minimal use of technology to support developmentally significant aspects of children's play.

Keywords: Voice Agents · Children · Teleoperation · Social Play

1 The Landscape of Children's Technologies

Touch screens have enabled children to begin using technology before they develop the motor skills required to use a keyboard and mouse [4]. Voice interfaces have further broadened the scope of interactions children can have with technology before becoming proficient in reading [10]. This increase in children's access to technology has raised concerns about dark patterns present in technology aimed at children [1]. These include patterns that aim to maximize children's engagement to subsequently maximize their exposure to advertisements, and invasive data tracking for targeted advertising [1].

In 2017, Hourcade et al. described the 3Cs (Creativity, Connection with the physical environment, and Communication) as an alternative sociocultural approach to children's technology [5]. They described the design of an early version of a system called StoryCarnival as an example of a technology guided by these principles [5]. From the beginning, StoryCarnival aimed to use e-book stories and a play planning tool primarily to inspire and set up social role play with generic props (e.g., blocks), shifting the focus from technology to peers and the physical environment. Since then, our research team has worked to make StoryCarnival publicly available[1] and developed make-your-own story templates and an adult-operated voice agent to keep children engaged in play activities during StoryCarnival sessions [8]. In this demonstration, we hope to illustrate and spark conversations about how we can shift away from the paradigm of high engagement with technology as a goal.

[1] http://storycarnival.org

2 Interactive Stories: Providing Context and Inspiration

Each StoryCarnival story introduces four characters, a problem, and an open-ended partial resolution. For example, in the "Snow Day" story, Dog, Bear, Monkey, and Cat each want to do a different activity on their snow day but all feel lonely when they split up. The story ends with the characters agreeing to compromise and take turns doing each activity. This sets up a scenario in which children can replay the conflict in the story and/or improvise how the resolution might play out. The stories are available as e-books or printable PDFs, so they can be used without screens or an internet connection when appropriate.

The make-your-own story templates provide a few options for different story elements children can select from which are then stitched together into an e-book story (see Fig. 1 for an example). This can create silly, non-sensical scenarios which are entertaining in a way that is important to cognitive development [9]. The templates can also increase the replayability of a single story structure (e.g., exploring a new place) by providing concrete examples of slight variations.

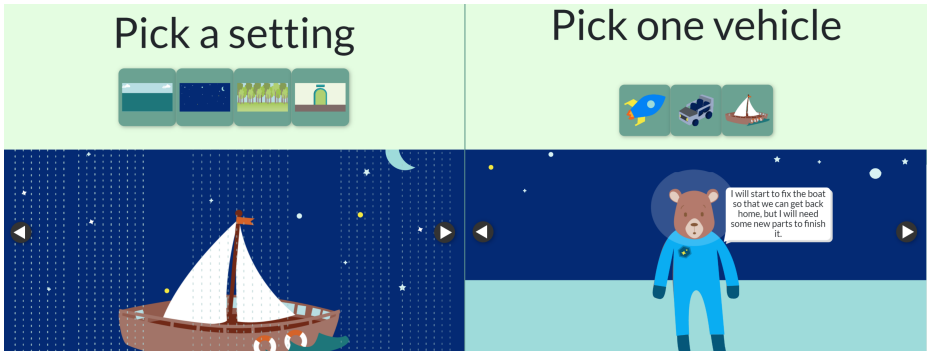

Fig. 1. Top left: options to choose from for a make-your-own template story setting. Top right: options to choose from for a vehicle in the story template. Bottom left: a page from the story when "space" was chosen as the setting, "boat" was chosen as the vehicle, and "storm" was chosen as the problem. Bottom right: a page from later in the story, illustrating how choices are also reflected in characters' outfits and speech.

3 Play Planner: Setting the Stage

Each character plays an explicitly defined role in each story, stating and demonstrating their skills and interests which make them distinct from the other. Unlike most children's stories, which tend to have one or two protagonists, the StoryCarnival stories illustrate four distinct characters of equal importance to each story. After a story finishes playing through the web app, children can each select which role they want to assume during play, and be reminded of what

each character did in the story via the play planner (see Fig. 2). The play planner supports groups of children in coordinating their plan for play immediately before play begins.

Fig. 2. Top: character options presented by the play planner for the Snow Day story. Bottom: the screen shown when a user selects Dog.

4 Teleoperated Voice Agent: Facilitating Communication

StoryCarnival also includes a tangible, teleoperated voice agent called MiniBird (see Fig. 3). The control interface uses AWS Polly text-to-speech synthesis. The voice agent itself is a TYLT mini (or similar size) Bluetooth speaker housed inside a 3D-printed cubic case (2 cubic in./5 cubic cm.) made from a flexible, transparent plastic resin. The case has openings on four faces to slot in artwork representing the MiniBird character (printed stickers and cardstock).

The voice agent essentially functions as a puppet, except the physical manipulation of the puppet is decoupled from the puppeteer – while an adult controls its speech, children can carry it around and incorporate it into their play. When teachers use puppets in classrooms, the teacher can step out of their role as an authority figure and assume the role of someone who needs help from the children [6]. This can encourage quiet children to speak up more and motivate children to explain their reasoning in more detail [6]. We saw this impact on shy children in our own prior work with StoryCarnival, with minimal [3]. While teachers see benefit in using puppets in the classroom, some opt not to use them because they find it difficult to create a persona for a puppet or switch between their teacher voice and puppet voice [2]. An adult-operated voice agent can lower

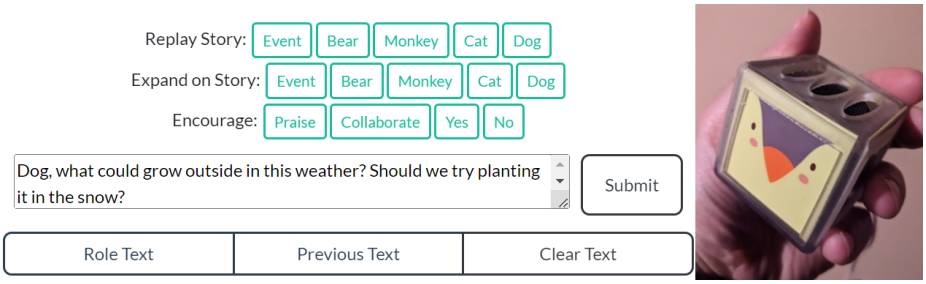

Fig. 3. Left: the voice agent control interface; text can be entered by typing or by cycling through story-related suggestions via the buttons. Right: MiniBird voice agent.

the barriers to using puppets as a support for children in social play without relying on the audio recording and processing required by automated voice agents [7]. Our work aims to explore what teleoperated conversational agents look like when an automated future iteration is not the ultimate goal.

5 Conclusion and Future Work

Through StoryCarnival, we try to understand and design for the specific ways technology can support and enhance low-tech activities without compulsive engagement with the technology itself. The StoryCarnival stories and voice agent keep caregivers and children in control of play activities with different levels of technology use possible but not pushed as the primary focus. In the future, we hope to turn StoryCarnival into a platform researchers can use to quickly create and evaluate media intended to inspire future activity.

Acknowledgements We thank all students and faculty who contributed to the current and prior StoryCarnival iterations. We thank the parents, teachers, and children who have worked with us to develop StoryCarnival. This work is supported by the National Science Foundation under Grants No. 1908476 and 2040204 and the National Science Foundation Graduate Research Fellowship under Grant No. 000390183.

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