Applications as Stories

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Abstract
Narrative engages people both emotionally and intellectually, shaping the way we perceive, interpret, and interact with the world. Our group is putting that power to new uses by experimenting with applications that are also stories: applications that use the principles of narrative to grab and keep people's attention, that guide novice users through the process of becoming experts, and that provide experiences that are as emotional and reflective as they are efficient and powerful.

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Introduction
Stories are fundamental to the way we perceive and construct meaning. By linking experiences, contexts, and emotions into chains of cause and effect – into stories – we build an understanding of our world, ourselves, and each other. Though the power of story has been studied extensively by researchers in fields such as rhetoric [11], narrative psychology [13], and education [5], further research is needed regarding the role narrative might play in human-computer interaction.

At present, games are one of the few types of computer applications that use narrative extensively. Indeed, it can be argued that any application with a strong narrative component is by definition a type of game, or at least that it has been "gamified". Functionally, the role of story in a game is to engage the player through fantasy and suspense [9]. Story overlays the bare mechanics of a game with meaning and significance.

We want to explore the potential of story-driven gamification and determine whether it is possible to apply the strengths of narrative to other kinds of applications. Our first step is to uncover and harness the elements that make a game narrative compelling: player identification with an avatar or protagonist, dramatic pacing, context, mystery, causality, exploration, and the player's role in shaping and directing the story [12][7].

Applying Narrative to Applications

There are several ways in which it might be beneficial to structure and present applications as stories. In our work, we intend to apply narrative concepts to help guide people from novice to expert use. Specifically, we are exploring the narrative concepts of *non-linear timelines, suspense,* and *subjective treatment*. We are also interested in the psychological phenomenon of *emotionally enhanced memory retention*.

Timelines

An important aspect of any narrative is the progression of the story, or *timeline*. Stories can progress linearly so that events occur in the same order that they occur through time, but many compelling narratives make use of non-linear timelines that involve flashbacks, multiple storylines, and varying perspectives. In our work, we explore the use of non-linear timelines to guide the experience such that people develop new skills in an order determined by their abilities, choices, and interests.

Because stories are typically built on a principle of progressive disclosure, a story-based application might naturally guide a user through the application's features in a way that makes it easier for the user to focus on essential features, preventing them from feeling overwhelmed by the application's full complexity. By sequencing interactions, from simple to complex, novices could be guided through a learning process by which they gradually attain mastery of a complex application [2][8]. Most successful games already employ these strategies, using the structure of a story to introduce new interaction techniques sequentially while providing positive feedback on the player's increasing mastery via their role in the narrative.

Suspense

One of the major advantages of building an application as a narrative is that a good story can be motivating. The desire to uncover what has happened (for example, in a mystery) or what will happen next (for example, in an adventure story) routinely keeps people turning pages or playing games late into the night. These two types of suspense are also known as the hermeneutic code and proairetic code [10]. The motivational effects of suspense could be used to encourage people to explore a technology's capabilities more thoroughly or to continue using an application more consistently over time.

Fantasy and Subjective Treatment

Many stories are presented from the point of view of one or more characters. This is called *subjective treatment*. In identifying with a character, a person may be drawn into a story. They begin to care about the world the character inhabits and the obstacles that character faces. This may motivate the player to overcome difficult challenges and to pursue complex or time-consuming goals.

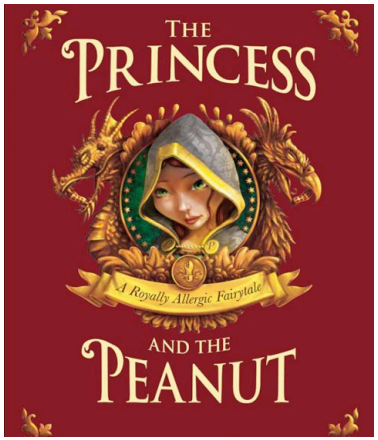

Figure 1. The application we are creating will have a story based on that of *The Princess and the Peanut*.

In games, a player often experiences the game world from the perspective of an avatar that they control. By linking attributes of the character to attributes of the player we hope to increase player identification with their avatar and, by proxy, the application. Game elements, such as the development and 'leveling up' of the avatar, may further increase a player's emotional tie to their avatar [4].

Emotion and Memory

A narrative framework can be used to present new information in a form that is concrete, emotionally-charged, and contextually motivated. This may accelerate learning, as new information is easier to understand and remember when it is made concrete and emotional [1][3]. If a narrative can tie the new information to a player's own goals and identity, that information might be learned even more easily [6].

Our Project

To test and refine our ideas about narrative, we are working with a mobile app development company, Visdatec Inc., to enhance their augmented reality smartphone application MyFoodFacts[1], by providing an interactive story to encourage people to use and improve their skill with the application. MyFoodFacts is an iPhone app which scans barcodes on food packaging and identifies products that contain dangerous allergens. By implementing an application that designed around a narrative, we will gain a better understanding of how to design narrative-driven applications. We will also evaluate the overall strengths and limitations of such an approach through testing of our prototype. To provide this narrative, we are also working with the author of the children's book *The Princess and the Peanut* (Figure 1) and adapting the story for our mobile application.

[1] http://www.myfoodfacts.com/, Visdatec Inc.

The application will use non-linear, player-driven timelines to present players with the information they need, when they need it. Mysteries and cliffhangers will be designed to keep players interested in exploring and using the application. The plot of the game will map the most important features and instructional content to the most emotional, shocking, and/or humorous events in the story, so as to make the most important content also the most memorable. Avatars in the game will reflect the players who control them, with an avatar's special powers and limitations relating to the player's own allergies.

We are using an iterative design process to develop our game, and running user studies at each stage to gauge the effectiveness of our techniques and of our narrative. We will gather qualitative data about our prototypes through a combination of observation, interviews, group discussions, and questionnaires. We will also gather quantitative data about whether the use of narrative affects motivation and the long-term retention of new interaction skills.

Challenges and Open Questions

Although the potential benefits of incorporating narrative into computer applications are considerable, there are also some limitations and uncertainties that need to be considered.

There may be a tradeoff between efficiency and the inclusion of narrative elements, as a narrative might require time to convey. That tradeoff may make narrative-based applications less beneficial for applications that people approach with a highly specific

goal or activity in mind. One of the great advantages of narrative is that it can provide the user with direction and motivation; if a person has already decided on a specific, concrete plan of action, our approach may, in some cases, be perceived to interfere with their goals. As a result, story-based design may be more appropriate for software that users may find daunting complex or unfamiliar or for software aimed at those who have a nebulous goal – such as self-improvement or safety – who may benefit from assistance in creating a successful plan of action and sticking to it.

It is difficult to create an engaging narrative that people will be interested in. It is even more difficult when the goal of the narrative is not just to entertain, but also to help people accomplish their goals. Methods need to be developed for capturing and reflecting a person's aspirations, and channeling those aspirations into motivation, learning, and engagement. While interactive narratives and player-created avatars may help a story to be more universally appealing without becoming hopelessly generic, such methods may not be sufficient in themselves. Applications, like games, must balance guidance with autonomy.

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