

MAS-771 Final Project Report

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May 11, 20011

The Problem

"Social Stories", or similar concepts such as "imagery" are core to the curriculum of many students with autism spectrum disorders (ASD). By providing students with relevant information about what to expect in specific social situations and settings, how to react to and interpret social cues, and how to consider the perspective of others, these stories are vital in bridging gaps in difficulties with social interactions for people with ASD. In directly addressing much of the "unwritten curriculum" of social norms, they allow for explicit teaching of vital and often complex lessons.

Many of the paper-based and generic stories available today, however, do not consider the unique and specific engagement needs of learners with ASD. Additionally, existing apps for this content area do not fully embrace the potential for customization and interactivity that we believe are vital to teaching these lessons in an engaging manner. These are problems we hope to address in the design of our MyPad Stories app. For these reasons, our proposed iPad application will specifically target the vital and complex task of teaching social lessons in a unique and engaging manner. We want to capitalize on the easy-to-use, interactive interface of the iPad in order to create an engaging means for teaching vital social lessons. By embracing positive means of engagement in existing apps, and adding additional features to increase engagement and relevancy in our app, we hope to create a comprehensive, engaging way for students with ASD to explore lessons on social interaction.

References

Please see a list of formative references below, including links to each article, as well as a note for each outlining how it informed our project and our design decisions. Although many of our readings for this course informed our project, we have tried to highlight only those articles which most directly impacted our project.

- Placing emphasis on customization to reflect unique specialized interests for learners with ASD can increase engagement across subject matter:
 - o From: http://affect.media.mit.edu/pdfs/10.Morris-Kirschbaum-Picard.pdf
- Use of interactive software can increase engagement, autonomy and relevancy for teaching and reinforcement of lessons to students with ASD:
 - o http://affect.media.mit.edu/pdfs/09.Hoque-etal-Interspeech.pdf
- Use of technology can increase engagement potential for teaching of complex social lessons:
 - http://affect.media.mit.edu/Rgrads/Articles/pdfs/Picard-2009-PhilTrans.pdf
- Anecdotal support for the engagement potential of iPads for persons with ASD:
 - o http://www.edweek.org/dd/articles/2011/02/08/mct ctipads.html
- Support for self-reporting and dual use of app for persons with autism creating stories of their experiences to inform our understanding:

- o http://affect.media.mit.edu/Rgrads/Articles/pdfs/Chamak-etal-2008-WhatCanWeLearn.pdf
- Article on learning with autism, the concepts of which are reflected in our design:
 - http://affect.media.mit.edu/Rgrads/Articles/pdfs/Dawson_AutisticLearning final 2008.pdf
- Support for unique sensitivity of persons with autism, and thus the need for customization of displays:
 - http://affect.media.mit.edu/Rgrads/Articles/pdfs/Tomchek-Dunn-2007-SensoryProcessing.pdf
- Design platform resources:
 - o Sencha Touch official website: http://www.sencha.com/products/touch/
 - o GNU GPL license v3: http://www.gnu.org/copyleft/gpl.html

What We Accomplished

Prototype:

Our initial goal was to build an iPad application. However, since none of our teammates had previous experience with iPad SDK, and due to the limited time, we decided to build a running website first. Then we discovered that Sencha Touch, an html5 web app framework, allows for the development of mobile web apps that look and feel native on iPhone, Android, and BlackBerry touch devices. Sencha Touch has two licensing options, commercial and open source. We are using the open source version. The open source license is compatible with the GNU GPL license v3. We will upload the source code of our application to SourceForge.net, so users can be free to modify the application for their own needs.

The url for the website is http://yewang.mit.edu/SocialStory/. It is linked to a database hosted on Ye's athena space. The database stores information of user accounts, books, pages in a book, and users' responses to a book.

Our application supports the following features:

User Log In:



Image 1: log in prompt

The log in prompt pops up when users go on the site. The system automatically creates a new account, if the name that users enter is not yet in the database. If users enter a name that is already taken, the information of the existing account with the name will be fetched. Eventually, we will ideally have a password-protected site that would also provide feedback to users who are trying to use a name that is already taken. This functionality will allow people to access their own collection of social storybooks on different devices at different places.

Homepage - browse collections of social stories:

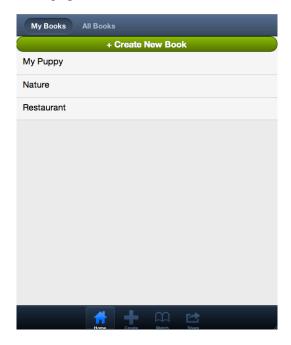


Image 2: homepage

After users log in, they can view the social stories they have already created. Users can edit and watch the existing books by clicking on the item. Users can also create a new book by clicking on the tab "+ Create New Book". "All Books" is not enabled yet.

Create:

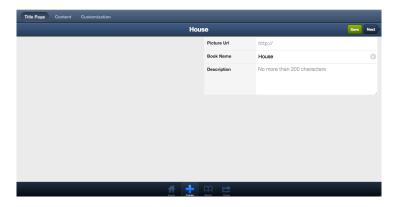


image 3: create title page

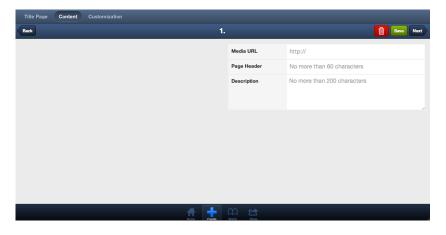


image 4: create content

Since we do not have a lot of storage space, we decided to use content already uploaded on the web. The media url can be a url for a picture, or the embed html for youtube videos. Users can save changes by clicking on the "Save" button. Clicking on "Next" auto-saves the page. Users can delete a page by clicking on the red trash button.

Watch:

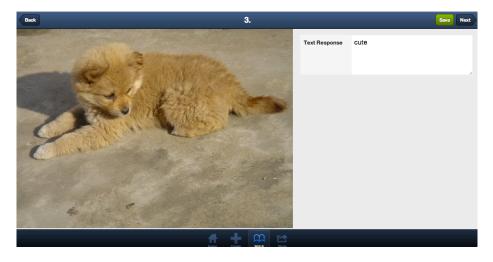


image 5: preview/watch

While reading a storybook, users can record their responses. Right now we only support text responses.

In addition to the features outlined above, we also worked with a partner at Harvard to begin to develop additional portions of our intended application. These portions include a splash page/home-screen with options for which part of the application you are navigating to, as well as a customization section that allows for the adjustment of displays. We met as a team weekly with this partner to discuss plans for eventual integration of these portions of the site with the story creator and reader sections outlined above. Currently, this portion of our project is being hosted at the following link, however, we do plan to eventually integrate the two sections onto one site:

http://hgseclass.harvard.edu/~tom811/mypad/mypad_home.html.

Below is a screen grab of our home-screen that will appear upon logging into the application. As you will see when you click on the link above, this page allows you to scroll over the four sections of our application (My Stories, Create Stories, Customize Homepage, and Share Stories), before selecting any of these options. When you roll over each, you get visual feedback of the icon enlarging, as well as text pop-ups and an audio cue for what it is you will be selecting.



image 6: splash screen

Below is a screen grab of our customize display functional prototype. Although this does not yet include all of the functions that we would like to offer as options, it is an example of how we are hoping to make our content as custom to the needs of each user as possible. Within the current prototype, you can edit the display color, font size, personal interest border, and cover page images.



image 7: Customize Display

Although we were not able to integrate the functionality of these two sections of our site within the timeline of this semester, this will be a top priority for moving forward. In

addition to this improvement, there are a variety of elements of our application development that we were not able to have functioning within our limited timeline and resources for this semester. Below is a brief list of some of the improvements we would like to make in future iterations of our product:

- Make the "story reader" section of our site separate from the story creator, so readers see a customized display of information without extra distracting icons.
- Aggregate all elements made in the story creator into the library of the story reader.
- Borrow from open-source coding on search engine for reflection of personal interest.
- Allow users to upload images or videos from their own library of pictures. Perhaps add a "take a picture" video that allows real-time picture taking and aggregation into the application.
- Allow users to add audio files and record audio directly into the app.
- Add more of a variety of response options beyond text responses, including ability to add voice or video notes, and ability to use icon buttons to communicate particularly relevant emotions.
- Add ability to embed interactive prompts.
- Build up the story sharing aspect of the site so as to encourage communication online around the application and its features (similar to the online community for Toontastic).
- Allow users to export their stories in relevant file formats for sharing outside of the application.
- Apply changes made in customization screen to all aspects of the site, and not just the homepage display.
- Aggregate responses and comments into digestible feedback for parents and teachers.
- Create a library of stock images and videos for users to pull from and edit for their own use.
- Create video tutorials to scaffold ease of use of the application.

Evaluation/Results

After getting our project to the point of a functioning prototype, we began our evaluation process by first building our own relevant stories within our framework. We attempted to create a variety of story formats (including some with just pictures, some with videos, and some with a mix of both), around relevant content areas for our target population. We found that this phase of testing was extremely helpful, as it allowed us to trouble-shoot any bugs or issues with the prototype that may have served as barriers to the feedback we were hoping to acquire from relevant members of our community. Furthermore, it pushed our thinking around what was possible within the application we had built, as it was much easier to brainstorm future improvements for our application after having put ourselves in the shoes of our end-users. During this phase of initial testing, some changes were made to bugs within the site design, and ideas for improvements in future product iterations were compiled.

Beyond this testing that we performed as a team, a major goal of ours was to test our product with relevant community members in our target population of users. As our application has both a story creation and reading section, we were hoping to test with as wide a variety of potential users as possible. This range included both parents and teachers of students with autism, who ideally would be using our application to create relevant

stories for their students. Beyond the story creators, our application would also be used by the students themselves, who would be coming to the application to interact with the custom content that was created for them. It is important to note that a future goal of ours is also to encourage a blurring of these distinct roles, as we hope that students may eventually feel comfortable enough with our applications to create their own stories about their perspectives. Because our design is still in prototyping stages, this element of our application was not yet tested.

In our original project proposal timeline, we had built in several weeks for testing our product, and an additional week for making changes based on this feedback. We did run into a timing issue, however, as major portions of our prototype were not ready for testing until last week. For this reason, we shifted from our original plan a bit, and decided to focus our first round of testing on the parent and teacher story creator interface. We thus sent the link for our story creator to several relevant people in this space. For the purposes of this round of evaluations, we gathered feedback via e-mail and phone. It is important to note, however, that we hope that the majority of this feedback and discourse surrounding our product will ideally occur in the online community we are hoping to eventually build up as a supplement to our product.

Below, please find a list of some of the major pieces of feedback we received from the community members with whom we performed prototype testing.

Feedback from members of the community (teachers and teachers' aides) thus far:

- Need for stock library images that are easily editable (as in Board Maker)
- Having stock stories with editable content would also be very helpful.
- "I would have no idea what to do when I first came to the page, so consider having a video tutorial on the home page walking me through how to use this.
- "I would also consider adding a video explaining what social stories and/or imagery is, and perhaps link to research supporting the value of using them."
- "I would want to have the option to add more than one image per page, as sequencing can be a target of difficulty for some of my kids, and being able to show multiple images on one screen is important for this."
- "Having the option to highlight specific parts of an image, perhaps with an arrow or an animation, would be helpful to point out a particular part of an image that is relevant to the lesson."
- Would like option to control when text feedback box is available, as it may be distracting for certain students.
- Would like option to imbed richer feedback prompts throughout the story (e.g. multiple choice questions using pictures as the answers).
- Would also like ability to imbed immediate feedback for interactive prompts.
- Would like ability to control display of interest, particularly within stories, as for many students this may distract from the lesson of the story.
- Definitely want the ability to add pictures and videos directly from one's own device.
- Would like ability to have stories read by the entire class, so that answers to interactive prompts could then be aggregated as feedback on what topics may be particularly difficult for all students.
- Love the ability to change one image or multiple images over time, as this will account for a variety of changes and will help keep the stories relevant.

• Want typical customization capabilities: font, size, color, background, brightness, volume, etc.

- From parent of two children on the spectrum: "I would love the option to copy an entire story and edit the content in the copy. This would have been very helpful for me recently, as I made two separate paper stories for my boys when I was going away on business. Being able to edit the content of some aspects for each boy would have saved me a lot of time."
- Consider how to make this relevant for users outside of the spectrum, as this may encourage the cross-informative design that we had originally envisioned.
- Consider adding a video record option for feedback.
- Need to minimize distracting icons, such as ability to navigate to story creator from homepage, as this may be very distracting for certain students.
- Multiple respondents noted the ease of being able to update stories from a computer while still being able to access them from a mobile device.

Beyond this initial feedback that we have gathered from story creators, we have also asked parents and teachers to begin to create stories that they will share with readers in our target population. Due to barriers surrounding access to technology, however, few users will be able to test these stories with iPads, which is the platform on which we would ideally like to evaluate our application. Some parents and teachers have begun over the last few days to test the story reading portions with students, however, we have not had time to gather this feedback into a formative report. On the surface level, however, the responses we have received are generally positive, and we look forward to more constructive and formative feedback that will inform our design decisions moving forward.

What Can Be Concluded?

Based on the prototype we have created thus far, and the testing we have performed with relevant community members, there are many conclusions that we believe we can draw from our project. The first of these is that there is an absolutely a need for an application similar to the one we have created. Initial reactions to our prototype, even in its very rough initial stages, have been generally positive, as it has the potential to provide a richer learning experience than the current paper-based models are able to offer. Furthermore, some design decisions have unintentionally distinguished our product from competitors in ways that we had not envisioned. The decision to make our application web-based, for instance, was made more because of the coding abilities of our team members. We found, however, that multiple members of the community with whom we tested our product saw the web-based nature of the application as a big positive, as it meant that they could edit content at home or on a separate device, while the student could still use a touchscreen tablet to read stories. Initially, we also chose to use link and video URLs as a temporary alternative to pulling files from one's own library, as we do not currently have the server space to host individual files, A finding in testing, however, was that many people appreciated the ability to quickly add files from the internet, as this is an efficient way to gather content when personal alternatives are not available.

Beyond these unintentional lessons, and some of the other positive feedback we received, we were also able to conclude that our project would absolutely benefit from changes made to future iterations. As we have outlined in earlier sections of this report, including our user feedback section and the end of our what we have done section, there are a several improvements that we would like to implement in order to have our project exist in a fully functional form. That being said, we would like to continue to test our project with members of the community, and launch our online community section around our application as soon as possible. We have learned that, even in the limited capacity and timeline we had for gathering feedback, user feedback is invaluable in continuing to guide the direction of the product design. For this reason, we believe that the priority of our next steps will include integrating sections of our application that currently do not tie together, and adding any necessary missing functionality. Once these changes are made, we are hoping to test our product in a more rigorous manner, as we hope to more effectively evaluate the success of our design with both story creators (parent and teachers) and readers (students). We would also like to be able to make more concrete claims about our application's improvements over paper-based models and existing applications, and thus we might also considering doing a rigorous study with control groups who are using alternatives to our application.

After we have done these evaluations, we hope to be able to synthesize our findings into a more formal report, and perhaps apply for grant funding to more robustly build out our product. At this point, we would ideally implement some of the other changes outlined in earlier sections of this report, such as more customization options. Ultimately, our goal is to have the best product possible in the hands of our target users as soon as possible, as we fell this will be the ultimate measure of our success on this project.