iPad Applications for Special Needs Education and Therapy
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What is ADHD?

Attention deficit hyperactivity disorder is characterized by inattention, hyperactivity, and impulsivity. ADHD is considered a developmental disorder that affects traits such as impulse control and attentiveness.
What is Autism?

Autism is a disorder of neural development that impairs social communications. Treatments for autism is harder to pin down as it generally is tailored to the individual. Treating autism requires patience and sensitivity to the person's sensory needs and methods of expression.
Inferred Results of Health Statistics Survey by CDC

- Number of children 3-17 years of age ever diagnosed with ADHD as of 2009: 5.3 million
- Percent of children 3-17 years of age ever diagnosed with ADHD as of 2009: 8.6%
- Percent of boys 3-17 years of age ever diagnosed with ADHD as of 2009: 12%
- Percent of girls 3-17 years of age ever diagnosed with ADHD as of 2009: 5.3%

- If 4 million children are born in the United States every year, approximately 36,500 children will eventually be diagnosed with an Autism Spectrum Disorder. Assuming the prevalence rate has been constant over the past two decades, we can estimate that about 730,000 individuals between the ages of 0 to 21 have an ASD.

- Approximately 13% of children have a developmental disability, ranging from mild disabilities such as speech and language impairments to serious developmental disabilities, such as intellectual disabilities, cerebral palsy, and autism.
iPad App Project Abstract
Phase I
Requirements Gathering

- Discussion with Lab Instructors and Therapists (~1 hour per department).
- Observation of clients and their learning experience (~10 business days).
- Analysis of current educational software (~5 business days).
Requirements Gathering
Interview Results for Lab
Requirements Gathering
Results of Observation for the Lab

- Clients in the 6 to 12 age group seemed less interested in reading as opposed to playing games.
- Clients in 6 to 12 age group respond better with frequent instructor visits.
- ADHD clients have tendency to "fidget" and occupy themselves by handling various items in the environment.

Conclusion
The presentation of reading material lacks active engagement of the client's attention.
Clients seem to enjoy relaying their opinion of the reading material.
Have the clients' reading experience utilize their need for activity.
Requirements Gathering
Analysis of Current Software for the Lab

What did Baby Bear ask Mother Bear?

A. "Will you make my breakfast?"

B. "Who makes honey?"

C. "May I go into the forest?"

D. "Will you take me for a walk?"
Requirements Gathering
Results from
Analysis of Current Lab Software

Instructors feel the current software solution doesn't directly address the clients' reading issues. There needs to be more focus on habit building for good reading methods. The software should engage the user in a more active reading role.
Requirements Gathering
Interview Results for Art Therapy
Requirements Gathering
Results of Observation for Art Therapy

- Clients enjoy the art experience as a means of self-expression.
- Autistic clients seem more settled and open to communication when participating in crafts.
- Clients show a very positive reaction and mood elevation when they produce craft items.

Conclusion
There is an opportunity to communicate ideas and feelings through artistic creation that would otherwise be unrealized. Providing an artistic medium for clients creates a means of channeling their energy and generating opportunities for communication.
Requirements Gathering
Analysis of Current Software for Art

The current software is run on a touchscreen desktop machine and provides allows the user to create art through the use of templates, stickers, color palettes, and pictures. Pictures are sent to the printer to allow the clients a keepsake of their creative works.
Requirements Gathering
Results from
Analysis of Current Art Software

Need a simple interface with intuitive navigation.
Also need to allow some kind of physical product of the user's creativity to maintain the sense of accomplishment that provides such a positive experience.
If possible, utilize the iPad VGA adapter to output video to an external display for an art gallery style presentation of user artwork.
Phase II
Design Process
Design Process
Behavior of Lab App

Main Menu

- Speed Test
- Reading Exercise

iPad
"Ready-To-Read"
Application Behavior

1. User is informed that reading material will be displayed and a timer will track the time spent reading the material.
2. A page of reading material is displayed.
3. Page is reduced to a single paragraph. The user is prompted to read highlighted keywords supplemented with images pertaining to the words meaning.
4. The paragraph is reduced to 2 or 3 sentences displayed sequentially until the full page excerpt is complete. The user is prompted to answer simple questions after reading the provided sentences.
5. The entire page of material is displayed then read to the user via Text-to-Speech.
6. The user is then asked to summarize the main idea of the reading material.

Results of the reading speed calculation are displayed.

Question Answered Correctly

- User is informed that the necessary comprehension wasn’t achieved.
- User is provided a page of material to read. User is prompted to read the highlighted first and last sentences of every paragraph on the page.
- The paragraph is reduced to 2 or 3 sentences displayed sequentially until the full page excerpt is complete. The user is prompted to answer simple questions after reading the provided sentences.
- The entire page of material is displayed then read to the user via Text-to-Speech.
- The user is then asked to summarize the main idea of the reading material.

Question Answered Incorrectly
Design Process

Behavior of Lab App

- Behavior of "STAR Artist" iPad Application
  - Save option for storing the current artwork to the iPad's storage.
  - Print out the current image on the palette.
  - Utilize the iPad camera to import snapshots for editing.

- Primary palette provides a display of the artwork as it is being edited.
  - Art Gallery feature to provide video output for displaying saved artwork to an external monitor with use of the proper Apple adapter.
  - Utilize the iPad camera to import snapshots for editing.

- Editing Tools for how changes will be imposed on the image. Affected by the current Color Palette value:
  - Color Palette for choosing colors to be used during editing.
  - Pencil Tool for allowing the user to create lines freehand.
  - Hand Tool for moving, placing, and resizing objects on the palette.
  - Line Tool for creating straight lines on the image using drag and drop functionality.

- Sticker Tool for inserting images from a predefined selection.
Phase III
Development Process
Development Process
About Xcode 4

https://discussions.apple.com/community/developer_forums
Development Process

About Cocoa Touch

The Cocoa Touch API uses the Model–View–Controller architecture which allows developers to isolate issues by creating the desired objects in the environment and allowing independent testing of each object (separation of concerns).

Cocoa Touch came about more as an afterthought but its benefits promised a much more simplified approach to developing apps so that the benefits to overhead reduction more than justified its usage.
Phase IV
The Testing Process
The Testing Process
Part I
This portion of testing will be performed by actual clients under instructor supervision. The sessions are recorded, thus allowing for my personal review to accompany the instructor's observations. This part of the testing process will last approximately 20 business days.
Sources

Utilized autism.com for ideas on addressing teaching methods for clients with autism.

Utilized cdc.gov to provide statistics for context.

Utilized additudemag.com for approaches and recommendations on teaching reading skills to clients with ADHD.

Personal Research and Observation

Observed clients from the ages of 6 and up at The STAR Center and examined features of the current software utilized by instructors.

Observed clients from Art and Music Therapy and noted the methods employed by The STAR Center's therapists.
This Concludes the Presentation