Pixel: Building a Dyslexic Child's Mind

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Pixel

Building a dyslexic child’s mind

By Aparna Natraj

A Thesis submitted in partial fulfillment of the requirements for the degree of Master of Fine Arts in Visual Communication Design

School of Design
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Rochester Institute of Technology
Rochester, NY
Dec 14, 2017
Approvals

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Pixel : Building a Dyslexic Child’s Mind

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Acknowledgments

Foremost, I would like to express my sincere gratitude to my advisors and professors: Nancy Ciolek, Chris Jackson and Michael Strobert, for their encouragement, insightful comments, and hard questions.

I thank all my classmates and everyone who participated in the user testing process of my thesis, for the stimulating discussions and for all the valuable feedback to help me improve this thesis.

I owe my deepest gratitude to my family: my father, Natraj and my mother, Revathi for their endless love and support. This accomplishment would have not been possible without them.

Finally, I would like to thank my best friend Rithwick, my source of encouragement and inspiration through this entire master program.

Thank you!

Aparna Natraj
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Abstract

Pixel : Building a dyslexic child’s mind
Aparna Natraj

Summary

One in five students, or 15-20% of the population, has a language based learning disability. Dyslexia is the most common of the language based learning disabilities. Dyslexia is mainly a problem with reading accurately and fluently — Accuracy being identified as Letter Recognition and Fluency as Word Recognition.

This thesis looked into various educational applications that help dyslexic children and identified that they rely heavily on intensive instruction in phonetic code and the learning method employed by these applications do not create a lasting impact. The proposed solution integrated the symbol mastery method of learning to create a new digital learning experience that solves the problem of reading accurately and fluently. A combination of hands on experience, visual aid and teaching the big picture, solves the problem through letter formation and shape building thus creating a method of permanent learning. The purpose of the application was to create a learning experience that blends with a dyslexic child’s unique thought process. The more a dyslexic can understand the traits of their thought process, the more adaptable to the word-thinking environment he/she becomes.

Keywords

Dyslexia, Reading, Accurately, Fluently, Letter Recognition, Word Recognition, Visual Aid, Big Picture, Hands on experience, Letter formation, Shape building, Sight Words, Symbol Mastery, Tablet Application, Permanent Learning, Educational.
Introduction

Dyslexics think in pictures and struggle with language. When an auditory symbol – a word – lacks a mental picture and meaning for the dyslexic, disorientation and mistakes are the result. When we show a dyslexic how to turn off the disorientations at the moment they occur, the problems start to disappear. This thesis seeks to help the dyslexic harness their strengths and use them to become accurate and fluent readers.

The Davis Dyslexia Association International (DDAI) has a correction program called the Symbol Mastery program. Through Symbol Mastery, the student makes a three-dimensional clay model of the meaning of each word, together with a model of the letters of the words. With this approach, learning is permanent.

This visual conceptual method to teach has created positive results in dyslexic children. Thus this thesis explores the Symbol Mastery method of learning to create a new digital learning experience.
Situation Analysis

Phonetic decoding is a hallmark characteristic of dyslexia. That is the reason that most dyslexia remediation is focused so heavily on phonics. It seems to make sense to intensify instruction in the area where the student seems to struggle the most.

But children with dyslexia struggle with phonetic strategies because their brains are wired differently. They simply are not able to categorize the sounds of language or connect sound to meaning in the same way as other students.

Dyslexic students become good readers when they learn to use mental strategies other than phonetic decoding to gain reading proficiency. These strategies build upon the natural abilities of the students, teaching them to harness their strengths and use them to become accurate and efficient readers.
Problem Statement

Dyslexia is a cognitive learning disability in which the brain has difficulty with phonological processing, or translating words into sounds. As a result, reading is a difficult task. The problem starts to develop at a very young age and dyslexic children are often confused and frustrated.

This does not make dyslexia a prediction of failure. Dyslexia is quite common and a good way to understand dyslexia is to establish what it is not. Additional attention should be given to these children and techniques that go with their thought process need to be employed to avoid disorientation and mistakes.

This thesis project seeks to propose a solution that will address the following identified challenges:

In what ways might this thesis:

- Create a learning experience that blends with their thought process?
- Make children stay focused and encouraged to learn?
- Strategies to ease the process and retain more of what the child reads?
- Make learning permanent?
Target Audience

1 in 6 children are born dyslexic. The problem starts to develop between the ages of 1 to 2. Between 3 - 4 is when the children have a challenge in mastering language. Gradually between the ages 5-8 they start facing difficulties in decoding.

Kids learn at different paces. In general learning to read is a complicated process for every child and it is hard to diagnose children under the age of 8 with dyslexia. There are several tests on the market at the present time for diagnosing dyslexia as early as 4 years of age. However, these early diagnoses is termed as ‘at risk’ for dyslexia until the child is six months into their second grade of education.

This thesis project aims at children 8 and above as the primary users. However, younger children can also benefit from this application.

The value that this project seeks to bring to dyslexic children is to ease the process of learning and help in retaining more of what the child reads.

Parents and teachers of dyslexic children are also a crucial and complementary part of the target audience since they are actively involved in the learning process. Their insights were key during the entire design process.
Research

The primary concern of this research aimed to provide a solid understanding of several topics to coherently support the design decisions. The investigated topics were: Dyslexia, Reading difficulty and Learning Methods. Gaming principals for children, user experience design for the youngest users and tactile technology were explored as well.

This thesis research started from a deep investigation of the Symbol Mastery Method of learning, in an attempt to get an understanding of how a dyslexic child thinks. Dyslexia is not a prediction of failure. Dyslexia is quite common and a good way to understand dyslexia is to establish what it is not.

The process of analyzing all the research and categorizing it into problems, behaviors, learning methods and relevant concepts helped in visualizing significant findings and strategies to ease the process of retaining information.
Identified Problem
Reading
Accurately
Fluently

HELPING DYSLEXIC CHILDREN
A holistic visualization of the most significant findings that were categorized into problems, behaviors, learning methods, and relevant concepts.

Technology
- Sifteo Cubes
- Tactile Technology
- Osmo

Ideations
- Tracing
- Shapes / Imagery
- Engaging experience

Struggle
- Traditional Classroom
- Phonetic Decoding
- Sequential Learning

Focus Areas
- Alphabets
- Words
- Sight Words

Learning Methods

Techniques
- Symbol Mastery
- Clay Modelling
- Physical Space

Creative Process
- Visual Aid
- Hands on experience
- Teaching the Big Picture

Figure 1: Research
Survey of Literature

Online Articles

Symbol Mastery
This web site is provided by Davis Dyslexia Association International. It has been created to provide ongoing support for students who have completed the Davis Dyslexia Correction program. Symbol Mastery is a visual-spatial learning process in which each individual must create their own model for words and concepts represented.

Dyslexia the gift of mastery
This web site is provided by Davis Dyslexia Association International. It helps you to better understand dyslexia and provide information about the Davis approach.

Multi-sensory Learning
This article discusses facts about how integrating visual, auditory, tactile (touch) and kinesthetic (movement) learning elements for dyslexics kids is extremely effective.

Osmo
Osmo is an award-winning game system that changes the way children interact with the iPad by opening it up to hands-on play. It is a digital system bridging digital and physical play.

UX for Kids’ Products: Designing for the Youngest of Users
This article talks about how it’s necessary to break down the category of “children” into smaller age segments as each age group has specific traits that need to be addressed in the design. The author also talks about the importance of color, navigation and gestures when designing for children.
Online Articles

**NHS Choices**
Accessed
September 20, 2016

**Video games tested as treatment for dyslexia**
This article discusses the benefits of video games on children with dyslexia. It is based on a study carried out by researchers from the University of Padua in Italy. Through their experiments they suggested that playing an action video game can improve the reading ability and attention skills of children with dyslexia.

**Homeschooling with Dyslexia**
Accessed
Maych 1, 2017
https://homeschooling-withdyslexia.com/how-to-teach-sight-words-dyslexia/

**How to Teach Sight Words to Kids With Dyslexia**
This article looks into effective ways to teach sight words to children with dyslexia. The author goes through the process of multi sensory teaching and when you should start introducing sight words to children.

**Understood - for learning and attention issues**
Accessed
March 1, 2017

**12 Tips to Help Kids With Dyslexia Learn Sight Words**
When it comes to reading sight words, dyslexic children find it even more difficult since they do not have a visual to connect to the word. This article gives a few tips on how to help children with dyslexia learn sight words. The methods suggested are creative and make sure the child is completely engaged in the process.

**Understood - for learning and attention issues**
Accessed
March 1, 2017

**Dyslexia: What You’re Seeing**
Kids learn at different paces and it is difficult to diagnose dyslexia in a very young age. This article talks about signs of what dyslexia looks like at different ages, at home and in school.
Online Articles

Day2Day Parenting
Accessed March 1, 2017
http://day2dayparenting.com/can-tell-child-dyslexic-treatment-options/

Signs of Dyslexia - Kindergarten and Elementary years
In this article, the author compiles many signs observed in dyslexic children in their Kindergarten and Elementary years. Finally, the author attempts to provide a guideline/techniques of how you can help dyslexic children learn during these years.

Books

Davis, Ronald D., Eldon M. Braun.

The Gift of Dyslexia: Why Some of the Smartest People Can't Read and How They Can Learn.
This breakthrough book changed the face of how dyslexia is viewed - and how it is remedied - worldwide. The new revised and expanded edition contains added information to help with the mental techniques for orientation and attention focus that are the hallmark of the Davis program.

Dunson, Walter E.
Waco, TX: Prufrock Press 2012

School Success for Kids with Dyslexia and Other Reading Difficulties
This book provides an overview of how children learn to read, the reading process, reading disorders, and some strategies to assist these students both at home and in the classroom. A in depth understanding about the processes of reading is gained through an understanding of how the brain processes language, and the differences that exist between learning styles.

Eide, Brock, Fernette Eide.
New York: Hudson Street Press 2011

The Dyslexic Advantage: Unlocking the Hidden Potential of the Dyslexic Brain
This book is an excellent tool in understanding the strengths of the dyslexic mind. The book gives specific references & examples to how and why the dyslexic brain processes the way it does. The book presents 'being dyslexic' in a positive light with the 'trade offs' being secondary, but also workable.
Books

Marshall, Abigail. 
Avon, MA: Adams Media 2009 
When Your Child Has . . . Dyslexia
This book takes an in-depth look at the reality of the disability and manages to make sense of it for worried parents. The author emphasis on three key points: get the right diagnosis, understand treatment options, and help your child learn.

Lengel, Traci, 
Mike Kuczala. 
Thousand Oaks, CA: Corwin 2010 
The Kinesthetic Classroom: Teaching and Learning Through Movement
The Kinesthetic Classroom uses latest research to show how physical activity helps young learners overall. The latest educational research shows how regular physical movement increases attention span and helps the brain learn new information quickly and easily.

Silverman, Linda Kreger. 
Denver, CO: DeLeon Pub. 2002 
Upside-Down Brilliance: The Visual-Spatial Learner
The author explains why Visual Spatial Learners don’t fit well with the auditory-sequential educational style of the typical school. And she offers suggestions on how to help these children fit in and learn comfortably in the classroom.

Maxwell, Betty, 
Crystal Punch. 
Charleston, SC: CreateSpace 2012 
Picture It!: Teaching Visual-Spatial Learners
This book provides crucial information regarding teaching to the natural strengths of visual-spatial learners and it reassures the fact that there are many techniques that can be employed to teach. The book further explores what you can change, what is the strength that can be used, and what may be hard to change.

Oelschlager, Vanita, 
Joe Rossi 
Akron, OH: VanitaBooks 2012 
Knees: The mixed up world of a boy with dyslexia
This is a children’s book that takes us on a journey narrated by a child, full of practical advice and wisdom. Knees tells the story of a little boy with dyslexia and how he learns to come to terms with his dyslexia in a positive manner.
Books


Designing Games for Children: Developmental, Usability, and Design Considerations for Making Games for Kids
This book helps you understand these developmental needs of children and how to effectively apply them to games. This is a hands-on manual of child psychology as it relates to game design and the common challenges designers face.


The Game Believes in You: How Digital Play Can Make Our Kids Smarter
The Game Believes In You shows us how games can help children to be better learners but even more importantly transform their educational experience. The author emphasis on the fact that today's world is more about problem solving than memorization and how the use of games is perfect for this.

Film

Directed by Luis Macias. Embracing Dyslexia
Accessed October 3, 2016 http://embracingdyslexia.com

Embracing Dyslexia
Embracing Dyslexia by carefully weaving together interviews with parents, experts, and adult dyslexics tackles the issues surrounding dyslexia like no other documentary film has before. Parents share emotional stories of their anxiety and frustration over failing to understand why their children were struggling with reading, writing, and spelling and the life-altering impact the word dyslexia had on their lives.

Directed by Lucie Curtiss and Douglas Curtiss. Sight Words For Dyslexic Children

How To Teach A Dyslexic Child The Sight Words
Lucie Curtiss and Douglas Curtiss have researched the available methods used to teach children sight words and have come up with a visual, interactive and hands on experience method. They even explain the science behind the method. They have a series of video explaining the techniques and how this method of teaching will make the words more likely to stick in the child's memory.
Competitive Analysis

In order to innovate and differentiate from what is already out there, the competitors must be identified and studied. These are the competitors and similar applications being analyzed:

Learn with homer

The Homer Method combines the best research on how children learn and the newest innovation in game design to offer a learning system that builds reading confidence and academic success.

Montessori Crosswords

Montessori Crosswords helps children develop their reading, writing, and spelling skills by building words from a set of 320 word-image-audio phonics combinations using a phonics-enabled movable alphabet.

PocketPhonics

PocketPhonics is used in over 1,000 schools and pre-schools to teach kids letter sounds, first words and handwriting. It shows children how to write letters using an arrow they follow with their finger or stylus. You also receive achievement certificates and weekly progress reports via email.

SoundLiteracy

Sound Literacy is a customizable letter tile app designed for tutors and teachers. Sound Literacy can be used to teach dyslexic students how to distinguish individual sounds, process word sound structures and develop spelling strategies.

Endless Reader

Endless Reader made for children 5 and above, introduces “sight words”, the most commonly used words with which dyslexics suffer the most.

Little Writer

Little Writer is a well-crafted tracing app for writing practice. This app adds shapes and numbers to the usual letter and word practice. Tracing is supported in the app with enough leeway to not frustrate young children.

Osmo

Osmo is a unique gaming accessory for the iPad that bridges the gap between digital play and “real life” play like board games.
Technical Explorations

Dyslexics need direct involvement and are able to understand better while doing hands-on activities. Information they learn via body movement not only help them focus, but will also help them remember what they learned.

Which is why the initial research was focused on identifying the technical aspects involved in creating a tactile interactive game system. Even though research shows that children with dyslexia learn best when they engage many senses, there were many limitations in using a tactile system. The main limitation being it limited the scope of learning.

The key criteria of this thesis is to provide the dyslexic with a learning tool that helps them read accurately and fluently so it was important to not comprise in the learning aspect, hence it was decided to design an application for a tablet. Using a tablet meant only touch based interactions but the opportunities to expand were more.
Process

The methodology that was used in this thesis combined researching the theoretical aspects of dyslexia, identifying problems specific to the age groups, understanding the learning methodologies employed to teach the dyslexic and gaming principals for children.

From literature it was identified that dyslexic children have a problem with reading accurately and fluently. The solution to overcome this problem is identified as effective letter recognition and word recognition. The image below depicts the process involved in understanding the problem.

![Figure 2: Process](image-url)
Symbol Mastery

In 1980, at age 38, Ronald Dell Davis overcame his own severe dyslexia when he discovered how to mentally orient his perceptions. Since then, he has dedicated his life to helping people with the “gift of dyslexia” achieve literacy and self-esteem. The Davis Dyslexia Association International (DDAI) was established to formally train other professionals to provide the Davis Dyslexia Correction program throughout the world.

The major component of the Davis Dyslexia Correction program is the Symbol Mastery. Through Symbol Mastery, the student makes a three-dimensional clay model of the meaning of each word, together with a model of the letters of the words. With this approach, learning is permanent.

The proposed solution integrates the Symbol Mastery method of learning to create a new digital learning experience that solves the problem of reading accurately and fluently. A combination of hands on experience, visual aid and teaching the big picture, solves the problem through letter formation and shape building thus creating a method of permanent learning.
Design Ideation

From start it was obvious that for the design of such an application, it was important to create a learning experience that blends with the thought process of a dyslexic child.

Dyslexics think in pictures, struggle with language and sequencing. Understanding the characteristics of a dyslexic helped in deriving the framework of this thesis.

Characteristics of a dyslexic child:
- Learn best with visual aid
- Hands on Experience
- Teaching the Big Picture

During the initial “Design Phase” of the application, simply only the visual factor was considered. This meant using a visual conceptual method to teach - the child is learning the entire word while also having a picture clue in their head that helps them recognize the word and retain the word.

After the primary circle of the designing process, some interesting facts were revealed:

Sight Words: Dyslexic readers have a hard time learning or remembering sight words because these words do not have a visual connected to it. It was important to focus in this area as they are the most commonly used words.

Hands on experience: Dyslexic children learn/retain information best when they are completely engaged in the process. Utilizing their strengths and tracing functionality can help create that.
User Persona

Jason Smith, 
Age 7 
Dyslexic Child 

Jason is a silent boy who doesn’t talk as much or seems to know as many words as his peers do. He is easily distracted by sound and finds it difficult in putting his words into thoughts.

“Reading is too hard!”

Needs & Desires 
Visual Aid, Experimentation (Tracing)

Hear 
“Pay attention in class”

Think/Feel 
Difficulty in learning sequenced information.

Say/Do 
I think primarily with images and feelings not sound.

See 
Other kids being able to grasp information faster.

Pain 
I struggle connecting letters to sound.

Gain 
Feeling good learning through hands on experience.

Amanda Smith, 
Age 31 
Parent 

Amanda is a parent of a dyslexic child and is extremely supportive and understanding. She is very patient and is willing to spend extra time helping her son learn.

“I don’t want my son to feel left out”

Needs & Desires 
Adopt the right method to teach effectively.

Hear 
“Spend more time teaching your son”

Think/Feel 
People with dyslexia learn differently

Say/Do 
Trying different methods to teach effectively.

See 
Few applications that cater directly to the needs of a dyslexic child.

Pain 
I hate it when people think that dyslexia is a sign of weakness.
**Empathy Map**

This method was applied to collaborate all the information and feedback received from teachers, parents and doctors who deal with dyslexic children. It helped identifying the user needs and defining strategies.

<table>
<thead>
<tr>
<th>Say</th>
<th>Do</th>
</tr>
</thead>
<tbody>
<tr>
<td>“They have a poor memory”</td>
<td>Giving more attention to the child and helping the child cope up.</td>
</tr>
<tr>
<td>“Difficulty in connecting letters to sounds”</td>
<td>Trying out different learning techniques that blends with the child’s thought process.</td>
</tr>
<tr>
<td>“Has a hard time reading sight words”</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Think</th>
<th>Feel</th>
</tr>
</thead>
<tbody>
<tr>
<td>“How can I help my child retain information”</td>
<td>Concern about the child’s future.</td>
</tr>
<tr>
<td>“Why is my child having a difficulty in reading”</td>
<td>Fear about the child feeling insecure in the classroom.</td>
</tr>
<tr>
<td>“Children with dyslexia learn differently”</td>
<td>Technology can help improve learning experiences.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Needs</th>
<th>Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanent Learning.</td>
<td>A method that compliments the way a dyslexic child thinks</td>
</tr>
<tr>
<td>Improve memory.</td>
<td>Building a connection and foundation.</td>
</tr>
<tr>
<td>Staying focused.</td>
<td>Visual Aid</td>
</tr>
<tr>
<td>Determined to learn.</td>
<td>Hands on experience</td>
</tr>
<tr>
<td>To be able to read accurately and fluently.</td>
<td>Teaching the big picture</td>
</tr>
</tbody>
</table>

**Visual Aid**

- Hands on experience
- Teaching the big picture
Design Solution

Pixel solves the problem of reading accurately and fluently through letter formation and shape building thus creating a method of permanent learning. A combination of hands on experience, visual aid and teaching the big picture to help the dyslexic child retain information. By understanding the traits of a dyslexic, pixel makes learning an enjoyable experience for the child.

The application is structured around three basic categories:
- Master Alphabets
- Learn based on Shapes
- Understand Sight words

Offering each child the ability to play/learn and proceed to choose categories in accordance with his or her individual needs and learning capacities.

The tracing functionality helps in creating an engaging experience which in turn helps in retaining the information. Also, it potentially motivates the children to increase their involvement with the application while simultaneously increasing the possibilities of achieving the said goals of the application. More specifically, each category’s content and purpose is presented in the following page.
Master Alphabets  Aims at building the foundation through letter recognition. As the child traces out the upper and lower case of a letter they get a feeling of the shape of the letter thus helping them to retain information.

**LETTER RECOGNITION**  Solves the problem of reading accurately by letter formation.

![Letter Recognition Diagram](image)

**Learn based on Shapes**  A visual aid that helps you with the problem of reading fluently through word recognition. Dyslexics are visual learners. This category makes the child trace/build/draw out the visual, increasing the child's involvement. After which the child builds the word associated to the visual, here by making a strong connection and helping the child to identify the word based on the visual while reading.

**Understand Sight Words**  A component of the Learning based on shapes. Sight words are the most commonly used words and do not have any visual aid associated with it. The best way to teach dyslexics is through visual aids, hence by utilizing the shape building/tracing feature the child is made to learn a sentence along with the word he/she learned. Teaching the big picture of things helps the child remember as compared to sequential learning. Hence the child is made to build the sight word after they complete learning the word.

**WORD RECOGNITION**  Solves the problem of reading fluently by shape building.

![Word Recognition Diagram](image)
Lo - Fi Wireframes

The first round of wireframing was done in Adobe XD to facilitate quick feedback on the interface.

1. Eraser Tool: to undo any actions
   Replay Tutorial: for learning purpose
   Volume: pronunciation of the alphabet
2. Button to navigate to the lowercase section

Figure 5: Lo-fi Wireframes
1. Disabling the tutorial and sound for the shape
2. Lowercase option; Default is Uppercase
3. Button to navigate to the Sight Words section
4. Navigate back to the shape
5. Disabling the tutorial for sight words
6. Learn more sight words based on one shape

Figure 6: Lo-fi Wireframes
User Testing

Based on inputs on the lo-fi wireframes iterations were made to improve the user experience of the application.

Users weren't motivated enough.

Solution

Dashboard showing the user their progress.
Motivating the user to do more.

Figure 7: Usability Testing
Eraser Tool, Replay Tutorial and Volume icons feel hidden.

Solution

Moving the icons to make it more prominent/visible to the user.

Figure 8: Usability Testing
Users thought completing the uppercase meant they are done.

Solution
Defining a task list to the user to make sure they do both the upper and lower case of the alphabet.

Figure 9: Usability Testing
No hierarchy. Users navigated to the sight words section before completing the word.

Solution

Showing the user progress/ feedback.

Figure 10: Usability Testing
Hi - Fi Wireframes

The layout of the app started to gain shape after the iterations on the lo-fi wire frames.
Figure 12: Hi-fi Wireframes
Style Guide

The iOS Human Interface Guidelines provided the necessary information regarding proper design patterns when designing for an iPad.

App Name and Logo

The App name Pixel was derived from the fact that dyslexics are picture thinkers. The concept of the logo is a combination of representing simplicity and the drawing/tracing (primary) feature of the application.

DYSLEXIA + PICTURE = PIXEL

Figure 13 : Pixel App Logo

Colors

The choice of pastel backgrounds as a means to accommodate users suffering from Dyslexia is effective.

Figure 14 : Color palette sampler with codes.
There is no evidence that dyslexia fonts help people with dyslexia to read faster and more accurately. The type family to be used was required to be a simple, easily readable and a sans-serif typeface. Sans-serif fonts increase the reading performance of the dyslexic, hence Omnes. Omnes meets the need for a rounded typeface which is neither overly mannered nor excessively literal in its approach.

**Omnes Medium**

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890.:;”(!?)+-*/=

**Omnes Regular**

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890.:;”(!?)+-*/=
Icons and Shapes

The icons and shapes that compose the application’s UI were designed to be minimalistic, efficient and easy on the eye.

Figure 15: UI Icons and Shapes
App Layout

The App layout helped in defining the space in the screen. Making things easier for your users. The tool bar placed at the left end of the app screen contains buttons for performing actions relevant to the current view or content within it. Maintaining an overall consistent appearance throughout the app was key while designing for the youngest of the users.

Figure 16: App Layout
Final Application

App Design and Prototype Implementation

This thesis was implemented using the Adobe Creative Cloud software (specifically Illustrator, Photoshop, After Effects and Adobe XD) to execute the digital components.

Using the mocked up screens and Adobe XD a prototype was created to imitate almost all the behavioral patterns of the actual software. Below is the link to the prototype:

https://xd.adobe.com/view/c9817837-c7a5-4678-8f7d-2025495a2dd9/

A demo reel explaining the interaction of the users was also made to show the tracing (hands on experience) function which is a key element to the application.
Interface Design

The Pixel app has been primarily designed for an iPad. It was also designed to be specifically in the landscape orientation to make use of the screen space for providing a more engaging and user-friendly experience.

The interface needed to be greatly simplified so that the children would be able to enjoy using the app and feel at ease.

The app has been built in the assumption that there will be a supervisor (parent/teacher) when the child uses the application.

Figure 17: Pixel Interface
Introduction Screens

When first opening Pixel, the user is led through a 3-screen overview of the purpose and functionalities of the app.

Figure 18: Intro Screens
Login Screens

A first time user (parent) needs to create an account for his/her child. By entering the age, the app determines the learning capacity of the child and displays information accordingly. This can be later altered in the settings section by the parent.

Figure 19: Login Screens
The user dashboard contains information regarding the child’s progress in the different categories. The dashboard not only presents the key information at a glance, it motivates the child to complete tasks and see progress.

Figure 20: Dashboard

1. Tool Bar
2. User Feedback
**Master Alphabets**

- Building the foundation and helping the child read accurately.
- The user is presented with an alphabet list and can choose to build a letter (upper and lower case) of their choice.
- A challenge section that tests the child is also present.
- A tutorial plays at the beginning to show how to trace out the letter. The user can always play the tutorial for reference.
- The child gets feedback/instructions as he/she builds the letter.
- Audio can be turned off if it distracts the child.
- User progress helping the user determine the tasks to be completed.

![Master Alphabets](image)

Figure 21: Master Alphabets
4. Final Application

Figure 22: Master Alphabets process/flow.
Learn based on Shapes

- Building the connection and helping the child read fluently.
- The user is presented with a list of shapes and can choose to build a shape of their choice.
- The user needs to build/draw the shape first, followed by the word and then the sight word.
- In default the letters are present in Upper case and the user has the flexibility to shift to Lower case while building the word.
- Build each letter of the word.
- Build the sight words as a whole.
- The trait/characteristic of a dyslexic child “learn best while taught the big picture of things” is enhanced by teaching the sight words through a sentence that has been formed based on the word learnt.

Figure 23: Learn based on Shapes
Figure 24: Learn based on shapes process/flow.
Build letters of the word

Build the sight word as a whole

Word Complete

Build the sight word as a whole

Figure 25: Learn based on shapes process/flow.
User Profile

- The account is registered in the name of the parent/teacher.
- Can monitor the child’s performance/progress.
- Can add more accounts.
- Ability to change settings based on learning preference.
- Help and Feedback on the application

Figure 26: User Profile
Evaluations

Pixel was evaluated through data that was collected by interviews with doctors, teachers and parents of dyslexic children. The feedback received from the Imagine RIT event also helped in improving the user experience of the application.

The main objective of the evaluation process was:

- To get feedback on how effective this tool can be for dyslexic children. Will it make a difference?
- Determine its usability within the learning environment.
- Evaluate the effectiveness of the application’s simplicity and focus on building connections.

Evaluating the application with adults who work with dyslexic children helped in getting an understanding on various aspects; how dyslexic children think, vocabulary level for different age groups and areas of interest for a dyslexic. These inputs helped in defining the categories/features of the application.

The design iterations were also done based on evaluations from the Imagine RIT event (see Appendix C for all responses) where a lot of parents with children gave valuable feedback on the interface and user experience.
In conclusion, Pixel is an application designed for dyslexic children 8 and above, to help them read accurately and fluently. The application effectively teaches a child by combining Hands on experience, Visual Aid and Teaching the Big Picture.

By implementing the symbol mastery method of teaching and creating a digital learning tool, Pixel proves to make a difference. The preliminary results show the promising prospects digital learning holds in such contexts.

The intention is to further continue research in the field of dyslexia, by testing the application’s effectiveness over an extended period of time to better assess the learning method.

There is no “cure” for dyslexia, but the Pixel app is a coping mechanisms that allow them to overcome the learning disability.
Appendices

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THESIS PROPOSAL

**Pixel**
Building a dyslexic child’s mind through an interactive play experience.

Aparna Natraj
October 18, 2016

Rochester Institute of Technology
College of Imaging Arts & Sciences | School of Design
MFA Visual Communication Design
# Approval

**Title**
Pixel : Building a Dyslexic Child's Mind

**Author**
Aparna Natraj

**Submission Date**
October 18, 2016

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Abstract

Pixel: Building a dyslexic child’s mind through an interactive play experience
Aparna Natraj

Summary

A visual-spatial learner is someone who generally thinks in pictures, rather than in words. They also tend to learn holistically, instead of sequentially, or in parts. The visual-spatial learner can easily see the big picture of things, but might miss out on the details. Dyslexia is a learning “disability” with strong ties to visual-spatial learning. Dyslexics think in pictures, struggle with language and sequencing.

It is the goal of this thesis to enable the dyslexic to recognize their unique thought process. The more a dyslexic can understand the traits of the thought process, the more adaptable to the word-thinking environment he/she can become.

This thesis project aims to create an interactive learning experience for kids with dyslexia by enhancing their visual-spatial abilities and help in their organization and literacy skills. The project aims to create an interactive game that uses innovative methods of visual learning to help dyslexics from the age of 3-8 years.

Keywords

Dyslexia, Symbol Mastery, Visual Spatial Learners, Picture Thinkers, Children, Game System, Interaction Design, Tablet Application, Educational, Phonics, Shape, Drawing, Puzzle,
Situation Analysis

Learning to read relies on working memory. We have to match each letter with the correct sound, put it together, and remember it for future use. The process of keeping multiple sounds and letters active is often too difficult for most dyslexics because they have poor auditory working memory. This means that they struggle to hold all the sound units in their head, which makes it hard for them to read.

In order to better design for dyslexic users a set of 4 questions were asked to parents/teachers and doctors who deal with dyslexic children.

- What are the challenges associated with your child’s dyslexia?
- What are the potential benefits of being dyslexic?
- What websites or mobile/tablet applications do you use?
- What aspects of these sites or mobile/tablet applications make them difficult to use?

There are multiple applications available to help children cope with their learning disabilities. While, these applications try to help dyslexics read and learn better, they fail to see that the learning method employed by these applications do not create a lasting impact.

The two main reasons these applications do not benefit are:

- The first is that the applications primarily focus on graphic design. This is a critical issue to be sure, but graphic design is only part of the overall user experience.
- The second reason is that these applications rely on intensive instruction in phonemic awareness and the phonetic code. But such teaching is an strenuous process for many students. Often progress is slow, relying heavily on repetition and “over learning.”

Phonetic decoding is a hallmark characteristic of dyslexia. That is the reason that most dyslexia remediation is focused so heavily on phonics. It seems to make sense to intensify instruction in the area where the student seems to struggle the most.

But children with dyslexia struggle with phonetic strategies because their brains are wired differently. They simply are not able to categorize the sounds of language or connect sound to meaning in the same way as other students.

Dyslexic students become good readers when they learn to use mental strategies other than phonetic decoding to gain reading proficiency. These strategies build upon the natural abilities of the students, teaching them to harness their strengths and use them to become accurate and efficient readers.

Problem Statement

Dyslexia is a cognitive learning disability in which the brain has difficulty with phonological processing, or translating words into sounds. As a result, reading is a difficult task. 1 in 6 children are born dyslexic. The problem starts to develop between the ages of 1 to 2. Between 3 - 4 is when the children have a challenge in mastering language. Gradually between the ages 5-8 they start facing difficulties in decoding.

This does not make dyslexia a prediction of failure. Dyslexia is quite common and a good way to understand dyslexia is to establish what it is not. It’s not a sign of low intelligence or laziness. It’s a common condition that affects the way the brain processes written and spoken language.

The traditional classroom is primarily designed for the verbal-sequential learner, and the dyslexics are a visual spatial learner. A visual spatial learner characteristically think in pictures and use a creative process that is different from a person who has a linguistic/sequential thought process. This creative process makes the brain take longer time to make connections, and does it in more steps. This is why dyslexics are often confused and frustrated in a traditional class room environment.

Which is why additional attention should be given to these children and techniques that go with their thought process need to be employed to avoid disorientation and mistakes.

Lastly, this thesis project seeks to propose a solution that will address the following identified challenges:

In what ways might this project:

• create a learning experience that blends with their thought process?
• make children stay focused and encouraged to learn?
• make learning permanent?
Survey of Literature

Websites

Symbol Mastery
This web site is provided by Davis Dyslexia Association International. It has been created to provide ongoing support for students who have completed the Davis Dyslexia Correction program. Symbol Mastery is a visual-spatial learning process in which each individual must create their own model for words and concepts represented.

Dyslexia the gift of mastery
This web site is provided by Davis Dyslexia Association International. It helps you to better understand dyslexia and provide information about the Davis approach.

Multisensory Learning
This article discusses facts about how integrating visual, auditory, tactile (touch) and kinesthetic (movement) learning elements for dyslexics kids is extremely effective.

Osmo
Osmo is an award-winning game system that changes the way children interact with the iPad by opening it up to hands-on play. It is a digital system bridging digital and physical play.

UX for Kids’ Products: Designing for the Youngest of Users
This article talks about how it’s necessary to break down the category of “children” into smaller age segments as each age group has specific traits that need to be addressed in the design. The author also talks about the importance of color, navigation and gestures when designing for children.

Video games tested as treatment for dyslexia
This article discusses the benefits of video games on children with dyslexia. It is based on a study carried out by researchers from the University of Padua in Italy. Through their experiments they suggested that playing an action video game can improve the reading ability and attention skills of children with dyslexia.
Books

- **The Gift of Dyslexia: Why Some of the Smartest People Can’t Read and How They Can Learn.**
  This breakthrough book changed the face of how dyslexia is viewed - and how it is remedied - worldwide. The new revised and expanded edition contains added information to help with the mental techniques for orientation and attention focus that are the hallmark of the Davis program.

- **School Success for Kids with Dyslexia and Other Reading Difficulties**
  This book provides an overview of how children learn to read, the reading process, reading disorders, and some strategies to assist these students both at home and in the classroom. A in depth understanding about the processes of reading is gained through an understanding of how the brain processes language, and the differences that exist between learning styles.

- **The Dyslexic Advantage: Unlocking the Hidden Potential of the Dyslexic Brain**
  This book is an excellent tool in understanding the strengths of the dyslexic mind. The book gives specific references & examples to how and why the dyslexic brain processes the way it does. The book presents 'being dyslexic' in a positive light with the 'trade offs' being secondary, but also workable.

- **When Your Child Has . . . Dyslexia**
  This book takes an in-depth look at the reality of the disability and manages to make sense of it for worried parents. The author emphasis on three key points: get the right diagnosis, understand treatment options, and help your child learn.

- **The Kinesthetic Classroom: Teaching and Learning Through Movement**
  The Kinesthetic Classroom uses latest research to show how physical activity helps young learners overall. The latest educational research shows how regular physical movement increases attention span and helps the brain learn new information quickly and easily.

- **Upside-Down Brilliance: The Visual-Spatial Learner**
  The author explains why Visual Spatial Learners don’t fit well with the auditory-sequential educational style of the typical school. And she offers suggestions on how to help these children fit in and learn comfortably in the classroom.
### Books

- **Picture It!: Teaching Visual-Spatial Learners**
  This book provides crucial information regarding teaching to the natural strengths of visual-spatial learners and it reassures the fact that there are many techniques that can be employed to teach. The book further explores what you can change, what is the strength that can be used, and what may be hard to change.

- **Knees: The mixed up world of a boy with dyslexia**
  This is a children's book that takes us on a journey narrated by a child, full of practical advice and wisdom. Knees tells the story of a little boy with dyslexia and how he learns to come to terms with his dyslexia in a positive manner.

- **Designing Games for Children: Developmental, Usability, and Design Considerations for Making Games for Kids**
  This book helps you understand these developmental needs of children and how to effectively apply them to games. This is a hands-on manual of child psychology as it relates to game design and the common challenges designers face.

- **The Game Believes In You: How Digital Play Can Make Our Kids Smarter**
  The Game Believes In You shows us how games can help children to be better learners but even more importantly transform their educational experience. The author emphasis on the fact that today's world is more about problem solving than memorization and how the use of games is perfect for this.

### Film

- **Embracing Dyslexia**
  Embracing Dyslexia by carefully weaving together interviews with parents, experts, and adult dyslexics tackles the issues surrounding dyslexia like no other documentary film has before. Parents share emotional stories of their anxiety and frustration over failing to understand why their children were struggling with reading, writing, and spelling and the life-altering impact the word dyslexia had on their lives.
Competitive Analysis

In order to innovate and differentiate from what is already out there, the competitors must be identified and studied. These are the competitors and similar applications being analyzed:

**Word Wizard**
Word Wizard offers several unique reading and spelling activities for children aged 4 to 10. A talking movable alphabet allows children to experiment with phonics and word building thanks to the advanced text to speech engine.

**Montessori Crosswords**
Montessori Crosswords helps children develop their reading, writing, and spelling skills by building words from a set of 320 word-image-audiophonics combinations using a phonics-enabled movable alphabet.

**PocketPhonics**
PocketPhonics is used in over 1,000 schools and pre-schools to teach kids letter sounds, first words and handwriting. It shows children how to write letters using an arrow they follow with their finger or stylus. Letter sounds are taught in small groups. Using a unique, spelling game. You also receive achievement certificates and weekly progress reports via email.

**SoundLiteracy**
SoundLiteracy is a customizable letter tile app designed for tutors and teachers. SoundLiteracy can be used to teach dyslexic students how to distinguish individual sounds, process word sound structures and develop spelling strategies.

**Oz Phonics**
Oz Phonics focuses on rudimentary letter-sound relationships, including short vowels and up to 10 consonants. With various in-app exercises, it’s designed for dyslexic children and adults who have trouble reading.

**Inspiration Maps**
This is a visual learning app for grades four and up, allowing students to build organized diagrams and outlines.

**Osmo**
Osmo is a unique gaming accessory for the iPad that bridges the gap between digital play and “real life” play like board games.
Methodology

The methodology that will be applied in this project will combine researching 3 aspects:

**Dyslexia**
- Researching the theoretical aspects of dyslexia.
- Identifying the problems specific to the age group of 3 to 8 years.

**Learning Technique**
- Understanding the learning methodologies employed to teach the dyslexic.

**Gaming Principals for Children**
- Breaking down age groups
- Understanding trends
- Methods to keep children focused
Target Audience

The different stages in dyslexia:

1-2 years  Developing Stage
3-4 years  Language Mastery
5-8 years  Decoding

This thesis project will be centered on dyslexic children from the age of 3 to 8 years.

The project adds value to these children by helping them understand their thought process and using it to their advantage to learn better.

Persona

TIM, 6 YEARS

Tim was first diagnosed with dyslexia at the age of four. School for Tim is a lot of extra work and frustration. He does not talk as much or seem to know as many words as his peers do.

Concerns
• Poor memory
• Difficulty in connecting letters to sounds

Goals
• Link the word to a picture

BELLA, 35 YEARS

Bella is a mother of an 8 year old dyslexic. Understanding her child's challenges is key to her so that she can get the best help for the child.

Concerns
• Child's future
• Child's insecurity in the classroom

Goals
• Adopt the right methodology to teach effectively
Design Ideation

In 1980, at age 38, Ronald Dell Davis overcame his own severe dyslexia when he discovered how to mentally orient his perceptions. Since then, he has dedicated his life to helping people with the “gift of dyslexia” achieve literacy and self-esteem. The Davis Dyslexia Association International (DDAI) was established to formally train other professionals to provide the Davis Dyslexia Correction program throughout the world.

The major component of the Davis Dyslexia Correction program is the Symbol Mastery. Through Symbol Mastery, the student makes a three-dimensional clay model of the meaning of each word, together with a model of the letters of the words. With this approach, learning is permanent.

When an auditory symbol – a word – lacks a mental picture and meaning for the dyslexic, disorientation and mistakes are the result. When we show a dyslexic how to turn off the disorientations at the moment they occur, and then help find and master the stimuli that triggered the disorientation, the reading, writing and spelling problems start to disappear.

Dyslexics think in pictures, struggle with language and sequencing. This is why the goal of the project is to use a visual conceptual method to teach. This means the child is learning the entire word while also having a picture clue in their head that helps them recognize the word and retain the word.

This project aims to create an interactive application that adopts the Symbol Mastery learning method to teach the dyslexic.
Flow Chart

Launch

Enter D.O.B

Home

Language

Parents Corner

Games

Alphabet

Puzzle

Capture

Selection

Formation

Letters

Gallery

Camera

Take a picture

Outline

Draw/Trace

Letters
Enter D.O.B

Entering the date of birth of the child as a determining factor for the games.

1. Languages
Offered in different language for children who speak multiple languages.

2. Parents Corner (Settings)
Enables the parents to customize the learning for their child.

HOME PAGE

3. Understanding Alphabets
The ability to practice identifying both uppercase and lowercase alphabets and their sounds.
TARGET: 3 - 4 years

4. Puzzle
Build the puzzle and learn the word associated to the puzzle.
TARGET: 5 - 8 years

5. Capture
Take a picture of anything you want. The app will transform it into simple outlines so you can draw it and learn the word associated to the drawing.
TARGET: 6 - 8 years
UNDERSTANDING ALPHABETS

1. Home
2. Handwriting
   Choosing print or cursive
3. Phonics
   Audio for the letter
4. Tracing
   Helping the child to understand the shape of the letter
5. Testing Game

TESTING

Testing the ability to identify the right letters.

6. Phonics
   Audio for the letter
Wireframe

PUZZLE
1. Completed
2. Yet to unlock
4. Grid
5. Puzzle pieces

PUZZLE COMPLETE
5. Completed Puzzle
Example: Image of a cat
6. Phonics
Audio for the alphabet
7. Word Grid
Wireframe

CAPTURE
1. Gallery
2. Camera
3. Captured Image

DRAW
4. Outline of the image
5. Color Palette
6. Share
When you're done, you can mail it to anyone you want to and even print it.
Project Deliverables

Digital Deliverables

The final outcome of this project will be a digital component.

- A demo reel explaining the interaction of the user.
- Design Document (in PDF):
  - Competitive Analysis
  - User Persona
  - Process/Information Flowcharts
  - Sketches
  - Wireframes with Annotations
  - Style Guide:
    - Visual identity
    - Logo
    - Mood-boards
    - Typography
    - App grid
    - Final UI Design

Specifications

The application will be designed for an iPad.
Implementation Strategies

This thesis will be implemented using the Adobe Creative Cloud Suite (specifically Illustrator, Photoshop and AdobePreview) to execute the digital components.

The paper prototyping will be hand sketched with pencil onto index cards to facilitate and stimulate quick user feedback in a timely manner.

The high-fidelity prototype will be achieved through a rapid prototype tool, Adobe XD, which uses the designed layouts saved as static images to simulate the interactions and transitions of a working prototype. The tracing function in the prototype will be achieved using Animate CC. Since there is no back end built into it, the prototype will not be able to save or store data from the user experience.

The final product will also be represented through a demo reel made using After Effects, explaining the interaction of the users.

Budget

This application will be created using the Adobe Creative Cloud Suite which costs $15.99 per month. Considering the fact that this thesis project will take a duration of 8 months, the total budget of the project will be $130. Since the Davis Dyslexia Association will be approached to promote the application, there are no anticipated promotion expenditures.
Evaluation Plan

The evaluation plan will consist of a paper prototype testing focused on usability. The paper prototype is done in order to validate the game mechanics and collect suggestions to improve the interactions based on the needs of the dyslexic.

Imagine RIT, a creativity and innovation festival that takes place at RIT in May will also serve as a great testing site for the game. The event attracts thousands of visitors from different profile types and the game will be tested with parents and kids attending the event.

The main focus is to test this game on dyslexic children and also parents / teachers who deal with dyslexic children. This offers an opportunity to disclose and validate the concept, and also get feedback on the following:

- Flexibility
- Simplicity
- Perceptible Information
- Tolerance for Error

The plan consists of setting up iPads with the running high fidelity prototype to let visitors do free exploration on their own. Simultaneously running the demo reel on a machine to let visitors understand the concept behind the game. After they explored the app, they would be prompted to fill out a 5-minute digital survey through Google Forms.
Timeline

The scheme below portrays how the design methodology would ideally be executed throughout each semester. The colored marks represent major deadlines to be followed and the black bars indicate the milestones to be accomplished.
Dissemination

The dissemination plan transcends the thesis time line since it starts once everything is finished and tested. The plan to promote the final outcome will include submission to the following design competitions around the world:

- Adobe Design Achievement Awards
- TechCrunch Disrupt
- Parents' Choice Award
- HOW Interactive Design Awards
- KAPi Awards
Bibliography


Imagine RIT Feedback Survey

1. What are you?
   a) Student  b) Professor  c) Visitor  d) Parent

2. How effective do you think Pixel would be to dyslexic children?
   a) Extremely Useful  b) Useful  c) Somewhat useful  d) Not at all useful

3. How visually appealing is the application?
   a) Extremely Appealing  b) Appealing  c) Somewhat appealing  d) Not at all appealing

4. Would children be able to easily navigate through the application?
   a) Yes  b) No  c) Somewhat

5. Is the layout of the app consistent and easy for a child to understand?
   a) Yes  b) No  c) Somewhat

6. What words come to your mind when you think of the Pixel app?
   Dyslexics, Picture Aid, Words

7. What do you like about the Pixel app?
   Simplicity

8. What do you not like about the Pixel app?
   Scope to expand - add more features

9. Do you have any other comments and how I can improve this concept?
   A demo reel effectively demonstrates the concept as compared to a prototype.
Imagine RIT Feedback Survey

1. What are you?  
   a) Student  b) Professor  c) Visitor  d) Parent

2. How effective do you think Pixel would be to dyslexic children?  
   a) Extremely Useful  b) Useful  c) Somewhat useful  d) Not at all useful

3. How visually appealing is the application?  
   a) Extremely Appealing  b) Appealing  c) Somewhat appealing  d) Not at all appealing

4. Would children be able to easily navigate through the application?  
   a) Yes  b) No  c) Somewhat

5. Is the layout of the app consistent and easy for a child to understand?  
   a) Yes  b) No  c) Somewhat

6. What words come to your mind when you think of the Pixel app?  
   Dyslexia, Traing, Words, Sentences

7. What do you like about the Pixel app?  
   Clean design, Strong Layout

8. What do you not like about the Pixel app?  
   User flow - confusing for children  Empty Status

9. Do you have any other comments and how I can improve this concept?  
   Add progress bar/feedback  Dashboard
Imagine RIT Feedback Survey

1. What are you?
   a) Student  b) Professor  c) Visitor  d) Parent

2. How effective do you think Pixel would be to dyslexic children?
   a) Extremely Useful  b) Useful  c) Somewhat useful  d) Not at all useful

3. How visually appealing is the application?
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4. Would children be able to easily navigate through the application?
   a) Yes  b) No  c) Somewhat

5. Is the layout of the app consistent and easy for a child to understand?
   a) Yes  b) No  c) Somewhat

6. What words come to your mind when you think of the Pixel app?
   WORDS, VISUAL AIDS, TRACING

7. What do you like about the Pixel app?
   VISUAL DESIGN

8. What do you not like about the Pixel app?
   APP PROGRESS BAR

9. Do you have any other comments and how can I improve this concept?
   PROMPTS, REMINDERS
Imagine RIT Feedback Survey

1. What are you?
   a) Student  b) Professor  c) Visitor  d) Parent

2. How effective do you think Pixel would be to dyslexic children?
   a) Extremely Useful  b) Useful  c) Somewhat useful  d) Not at all useful

3. How visually appealing is the application?
   a) Extremely Appealing  b) Appealing  c) Somewhat appealing  d) Not at all appealing

4. Would children be able to easily navigate through the application?
   a) Yes  b) No  c) Somewhat

5. Is the layout of the app consistent and easy for a child to understand?
   a) Yes  b) No  c) Somewhat

6. What words come to your mind when you think of the Pixel app?
   clean, tracing

7. What do you like about the Pixel app?
   user friendly, mutual appealing

8. What do you not like about the Pixel app?
   basic feature

9. Do you have any other comments and how I can improve this concept?
   add more features and functions
Imagine RIT Feedback Survey

1. What are you?
   a) Student  b) Professor  c) Visitor  d) Parent

2. How effective do you think Pixel would be to dyslexic children?
   a) Extremely Useful  b) Useful  c) Somewhat useful  d) Not at all useful

3. How visually appealing is the application?
   a) Extremely Appealing  b) Appealing  c) Somewhat appealing  d) Not at all appealing

4. Would children be able to easily navigate through the application?
   a) Yes  b) No  c) Somewhat

5. Is the layout of the app consistent and easy for a child to understand?
   a) Yes  b) No  c) Somewhat

6. What words come to your mind when you think of the Pixel app?
   clean, simple, beautiful

7. What do you like about the Pixel app?
   user-friendly

8. What do you not like about the Pixel app?
   N/A

9. Do you have any other comments and how I can improve this concept?
   add more features
Imagine RIT Feedback Survey

1. What are you?
   a) Student  b) Professor  c) Visitor  d) Parent

2. How effective do you think Pixel would be to dyslexic children?
   a) Extremely Useful  b) Useful  c) Somewhat useful  d) Not at all useful

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4. Would children be able to easily navigate through the application?
   a) Yes  b) No  c) Somewhat

5. Is the layout of the app consistent and easy for a child to understand?
   a) Yes  b) No  c) Somewhat

6. What words come to your mind when you think of the Pixel app?
   Bright, Color, Modern

7. What do you like about the Pixel app?
   I like that it implements the symbol symbol, method of learning. Good. Research

8. What do you not like about the Pixel app?

9. Do you have any other comments and how I can improve this concept?
   Oral directions along with written directions.
Imagine RIT Feedback Survey

1. What are you?  
   a) Student  b) Professor  c) Visitor  d) Parent

2. How effective do you think Pixel would be to dyslexic children?  
   a) Extremely Useful  b) Useful  c) Somewhat useful  d) Not at all useful

3. How visually appealing is the application?  
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4. Would children be able to easily navigate through the application?  
   a) Yes  b) No  c) Somewhat

5. Is the layout of the app consistent and easy for a child to understand?  
   a) Yes  b) No  c) Somewhat

6. What words come to your mind when you think of the Pixel app?  
   educational, child-friendly, learning tool, teaching

7. What do you like about the Pixel app?  
   color, layout, simplicity

8. What do you not like about the Pixel app?  

9. Do you have any other comments and how I can improve this concept?  
   Test it on dyslexic children will help you improve


Imagine RIT Feedback Survey

1. What are you?
   a) Student  b) Professor  \(\checkmark\) Visitor  d) Parent

2. How effective do you think Pixel would be to dyslexic children?
   a) Extremely Useful  b) Useful  c) Somewhat useful  d) Not at all useful

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   a) Yes  b) No  c) Somewhat

5. Is the layout of the app consistent and easy for a child to understand?
   a) Yes  b) No  c) Somewhat

6. What words come to your mind when you think of the Pixel app?
   [Children, Educational, Training]

7. What do you like about the Pixel app?
   [Simple, Engaging, Layout]

8. What do you not like about the Pixel app?
   [I am a right learner and I love it]

9. Do you have any other comments and how I can improve this concept?
   [ ]
Imagine RIT Feedback Survey

1. What are you?
   a) Student    b) Professor   c) Visitor   d) Parent

2. How effective do you think Pixel would be to dyslexic children?
   a) Extremely Useful   b) Useful   c) Somewhat useful   d) Not at all useful

3. How visually appealing is the application?
   a) Extremely Appealing   b) Appealing   c) Somewhat appealing   d) Not at all appealing

4. Would children be able to easily navigate through the application?
   a) Yes   b) No   c) Somewhat

5. Is the layout of the app consistent and easy for a child to understand?
   a) Yes   b) No   c) Somewhat

6. What words come to your mind when you think of the Pixel app?
   educational tool for dyslexic children

7. What do you like about the Pixel app?
   good research led to a clean and simple design

8. What do you not like about the Pixel app?

9. Do you have any other comments and how I can improve this concept?
   Scope to add more functions/features
Imagine RIT Feedback Survey

1. What are you?
   a) Student  b) Professor  c) Visitor  d) Parent

2. How effective do you think Pixel would be to dyslexic children?
   a) Extremely Useful  b) Useful  c) Somewhat useful  d) Not at all useful

3. How visually appealing is the application?
   a) Extremely Appealing  b) Appealing  c) Somewhat appealing  d) Not at all appealing

4. Would children be able to easily navigate through the application?
   a) Yes  b) No  c) Somewhat

5. Is the layout of the app consistent and easy for a child to understand?
   a) Yes  b) No  c) Somewhat

6. What words come to your mind when you think of the Pixel app?
   TRACING APP

7. What do you like about the Pixel app?
   I LIKE THAT IT TRIES TO IMPLEMENT A LEARNING METHOD THAT WORKS.

8. What do you not like about the Pixel app?
   NO POINTS FEATURE

9. Do you have any other comments and how I can improve this concept?
   PROGRESS, POINTS, FEEDBACK
Imagine RIT Feedback Survey

1. What are you?
   a) Student  b) Professor  c) Visitor  d) Parent

2. How effective do you think Pixel would be to dyslexic children?
   a) Extremely Useful  b) Useful  c) Somewhat useful  d) Not at all useful

3. How visually appealing is the application?
   a) Extremely Appealing  b) Appealing  c) Somewhat appealing  d) Not at all appealing

4. Would children be able to easily navigate through the application?
   a) Yes  b) No  c) Somewhat

5. Is the layout of the app consistent and easy for a child to understand?
   a) Yes  b) No  c) Somewhat

6. What do you like about the Pixel app?
   The research that has gone to understanding the traits of a dyslexic.

7. What do you not like about the Pixel app?
   No points

8. Do you have any other comments and how I can improve this concept?
   Add user feedback elements
Imagine RIT Feedback Survey

1. What are you?
   a) Student    b) Professor    c) Visitor    d) Parent

2. How effective do you think Pixel would be to dyslexic children?
   a) Extremely Useful    b) Useful    c) Somewhat useful    d) Not at all useful

3. How visually appealing is the application?
   a) Extremely Appealing    b) Appealing    c) Somewhat appealing    d) Not at all appealing

4. Would children be able to easily navigate through the application?
   a) Yes    b) No    c) Somewhat

5. Is the layout of the app consistent and easy for a child to understand?
   a) Yes    b) No    c) Somewhat

6. What words come to your mind when you think of the Pixel app?
   tracing, children, educational, reading

7. What do you like about the Pixel app?
   simple, idea

8. What do you not like about the Pixel app?

9. Do you have any other comments and how I can improve this concept?
   points, feedback
Dyslexia

Children: Challenges

- Reading
- Time Awareness
- Note taking

Strengths

- Good Problem Solvers
- Creative
- Observant

Dyslexia Friendly Classrooms:

- Encouragement
- Teach the Big Picture
- Talk things over — Supervisor
- Learn by direct experience — Tracing, Interaction
- Don't over correct
- Biba Time
- Tackle
- Imagery
- Short and clear content
- Reminders, prompts
Dyslexia at Different Ages

Age 5-9: Early Elementary.
- Slow at Reading, Reversal in Reading

Age 10-14: Late elementary-middle
- Need extra time, difficulty reading aloud

Age 15-20+: High School College
- Quantity of work less than expected

Help with Acceptance and Support
- Focus on strengths and abilities

Children learn at different paces
- Hard to determine dyslexia in a very young age:
  - “at risk” diagnosis
Dr. Rampradeep
Dr. Vidyadhar Rampradeep

PHONE INTERVIEW

- Design + Dyslexia
  - Primarily focused on graphic design
  - Only part of the overall experience
  - Fonts can be:
    - Part of the picture

#1 Dyslexia affects people in a variety of ways

#2 Dyslexia can be advantageous

Current applications rely on phonetic code:
  - Strenuous, progress is slow, repetition, over learning

Phonics - doesn't work with dyslexic children.
Challenges associated?
Benefits of being dysgenic?
Current apps?
Difficulty in the current apps?
Competitive analysis
Importance in graphic design
* Phonetic
* Bulky design
* Typography
* Animation
* Disturbing interface

Universal design:
* Flexibility
* Simple & Intuitive
* Tolerance for Error
* Perceptible Info

Experience of being dysgenic can vary wildly.

Connect the dots. Focus on the traits.
Coping mechanisms that allow them to overcome the learning disability.
- Read a lot
- let them read alone quietly and loudly
- stories
- graphic novels, comic
- messages -> keep it interesting

Sight words - focus
- flashcard
- bounce -> interactive
- drawing -> creative
- hands on experience
  Engaging
- go into detail
- memory aid
- artistic flair add
- mental picture
- worksheets
- puzzles -> too simple
- oral -> not hands on
- summarize

x Need constant praise -> feedback
  rebuild self esteem
x Checklists/ Routines
  Task List
  Challenges
  Progress
Bibliography


