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Dyslexic edge: designing an awareness campaign to foster wider understanding of dyslexia

Laura Anne Huisinga

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Dyslexic edge: Designing an awareness campaign to foster wider understanding of dyslexia

by

Laura Huisinga

A thesis submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of
MASTER OF FINE ARTS
Major: Graphic Design

Program of Study Committee:
Alex Braidwood, Major Professor
Debra Satterfield
Fred Malven

Iowa State University
Ames, Iowa
2015

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DEDICATION

To my Mother, my first teacher.

Even if she did not always understand me, she has always loved me.
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ABSTRACT

This paper details the process of designing a dyslexia awareness campaign. The literature review covers: what dyslexia is, who is affected, and why a carefully designed campaign is needed. The methodology section covers how research was collected in various ways to create an effective design. Including an initial focus study of 36 K-12 teachers that gathered both qualitative and quantitative data. Followed by a review of existing design campaigns, cataloging the pros and cons of each based on the literature review and the existing style guides put forth by dyslexic awareness organizations. Finally, the implementation of design methods for multimodal communication on the web will be show. More research is needed to define comprehensive style guides when designing with dyslexic users in mind. These guidelines would improve communication of information for all users, not just benefiting users falling on the spectrum of dyslexia.
CHAPTER ONE
INTRODUCTION: DYSLEXIC EDGE

1.1 Introduction

Dyslexia frequently occurs, yet most individuals are ill-informed; sometimes completely ignorant of how dyslexia affects an individual. The lack of understanding about dyslexia affects the general populace at many levels including educators, parents of dyslexics, even dyslexics themselves. Much has been learned about dyslexia, how it affects individuals and strategies for overcoming dyslexia’s deficits. Unfortunately this knowledge does little good if no one is aware of it.

The Dyslexic Edge is an outreach and awareness campaign about dyslexia. The campaign focuses on empowering dyslexics, spreading understanding about the root causes of dyslexia, and it’s resulting advantages/disadvantages.

1.2 Purpose of Research

The Dyslexic Edge is about understanding that dyslexia is more than a ‘disability’. A dyslexic brain is not broken or less than a non-dyslexic brain. Having dyslexia means thinking in a different way; processing and visualizing the world in a different way. This difference, which can causes great distress and grief in a literacy based society, also gives advantages. Often the deficits dyslexics experience are accompanied by advanced visual spatial skills, and an ability to see the big picture. Dyslexics may frequently struggle with everyday detailed tasks, while simultaneously exceeding at higher level thinking tasks. This dichotomy of perceived intelligence versus actual intelligence can foster a sense of balancing on the edge of failure.
The Dyslexic Edge is about embracing the tightrope act and not being afraid of failure. By focusing on the strengths and advantages that come from having a dyslexic brain, new innovative ideas will be allowed to flourish. “Those who learn with great difficulty in one setting may learn with surprising ease in another” (West, 2009 p.24). In order for changes to take place in our education system, the workplace and society in general, a greater understanding of dyslexia is needed.

This fresh perspective suggests that we should be more concerned with results than with trying to get everyone to learn things in the same way, especially if we are more interested in creating new knowledge than in merely absorbing and passing on old knowledge. In some cases, the conventional education system may eliminate many of those who have the greatest high-level talents, especially when these talents are predominantly visual rather than verbal (West, 2009 p.24).

1.3 Definition of Key Terminology

**Dyslexia**: See p.7 for a chart of different definitions.

**Specific Learning Disorder**: a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in the imperfect ability to listen, think, speak, read, write, spell or do mathematical calculations, including conditions such as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. - (Specific Learning Disabilities).
**Learning Disability:** affect one's ability to understand or use spoken or written language, do mathematical calculations, coordinate movements or direct attention (Psychology Today).

**HMD:** Head Mounted Display - can be a pair of goggles or a full helmet. In front of each eye is a tiny monitor. Because there are two monitors, images appear as three-dimensional. In addition, most HMDs include a **head** tracker so that the system can respond to **head** movements.

**ADD:** Attention Deficit Disorder

**ADHD:** Attention Deficit and Hyperactivity Disorder

**aMRI:** anatomical Magnetic Resonance Imaging

**APA:** American Psychological Association

**DSM-V:** Diagnostic and Statistical Manual of Mental Disorders V

**IDA:** International Dyslexia Association

**IQ:** Intelligence Quotient

**MSI:** Magnetic Source Imaging

**NACHC:** National Advisory Committee on Handicapped Children

**NJCLD:** National Joint Committee for Learning Disabilities

**SEN:** Special Educational Needs
CHAPTER TWO
REVIEW OF LITERATURE

2.1 Introduction

With a greater understanding of the root cause of dyslexia and how it affects individuals, more can be done early on to assist individuals with dyslexia. Due to rapidly evolving technology there are a host of available resources for improving learning in the classroom as well as daily life struggles. By first understanding the need, implementation of these technologies can take place in order to improve quality of life. With the evolution of technology there will be an increase in visual opportunities such as, interactive text books on tablets, online video tutorials, even the use of 3D virtual environments through Head Mounted Displays.

They [dyslexics] may have had more difficulty learning from books and lectures, but with future changes they may find themselves far better adapted to learning from simulations of reality as education and testing programs began to emphasize interactive computer simulation over the verbal description of reality traditionally provided in books and lectures (West, 2009 p.25).

2.2 What is dyslexia

Dyslexia is often misunderstood, misrepresented, and not taken into consideration. Much more than just a reading disorder, dyslexia's effects are life long. “Dyslexia is a complex problem that has its roots in the very basic brain systems
that allow man to understand and express language. By discovering how a disruption in these fundamental neural circuits for coding language gives rise to a reading impairment, we have been able to understand how the tentacles of the disorder reach out from deep within the brain and affect not only how a person reads but surprisingly, a range of other important functions as well, including the ability to spell words, to retrieve words, to articulate words, and to remember certain facts” (Shaywitz, 2008-12-24).

Since dyslexia affects an individual's ability to understand, express, and manipulate language, it can affect the processing systems beyond reading. “Many dyslexic students also show problems with handwriting and written expression; basic arithmetic and rote memory for math facts; processing speed; motor coordination; and difficulty hearing with background noise; visual function for close-up work; following directions; keeping information in their mind (working memory); mastering procedures; planning and organization; error detection; time awareness and pacing; sequencing; and mental focus and attention” (Elliott, Grigorenko, 2014-02-28). Understanding how the deviations in brain processing systems affects the cognitive behaviors of dyslexics will allow for helpful intervention and understanding.

“Questions about the existence or otherwise of dyslexia have raged periodically for many years” (Elliott, Grigorenko, 2014-02-28). These questions about the validity of dyslexia often arise due to misunderstanding the root causes of dyslexia. Unfortunately without a fully formed understanding of dyslexia, issues and struggles related to dyslexia may be discounted unfairly. “At first glance, this seems rather puzzling, as fascination with unexpected reading difficulties in individuals with high levels of intelligence and
sound eyesight has been expressed for centuries (Shaywitz, 2005), and the topic has been extensively researched across a variety of disciplines” (Elliott, Grigorenko, 2014-02-28).

“For example, since most individuals with dyslexia favor episodic over semantic memory, most will remember information about things they’ve experienced (or imagined as scene-based experiences) better than abstract or non-contextual facts. Individuals with dyslexia will also remember information better if they find it interesting and if they can place it into a larger framework of knowledge” (Eide, Brock, Fernette 2011-08-18).

“These learners also tend to enjoy multisensory or multi framework approaches that present the same information in different ways. They frequently enjoy discussing how the approaches they’re using work, as this engages their strengths in gist, cause and effect, and contextual thinking.” (Eide, Brock, Fernette 2011-08-18).

Since dyslexia is first thought of as a learning disorder rather than a style of processing or learning little attention gets paid to the talents or abilities that result from this style (Eide, Brock, Fernette 2011-08-18). Next, various definitions of dyslexia will be presented as well as the cognitive behaviors that result from structural brain differences. The advantages as well as the deficits in cognitive processing based on the structural differences of the brain will be discussed.

2.2.1. Definition of Dyslexia

Defining dyslexia is both simple and paradoxically complex. A major reason for the lack of understanding surrounding dyslexia is the lack of one agreed upon definition, despite the copious amounts of research. Most parties agree that the definition should principally concern the inherent and particular difficulties encountered by those who struggle to read text. It is difficult because the field has been unable to produce a
universally accepted definition that is not imprecise, amorphous, or difficult to operationalize. Without a universally agreed-on operational definition, we cannot be sure that assessments are measuring the same thing, and as a result, there are likely to be serious doubts about any resultant diagnosis or classification (Siegel & Lipka, 2008), (Elliott, Grigorenko, 2014-02-28). Below is a chart of several definitions of dyslexia.

Table 1: Definitions of dyslexia

<table>
<thead>
<tr>
<th>Association</th>
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<tr>
<td>DSM5: Diagnostic and Statistical Manual of Mental Disorders 5th Edition Listed as Specific Learning Disorder Note: Dyslexia is an alternative term used to refer to a pattern of learning difficulties. (Citation DSM5)</td>
<td>Specific Learning disorder is a neurodevelopmental disorder with a biological origin that is the basis for abnormalities at a cognitive level that are associated with the behavioral signs of the disorder. The biological origin includes an interaction of genetic, epigenetic, and environmental factors, which affect the brain's ability to perceive or process verbal or nonverbal information efficiently and accurately. One essential feature of specific learning disorder is persistent difficulties learning keystone academic skills (Criterion A), With inset during the years of formal schooling (i.e., the developmental period). Key academic skills include reading of single words accurately and fluently, reading comprehension, written expression and spelling, arithmetic calculation, and mathematical reasoning.</td>
</tr>
<tr>
<td>National Institute of Child Health and Development (NICHD) and International Dyslexia Association</td>
<td>It is characterized by difficulties with accurate and / or fluent word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction. Secondary consequences may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge.</td>
</tr>
<tr>
<td>British Dyslexia Association</td>
<td>Dyslexia is a specific learning difficulty that mainly affects the development of literacy and language related skills. It is likely to be present at birth and to be life-long in its effects. It is characterized by difficulties with phonological processing, rapid naming, working memory, processing speed, and the automatic development of skills that may not match up to an individual's other cognitive abilities. It tends to be resistant to conventional teaching methods, but its effect can be mitigated by appropriately specific intervention, including the application of information technology and supportive counseling.</td>
</tr>
<tr>
<td>MayoClinic (Dyslexia, mayoclinic.com)</td>
<td>Dyslexia is a learning disorder characterized by difficulty reading due to problems identifying speech sounds and learning how they relate to letters and words. Also called specific reading</td>
</tr>
</tbody>
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disability, dyslexia is a common learning disability in children. Dyslexia occurs in children with normal vision and intelligence. Sometimes dyslexia goes undiagnosed for years and isn't recognized until adulthood. There's no cure for dyslexia. It's a lifelong condition caused by inherited traits that affect how your brain works. However, most children with dyslexia can succeed in school with tutoring or a specialized education program. Emotional support also plays an important role.

| World Federation of Neurology (1968) (cited in Critchley 1970), is one that is still widely used. (Riddick, Barbara 2012-10-12) | Dyslexia is a disorder manifested by difficulty in learning to read despite conventional instruction, adequate intelligence and sociocultural opportunity. It is dependent upon fundamental cognitive disabilities, which are frequently of constitutional origin. |

2.2.2. Structural Differences & Cognitive Behavior Patterns

It is important for educators, parents, and dyslexics to understand the root causes of dyslexia by understanding the affected areas in the brain. This deeper understanding will help dispel misconceptions and create a greater understanding of how to help dyslexics excel.

Even without one agreed upon definition each has many of the same points. There is a general agreement that dyslexia is linguistic, not visual, The affected areas of the brain include: The frontal lobe (controls speech, reasoning, planning, regulating emotions, and consciousness.), The occipital lobe, (primary visual cortex which helps with letter recognition), The temporal lobe (verbal memory), Left parietotemporal system (conscious, effortful decoding of words, important for comprehending written and spoken language), left occipitotemporal area (automatic, rapid access to whole words and is a critical for fluent reading). (Hudson, High, and Al Otaiba.). Having these areas affected can result in the cognitive behavior patterns seen in dyslexic individuals.
Including difficulty with any of the following: learning to speak, organizing written and spoken language, memory, learning letters and their sounds, memorizing number facts, spelling, reading, learning a foreign language, or correctly doing math operations. Dyslexia is vastly more complex than letter reversal or poor spelling.

**Figure 1:** Sections of the brain. ("About Strokes" - www.stroke-survivors.co.uk)

The Nobel Prize was awarded to Dr. Sperry in 1981 for his discovery that the different hemispheres of the brain process information in different ways. This groundbreaking work was popularized with the over simplification of right-brain and left-brain thinking referring to creative or logic based thinking respectively. While the terms right-brained or left-brained are used to describe cognitive styles, it goes beyond creative verses logical processing. In a nutshell the left side of the brain does fine detail oriented processing. The left side is used to distinguish, categorize and examine known components closely. The right-side processes on a large scale, looking at the big picture and global ideas, allowing connections, and tying of diverse ideas or relationships to be spotted. Right-brained processing allows the gist or essence of an idea to be understood quickly. (Eide, Brock, Fernette 2011-08-18)
While the work of Sperry and others has been widely reported, far less attention has been paid to the work of Norman Geschwind and other neurologists whose research into nonsymmetrical development of the two hemispheres has suggested promising new perspectives (West, 2009 p26).

Evidence suggests that individuals with dyslexia used the right side of their brain more predominantly than non-dyslexics for a variety of processing tasks. Drs. Sally and Bennett Shaywitz at Yale first demonstrated this difference in the late 1990s. “Reading expert Dr. Maryanne Wolf summed up the results of this work by writing, “The dyslexic brain consistently employs more right-hemisphere structures [for reading and its component processing activities] than left-hemisphere structures” (Eide, Brock, Fernette, 2011). Processing with the right side of the brain while reading is not unique to dyslexics.
but happens in all beginner readers. The dyslexic individual is unique because, they never make the complete transition from right hemisphere processing to left hemisphere processing. “Dr. Guinevere Eden and her colleagues at Georgetown University have shown that most beginning readers use both sides of their brain quite heavily—just like individuals with dyslexia. It’s only with practice that most readers gradually shift to a largely left-sided processing circuit” (Eide, Brock, Fernette, 2011).

Without intervention, most dyslexics will maintain the heavy reliance on right-hemisphere processing. The shift from right to left brain-processing results from practice and experience. This transition can be seen in many brain systems, which explains some of the difficulties dyslexics experience beyond reading issues, as well as some of the advantages. “This tendency to shift from right- to left-hemisphere processing as skill increases is intriguing because it suggests that the dyslexic failure to make such shifts might reflect a kind of general difficulty in acquiring expertise through practice” (Eide, Brock, Fernette, 2011).

Maryanne Wolf discusses this in her book Proust and the Squid. The figure depicted below is a timeline based on cumulative research from labs around the world. She cautions that this research is by no means definitive yet it is the best understanding of the data collected to date.

Should the emerging concept of a right-hemisphere-dominant reading circuit with dyslexia prove correct for some reader then not only is the dyslexic brain in these children seeing hearing, retrieving, and integrating orthographic, phonological, semantic, syntactic, and inferential processing more slowly; is also doing all this with a largely different
circuit structures, in a hemisphere never designed for temporal precision

(Wolf, M, 2008 p.186-188)

**Figure 3:** Time Line for Dyslexia: Shows bilateral and delayed processing in dyslexics compared to typical readers. (Wolf, 2008. p187)

“The dyslexia-associated increase in right-hemisphere processing may help to explain many of the challenges and strengths that individuals with dyslexia commonly show. On the challenge side, the physically broader and more diffuse
connections in the right hemisphere can lead to slower, less efficient, less
accurate, and more effortful processing. This can place a greater burden on
working memory, especially for tasks that require processing a great deal of fine
detail. On the strength side, the broader network of connections provided by the
right hemisphere favors new and creative connections, the recognition of more
distant and unusual relationships, and skill in detecting inferences and
ambiguities” (Eide, Brock, Fernette, 2011).

The difference in how dyslexic individuals process goes beyond heavy reliance on
right-hemisphere processing to a difference in the actual structure of the brain. While the
list of symptoms or problems faced by dyslexics may seem extensive these processing
problems can all be traced back to the variations in the brain structure and function.
Dr. Manuel Casanova of the University of Kentucky School of Medicine studied the cell-
to-cell connections that link the neurons—which are the cells most responsible for
information processing—in the human brain. A key feature of a dyslexics brain is a larger
spacing between the clusters of neurons in the brain’s cortex. These clusters are
organized into minicolumns that are responsible for our cognitive functions such as
memory, language, sensation, and attention with deficits in accurate or fluent word
recognition and poor spelling. It is life long, while the deficits can be mediated with
proper tutelage and aids, it can never be completely cured. Because dyslexia affects how
the brain processes information, other linguistic related cognitive function may also be
affected including, phonological processing, rapid naming, working memory, processing
speed, auditory processing, handwriting sequencing and the automatic development of
skills and conscious awareness. These stacked neurons (mini columns) fire in unison but
the minicolumns are also connected to each other by axons to create circuits for processing more complex information. Because these minicolumns are connected by axons the spacing between them produces different types of circuits. Tightly pack minicolumns result in shorter axons and smaller localized circuits. While the wider the spacing between minicolumns results in longer axons that allow for larger circuits connecting minicolumns in distance areas of the brain.

Local connections are especially good at processing fine details—that is, at carefully sorting and distinguishing closely related things, whether different sounds, sights, or concepts. Brains biased to form more of these shorter connections generally show a high level of skill in detail-oriented tasks that involve “extracting” the fine features of objects or ideas. In contrast, longer connections are generally weaker at fine-detail processing but excel at recognizing large features or concepts—that is, at big-picture tasks (Eide, Brock, Fernette 2011-08-18).

To conclude this section, dyslexic’s brains are not only physically structured differently than non-dyslexics they also use different pathways and systems of processing. These differences allow the dyslexic brain to function in different ways resulting in the ability to excel at different tasks. This neuro diversity is important to our survival as a species as well as the advancement of our society. “We have long been aware of the great range of the human intellect and imagination. We are only slowly becoming aware that some of the brain’s capacity may depend upon variations in brain growth and development that can lead, in turn, to a vastly greater range in what the human mind can imagine and work for” (West, 2009 p102) “It follows that educational
and employment systems that are based more on an illusion of essential uniformity than the reality of essential diversity could have a great potential to be wasteful as well as destructive” (West, 2009 p.102)

**2.2.3 Misconceptions**

Although a good deal of research has been published to help clarify our current understanding of dyslexia, common misconceptions continue to surround dyslexia. Hudson et al., 2007) A common misconception is that dyslexia just means you reverse letters, and struggle to read. While some dyslexics do reverse letters, many beginner readers without dyslexia do the same. Dyslexia is a vastly more complicated issue that affects auditory processing, visual encoding and decoding of words, even short-term memory. Common signs of dyslexia include difficulty with any of the following: learning to speak, organizing written and spoken language, learning letters and their sounds, memorizing number facts, spelling, reading, learning a foreign language, or correctly doing math operations.

Dyslexia has been incorrectly thought of as a vision-based deficit since the 1920’s based on the reversal of letters, and words. Eye training was believed to help overcome the presumed visual deficit. Research has show that the deficit is actually language-based and has nothing to do with the visual system. Children with dyslexia are not unusually prone to seeing letters or words backwards. However they do have a hard time naming letters often referring to a “b” as a “d” or reading “saw” as “was”. The issue lies not in the visual system but the linguistic system (Shaywitz, 2008-12-24). Despite this research many individuals, including some educators, still believe the myth that dyslexia predominantly affects the reversal of letters or words because of a visual deficit.
Just because someone has dyslexia does not mean they will never learn to read. Dyslexics do not necessarily avoid reading, they read because the content is of value to them not because the process is easy. Just because a dyslexic individual reads does not mean they are not dyslexic. “All dyslexics can learn to read it just happens much later, with much more effort than others” (West via Simpson 2009 p.79).

Some individuals believe that dyslexics just need to try harder, or they are just being lazy. Actually, dyslexics often have to put in much more effort than their non-dyslexic peers. Because their brains function differently, traditional reading instruction may not work as easily for them. Highly structured intensive instruction has been proven to be the most effective. This includes methods that involve multiple senses such as sight, sound, touch, and movement to involve all of the learning pathways. (5 Common Myths About Dyslexia, 2014)

Dyslexia is often believed to be a childhood affliction that can be cured or outgrown. Since Dyslexia is a brain-based condition affecting the way information is processed it is a life-long condition. However, early intervention can have a significant positive impact on reading ability and academic achievement. (5 Common Myths About Dyslexia, 2014)

2.2.4. Inherent Advantages

Since dyslexic brains function differently they often have inherent advantages. “Non-dyslexic brains display the order, stability, and efficiency of train tracks, well-organized filing cabinets, sequential narratives, or logical chains of reasoning. Dyslexic brains store information like murals or stained glass, connect ideas like spider webs or hyperlinks, and move from one thought to another like ripples spreading over a pond. In
short, dyslexic brains function differently from non-dyslexic brains, not because they’re defective but because they’re organized to display different kinds of strengths. These strengths are achieved at the cost of relative weaknesses in certain kinds of fine-detail processing” (Eide, Brock, Fernette 2011-08-18).

This ability to process diverse information in a holistic manner allows dyslexics to excel at connecting the dots, narration, and understanding how past, present and future come together. Eide, Brock, and Fernette point out three different strengths that result from this type of processing. “1.) Individuals with dyslexia often show strengths in big-picture, holistic, or top-down processing, though they may struggle with fine-detail processing. 2.) Many individuals with dyslexia show strengths in interconnected reasoning, or the ability to perceive more distant or unusual connections, to reason using interdisciplinary approaches, or to detect context and gist. 3.) Many individuals with dyslexia excel in narrative reasoning, or the ability to perceive information as mental “scenes” that they construct from fragments of past personal experience (episodic memory)” (Eide, Brock, Fernette 2011-08-18).

Since dyslexics have a difficult time with rote memorization they often need to go further to completely understand a concept at a fundamental level. This deeper understanding allows for creative applications of the knowledge that would not be possible with just memorization. This could explain why “dyslexics appear to be disproportionately represented in the upper echelons of creativity and in the people who, whether in business, finance, medicine, writing, law, or science, have broken through a boundary and have made a real difference to society” (Shaywitz, 2008-12-24).
Observation by Gerald Holton Physicist and historian “An apparent deficit in a particular person may merely indicate an imbalance of our normal expectations. A noted deficiency should alert us to look for a proficiency of a different kind in the exceptional person” (West, 2009 p.58). Some of these proficiencies can be categorized into four main categories abbreviated M.I.N.D. West discusses the MIND characteristics in his book *In the Mind’s Eye: Creative Visual Thinkers, Gifted Dyslexics, and the Rise of Visual Technologies* (2nd ed.). The chart below summarizes the M.I.N.D. ability traits.

*Table 2: M.I.N.D. (West, 2009).*

| M | M-strengths are abilities that help us reason about the physical or material world—that is, about the shape, size, motion, position, or orientation in space of physical objects, and the ways those objects interact. M-strengths consist primarily of abilities in areas that can be termed spatial reasoning, which has often been recognized as an area of special talent for many individuals with dyslexia. |
| I | I-strengths create exceptional abilities to spot connections between different objects, concepts, or points of view. They include: • The ability to see how phenomena (like objects, ideas, events, or experiences) are related to each other, either by “likeness” (similarity) or “togetherness” (that is, association, like correlation or cause and effect). • The ability to see phenomena from multiple perspectives, using approaches and techniques borrowed from many disciplines. • The ability to unite all kinds of information about a particular object of thought into a single global or big-picture view and to determine its gist, or most essential or relevant aspects in particular contexts. |
| N | N-strengths are the ability to construct a connected series of “mental scenes” from fragments of past personal experience (that is, from episodic or personal memory) that can be used to recall the past, explain the present, simulate potential future or imaginary scenarios, and grasp and test important concepts. |
| D | D-strengths create the ability to accurately predict past or future states using episodic simulation. D-strengths are especially valuable for thinking about past or future states whose components are variable, incompletely known, or ambiguous, and for making practical, or “best-fit,” predictions or working hypotheses in settings where precise answers aren’t possible. |
2.3. Why this campaign is necessary

There are four main reasons to create awareness of dyslexia.

1) The amount of individuals affected.
2) The preventable emotional turmoil experienced by the student.
3) Calling attention to the benefits of dyslexia.
4) Catching learning disabilities early so proper training can ensue.

According to the International Dyslexia Association (IDA), as many as 15-20% of the population has a language-based learning disability. Of the students with specific learning disabilities receiving special education services, 70-80% have deficits in reading. Dyslexia is the most common cause of reading, writing and spelling difficulties.

(“Dyslexia Basics”)

2.3.1. Who is affected

Approximately one fifth of the U.S. population shows at least one symptom of dyslexia (IDA) while 10% to 15% carry a diagnosis of dyslexia. Girls are just as affected as boys despite more boys being diagnosed. Sometimes boys are over diagnosed while girls tend to hide their symptoms and slip by un-noticed. Girls tend to hide that they are struggling, while boys act out more when they are struggling; leading to disruptions in the classroom, thus drawing the teachers attention.

“According to school identification procedures, the prevalence of reading disability is three to four times more common in boys than in girls. These findings are in agreement with older reports in which the ratio of boys to girls
with reading disability has varied from 2:1 to 5:1. A common thread that unites these past studies is that they were all based on samples identified through either clinic or school identification procedures. In contrast, we found no significant difference in the prevalence of reading disability in the boys and girls we identified. In general, when each child in a school or school district is individually tested, researchers report as many reading-disabled girls as boys” (Shaywitz, 2008-12-24).

Figure 4: Prevalence of Reading Disability in Boys and Girls Schools identify many more boys than girls; in contrast, when each child is tested (research identified) comparable numbers of boys and girls are identified as reading-disabled (Shaywitz, 2008-12-24).

Dyslexia affects adults as well as children. Individuals do not grow out of dyslexia. Adults usually adapt with a variety of coping strategies to compensate for any
deficits. This does not mean that they have grown out of or are cured of dyslexia.

“Dyslexia is a chronic condition and that does not represent a temporary lag in reading development” (Shaywitz, 2008-12-24). “If a child is dyslexic early on in school, that child will continue to experience reading problems unless he is provided with a scientifically based, proven intervention” (Shaywitz, 2008-12-24).

![Figure 5](image-url)

**Figure 5.** Dyslexia Is Persistent Overtime, reading performance improves in both good readers (upper curve) and poor readers (lower curve). However, the gap between the two groups remains. (Shaywitz, 2008-12-24).

Since one fifth of the U.S. population show at least one symptom of dyslexia (IDA) this means 6 out of 30 students in a classroom could have some degree of dyslexia. Dyslexia can range in its severity and symptoms, however. Even individuals with mild dyslexia still may face struggles in the classroom. Unfortunately, many educators do not
fully understand this learning disorder. “The biggest concern we hear from parents is that the teachers assigned to help their child in school know little to nothing about dyslexia,” said IDA Interim Executive Director, Kristen Penczek. “Without the basic understanding of what dyslexia is, what it isn’t, and the signs, symptoms, and next steps involved, they are paralyzed” (*International Dyslexic Association*).

Teachers are becoming aware of the need for change and have a desire to help struggling dyslexic students instead of writing them off as lazy or stupid – which more often than not was historically educator’s response to many dyslexic students. This was due to a lack of understanding and misconceptions about dyslexia. There is still a drastic lack of understanding among educators about how to help dyslexic students. Further training should be incorporated in ways to help pupils with learning difficulties in general and dyslexic difficulties in particular (Gwernan Jones, Burden, 2010).

### 2.3.2 General Lack of Knowledge

Despite the fact that many research advancements have been made in the understanding of the root causes of dyslexia, the general public, remains at large, ignorant of these advancements. This also frequently includes the parents of dyslexic children, who may think they already know what dyslexia is or don’t know where to turn for resources. “For the public at large, the term [dyslexia] is usually restricted to reading difficulties. However, to the neurologist, the reading problem is only one symptom of deeper processes that may manifest themselves in a number of different ways” (West, 2009 p.103).
The general lack of knowledge becomes a particularly difficult issue with the parents of dyslexic children. The confusion about what dyslexia is and how to best help their child can be daunting when no prior knowledge of dyslexia. Not having access to sufficient resources or not knowing how to find resources can leave a parent feeling isolated. Talking with friends or family may prove detrimental because of the rampant belief of many misconceptions about dyslexia. Unfortunately many educators also sometimes are ill-equipped to discuss dyslexia due to lack of specific training regarding dyslexia.

“Studies on adults (Jorm et al., 2004) and adolescents (Leighton, 2009, 2011) have shown that lay people confuse dyslexia with learning difficulties such as ADHD. They seem poorly informed about the nature of dyslexia and how it can best be treated” (Furnham, A. 2013). The results of their study showed that many people were confused about the neurological causes as well as genetic links of dyslexia. Overall the results suggest some curiosity and understanding mixed with ignorance and naivety in regards to the multifaceted learning disorder of dyslexia. (Furnham, 2013)

A study by Adrian Furnham looked at the extent to which lay people believe many myths associated with dyslexia. It examined attitudes and beliefs about the causes, manifestations and treatments for dyslexia in a British population sample. He used an in-depth exploratory interview with non-specialist people regarding their understanding of dyslexia. Item analysis showed participants were poorly informed about many aspects of dyslexia. Factor analysis returned a structure of latent attitudes in five factors (Characteristics, Biological and Social Causes, Treatment and Prevention).
Taken together, the present results suggest that lay people show modest curiosity and understanding but also ignorance and naivety with regard to the multifaceted learning disorder of dyslexia. They suggest that educational programs are required to improve learning difficulties literacy in relation to dyslexia among the general public, teachers and parents (Furnham, 2013).

2.3.3. Educators Lack of Full Understanding

Currently in our education system there is a lack of understanding about dyslexia. Findings from studies have indicated that teachers lack essential knowledge needed to teach struggling readers, particularly children with dyslexia. (Washburn et al. 2011) The need for educators to understand dyslexia and how to best teach dyslexic students goes far beyond beginning reading and special education instruction. All levels of education and all disciplines should have a working knowledge of dyslexia and how it affects a student's learning. Since dyslexics make up 15% to 20% of the population many highly intelligent students who struggle with dyslexia are sprinkled throughout all levels of classes in an education system. Dyslexic students are not specifically confined to the special education classes but are intermingled amongst their non-dyslexic peers. This means that all instructors at all levels will have dyslexic students. Therefore it is imperative that a basic understanding of dyslexia is achieved by all teachers though out the k-12 system.

A growing amount of research has been conducted and published on teacher knowledge of certain reading-related constructs pertaining to
instruction for beginning readers and readers with learning disabilities such as dyslexia (Binks-Cantrell, Joshi, Washburn, & Hougen, 2012; Bos, Mather, Dickson, Podhajski, & Chard, 2001; Moats, 2009; Piasta, Connor McDonald, Fishman, & Morrison, 2009; Spear-Swerling, 2007).

Unfortunately, this body of research has reported that teachers, both preservice and in-service, lack a foundational understanding about basic language or linguistic concepts related to reading instruction for beginning and struggling readers (i.e., phonology, phonics, and morphology) (Washburn et al. 2014).

Furnham states that there have been multiple studies done to assess teachers knowledge of dyslexia. Many of these studies have shown due to the lack of knowledge they are poorly equipped to spot dyslexia. Furnham sites Cameron & Nunkoosing, 2012; Cunningham et al., 2004, McCutcheon et al., 2002; Joshi et al., 2009; Moats, 2009; Regan & Woods, 2000; on the matter. Furnham points out how the Dyslexia Belief Index of Wadlington and Wadlnington (2005) found several misconceptions were believed by the majority of the student and lecturer participants about dyslexia.

“Washburn et al. (2011) found in their study of 185 American teachers of elementary-aged children that they seemed to hold the common misconception that dyslexia is a visual processing deficit rather than a phonological processing deficit. Bell, McPhillips and Doveston (2011) noted how teachers had biological, cognitive and behavioral conceptualizations of dyslexia.” (Furnham, 2013).
In a study conducted by Ruth Gwernan-Jones and Robert Burn they examined teacher’s attitudes toward dyslexic students and their ability to help them. They participated before and after their teaching practice. The results showed that a small but significant change occurred after teaching. “It is proposed that a new breed of teachers may be entering the teaching profession with positive beliefs about their ability to help dyslexic pupils, but who remain unclear as to how this can be accomplished. Some implications for action and suggestions for future research are provided” (Gwernan-Jones, & Burden, 2010).

This uncertainty about how to help dyslexic students really comes through in the question: ‘I feel more training should be given to teachers about dyslexia’. “A strongly positive mean score was obtained in response to this item by the whole group, with more than 90% agreeing or strongly agreeing with the statement. Again the percentage of positive responses by both females and males was very similar” (Gwernan-Jones, & Burden, 2010).

“Nevertheless, a cautionary note must be added to the effect that despite their positive attitudes, only a small proportion of the newly qualified teachers had any clear ideas as to exactly how to provide help and support to dyslexic pupils. This serves to emphasis the point that positive attitudes and good intentions can only take one so far. If these raw recruits enter a teaching profession or individual schools where general attitudes towards dyslexia are negative or intolerant, then it is quite likely that their motivation to help will be undermined, particularly in the face of their own limited skill base. It is essential, therefore, that the current plans
to extend Postgraduate Teacher Training to include an induction year involving various extra modules for a Master’s degree qualification should incorporate further training in ways to help pupils with learning difficulties in general and dyslexic difficulties in particular.” (Gwernan-Jones, & Burden, 2010).

Washburn et al. (2011) conducted a study to examine the current knowledge and perceptions of elementary teachers about dyslexia. Findings from this study indicated that teachers, on average, were able to display implicit skills related to certain basic language concepts (i.e. syllable counting), but failed to demonstrate explicit knowledge of others (i.e. phonics principles). Also, teachers seemed to hold the common misconception that dyslexia is a visual processing deficit rather than phonological processing deficit.

“IT has been suggested that teachers often have misconceptions about the nature of dyslexia (Hudson et al., 2007; Sanders, 2001). Responses to the dyslexia sub-items (37a–e) confirmed such suggestions and were similar to findings from previous studies” (Washburn, Joshi, & Binks-Cantrell, 2011).

Ninety-one percent of teachers indicated either ‘probably or definitely true’ to ‘seeing letters and words backwards is a characteristic of dyslexia’. This finding is somewhat indicative of the popular misconception that dyslexia is a result of a visual deficit. However, as Moats (1994) has stated ‘the scientific community has reached consensus that most reading disabilities originate with a specific impairment of language processing, not with general visual–perceptual deficits’ (p. 82). Also, 71% reported that ‘children with dyslexia can be helped by using colored lenses/colored overlays’. However, teachers’ knowledge of
dyslexia was more accurate on the remaining three sub-items: 74% indicated ‘probably or definitely true’ concerning dyslexics problems with decoding and spelling but not listening comprehension; 82% indicated ‘probably or definitely false’ to ‘dyslexics tend to have lower IQ scores than non-dyslexics’; and 87% indicated ‘probably or definitely false’ to ‘most teachers receive intensive training to work with dyslexic children’. The findings from the dyslexia sub-items supported the notion that dyslexia is still misperceived despite current research. (Washburn, Joshi, & Binks-Cantrell, 2011).

The stigma against dyslexia carries over into adulthood as well. In a study conducted by Riddick They interviewed a small number of practicing teachers and trainee teachers with dyslexia about their experiences of teaching and training and the specific coping strategies they adopted in the classroom. “The Dyslexia in Higher Education Report raised concerns about the negative attitude of some teacher training departments to admitting and supporting students with dyslexia” (Riddick, B. 2003). It is unfortunate that stigmas against dyslexic individuals carry into the workplace. By fostering social inclusion in the classroom, inclusion can transition into adulthood as well. The general findings of the study indicate that similar emotional turmoil resulting from dyslexia carried through from childhood to adult life. “The majority felt their own very negative experiences of school had been a strong motivating factor in wanting to teach in order to give children a better educational experience than their own. Trainee and newly qualified teachers were fearful of being ‘found out’ by other members of staff and often felt low in confidence despite performing well in the classroom. Most would have
welcomed constructive support and mentoring from experienced teachers with dyslexia” (Riddick, B. 2003).

Dyslexia is a life-long condition that affects how the brain processes information. This means that not only elementary teachers but middle, and high school teachers should have a basic understanding of dyslexia as well. The issues a student faces in the higher level grades may be less obvious but equally as serious. Students may have an increasingly difficult time copying lecture notes off the board, struggle with foreign language, get held back at more basic math levels because they struggle with the rule based system. These issues can be often misattributed to lack of effort, or lower intelligence. Dyslexic students often do not understand that these areas of struggle are also connected to their dyslexia. Students will then either keep quiet, trying to keep up but slipping farther behind or act out in an attempt for their struggling to be noticed.

2.3.4 Benefits of Empowering Dyslexics

Dyslexia is not a disease; it is a genetic and neuroanatomical difference that results in certain cognitive behavior patterns, not all of which are negative. Yet many people with dyslexia are ashamed and feel they have to hide their learning disorder. This is why not only the general public needs to be better informed about dyslexia, but dyslexics themselves need have a better understanding. By understanding the cognitive behavior patterns dyslexics can feel empowered to lean on their strengths and find ways to cope or supplement areas in which they struggle.
If a child or adult is undiagnosed or has an instructor who is ill informed about dyslexia unfortunate emotional turmoil can result. Dyslexic individuals are intelligent people, with often above-average intelligence. They simply have a hard time with language. This can sometimes result in feelings of inadequacy, or stupidity. The stigma of having a learning disability can cause other children to draw conclusions about a dyslexic child's intelligence. Teachers may end up thinking a student is just lazy or uncooperative. By creating more awareness about dyslexia this unfortunate emotional turmoil can be minimized.

An important implication of creating awareness is to empower the dyslexic individual. So often only the negative aspects of dyslexia are discussed. There are actually many positive aspects of dyslexia as well. By understanding the neuroanatomical structure of a dyslexic brain many positive cognitive behaviors can also be understood. For instance, dyslexics tend to be very spatially talented, in that they have an ability to mentally rotate objects in their mind. They tend to excel in occupations like: engineers, architects, designers, artists and craftspeople, mathematicians, physicists, physicians (esp. surgeons and orthopedists), and dentists. Dyslexics also tend to have strong people skills and may be able to read people very well. Frequently dyslexics are able to make interesting connections or see the big picture before others. This ability of creative, global-thinking is a direct result of the neuroanatomical structure of a dyslexic brain, and their bent toward right-brain processing. (West, 2009)
2.3.5 Consequences of ignoring dyslexia

When dyslexia is ignored it can lead to multiple issues for a dyslexic individuals. Low self esteem, and engaging in risky or destructive behavior can lead to dropping out of school, or even sometimes prison. When a person is constantly told that they are a failure, or that they can’t accomplish things they start to believe it. Educators and parents need to be aware of the impact, and stress dyslexia has on a young mind. “Teens with learning and attention issues may be more likely to engage in risky behaviors. They may take more risks because of low self-esteem or immature thinking” (Why Teens …Take More Risks, 2014).

Ben Foss's founder of Head Strong Nation writes that he likes to start conversations about dyslexia by saying “Dyslexics are 10 percent of people, 35 percent of entrepreneurs and 41 percent of prisoners” (Foss). Having support systems in place can mean the difference between someone giving up because they feel inadequate or someone embracing their strengths to create something new.

A large long lasting consequence of dyslexia is shame. On headstrongnation.org an out reach group for dyslexics they talk about the shame many dyslexics feel. They point out that shame is different then guilt. You feel shame because of an intrinsic quality, while you feel guilt for an act you committed. “Gershen Kaufman, PhD, a leading psychological expert on the general topic of shame, believes that the level of shame associated with reading disabilities “often matches, in intensity, the shame experienced over incest.” The shame related to dyslexia is often slow-drip trauma” (Kaufman).
The stigma of a being labeled with a learning disability, or dyslexia remains fresh in many dyslexics minds. Even today when so much has been learned about dyslexia and what causes it; often the school-yard taunts of stupidity remain fresh. Eileen Simpson published a book in 1979 called *Reversals* of her first-person accounts with dyslexia. Her preface notes the general reluctance to share personal accounts of dyslexia “The old shame and fear of ridicule remain forever lively” (Simpson, 1991). This prevalence of shame can be seen today as well. One of the anonymous teachers who participated in the focus survey conducted for this thesis wrote: “One parent refused to tell their child that the child is dyslexic because the parent also has dyslexia and doesn't want the child to be labeled. As teachers, we were not allowed to discuss the child's condition with the child (who was 15 years old).” If as a society we can’t even talk about dyslexia then how do we expect to ever understand it. The emotional, stress, pain and frustration could be greatly mitigated for dyslexic individuals if there was simply greater awareness. By become more aware of the root causes and effects of dyslexia support systems can be put in place.
CHAPTER THREE

ANALYSIS OF CURRENT AWARENESS CAMPAIGNS

3.1. Overview

I conducted an assessment of current dyslexia awareness campaigns and information sites. Several common aspects emerged including, text heavy interfaces, complex navigation and lack of information graphics to visually communicate information.

3.1.1 Purpose

The purpose of this assessment was to see what current campaigns and information were available to the general public. By analyzing the pros and cons of these existing design solutions a better, well rounded design can be achieved. I used research from my literature review as well as existing guidelines from two dyslexia advocacy groups to analyze the content of each site.

3.2. Analysis of Current Awareness Campaign

Currently the International Dyslexia Association (IDA) distributes classroom kits during Dyslexia Awareness Month. “The kit, *Dyslexia in the Classroom: What Every Teacher Needs to Know*, will help raise awareness, share best practices, and be a resource to the school’s administration and staff. Currently, there are limited resources available to public elementary school teachers related to dyslexia and other learning differences. IDA is opening the door to a better understanding of dyslexia by providing this vital resource to support teachers in their passion to help every child reach their fullest potential” (IDA: Unlocking Dyslexia). Unionlearn also has a dyslexic awareness campaign where they
conducted an online survey of union reps, carried out between September 21-October 7, 2011; there were 270 responses. UNISON, the public service union, is publishing 'Dyslexia in our own words', a series of case studies and advice for ULRs, as part of Dyslexia Awareness Week. “Often, dyslexia isn't recognized for what it is. Managers seem to think that it is purely a difficulty with reading, when it can also lead to organizational difficulties. It is therefore often misidentified as an attitude problem - as being deliberately disobedient. Plus, colleagues think they are taking too long to do work online and think they are lazy, etc.” (Unionlearn).

Many other public awareness pieces that have been created by artists and designers focus on getting a neuro-typical individual with no reading impairment to understand what a dyslexic individual faces. Some prominent examples of exemplary design include the work of Sam Barclay. An article in WIRED magazine talks about his work.

“British designer Sam Barclay, along with 5-10 percent of the population, lives with this learning disability and has created a new textbook called _I Wonder What It’s Like to Be Dyslexic_ that’s purposefully designed to make unimpaired readers struggle. His goal is to simulate what it’s like for someone with a learning disability while explaining the underlying psychology, and hopefully teaching a bit of empathy in the process” (Flaherty, 2013)
As mentioned before, while, this can create empathy it does not always create the amount of understanding that is necessary for real change. By combining the technical knowledge about dyslexia with visually appealing information graphics a greater understanding of dyslexia can be reached. The emotional damage suffered by many dyslexics could be minimized drastically if those around them, including themselves, developed a greater understanding of dyslexia.
3.2.1. Review of Several Dyslexia Awareness Sites

The following table shows several main dyslexia information websites, with the summaries of their design pros and cons. Many cons included text heavy interfaces, complex navigation and lack of information graphics to visually communicate information. Most sites felt cramped, or overwhelming, despite having good information.

Table 3: Dyslexia websites pros verse cons

<table>
<thead>
<tr>
<th>Website</th>
<th>Design Pros/Design Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>International Dyslexia Association</td>
<td><strong>Pro</strong> •extensive information. •Parent resources •Teacher resources <strong>Con</strong> •Text heavy, small font size with small leading. (readable but both size of font and leading should be increased for dyslexic users.) •Not enough of visual information or videos. •High contrast of text and screen. Slight off-white and dark gray should be used on text to lessen eye fatigue •Poor search functionality •not enough open negative space, overwhelming</td>
</tr>
<tr>
<td>IDA – 2014 old version</td>
<td><strong>Pro</strong> •Use of more imagery and white space. •Lowered intensity of contrast used off white and gray-blue. •increased type size and leading on some body text. <strong>Con</strong> •Complex navigation •Still not taking advantage of visuals to communicate info. Still very text heavy.</td>
</tr>
<tr>
<td>IDA - 2015 redesign</td>
<td><strong>Pro</strong> •Use of more imagery and white space. •Lowered intensity of contrast used off white and gray-blue. •increased type size and leading on some body text. <strong>Con</strong> •Complex navigation •Still not taking advantage of visuals to communicate info. Still very text heavy.</td>
</tr>
<tr>
<td><a href="https://eida.org/">https://eida.org/</a> (IDA: Dyslexia Research)</td>
<td></td>
</tr>
</tbody>
</table>


Pro - Homepage
• Colorful.
• Broken down into clear sections.

Con - Secondary pages
• Text heavy, ok font size and leading.
• Not taking advantage of visual information or videos.
• Poor search functionality
• not enough open negative space, overwhelming

British Dyslexia Association
BDA - homepage and secondary page
http://www.bdadyslexia.org.uk/

Pro
• Large text with lots of leading
• Gray background instead of white to reduce contrast and eye fatigue.
• Lots of information
• Simple to search
• breaks down information in small chunks, usually displayed in slide shows.
• makes use of video
• Has text to speech and ability to increase font size on every page.

Con
• Could use more graphics to explain information.
Mostly just pictures of kids right now.
3.2.2. Design Style Guidelines For Dyslexic Users

Below, a chart of the design guidelines from the British Dyslexia’s Association website (British Dyslexia Association) and the Dyslexia Association of Ireland’s website (“Making Information Accessible”) can be compared. Observe the many similarities in guidelines. One important feature not mentioned is the ability to add text to speech capabilities to a website.

**Table 4: Existing style guidelines for dyslexics**

<table>
<thead>
<tr>
<th>Media</th>
<th>British Dyslexia Association</th>
<th>Dyslexia Association of Ireland</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>· Avoid white backgrounds for paper, computer and visual aids. White can appear too dazzling.</td>
<td>· Use a colored paper, even cream or off white. Some individuals will have specific color preferences, e.g. yellow or blue.</td>
</tr>
<tr>
<td></td>
<td>Use cream or a soft pastel color. Some dyslexic people will have their own color preference.</td>
<td>· Use matt paper to reduce glare.</td>
</tr>
<tr>
<td>Font Type</td>
<td>· Use a plain, evenly spaced sans serif font such as Arial and Comic Sans. Alternatives include</td>
<td>· Use a san serif font such as Arial, Comic Sans, Verdana or Sassoon.</td>
</tr>
<tr>
<td></td>
<td>Verdana, Tahoma, Century Gothic, Trebuchet.</td>
<td>· Use lower case letters. Avoid unnecessary use of capitals. Using all capital letters can make it harder to read, and it can also appear that you are shouting at the reader.</td>
</tr>
<tr>
<td>Font Size</td>
<td>· Font size should be 12-14 point. Some dyslexic readers may request larger.</td>
<td>· Use a minimum of 12pt or 14pt font size. (It should be noted that when dealing with type on a web size should be increased to a min of 14.)</td>
</tr>
</tbody>
</table>
| **Font Color** | · Use dark colored text on a light (not white) background.  
· Avoid green and red/pink as these are difficult for color-blind individuals. | · Avoid light text on a dark background. |
| **Headings and Emphasis.** | Avoid underlining and italics: these tend to make the text appear to run together. Use bold instead.  
· AVOID TEXT IN BLOCK CAPITALS: this is much harder to read.  
· For Headings, use larger font size in bold, lower case.  
· Boxes and borders can be used for effective emphasis. | · Use bold print to highlight. Italics and underline should be avoided as they can blur text. |
| **Layout.** | · Use left-justified with ragged right edge.  
· Avoid narrow columns (as used in newspapers).  
· Lines should not be too long: 60 to 70 characters.  
· Avoid cramming material and using long, dense paragraphs: space it out.  
· Line spacing of 1.5 is preferable.  
· Avoid starting a sentence at the end of a line.  
· Use bullet points and numbering rather than continuous prose. | · Use at least 1.5 line spaces between lines of text, if possible.  
· Highlight important text in a box or use color. |
| **Increasing accessibility.** | · Flow charts are ideal for explaining procedures.  
· Pictograms and graphics help to locate information.  
· Lists of ‘do’s and ‘don'ts’ are more useful than continuous text to highlight aspects of good practice. | · Use bullet points and numbers rather than long passages of prose.  
· Keep text left justified with a ragged right edge.  
· Don’t use unnecessary hyphenation.  
Ensure that the website is designed so that |
Designers know that information graphics are a good way to explain and represent complex data quickly. If information graphics are designed well a vast audience of varying cognitive levels can be reached. In addition, large amounts of information can be quickly communicated. An individual could understand all the main points, without having to read extensively on the topic. “One of the greatest benefits of data visualization is the sheer quantity of information that can be rapidly interpreted if it is presented well” (Ware, C. 2013). This is a huge benefit of information graphics, especially when you are trying to educate a given audience that is unaware of their ignorance on the subject. “Visualization facilitates understanding both large–scale and small–scale features of the data. It can be especially valuable in allowing the perception of patterns linking local features” (Ware, C. 2013). Designers know that visual graphics are a smart, effective way to communicate information, yet there is a dearth of information graphics explaining the various nuances of dyslexia. Instead there is an abundance of pieces of art, as well as various designs including book design, product design, animation, etc. that aim to create empathy for dyslexics. This type of work in and of itself is not bad, nor should it be looked down upon, empathy is vastly important. Unfortunately empathy is not always enough to create change. Understanding on the other hand of the root cause,
neuroanatomical structure, cognitive behavior patterns and common signs of dyslexia can create change to aid and empower a dyslexic individual.
CHAPTER FOUR
METHODOLOGY

4.1. Focus Group Survey Methodology

I conducted a focus study to find out more information about the current knowledge about dyslexia and the desire for new technology to aid dyslexic learners. A twenty-question survey was created to gage the current climate of understanding about dyslexic students and the use of technology to improve learning. The focus group was comprised of elementary, middle, and high school teachers from a Catholic school system in Cedar Rapids, Iowa. A total of 36 instructors completed the survey. They taught at a variety of age levels including: 1 preschool, 6 elementary, 14 middle school, and 16 high school teachers. They were asked to answer 14 quantitative questions and 6 qualitative.

4.1.1. Findings From Group Survey

The survey showed a strong desire to help dyslexic students, but an uncertainty of how to do so. There was a general understanding of areas where students with dyslexia struggled but also an uncertainty about the completeness of their knowledge about dyslexia. When asked if they felt they knew enough about dyslexia as teachers, 3 answered yes, 9 answered Not Sure and 25 said No. When asked if students with dyslexia were currently being assisted adequately, 6 replied yes, 21 said not sure and 9 said no. When asked about what resources were available for teachers most responded, “guided study teacher” or “internet”. Parent access to resources also seemed to be in question. While 12 out of 37 said parents had adequate access to information, only 4 said no, 21 out of 37 (61%) said they were unsure. See Appendix A for full set of survey questions and answers. When asked if they worked with dyslexic students 10 out of 37 said no
while 27 said yes. When asked how many dyslexic students per year they worked with 9 said none, 25 said 1-5 and 3 said more than 5. It is rather unlikely that 10 instructors have never worked with a dyslexic child when 1 in 5 fall somewhere on the spectrum. The highest rated issues when working with a dyslexic were problems with spelling, reading, following written instructions and copying notes. Another category was included where one teacher listed her dilemma with a particular student. “One parent refused to tell their child that the child is dyslexic because the parent also has dyslexia and doesn't want the child to be labeled. As teachers, we were not allowed to discuss the child's condition with the child (who was 15 years old).”

When asked about technology, 23 out of 36 said they used iPads in the classroom while only 1 out of 36 said they used Virtual Reality. However when asked what kind of technology they would be interested in using to help dyslexics learn 20 out of 26 said multisensory interfaces. Multisensory interfaces would include the use of kinesthetic, tactile, auditory and visual feedback. This type of feedback has been shown to be the most effective for dyslexic learners. The use of HMDs (head mounted displays) and virtual reality would make this multisensory experience available. Although when asked about virtual reality specifically only 6 out of 26 showed interest. This shows that there may be a disconnect in the understanding of the technology, what it can do and how it can be implemented. To best help dyslexics there is clearly a need for this technology in the classroom. However, before it can be implemented it needs to be developed specifically with the classroom in mind.
4.2. Development

After doing a review of the existing dyslexia awareness campaigns and conducting an initial focus study of K-12 teachers, I decided to create an awareness campaign that was based online as a website. To publicize the campaign, a Twitter and Facebook account were created. Social media not only allows a way to spread the word but it offers a place for users to connect and collaborate. After conducting the review of other dyslexia awareness campaigns, it became clear that while there was a lot of valuable information, it was not as accessible as it could be. By designing a website with a multimodal system for communicating, users could access the information in multiple ways, increasing understanding and retention. The website focuses on combining style guidelines for dyslexic users, graphically communicating information, providing audio and including videos as well as text.

The first step of the campaign was to design a logo, pick out a color system and font-families. I wanted the logo to embody the struggle of someone with dyslexia as well as their strengths. Overall, the logo is meant to acknowledge the emotional struggle many dyslexics face as well as the advantages that result from a different style of thought. The logo, divided into a maze-like structure, represents the different strengths that result from neurological differences. No two areas are the same, yet all are equally dominant to represent the importance of neurological diversity. The use of the golden ratio represents the dyslexic’s ability to visually process complex information. The whole structure was made out of the letters EDGE. This represents the dyslexic’s ability to see past an initial idea or meaning, allowing them to find different solutions to a complex problem.
Some of the process work for the logo can be seen in the figures below. I wanted to play with the idea of an edge; of balancing and seeing multiple solutions. The iterations below helped inform the final design.

**Figure 9: In progress logo work**
For the color system I wanted bold bright colors that would be attractive to younger tweens as well as complex colors that would appeal to older adults.

For the font families I used on the website and information graphics I chose **Proxima Nova** and **Museo Slab serif** for accents. I wanted the main font to be a sans-serif to help with readability for dyslexic users. Serifs can blend the letters together making reading more difficult for a dyslexic user. A study conducted in 2013 by Rello, L., & Baeza-Yates, R. using eye tracing software shows greater readability for dyslexic readers using san-serif fonts. “Using a within-subject design, 48 subjects with dyslexia read 12 texts with 12 different fonts. **Sans serif, monospaced** and **roman** font styles significantly improved the reading performance over **serif, proportional** and **italic** fonts. On the basis
of our results, we present a set of more accessible fonts for people with dyslexia” (Rello, & Baeza-Yates, 2013).

What makes sans-serif fonts more legible for dyslexic readers? The serifs on letterforms can blur the words together making it more difficult to distinguish individual letterforms. Based on the study mentioned above the results indicated that sans serif fonts resulted in shorter fixation but similar reading times to serif fonts.

4.2.1 Personas

Personas were created for each of the main user groups that were to be targeted for the website; a student, parent, and teacher. Creating personas helps during the development process to keep your target audience in focus. Will Rebecca be able to read and use this site? Will she feel more empowered and willing to ask for help when she needs it? Will Tammy come away with a better understanding of her child and how to talk to her teachers? Will Jim be able to spot students in his class that are struggling because of dyslexia?

Students – Rebecca O’Hara

Rebecca is 10 years old and in the 4th grade. She loves learning, is fascinated by science and technology but she doesn't like school very much. She is frequently sick and tries to get out of school any way possible. She often feel frustrated in school and is unsure why the basic task that other students find so simple cause her great difficulty, despite her feeling that she is actually more intelligent than they are. Her least favorite game is trivia. Once a week for fun the class gets to play around the world trivia. Rebecca never makes it past her desk. She doesn't hate the game because she doesn't know the
answers. She hates it because she almost always knows the correct answer but she cannot ever form a verbal response fast enough. So the other students tease her for being stupid while in her mind the answer to every question is visualized but unspoken. Rebecca has just been diagnosed with dyslexia she doesn't know what that means for sure but feels it must have something to do with her difficulties in school. Her older brother Tim tells her its because she’s slow and her mother says its because she is special. Rebecca feels like there might be more to it than that.

Parents – Tammy O’Hara

Tammy is Rebecca’s mom. She has always know that her daughter is very bright yet she struggled to learn how to read or memorize her time tables. She was so confused when Rebecca started to hate school about half way through 1st grade. She had loved kindergarten and was always fascinated by museums and libraries. Her favorite spot in the children’s section was the children's encyclopedias which couldn't be check out so Rebecca would pour over them for as long as possible each time they visited the library. Tammy doesn't know much about dyslexia, but she has know for quite some time that Rebecca, despite being extremely intelligent, struggles greatly in school. She also knows that Rebecca isn’t just being lazy or stubborn because she watches and helps her with her assignments each night. She finally requested to have Rebecca tested. Now that she knows Rebecca is Dyslexic what does that mean? How can she help her daughter learn to adjust for this? What resources are available for her?
Teachers – Jim Brosman

Jim is a seventh grade science teacher. He is 32 and has been working at a medium sized school for 6 years. All the students like Jim, he always has interesting experiments and likes to make class fun. Jim has had students with dyslexia before. Usually it is the type of thing that is mentioned in hushed tones at the beginning of the year and some minor adjustments are requested. Such as private test time or outlines of the notes. Generally these students do well enough and Jim assumes that the accommodations are adequate. This year though Jim has a student named Chris. Chris is extremely intelligent, he also really loves science. So much so that he almost always come in after school to tell Jim about something he saw in Popular Science and discuss it with him. Unfortunately in class Chris is a whole different person. He rarely volunteers answers and his test scores are atrocious. During experiments Chris is always the first done with the best-executed experiments but when he goes to answer the questions he hardly writes anything down. Jim is concerned so asks one of the other teachers about Chris. “He’s just being lazy. I have seen him reading advanced science fiction novels before school yet he can’t be bothered to write in complete sentences for class. His file says he was diagnosed with dyslexia but if he can read those advanced novels he’s probably not” Jim thinks there is more to the story and decides to learn more about dyslexia.

Based on the persona development I decided to capitalize on these three target user groups not only with the content but how it was presented as well. The first initial wireframes show a more rigid template that was expanded upon during development to better fit the individual groups. The way the content is presented to a teacher should be
much different than how it is presented to a middle school student dealing with dyslexia. These differences will be discussed further with the final design figures.

4.2.2 Information Architecture

The architecture was based on the initial focus group survey, the literature review of the current lack of knowledge, and finally the review of the current awareness campaigns. Three main categories emerged; students with dyslexia, parents of students with dyslexia, and teachers. The architecture was designed to be as simple for the user as possible, only going two levels deep. The site is designed as an awareness campaign meant to provide an overview and basic understanding of dyslexia. It is meant to get
people interested in asking the right questions and locating good resources, not to be a library in and of itself. Difficulty discussing dyslexia between these three groups was identified both in the literature as well as the focus survey. It was important to include information about how to open discussions as well as to cross-link. This way a parent after reading how to talk to their child's teacher can go and read from a teacher’s perspective how to talk to a parent. Opening the channels of communication between students, parents, and teachers, is the first step to improving not only the individual child's education but also the understanding of dyslexia across the board.

4.2.3. Wireframes
The Dyslexic Edge website needed to be responsive so it could be reached on a variety of devices at any time. Wire frames are an important part of the planning stage to make sure content is laid out in a logical manner. Below are images of the wire-frames and initial static designs of the website.

![Figure 12: Homepage desktop version –wire frame](image)
Figure 13: Homepage full color initial design.

Figure 14: Secondary Page Desktop version

Figure 15: Secondary page full color
Figure 16: Home Page Mobile

Figure 17: Home page Mobile Navigation
CHAPTER 5. RESULTS AND FUTURE RESEARCH

The final results of my research for the Dyslexic Edge awareness campaign are shown below. It consists of the Dyslexic Edge logo, one website for three separate user groups to create awareness about what dyslexia is and where to turn for more information. The website included information diagrams and a motion graphic created to help visualize the information. The social media component includes Facebook and Twitter to raise awareness, draw people to the site and create a place for people to connect. The GoodReads account allows users to find more in-depth resources and share them. Finally the Instagram account was created to reach out to dyslexic tweens, not only to create awareness but to empower as well. Images are all from live, functioning websites.

5.1. Final Designs

![Final designs of website home page](image)

**Figure 18:** Final designs of website home page
The homepage is meant to be a quick overview of dyslexia. The animation gives a concise but accurate explanation of how dyslexia is a processing issue that incorporates much more than letter reversal. The information graphic cards are dispelling common myths with an explanation and supporting imagery to help clarify. The imagery has a child-like illustration quality geared to appeal to elementary teachers. Figure #: Information graphic from Homepage

Figure 19: Top home page and scrolled down

Figure 20: Motion Graphic from homepage
Figure 21: Motion Graphic from homepage Continued
Script for motion graphic:

1. What is dyslexia? Dyslexia is a specific learning disorder that affects reading and the processing of words. The word Dyslexia derives from the Greek language, it literally means “difficulty with words”

2. The severity of dyslexia falls on a spectrum. While some may read slowly with great concentration others may struggle to decode even one syllable words. This however is not a sign of low intelligence; in fact Dyslexia is characterized by average to above average intelligence.

3. There is a common misconception that dyslexia results from a vision based impairment. However seeing or hearing the words is not the issue. The difficulty comes in the way these words are processed or manipulated in the brain.

4. Take the word ‘Hat’ by removing the H you are left with ‘at’ by add an ‘e’ to the end you now have ‘ate’. Dyslexics often struggle with this type of word manipulation.

5. Telling dyslexics to sound out the word they are trying to spell often will result in misspellings. Since English is not a phonetic language a writer must rely heavily on the visual memory of how a word is spelled, in addition to the sound. For example k, c, ck, and qu, all have similar sounds but result in very different spellings.

6. Dyslexics also take more time decoding words in order to process them. Larger words such as “Spectacular” need to be broken down “Spec • tac • u • lar”. This increase in decoding time also increases reading time. When anyone firsts learns
to read we rely more heavily on the right side of our brain. (Short version jumps to 15 for end)

Extended script for future implementation motion graphic (includes previous):

7. Well, you may have heard the term right brained and left brained before. Right/Left has been used in the past to signify differences such as creative versus logic based thinking or visual versus literal thinking. We now understand that as a gross oversimplification. More accurately, the Left side of the brain is responsible for Narrow Focused Attention on a known activity. While the right side of the brain remains Broadly Vigilant for important unknown information, as well as making connections with the world.

8. This distinction between broad or holistic right brain activity and narrow detailed oriented activity during reading shows the learning transition from a beginner to an expert. Since dyslexics tend to continue to rely more on the right side of their brain for processing this results in less ability to process known information quickly, resulting in the slower processing, or decoding time.

9. Other areas affected may include difficulty with learning to speak, organizing written and spoken language, memory, learning letters and their sounds, memorizing number facts, spelling, reading, learning a foreign language, or correctly doing basic math operations. Clearly dyslexia is vastly more complex than letter reversal or poor spelling.

10. While the continued reliance on both sides of the brain can make reading, writing, basic math or memory tasks difficult it also results in benefits.
11. Dyslexics tend to be right-brain dominant learners. With strengths in three
dimensionality, picture-based thinking, imagination, big picture thinking,
associative connections, and intuitive reasoning. They excel at higher level
thinking without getting lost in the details. The reliance on the right side of the
brain increases their ability to process visual information such as: quickly
understanding charts, graphs and diagrams. They will often also find diverse and
unique solutions to problems because of their ability to see many different
connections.

12. One reason Dyslexic students are able to make diverse and unique connections is
due to the physical structure of their brains. All our brains have columns of
neurons stacked on each other called mini columns. Dyslexics have more space
between these mini columns, which results in the connecting axons to spread out
farther. The structure of the brain results in diverse connections that allow
dyslexics to see things in a way others may miss. For instance dyslexics will often
think of the secondary definition of a word first instead of its more commonly
known definition. (crane= bird and piece of machinery)

13. These abilities may start to be considered a great advantage. As technology
increasingly relieves the rule based, basic mental tasks students will need to rely
more heavily on higher level thinking skills that cannot be programmed into a
computer.

14. Our classrooms may also start to undergo transformations. Due to advancements
in technology teachers no longer need to solely relying on traditional reading,
writing, and memorization to transfer knowledge. Classrooms will be able to
incorporate more hands on visual, kinesthetic, multisensory learning through virtual or augmented reality.

15. Since our current education system still relies heavily on traditional reading, writing, and memorization to transfer knowledge. Dyslexic students can often feel frustrated, and ashamed in the classroom. However, dyslexia does not mean a student is stupid, lazy or incompetent. It does mean they think in a different mode and struggle with detail oriented basic memorization tasks. Such as spelling, memorizing times tables or formulas. Providing support to overcome and compensate for these deficits will allow students to excel.

Figure 22: Final designs of website student page
Figure 23: Final designs of website student page
Figure 24: Dyslexic kitty learning style
Ununderstanding Dyslexia

A good way to understand dyslexia is to establish what it is not.
1. It is not a sign of low intelligence or laziness.
2. It is also not due to poor vision.
3. It is a common condition that affects the way the brain processes written and spoken language.

Dyslexia is primarily associated with trouble reading. Some doctors, specialists, and educators may refer to it as a reading disorder or a reading disability. But it can also affect writing, spelling, and even speaking. By Emily Lapin from understood.org

- Dyslexia often runs in families.
- About 40% of siblings of children with dyslexia may have the same reading issues.
- As many as 40% of parents of kids with dyslexia may have it too.
- Scientists have also found several genes associated with reading and language processing issues.
- Having dyslexia doesn’t mean you aren’t bright.
- Brains may look different from the brains of people who don’t have dyslexia.
- Right and left brain hemispheres are more equal in size.
- Most columns of neurons farther apart.
- Dyslexics use different brain circuits while actively reading.
- Higher reliance on the right hemisphere of the brain instead of the left.
- Behave are even at every step in processing.

Figure 25: What is dyslexia
Figure 26: Final designs of website teacher page
Understanding Dyslexia

A good way to understand dyslexia is to visualize what it
is not an sign of low intelligence or bitterness. It is also not
true to your vision. It is a common condition that affects the
way the brain processes written and spoken language.
Dyslexia is most commonly associated with trouble reading. Some
doctors, specialists, and educators may refer to it as a reading
disorder in reading disability. In our case, the dyslexia,
spelling, and reading disabilities. Dyslexia is one of the
most prevalent learning difficulties for children. The website
contains a wealth of information for educators and teachers.

Spotting Dyslexia in The Classroom

By: Sabina Belles, Special Education Specialist, Afterschool

Dyslexia is a learning disability that affects how
people read, write, and spell. The U.S. Department of Health and
Human Services estimates that between 15% and 20% of all children
in the U.S. have dyslexia. In some cases, it is undiagnosed,
which can lead to problems in school and beyond. Dyslexia can
be diagnosed by a professional who specializes in assessing
children's reading skills. Teachers should understand what dyslexia
is and be aware of the warning signs and refer a child for
evaluation if they believe a learning disability is present.

How To Talk to Parents About Dyslexia

By: Sabina Belles, Special Education Specialist, Afterschool

As a teacher, you may naturally find students with dyslexia
in your classroom. It is important to understand some of the signs
of dyslexia to support these students. When teaching a class,
consider the following strategies to support students with dyslexia:

1. **Provide a structured learning environment**: Create a
   supportive and organized classroom that helps students
   focus on the task at hand.
2. **Use visual aids**: Incorporate visual aids like charts,
   diagrams, and videos to help students understand
   complex topics.
3. **Offer individualized support**: Recognize that each
   student has unique needs and provide tailored support.

Dyslexia Teaching Techniques

A dyslexia-friendly classroom begins with a dyslexia-friendly
philosophy. First, your classroom map must be welcoming
for students with dyslexia. You can implement strategies
that benefit students with dyslexia:

- **Visual aids**: Use diagrams, charts, and videos to help
  students understand complex concepts.
- **Sustained attention**: Encourage students to
  maintain focus during lessons.
- **Vocabulary development**: Build students' vocabulary
  skills through meaningful language use.

RESOURCES

- Read with Dyslexia
  - Website: www.readwithdyslexia.org
  - Resources: www.readwithdyslexia.org/resources
- International Dyslexia Association
  - Website: www.ida.org
  - Resources: www.ida.org/resources

Figure 27: Final design of website teacher page full view
**Figure 28:** Final designs of website parent page
Figure 29: Final designs of website parent page full view
5.2. Future Research Goals

There is much research yet to be done in this area. This awareness campaign focused specifically on three user groups: teachers, parents, and students. While these groups are diverse in their needs and style, they still all revolve around the K-12 school
system. The campaign’s focus revolves around the student; spiraling out to the support system around them; showing how parents, and teachers can aid in teaching, preparing and supporting a dyslexic student. Future awareness campaigns should also be extended to adults with dyslexia. Particularly those who were undiagnosed in childhood and only recently have become aware of the issue. Dyslexia in the work place is a rarely discussed issue that affects just as many adults as children. Dyslexia is a life long condition, which means adults struggle with many of the same issues faced by dyslexic children in the classroom. Dyslexia is almost always discussed in the context of children. While awareness about dyslexia in children is critical for mediating traumatic life-long struggles, discussing the affects of adult dyslexia is also of high importance. Many adults still strongly feel the stigma they felt as children. This reluctance to discuss the root issue of dyslexia leads to adults not being able to ask for the help or accommodations needed to excel at their job.

Lack of awareness about dyslexia in the workplace can cause many issues. Dyslexia could potentially affect relationships with colleagues, earning potential, and layoff rate. Without an understanding of dyslexia some workers are branded as lazy, or placed in menial jobs due to the assumption that they are unintelligent. Dyslexics have a lot to offer companies in the way of creative thinking and problem solving. Often their strengths are overlooked in the workplace, while their struggles are pronounced.

One future research goal is to create a fully inclusive, modular, web based awareness campaign. This modular awareness campaign would be able to display targeted information for a specific user. The style and information displayed for a dyslexic second grader would obviously be different than the style and content displayed
for a high school teacher. The same goes for a recently diagnosed adult and an employer. This filtration of content would not prevent one user from accessing content seen by another user but would instead provide an initial target approach to awareness. This could be achieved by having a basic entry form to populate the appropriate content, and style.

Another future research goal is defining comprehensive style guides for designing with dyslexic users in mind. In order to define style guides studies to examine optimal type sizes, font choices, leading and line length may need to be conducted. Also looking at layout and placement of information on a website in particular. Various dyslexia advocacy groups have suggested some guidelines. However, more extensive testing done with a team of graphic designers and dyslexia experts seems to be missing. It is my educated opinion that while universal dyslexia guidelines could be created to increase website communication for dyslexic users; the most important guideline will be regulated customization. By designing a site that has certain customization features built in, as well as text to speech capabilities it will allow for a range of problem areas to be adjusted.

Keeping websites responsive so that information is always as readable as possible on all devices is also important. Some dyslexics find that extremely short line lengths improve comprehension and aid in uninterrupted saccades from one line to the next. In a study conducted in 2013 Schneps MH, Thomson JM, Chen C, Sonnert G, Pomplun M, evaluated the comprehension and speed of 103 dyslexic high school students. They tested a hand held e-reader (smartphone, iPod) against traditional paper. The short truncated text lines on the e-readers increased comprehension and speed in severely impaired phonological dyslexic readers (Schneps, Thomson, Chen, Sonnert, & Pomplun 2013).
Finally, another important consideration for web design for dyslexic users is the incorporation of multimodal forms of communication. Taking the same message and communicating it in several diverse ways can improve communication, making sure it can be graphically understood, read, and heard. To take it a step further, research should also look into kinesthetic interaction on websites through technology like the leap motion or Pinch VR (Pinch VR).

I would like to create an online, visual style guide of digital media for dyslexic users. Looking at all of the available existing studies on: line-length, font-size, leading, and font-type for dyslexic users, would give a starting point for guidelines. Basic guidelines would be constructed, and then user tested for validity. As mentioned before, many of these guidelines will most likely fall into a best practice range with no one specific answer. By providing these guidelines online they could be accessible to anyone who wanted to create digital content. Being aware of dyslexia is only the first step. If digital content is created with guidelines for dyslexic users in mind, usability and comprehension could be improved for a much larger audience.
CHAPTER 6. CONCLUSION

Currently there is a lack of dyslexia awareness graphics that would create deeper understanding past empathy. Designers partnering with psychologists and educators could create stronger information graphics and awareness campaigns. The creation of these graphics could have a monumental impact on dyslexics everywhere, from the elementary classroom to the workplace. Dyslexic individuals have a lot to offer; their development should be nurtured instead of cast aside as a lost cause. Having a support system in place can really define the success and emotional well being of a dyslexic individual.

6.1. Conclusion

This awareness campaign was designed based on the lack of knowledge about dyslexia in the general population, among educators, and even dyslexics themselves. The medium of a website was chosen to reach the broadest audience as well as make connecting to external resources simple. Social media was employed to help spread the message and drive traffic to the site. The site attempts to use design guidelines derived from the literature review as well as existing guidelines put forth by dyslexia advocacy groups. Finally the site also strives for a multimodal system of communication. Providing information graphics, video, and audio capabilities. (note: the actual text to speech function is currently not working on the live site due to the fact that it requires a paid subscription.)

The use of a website for the awareness campaign also allowed for one central location that could be styled differently for three separate user groups. Style choices such as font type, size, leading, and line length are the same throughout to optimize
readability. However some decisions were based per user group. The teacher page is the most text heavy of all the pages, with stylized graphics to support the article text. The graphics were done in the same illustration style as the information graphic.

The parents concern focuses on their specific child. This is reflected both in the content and style of the parent page. Images of parents and children are used to support the text. Less text is used on the parent page with more negative space between articles. Since dyslexia is genetic there is a high likelihood that the parent is also dyslexic. By leaving more open space and shorter intro text, sorting though the information becomes less intimidating.

The student page looks even more different from the teacher and parent pages. The student page was targeted at dyslexic middle school students. They are old enough to understand the information being presented on their own. Yet they have little incentive to read long articles of tedious text. The articles have been reworked into flow charts with minimum text and humorous illustrations. This cascading style of information is designed to draw a student in and keep their attention by breaking the text with imagery. The rough sketch style was used to create a feeling of doodling in class, creating a connection with the student, and avoiding the feeling of one more adult telling you what to do. Since the final web design was not usability tested, there are several areas that need to be examined in future research. When text is overlaid on an image or intermingled with imagery like in a graphic novel does the readability for a dyslexic individual decrease? On the flip side does the surrounding imagery off set the readability issue with increased comprehension?

As mentioned in the future research section this awareness campaign misses out on a huge chuck of affected dyslexics. The campaign was focused on students and their
support structure. Awareness about dyslexia also needs to be addressed at a much larger scale. Dyslexia in the workplace can be equally traumatizing as dyslexia in school. A support system for adult dyslexics could be equally important as it is for a young student. Many of the same issues are experienced because the root cause is the same. Just as a student needs the understanding of teachers and parents an adult needs the support of a partner, or friends, and employers. Below is a summary of future research goals.

6.2. Summary of future research

I plan on pursuing three main areas of future research. 1) The creation of a modular, adaptive, awareness campaign encompassing a larger user base. 2) Dyslexic friendly style guidelines for digital media. 3) Studying the affects of incorporating kinesthetic motion for dyslexic users. Do dyslexic users prefer gesture-based interfaces? Would incorporating gesture increase comprehension of information? These three areas have not been fully researched. Defining style guidelines for digital media becomes increasingly important as more print content transfers to the digital world. Increasingly schools are turning to ipads to replace notepads and textbooks. We have an opportunity to increase comprehension and improve learning outcomes by taking full advantage of digital media. If we simply transfer the print world exactly as it is to the digital we are missing a golden opportunity.

Style guidelines for optimal web communication for dyslexic users would improve communication. Not only for the large dyslexic population but communication for multi-lingual, young readers, non-neurotypical as well as typical readers could improve. Taking the research a step further by looking into interacting with websites
kinesthetically would also benefit multiple users including dyslexics. With the incorporation of new tracking technologies kinesthetic interaction have become possible. This research will increasingly become important as virtual reality and gesture-based interfaces are created.

In closing, awareness about dyslexia affects us all. Dyslexia is a common processing issue affecting all ages. Dyslexia is in the third grade and the boardroom. Dyslexic individuals’ unique way of processing information offers many benefits when it comes to problem solving or visualizing big data. Creative ways of thinking are imperative for innovation and advancement. Understanding dyslexia will prevent much frustration and allow dyslexics to contribute to the advancement of the future.
WORKS CITED


## 1. Have you ever taught/worked with a dyslexic student?

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>27</td>
<td>73%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>10</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>37</td>
<td>100%</td>
</tr>
</tbody>
</table>

### Statistic
- **Value**
  - Min Value: 1
  - Max Value: 2
  - Mean: 1.27
  - Variance: 0.20
  - Standard Deviation: 0.45
  - Total Responses: 37

## 2. How many known or suspected dyslexic students do you work with each year?

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>None</td>
<td>9</td>
<td>24%</td>
</tr>
<tr>
<td>2</td>
<td>1-5</td>
<td>25</td>
<td>68%</td>
</tr>
<tr>
<td>3</td>
<td>5-10</td>
<td>1</td>
<td>3%</td>
</tr>
<tr>
<td>4</td>
<td>10-20</td>
<td>2</td>
<td>5%</td>
</tr>
<tr>
<td>5</td>
<td>20</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>37</td>
<td>100%</td>
</tr>
</tbody>
</table>

### Statistic
- **Value**
  - Min Value: 1
  - Max Value: 4
  - Mean: 1.89
  - Variance: 1.89
  - Standard Deviation: 0.49
  - Total Responses: 37
3. Check any of the following issues you encountered while teaching/working with dyslexic students.

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>poor handwriting</td>
<td>20</td>
<td>65%</td>
</tr>
<tr>
<td>2</td>
<td>difficulty with spelling</td>
<td>28</td>
<td>90%</td>
</tr>
<tr>
<td>3</td>
<td>difficulty with reading</td>
<td>27</td>
<td>87%</td>
</tr>
<tr>
<td>4</td>
<td>difficulty following verbal instructions</td>
<td>2</td>
<td>6%</td>
</tr>
<tr>
<td>5</td>
<td>difficulty following written instructions</td>
<td>22</td>
<td>71%</td>
</tr>
<tr>
<td>6</td>
<td>difficulty copying notes (inaccurate or taking longer)</td>
<td>25</td>
<td>81%</td>
</tr>
<tr>
<td>7</td>
<td>turning in work late or incomplete</td>
<td>16</td>
<td>52%</td>
</tr>
<tr>
<td>8</td>
<td>fearful of reading out loud</td>
<td>16</td>
<td>52%</td>
</tr>
<tr>
<td>9</td>
<td>fearful of writing on the board</td>
<td>15</td>
<td>48%</td>
</tr>
<tr>
<td>10</td>
<td>goes to great lengths to hide areas of deficiency from peers and adults</td>
<td>18</td>
<td>58%</td>
</tr>
<tr>
<td>11</td>
<td>Other, Please specify below</td>
<td>3</td>
<td>10%</td>
</tr>
</tbody>
</table>

Statistic | Value
---|---
Min Value | 1
Max Value | 11
Total Responses | 31

4. If other, Please specify

Text Response
One parent refused to tell their child that the child is dyslexic because the parent also has dyslexia and doesn't want the child to be labeled. As teachers, we were not allowed to discuss the child's condition with the child (who was 15 years old).

- placing words in the incorrect order on typed papers
- unwilling to share/speak in class discussions
- can be angry with self or others
### 5. What measures if any were taken to aid dyslexic students?

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Given extra test time</td>
<td>32</td>
<td>100%</td>
</tr>
<tr>
<td>2</td>
<td>given Less spelling questions</td>
<td>14</td>
<td>44%</td>
</tr>
<tr>
<td>3</td>
<td>given typed versions of the notes</td>
<td>24</td>
<td>75%</td>
</tr>
<tr>
<td>4</td>
<td>other – Please specify</td>
<td>9</td>
<td>28%</td>
</tr>
</tbody>
</table>

### 6. If other – please specify

- Allowance to take tests orally
- Hands on (tactile) spelling aides
- Given Essay Tests Orally to Student
- talked with the student about what they meant by their writing not what they wrote
- testing completed in an alternative location, audio assistance with reading, testing done on iPad to allow them to manipulate the print
- written assignments are dictated by student and written by teacher
- Given alternate assignments with extra support.
- Read tests- homework, daily directions etc.
- tests read aloud
- Tests read to them, use of assistive technology such as text to speech, use of an iPad.
- Tests read aloud. No "bubble sheets" used for testing.
- Spelling didn't count in areas other than spelling
### 7. Do you feel that you know enough about dyslexia?

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>3</td>
<td>8%</td>
</tr>
<tr>
<td>2</td>
<td>Not sure</td>
<td>9</td>
<td>24%</td>
</tr>
<tr>
<td>3</td>
<td>No</td>
<td>25</td>
<td>68%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>37</td>
<td>100%</td>
</tr>
</tbody>
</table>

#### Statistic

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Responses</td>
<td>37</td>
</tr>
<tr>
<td>Min Value</td>
<td>1</td>
</tr>
<tr>
<td>Max Value</td>
<td>3</td>
</tr>
<tr>
<td>Mean</td>
<td>2.59</td>
</tr>
<tr>
<td>Variance</td>
<td>0.41</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.64</td>
</tr>
<tr>
<td>Total Responses</td>
<td>37</td>
</tr>
</tbody>
</table>
8. What sort of resources are available to you if you suspect a student is dyslexic?

**Text Response**

Access to a guided study room for the students during testing and free periods
The Iowa AEA's are a great source of support in man power and materials.
Guided Study
GWAEA psychologist, reading resource teacher
Guided Study Teacher
The only additional resources we receive are ones that the parent provides, if they feel the need to share various students or doctor's notes with us personally.
I personally am aware of tutors trained in Orton-Gillingham; the U of I is very close to us.
The internet
parents
GWAEA, online information
I don't know
virtually none
Grantwood AEA
Child Study support with guidance counselor, Grant Wood staff
a resource teacher
The internet.
I go to our Grantwood AEA resources
GWAEA resources, internet info
I have had training in the Orton-Gillingham method of working with dyslexic students, but other than that, very little is available from the school.
Internet
Students usually have a 504 Plan with accommodations listed. Our AEA Speech/Language person is also an assistive technology expert.
GWAEA Resources
GrantWood AEA
School counselors would provide info.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Responses</td>
<td>24</td>
</tr>
</tbody>
</table>

9. Do you feel parents have access to information about dyslexia?

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>12</td>
<td>32%</td>
</tr>
<tr>
<td>2</td>
<td>Not Sure</td>
<td>21</td>
<td>57%</td>
</tr>
<tr>
<td>3</td>
<td>No</td>
<td>4</td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>37</td>
<td>100%</td>
</tr>
<tr>
<td>Statistic</td>
<td>Value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min Value</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max Value</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>1.78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variance</td>
<td>0.40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.63</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Responses</td>
<td>37</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**10. Do you feel the information parents are getting is sufficient?**

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>5</td>
<td>14%</td>
</tr>
<tr>
<td>2</td>
<td>Not Sure</td>
<td>23</td>
<td>66%</td>
</tr>
<tr>
<td>3</td>
<td>No</td>
<td>7</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>35</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min Value</td>
<td>1</td>
</tr>
<tr>
<td>Max Value</td>
<td>3</td>
</tr>
<tr>
<td>Mean</td>
<td>2.06</td>
</tr>
<tr>
<td>Variance</td>
<td>0.35</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.59</td>
</tr>
<tr>
<td>Total Responses</td>
<td>35</td>
</tr>
</tbody>
</table>

**11. Do you think students with dyslexia are currently being assisted adequately?**

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>6</td>
<td>17%</td>
</tr>
<tr>
<td>2</td>
<td>Not sure</td>
<td>21</td>
<td>58%</td>
</tr>
<tr>
<td>3</td>
<td>No</td>
<td>9</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>36</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min Value</td>
<td>1</td>
</tr>
<tr>
<td>Max Value</td>
<td>3</td>
</tr>
<tr>
<td>Mean</td>
<td>2.08</td>
</tr>
<tr>
<td>Variance</td>
<td>0.42</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.65</td>
</tr>
<tr>
<td>Total Responses</td>
<td>36</td>
</tr>
</tbody>
</table>
12. If no, what could be improved?

Text Response

More trained staff
I am not sure, I just feel that we are doing a disservice to them!
Better ways to test and document; more accommodation options that adjust for how it is accomplished rather than lessen the quantity of things
Awareness of signs for detecting it. I could have dyslexic students but if they are not aware or if they don't tell me, how do I know.
Teacher training
specific information as to what teachers can do to help diagnosis
If we know about it...
a few teachers are not willing to go out of their way to make accommodations
As a private school, we do not offe special education services. We can make classroom accommodations, but we do not have specialized instruction for students with learning disabilities.
I think whatever it takes to make dyslexic student feel comfortable is necessary.

13. What age range do you work with?

<table>
<thead>
<tr>
<th>#:</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Preschool</td>
<td>1</td>
<td>3%</td>
</tr>
<tr>
<td>2</td>
<td>Elementary</td>
<td>6</td>
<td>17%</td>
</tr>
<tr>
<td>3</td>
<td>Middle School</td>
<td>14</td>
<td>39%</td>
</tr>
<tr>
<td>4</td>
<td>High School</td>
<td>16</td>
<td>44%</td>
</tr>
<tr>
<td>5</td>
<td>Higher Education</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

Statistic | Value
---|---
Total Responses | 36

Statistic | Value
---|---
Min Value | 1
Max Value | 4
14. Have you ever received specialized training to work with dyslexic students?

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>5</td>
<td>14%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>30</td>
<td>86%</td>
</tr>
</tbody>
</table>

Statistic

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min Value</td>
<td>1</td>
</tr>
<tr>
<td>Max Value</td>
<td>2</td>
</tr>
<tr>
<td>Total Responses</td>
<td>35</td>
</tr>
</tbody>
</table>

15. What type of technology do you currently use in the classroom?

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Smart boards</td>
<td>14</td>
<td>39%</td>
</tr>
<tr>
<td>2</td>
<td>Computers</td>
<td>29</td>
<td>81%</td>
</tr>
<tr>
<td>3</td>
<td>Tablets</td>
<td>23</td>
<td>64%</td>
</tr>
<tr>
<td>4</td>
<td>Virtual Reality</td>
<td>1</td>
<td>3%</td>
</tr>
<tr>
<td>5</td>
<td>Augmented Reality</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>6</td>
<td>Other, specify</td>
<td>1</td>
<td>3%</td>
</tr>
</tbody>
</table>

Statistic

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min Value</td>
<td>1</td>
</tr>
<tr>
<td>Max Value</td>
<td>6</td>
</tr>
<tr>
<td>Total Responses</td>
<td>36</td>
</tr>
</tbody>
</table>

16. What other technology do you currently use in the classroom?

Text Response

iPads
We are a 1:1 iPad school and I use my Apple TV and MacBook Pro on a daily basis.
Graphing calculators an iPads
elmos
Apple TV

Statistic

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Responses</td>
<td>5</td>
</tr>
</tbody>
</table>
17. What type of technology would you like to implement in your classroom to improve learning for dyslexic students?

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Smart boards</td>
<td>8</td>
<td>31%</td>
</tr>
<tr>
<td>2</td>
<td>Computers</td>
<td>6</td>
<td>23%</td>
</tr>
<tr>
<td>3</td>
<td>Tablets</td>
<td>11</td>
<td>42%</td>
</tr>
<tr>
<td>4</td>
<td>Multisensory interfaces (include tactile, kinesthetic, visual and auditory feedback)</td>
<td>20</td>
<td>77%</td>
</tr>
<tr>
<td>5</td>
<td>Virtual Reality</td>
<td>3</td>
<td>12%</td>
</tr>
<tr>
<td>6</td>
<td>Augmented Reality</td>
<td>1</td>
<td>4%</td>
</tr>
<tr>
<td>7</td>
<td>Other, specify</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

Statistic Value

Min Value | 1
Max Value | 6
Total Responses | 26

18. What other technology would you like to implement in your classroom to improve learning for dyslexic students?

Text Response

Free versions of audiobooks would be helpful.

Statistic Value

Total Responses | 1

19. Do you feel Dyslexic students learning would be improved if they had access to a multisensory interface with tactile, kinesthetic, visual and auditory feedback?

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>25</td>
<td>69%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>3</td>
<td>Not Sure</td>
<td>11</td>
<td>31%</td>
</tr>
</tbody>
</table>

Total 36 100%
<table>
<thead>
<tr>
<th>Statistic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min Value</td>
<td>1</td>
</tr>
<tr>
<td>Max Value</td>
<td>3</td>
</tr>
<tr>
<td>Mean</td>
<td>1.61</td>
</tr>
<tr>
<td>Variance</td>
<td>0.87</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.93</td>
</tr>
<tr>
<td>Total Responses</td>
<td>36</td>
</tr>
</tbody>
</table>

20. I would be interested in viewing the finished campaign. Please contact me again with a link to the finished website.

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>12</td>
<td>36%</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>21</td>
<td>64%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>33</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min Value</td>
<td>1</td>
</tr>
<tr>
<td>Max Value</td>
<td>2</td>
</tr>
<tr>
<td>Mean</td>
<td>1.64</td>
</tr>
<tr>
<td>Variance</td>
<td>0.24</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.49</td>
</tr>
<tr>
<td>Total Responses</td>
<td>33</td>
</tr>
</tbody>
</table>
APPENDIX B

IRB EXEMPT FORM

Date: 10/7/2014
To: Laura Huisinga
158 Design

From: Office for Responsible Research

Title: Focus Group: Dyslexia at Different Levels of Education

IRB ID: 14-519

Study Review Date: 10/7/2014

The project referenced above has been declared exempt from the requirements of the human subject protections regulations as described in 45 CFR 46.101(b) because it meets the following federal requirements for exemption:

- (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey or interview procedures with adults or observation of public behavior where
  - Information obtained is recorded in such a manner that human subjects cannot be identified directly or through identifiers linked to the subjects; or
  - Any disclosure of the human subjects’ responses outside the research could not reasonably place the subject at risk of criminal or civil liability or be damaging to their financial standing, employability, or reputation.

The determination of exemption means that:

- You do not need to submit an application for annual continuing review.
- You must carry out the research as described in the IRB application. Review by IRB staff is required prior to implementing modifications that may change the exempt status of the research. In general, review is required for any modifications to the research procedures (e.g., method of data collection, nature or scope of information to be collected, changes in confidentiality measures, etc.), modifications that result in the inclusion of participants from vulnerable populations, and/or any change that may increase the risk or discomfort to participants. Changes to key personnel must also be approved. The purpose of review is to determine if the project still meets the federal criteria for exemption.

Non-exempt research is subject to many regulatory requirements that must be addressed prior to implementation of the study. Conducting non-exempt research without IRB review and approval may constitute non-compliance with federal regulations and/or academic misconduct according to ISU policy.

Detailed information about requirements for submission of modifications can be found on the Exempt Study Modification Form. A Personnel Change Form may be submitted when the only modification involves changes in study staff. If it is determined that exemption is no longer warranted, then an Application for Approval of Research Involving Humans Form will need to be submitted and approved before proceeding with data collection.

Please note that you must submit all research involving human participants for review. Only the IRB or designee may make the determination of exemption, even if you conduct a study in the future that is exactly the same study.

Please be aware that approval from other entities may also be needed. For example, access to data from private records (e.g., student, medical, or employment records, etc.) that are protected by FERPA, HIPAA, or other confidentiality policies requires permission from the holders of those records. Similarly, for research conducted in institutions other than ISU (e.g., schools, other colleges or universities, medical facilities, companies, etc.), investigators must obtain permission from the institution(s) as required by their policies. An IRB determination of exemption in no way implies guarantees that permission from these other entities will be granted.

Please don't hesitate to contact us if you have questions or concerns at 515-294-4566 or IRB@iastate.edu.