

A BRAIN DIFFERENCE: ACKNOWLEDGING THE COMPLEXITIES OF DYSLEXIA

A CREATIVE PROJECT

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## Introduction

I was diagnosed with dyslexia in the 7th grade. Receiving a diagnosis at age 12 was both a relief and scary, but my parents and I were fairly certain that having a name for my struggles was better than not having one. Throughout school I became accustomed to attending the resource classroom for extra help with studying, homework, and tests. It took a lot of patience and research, but I have grown to accept, embrace and understand dyslexia. Throughout my life and research I have discovered dyslexia and its complexities.

According to The Yale Center for Dyslexia and Creativity, dyslexics comprise one fifth of the population (Shaywitz, 2003). The National Institute of Child Health and Human Development (NICHD) uses the following definition to describe dyslexia:

Dyslexia is a specific learning disability that is neurobiological in origin. 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 (as cited by Eide & Eide, 2012, p. 8).

Some see this as a “shrinking definition” because it only defines the challenges experienced by dyslexics and does not offer any context to help understand skills dyslexics often have because of their processing difference (Williams & Casanova, 2010; Eide & Eide, 2012). The Yale Center for Dyslexia and Creativity points out that the difficulties presented by dyslexia do not connect to one's intelligence. They explain that dyslexia is an unexpected reading difficulty presented in an individual who has the intelligence to be a much stronger reader (Yale Center for Dyslexia and Creativity, n.d.). Eide & Eide (2012) argue that dyslexia should be looked at as a learning or processing style rather than a learning disorder. They argue dyslexics have certain talents and abilities that are a direct product of their brain difference.

The advantages dyslexics may experience include making creative connections between concepts, recognizing unusual relationships, strengths in big picture processing, and strengths in material, interconnected, narrative, and dynamic reasoning (Eide & Eide, 2012). While these researchers acknowledge both the challenges and advantages of dyslexia, much of the general population see it only as a disability. The advantages are often dismissed, misunderstood, or unrecognized. Common definitions of dyslexia are too narrow, dismissing the complexities of this processing difference.

I will address this problem space using design thinking methods. Design thinking is a five-step iterative problem solving process used to design solutions based on a

user's needs (“Design Thinking: A Method for Creative Problem Solving,” 2018). During the empathy research stage, I conducted interviews and analyzed their results using empathy mapping. Interview participants included both dyslexic individuals and dyslexia supporters. Results of the interviews identified four key challenges when discovering dyslexia:

1. Receiving a diagnosis of dyslexia is overwhelming — it takes time to accept.
2. Open conversation about this learning difference should be more common.
3. It is better to receive a diagnosis earlier as opposed to finding out you have dyslexia later in life.
4. Individuals have more awareness of the challenges of dyslexia and little awareness of its advantages.

Through the design thinking process, I determined that information regarding dyslexia would be best presented using transmedia storytelling. Transmedia storytelling is a technique that uses multiple media forms and media channels to create a narrative. Media forms and channels are used to deliver separate stories that, when experienced together, create a collective and immersive experience (Jenkins, 2007).

This project will include a blog and speaker series. These experiences will implement transmedia storytelling and design thinking methods to showcase four points about dyslexia: its commonality, its complexity, its challenges, and its advantages. The

goal of this project is to help individuals with dyslexia better understand themselves, guide them as they learn to persevere through their challenges, and capitalize on their dyslexic advantages. In addition, this project seeks to provide educators, parents, and peers a resource to better understand the processing differences of affected individuals.

It is important this research be presented in a manner that allows individuals with dyslexia the ability to best understand and implement its results. Presenting written information in a way that works best for dyslexics allows these individuals to comprehend the research and its outcome more quickly and fully. Having that understanding also provides the opportunity to take an active role in the conversation about their own processing difference. Making this research dyslexia-friendly shows that there are alternative ways of information-comprehension.

To make this research dyslexia-friendly (Stacey, 1997), it has been written using:

- A sans-serif font
- Short paragraphs when possible
- A spare line between each paragraph
- More punctuation than non-dyslexic people find necessary
- Hyphens used to make compound nouns, even when the common spelling of the compound noun does not use the hyphen
- Colloquial contractions such as 'don't' for 'do not'
- Numbers in digit form instead of words
- And page numbers for references when possible

In addition to a dyslexia-friendly writing method, it is important to address how dyslexia will be referenced throughout this research. Different terms are often used to refer to dyslexia. Early research most commonly refers to dyslexia as a specific learning disability. Recently, both individuals in the dyslexia-community and academics have begun to refer to it as a learning difference, processing difference, or brain difference. Depending on the source being cited, dyslexia may be referred to by any one of these terms. This project looks at both the challenges and advantages of dyslexia and focuses on encouraging others to view dyslexia in a more complex way than only for its drawbacks. The terms learning difference, processing difference, and brain difference align best with this projects goals and will be used most frequently.

This project explores and communicates the complex challenges and advantages of dyslexia. Its goal is to create content that explains the processing difference and its complexities. It also empowers and encourages individuals with dyslexia to be open about their experiences and accept their brain difference.

## Literature Review

### Dyslexia

Dyslexia is defined as a “Specific Learning Disability” that presents difficulties with accurate and fluent word recognition, language encoding and decoding, and problems with reading comprehension. Although these are the most common and well known challenges of dyslexia, by only recognizing these challenges the overall complexity of dyslexia is dismissed. Many do not realize dyslexics often also have trouble with a variety of other things. According to Eide & Eide (2012, p.22), these other challenges include:

- processing speed
- motor coordination
- mishearing and difficulty hearing in background noise
- visual function of near work
- following directions
- keeping information in their mind (working memory)
- planning and organization
- error detection
- time awareness and pacing
- sequencing
- mental focus and attention

- developing a sense of direction such as left and right, or north, south, east, and west

All of these findings can be traced back to four variations of brain structure and function associated with dyslexia. These differences include phonological processing, procedural learning, differences in the use of the right brain, and unusually broad spacing between the functional clusters of neurons.

Phonological processing, or the processing of word sounds, is the most frequently referenced brain variation of dyslexia. Many symptoms of dyslexia are attributed to phonological processing difficulties (Eide & Eide, 2012, p. 23). Skills used for phonological processing are needed for the foundation of language and language processing because it plays a role in analyzing and manipulating the sound structure of words. This brain variation affects reading fluency and comprehension, as well as decoding (sounding out words) and encoding (spelling words). In addition to the many symptoms of dyslexia, there are several related diagnoses that can accompany dyslexia: dysgraphia (difficulty writing and forming letters), dyscalculia (difficulty comprehending mathematical concepts), and dyspraxia (a speech disability where the area of the brain responsible for telling muscles how to move correctly to pronounce words is impaired).

Procedural learning is the process of learning how to do something so well that eventually the process of completing a certain task becomes automatic (Eide & Eide,

2012, p. 26). For dyslexics, the process of learning to apply complex rules is challenging. When looking at basic academic skills one can see that many are rule- and procedure-dependent. Academic skills that require the application of procedures include:

- differentiating word sounds
- learning the rules of phonics
- spelling
- recognizing word forms (morphology)
- interpreting sentence organization of meaning (syntax)
- recognizing language style and pragmatics
- mathematics
- handwriting

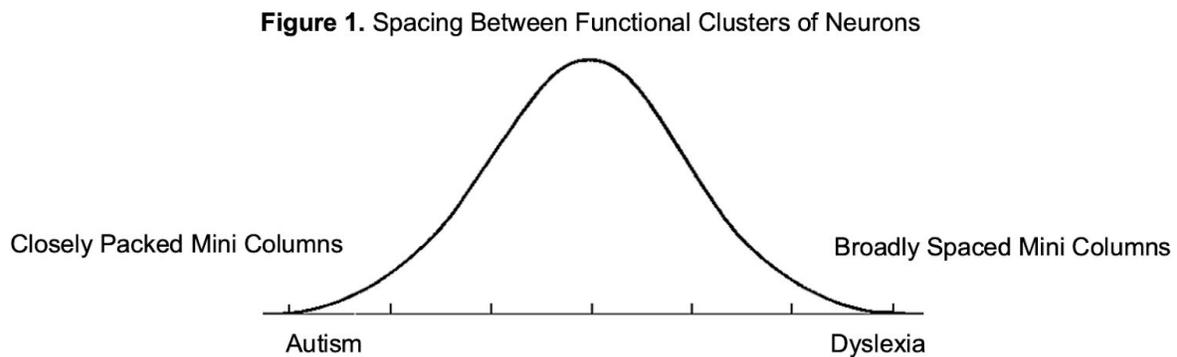
Procedural learning also includes learning sequences like the alphabet, days of the week, months of the year, and punctuation rules (Eide & Eide, 2012, pg. 27). Because dyslexics struggle with procedural learning it takes these individuals longer to get through a process. Fawcett (2010, pg. 369) refers to this as the *square root rule*, meaning it takes the square root longer for a dyslexic to learn something than it takes for someone who is not dyslexic.

Scientists have found that dyslexics use the right hemisphere of the brain for reading more extensively than non-dyslexics (Eide & Eide, 2012). Shaywitz and Shaywitz (1998) used fMRI to scan dyslexics' brains while they read to see which areas

of their brains were most active. Turkeltaub, et al., (2003) found that most beginning readers use both hemispheres of the brain heavily as they learn to read. However, non-dyslexics eventually shift to the left-side processing circuit — or to expert processing — when dyslexics do not. The right-hemisphere of the brain is the big picture processing hemisphere that recognizes the overall point of the task we are learning, and how it is similar to something we have learned in the past. It helps us solve problems and fill in details we miss (Eide & Edie, 2012, pp. 33). The left hemisphere has strengths in accuracy, efficiency, speed, and automaticity and allows one to pinpoint details and develop expertise at a skill. The left hemisphere recognizes the primary meaning of a word while the right hemisphere recognizes the secondary meaning such as its relationship to other words or synonyms and alternative definitions, figurative, humorous, or ironic connections (Jung-Beeman, 2005). The right hemisphere makes connections and is good for metaphors, jokes, inferences, stories, social language, ambiguities, or inconsistencies. Research suggests the ability to make the shift from using their right brain to their left brain is more challenging for dyslexics. When developing a new skill it is harder for that skill to become a habit or be mastered.

During his research of the cell-to-cell connections of the human brain, Dr. Casanova (Williams & Casanova, 2010) found that the dyslexic brain has unusually broad spacing between functional clusters of neurons in the brain's cortex. The cell-to-cell connections that link neurons are most responsible for information processing in the human brain (Eide & Eide, 2012). This key difference in a dyslexic

brain also relates to its right brain cognitive style. In his research, Casanova began to reveal how the spacing of neurons varied among individuals with certain brain differences such as dyslexia or autism. For the total population, the spacing of an individual's mini columns can be presented as a bell curve, with the left end (Figure 1) representing individuals with closely packed minicolumns and the right end representing individuals with broadly spaced minicolumns. Individuals with autism would fall on the left end of the bell curve where closely packed minicolumns are represented. Dyslexic individuals fall on the opposite end, or where broadly spaced minicolumns are represented. Close connections align with the processing skills of the left brain (detail, speed, accuracy, and automaticity). Broadly spaced minicolumns align with the processing skills of the right brain (context, problem solving, making insightful connections, and perceiving relationships).



*Figure 1.* Bell curve representation of the spacing of neurons in the brain and how they vary for individuals with certain brain differences such as dyslexia or autism.

A broad variety of symptoms, and each dyslexic experiencing those symptoms differently, makes defining and classifying this brain difference one of the greatest challenges dyslexia research (Kalyvioti, 2014).

### **Advantages of Dyslexia**

Brock and Fernet Eide (2012) discuss the innate talents possessed by dyslexics, or the “MIND strengths.” This acronym represents Material, Interconnected, Narrative, and Dynamic reasoning. These strengths are the result of the brain variation, the unusually broad spacing between the functional clusters of neurons. Eide & Eide note that this variation in the brain could predispose individuals to many of the challenges and strengths that are associated with dyslexia. It supports the idea that dyslexia is not a purposeless breakdown in function, but that it represents a valuable trade-off that has been chosen for its special processing benefits (pg. 41). The presence, intensity and trade-offs of the MIND strengths vary for each dyslexic.

**Material reasoning.** The ‘M’ in MIND stands for material reasoning. Dyslexics with the strength of material reasoning have a specific understanding of the physical or material world and are able to reason with the shape, size, motion, position, or orientation in space of physical objects, as well as the ways those objects interact (p. 49). This allows individuals to easily manipulate three-dimensional environments in their mind. The compromise from material reasoning is difficulty with two-dimensional processing. This results in reversing symbols while reading and writing.

**Interconnected reasoning.** The 'I' strength gives dyslexics the exceptional ability to spot connections between different objects, concepts, or points of view (p. 83). Dyslexics with interconnected reasoning are excellent problem solvers because they can view the problem using alternative approaches. They are also able to combine different types of information to create one unified big-picture or global view (p. 83). The trade-offs of interconnected reasoning include difficulties with speed, accuracy, reliability, and precision. These types of challenges may cause problems during standardized or IQ tests. Another trade-off of interconnected reasoning is individuals struggling with switching perspectives, such as 1st, 2nd, and 3rd, person perspectives, unknowingly while writing, organizing, and alphabetizing.

**Narrative reasoning.** The 'N' strength gives dyslexics 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 (p. 114). These individuals will often think and convey information in story form. One of the trade-offs of this strength is the tendency to have a much stronger episodic memory than a semantic memory, and a weakness in procedural memory.

**Dynamic reasoning.** The 'D' strength allows dyslexics to accurately predict past or future states using episodic simulation. These strengths are especially valuable for thinking about past or future states whose components are variable, incompletely

known, or ambiguous. The 'D' strength can help an individual make practical, or 'best-fit,' predictions or working hypotheses in settings where precise answers aren't possible (p. 143). An individual with dynamic reasoning strengths uses narratives created from episodic memory to accurately predict future events, reconstruct past events they did not witness, or solve new problems. Dynamic reasoning requires a lot of quiet reflection and relaxing into one's work, which can often look like goofing off to others. This is one of the trade offs of this strength. Time to reflect is often in short supply in schools and at work. However, reflecting is a valid problem solving technique (p.143).

**Empathy.** One other strength that dyslexics typically share, even though their other strengths and weaknesses vary, is empathy (Saltz , 2018, p. 37). It's impossible to pinpoint how much of the sensitivity evident in many people with dyslexia is rooted in having suffered with a learning disability, versus being a product of divergent thinking (p. 38). It is argued that individuals who experience a brain difference such as dyslexia are able to empathize and relate to the struggles of others because they understand the feelings of being different. These individuals are also able to see the 'big picture' and not focus on the minute details that make someone different. Rather, they can see the advantages in another individuals' challenges because they had to learn to see the advantages in their own.

## Storytelling and Transmedia Storytelling

According to psychologist Dr. Daniel Paolinelli (as cited in Miller, 2014, p. 5), the human ability to connect past, present, and future through narrative gives humans a unique advantage over other organisms. It allows us to predict future events based on what has happened in the past, helps us strategize, and helps us understand each other and behave in a way that is advantageous to us. There is no other form of human communication that allows us to do this. Stories not only connect us to the past, present, and future but, allow us to make connections with others. Annette Simmons (2006, p. 29), explains that a story can mold perceptions and touch the unconscious mind. When we listen to people tell stories we are constantly evaluating not only the story, but the person who is telling it. Through the stories people tell, we can persuade others to see a situation from our point of view or get insight into someone's character. Stories are also told because they have the ability to inspire action. Steve Denning explains story's ability to inspire in his article about the science of storytelling. He writes, "Prose remains unread. Reasons don't change behavior. When it comes to inspiring people to embrace some strange new change in behavior, storytelling isn't just better than the other tools. It's the *only* thing that works" (Denning, 2012).

Throughout human history, Rose, et al. (2011) note, storytelling has been used to explain the wonders of nature, share religious and spiritual teachings, to entertain, and to survive. History is shared through storytelling. We use stories to make sense of our

world and to share that understanding with others. In the 20th Century, the mass media consisted of newspapers, magazines, movies, music, and TV. The rise of the internet changed the consumer's role from passive consumer to active consumer. The internet allows for nonlinear, participatory, and immersive stories to be told (Rose, et. al., 2011). Consumers not only take in the stories created and shared by others, but they are also encouraged to comment and contribute.

Over time, storytelling has evolved with changes in technology creating new and innovative storytelling methods. One of these innovative methods is transmedia storytelling. Transmedia storytelling (also known as transmedia narrative or multiplatform storytelling), is a technique of telling a story across multiple media forms and channels. Jenkins (2007) defines transmedia storytelling as “a process where integral elements of a fictional universe get dispersed systematically across multiple delivery channels for the purpose of creating a unified and coordinated entertainment experience where each medium makes its own unique contribution to the unfolding of the story.” Transmedia storytelling has influenced academia, media arts, advertising, and marketing. It can involve media such as blogs, websites, video games, merchandise, books, movies, and live events. Each element of a transmedia story should be able to stand alone while also adding a different piece to a more complete storyworld when all are experienced together. Different parts of a story unfold across various platforms, allowing an audience to make choices about what parts of the story to engage with, and how, and when they do it (Heilemann, Soderlund, Kehoe, Brecht,

2017). Allowing audiences to make their own choices about which pieces of a story network they consume is what makes this form of storytelling so engaging. The different stories from the same story-world are spread across various platforms which encourages the audience to engage with the story in multiple locations.

The variety of platforms available allow many options for presenting a story as well as many opportunities for individuals to engage and contribute to content in ways most enjoyable for them. The ability to present a story in a variety of ways on multiple platforms provides the opportunity to simplify complex concepts. Jenkins (2010) notes that we live in a transmedia, globally connected world in which we use multiple media to communicate.

## Project Design

This project used design thinking activities to collect and analyze research, empathize with the target audience, ideate, and prototype design solutions for the problem space. The empathy research stage of the project included interview preparation, empathy interviews, and empathy mapping.

Interview participants were previously diagnosed with dyslexia, or were educators, parents, or guardians of individuals with dyslexia. All participants were over the age of 18. Note that throughout the rest of this paper, I refer to parents and educators of individuals with dyslexia as individuals who support dyslexics. The first attempt to contact individuals who have dyslexia for interviews was done through an email to the University Disabilities Services Office. To ensure participant privacy, the office sent this email to documented dyslexics on the Universities campus. This method returned no responses.

A second email was sent to individuals in the dyslexia community with whom I have connected as a person with dyslexia. Participants consisted of distant social connections, individuals recommended by others, and my network of connections within the community of people who have or are familiar with dyslexia. All interviewees were contacted via email and were interviewed in a location agreed upon by myself and the interviewee or by using a digital method such as Skype and Google Hangouts. Each

interview lasted less than one hour and was conducted in an informal and conversational manner. The participant was reminded that answers to all questions were optional, the information shared would remain anonymous and would not be viewed by anyone else, and that interview notes and audio recordings would be stored securely. After each interview, the interviewee and their responses were referred to by a reference number for the duration of the project. Each interviewee was reminded that he or she could withdraw from the study at any time, and his or her data would be removed from the study.

In order to conduct productive interviews, I went through a preparation stage (Plattner, 2017) where I determined who would be interviewed and the questions to ask interviewees. Since some participants had dyslexia, and some did not, the questions varied slightly between interviews. All questions were drafted and edited multiple times to make sure they were clear and concise. It was important to enter each interview prepared because not only was there a limited amount of time to meet with each participant, but the topics discussed had the potential to be sensitive. It was important to make sure participants felt comfortable being open about their experiences.

Each interview was conducted based on the interview for empathy model (Plattner, 2017). Interviewing for empathy enables a individual to understand the thoughts and emotions of their interviewee so they can innovate for that individual's needs. This method requires the interviewer to make sure the interviewee expresses

everything they are thinking by always asking why, never suggesting answers to questions, and encouraging the sharing of stories. The interviewer must also pay attention to nonverbal cues, be comfortable allowing moments of silence during the conversation, only ask one question at a time, and be prepared to capture answers. By sticking to this method throughout my interviews, I was able to better understand the experiences of the participants and identify the needs of my audience. The purpose of the interviews was to understand the different experiences and perceptions of individuals who have dyslexia or support individuals with dyslexia. It was important that I collected a variety of perspectives and recognize that all individuals experiences are unique.

After conducting each interview, the next step was to analyze and compare the participant's responses. This was done using empathy maps. Empathy maps help synthesize observations and draw out unexpected insights (Plattner, 2017). An empathy map was created for each interview, and then, a final empathy map was made to compare responses across all interviews. The first step of empathy mapping is to unpack. In a four-quadrant layout, the findings from the interviews were sorted into the quadrants with categories say, do, think, and feel (Figure 2).

Quadrant 1 contains important quotes and defining

**Figure 2.** Empathy Map

Say	Do
Think	Feel

*Figure 2.* Example layout of an empathy map. Empathy maps are used to unpack the thoughts, emotions, actions, and words of an individual. This method helps one empathize with their audience or client allowing them to understand and design for the individual's needs.

words that were said during the interview. Quadrant 2 is where any actions or behaviors the interviewer noticed during the conversation are recorded. In quadrant 3, the interviewer records anything they believe the interviewee may have been thinking during the interview. Quadrant 4 is where any emotions the interviewee may have felt during the interview are recorded.

After unpacking the results of the interview into an empathy map, themes were identified and compared in order to determine the needs of the prospective audience. Understanding the needs of the audience allows the designer to prototype the most useful solution. As stated earlier, the empathy mapping process was repeated with the results from each interview and once with the results of all the interviews collectively.

### **Empathy Research Results**

I determined during the interview preparation stage that interviewing individuals with different connections to dyslexia would be valuable to the project. For example, someone with dyslexia has a different perception of the learning difference than would a parent raising a child or a teacher working with a student. It was important that I find ways to represent all viewpoints and experiences. Including different points of view also makes the research and content created from that research relatable to all types of people affected by dyslexia.

During the empathy research stage, I conducted a total of 10 interviews.

Interview 1 was with a newly graduated masters student who has entered the workforce and was diagnosed with dyslexia as a child. Interview 2 was an adult woman who is very successful in her career and has dyslexia. Interview 3 was with a mother of a dyslexic child who is also a trained and certified tutor for individuals with dyslexia. Interview 4 was with my own mother who learned while working through raising a dyslexic child that she likely also is dyslexic. Interview 5 was with a mother of a child with dyslexia and a dyslexia tutor in training. Interviews 6 and 7 were done together, 6 was a middle school teacher and 7 was a middle school Special Education teacher. Interview 8 was with a college professor who has also been a school teacher and principal. Interviews 9 and 10 were with two administrators from the Dyslexia Institute of Indiana, one who has dyslexia and one who does not.

To compare the interview results, participants were divided into four groups including individuals with dyslexia, parents, teachers, and individuals who work at the Dyslexia Institute of Indiana (DII). Common themes which arose across all interviews included feelings of frustration, confusion, relief, success, feeling misunderstood, and feeling stupid. Most interviewees also discussed challenges within the education system including a lack of financial resources. Almost all participants preferred and agreed with the use of the terms learning difference, processing difference, and brain difference as opposed to learning disability when referencing dyslexia. There were mixed opinions about the advantages versus the disadvantages of dyslexia. However, most believed

advantages are experienced. All interview participants agreed having a diagnosis of dyslexia was better than being an undiagnosed dyslexic.

The tone varied between interviews with individuals who have dyslexia and participants who support those individuals. Parents of dyslexics had a more serious tone throughout their interviews, which manifested through a lower and quieter vocal range, more serious expressions and erect posture. They also tended to be more hesitant to share details of their child's experience. Before their child received the diagnosis of dyslexia, parents were often confused because their child seemed very intelligent at home, but their school work did not reflect their abilities. Once their child received a diagnosis, the parent expressed they felt immediate relief to have an answer for the struggle and confusion. Parents also expressed frustration with the educational system, especially in public schools. They explained that dyslexic students are typically not seen as a priority for extra help because they often do well enough to get by in school. Public schools have a limited amount of funding that must be allocated to the students with the greatest needs. Parents explained that because of this, it can be hard to trust the public education system. They must often seek expensive outside help for their child.

The interview with my own mother varied from interviews with other parents in three ways: First, she felt comfortable being extremely open with the information because the information was about our own shared experience. Second, through

research and drawing comparisons between my experience growing up and her own, she was able to speak to the experience of discovering that she likely has dyslexia. Last, the mindset and approach my parents chose when I was diagnosed with dyslexia stood out to me. I have a more optimistic view of the brain difference than others, and my parents' interactions and approach likely contributed. My mom explained that we chose as a family to be open about our journey from the beginning, and not to hide my diagnosis. My mom described a decision in which my parents would "...remove the ability for others to label me and decided we would create our own label and that we would own it." Making this risky decision was not easy, she noted, but the family decided to identify with dyslexia from the beginning. Some parents I interviewed were guarded with the information they shared. I spent a limited amount of time with them, whereas I have known my own parents my whole life. It is difficult, therefore, to say how different my parents' approach to dyslexia is from that of others. There is no single way to confront a diagnosis, and it is important to do what is right for one's family. However, I did conclude that more openness and conversation is helpful when trying to embrace and accept a learning difference.

Participants with dyslexia were very open about their experiences, and while there were some serious moments in the conversations, these individuals felt comfortable using humor to discuss the situation. Most did have a sense of positivity toward their perspective on dyslexia. This could be because individuals with dyslexia are sharing firsthand experiences and emotions that are their own. Those who share

information about their child or their student may feel more protective. The dyslexics I interviewed were all adults, and might be more secure than younger individuals with dyslexia, or might have had more time to better understand how it has manifested in their lives. They have successfully made it through school, have begun or are well into careers, and have more experiences to draw upon while telling their stories.

The interviewees with dyslexia explained that during school they experienced frustration with teachers who did not understand their situation, hurtful comments from peers, and challenges with low self-esteem and self-confidence. These interviewees expressed feeling confused in school. This confusion often resulted from the way material was presented rather than the subject matter or type of assignment given. They noticed that they struggled more than their classmates, and believed something was wrong with them or that they were stupid. When asked if they recognized any advantages of dyslexia, Interviewee 1 stated that the struggles dyslexia presents are not an advantage. If she could be as successful as she is today and not be dyslexic, she would choose that alternative. Interviewee 2, did not find out she had dyslexia until she was an adult. She teared up while explaining that she wished she would have known sooner. She wondered what difference an earlier diagnosis would have made during her studies and in the beginning of her career. Throughout her career, she noted, there have been moments where she has been able to see the big picture goal of the company more clearly than others. She believes this is a strength of dyslexia and that it has given her an edge throughout her career. All interviewees with dyslexia believe

dealing with the challenges of the brain difference throughout their lives have helped them develop a strong work ethic, resilience in challenging situations, and empathy toward others.

Interviews 6, 7, and 8, a teacher, a special education teacher, and a college professor, all shed light on the limited resources and lack of training in schools for supporting dyslexia. All have had several dyslexic students in their classes throughout their careers. They all believe they have had undiagnosed dyslexics in class.

Interviewee 6 expressed that she has felt inadequate as a teacher because she struggled to connect with a student. She has often wished she had more training on teaching students with learning differences. Large class sizes can make it hard to give struggling students the individual help they require. Students who have dyslexia, she has found, are excellent at group discussions, group projects, and often turn in projects that are more creative than their non-dyslexic classmates.

Interviewee 7, a special education teacher, has received Orton-Gillingham training, which is based on the teaching and studying of language and is recommended when teaching students with dyslexia. She regularly uses nontraditional, multisensory teaching methods with her students. In her classroom, she focuses on students strengths rather than weaknesses and also teaches students how to advocate for themselves. She explained when she is "...frustrated at work, it is often because of other teachers or parents and never because of [her] students." She feels frustration

with other teachers when they misunderstand a student's needs, or when there is a lack of effort to understand those needs.

All interviewees expressed a need for more resources and training for teachers about dyslexia and other learning differences. Similar to parents or students, teachers also have a sense of relief when a student receives a diagnosis of dyslexia. It helps the teacher know how to help them with assignments. Interviewees 6, 7, and 8 all feel encouraged when they make a breakthrough with a student who is struggling, and they love seeing the progress of their students throughout the school year.

The interview with the administrators of the Dyslexia Institute of Indiana (DII) had a very positive tone overall. The administrators had light tones of voice, were expressive and glad to share about the DII, and felt comfortable using humor to discuss some of the challenges and situations they have experienced. Both administrators have a positive outlook on dyslexia and recognize the advantages of it. They witness the vast spectrum of emotions their clients feel. These include frustration, confusion, and relief, among others. The administrator from the institute who has dyslexia explained that he hid his diagnosis for most of his career to avoid judgement and questions, stating, "People discount you when you can't spell correctly." Today the individual feels more comfortable sharing his experiences and even used humor to discuss some of the challenges he has faced. Both interviewees explained the struggle with funding and the expense of tutoring and training. They have high hopes for Senate Bill 217, passed in

Indiana, requiring all school to have a dyslexia specialist on staff. They hope that it will change the way dyslexia is handled, especially in public schools. Both administrators believe dyslexia to be a difference and not a disability. They expressed the importance of reassuring their clients that everything will be ok, that they are not dumb, and that dyslexia is not something you have to hide. They have also experienced positive responses from clients when they share success stories about other dyslexics.

Again, all of the interview participants shared common feelings of frustration, confusion, and relief. For both parents and individuals with dyslexia, family, friends, or support groups provided better support systems than schools. Individuals with dyslexia rely much more on their family members or outside tutors than they do their teachers at school to help them overcome challenges. Teachers do not always have the time and resources to give struggling students the one-on-one attention they require. One interviewee explained public schools often lack the funding to provide every student that is struggling with the help they need. Students who are having the most difficulty are often made a higher priority. Students with dyslexia create their own work-arounds for their struggles, so their grades do not always reflect these struggles. Interviewee 1 said that during school she commonly heard the dismissive phrase, "You are fine. You are passing." Interviewee 5 said her child has been told that, "He is not that bad off and doesn't qualify for special help." This effectively denies this student the opportunity to fulfill his potential. As a response to these types of comments, Interviewee 1 explained that educators must "...realize a student can be both smart and struggling."

Dyslexia is genetic. Family members of individuals diagnosed with dyslexia often have a revelation that they are dyslexic as well. All interviewees expressed that developing an understanding of dyslexia takes time and patience. Diagnosis and disability can be scary words. The tone of many interviews showed that not everyone has a positive experience with dyslexia. They often have the opposite opinion of the learning difference until later in life when they are able to appreciate that dyslexia is what makes them unique. All interviewees expressed they believe having dyslexia does not have to be a negative experience, that there should be more conversation about the learning difference, and that an early diagnosis is better than one later in life.

### **Designed Solution: “Discovering Dyslexia,” a Transmedia Story**

Through the interview process, I learned that my positive perspective and acceptance of dyslexia is a minority mindset. My experience was very similar to the interview participants, however, I adopted a positive outlook much earlier in my dyslexia journey than other individuals. I have found a positive mindset to be very helpful when dealing with the frustrations and confusions of dyslexia. Empathy research showed a need for more open communication about dyslexia, the common experiences these individuals share, and the different perspectives one can adopt to help cope with and accept the situation. I also found it is important for individuals who have accepted and embraced dyslexia to share their success stories and how they arrived at that point in their journey. The transmedia story I have created to address these issues has 3 parts:

an online blog, a live speaker series event, and this research document about my own experience. These will show how and why one should accept, embrace, and be open about dyslexia as a brain difference.

The “Discovering Dyslexia” blog (Figure 3) will showcase the realities of dyslexia, address both its challenges and advantages, and offer advice on how to accept and embrace the brain difference. The blog offers advice for coping with and embracing dyslexia. I will be the primary writer but will also invite guests to write posts as well. The stories I share consist of my experiences, explain unexpected challenges that have come up as I have matured and entered adulthood, how my perspective of dyslexia has changed over time, and other general tips about life as a dyslexic. Guest posts offer parent and teacher perspectives. By providing individuals with dyslexia another resource to understand their brain difference I hope to offer an opportunity for these individuals to take an active role in the conversation about dyslexia.

**Figure 3.** Discovering Dyslexia Blog

HOME BLOG RESOURCES ABOUT

# Discovering Dyslexia

Books about Dyslexia.

The following is a list of books I found helpful when doing my own research about dyslexia. Through reading these books I learned about:

- what makes an individual with dyslexia different from others
- the four brain variations of dyslexia
- the MIND strengths
- the advantages of dyslexia
- how the challenges and advantages of dyslexia change as one matures
- how to better explain what dyslexia is to others

**The Dyslexic Advantage**  
Brock L. Elde M.D., M.A., Fernette F. Elde M.D.  
This book taught me what makes a dyslexic person different from a non-dyslexic person. It also introduces the MIND strength, advantages of dyslexia.

**The Power of Different**  
Dr. Gail Saltz  
Introduce your team! Click here to add images, text and links, or connect data from your collection.

Post 1: Welcome to Discovering Dyslexia!  
Hello! My name is Lindsey and I am a second-year graduate student studying Emerging Media Design and Development. I have many different hobbies and...

Post 2: Getting Tested And The Advantage of a Diagnosis  
I had a pretty typical childhood. I grew up living in a small house in a small town. My mom was a "stay at home mom" and would greet my younger brother and...

Discovering Dyslexia  
Hello and Welcome! I have done better

*Figure 3.* Discovering Dyslexia is an online blog written to share experiences and perspectives about dyslexia. The goal of the blog is to highlight the realities and complexities of the brain difference including both its challenges and advantages. The blog is a resource for individuals with dyslexia and their support systems to help them learn about and better understand the brain difference.

Each blog post will also include an audio recording for anyone who would prefer to listen to the information. This allows the content of the blog to be inclusive and accessible to anyone. The audience can also find a suggested readings and resources page with books and videos that have helped me learn about dyslexia, cope with the anxieties that come along with it, understand why it is ok to be different, and feel more confident discussing dyslexia with others. The books are categorized as novels, self-help, and dyslexia resources.

Each post on “Discovering Dyslexia” is written and constructed for ease of use by individuals with dyslexia. Presenting written information in a way that works best for dyslexics allows these individuals to comprehend the information more quickly and fully.

To make this blog a dyslexia-friendly read, it has been written using parameters from Stacey (1997):

- A sans-serif font
- Short paragraphs
- A spare line between each paragraph
- More punctuation than non-dyslexic people find necessary
- Hyphens used to make compound nouns
- Colloquial contractions such as ‘don’t’ for ‘do not’
- Numbers in digit form instead of words
- Page numbers for all references when possible

Making this resource dyslexia-friendly embraces alternative ways of information comprehension.

The second piece of the transmedia story is a live speaker series. Individuals with dyslexia often learn better through multisensory methods. A speaker series will offer a more hands-on, live experience for individuals interested in learning about

dyslexia. This series will consist of approximately four speakers who will each discuss a different aspect of dyslexia. Suggested topics for the speaker series include the four brain variations of dyslexia, how dyslexia changes as you age, the MIND strengths, and how to embrace dyslexia and feel confident about it. Indiana Senate Bill 217 regarding the education of individuals with dyslexia, provides timeliness and an advantageous location for the event. The speaker series will be promoted by the Dyslexia Institute of Indiana and will have a representative of the Institute to speak about their role as a nonprofit and the resources they provide. I would be the fourth speaker discussing accepting and embracing dyslexia as a brain difference. This brings the transmedia story full circle from the online blog through the end of the live speaker series event.

## Discussion

Dyslexia is most recognized for the challenges it presents with reading and language processing. While academia has acknowledged both the challenges and advantages presented by dyslexia, the general public and society still primarily see dyslexia as a learning disability. Individuals who have dyslexia often misunderstand their brain difference. While the four brain variations of dyslexia — phonological processing, procedural learning, differences in the use of the right brain, and unusually broad spacing between the functional clusters of neurons — present challenges, they also present advantages in the form of the MIND strengths. Material, Interconnected, Narrative, and Dynamic reasoning are all strengths individuals with dyslexia may have, but unfortunately these strengths are not often discussed when talking about dyslexia. Exploring the MIND strengths should be put into practice when communicating about dyslexia.

Because of my dyslexia, I have experienced the many complex emotions, challenges, and advantages that accompany the brain difference. I did draw upon my own experiences while producing this project. During research, I held an objective and unbiased position toward all points of view and only applied my own experiences when it would not affect the results of the project. My experiences add depth to the information. I have experienced the frustration, confusion, and relief that comes with being tested and receiving a diagnosis of dyslexia. I want to understand the brain difference better and encourage others to do their own research so they can form an

understanding about how they think, learn, and work. By creating a transmedia story about dyslexia I hope to minimize the negative emotions and misconceptions that accompany having a learning difference. I hope to encourage others to learn about the brain difference so they can accept and embrace dyslexia as a part of who they are. I want others to experience how empowering it can be to fully understand what makes them unique.

The online blog and my personal narrative are the most fully developed of the transmedia story created through my research. Planning of the live speaker series is underway, and will hopefully be deployed soon. In addition to those pieces of the transmedia story, this paper written about this project provides another resource for a different audience than either the blog or speaker series. This transmedia story will continue to grow as others contribute their own experiences and are inspired to tell their own stories.

Each dyslexic's experience is different. It is important that I do not assume all individuals who have dyslexia have the same perspective about it that I do. During empathy research my hope was to speak with other dyslexics 18 and older. Since having a learning difference presents challenges, it is sometimes hard to find people who are willing to talk openly about their situation. Any information I gathered about children or teenagers with dyslexia came from academic research and interviews with parents, and were not the first-hand experiences of those individuals. More discussions

with children and teenagers about their experiences with and perspectives on dyslexia would be beneficial. Further research avenues regarding dyslexia may also include traditional teaching methods and the ability for schools and teachers to adapt to the learning styles of individuals with dyslexia. This would include implementing nontraditional, multisensory teaching methods into classrooms. This would allow all students to have a common learning experience that embraces all information processing styles.

Living with dyslexia is complicated, but it can also have many rewards. It is a journey that includes feelings of inadequacy, learning to advocate for oneself, and becoming self aware. Some journeys are more painful than others. We have known that dyslexia exists since the middle of the 19th century. However, acknowledgement, awareness, and diagnosis has only become common in the last 20 years. Self acceptance is important to success. One must choose to view dyslexia in a positive way and recognize that the brain difference is what you make of it. Today, new legislation, teaching methods, and research help improve the lives and experiences of individuals who have brain differences. The best thing we dyslexics can do for ourselves is to learn about our strengths, weaknesses, skill sets, and passions. We must accept who we are, discuss dyslexia, and ask questions about it. By doing our own research, sharing our stories, and embracing the brain difference we can provide others with the full picture of the gift of dyslexia. Embrace dyslexia, passionately.

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