

# The Meaning of Movement

Using Motion Design to Enrich Words for Deaf and Hard of Hearing Children

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*The personal, religious, philosophical, or political positions found in this project are solely that of the student, and do not necessarily reflect the views or opinions of the committee or Liberty University.*

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# Abstract

# Abstract

This thesis aims to address challenging areas of vocabulary for deaf and hard of hearing children by developing an open resource for students, parents, teachers, and content creators that utilizes motion to enhance written words for deaf and hard of hearing children. This research seeks to study the means of nonverbal communication such as body language expression and paralinguistic prosody (i.e., tone, intonation, volume, and pitch) qualities within the framework of graphic design through motion design. Body movement and expression are essential during face-to-face communication, but written language lacks such context clues. Additionally, the hard of hearing may not fully detect prosody within their range of hearing. This lack of information gathered through body language and paralinguistics can be replicated with animated movement, which adds greater context to otherwise static text, enhancing insight into the meaning or use of a word. Seeing how a word in written form correlates with enhanced meaning through movement provides greater understanding and retention. This enhancement promotes improved communication in the world through graphic design. Motion design, specifically kinetic typography, offers a promising tool to help aid with language learning for continued exploration and development.

**“Motion graphics presents a set of unique, creative challenges that combine the language of traditional graphic design with the dynamic visual language of cinema into a hybridized system of communication.”**

*- Jon Krasner  
(Motion Graphic Design xii)*

# Introduction

**“Hearing sounds and words helps children learn to talk and understand. A child with hearing loss misses out on these sounds. This can cause problems with speaking, reading, school success, and social skills.”**

*- American Speech Language Hearing Association  
("Effects of Hearing Loss..." 2015)*

## Introduction

Language is vital to humanity. As a child grows, their speech and language are major developmental milestones. These milestones often include baby babbling, speaking a first word, and eventually reading and writing in school. The importance of communication is why language is one of the first skills taught because it is necessary for every sphere of life personally, socially, academically, and professionally.

### The Problem

Deaf and hard of hearing children face obstacles in developing vocabulary due to their obstruction of hearing verbal communication or certain frequencies, leading to language deprivation resulting in a hindrance of other education processes and a higher risk of mental health problems.

While I do not have any personal experience, family, or friends being deaf or hard of hearing, my motivation for choosing this topic to tackle for my thesis involves the combination of three aspects (1) my background in animation (2) the continuous need for accessible communication especially among developing children and (3) the correlation between paralanguage and motion specifically as it pertains to the reliance on visual communication and lack of prosody for the deaf and hard of hearing.

To expound upon these motivations, in my experience growing up as a homeschooled student, I relied on flashcards and posters with text and images during my initial language learning. Later



on, I used the digital Rosetta Stone software for my foreign language learning program. Rosetta Stone primarily uses text, typing, audio, and photographs in their lessons to aid student learning. I preferred this digital interactive environment compared to the flashcards and posters of my earlier years. However, after gaining a background in animation from my bachelor's degree, I perceived an element that's potential is not fully utilized for language learning—motion.

Text, images, and photographs are all static elements. These static elements have been the main components in traditional graphic design throughout history. Today, a vast discipline has developed from the spectrum of art, design, graphics, and motion called motion design (Shaw 1). Motion through time and space is a powerful communicator. As I learned in one of my first animation assignments utilizing just a coin and a camera, the motion of an object can express a variety of characteristics. For example, a simple silent animation of a coin could reveal a bouncy ball that repeatedly springs into the air, a balloon that floats off into the sky, or a bowling ball that clunks to the ground. The coin never changed form, but the movement dictated how the coin was perceived. The same principle of meaning communicated through motion can apply to enhance written language for learning.

Developing language tools is necessary because language is not easily accessible to everyone. However, the world heavily relies on being able to use spoken and written communication. Blindness, deafness, autism, dyslexia, aphasia, and speech

impediments are a few examples where ordinary spoken and written language can be more difficult. In particular, deaf and hard of hearing students typically rely more on visual communication and may be unable to detect the paralinguistic qualities in speech resulting in a loss of perceived meaning. This visual reliance makes deaf and hard of hearing students a particularly exciting area of study for motion design.

According to the Center for Disease Control and Prevention (CDC), deafness and hard of hearing occur in 1.7 out of every 1,000 babies who were documented from Early Hearing Detection and Intervention programs from a 2017 Survey ("Data and Statistics..."). Although, other reports say it occurs 2-3 times out of every 1,000 babies ("Hearing Loss Facts..."). These numbers do not include infants that lose their hearing after initial birth screening due to instances such as illness. These numbers present several children needing a unique language approach. However, there is debate over the best approach to language learning for deaf and hard of hearing children for combating potential language deprivation.

Evidence promotes conflicting opinions on American Sign Language (ASL) versus Listening and Spoken Language. Some sources even recommend using a combination of both as having the best outcome when implemented early due to the first five years of life being crucial for language development. Many other approaches also exist including: total communication, cued speech, speechreading, auditory-oral, or auditory-verbal. Along with all those methods, there is also the



decision whether the student attends public, private, or home school. This study does not seek to further any side of this impasse on language approach as this will ultimately vary upon the choice of families. Despite the language approach, there remains a persistent need for finding greater ease in teaching literacy and vocabulary to deaf and hard of hearing children. The concern is especially true if early identification is not detected, the child is from a low-income family, or has additional learning disabilities.

Ideally, when children reach third grade, they will switch from learning to read to reading to learn. Deaf and hard of hearing children should perform as well as hearing children in such academic endeavors. However, deaf and hard of hearing children face obstacles in developing vocabulary due to the obstruction of hearing, leading to language deprivation resulting in a hindrance of other educational processes and a higher risk of mental health problems. For hard of hearing children who choose ASL, learning to read involves learning an entirely new language. For hard of hearing children who use listening and spoken language, certain frequency levels are obstructed. This obstruction makes certain letter sounds or the tone of delivery imperceivable even if the sound is loud enough. Noisy environments further complicate this issue. The effects go beyond spoken and listening language, as not hearing specific phoneme sounds makes learning written language more difficult. Without specific intervention, a child with mild difficulty hearing can miss +50% of classroom discussion ("Hearing Loss Facts..."). These obstacles require detailed guidance.

However, numerous sources note a shortage of qualified teachers of the deaf (Lindow-Davies) ("Letter to DFED Programs.")(Johnson).

Additionally, when public and private school education is thrown into distance learning, such as during the COVID-19 pandemic, virtual schooling can increase learning difficulty for deaf or hard of hearing children and their families. Some examples of virtual schooling obstacles include increased hearing difficulty through online platforms and a lack of language input/output opportunities among families with mixed hearing and deaf or hard of hearing persons. Therefore, language resources should not only focus on in-person solutions, but also virtual or remote aspects.

The goal of this research is: to identify specific difficulties deaf and hard of hearing children have with words; to explore how motion design can embed nonverbal communication properties in written vocabulary words; and to use that research to inform the creation of kinetic typography videos for incorporating into a motion language library towards enhancing the visual language resources for deaf and hard of hearing children. This visual word library can be utilized by parents, teachers, and content creators alike for improving communication.

**“Without specific intervention, a child with mild difficulty hearing can miss +50% of classroom discussion.”**

*- Hearing Loss Association of America  
("Hearing Loss Facts...")*

Research  
Research  
**Research**

**“Time—the fourth dimension—has been  
recognized as a vital force in visual  
communication.”**

*- Jon Krasner  
(Motion Graphic Design xii)*

## Literature Review

The following research defines the vocabulary challenges of deaf and hard of hearing children, the meaning of nonverbal communication, and the meaning of motion. This information provides preliminary context and clarity to the research problem by highlighting the potential of motion design use for creating solutions of enhanced language and vocabulary learning for deaf and hard of hearing children through its ability to convey greater meaning.

### Language Difficulties for Deaf and Hard of Hearing Children

#### Defining Concerns

In understanding the challenges of vocabulary in the development of deaf and hard of hearing children, it is essential to see how and to what extent hearing loss affects individuals. Children who are deaf or hard of hearing from a young age or birth must learn in an environment that is not always conducive to their development. The World Health Organization (2020) provides an article on deafness and hearing loss that estimates around 34 million children have disabling hearing loss worldwide. Hearing loss and deafness are gauged by decibel thresholds where anything worse than 25 dB is considered hearing loss (“Deafness...” 2020). Hard of hearing is outlined as someone who can still communicate back and forth with spoken

words, but generally need hearing aids, cochlear implants, closed captioning, and other assistive devices. Deafness is outlined as someone who has very little to no hearing and relies on alternative or sign language to communicate (“Deafness...” 2020). Causes of hearing loss include congenital causes at or soon after birth and acquired causes that can happen during any point of a person’s life, such as an illness or accident (“Deafness...” 2020). Therefore, there are many reasons why someone may be deaf or hard of hearing at any stage of life.

**“Improving access to education and vocational rehabilitation services...will decrease unemployment rates for people with hearing loss.”**

*- The World Health Organization  
 (“Deafness...” 2020)*

The article also outlines some impacts of hearing loss such as functional concerns involving communication, social and emotional impact, and even economic costs (“Deafness...” 2020). Of particular interest to this research problem are the functional and economic costs as the article says that, “Spoken language development is often delayed in children with unaddressed hearing loss...They often have increased rates of grade failure and greater need for education assistance” and that, “Improving access to education and vocational rehabilitation services...will decrease unemployment rates for people with hearing loss.” (“Deafness...” 2020). The primary prevention concerns of the article involve immunization and

educating and implementing greater maternal and child health care programs/practices (“Deafness...” 2020). The report also stresses how early identification of hearing loss in a child is crucial to helping them develop communication at a more normal pace (“Deafness...” 2020). Of course, these preventative measures are not always possible to achieve.

Additionally, the American Speech Language Hearing Association’s audiology information series (2015) presents the consequences of hearing impairment during adolescents’ development. The info sheet notes how children with hearing disabilities are prone to developmental delays since, “hearing is critical to speech and language development, communication, and learning” (“Effects of Hearing...” 2015). The info sheet outlines four areas of impact: communication skills, academics, social life, and vocation (“Effects of Hearing...” 2015). The info sheet details how these four areas are impacted because children with hearing impairments struggle with vocabulary, sentence structure, and speaking (“Effects of Hearing...” 2015). Because of the effects language deficiency can have in these areas, language learning for deaf and hard of hearing children is a significant area of focus.

### **Specific Challenges**

In light of these concerns, studies have looked at the language acquisition of deaf and hard of hearing children. Walker, Redfern, and Oleson (2019) saw that investigation had been completed on how many words children with hearing loss

could acquire. However, these studies did not provide information about how well children with hearing loss knew those words. In other words, the breadth versus the depth of the word knowledge (Walker et al. 525). The authors' study included 93 hard of hearing children and 62 hearing children as participants (Walker et al. 529). The study tested how hard of hearing children acquire language breadth and depth as they age and see if any factors help develop breadth and depth (Walker et al. 532). The authors' findings saw that compared to hearing children, there were both breadth and depth shortfalls in hard of hearing children (Walker et al. 532). The study also noticed that certain factors like an early intervention with hearing equipment and quality linguistic input directly affect hard-of-hearing children's language performance (Walker et al. 534). Language deficiency is concerned with the number of words a child learns and how well those words' meanings are understood.

A significant concern for deaf and hard of hearing children's language learning is falling behind their hearing peers. However, as seen above, defining the measures of language acquisition is not simple. Dudek-Brannan (2018) also discusses this in her studies of children's vocabulary development through the school-aged years. Dudek-Brannan remarks how statistics calculate the number of words children should know at each age differ upon reports due to numerous variables making it hard to produce an exact measurable level of vocabulary for every age or developmental stage (Dudek-Brannan 2018). Instead of measuring words numerically, Dudek-Brannan suggests pinpointing

significant developments (Dudek-Brannan 2018). Specific stepping stones show progress in areas that are important for further academic success. The three major development categories that Dudek-Brannan presents are double function words, adverbs, and meta verbs (Dudek-Brannan 2018). Double function words have multiple meanings, especially those with concrete and psychological meanings (Dudek-Brannan 2018). Dudek Brannan outlines that typically: 3 - 4 year olds will understand concrete meanings; 9 - 10 year olds will begin to pick up psychological meanings; and 11 - 12 year olds will understand both concrete and psychological meanings (Dudek-Brannan 2018). Adverbs are descriptive words that will be understood around 6 years of age, but will solidify more at 10 years of age (Dudek-Brannan 2018). Meta verbs are words used to describe thinking or communicating and understanding of these words, while developing during the school-age, may not even fully form into adulthood (Dudek-Brannan 2018). These milestone development categories by Dudek-Brannan, particularly the double function words, can pinpoint specific further language challenges for deaf and hard of hearing children.

Additionally, deaf and hard of hearing can have difficulty distinguishing such words depending on the frequencies they can hear. Lekashman (2017) outlines a list of words that those who are hard of hearing may have trouble distinguishing. While it is common to assume that speaking louder would help someone with hearing loss hear and understand what is being said, Lekashman notes that even if a word is audible to someone with hearing loss, it can still not be understood

(Lekashman 2017). The article explains how this may be so because certain words sound similar. Lekashman uses a graph of the “speech banana” to illustrate how different letter sounds present at different frequencies and higher frequency sounds can be more challenging to hear in the most common type of hearing loss (Lekashman 2017). Lekashman considers replacing this vs. that, taste vs. flavor, house vs. home, first vs. one, nice vs. good, thirsty vs. drink, past vs. before, she vs. her, such vs. very, and almost vs. nearly (Lekashman 2017). Of course, Lekashman notes how not all the words can have a perfect synonym or counterpart (Lekashman 2017). This “synonym” method also requires an extensive vocabulary to be already established. So while this may be practical for someone who has reduced hearing later in life, it may not be entirely helpful for children still learning language.

In line with Lekashman’s observations, the American Speech Language Hearing Association maintains that deaf and hard of hearing children have: inability to hear “s” or “ed” sounds for plural or past tense words; inability or difficulty perceiving “sh” “f” “t” or “k” sound; and have trouble speaking or controlling the way they speak out loud (“Effects of Hearing Loss...”). Further, the article says that deaf and hard of hearing children learn concrete words more easily than abstract ones (“Effects of Hearing Loss...”). They also note a difficulty with words with multiple meanings (“Effects of Hearing Loss...”). Other problem areas listed for hard of hearing children include: complex sentences, clauses, and passive voice (“Effects of Hearing Loss...”).

Within these areas of trouble and areas of development, one overlapping theme is that of double function words. Double function words such as: homonyms (same sound and spelling, but different meaning; homophones (same sound, but different spelling and meaning); and homographs (same spelling, but different sound and meaning), have both been noted as (1) a significant language development stepping stone (Dudek-Brannan) and (2) a potential issue for deaf and hard of hearing (“Effects of Hearing Loss...”). Thus, targeting double meaning words like homonyms, homophones, and homographs for deaf and hard of hearing children is important because they have been found explicitly challenging and seen as a critical developmental milestone.

**“Children with hearing loss... may...not use sounds like s, sh, f, t, or k. These are quiet sounds that are hard to hear.”**

*- The American Speech Language Hearing Association (“Effects of Hearing Loss...”)*

### **Previous Solutions**

In response to language learning obstacles for deaf and hard of hearing children, researchers have sought information to create the best methods for aiding learning over time. Starting back ten years from now, Luckner and Cooke (2010) surveyed forty-one studies on vocabulary and the hearing impaired published between 1967 and 2008 to show the continued need for research in the area.

The authors created a summary synthesis of their surveyed material for further use due to their perceived lack of documented methods proven effective for hearing impaired education (Luckner & Cooke 40). The forty-one sources that the authors found by first exhaustively searching specific key terms in various databases and secondly retrieving sources from the first sources reference lists were subjected to four criteria: (1) published between 1967-2008; (2) participants were hard of hearing or deaf; (3) subject focused on vocabulary; and (4) participants were aged between 3-21 years (Luckner & Cooke 40). The authors note that only 5 of the studies included testing specific intervention methods and one studies method that showed positive results utilized a computer program (Luckner & Cooke 41). In addition, Luckner and Cooke note how this study does not include any research on vocabulary development during the formative years of birth to 3 years of age, which they suggest would be an excellent addition to the body of research (Luckner & Cooke 59). Finally, the authors highlight the importance of continued research in the best methods and practices for teaching vocabulary to the hard of hearing or deaf as vocabulary is fundamental for all other endeavors.

Research has also been done on whether teaching methods for hearing children work for deaf or hard of hearing children. Lederberg and Spencer (2009) conducted a study on deaf or hard of hearing preschoolers to see if they could be categorized into previously researched language learning categories including: slow word learning, direct rapid word learning, and indirect word learning

(Lederberg & Spencer 45). The researchers found that of the participants surveyed, the students could be organized into the types of language learning categories referenced prior and that the student's performance was based on their current library of vocabulary rather than their age or development level (Lederberg & Spencer 56). However, because of this, when a child is perceived to be more developed on a non-language level either by age or development, teachers and parents mistakenly assume the child will naturally continue to build their vocabulary library, but as this study shows, that is not necessarily the case and specific intervention is still necessary to continue or accelerate vocabulary and language learning (Lederberg & Spencer 60).

Williams (2012) analyzes research done on methods that have been shown to help young students learn vocabulary. Williams writes that even though d/Deaf and hard of hearing children may need additional help, they still develop the English language the same as that of a hearing child (Williams 502). Therefore, the same methods used to teach hearing children still pertain to d/Deaf and hard of hearing children (Williams 502). The methods reviewed included: dialogic reading, props and extension activities, rich instruction, extended instruction, anchored instruction, and story retelling. Williams found that the main components of effective procedures included (1) explicit explanation of intended vocabulary words involved in an interactive reading session, (2) follow up interactive activities that include the vocabulary words, and (3) opportunities to interact with the words in other forms such as props or



word lists (Williams 506). Other avenues included speaking the target word, repetition, and expressive use were also noted techniques (Williams 507). Ultimately, some form of interventive teaching is helpful for hard of hearing students since they often do not gain input from incidental exposure to words (Williams 507).

Tucci, Trussell, and Easterbrooks (2014) identified six strategies for teaching literacy to deaf or hard of hearing children including cued speech, visual phonics, speechreading, fingerspelling, semantic and iconic representation, and morphographemics (Tucci et al. 192). In seeking support for these strategies, the authors found and reviewed nine articles that met their intended requirements (Tucci et al. 192). This effort revealed insufficient data for providing support and materials for language teachers of deaf or hard of hearing students (Tucci et al. 191,200). Overall the authors found that: there was not enough investigation into the usefulness of cued speech; the rising amount of study on visual phonics looks promising for developing tools; there were no intervention studies on speechreading meeting their requirements; research on fingerspelling reveals promising outcomes; semantic and iconic representation showed successful results; morphographemics was mostly studied with hearing students or older deaf or hard of hearing students (Tucci et al. 192-199). This means that visual phonics, fingerspelling, and semantic/ iconic representation were the three methods that have emerging supportive evidence of teaching grapheme-phoneme correspondence or an alternate version of decoding for deaf or hard

of hearing reading (Tucci et al. 199). However, most interesting to this literature review is the support for semantic and iconic representations for literacy learning. The semantic and iconic principles are based on understanding how children use background, contextual information, and imagery to gain understanding and meaning (Tucci et al. 197-198).

**“The use of iconic representation in language learning is based on Bruner’s (1966) theory that children use internal imagery, where knowledge is represented by icons or images, to understand new concepts.”**

*- Tucci, Trussell, and Easterbrooks  
(Tucci et al. 198)*

In comparison, while most methods naturally involve visual solutions as seen above, Marschark, Spencer, Durkin, Borgna, Convertino, Machmer, Kronenberger, and Trani (2015) sought to research whether deaf or hard of hearing students actually have greater visual learning skills as compared to hearing students (Marschark et al. 310). The study analyzed four groups of first year university students, two groups composed of deaf or hard of hearing students, one of which contained cochlear implant users and two groups of hearing students, one of which contained sign language interpreters (Marschark et al. 312). Overall, the authors concluded that no findings from the study supported a generalized assumption that deaf

and hard of hearing students are visual learners (Marschark et al. 326). Instead, the three main findings from their study were (1) deaf/hard of hearing students did not have visual-spatial advantage, (2) abilities in spatial tasks were not tied to signing, but relied on abilities in their preferred mode of communication whether that be spoken or sign, and (3) students from each group may use different cognitive tracks in solving the same visual problem (Marschark et al. 326). According to this study then, while they may rely on visual communication, not all deaf or hard of hearing students may be visual learners. Thus, there is a distinction between visual communication and visual learning. This research shows the continued need for developing language tools as many studies promote the need for purposeful language practice for deaf and hard of hearing students. While all deaf and hard of hearing students are not visual learners, they still utilize visual communication. Visual communication can be developed to improve existing tools that rely on visual elements. Graphic design and motion design can be used towards this end.

## The Meaning of Movement

### Nonverbal Communication

Communication is not limited to language. For example, a part of signed and spoken speech has non-lexical or nonverbal elements. Vicars discusses nonlinguistic communication by first defining the distinction between sending a message and

communicating, which only happens once someone else receives and understands the message (Vicars 2001). The mode that a message is sent through includes any number of vessels such as speaking, writing, and forms of art, but also gestures, facial expressions, and postures (Vicars 2001). This leads to a distinction between language and communication as language is only one means to achieve communication (Vicars 2001). Nonlinguistic communication then, is messages that are not sent through such a framework (Vicars 2001).

The percentages vary among studies, but multiple sources point to nonlinguistic communication elements as being more important to conveying meaning than the language it accompanies. Elements of nonlinguistic communication involve body language, facial expression, paralinguistics (speed, loudness, pitch, tone, laughing, crying, sighing, etc.), and gestures (Vicars 2001). However, Vicars expands that nonlinguistic communication also includes such things as videos, pictures, color, objects, symbols, etc. These are all things that can send messages to someone that do not involve a language framework (Vicars 2011). In this sense, graphic design through its use of color, line, point, size, space, texture etc. already heavily relies on nonlinguistic communication to transport messages.

Although, while nonverbal communication is important, some studies have been wrongly cited. Lapakko (1997) wrote an essay scrutinizing a frequently referenced article by the psychologist Albert Mehrabian who is known for his writing on verbal and nonverbal messages. It has been inferred

and dispersed by many that, between two studies by Mehrabian and Ferris (1967) and Mehrabian and Wiener (1967), a formula now widely cited says that spoken communication is 7% verbal, 38% vocal, and 55% facial (Lapakko 63). However, as Lapakko argues, these numbers by Mehrabian have been taken out of proportion. Lapakko outlines why the studies do not support its often cited claims due to small and biased sample size, the verbal portion not being fully tested, the formula being pieced together from the two studies, and the studies overall lack of methodological validity especially in regards to comparing the importance of verbal to non verbal communication as this was not the intended area of study (Lapakko 64). Lapakko even notes how Mehrabian himself stated how his own work has been overly misrepresented in other works (Lapakko 65). Lapakko concludes overall that while nonverbal aspects have a bearing on a verbal message, the popular 7-38-55 ratio should be reconsidered, especially since trying to formulate numbers for a relationship with so many variances is nearly impossible (Lapakko 66).

Studies have been conducted on how hard of hearing children detect paralinguistic qualities. In particular, Morris, Christiansen, Uglebjerg, Brännström, and Falkenberg (2015) sought to see how well children with cochlear implants compared to a hearing child detect/understand non-lexical elements of speech (paralinguistics), especially prosody (intonation, tone, stress, rhythm). The focus on prosody involved the researchers' perceived inability, based on previous literature, of children with cochlear implants to recognize emotion within speech (Morris et al. 841). The

study was completed by questionnaire to parents who have both hearing children and children with cochlear implants (Morris et al. 842). From the results, the authors noted that three out of the eighteen children with cochlear implants were reported to have the same amount of ability to perceive prosody as their hearing sibling(s). When the observation environment changed, such as in a noisy environment, there was a significant difference in performance between children with cochlear implants and hearing children (Morris et al. 848). Overall, the researchers concluded that children with cochlear implants do have trouble with prosody. The difference, as compared to the hearing child, is noticeable (Morris et al. 849). The prosody of paralinguistics is challenging to detect because it involves hearing the invisible intonation, tone, stress, and rhythm in speech. This leaves a void where visuals can be used to fill in these missing pieces.

**“The overall finding that CI children are not deemed by their parents as being as competent in prosody perception, indicates that facilitating improvements in these perceptual domains should be pursued in device development and rehabilitation.”**

*- Morris, Christiansen, Uglebjerg, Brännström, and Falkenberg  
(Morris et al. 849)*

One such study on replacing prosody with visuals was done by Kavli (2004). The study analyzes if

standardized attempts to add paralinguistic elements into written communication sent between people through a computer more accurately portray the intended message being communicated. This research question is based on what Kavli saw in the literature of that time, as a perceived need to embed paralinguistic qualities in text communication (Kavli 130-131). Although one problem Kavli notes with attempts to embed paralinguistics in written communication is that, from her research, it was seen how paralinguistic qualities often come naturally at no extra thought to the speaker. In contrast, emoticons, textual descriptions, and graphic pictures are deliberate thought-out additions (Kavli 70). Kavli approached the study by recruiting Brevard college students who voluntarily participated and were randomly assigned to one of four equal groups that resulted in there being one control group and three experimental groups, each representing the three found written paralinguistic techniques of emoticons, textual descriptions, and graphic pictures (Kavli 16, 85). The method involved sending four messages sequentially to the participants (each group was sent the messages corresponding to their paralinguistic type groups or with only the text for the control group), which were received on their personal computers and then asked the participants to answer five questions about each of the messages (Kavli 89). The messages were written as if the students were receiving feedback from their professor (Kavli 88). Then the data was analyzed to see how accurately the reader perceived the message and how strongly the message communicated the sender's emotion (Kavli 84). In the end, the study concluded that the three versions of written paralinguistics did not increasingly enhance the participant's analysis

of the messages in comparison to the control group's response (Kavli 128). Further, out of the paralinguistic tools used, the participants preferred graphic faces most, but the option of no paralinguistics was followed as a preferred option (Kavli 131). This study by Kavli still begs the question of further research into the pursuit of paralinguistics in non-verbal communication. Especially with a greater focus on using graphic design for non-verbal paralinguistic pursuits.

### **Motion Design**

As Krasner writes in his Motion Graphic Design book, art has continuously sought to achieve motion (Krasner 2). Precursors to animation and motion design include cave paintings where animals were drawn with multiple legs to show them running and optical inventions such as the zoetrope that uses spinning images to create the illusion of motion (Krasner 2-3). With the evolution of film and animation melding with graphic design, there are now many areas of nuanced study for motion design including film, television, interactive media, and public spaces. Designers such as Shaw and Krasner have outlined fundamentals and techniques of motion design for other designers to utilize. This is important because motion, "can have more impact than the actual content being animated" (Krasner 164). Motion can be used as the message, communication, and storytelling device.

Krasner (2013) details the language of motion between the two categories of primary motion and secondary motion. Primary motion includes: spatial properties involving position, size,

orientation, and direction; the birth, life, and death of the object; the basic animation principles of squash and stretch, anticipation, follow through and overlapping, pause, timing, acceleration/ deceleration, and exaggeration; and lastly coordinating relative motion (Krasner 166-174). Secondary motion involves the movement of the camera or viewer (Krasner 181). This is the window through which the material is experienced. Many camera movements exist such as panning, zooming, and tilting. Consideration for both primary and secondary motion reveals innumerable options for communicating through motion.

**“Timing is the part of animation which gives meaning to movement.”**

*-Timing for Animation  
(Whitaker & Halas 2)*

While there are many elements of motion design to consider, a key component to expressing meaning through motion deals with timing. Motion is based in time. Animators study timing to create believable movements. Whitaker and Halas (2009) write that, “timing is the part of animation which gives meaning to movement” (Whitaker & Halas 2). In order to study timing, many animators study nature. The effects of the environment, natural forces, and emotions all affect the motion of an object or character (Whitaker & Halas 3). Thus, the timing of a movement will have a large effect on how that movement is perceived.

## **Kinetic Typography**

Animated typography is a continuously growing branch of motion design. Although, animated text is by no means a recent development. Animated text has been around since the beginning of film and animation. When the birth of film appeared between 1893 and 1895, animation followed in its tracks. One of the first animators attributed in history is Arthur Melbourne-Cooper (Furniss 30). However, it is contested as to whether or not Melbourne-Cooper did produce animations before the turn of the century (Furniss 30). Melbourne-Cooper, along with many first animators, worked in stop-motion, such as in his “A Dream of Toyland” (1907). However, this animation only employs static title cards often seen in silent films. One of the first examples of animated text is from Melbourne-Cooper’s other surviving work from 1899 or 1915 (as the date is contested) “Matches Appeal” done for a Bryant and May advertisement shows text appearing over time as it is being “written” by a stick figure made out of matches (Furniss 30). Another famous film entrepreneur, Georges Méliès, also experimented with animating text early on for advertisement work in 1899 (Brownie 4). There is record that Méliès used stop-motion to animate children’s alphabet blocks. Unfortunately, this animation is not a visual remnant because 60% of Méliès work no longer exists (Brownie 4; Thompson & Bordwell 15). This still goes to show that working with animated letters has a long history.

Nowadays, most animated letterforms in motion design are called kinetic typography. Sometimes this is a misnomer as not all animated text is kinetic. Brownie explains this in her book *Transforming Type: New Directions in Kinetic Typography*. In the book, Brownie lays out categories of temporal typography (that is any text incorporated into a time based medium) from her analysis of Y. Y. Wong's 1995-1996 work. These categories of temporal typography begin with the first main division between serial presentation and kinetic typography (Brownie 6). Examples of serial presentation would be like the title cards in silent films or standard captions where the text is basically like printed type, only it now has the addition of time with space. Kinetic typography is much more expansive to Brownie and is marked by the motion, change, or morphing of the letterforms themselves (Brownie 6). Brownie breaks kinetic typography down into the categories of global motion and local kineticism. Global motion is broken down into scrolling typography and dynamic layout (Brownie xi, 14). Local Kineticism is broken down further into elastic typography and fluid typography (Brownie 19,21) Finally, fluid typography is broken into the categories of metamorphosis, construction, and revelation (Brownie 24, 28, 29, 33, 34). In this way, text can be composited over image and morph into a text/image hybrid.

The type of temporal typography in the categories laid out by Brownie can be used to achieve different effects. The different types can drastically affect the look, feel, and meaning of the animation. For example, videos like "Strawberry Shortcake Book

Reading for Kids | Kinetic Typography" (Story Time for Kids - WildBrain) on YouTube uses minimal movement. The words are used more in support of the images than being the main feature. The majority of words are just transitioned on the screen with no enhancement of the meaning of the words. On the other hand animations like: Brain Nappi's "Words Animation"; Hassan Alkhatib's "Animated Words - Motion Graphics"; PixelValet's "Emotions - A kinetic typography"; and Antara Bhargava's "Kinetic Typography- Kids App Teaser" involve kinetic typography that uses associated imagery, style, and, motion to portray the meaning of the animated words. In these animations, the word "accordion" folds up, "dominoes" topple over, "light" floats into the air, and "ink" blots onto paper. This form of kinetic typography can enhance vocabulary learning for deaf and hard of hearing children.

## Applications of Motion Design and Kinetic Typography

With the developments of kinetic typography, studies have been completed on using motion design to enrich words for various applications. Rashid, Aitken, and Fels (2006) explored the possibility of animated text enhancing closed captioning. The authors focused on developing the portrayal of base human emotions including anger, fear, sadness, happiness and disgust (Rashid et al. 28). Certain animation effects were assigned to portray each emotion by the research (Rashid et al. 28). The conclusion of the study revealed that

it was possible to portray, at least, a designer's interpretation of the base emotions into kinetic typography (Rashid et al. 30). However, the authors note how further study would need to be conducted on whether the kinetic typography actually increases viewers comprehension of the message (Rashid et al. 30). The authors also concluded that further research should be completed on the relationship between each element as it pertains to intensity, size, and amount of the effect without overpowering the text into an unreadable state (Rashid et al. 29).

Malik, Aitken, and Waalen (2009) conducted research based on their hypothesis that animated or moving text can provide greater communication of emotions than static text. The authors formed this hypothesis in response to previous research that has found the paralinguistic qualities (i.e. body language, gestures, facial expressions, tone, pitch, and volume) of speaking to convey more information than the words themselves (Malik et al. 469). Additionally, the authors note that former preliminary studies on the subject provide awareness of the possibilities of animated text-enhanced communicative properties, but little empirical evidence (Malik et al. 470). As such, the authors sought to build upon the notion that animated text can replicate some of the missing paralinguistic qualities of static text by specifically testing the ability to communicate four base emotions through animation to the test subjects in their qualitative study. Their study revealed that, "43 of the 46 subjects found that the animations did in fact communicate emotion more effectively than the neutral text" (Malik et al. 476). The

authors noted how their results could be skewed by unaddressed issues of gender biases and cultural variants (Malik et al. 477). In conclusion, the authors reflected that this information directly affects their implications of using animated text as actors, but additionally present their findings as having possible social implications for enhancing closed-captioning on TV for those who are hearing impaired (Malik et al. 477). A factor of this study's results that was not addressed the study also did not analyze the effects as it pertains to individuals who are hard of hearing.

Jin (2013) presents research on guidelines for designing digital text that best enhances students' learning of the content due to the perceived lack of research and guidelines existing on dynamic/interactive text that has been relying on principles developed for static print text (Jin 248). The guidelines developed by the author include, "visualize the relationships between paragraphs and pages", "visualize hierarchical structure between pages and present the selected page in the overall hierarchical structure context", "present keywords or key phrases in order", and most important in the context of this review "visualize the meaning of the keywords or key phrases with motion" (Jin 249-250). The research data findings based on Jin's digital text guidelines showed that the design did improve the test participants' understanding and use of the material (Jin 256).

Hald, Hurk, and Bekkering (2015) researched whether animations that demonstrate words congruent to the word's meaning can enhance children's ability to learn words better than static



pictures and what that relationship is between that animation and word learning (Hald et al. 107). Their research was kindled from the thought of the Action Based Language Theory by Glenberg and Gallese which says that an important aspect of word learning includes motor action that coincides with the language that produces greater understanding (Hald et al. 107). The authors note previous study done on the effects of visual and verbal input on word learning, but the studies did not differentiate between static images and moving images and any enhancement of learning found with animation included text with the video (Hald et al. 108). The authors studied 156 students from the 2nd grade to complete two experiments for learning a set of 21 visual verbs (that could be animated) that were new to the students' vocabularies based on a pretest of their current knowledge (Hald et al. 109, 112). The authors' first experiment tested three groups (1) a word paired with a congruent animation, (2) a word paired with a picture, or (3) a word paired with an incongruent animation (Hald et al. 109). The authors' second experiment focused on showing the link between pairing a congruent animation with a sentence that leads to greater enhanced understanding (Hald et al. 109). The results from the authors' first experiment revealed that the students did learn best from the sentences presented with meaning congruent animations with recall tasks and worked equally as well as pictures on recognition tasks whereas the incongruent meaning animations performed the worst (Hald et al. 114). The author's results from the second experiment found evidence to suggest that the link between viewing congruent animation of a verb in a sentence reflects greater

learning of the word by supplying the brain with more conceptual information for determining the meaning of the verb (Hald et al. 118). This study then shows how meaning related animations, is a viable approach to enhancing student learning.

## Summary

To summarize the above research, deaf and hard of hearing children are presented with greater obstacles to literacy due to either using another language (ASL) or not being able to hear or distinguish certain sounds. While there is debate about the best language approach for such children, researchers have sought out the best solutions for teaching. Some of the best methods included some form of visual tools. Regardless of the kind of language, communication involves nonverbal elements to express and extend meaning. An interesting area of exploration in light of this information is motion design that replicates nonverbal communication with animated movement. This reveals the greater potential for using motion design to create a solution of enhanced language and vocabulary learning for deaf and hard of hearing children through its ability to convey enhanced meaning.

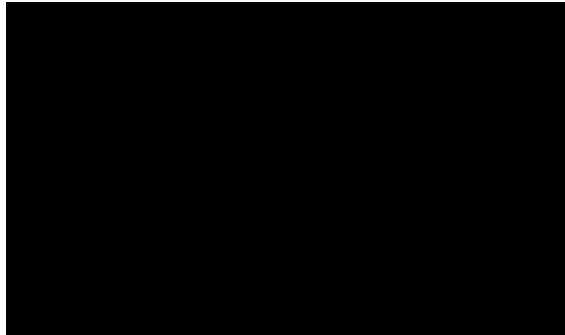
## Case Studies

### **Turkish Study - “Graphic Symbol Based Interactive Animation Development Process for Deaf or Hard of Hearing Students”**

Published in March 2020, Şilbir, Coşar, Kartal, Altun, Atasoy, and Özçamkan-Ayaz created an educational interactive animation tool for enhancing the literacy skills of deaf and hard of hearing students. Their study titled, “Graphic Symbol Based Interactive Animation Development Process for Deaf or Hard of Hearing Students” was supported by TUBITAK under Grant Number 113K717. The goal in creating this project was to identify standardized design components of animation and graphical elements that best support deaf and hard of hearing learning (Şilbir et al. 372).

To do this, the authors first created their visual solution based on their initial analysis of found needs. This initial analysis was based on Turkish language and literature experts, an instructional design expert, classroom teachers, and classroom instruction experts. The stories for the animation were created in consideration of the ALIS graphic symbol dictionary (Şilbir et al. 374). The authors then tested the developed visual solution in a real-world classroom setting. Next, the visual solution was introduced into classrooms of two special education teachers and seven 3rd and 4th grade students with advanced hearing loss (Şilbir et al.

373). Afterwards, the authors received feedback for improving the visual solution from both teacher interviews and in-class observation research for the duration of two academic years totaling 43 applications (Şilbir et al. 373-374). This feedback was evaluated weekly by an assessment group including researchers, instructional designers, Turkish language and literature specialists, a classroom teacher specialist, and teachers (Şilbir et al. 374).



*Share Animation Screenshot from*  
<https://alis.org.tr/animasyonlar/32-3.m4v>

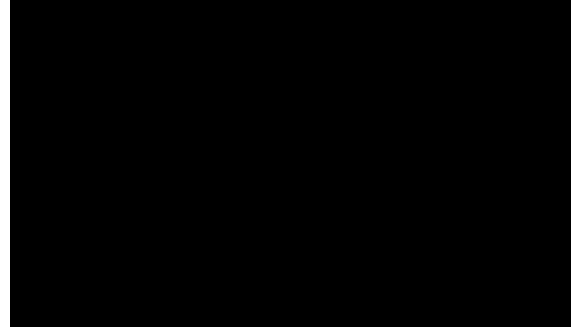
Throughout the duration of review, concerns were raised about: navigation through sentences; small objects; standard portrayal of thinking/ speaking throughout all material; suitable font for children; use of punctuation; length of sentences; length of story events; animation style; use of sound; and customizability of the inclusion of each element within the interface (i.e. graphics and text) (Şilbir et al. 375). These issues were analyzed and addressed in the final animations and as a result, a design guide was created from

the findings of the study. The authors concluded seven principles for developing literacy education based animation for deaf or hard of hearing students including: simple designs (no hard to see or extraneous elements); standard drawings (consistent style and conventions); suitability for the student (font mimics students writing); short and simple sentences (no more than six words with correct punctuation); avoiding complicated explanations (broken down into segments and information should directly correlate); providing sound support (speaking and background noise should be included); and opportunity for interactive use (user interface should include options for using the text or graphic symbol support) (Şilbir et al. 378).

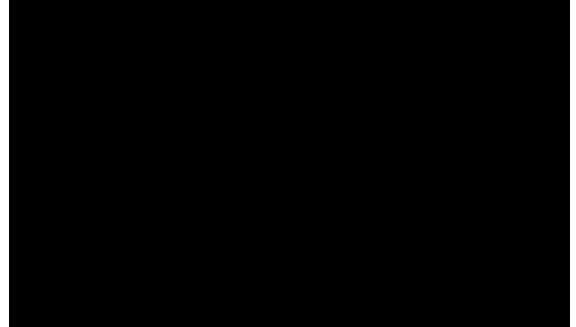
These design recommendations can help inform decisions for the visual solution developed in this thesis. This study supports the importance of creating visual tools for deaf/hard of hearing students. Especially as it pertains to the development of language and literacy. While it does not concern the direct movement of text to add meaning, the design recommendations do advise the basis for the layout, elements, and style guidance of educational animations for deaf/hard of hearing children.

The selection depicts three characters in a home sharing chocolate candy bars. The image is produced in a cartoon style using simple forms, bright and neutral colors, and black outlines. The style is reminiscent of childhood drawings. Text and graphic symbols depicting the text are

overlaid over the image with a white background. The graphic symbols are the same style as the animation scene, but more simplified. The audience is Turkish 3rd and 4th grade students who are deaf/hard of hearing. The visual solution is primarily consumed in a classroom setting. However, since there is open access available at [www.alis.org.tr](http://www.alis.org.tr) the visual solution could be consumed online anywhere. The animation depicts in story form the sentence/words being studied. Black text is used to display the text, but certain areas of emphasis are colored red. The main composition is taken up by the animation. The lower half of the screen is used for the text and graphic symbols. A main character reappears throughout the story material. Symbols are from the ALIS Graphic Symbol Dictionary. This visual dictionary was created as a visual mode of communication for deaf and hard of hearing. The aesthetic choices of the project as they relate to this thesis includes using a style that is appealing to children. All elements of the image or text should be simple and clear. There should be consideration as to what typeface will be easy for children to read. Especially since this thesis revolves around text more than image. While the animation visually explains the intended vocabulary words, the actual text is not enhanced or animated at all (outside of using red to highlight certain letters). The primary mode of communication is visual, but is focused on the pictures explaining the words rather than animating the words themselves.



*Alis and His Family Animation Screenshot from <https://alis.org.tr/animasyonlar/45-3.m4v>*



*Website Screenshot from [www.alis.org.tr](http://www.alis.org.tr)*

## Lau & Chu Study - “Enhancing Children’s Language Learning and Cognition Experience through Interactive Kinetic Typography”

Published in August 2015, Lau and Chu created animations to study the use of kinetic typography on vocabulary education in children. Their study is titled, “Enhancing Children’s Language Learning and Cognition Experience through Interactive Kinetic Typography”. By studying how motion graphics, kinetic typography, and information design enhance the understanding of words for developing children’s vocabulary and creating active participation in learning, this project aimed to design an interactive kinetic dictionary for kindergarten students (Lau & Chu 36, 37). Although, the study also says their target audience is children aged 2-7 years old (Lau & Chu 37).

To do this, the authors developed a structure for creating the interactive kinetic typography dictionary. The structure is developed from two main components: (1) design approach on expression (including typography and visual composition) and (2) execution on kinetic typography (including fundamental structure and interactivity). The study uses the word “grow” as an example for their process. Explaining how children learn by relying upon and building off of their previous knowledge, the authors determined to use pre-existing knowledge of seeds, leaves, and flowers for the graphical representation of the word (Lau & Chu 38). From there, the next step to consider in the visual design approach was the

typography. The type of typeface can be used to express the words meaning further. For example, the authors chose to use bold, flat, round, and serif letterforms to attract attention (Lau & Chu 38). Color and texture can also communicate the message of the text and grab attention. Primary colors are often used in children’s material for this reason (Lau & Chu 39). The author’s project example of “grow” is green to match the color of plants. The next step in the author’s process involves visual composition. This involves using illustration and decorations to draw on knowledge and enhance meaning, but largely attracting and holding interest (Lau & Chu 40). The author’s project example of “grow” uses illustrations of a seed, sun, flower, clouds, rain, and flowers in combination with the letter forms. From there, the author’s move on to discussing the temporal and interactive properties. Here it is shown how fundamental structure is describing the way in which letters, words, and phrases appear in the animation (Lau & Chu 41). How a word is animated can affect the way in which it is read. The example animation has each letter growing up from the dirt in order of the word, this helps create a reading path for the eyes to follow (Lau & Chu 41).

Additionally, the fundamental structure involves the use of space to direct attention. Positive and negative space can emphasize certain elements (Lau & Chu 41). Then, there is the component of motion. Kinetic typography adds layers to all of that by creating meaning out of time, rhythm, movement, speed, and space (Lau & Chu 41). The movement is two fold in this case, drawing attention and adding meaning (Lau & Chu 41). In

the “grow” example, the letter “g” is seen blooming into a flower. With the additional interactive factor, the author has geared the solution toward touch screen devices where children control the graphical elements (such as the clouds and sun) and it triggers the growing animation of the “grow” word (Lau & Chu 43).

This study reflects the intentions of the current thesis through creating animated vocabulary words for educational purposes. Rather than solely using or focusing on graphical illustrations for visual communication. This study looks at how to create typographic illustration with the words themselves through design properties. Although, it is noted how there are still multiple graphic elements included in the final solution, not just the animated word.

The selection example from the study shows the word grow in various states. The word is always in a flat green serif font. It is depicted as growing out of a mound of dirt with a sun to the top left and rain clouds to the top right. When the word is fully grown, the “g” morphs to bloom a flower and a bird perches on the “o”. All of the elements are colored flat with no outline. Although, there is slight variation of color shades in places such as the darker rays of the sun and the dark storm cloud behind the first. The colors are bright, but accurately depict the matter of each element (i.e. yellow sun, brown dirt, blue/grey clouds). The shapes are simple, clean, and crisp. Unfortunately, analysis of the movement, timing, and rhythm is unavailable since there is no source of the original animation, only the still frames.

## **Ezzo Thesis - “Using Typography and Iconography to Express Emotion (or Meaning) in Motion Graphics as a Learning Tool for ESL (English as a Second Language)”**

In May 2016, Ezzo submitted his thesis, “Using Typography and Iconography to Express Emotion (or Meaning) in Motion Graphics as a Learning Tool for ESL (English as a Second Language) in a multi-device platform” at Kent State University. Ezzo’s thesis focuses on developing a solution for some of the problems that ESL learners face. Ezzo’s solution involves using design tactics, semiotics, and kinetic typography to create expressive open captioning that all English language students can use to improve their language.

Based on Ezzo’s research involving English language learning methods (behaviorism, phonics, and grammar translation), expressive typography, iconography, and comparative analysis to Rosetta Stone, a series of 4 video captions were created and tested. Movie clips were used as the content upon which to caption. The first captions utilized emojis and colors in the open captioning design in an attempt to convey the overall emotion of the words (Ezzo 30). The second captions built off the first with emojis, but included the addition of syllable breakdowns/emphasis of words in an attempt to improve pronunciation (Ezzo 30). The third captions placed phonetic spellings of words underneath the normal caption (Ezzo 30). The fourth captions utilized kinetic typography and iconography and were placed on the screen to interact with the video (Ezzo 30).

Some of the challenges faced in creating this project include how the introduction of new placements for captions outside of the bottom of the screen were found to take away from the video behind. The designs were also confined to certain assumptions Ezzo lay's out including, "Learning ELL is only available online and in classroom settings; The phonetic language is a universal tool for learning ELL; Memorization is the key to the ELL process; Most students are visual learners; Universal EMOJI icons are known by all" (Ezzo 29). The latter assumption is important in regard to the first developed solution because Ezzo found that Emoji meaning is not universal and meaning can also be affected by the size the Emoji is seen (i.e. phone screen vs. TV screen (Ezzo 34). Another challenge is with the third developed solution. The phonetic spelling was originally included underneath every word, but had to be revised to emphasize only certain words to not be overwhelming (Ezzo 20). This solution also had multiple revisions to make sure the words being phonetically spelled were emphasized enough as contrasting text color was not enough, so green boxes were added behind the text (Ezzo 39).

The results from testing each type of caption Ezzo created is as follows. Each movie clip was played with the captions with and without sound. For the first caption type using emojis, a clip from the movie The Proposal was used. The results found that 80% surveyed agreed the captioning worked with sound (Ezzo 36). The other 20% agreed the captioning worked with and without sound (Ezzo 37). It was also found that 100% agreed that the coloring distracted from the video clip (Ezzo 37).

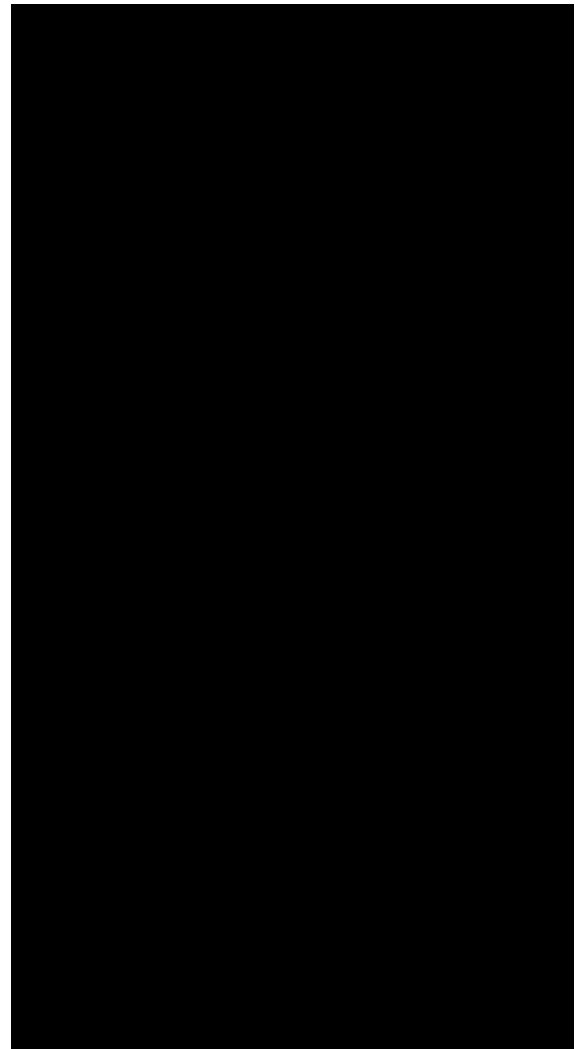
For the second type of caption using stressed syllabus, a clip from the movie Poltergeist was used. In this case, fear was the intended emotion being portrayed. Out of the students surveyed 60% agreed the emotion being communicated was fear and 30% thought it was anger. There was also a student who thought it was meant to convey tension (Ezzo 37). In regards to the stressed syllables, 40% said it was effective, 40% said it was neither effective nor ineffective, and 20% said it was ineffective (Ezzo 38). The third caption type was placed over a movie clip from the movie Back to the Future. The data from this phonetic caption type was also based on the students prior knowledge of phonetics, which 40% had not learned (Ezzo 40). The design of the captions were also distracting to 80% of the surveyed (Ezzo 40). Despite this, 60% of the students said it was effective for learning phonetics (Ezzo 41). The fourth caption type used a clip from the stand up comedy of Sabastian Maniscalco. The results from this animated caption of words/graphics showed 80% of students agreed the treatment improved English and vocabulary learning (Ezzo 42). Additionally, 80% agreed that the treatment enhanced or clarified the meaning of the words (Ezzo 42). Finally, out of all four caption treatments 90% agreed the fourth kinetic treatment was the most effective (Ezzo 42).

The first caption type is placed at the bottom of the screen. An emoji reflecting the emotion of the dialogue is placed to the left side of the text box. The textbox is a long box with rounded ends. The textbox is colored to match the emoji color. Black or white contrasting text is placed over the colored box. The second caption type is placed at



the bottom of the screen. It is designed the same as the first caption type. However, certain words are highlighted by using a different text color and are hyphenated/capitalized into syllables. The third caption type is placed at the bottom of the screen. White text is on top of a black background. Except for certain emphasized words that are done in yellow text with green backgrounds. Below those words there are phonetic spellings of those words also in yellow text with green backgrounds. The fourth caption type does not have a static placement, but moves throughout the duration of the clip. However, it does primarily stay on the right side of the screen. White text is placed over the video with no background box. Certain words are boldfaced and have accompanying graphic symbols that represent those words. Additionally, certain words like “ring” and “weird” are animated to reflect their meaning.

The audience for this project was English language learners in an online or classroom environment. The various treatments of the text in the captioning are used to effectively narrate the video clips, helping viewers learn the language. Three of the solutions mimic standard captioning in their composition. The fourth solution breaks free from static positioning. Seeing how English is a second language for deaf ASL users to learn, it is appropriate to compare studies developed for ESL/ELL tools in regards to this thesis problem statement. This study also seeks to use design to add additional meaning to written text towards enhancing learning. The most effective means to do that, out of the methods studied involve temporal or kinetic typography, which is a focal point of this thesis.



*4th Caption Treatment Screenshots from  
<https://vimeo.com/127063487>*

# Design Process

# Design Brief

## PROBLEM STATEMENT

a brief summary of your project, its importance, and the problem that you are addressing

Language is imperative for all spheres of life. However, the world heavily relies on spoken and written communication, which is more difficult to learn when one cannot hear or easily understand audible sounds. Deaf and hard of hearing children face obstacles in developing vocabulary due to the obstruction of hearing sound, which can lead to language deprivation resulting in a hindrance of further educational processes and a higher risk of mental health problems. In order to combat the potential language deprivation for such children, there is debate over the best approach to language for deaf and hard of hearing children. Unanimous is that, in some way or another, interventive learning approaches are necessary in order to sufficiently teach deaf and hard of hearing children language. Motion graphics offers a promising tool to help aid with language learning that should be further developed. In order to provide additional layers of richness to learning language, this project seeks to utilize graphic design and motion graphics to embed greater meaning into written words through visual association and motion. Body movement and paralinguistics are important for communicating, but are absent from written language. Motion graphics and kinetic typography can be used to replicate such nonverbal components of speaking in written form. Seeing how a word looks in written form in correlation with enhanced meaning through movement will ideally provide greater understanding and/or retention of the written vocabulary word.

## TARGET AUDIENCE

a description of your target audience, the end user, or consumer

The target audience for this project is multifaceted. The animations themselves would be created for deaf and hard of hearing children 4-6 years of age. However, the implementation of the animations would be done by parents and teachers. So the distribution of the animations over an online platform would need to target parents and teachers.

### Deaf and Hard of Hearing Children 4-6 years old

Children would be the primary consumers of this project. This age period is within the first through third grade where students are honing their early vocabulary and literacy skills. During preschool-first grade, children will be focusing on schoolwork for longer periods than before. Their attention will need to be held during lessons. During first grade, some children will begin to read independently. The language learning in earlier years will help in the future as by the third grade, children switch from learning to read to reading to learn, so children need to have solid language skills already built by that point.

### Parents

Parents seeking additional material for their deaf and hard of hearing child's language learning are a factor of the target audience. It is the parents who would be choosing to play the animations for their child. Parents have a plethora of language options to choose from including American Sign Language, Listening and Spoken Language, Total Communication, Cued Speech, Speechreading, Auditory-Oral, Auditory-Verbal, or any combination therein. The choice of language approach is also determined by whether the parent's are deaf or hearing themselves. Parents can introduce a visual resource to their children alongside any of these varied language approaches.

## KEY COMPETITORS

a list of similar organizations, products, or services

### Teachers

Teachers seeking additional material to include in their vocabulary lesson plans are a factor of the target audience. This would include both teachers who have deaf or hard of hearing pupils in their class, but also specific teachers of the deaf. Additionally, parents who homeschool their children would cross over into this targeted area as they would be both the parent and the teacher of their children. Parents who homeschool often seek online resources they can use to enhance their children's learning.

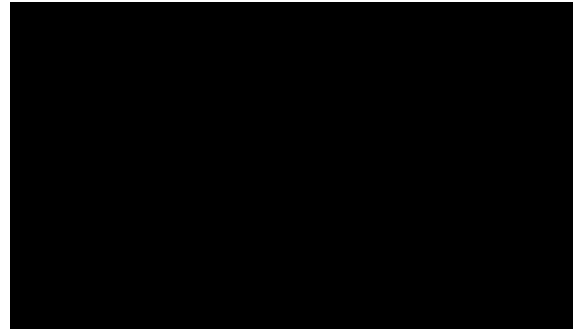
### Content Creators

Content creators will be able to utilize the visual library to cut down on costs of budget and time for their projects. Rather than having to create animation from scratch to include in their projects, they will be able to download project files and movie files to include in their work. They can also contribute to the library for others to use their material.

### English SingSing

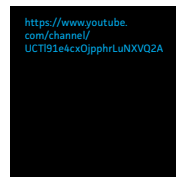
<https://www.youtube.com/channel/UCGwAAgYAnGMIVvJJA0EGA>

This YouTube channel was created in 2014. English SingSing creates animated video content for children that is meant to help them learn English in a fun appealing way. The various animations use rhymes, dialogue, song, rap, story, and phonics to drive the animations.

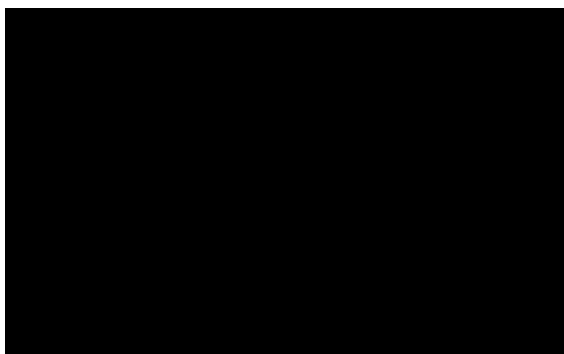


*Kids Vocabulary Compilation Screenshot from  
[https://www.youtube.com/  
watch?v=AXwevqvuDlo&list=PLi5rkhsE0L  
csBSFwFkG2dLdBVrgAm3Qs](https://www.youtube.com/watch?v=AXwevqvuDlo&list=PLi5rkhsE0LcsBSFwFkG2dLdBVrgAm3Qs)*

### Lingo Kids



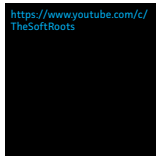
Lingokids is an app for kids 2-8 years old. Their company has trademarked their playlearning™ method. Their company appears on multiple platforms as they have their app, website, and have YouTube videos. Lingokids focuses on kids learning through playing. They say, in addition to language learning, their app promotes creativity, collaboration, critical thinking, and communication. Their material covers more than 3,000 English words covering 60 different topics. Children learn through practicing the alphabet, listening to audiobooks, and sing songs in English. Lingo Kids can be found online at <https://lingokids.com/> or <https://www.youtube.com/c/Lingokids/> featured. They are also found in app on Apple or Google play store.



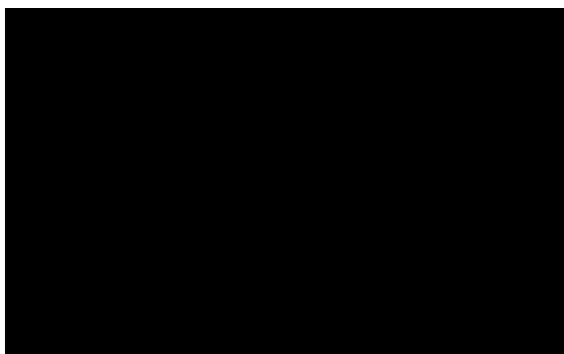
*Lingo Kids Screenshot from <https://lingokids.com/>*

### **The Soft Roots**

<https://www.youtube.com/c/TheSoftRoots>



The Soft Roots is a YouTube channel that produces 2D and 3D animated videos that teach children English. Their animations use entertaining songs along with the animation. It is aimed particularly for toddlers, kindergartners, and preschoolers. Their aim is to make fun, enjoyable, educational, and safe content for parents to share with their children.



*Word Animation Screenshot from <https://www.youtube.com/c/TheSoftRoots/featured>*



## Hear Builder

<https://www.hearbuilder.com/>

HearBuilder is a research based online software that utilizes interactive content to improve children's listening, auditory comprehension, and memory retrieval skills. The content is aimed at children in preschool through 5th grade. Content is organized into four main categories including Following Directions, Phonological Awareness, Auditory Memory, and Sequencing. They promote skills that will apply in all areas of the children's lives. The program has been found especially beneficial for those diagnosed with Auditory Processing Disorders. Additionally, it has been indicated that teachers of the deaf have found success in using the program with hard of hearing students especially those with cochlear implants.

*Game Play Screenshot from <https://www.hearbuilder.com/>*

## PROPOSED OUTCOME

what is the design solution that you believe will work best and why?

The intended design solution would be a website library of animated vocabulary words. The website would be open for people to share and use the animations. The word videos could be sorted by different categories, suggested grade level, or letters. The videos could then be viewed, shared, embedded, or downloaded for watching, implementing into a lesson plan, or including into additional created content games/videos/animations. The animated vocabulary words would be focused on using temporal typography to animate the words using design and motion to embed associations onto the word visually. The library of videos can constantly expand to include more animations as they are created. Some words may even have multiple videos as animators may interpret them visually in different ways. These videos could also be compiled into playlists so that all versions of one word can be viewed together.


## PROPOSED DELIVERABLES

created to solve your design problem

Proposed deliverables would include examples of word animations focused on a set of Homonym, Homophone, and Homographs and mock up of the website that would collect and distribute the resource.

- Homonym Animation
- Homophone Animation
- Homograph Animation
- Website Mockup

The deliverables will work together to offer a solution to enhancing deaf and hard of hearing children's vocabulary learning by creating the beginning content of an animated




vocabulary library. The animations will show how kinetic typography can embed greater meaning into otherwise static text, which would be compiled together into the online platform for utilization by the public.

---

## DESIGN CONSIDERATIONS

examples include function, purpose, environment, packaging, distribution




Areas of design consideration would include

- Incentive for animators to contribute to the animated vocabulary library?
  - Method of curating the submitted content?
  - Copyright factors for the ability to use the library content in other media?
  - Ease of use of the platform for dispersing the material and including in lesson plans, game content, and animations?
- 

## DESIGN CONSTRAINTS

any foreseen constraints that would affect your design decisions

Being a digitally produced solution, there would not be any material constraints. The biggest constraint would be time to produce both example animations and design a mockup version of the intended website.



# Design Process

The design process was two-fold for this project. First, I focused on designing the word animations. With animation, there are multiple steps before the actual animation is done. The majority of the time is spent planning out the animation. The process outline for creating the word animations was as follows:

## Word Animations

- Word Selection
- Inspiration
- Storyboarding
- Element Creation
- Font Selection
- Animation

Second, I focused on creating the mockup of the website. The process outline for creating the website mockup was as follows:

## Website Mockup

- Section List
- Sketch
- Wireframe
- Logo
- Build

# Word Animations

## Word Selection

The first matter to decide when creating the visual solution for this project was which words to use for the example animations. The example animations would show the general direction of animations to be compiled in the visual library. As there are a plethora of words that could be selected, the selection for the example animations was narrowed down based on the intended younger audience and research findings. For the intended audience, this particular animation solution is intended for youth aged 4-6 years of age where children are learning and then solidifying their reading and writing skills in school. Thus, the words for these example animations would need to be simple 3-4 letter words that children are introduced to early on.

Word selection for the animations was also chosen based on the research findings where similar words can be more difficult to distinguish. As outlined by Dudek-Brannan and the American Speech Language Hearing Association, double meaning words are an area of particular difficulty for deaf and hard of hearing students (Dudek-Brannan 2018)(“Effects of Hearing Loss...”). In order to focus on this specific area of double meaning words, three different word sets were chosen representing different categories of homonyms, homophones, and homographs including a word set that: has the same spelling different pronunciations (wind, wind), the same spelling same pronunciation (bat, bat), and has

different spellings same pronunciation (see, sea). Targeting these categories of words helps learners build awareness of the different meaning they may encounter based on context. Even though words such as sea and see can already be visually distinguished by the spelling, including these words helps learners match the correct meaning to spelling even though they are more distinguished by the different spellings.

## Wind

as in going around

## Wind

as in an air current

## Bat

as in the animal

## Bat

as in the movement

## See

as in perceiving with eyes

## Sea

as in the ocean

## Inspiration

In order to gain inspiration for each of the selected words, each word was searched to find synonyms, descriptive words, and visual representations of the words. This is based on the research that studied how children use background, contextual information, and imagery to gain understanding and meaning (Tucci et al. 197-198).

The animations needed to have this kind of contextual information embedded into the design, style, and motion of the words. Word lists, images, and sketches were compiled for each word into the following inspiration boards. During this collection process, it was important to consider and then filter out inspiration from the base meaning of the words only and not from additional counterparts. Although, some overlap is unavoidable.

For example, researching the word sea yields many results that include dolphins, boats, fish, nautical objects, and other sea themed elements. However, for the purposes of this project, the word sea needed to represent the whole ocean and not just a singular part that dwells in or pertains to the ocean. Otherwise the embedded meaning can be misconstrued to mean fish or boat instead of the full ocean.

Although, at the same time, every word could be represented in a multitude of ways. So there is no way to achieve the “correct” representation fully. Selection of what information is used to inspire the look and movement of the animated word will

be subject to the particular audience it is intended for (i.e. age and demographics etc.) and how the animator understands and sees the word. This point also leads into the second half of this project later where the website is developed because the vision of the website would allow for multiple versions of words to be posted together. In this way, a range of meanings for the same word can be perused.

## Areas of Inspiration

- Synonyms
- Descriptive Words
- Visual Representations

## Inspiration Boards

- Word Lists
- Photographs
- Sketches

## Animation Brainstorming

### Word: Wind (around)



#### Word List Ideas

- curve
- twist
- path
- turn
- bend
- zigzag
- weave
- snake
- meander
- wrap
- fold
- entwine
- lace
- coil
- roll

1. [https://www.amazon.com/Automatic-Machine-Electric-Babylock-Accessory/dp/B075QXKR9S?pf\\_rd\\_p=1](https://www.amazon.com/Automatic-Machine-Electric-Babylock-Accessory/dp/B075QXKR9S?pf_rd_p=1)
2. <https://i.pinimg.com/originals/46/ca/e2/46cae260a9cad850a6415303d461185c.jpg>
3. <https://images.swing-sets.biz/turbo-tube-slide-18Sk7MygrdSAAA.jpg>
4. <https://myplacetoyours.com/2011/12/the-carpenter-and-the-staircase.html>
5. <https://9gag.com/gag/aQdGZDq?ref=ios>

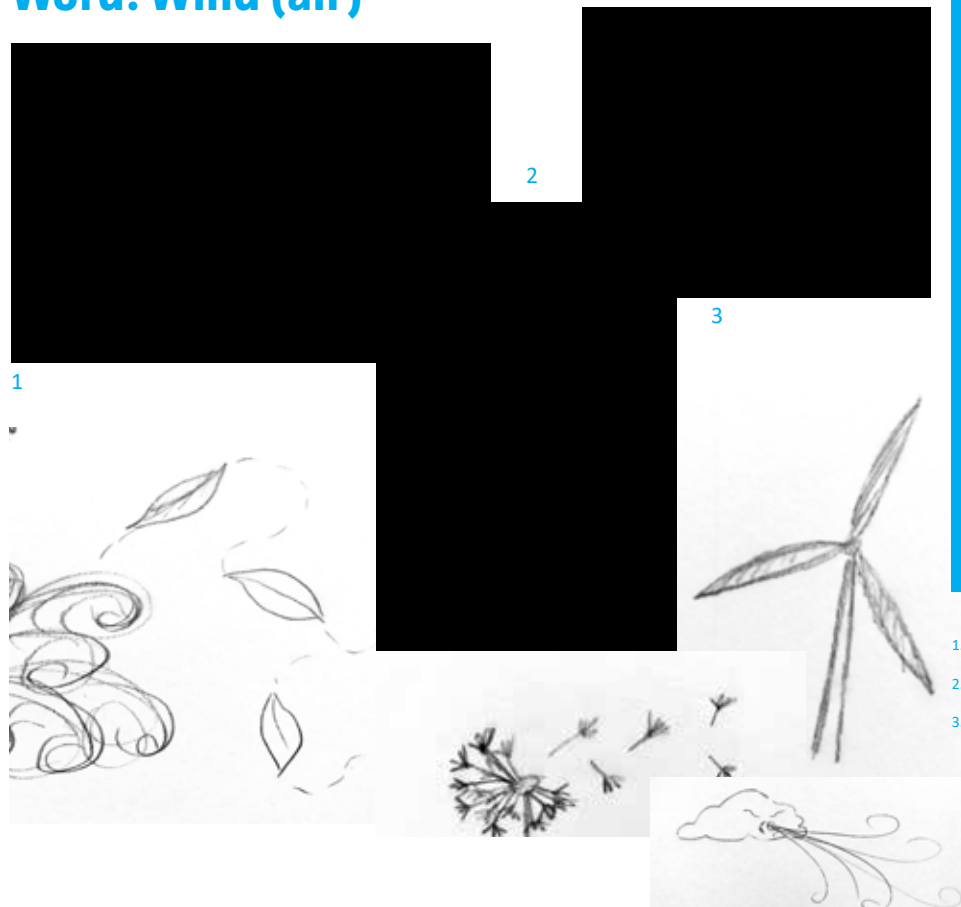
### Wind Inspiration

This collection of ideas shows a range of visual representations of the word wind. However, some representations such as the spool of thread and the DNA will not be as easily understood as the image of a slide or road to the intended younger audience.



## Animation Brainstorming

### Word: Wind (air)



#### Word List Ideas

- weather
- breeze
- gale
- hurricane
- draft
- blow
- breath
- puff
- trees
- plants
- leaves
- dust
- particles
- flag

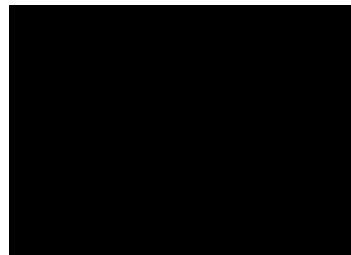
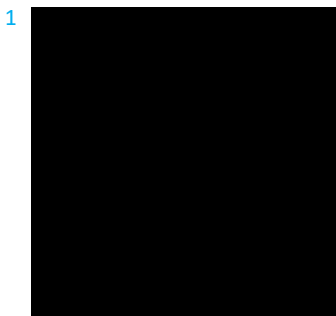
1. <https://www.wonderworksonline.com/wp-content/uploads/1970/01/Wind.jpg>
2. <https://ruffledblog.com/australian-countryside-wedding/>
3. [https://images2.minutemediacdn.com/image/upload/c\\_crop,h\\_704,w\\_1254,x\\_0,y\\_66/f\\_auto,q\\_auto,w\\_1100/v1554999759/shape/mentalfloss/504535-istock-531919250.jpg](https://images2.minutemediacdn.com/image/upload/c_crop,h_704,w_1254,x_0,y_66/f_auto,q_auto,w_1100/v1554999759/shape/mentalfloss/504535-istock-531919250.jpg)

### Wind Inspiration

This collection of ideas shows a range of visual representations of the word wind. However, since air is essentially invisible, the focus is placed on objects that are typically manipulated by wind. Some of these items are man made like a flag or windmill and some elements are already found in nature such as leaves, flowers, and grass. Since air is part of nature using another element in nature to describe air is preferred.

## Animation Brainstorming

### Word: Bat (repel)



#### Word List Ideas

- baseball
- sport
- ball
- game
- wood
- hit
- impact
- repel
- swat
- shew

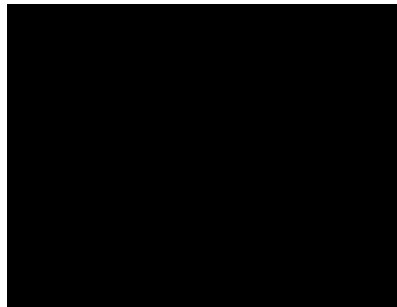
1. <https://www.amazon.com/s?k=sports+aesthetic+baseball>
2. <https://www.tabletenniscoach.me.uk/wp-content/uploads/2019/09/baseball-bat.jpg>
3. <https://pbsartstudio.blogspot.com/>
4. <https://baseballboom.com/wp-content/uploads/2019/02/ichiroswing.jpg>
5. <https://bakosports.com/wp-content/uploads/history-of-wood-baseball-bats.jpg>

### Bat Inspiration

This collection of ideas shows a range of visual representations of the word bat. The main idea that appears with this word is in reference to the sport baseball. However, it could also be linked to the action of batting away or swatting a bug for example. So then it is a matter of determining which motion and background embeds the most meaning. Along with which element is most plausible for animating as the words will be the actors for animations.

## Animation Brainstorming

### Word: Bat (animal)



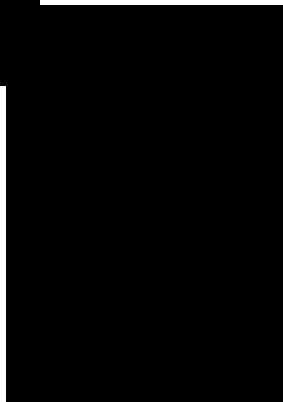
1



3



2



4



#### Word List Ideas

- animal
- wings
- nocturnal
- night
- fangs
- dark
- halloween
- moonlight

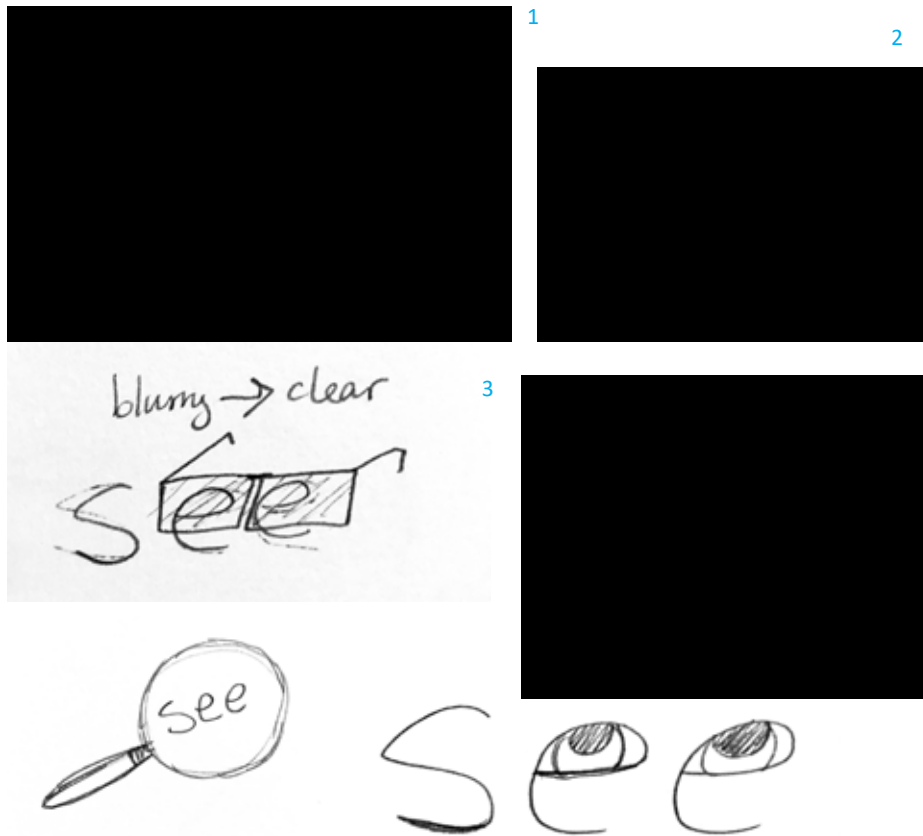
1. <https://i.pinimg.com/originals/0f/63/b8/0f63b850e16849380b4ed8cba57df3d7.jpg>
2. <http://www.batcon.org/about-bats/bats-101/>
3. <https://i.pinimg.com/originals/ff/62/4c/ff624c103b02b420f98d797731ad4b44.jpg>
4. <https://batsrule-helpsavewildlife.blogspot.com/2016/08/national-flying-fox-forum-queensland-au.html>

### Bat Inspiration

This collection of ideas shows a range of visual representations of the word bat. This word is more straight forward than others as its meaning pertains to a specific animal. However, areas can still be explored as to how to best represent that animal. For example, bats or even vampires are often associated with Halloween.

## Animation Brainstorming

### Word: See



#### Word List Ideas

- eye
- sight
- focus
- discern
- perceive
- glimpse
- notice
- understand
- grasp
- comprehend
- realize
- glasses
- microscope
- magnify glass
- clarity

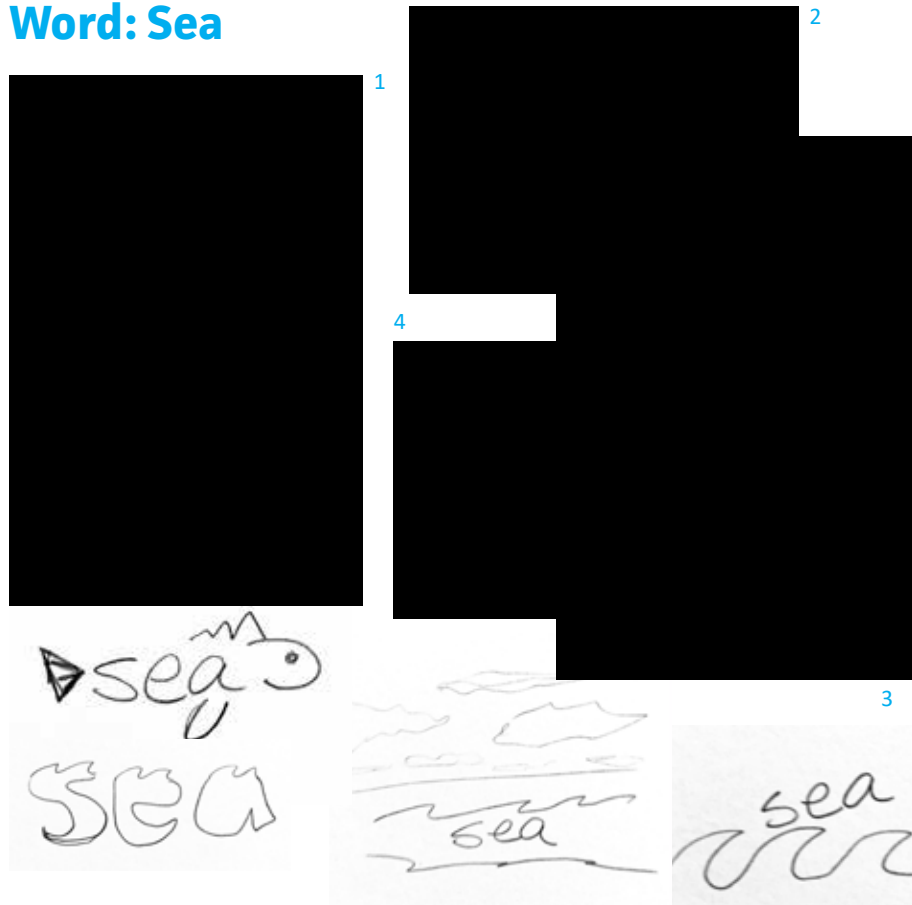
1. <https://excellencewithyouinmind.wordpress.com/2016/01/23/i-refuse-to-grow-up-but-not-in-the-way-you-think/>
2. [http://i1142.photobucket.com/albums/n612/chicityfashion/chicityfashion\\_album\\_part2/\\_DSC7371.jpg](http://i1142.photobucket.com/albums/n612/chicityfashion/chicityfashion_album_part2/_DSC7371.jpg)
3. <http://www.7daystime.com/wp-content/uploads/2014/01/See-eye.jpg>

### See Inspiration

This collection of ideas shows a range of visual representations of the word see. Inspiration to represent this word mainly involves the eyes, but extends into tools that can help you see better such as eyeglasses or a magnifying glass.

## Animation Brainstorming

### Word: Sea



#### Word List Ideas

- ocean
- salt
- water
- expanse
- marine
- waves
- nautical
- blue
- spalsh
- foam
- seaweed
- fish
- sealife
- boats
- swimming
- beach
- sand

1. <https://thecameronteam.net/15-color-palettes-inspired-by-the-ocean/>
2. <https://www.puzzlewarehouse.com/35055-Dolphins-500-pc-puzzle-NEW-35055.html>
3. [https://www.flickr.com/photos/lo\\_straniero/3890053479/](https://www.flickr.com/photos/lo_straniero/3890053479/)
4. <https://www.projectarian.com/2018/07/22/weekend-afghan-mermaid-net/>

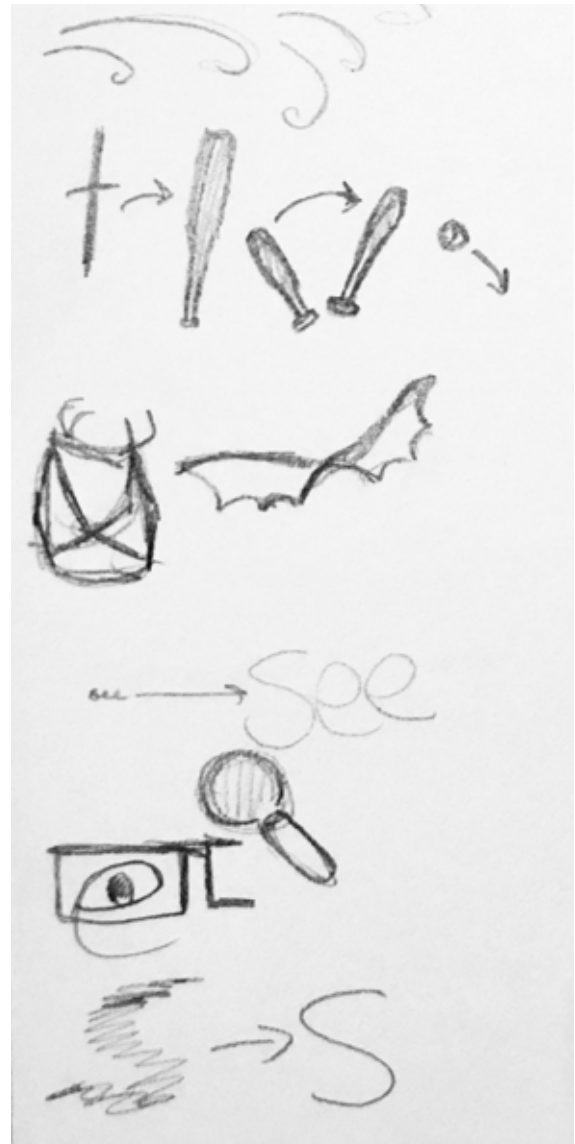
### Sea Inspiration

This collection of ideas shows a range of visual representations of the word sea. There are many elements that can reference the sea such as the images of dolphins, a coral reef, fish, and boats or ships. However, the animation needs to represent the sea as a whole and not just a part. However, some overlap is unavoidable as representation of the sea as a large mass of water can easily be misconstrued as detailing a singular wave in that water.

## Storyboarding

Having explored inspiration for each word selection, the next step was to build on the associations found and create storyboards for each animation. Storyboarding is an important step for planning out an animation. The storyboard shows the elements that will be included. The layout of the scene. The projected motion of the elements and the motion of the camera. The storyboard is where the first rough idea of the timing is captured. As discussed in the research chapter above, timing is crucial for animation. The first subject that Whitaker and Halas dive into after introducing the importance of timing is about the storyboard. Whitaker and Halas say that, "The storyboard should serve as a blueprint for any film project...It is at this stage that the major decisions are taken as far as the film's content is concerned" (Whitaker & Halas 5). Additionally, the storyboard can be observed to see if there are any foreseeable problems that could occur during the building or animating phase.

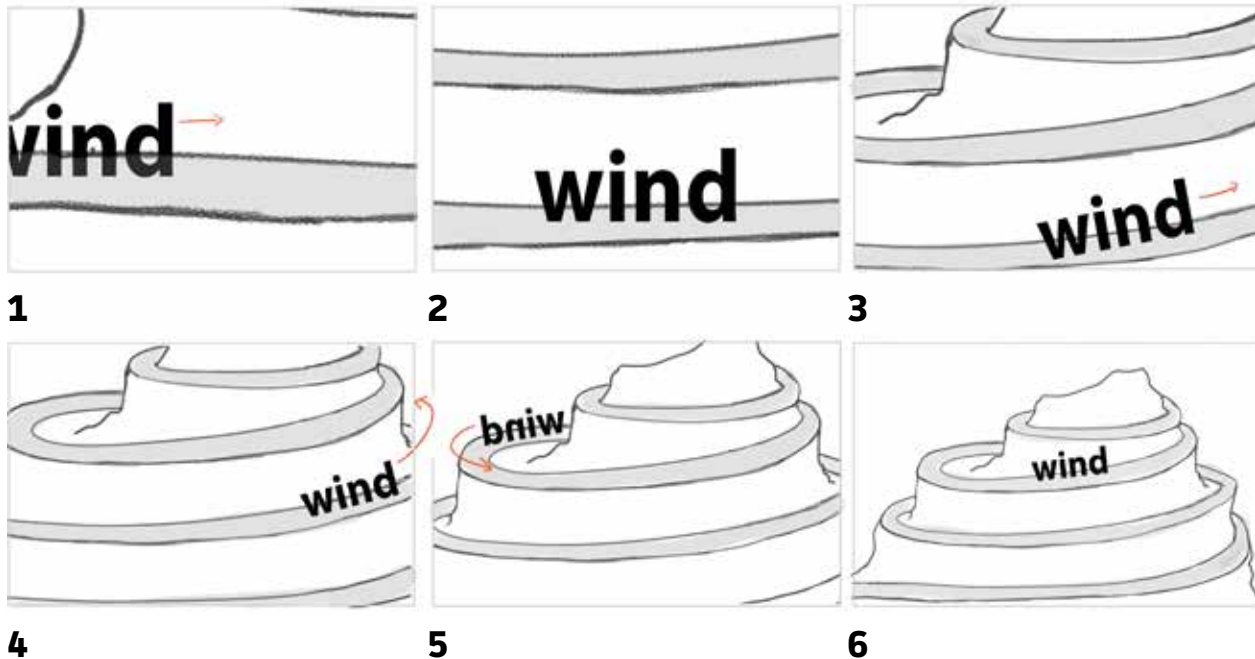
Since the intended animations are short, the following storyboards are paired down to 6 frames each. Each frame shows the major developments of the elements throughout the animation. In order to have a more fluid ability while brainstorming the storyboards, I started by sketching with paper and pencil first. Even though you can ctrl+z in a digital program, it was easier to get the ideas flowing with pencil. Once the main ideas were sketched out, I then moved into Photoshop and drew the final storyboard frames digitally within a storyboard template.



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## Animation Storyboarding

### Word: Wind (around)



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### Wind Storyboard

For the wind animation, I decided to create a winding path up a mountain. Out of the inspiration images, I found this example to be the most recognizable by the intended audience. In place of a car traveling the road though, I placed the word making its way around. I also laid out a camera movement with the camera starting close up to the word and the road before panning out to show the whole scene.

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## Animation Storyboarding

### Word: Wind (air)



---

### Wind Storyboard

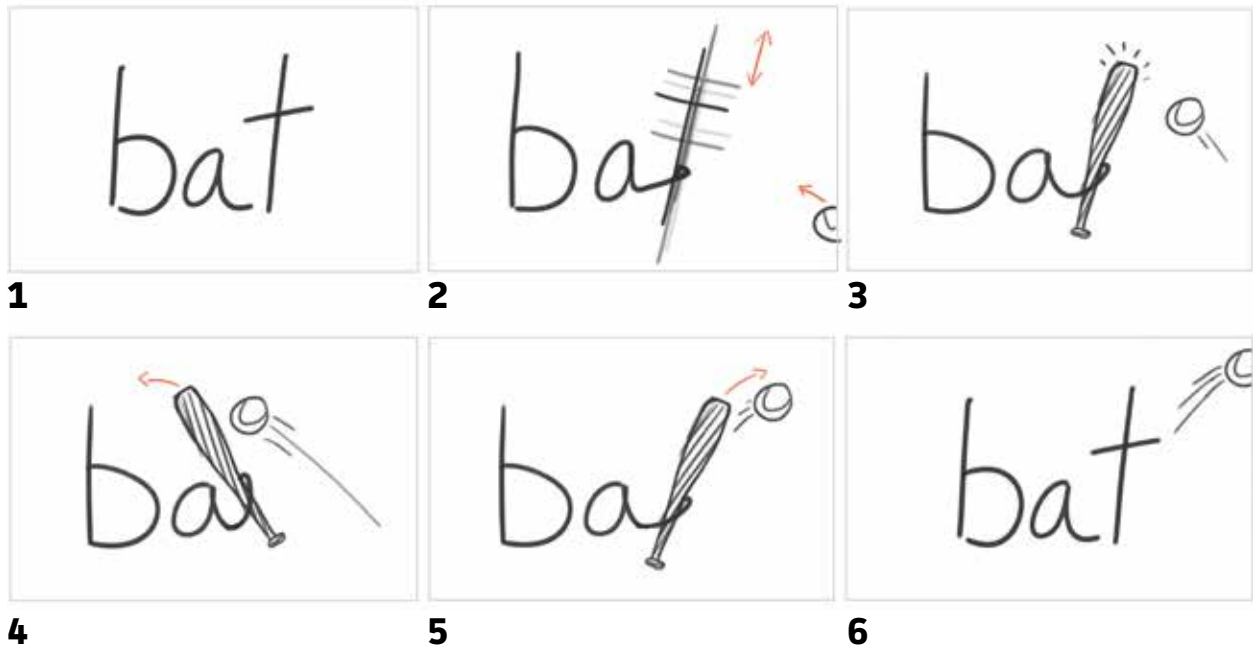
For the wind animation, I initially planned to go with the reference of leaves blowing in the wind. As the storyboard shows, the wind would be visually represented by the swirls traveling from left to right across the screen while the camera stays in a solitary position. Then along with the leaves the swirls would push the word onto the screen before whisking it away again. However, the word needs to remain on the screen long enough to be readable, rather than being stagnant during that time, the arrow indicates the appendages of the letters still being affected by the swirls despite the word pausing at the center of the screen.



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## Animation Storyboarding

### Word: Bat (baseball)



---

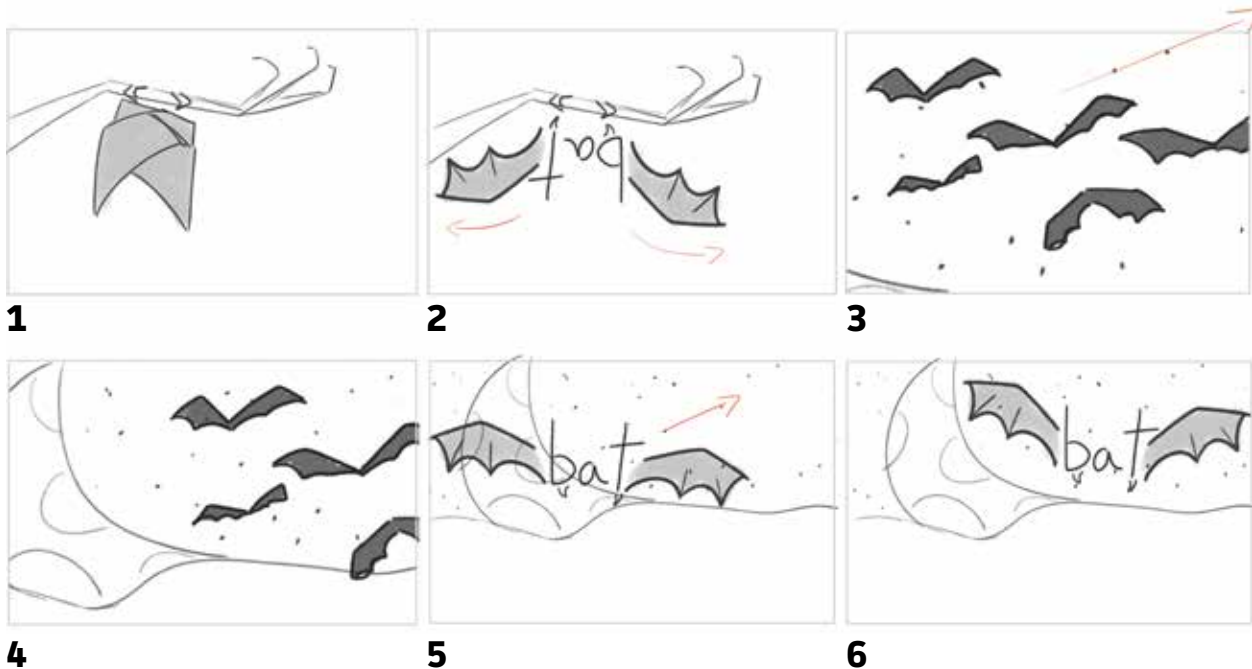
### Bat Storyboard

For the bat animation, I decided to go with a reference to a baseball bat. Turning the letter “t” of bat into a baseball bat was the perfect opportunity for kinetic typography. Initially, I thought the leg of the “a” would be the “batter” as seen in the storyboard. Even though it is clear the “t” has transformed into a bat, it was important to show the action of batting so a ball flies in from the right side of the screen, but the camera remains still.

---

## Animation Storyboarding

### Word: Bat (animal)



---

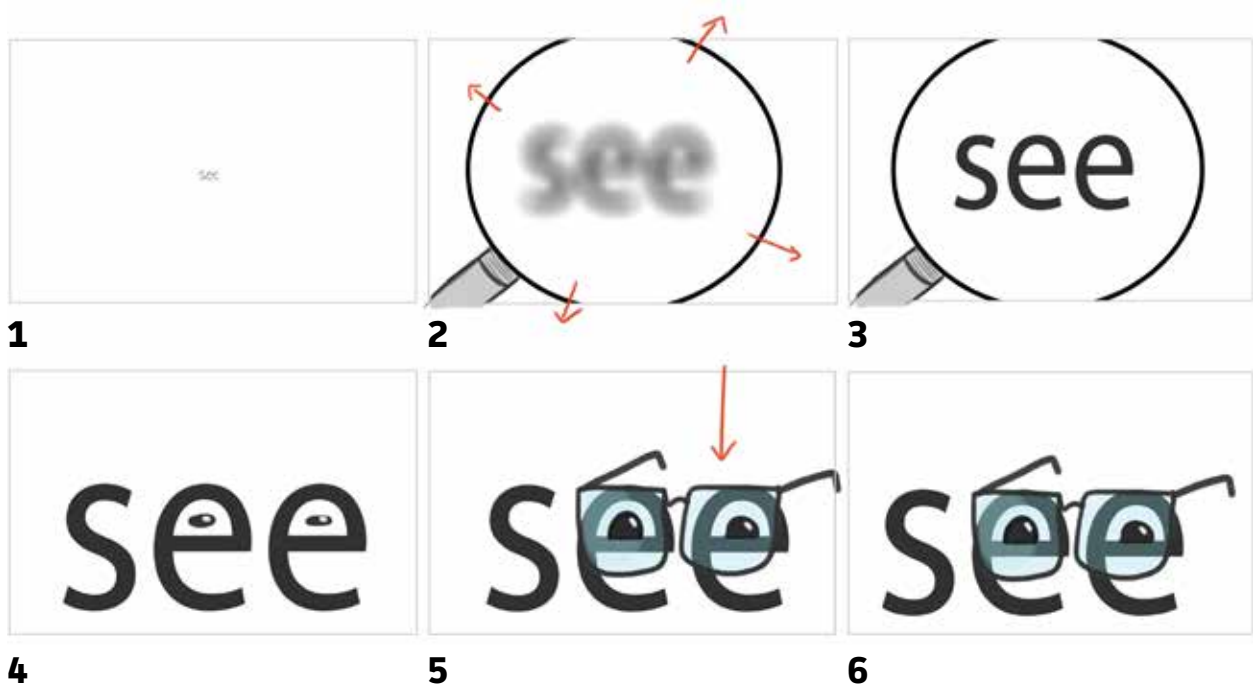
### Bat Storyboard

For the bat animation, the main component of the animal was already a given. However, I had to decide what other elements would be included with the scene and how the bat would move. Many reference images of bats include them hanging upside down, so I initially used this to inspire the beginning of the animation with the bat opening up its wings before flying away as seen in the storyboard.

---

## Animation Storyboarding

### Word: See



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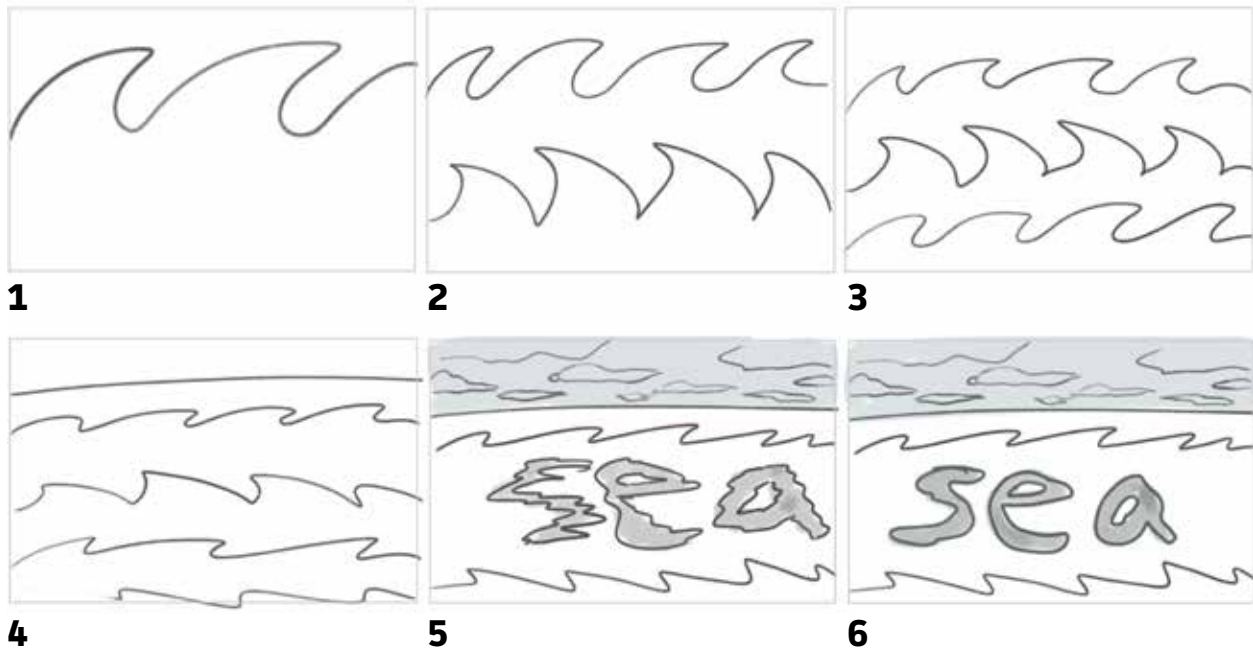
### See Storyboard

For the see storyboard, I wanted to play on the viewers experience by making the word unreadable or indistinguishable at first and then use a magnifying glass to make it visible to see. However, I also had the idea of making the letter “e”’s in see into eyeballs and giving them glasses. So I combined both ideas together.

---

## Animation Storyboarding

### Word: Sea



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### Sea Storyboard

For the sea animation, I wanted to create a seascape. However, like the wind (around) animation. I decided to use camera motion to start zoomed in on the waves before panning out to the full scene. Then I intended the letters to be made out of the sea foam of the waves. Once the letters became visible they would move with the motion of the water.

## Element Creation

The elements for the animations were created in Adobe Photoshop. The shapes were drawn on separate layers and clipping masks were used to shade the shapes for added detail such as the paper texture applied to the elements. The look of this set of animations includes brighter colors to catch the eye of the intended audience. The style also consists of a storybook/paper feel that will appeal to the younger viewing audience. At the same time, colors were chosen to reflect how each object appears in the real world as is important for building off of the audiences pre-existing knowledge to embed meaning as discussed in the Lau & Chu study above.

## Animation Backgrounds



**Wind (around)**



**Wind (air)**



**Bat (repel)**



**Bat (animal)**



**Sea**



**See**

## Animation Assets



## Font Selection

A different font was chosen to represent each word. The fonts were chosen based on the meaning of each word and the characteristics of the visuals being portrayed. It was also important for the fonts to be readable by the audience. Additionally, the Turkish study by Şilbir et al. found that young students responded best when the font reflected their style of hand writing. Children's handwriting is not often uniform, so there was flexibility in choosing a more stylized font vs. a more monotone font that would typically be considered readable.

---

## Animation Fonts

**TW Cen MT  
Condensed**

Blue Goblet

**CUBANO**

Wind (around)

Wind (air)

Bat (repel)

Chuancy

Chenai

Arial

Bat (animal)

Sea

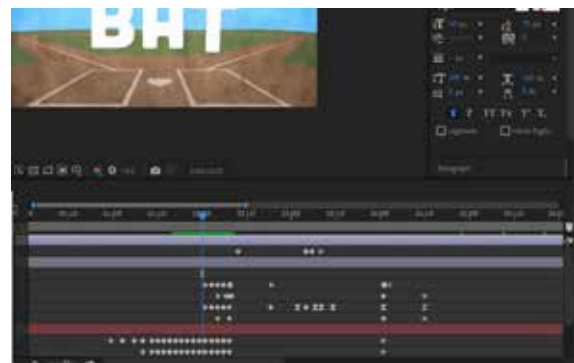
See

## Animation

The animation was completed using Adobe After Effects. The Photoshop elements were imported into After Effects directly as layers so that each piece was separate for animation, but if changes were needed the file could be easily updated. Key frames and effects were used to create the motion. Where necessary the speed graph and bezier curves of the key frames were altered to refine the look and timing of the movements.

It was important to keep the animations short as to not lose the interest of the audience. Additionally, the animations should be kept short since they are also meant for incorporating into other work (i.e. other presentations or videos) rather than being solely a stand alone entity. A factor that could have been considered was making the animations loopable so that they could play for any amount of time.

While the background of the animations and additional elements are included in the full animation to capture the meaning of the words, it was crucial to animate the letters themselves to move in some way. This is because (1) as seen through the above research, meaning can be embedded directly onto the word through the motion and (2) so that the word animations can also be saved through the accompanying website with an alpha channel transparent background for overlaying just the text onto a different background or video.



# Website Mockup

## Purpose

The purpose of the website is to serve as a collection and distribution system as a library of animated vocabulary words. The website would be open for people to share and use the animations. The website provides a search filter for finding videos that start with a certain letter or pertain to a certain grade level or category of vocabulary. The videos could then be viewed, shared, embedded, or downloaded for watching, implementing into a lesson plan, or including into additional created content games/videos/animations (with or without the background so as to isolate the text if necessary). The library of videos can constantly expand to include more animations as they are created. Some words may even have multiple videos as animators may interpret them visually in different ways. These videos could also be compiled into playlists so that users can compile and save specific content to organized sections.

## Section List

The first step in figuring out how to design this website started by listing ideas for the web page sections that would be necessary to include. Since there are different targeted users, the sections need to be kept to a minimum and be as simple as possible so as to accommodate the various uses.

# Website Sections

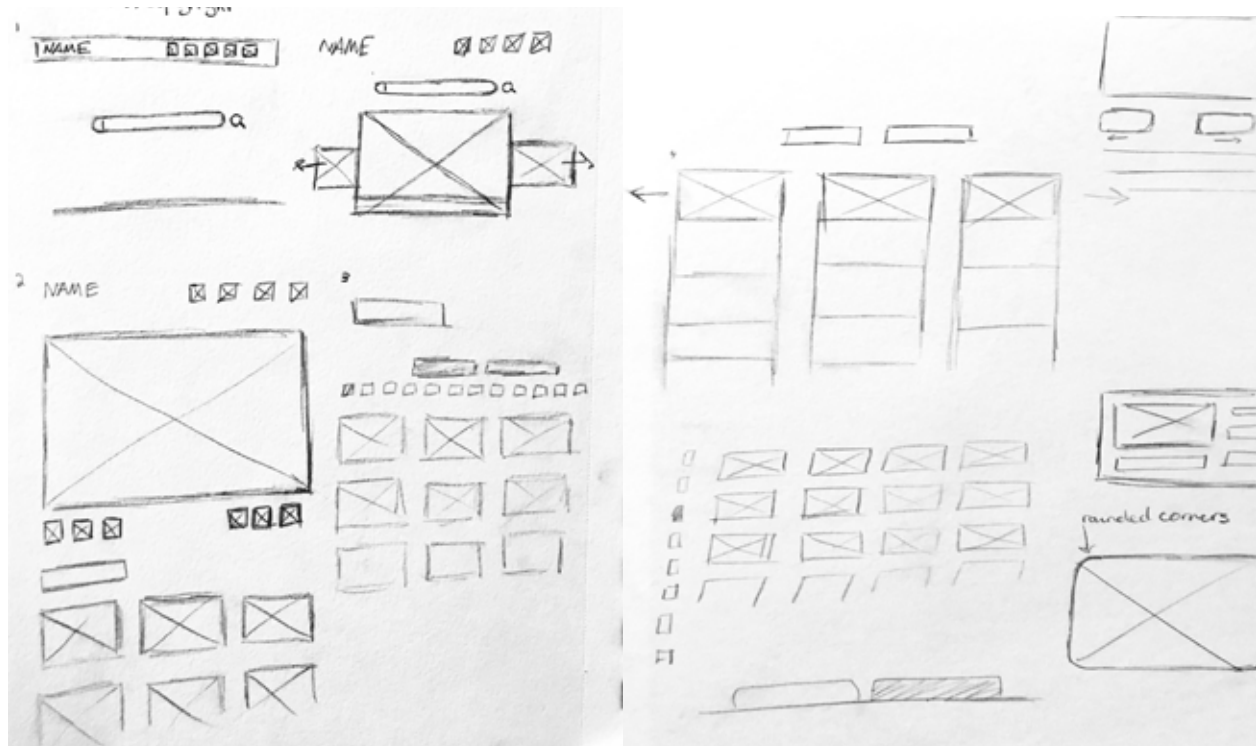
- Video Player (include buttons for share/download/embed options of the movie file with or without alpha channel and native project file)
- Home
- Search
- Index Search (topic/letter)
- Submission Area
- Playlists (topic/word)
- User Login



## Sketches

The next step in the website process was to create rough sketches of ideas for each of the sections on the list. I explored a few different options for each section while sketching. The sketching helped to flesh out the section ideas and for starting to visualize the end product.

## Website Sketches



## Wireframe

Based on the sketches, the next step for the website was to create wireframes of the main pages. Wireframes are similar to storyboards during the planning process. The homepage is laid out with a menu bar across the top that will be accessible from every page. The main focus is on the content of the website as previews of the animations are shown in the middle of the screen. The search bar is also front and center for easy searching.

---

## Website Layout

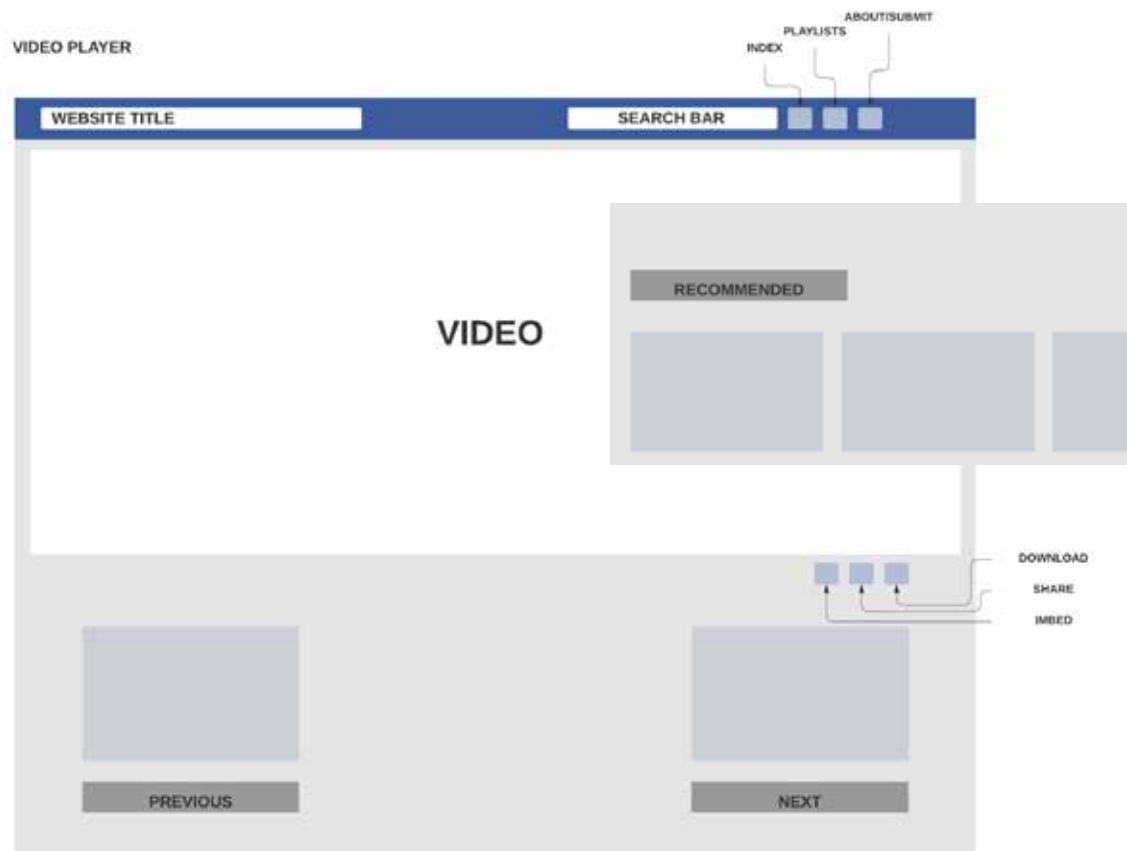


## Wireframe

The layout for the video player is kept simple with the menu bar across the top of the screen and the video area covering the rest of the screen. Then when you scroll down the page there will be options to go forward or backward through the animations. Below that there would also be a recommended section where animations of similar words or content would be suggested.

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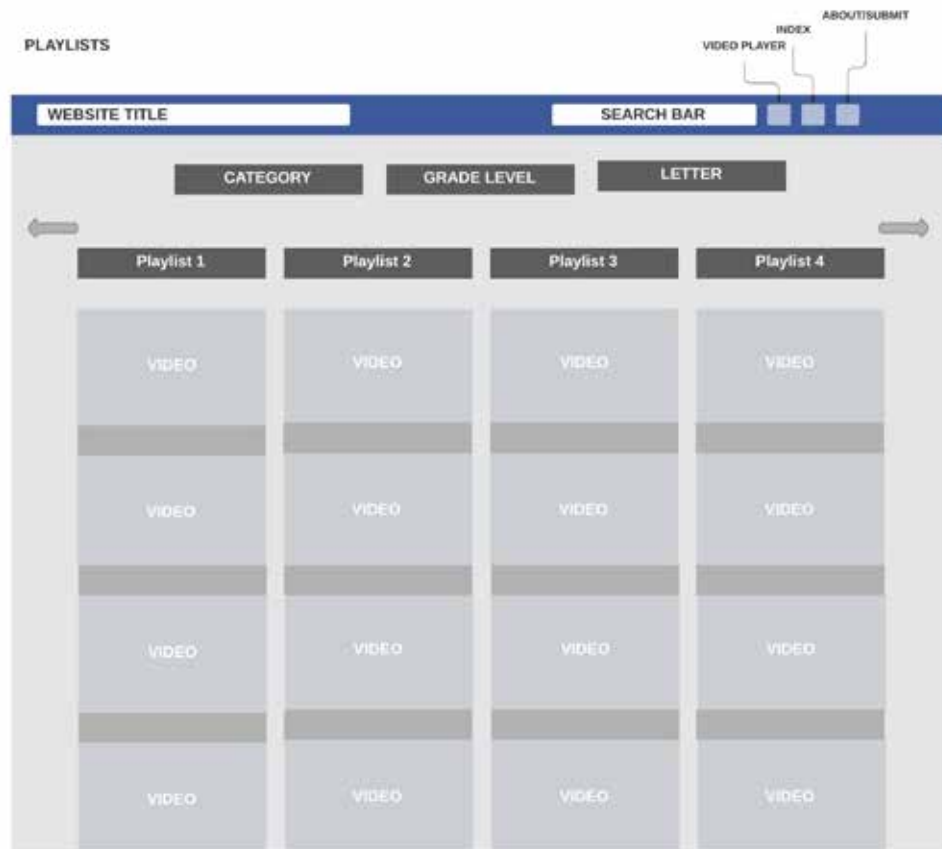
## Website Layout



## Wireframe

The layout for the playlists page uses vertical and horizontal columns to organize each playlist. Scrolling horizontally will show the various playlists while scrolling vertically shows the contents of the playlists. There would also be buttons to filter out and show only certain categories of playlists. In order to save to a playlist though, users would need to log in to an account.

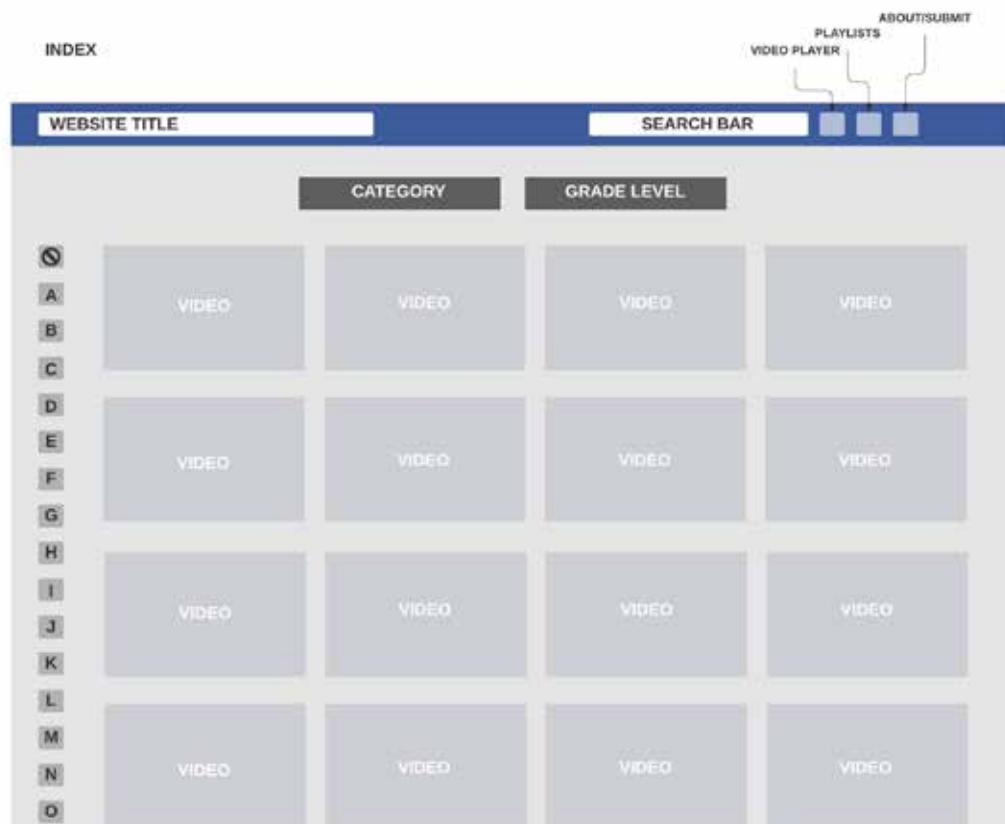
## Website Layout



## Wireframe

The index search page of the website has two different filtering criteria. In a vertical column on the left, the alphabet is shown in separate buttons. Different letters can be selected to filter videos that only start with that letter. The second search criteria that can be applied is the category and level tabs at the top. Choosing a selection from those tabs will filter the results to match the selections.

## Website Layout



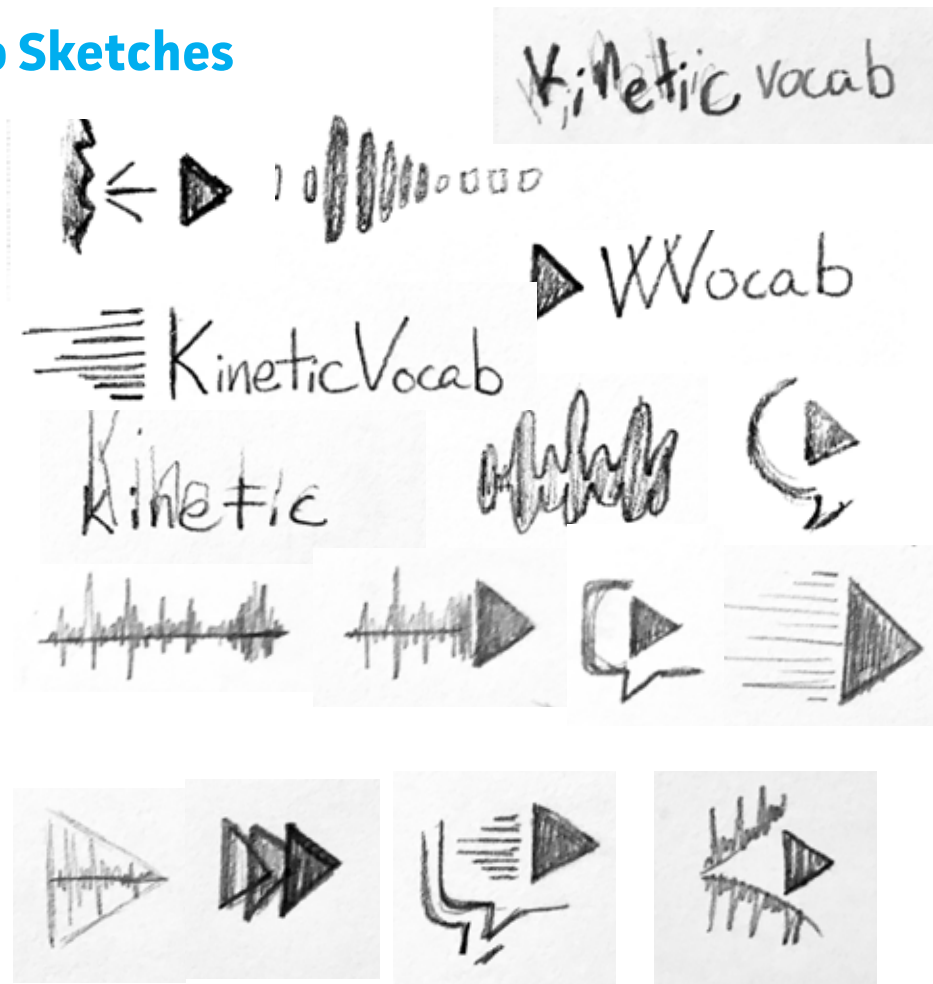
## Logo Sketches

The next element to figure out after the wireframes, but before building the site was the logo or wordmark for the website. This involved first choosing a title for the website. Since the website is built around the idea of a moving word library, the words kinetic and vocabulary were put together for the title KineticVocab. It was important for the logo to embody the idea of motion and vocabulary. Thus, I started by brainstorming words and synonyms that sparked ideas of movement and vocabulary. From that word list, I then started sketching out some visual ideas based on the words.

## Website Logo Sketches

### Word List Ideas

- motion
- kinetic
- driving
- propelling
- propulsive
- motor
- locomotion
- shifting
- stirring
- travel
- academic
- educational
- deaf/hh
- enrich
- support
- language
- supplement
- vocabulary
- words



## Logo

I placed the sketches into Adobe Illustrator and started working on the finalized version of the logo/wordmark. I played around with using a speech bubble to represent vocabulary and a play button with speed lines to represent the movement/animation aspect of the website. I also made some simplified versions where the speed lines were connected to the “K” in kinetic and the play button symbol was either placed at the end of the title or dropped off completely. The color scheme I used here was meant to be bright and eye catching. To show the fun playful nature of kinetic animation, but still look professional enough to feel educational. Thus, a mixture of oranges and blues were chosen as orange is bright and fun and blue is more serious.

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## Website Logo Iterations



## Building

The website was built using Adobe XD program. First, the wireframes were placed into the workspace. The wireframes acted as a template while building each website section. The websites main components were created first before any colors or details were added.

When it was time to add color to the website. I used the same color palette from the logo design. Most of these colors are used in the top menu bar of the design while the background is a solid black texture. The black textured background was chosen for two reasons (1) it resembles the look and feel of a chalkboard which reinforces the educational properties of the website and (2) a dark background helps the eye to focus on the video content.

Once the design was built, the next step was to use the prototype tab in Adobe XD to make the mockup of the website. Different components of the prototype capabilities were used. Certain elements in the interface change based on the mouse hovering over them. Other elements are scrollable and the buttons are clickable. The user login menus were made to be able to overlay on the other pages of the website. The menu was also set up so as to be accessible throughout the entire mockup.

To give an idea of how the animations would look in the website, screenshots of the example word animations were placed into some sections of the website. Additionally, some stock images were used as example thumbnail images.





# **Final Work**

# Final Work

## Research Motivated Decisions

The above research influenced the results of the final work in multiple ways. First, as discussed during the design process, the word selection was chosen based on the research by Dudek-Brannan and the American Speech Language Hearing Association (“Effects of Hearing Loss..”). While the principle of kinetic vocabulary could be applied to any range of words, this thesis focused the solution on young deaf or hard of hearing children aged 4-6 years old. Thus, the word selection was tailored to this younger audience and the typical challenges they face in language learning. One such area of challenge that is also a significant developmental milestone is double meaning words, which were used for this design solution.

Second, the design solution was based on research from Tucci et al. and Hald et al. This research found that semantic/iconic representation was among the best methods having supportive evidence for teaching grapheme-phoneme correspondence or an alternate version of decoding for deaf and hard of hearing (Tucci et al. 199). As well as evidence suggesting a link between viewing congruent animation of a verb reflection greater learning of the word by supplying the brain with more conceptual information for determining the meaning of the verb (Hald. et al. 118). Based on this research, the final design solution utilized existing schema that children would understand to embed the meaning of the words in the animation. Further,

the research from Lau & Chu also supported the use of age appropriate pre-existing knowledge in the design of the final solution. Lau & Chu wrote how the design should reflect how the pre-existing knowledge appears in the real world rather than having an artistic take (Lau & Chu 38). In this way, the final solution reflects this research by building the elements based on age appropriate pre-existing knowledge for the targeted audience and by keeping the elements based in the real world. For example, the skies are blue, the grass is green, the dirt is brown, etc.

Third, the research affected the final design solution with the information from Whitaker & Halas on timing and movement in animation. One of the key aspects of animation is the timing. Ideally, an animation should be clear enough that even if it was a coin or a circle moving on the screen the meaning of the movement would still be reflected. This final design solution focused on creating the illusion of realistic timing for the animated elements whether it was the words or the additional elements moving.

Lastly, the research from the study done in Turkey by Şilbır et al. laid out multiple points that influenced the final design solution. Şilbır et al. found that language animations for young deaf and hard of hearing students should include consistent style, suitable fonts, and simple explanations. These points influenced the design decisions. However, there were also points from this study that were not included that would improve the design solution such as including sound in the animation (despite the audience being deaf and hard of hearing) and opportunity for interactive use.

## Wind Animation

The final wind animation stayed true to the original storyboard plan. The word “wind” acts as a car traveling a winding road around a mountain. The car and mountain are age appropriate schema to build off of for the targeted audience. Although the word does not resemble a car visually, the movement is meant to replicate the car driving on the road. An additional element that could help this illusion is having the word bounce up and down slightly while moving forward as happens when a car is running especially on a bumpy road. Lastly, this animation is one solution where it works as a whole, but would not work for the purpose of the full solutions vision, as it would not make sense viewed with the word alone without the background.

---

## Animation Final Word: Wind (around)

View: <https://www.youtube.com/watch?v=OHhA8TsVFG4>



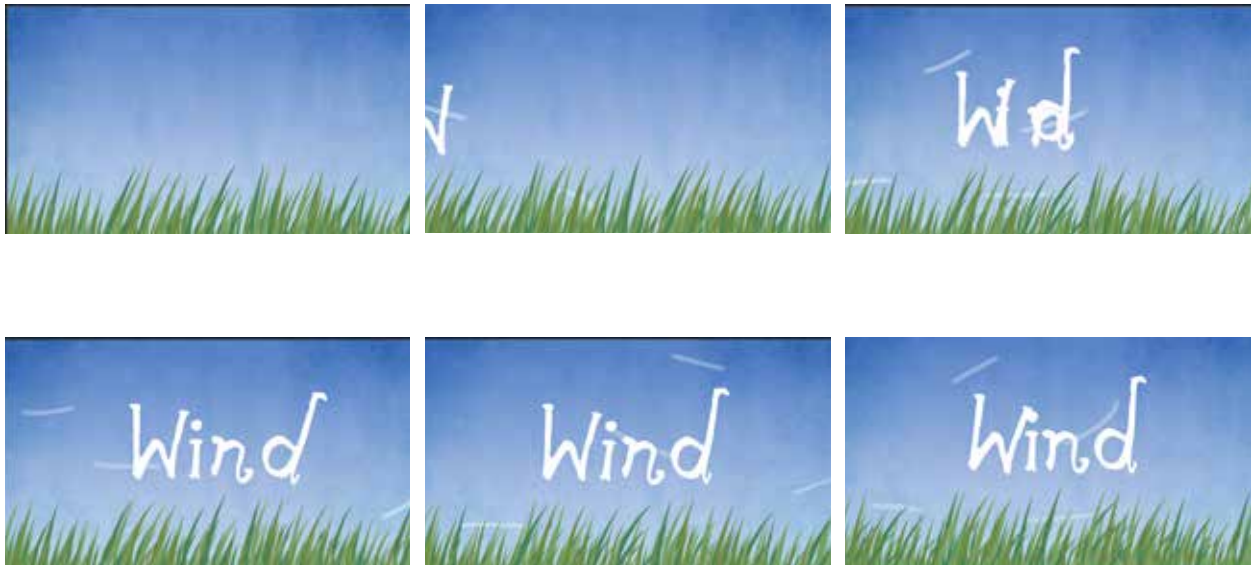
## Wind Animation

The final wind animation has some changes from the original storyboard plan. Mainly this would be the addition of grass at the bottom of the screen blowing in the wind. The grass was included to add an additional age appropriate element to gain meaning. Otherwise, the plan for the air “swirls” and letter treatment remained the same. The wind pushes in the letters to spell wind and even while the word is held in the center of the screen. The letters still move in response to the “wind”. This is a successful example of kinetic animation where the letterforms are moving independently from each other to create the effect. This animation would also work with or without the background so that the text could be isolated or composited on another video.

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## Animation Final Word: Wind (air)

View: <https://www.youtube.com/watch?v=1ROC�VJLZUE>



## Bat Animation

The final bat animation stayed mostly true to the original storyboard plan. However, the “A” does not control the bat as seen in the storyboard. Instead, the “T” changes on it’s own accord as it prepares to swing at the incoming baseball. The elements are age appropriate to aid meaning and the animation is successful in its kinetic properties with the letterforms moving separately and even morphing into different forms. Additionally, the word animation could be separated from the background for use in other content.

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## Animation Final Word: Bat (repel)

View: <https://www.youtube.com/watch?v=4C9LGUU-KrQ>



## Bat Animation

The final bat animation changed from the original storyboard plan. The animation was simplified from including the bat hanging from the tree to just a flock of bats flying across the sky and then the word bat is seen flying as well. The element of the bat is straight forward for this animation as it is designated for a specific animal. However, the background was created to evoke the sense of night and Halloween that is often associated with bats. This animation could be used with or without the background. However, in terms of kinetic animation the word bat is fairly static as the letterforms themselves do not move separately or transform.

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## Animation Final Word: Bat (animal)

View: <https://www.youtube.com/watch?v=36lpZdYWpA>





## See Animation

The final see animation remained true to the original storyboard plan. Here a solid background was used to place emphasis on the two versions of “seeing” that were being portrayed (1) with the magnifying glass and (2) with the glasses. An additional element added during the animation process was to keep the word fuzzy until the glasses are in place. In terms of kineticism, the “e”’s do transform into eyes, although the letterforms do not move themselves outside of growing. The animation can be used interchangeable with a different background.

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## Animation Final Word: See

View: <https://www.youtube.com/watch?v=w22JEZldG14>



## Sea Animation

The final sea animation remained similar to the original storyboard plan. However, the movement of the letters changed so as to be better suited for being able to work with or without the background. Here the letters fade in with a swooping wave motion and then continue to bob up and down as if floating in the water. The letters are kinetic as they stretch with the movement and move independently from each other.

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## Animation Final Word: Sea

View: <https://www.youtube.com/watch?v=uuFunckaVAc>





# Final Work

## Problem Solving

The animations create more specialized visual material content for teachers, parents, and content creators to utilize for deaf and hard of hearing children. This final design solution seeks to move in the direction of not only including type in animations, which has been done before, but putting more emphasis on creating kinetic typography versus temporal typography. As is discussed in the research above, Brownie categorizes various means of temporal type. This includes everything from static presentation such as silent film title cards to the fluid morphing of kinetic typography (Brownie 6-34). The majority of educational material uses static presentation of type rather than fully exploring kinetic interpretations. This design solution seeks to push forward the use of kinetic type in the educational sphere and future areas for greater communication.

The final design solution of the website mockup was created in response to the problems perceived during the research portion of this project. The vision of the website is to create a collection where multiple nuanced meanings of words can be explored, shared, and used. This includes use for parents, teachers, and content creators.

Most specifically, for content creators it creates a resource to use and share material for projects that saves time and resources without sacrificing the

opportunity to embed greater meaning in the text. All projects are constrained by different amounts of time, money, man power, and resources. Many content creators already rely on website that hold collections of images, fonts, color schemes, audio, music, and other elements. These types of collections save time for creators so that they do not have to make every element from scratch. The vision of the website is to add to this bed of resources for creators.

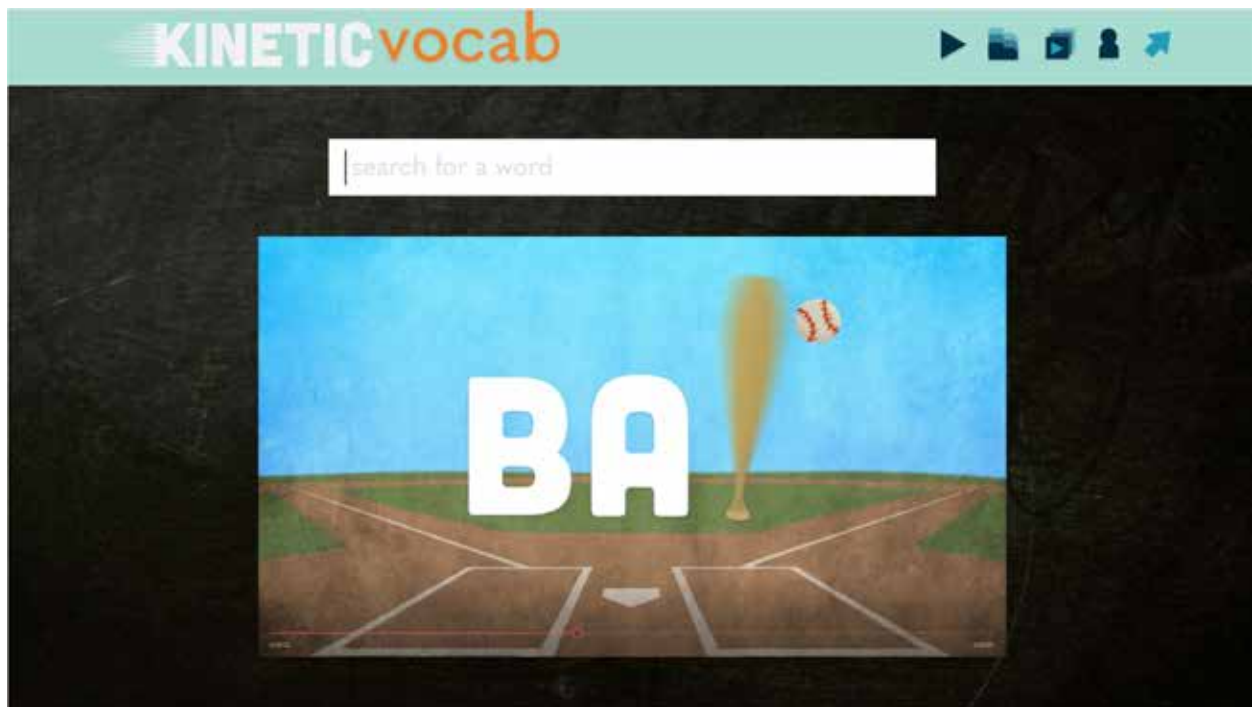
## Website

The final homepage is simplified from the original wireframe plan. The search bar is still front and center for easy searching. The video preview was simplified to just one box rather than having arrows or thumbnails to the left and right. The menu bar states the websites title and offers the menu options. To play on the kinetic aspect the KineticVocab mark is animated upon being moused over. Additionally, the menu options buttons slide to reveal their titles when moused over, that way it clears any confusion about which button goes to which page.

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## Website Final

View: <https://xd.adobe.com/view/03392fe9-5510-42fb-9533-284f111c73cd-566a/>



## Website

The final video player page remained similar to the wireframe plan minus the previous and next video thumbnails, but a strip of suggested videos is still placed when scrolling to the bottom of the page. The video area is the main element of focus with all the typical play/pause/mute/fullscreen options. Directly underneath the video are the icons for adding to playlists, downloading files, sharing, and embedding. Again, these icons reveal their titles when moused over so that users do not have to guess which button does what.

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## Website Final

View: <https://xd.adobe.com/view/03392fe9-5510-42fb-9533-284f111c73cd-566a/>



## Website

The final index search page remained true to the wireframe plan. Although, it was retitled to word library to make the page more easily understood for the user. Additionally, when you type into the search bar it automatically takes you to the word library page when showing the results of the search.

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## Website Final

View: <https://xd.adobe.com/view/03392fe9-5510-42fb-9533-284f111c73cd-566a/>



## Website

The final playlist section of the website remained true to the wireframe plan, although the design was simplified visually. The columns still scroll horizontally and vertically. This is a page where users would be directed to login to their account first before accessing as they must be logged in to save videos to a playlist. Additionally, the pages outside of the homepage and the search page include the search bar in the top menu for easy access.

## Website Final

View: <https://xd.adobe.com/view/03392fe9-5510-42fb-9533-284f111c73cd-566a/>



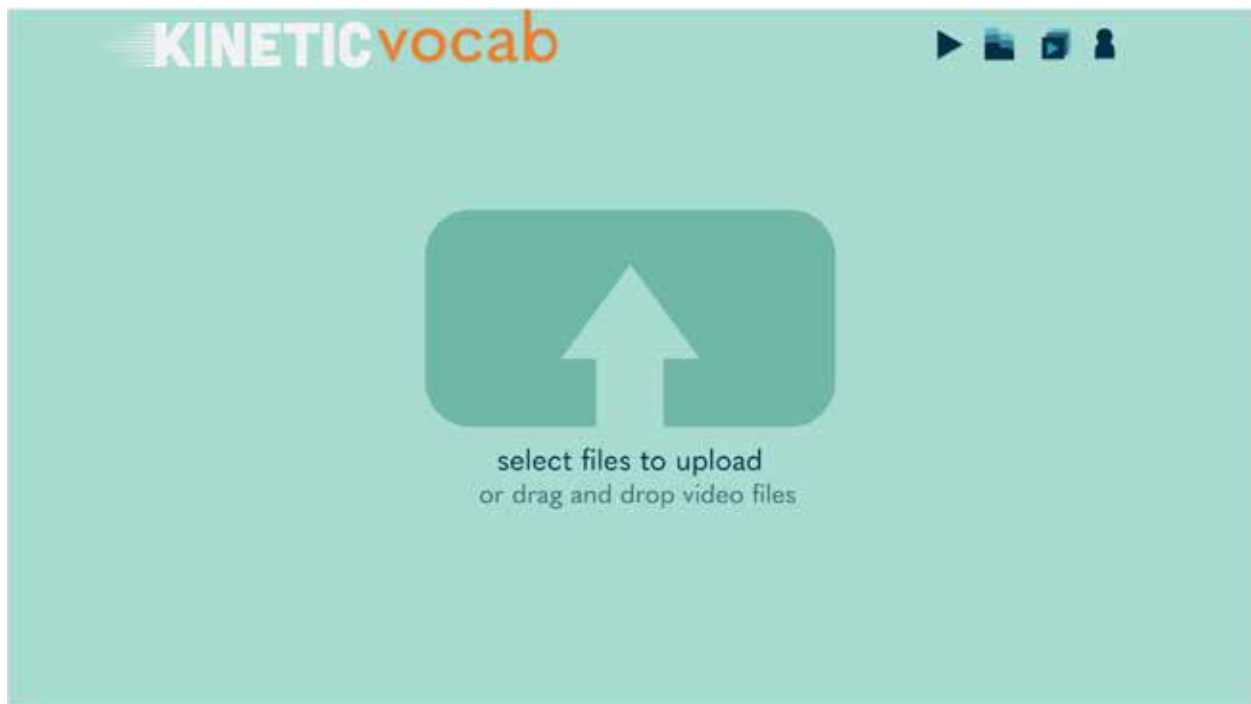
## Website

The upload page was kept simple where you can either click to add files or drag to add files to the library. Upon clicking or dragging the files in, a form would be pulled up to finalize the details before submitting. This is another page where the user would be directed to login first before being able to access the page. This way the users information can also already be inputted for under the information tab of the submitted video.

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## Website Final

View: <https://xd.adobe.com/view/03392fe9-5510-42fb-9533-284f111c73cd-566a/>



## Website

The login menus were kept simple and inline with the style of the top menu. Additionally, there would be a page after creating or logging into an account where a user could update and change information about their account.

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## Website Final

View: <https://xd.adobe.com/view/03392fe9-5510-42fb-9533-284f111c73cd-566a/>



my profile

**Create an Account**  
or **Login**

name

email

username

password

confirm password

☐ remember me?

**SIGN UP**



my profile

**Login**  
or **Create an Account**

username or email

password

(forgot your password?)

☐ remember me?

**LOGIN**

# Conclusion



# Conclusion

## Project Summary

In a world that heavily relies on communicating through sound, there are more hurdles for children who are deaf or hard of hearing when learning language. While there is debate about the best language approach between sign language, spoken language, and combination methods, researchers and educators have sought out the best approaches to teaching these students. The use of motion graphics has been utilized to animate text before in many different applications, it is not a novel idea. The thought of movement expressing the meaning of words is not a new concept. Even in the sense of using moving text in the context of deaf/hard of hearing for applications such as video captioning as was seen above has already been explored. However, the process has not become a prevalent tool for the deaf and hard of hearing despite the ability to embed enhanced meaning into the text. The educational and entertainment field are not utilizing the tool to its fullest extent. Most interpretations utilize only temporal type rather than fully kinetic typography.

This lack of utilization is what this project seeks to confront. This is done through the creation of the six example word animations, which focus on highlighting the meaning of the words through motion and context association. The visual solution then goes a step further with the proposal of the KineticVocab website. This website serves as a “library” for the animated movies where teachers, parents, and content creators can go

to use the animations for classes, entertainment, and to layer within projects without having to animate the words from scratch. Teacher's lesson plans could greatly benefit from being able to download kinetic vocabulary to easily include in their plans and presentations. Additionally, children's entertainment videos can improve by being able to quickly download and composite or edit in animated words over/in their work rather than using static text. Thus, the vision of the KineticVocab website would be a resource for these uses and fill the remaining gap that is not utilizing kinetic typography as a language tool.

This work then creates more specialized visual material content for teachers and parents to utilize for deaf and hard of hearing children by focusing on kinetic typography. It also creates a way to collect and share these kinds of animations so that multiple nuanced meaning of words can be fully explored visually. Lastly, it creates a resource for creators to use and share material for projects that saves time and resources without sacrificing the quality of including embedded meaning for words.

## Future Vision

Looking to how this project will be continued for growth and development in the future, there are both (1) areas of improvement to make and (2) further ideas branching off from this project. First, in regards to improvement, the main focus would be on the website element of the project. More research would be done into UI design in correlation with the above research so that the website can be further developed to exceedingly fulfill the vision. From that, the mobile environment

is also popular, if not more so than the computer, and would be a good area to explore for making a mobile version of the website as well. This could include the ability to composite the kinetic vocabulary over mobile photos and videos similar to the stickers and gifs in popular mobile apps seen now, but in this case it would add meaning more than being designed solely for decoration. Perhaps another area within this to consider would even be creating a more interactive or game based system utilizing kinetic vocabulary using the mobile environment.

Additionally, other areas of improvement would involve looking to solve problem areas with the vision. For example, as discussed in the design briefs considerations, a problem with the idea of a moving word library is that—there are many words. Since there are so many words that could be included in a motion word library, there needs to be a means to collaborate among animators to build the content. However, there would most likely need to be some sort of incentive for animators to do so, otherwise there would be little to no contributions. Otherwise, you would need at least one animator with a lot of time on their hands or there would be need to hire an animation team to fulfill a certain amount of animations.

Second, in regards to further ideas branching off from this project, there are three different ideas. The first idea would be to expand the scope of the animations and website to include word animations for older students to even adults who are deaf or hard of hearing. The focus of this project was on deaf and hard of hearing children aged 4-6 years old. Thus, the research into creating animations for this younger age range would not apply to an

older audience and would need to be explored. This would include figuring out how to animate larger words and more abstract words. While abstract words can be harder to animate as there are less obvious concrete visuals to work from, it is possible with kinetic animation as was seen in work such as the Malik, Aitken, and Waalen (2009) study on communicating emotions with animated text.

The second idea focused on aiding deaf and hard of hearing with animation would be creating animated phonics. Visual phonics exists with 46 different hand positions and corresponding movements which represent each of the 46 phoneme letter sounds of spoken English. By using one of these hand gestures cues to represent the corresponding phoneme it helps aid deaf and hard of hearing with their speech and reading learning. Most videos of visual phonics include a person making the hand signs while they either hold a flash card of the phoneme or it is displayed static on the screen. However, two options for improving these visual phonics with animation would be to animate the written phonemes with the established hand movements or to use animation technology that converts audio to motion. The first option would involve taking the already established hand movements, but combining and manually applying that movement through animation to the written phonemes. The second option would use a program like Adobe After Effects that has technology capabilities to convert audio clips into motion. A sound clip of each phoneme sound could be recorded and then that recording can be converted to movement inside the program and applied to the written phoneme.

The third and last idea branches off from utilizing kinetic typography as a language tool in the realm

of deaf and hard of hearing, would be to use kinetic vocabulary for learning new languages. The principles of kinetic animation as discussed in this project could be utilized to create word animations for a multiple language learning tool. As discussed in the introduction, language learning courses like the Rosetta Stone software uses text, images, and videos in their lesson plans. However, the addition of kinetic typography could improve the learners depth of understanding when learning a new language. This idea would require knowledge and research into foreign language learning. However, since expression of motion is a universal language, the possibilities of kinetic typography for foreign language learning is promising.

All of these ideas offer a wide variety of directions for the project to grow and develop. The project presented here is only one solution to improving communication among the world. Perhaps this project will spark more ideas for creating, distributing, and utilizing moving text in the future so that it will become a common place tool for all language learning spheres.

## Reflection

Throughout this project I have grown significantly as a designer. Coming from a fine art and animation background to studying graphic design, this project has solidified my understanding of designing for problem solving vs. artistic expression. Both problem solving and artistic expression are viable communication quests and noble pursuits, but both involve different struggles. This project has pushed me to continue forward and strive for greater understanding of design research and solutions that can change and impact the world.

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