

Decode

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Executive Summary

Decode is an accessibility tool in the form of a browser extension used on Google Chrome that, when active, alters the written content on your site of choice to accommodate your specific accessibility needs. The extension allows for total customization of settings such as font style, font color, page color, screen filters, and more. We are exploring the concept of web accessibility for cognitive impairments throughout our design process. As a team, we're passionate about making web browsing more accessible to students with cognitive and visual impairments. Our product, Decode, promotes the democratization of assistive technology by making it free and easy to use by all.

Why Decode? - Situational analysis

Assistive technology for cognitive and visual impairments are widely underrepresented in today's technology. By bringing to light the struggles that many people with these impairments experience we hope to create a larger conversation about assistive technology and designing for underrepresented groups. As Decode we hope to allow our users to feel empowered and assist them in their daily lives, focusing on creating a healthy relationship between technology and their assistive needs. Not only does this field allow us to learn how to design empathetically, but we are also able to create equitable works that ensure people of all backgrounds are represented.

Research question

Looking at the current accessibility design space, Decode's goal was to reassess how accessibility is approached today and address its current limitations. How are the current accessibility tools available as chrome extensions limited in what they can do to accommodate users with disabilities? How can we fill in those gaps with features and user experience that other competitors are lacking?

Competitive Analysis

Through our competitive analysis, we found that most accessibility tools on Google's chrome extension market had very few of the accessibility features that we researched. Most of them specialize in screen filtering and rarely on altering the actual content of a page. From our analysis, we discovered that while our strongest competitor, "HelperBird" had all the necessary features, the presentation of said features was overwhelming and counterproductive to the overall efficiency of the product. In order to avoid this, Decode focused on not only providing necessary tools and features through the design process but also ensuring that the user experience was at the forefront of every decision.

User Research

We want our users to feel confident by allowing DeCode help them and their visual/cognitive obstacles to navigate online media. By utilizing the customization abilities from DeCode, our users may work more efficiently and to their full potential.

Overall our users had a very positive experience with decode, with 80% of our users saying they would download decode, and found decode helpful. Our users all expressed how they had a very positive experience, for the one response we got that was a 3 for their likeness to download decode, they expressed they liked decode but did not suffer cognitive or visual impairments. 60% of our users polled said they found decode to alleviate their symptoms, with again one of our users not suffering from cognitive or visual impairments, and the other said if they had more time with the extension they felt it would help.

Research

Looking at the current accessibility design space, Decode’s goal was to reassess how accessibility is approached today and address its current limitations. How are the current accessibility tools available as chrome extensions limited in what they can do to accommodate users with disabilities? How can we fill in those gaps with features and user experience that other competitors are lacking?

From the research, we were able to come up with a list of the main symptoms that we are trying to alleviate that are associated with cognitive and visual impairments. Based on the research we were able to come up with a list of features that we thought Decode would need for each impairment. Along with those features we also looked at how color filters can impact a user’s experience on a site. Here is a table with a guide to how we justified solutions to our research question.

Visual/ Cognitive Impairment s	Symptoms to relive	Assistive Features	Color themes
Dyslexia	<ul style="list-style-type: none">• Words getting mixed up• Trouble reading out loud• Jumping around on a page too much (Focusing)	<ul style="list-style-type: none">• Line reader/ Dyslexia Ruler• Specific fonts• Ad Blocker	<ul style="list-style-type: none">• Avoiding plain white background• High contrasting colors• Light color backgrounds• The ruler can be any color preference
ADHD	<ul style="list-style-type: none">• Trouble focusing	<ul style="list-style-type: none">• Ad Blocker	<ul style="list-style-type: none">• Any color for line reader

	<ul style="list-style-type: none"> • Losing spot while reading • Distractions on page 	<ul style="list-style-type: none"> • Line Reader/Dyslexi a ruler 	<ul style="list-style-type: none"> • Colors are not as important
General Computer Usage	<ul style="list-style-type: none"> • Eye strains • Headaches • Blurred vision • Red eyes 	<ul style="list-style-type: none"> • Screen filter • Text color adjustments • Font size adjustments 	<ul style="list-style-type: none"> • Orange tint filter to relieve any eye strains • Lower Brightness and Pinkish/orange filter help with headaches. • Squinting can be helped with a Zoom filter, bigger text fonts.
Color Blindness	<ul style="list-style-type: none"> • Reading on pages with color that are difficult to see 	<ul style="list-style-type: none"> • Screen filter • Text color adjustments • Font size adjustments 	<ul style="list-style-type: none"> • Based on users' color blindness, there are different color-focused filters you can apply to assist with the lack of color blindness.

This table worked as a foundation for Decode, and how we build our features and user experience. Based on our user outcomes we allowed our research to influence how we curated our chosen features, to ensure Decode made an impact on the accessibility space.

Competitive Analysis

As an accessibility tool, Decode is up against many others in the market.

Through our competitive analysis, we had 3 main goals:

1. Explore their UX and see what we like
2. What the apps lack
3. Opportunities for our app

For our competitive analysis, we wanted to ensure that we looked at products that were in a similar market like us on google chrome. We felt that looking at the chrome extension marketplace; we could see what some of our competitors were doing right and what we could innovate. When we broadened our search to any type of accessibility tool offered, we found that most were either fonts or purchasable tools. We discovered that most went in a different direction than what we found useful for our space. So we focused on chrome (below are outlined some of the non-chrome extension tools on the market).

On the google marketplace, right away, we noticed that there was a lack of assistive technology that was for dyslexia in particular. There were plenty of text-to-speech and text modifying applications on the site, but only a few marketed to dyslexia. This was helpful because we got to see how saturated the market was with accessibility tools but none that specialized the market we were going for. Many of the accessibility tools on chrome have huge discrepancies in ratings and downloads; for example, Helperbird had over 20,000 downloads while ReadMate had almost 300. So this is something part of the google marketplace that we need to understand, how to market for an extension and its possible to break into the market. Below you will find links to competitors we found that we felt could help in the evolution of Decode.

Google Sheets of Competitive Analysis

Competitor	Read&Write	ReadMate	Helperbird	Readme	TurnOffTheLights	Screen Shader
Active Users	10,000,000+	284	10,000+	40,000+	1,000,000+	100,000+
Rating	3/5 stars	4/5 stars	5/5 stars	4/5 stars	5/5 stars	4.5/5 stars
Category	Accessibility	Accessibility	Accessibility	Accessibility	Accessibility	Accessibility

Features	Read&Write	ReadMate	Helperbird	Readme	TurnOffTheLights	Screen Shader
Screen Filter	✓	✓	✓	✗	✓	✓
Font Changes	✗	✓	✓	✗	✗	✗
Annotations	✗	✗	✓	✗	✗	✗
Text to Speech	✓	✗	✓	✓	✗	✗
Ad blocker	✗	✗	✓	✗	✓	✗
Dyslexia Ruler	✓	✓	✓	✗	✗	✗
Website	✓	✓	✓	✗	✓	✓
Language Support	✓	✗	✓	✓	✓	✗
Subscription	✓	✓	✓	✗	✗	✓

Link to sheet: [Atlantis Competitive Analysis](#)

Competitor	Read&Write	ReadMate	Helperbird	Readme	TurnOffTheLight	Screen Shader			
Active Users	10,000,000+	284	10,000+	40,000+	1,000,000+	100,000+			
Rating	3/5 stars	4/5 stars	5/5 stars	4/5 stars	5/5 stars	4.5/5 stars			
Category	Accessibility	Accessibility	Accessibility	Accessibility	Accessibility	Accessibility			
Features	Read&Write	ReadMate	Helperbird	Readme	TurnOffTheLight	Screen Shader			
Screen Filter	✓	✓	✓	✗	✓	✓			
Font Changes	✗	✓	✓	✗	✗	✗			
Annotations	✗	✗	✓	✗	✗	✗			
Text to Speech	✓	✗	✓	✓	✗	✗			
Ad blocker	✗	✗	✓	✗	✓	✗			
Dyslexia Ruler	✓	✓	✓	✗	✗	✗			
Website	✓	✓	✓	✗	✓	✓			
Language Support	✓	✗	✓	✓	✓	✗			
Subscription	✓	✓	✓	✗	✗	✓			

KEY

Do not have Feature

Have Feature

Have a similar feature

In conclusion, from our competitive analysis, we found that most accessibility tools on Google's chrome extension market had very few of the accessibility features that we researched. Most of them specialize in screen filtering and rarely on altering the actual content of a page. From our analysis, we discovered that while our strongest competitor, "HelperBird" had all the necessary features, the presentation of said features was overwhelming and counterproductive to the overall efficiency of the product.

In order to avoid this, Decode focused on not only providing necessary tools and features through the design process but also ensuring that the user experience was at the forefront of every decision.

UI/UX

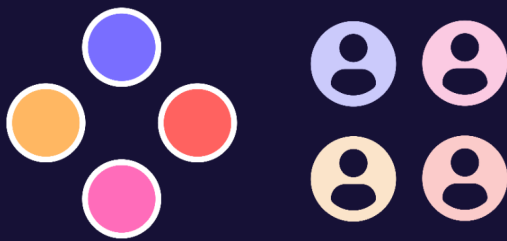
For our UX design, we wanted the experience to be relaxing, sleek, and easy on the eyes - this meant a darker background with lighter text, which also gave the application a modern look and feel. Too much white/ bright color on a screen can trigger headaches, cause eyestrain, and make it generally harder to read. Light text on a dark background is softer to look at as well as visually pleasing. The team was most drawn to blues, purples, and pinks for the initial color palette as those colors promote calmness and relaxation. The design itself is intended to relieve students' hardships with Cognitive and Visual impairments that lead to learning difficulties.

We used [Adobe Color](#) to test the accessibility of a few initial color palettes we thought best suited our project. It works by showing how a palette is perceived by people with different color blindnesses and will alert you if your colors overlap or are not accessible. After finalizing our color palette, we ensured that the color contrasts and shades accommodated color blindnesses so that anyone can view Decode with ease.

(Image if needed)

When it came to fonts, we stuck to the basic and most accessible ones we knew our users would have access to. Verdana and Arial have a 99% availability on PCs, so we decided to use the two for our header and body text fonts. We chose Arial Black as the font for our logo and headers, primarily because it's clear and easy to read, and accessible for all. Verdana, our body text, is a sans-serif with wide proportions, making it exceptionally easier for any user to read. Both fonts were designed with accessibility in mind, making them the prime choice for our project.

DECODE

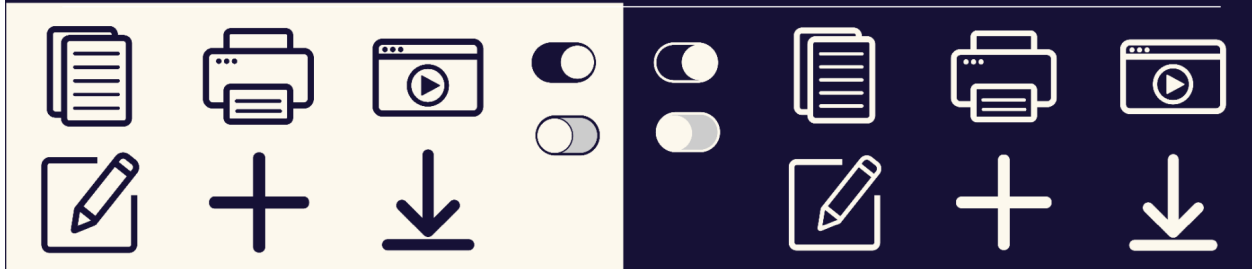


Arial Black

Aa Bb Cc Dd Ee Ff Gg Hh Ii Jj
Kk Ll Mm Nn Oo Pp Qq Rr Ss Tt
Uu Vv Ww Xx Yy Zz

Verdana

Aa Bb Cc Dd Ee Ff Gg Hh Ii Jj
Kk Ll Mm Nn Oo Pp Qq Rr Ss Tt
Uu Vv Ww Xx Yy Zz



Technology

Platforms:

We will be using a chrome extension as our platform for DeCode. We chose to develop a chrome extension because it is the most accessible to our users. We know this because Chrome dominates the Browser Market by over 50%. We anticipated that the majority of our costs for building DeCode would come from purchasing dyslexia-friendly fonts needed that we don't already have access to. We estimated the cost for these to be around \$500 - \$750+. We have not incorporated them into the current version of Decode However, due to time constraints, but in the future expanding the extension's fonts to include this would be essential to complete its design. The extension will only be available on chrome browsers on computers that can handle the extension running. Since chrome takes up ram for each tab, many computers cannot handle it very well. Computers that can handle chrome extensions include the list below:

- Windows:
 - Windows 7 and up, An Intel Pentium 4 processor or newer, and Servers require Windows® Server 2008, 2012, or 2016.
- Mac:
 - OS X El Capitan 10.11 and up
- Linux:
 - 64-bit Ubuntu 14.04+, Debian 8+, openSUSE 13.3+, or Fedora Linux 24+, and an Intel Pentium 4 processor and up that's SSE3 capable.
- Android:
 - Android Lollipop 5.0

Below is iteration information and notes on the extension's functionality.

For the filters, we will use sepia, brightness, and contrast in combination. Sepia filters work well with the eyes because of the warm colors they produce. In terms of the rationale for using sepia in our filter for the extension. Since we don't have the option to utilize more than one filter option given the deadline we have set right now, we are going to use this one for now. The brightness will also be reduced using this feature since many with photosensitive eyes need to be able to give them a rest, they can also of course, create their own custom dark-mode, but this will help accentuate that to make it a better rest for their eyes as they read things. The filter increases Contrast by 90%, Reduces Brightness by 90%, and intensifies Sepia by 50%. The difference in the filter is SLIGHT but that's because the filters keep each other in check by keeping in a balanced state. Though the filter is very slight, this is to ensure that the user is able to read the page with a variety of needs in mind from color blindness to blurry vision to dyslexia, they are very different needs. In a later iteration (should there be one) we can add contrast, sepia, and brightness sliders separately giving the user the ability to customize these values for their personal needs, for now, though we simply do not have the time.

Note: Youtube Thumbnails do not show up very well while the extension is running

Youtube Video Overlays do not show up very well either, to get them to go away, move the mouse cursor to the middle of the screen and leave it until they disappear.

Note: careful when turning off images - this can result in the thumbnails for things like youtube videos no longer being visible.

The Que can only hold one uploaded image at a time, so preview all your images before you choose one, once you see one you like, only then, should you upload it (press otherwise you will have to reopen the extension and it may not work again please do not switch external icons too much, or you will have trouble changing it as it causes (or can cause) a lot of strain on the

extension internally depending on various factors like the computer, the size of files, how many times you switch them in quick succession, etc, in general, if you want to change profile icons, it is best to do it once a day at most, if you really need to, you can do more than that but for the best performance it is suggested as this isn't a feature meant to be used very often and it is not one that is guaranteed to consistently work due to these factors. Users can preview gifs before uploading, however, they will be transferred into a normal image as your pfp.

In terms of general information; Be careful with changing text sizes. If too large or too small the text can be made unreadable. If the extension turns a page grey, turn the screen filter on and off. Most features do not work on google documents. For the intended experience, when using the extension, please set a theme before using the extension on web pages. Be sure to save the theme settings on each page of the extension to fully create the theme before using it on another page. Often, if you annotate a link, then attempting to click on the input text field will result in the link being activated, so it's best to avoid annotating links, as well as with highlighting, and adjusting. Installation: drag and drop your CRX file into chrome. You will NOT be added to any emailing lists, your email is kept for log-in security purposes only. Before Saving the Theme on the first page (font and text settings page), you must preview it. The Google sign-up is a placebo button. If you get the message "Permissions not set!" after allowing ad blockers, there may be an internal error, please try again later or reinstall the extension. We will not be able to send the extension to users as a package directly into their chrome browser's extension Manager as it is supposed to, until it is on the Chrome store. This does not have a pop-up blocker feature, just an ad blocker. The adblocker does not block all forms of ads, only the ads that it recognizes. The adblocker utilizes web request operations that are not definable at run-time, so in order to turn the adblocker on, or off, you will have to click the toggle, go to manage extensions via the puzzle piece

next to your pinned extensions, and press the reload button for Decode. (it looks like a circling arrow) This will refresh the variable that allows adblocking, or rejects it. Adblocker makes ads invisible, but in some cases, if you click on the space where any ads once were, it can activate them. So be careful when clicking in spaces marked with ad signs and emblems. For now turning gifs on and off doesn't work because identifying gifs vs images is more complex since they are relatively the same in HTML pages. You will have a blank image if you upload anything other than an image, you will have to replace it with an image. After reviewing the policies below: https://developer.chrome.com/docs/webstore/program_policies/ we were able to accept the terms set by the chrome store. A number of APIs used needed to undergo compliance review and permission justification however now it is being reviewed for publishing. Changes after user testing: Color picker only has one picker now. Hex code inputs are automatically corrected if they are not doable i.e. valid for colors. Hex codes can be used instead of the wheel. UI scaling has been adjusted to fit other devices. (resolution compatibility changes).

API Information and use: There are 8 APIs, (the Context Menus API was removed since we do not need it.) The Active Tab API: This is necessary for the extension to keep track of which tab the user is viewing to ensure that the correct tab or tab(s) are being adjusted for their specific accessibility needs.

Declarative Content API: This is needed for users to edit pages without reactivating the extension repeatedly. for user convenience and time (which is very important for the users we are targeting i.e. college students with specific accessibility needs related to cognitive impairments) This allows the extension to run in the background and edit page content for the user in an efficient and timely manner.

Tabs API: This is necessary to keep track of when a page selection is made in the current tab. The user can select text on the page if they want to

adjust it to be easily readable. the tabs API is used to keep track of the user's current selection and execute the script to keep track of the current selection to adjust it when the user clicks the button that does so.

Background API: In order for the extension to complete tasks whenever the user requests them (by pressing a button for said task in the extension pop-up), it must be active in the background to complete their request(s). Additionally, if they put the dyslexia ruler function on (to highlight specific blocks of text, it has to be running whenever they hover over text in order to highlight it in real-time.

Storage API: This is to save user settings, in order for them to access them later. This way they do not have to repeatedly set each variable (color text font etc.) that they want to use for the page(s) they are viewing.

Web Request API: WebRequest permissions are needed in order for the extension to keep track of ads that are attempting to activate on a page. The extension is meant to block ads to help users (specifically those with cognitive impairments) focus on the pages they are trying to navigate rather than getting distracted by ads that can be annoying / potentially harmful to them.

Web Request Blocking API: Web request blocking is needed in order to block ads from completing their requests while loading so the user does not have to see them as many sites have a tremendous number of ads so much so that users often find navigating them extremely difficult and sometimes stressful, for a college student with cognitive impairments this is one of the most harmful elements of modern sites which keep them from being able to traverse online content required for their classes.

Host API: This is required for the Webrequest ad blocking, as well as the ability to adjust the CSS on the pages the user is looking at. - Each API requires user consent (permissions) available for view on the google chrome store before downloading it.

User Research

Through the usage of our extension, we hope to allow our users to feel empowered and assist them in their daily lives by focusing on creating a healthy relationship between technology and their assistive needs. We want our users to feel confident by allowing DeCode help them and their visual/cognitive obstacles to navigate online media. By utilizing the customization abilities from DeCode, our users may work more efficiently and to their full potential.

ARTISTIC ARCHIE

GENDER: Non-binary
AGE: 22
OCCUPATION: Student
RACE: Mixed
LOCATION: Seattle, WA

BIOGRAPHY:
Archie studies at the University of Pennsylvania, who is working towards their bachelors degree. Archie has dyslexia, which impacts thier learning tremendously. They want an efficient and easy to use tool that assist their learning needs. A tool that also makes them more confident as a student and allows them to work effciently and to the best of their abilities.



MOTIVATIONS

- Getting good grades in college courses
- Controlling their dyslexia
- Completing work faster

FRUSTRATIONS

- Dyslexia getting in the way of their learning
- How much time it takes to complete assignments

“I NEED A TOOL TO ASSIST MY DYSLEXIA SO I CAN REACH MY FULL POTENTIAL AS A STUDENT.”

Chrome Extension MUST-HAVES

- Customization of settings for content
- Adaptability of needs
- Text warps such as tilt, and zoom, for ease of reading
- Must apply to any webpage
- Must be user friendly

Research Methodology

We connected with peers who we found fit our primary user audience in regards to age range, and if they were students who could benefit from the accommodations our product can provide. We decided to observe 5 students with a talk aloud protocol via zoom, where they had the ability to install Decode and navigate through the extension guided only by a provided list of tasks. After completing the assigned tasks, each participant was asked a series of reflection questions that our documentor wrote down.

Since Decode is not fully built out in terms of desired features, we focused on building out the experience. We tested people with our current product as it stands, meaning limited features but a good user experience. By testing what we had, we were able to see if we made good assumptions in our research, if our features were actually as useful as we'd predicted, and if our competitive analysis had grounds for its conclusion of what was missing in other extensions.

Our first user, age 19 and a sophomore in college, did not have any visual or cognitive impairments and was our pilot study. While they were not our primary user, they did find the customizability of Decode helpful

Our next user, Sarah, is a Junior in college at age 20 who struggles with eye strain and headaches when on the computer for long periods of time. Sarah found Decode easy to use and appreciated the ability to change text size and color, as it alleviated her eye strain she typically experiences while reading on the computer.

"Assistive technology should be simple and seamless and Decode has achieved that." -Sarah, 20

Our third user, Yoseph, is a 24-year-old computer scientist who spends a lot of time on computer screens. He found Decode helped alleviate his eye strain, and focus on large bodies on text when reading or writing on his screen.

Veronica was our 4th user, a 22-year-old student who struggles with their ADHD and Dyslexia when reading on their computer. Veronica found Decodes screen filters and font options really helpful and plans to use the parts of the extension we have built going forward in their school career and beyond.

Our final user for the study, Leo, is a 19-year-old college student and writer who has ADHD and Migraines. Leo has used other accessibility extensions in the past and has found none as helpful as Decode. They also plan to use Decode's available features going forward in their daily life instead of the extensions they were already using.

Usability Study Findings:

For our testing, all five users were asked the same questions, pre, and post-interview. We gave them a list of tasks, allowed them to navigate through the extension, and asked them reflection questions. Given the scale of our project was narrowed due to time constraints, we prioritize our sign-up/login page, settings page, as well as the ability to apply saved themes to any browser page. We planned for each session to be a maximum of thirty minutes when scheduling our users, and tried to group them together within two days so we could have more time to go over the feedback.

All three of us participated in each user testing session, but we did rotate roles so everyone got a chance to lead, observe, and document. Each User's usability document has a note of which of us was the lead, documentor, and observer in each session. This was a really effective system for us, and since we were following the same document of questions/ tasks for each user, our process was the same regardless of who led the study, and fairly efficient. It was really helpful for us all to be able to take on that role of guiding our users as well.

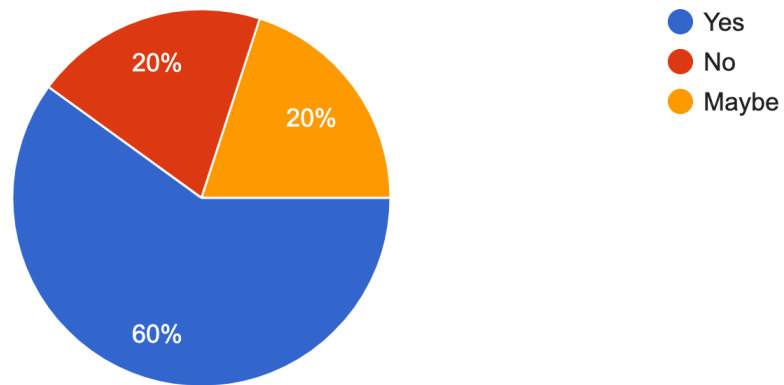
After testing, the results suggest that the users, in general, found the extension "helpful". They considered the flow of their interactions with the extension smooth and easy to follow. One notable quote from one of our users was:

"I would definitely recommend this to friends especially for something like migraine and eye strain since the ability to change color to a darker background and lighter text really helps." - Subject Four

This stood out to us since it clearly expressed their thoughts about the aspect of our extension and similar usability extensions like ours that keep the user's dark background settings active. This particular user also mentioned that they use another extension and downloaded it specifically to give them a dark background - however it does not work. They did mention some critique in terms of choosing colors. They would like to be able to use hex codes or something other than the color wheel to choose their colors since the color wheel was difficult to utilize compared to the rest of the extension. This is likely due to the fact that the color wheel has 3 different color pickers available to try different combinations at once - though they likely are not needed, and we can add hex inputs as an alternative to the color wheel with near minimum effort. Users had difficulty with the page sign-up as many of them could not remember their passwords. The page sign-up requires a passcode of 8 characters with at least one lower-case letter, a capitalized letter, and a unique character or number. This is likely a part of the reason they had such difficulty. To prevent this in the future we added the password reminder functionality. Though for greater security and convenience; we will likely keep the user signed in even when they refresh the page until they click the log-out button.

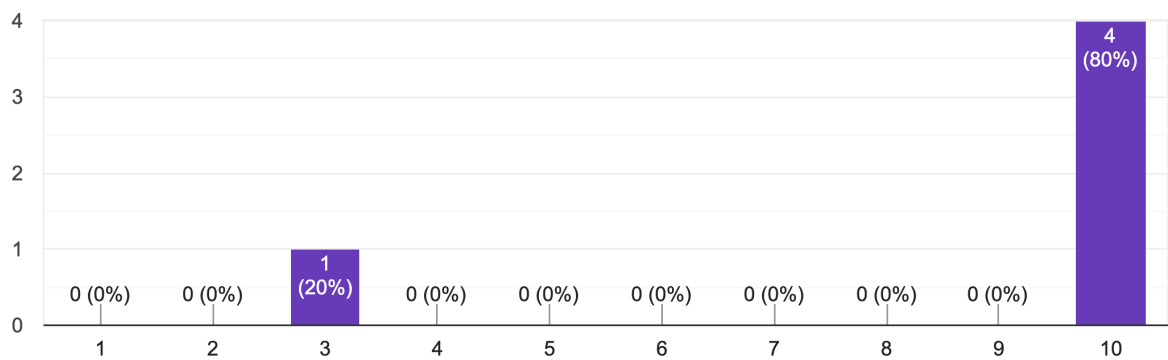
Did decode alleviate your symptoms?

5 responses



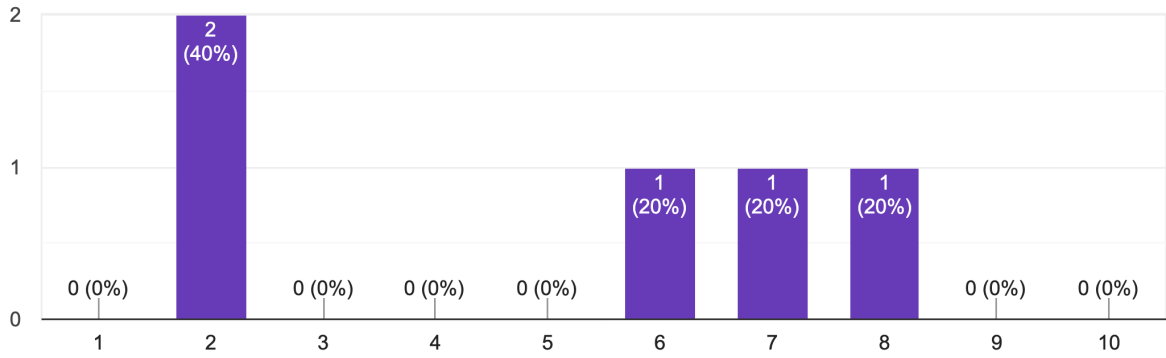
On a scale of 1-10, how helpful was decode?

5 responses



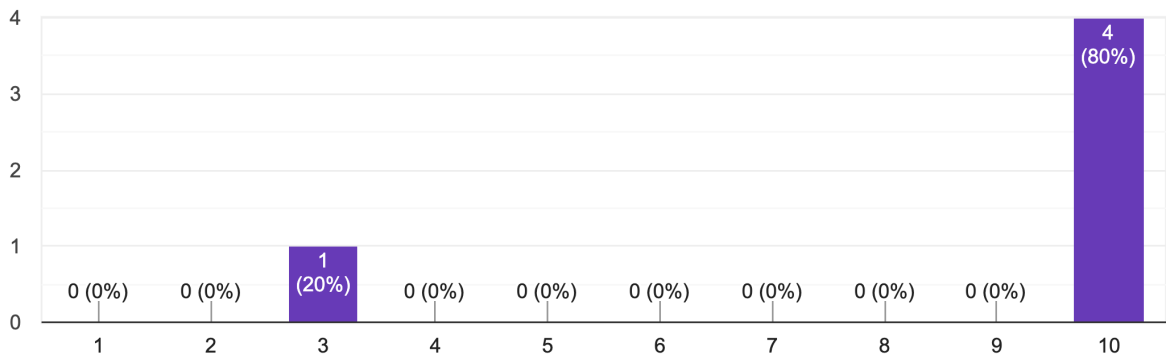
How likely are you to download assistive tech?

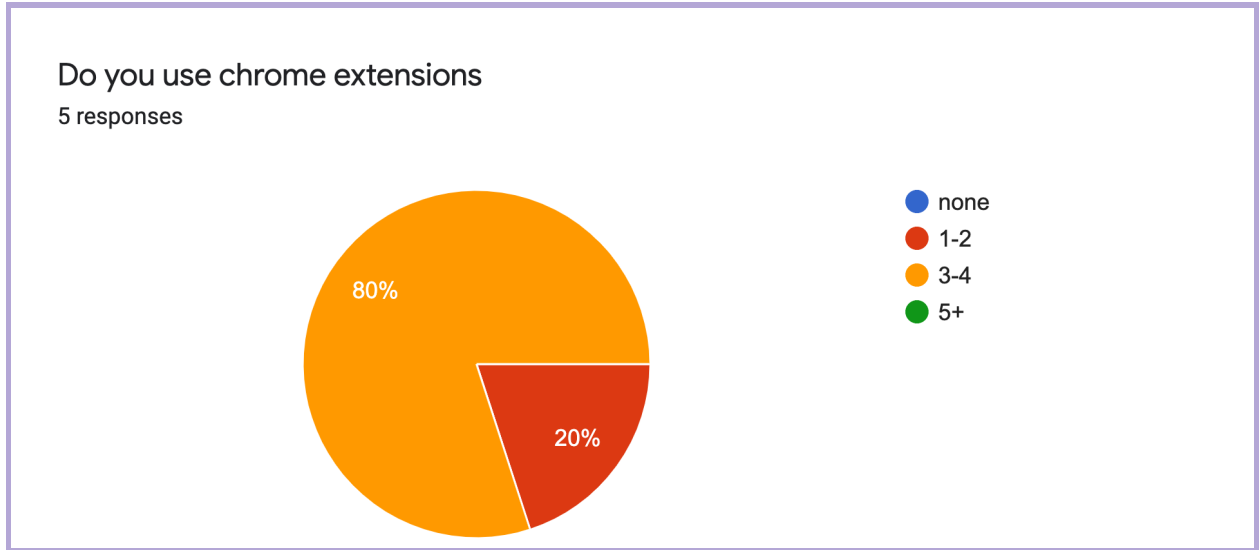
5 responses



On a scale of 1-10 how likely are you to download decode?

5 responses





Overall our users had a very positive experience with decode, with 80% of our users saying they would download decode, and found decode helpful. Our users all expressed how they had a very positive experience, for the one response we got that was a 3 for their likeness to download decode, they expressed they liked decode but did not suffer cognitive or visual impairments. 60% of our users polled said they found decode to alleviate their symptoms, with again one of our users not suffering from cognitive or visual impairments, and the other said if they had more time with the extension they felt it would help. We also wanted to get a read for the popularity of chrome extensions, since that is the platform that Decode is on. So we wanted to hear from our users about their experience with chrome extensions in general and if they had any. 80% of our users did have 3-4 chrome extensions with some sharing that they were for assistive reasons like changing background colors. We also asked about their familiarity with assistive technology and if it was something that they would be interested in, and most shared that they were likely to download assistive technology. These findings show that chrome extensions are popular among our users, chrome extensions are rarely developed for assistive reasons, that's not to say that there is not a demand for assistive technology in this space.

Recommendations

In our research and competitive analysis, we found that there were certain features that were missing from popular accessibility tools that we wanted to incorporate into our own project in order to have a greater impact on the accessibility space.

Our top competitors, and extensions like it, are all activated by clicking on their icon in your browser extensions bar on chrome. When you click it, it activates a list of settings for you to choose from and edit. Whatever settings you select will apply to the browser tab you are actively on. This was a major user experience feature that we wanted to change with Decode. The act of having to recreate your preferred settings every time you open a new page can be tedious and distracting for users- something we want to avoid, especially for our users with cognitive impairments. We want our user experience to alleviate the tedious and difficult work of trying to accommodate one's own impairment. This makes repeating your preferred settings every time you open a new browser tab counterproductive to our goal. One thing that makes Decode stand out from our competitors is that we will have a website with a home page, settings page, notes archive, account page, and more where you can save all your preferred settings into 'themes' and simply click the Decode icon to apply it to any given page.

Decode stands apart from competitors due to our user experience. The customization and personalization of one's settings is really important to us, along with having a clean and simple user interface to eliminate unnecessary distractions and stress that could potentially take away from the primary use of our product. This meant focusing down on our features so as to not

overwhelm the user with choice, while still giving them access to everything they could need.

Our theme creator is separated into three categories, on three pages; screen, text, and content settings. We took a look at our lead competitor, Helperbird, and through our competitive analysis determined what features they had that worked for them that we wanted to utilize/ modify based on our own research, and which features they didn't have that we wanted to add to our own product.

Feature #1: Screen filter

Like Helperbird, we also plan to have color filter features on our extension, but rather than keeping it in a "colorblindness" category, we will refrain from using impairment labels for settings. We don't want to label any of our features as pertaining to a specific impairment, as they may help people who don't identify as having said impairment, so labeling it may discourage users from trying all our features and finding what really helps them. Hence why we will be having a screen filter option be placed under the 'screen settings' category. Our screen filter has adjustable opacity and adjustable color using a color wheel and hex code input.

Feature #2: Text altering

We decided our most important feature, to begin with, was our text settings. Our text settings have a variety of fonts for users to choose from. Users can completely tailor their text to be the font, size, and color of choice.

Feature #3: Hide content

One thing we thought would be a really necessary feature to have on Decode is the option of hiding all images/ gifs on a browser. This can be really helpful for people with cognitive impairments who wish to eliminate

distractions from a website, as we discovered upon research is something that people can struggle with when trying to focus on the actual text on a page.

Feature #4: Dyslexia Ruler/ Line Reader

We knew we wanted to have not only a highlighter feature, but a dyslexia ruler as well. A dyslexia ruler is a tangible ruler with a coloured tint/ overlay that assists with dyslexia and visual stress/ eye strain. We believe that having a digital dyslexia ruler could help users stay focused on the line they are reading with ease. Since none of our features are limited to one type of user, we renamed the dyslexia ruler to be called a line reader so as to give any user the chance to see if this feature benefits them regardless of the impairments they identify as having. The line reader moved from each line of text using the up and down arrow keys.

Feature #5: Notes Archive

Our notes archive is an important part of Decode that sets us apart from our other accessibility extensions. Unlike our competitors, who have a sticky note feature, we wanted our notes to save to an archive and exist across multiple tabs in your browser so you can type as you scroll. This eliminates the distraction of having to leave the informational site you are on to go write your notes on an entirely separate tab. For our users with cognitive impairments, eliminating this extra step that can put strain on memory and attention makes a big difference in their study habits. The notes archive stores all of the notes taken on our notepad feature while decode is active. When saving the notes, the user would be prompted to "tag" the notes, which would then sort them into one of the listed categories. The category names are customizable (i.e. notes could be sorted by class subject, website name, etc). When you click on a note, you can select from your saved themes to change the display and style, as well as edit the content.

Conclusion

Decode has taken user and market research to bring a product that is built entirely with the users in mind. From our market research we saw what was lacking in the field of accessibility, our competitors sacrificing the quality of user experience. We found through our usability testing that having a clean interface and simple experience went a long way when it came to our users enjoying and utilizing Decode. Decode's mission was to look at how we could make an impact on the accessibility design space today, through this research we saw how many of the available and popular assistive technologies were profiting and exploiting the needs of their users. Decode is taking the initiative to bring necessary tools to the public without the barriers of subscription-based models and we hope to see more companies doing the same. We believe in the democratization of accessible technology, showing that through Decode it is not only possible but needed.

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