

Implementing UI/UX Design Principles for An Effective Nighttime Stories Website

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Abstract

In this paper I researched and implemented core design principles and built a website application in HTML, CSS, and JavaScript. This website application was created for users who want to read short stories or poems to unwind before bedtime. Because this website was created for users to read stories and poetry on a calming application that helps in aiding them to have peaceful rest and an easier time falling asleep, we used core UI/UX design principles to make the application accessible, easy to use, and reliable in its functionality.

Contents

1	Introduction	4
2	Core UI/UX Principles and User Concepts	4
2.1	Principle 1: A Creator Isn't the User	4
2.2	Principle 2: Everything is Competition	5
2.3	Principle 3: User Journey	6
2.4	Principle 4: Experiences	6
2.5	Principle 5: Familiarity	6
2.6	Principle 6: Stability, Reliability, Security	7
2.7	Principle 7: Speed	7
2.8	Principle 8: Usefulness	8
2.9	Principle 9: Accessibility	8
2.10	User Concepts	9
3	Association and Colors	10
4	Procedure (Web building Process)	12
4.1	Layout, Wireframes, Themes, and Navigation	12
4.2	Accessibility-Dyslexia	15
4.3	Accessibility-Color Blindness	16
4.4	Mistakes to Avoid	18
5	Results and Analysis	19
5.1	Usability Testing and Survey	19
5.2	Future Works	26
6	Conclusion	27

1 Introduction

User Interface (UI) is intertwined with User Experience (UX) design. The user interface is an application's layout including aesthetic aspects and functionality. The user interface is vital in creating the user experience.

"The user experience is the result of using any product or service, and includes aspects of cultural anthropology, human-computer interaction, engineering, journalism, psychology, and graphic design" [8]. While the user experience can range and involve many facets, the main priority is always an application that satisfies the users wants, needs, and goals.

It is a standard practice for developers to use UI/UX design principles when creating a website since it is believed that this will make for an optimal application that will create the best experience for users.

The goal of this study was to implement standard UI/UX design principles to see if users find the nighttime story web application appealing, functional, and accessible. This was done by studying the design principles and then implementing them when creating the website. After the creation of the website, usability testing was preformed and a survey was given to users in order to measure how the website was perceived through these standard constructs.

2 Core UI/UX Principles and User Concepts

Before creating the nighttime web application Lullaby Lit, it is important to learn the core fundamentals that will make the website application accessible and ideal for users to engage. Developers believe these principles and strategies are what create all successful applications. Here are the main fundamentals and concepts that stood out and are later incorporated in Lullaby Lit.

2.1 Principle 1: A Creator Isn't the User

One aspect to keep in mind is that creators of software and applications are not users. Usually, when developers first come up with their ideas, they are very excited to start implementing designs they think are unique.

An example of this is using their own color palettes that they think will fit well with their applications.

While it is great for creators to be excited about their project, they should not bring biases into their creation. Biases can include being knowledgeable about the subject matter present in the application. When people begin their journeys in web development they start learning HTML, CSS, and JavaScript. UI/UX design is not usually taken into consideration until they begin creating more advanced applications.

One aspect that can be an issue is color biases and choosing a color based on preference for a website. While it may seem minor, these biases could neglect the needs of a potential user who could be colorblind.

The knowledge gained from web development and learned researching was used to create a functional application that potential users would appreciate and find useful as well as accommodating.

2.2 Principle 2: Everything is Competition

"Users are self-oriented in relation to their needs, desires, and wants" [8]. Everything in society is calling for potential user's attention. Since this application is created for reading, here is what exists in the market that is begging for potential user's attention.

There is Webtoon, a popular application where users can log into their phone or website to read digital comics. Another application is YouTube and other social media platforms people use to either watch funny videos or shows before bed. Potential users may prefer to read physical copies of books and poetry. There are many things potential users have access to that need to be considered competition. It is important to figure out what makes Lullaby Lit unique compared to similar applications for the user that the users attention will gravitate towards Lullaby Lit instead of what they have used previously. The goal of Lullaby Lit is that the application brings value to potential users by calming them compared to the other stimulating applications. Lullaby Lit needs to be more accessible to reach more people.

2.3 Principle 3: User Journey

A user's journey is important. When a person comes to Lullaby Lit, it isn't possible to force them to click a certain link or view a certain page. Developers are only able to suggest a route for them based on the layout of the website. This is how to get a desired outcome for users to have an optimal experience. The plan is to make Lullaby Lit as straight-forward as possible.

In addition to caring about the specific journey a potential user takes through the website, it is important to anticipate events potential users may encounter. There must be an account for the need for assistance or remove extra obstacles that may frustrate the user. An important aspect is to preserve safety, security, and dignity for the user experience as well. In a standard web application, the best way to avoid violating these aspects is to keep any data that the user inputs secure, as well as having a website that is functional and not broken.

2.4 Principle 4: Experiences

When shaping the experience intended for a user, it is important to keep everything simple. Observing websites and applications that are similar to Lullaby Lit is important, but it should not be the main focus since there will always be newer software to compete with in the future.

Users come to a website for the media and knowledge, so any extra distractions and other unnecessary features need to be accounted for and removed. Additions can be helpful if it benefits the user and enhances their experience. The past experiences of potential users will shape their future experiences. When developing lullaby Lit, knowing what potential users have seen before in other applications will be needed in order to keep them interested.

2.5 Principle 5: Familiarity

Familiarity is extremely important to the user experience. If the idea is too unique it may be harder for potential users to engage in the website due to the disconnect in understanding, or it may be hard for them to see the value and how it connects with their goals.

The user could also lose interest if they don't find the concept interesting. The plan for Lullaby Lit was to make the website content familiar by adding a few common short stories and poetry that are familiar and nostalgic. Another plan is to make the layout of the website familiar by using a standard website layout.

2.6 Principle 6: Stability, Reliability, Security

A major UI/UX design principle is website safety and trustworthiness. Important aspects of this are stability, reliability, and security.

Stability is an unrecognized achievement of an error-free experience. Reliability is relative to a specified time, and it anticipates issues such as sudden outages, checkout errors, and search penalties [8].

It is important that Lullaby Lit is reliable and stable. If there are errors, potential users can get frustrated and refuse to use the website or even recommend it to other potential users.

Security comes when important information is kept safe by being hidden from view. An example of this is when login information, for a user, isn't easily accessed by other users. Since Lullaby Lit is in the early stages, user login will be an aspect to focus on in the future. When login info is an option for Lullaby Lit, it is important to make sure the information potential users type onto the website is not breached. The idea is that sensitive information can't be breached if it is not easily visible or accessible.

The plan to help users see Lullaby Lit is stable, reliable, and secure, is to make the website have a professional aesthetic which will allow users to know that the website is safe. Lullaby Lit will have a modern look, correct spelling, and the graphics will look decent. When websites look undone or janky, a user's trust diminishes and that is what will be avoided when developing Lullaby Lit.

2.7 Principle 7: Speed

The speed of an application affects everything. The goal is for past, present, and future users to continue returning to Lullaby Lit. The only way this is a possibility is to have a

website that is quick and responsive. Websites that are slow to load will cause a user to lose interest and focus their attention elsewhere, which is what needs to be avoided. The goal when developing Lullaby Lit is to make sure all the pages of the site are not broken and work as intended without missing information or images that have trouble loading. There are website speed test tools that are able to analyze website performance. Since this website is a prototype, user feedback was used to determine how the website felt to them overall.

Time is also important in aspects of speed. The more options available, the longer a person stays on a website. It is also important to only have options on the website that are necessary for the users' goals. If a website strings a user along to keep them on the website longer but does not provide true value, they will lose interest. Lullaby lit only added what was necessary without extra confusing information.

2.8 Principle 8: Usefulness

How useful an application is will determine if a developer's application has the potential for success. While Lullaby Lit is intended for leisure, the purpose is to allow users to unwind and have an easier time falling asleep. This is the description that will be used to market the website. If Lullaby Lit does what it is intended to do, when users try it, it will build reliability and trust. This will prove useful to the users' goal.

2.9 Principle 9: Accessibility

Accessibility is an important factor when creating an application. 1 out of 6 Americans face a form of disability. "A disability is a physical, mental, cognitive, or developmental condition that impairs, interferes with, or limits a person's ability to engage in certain tasks or actions or participate in typical daily activities and interactions" [8]. Since Lullaby Lit focuses on the visual, there was a focus on making the website accessible for users who are colorblind, dyslexic, and aimed to avoid blinking/flashing content. The website also provided alt text for images.

2.10 User Concepts

Several user concepts that are important to consider when creating an application for the user experience are perception, attention, flow, and storytelling.

Perception is how information is perceived. It is made up of several aspects such as top-down processing, mental modes, just noticeable differences, bottom-up processing, and Gestalt Grouping.

Top-Down processing is how the brain processes information it is given through a person's senses.

"Schema is a mental shortcut, a way to interpret incomplete information" [8]. Schema shape perceptions by filling in the blanks.

Mental Modes are perceived experiences and construct models based on related past experiences. "Mental models include schemata but also behaviors and outcomes. Schema may describe a plane; a mental model describes a plane as well as flying and landing it" [8].

Just Noticeable Differences- Is the smallest detectable difference between two levels of stimuli [8]. A well-known example of this is a frog sitting in a pot as it boils but does not leave since the water is slightly changing.

Bottom-Up Processing is where construct perceptions are based on sensor data such as sound, smell, sight, and touch.

Gestalt Grouping is how people perceive objects as organized patterns. The laws cover similarity, proximity, continuity, and closure.

Attention- Users tend to overlook information. "Attention is how minds process information, and the mental aspect is both automatic and controlled" [8]. Automatic processing focuses on routine and predictable tasks while the controlled processing commands more mental resources. Both forms of attention are present when using an application. Familiar experiences become more automatic for a user. The first time a user uses an application, it requires controlled attention.

The Stroop effect happens when competing stimuli cause cognitive interference [8].

Flow- In a flow state, users' attention is balanced between interest and control. Flow must be present for the application to remain useful. Flow is how a user is able to navigate

through the application and their journey.

Storytelling- In storytelling there is Ethos which Perceives a character of a person, place, or thing and effects behavior. There is also Pathos which is an emotional connection with an audience and illuminates the story with emotion. There is also Logos which appeals to human logical senses. Kairos in storytelling is an event that happens at the exact right moment in time.

”UX is a form of persuasive rhetoric. UX and Storytelling share a similar inductive and deductive arrangements” [8]. (Inductive makes a claim and supports it later while Deductive is making claims until offer a supportive narrative is offered.)

These user concepts help to better understand several aspects present in Lullaby Lit.

3 Association and Colors

Color is a huge aspect of Lullaby Lit, especially since the colors chosen was to fulfill the goal of creating a peaceful website presence for the user. It was a top priority to choose colors that correlate with peacefulness. There are many generalizations that are used when it comes to colors and applications in the effort to elicit some form of emotional response or connection to the user. It is a widely accepted “fact” that blue is a calming color, but does this statement hold validity? The research of Schloss and O’Connor was studied to determine if color psychology is valid, and if there was room to expand our color palette outside the normal accepted color associations [7] [6].

Schloss made the argument that associations between colors and concepts are not limited to concrete objects or abstract concepts and that color semantics (color meaning) is dependent on the context of the situation for people and can become flexible. Schloss discusses this idea through the idea of Color Interface Framework.

The Color Interference Framework is a concept that explains how people infer meaning from colors and use the inferences to make judgments about the world. This framework suggests new associations can be formed for exposure to new concepts. An example of this is when Schoenlein and Schloss tested their hypothesis about Color Interference Framework. The did this by using fictional alien species called Filk and Slub.

”The test subjects saw examples of colored aliens from each species, which had different color distributions: One species was warm biased (mostly orange, red, and yellow), and the other was cool biased (mostly cyan, green, and blue). After, participants rated color-concept associations for each species with each color they saw during exposure plus new, unseen colors varying in saturation/lightness. Overall, participants formed new associations from exposure, and association strength increased with color-concept exposure frequency” [7].

In comparison to Schloss, O’Connor studied the idea of color psychology and if it was a valid concept. ”Color psychology is the idea that color causes a range of affective, cognitive, and behavioral responses and associations linked to specific colors” [6].

”Red is a bright, warm color that evokes strong emotions; Red is also considered an intense, or even angry, color that creates feelings of excitement or intensity” [6].

Another example is, ”blue calls to mind feelings of calmness or serenity. It is often described as peaceful, tranquil, secure, and orderly. Blue can also create feelings of sadness or aloofness. Blue is often used to decorate offices because research has shown that people are more productive in blue rooms” [6].

While this is a universally accepted concept, O’Connor was unable to find any irrefutable proof between color and psychological responses. Biases can be present when it comes to associating events that are unrelated. An example of this is a person expressing happiness looking at a field of sunflowers. One could argue that this is because the yellow of the sunflowers is boosting their mood, but the real reason the person is smiling is because that was the first flower they ever received from a significant other.

While color theory can’t be completely proven false, there does seem to be room for exploring other color options when it comes to color association that was implemented in the Lullaby Lit website design.

4 Procedure (Web building Process)

4.1 Layout, Wireframes, Themes, and Navigation

When starting to build the website, the first focus was on the layout and composition. The plan was to have a homepage with a navigation banner and two buttons. One button would be for going to a page with poems and the other for short stories. Before beginning development, an aspect focused on was Grid Theory. Grid theory's focus is on balance of lining up items and proportions. Some designers use the Golden Ratio which refers to dividing media with focal points. The Rule of Thirds is a simplified version of The Golden Ratio [2]. The website project started with creating a grid to lay out elements. This process is where wireframes are being created. Wireframes are important because a developer and designer are able to efficiently move items around while gaining an idea of how the final application will appear to the user.

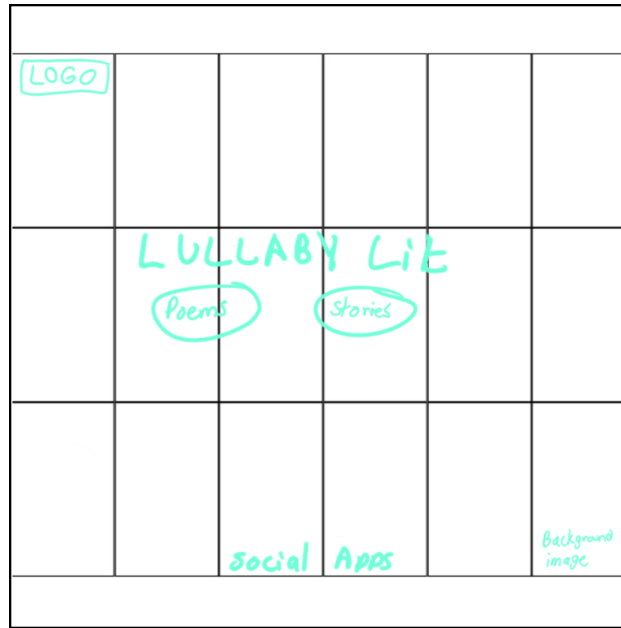


Figure 1: This is the wireframe home page for Lullaby Lit. We have the logo in the left-hand corner, the title centered with two buttons underneath that will lead users to the poem collection or story collection. In the footer it has social apps, and a plan to have a background image on the page.

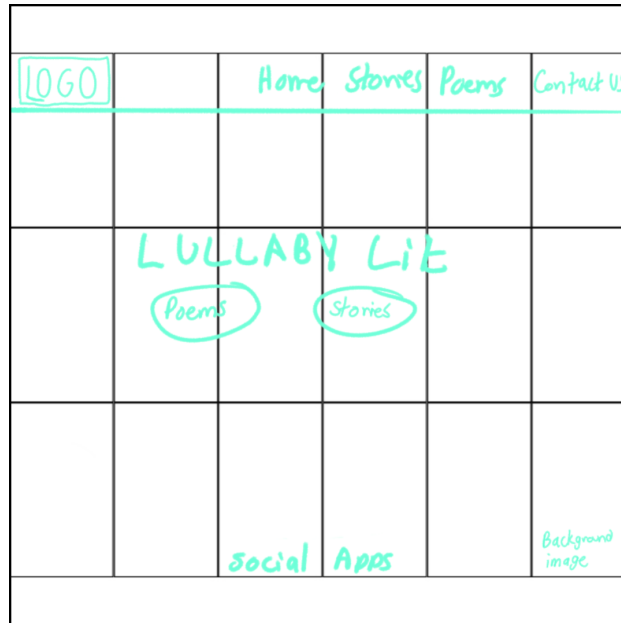


Figure 2: This is another version of the wireframe home page for Lullaby Lit. We have the logo in the left-hand corner, the title centered with two buttons underneath that will lead users to the poem collection or story collection. In the footer it has social apps, and a plan to have a background image on the page. We also have a navigation bar at the top of the page that has the options of home, stories, poems, and contact us.

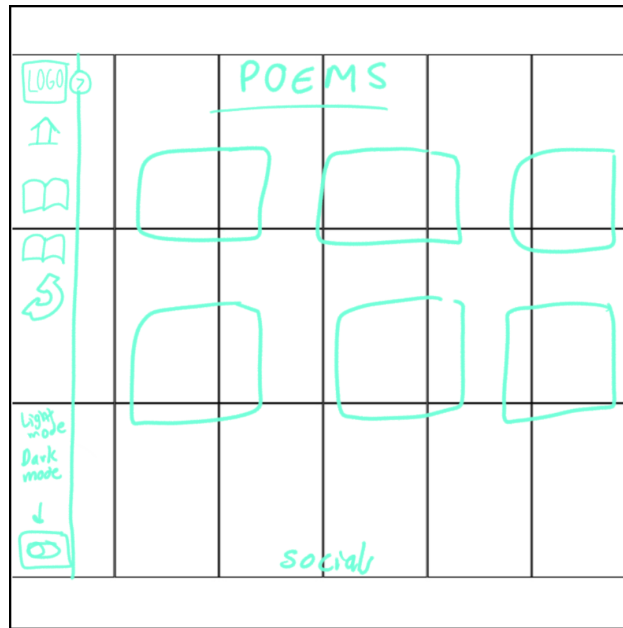


Figure 3: This is the wireframe for the poem collection page where users can pick a poem to read. There is a side navigation var where there is a logo, icons to access the homepage, poetry collection, story collection, a contact page, and a light and dark mode. There are also socials in the footer[3].

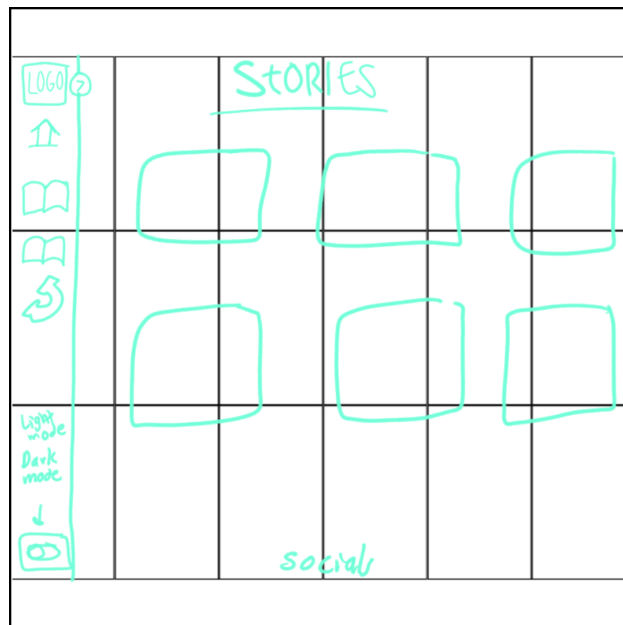


Figure 4: This is the wireframe for the story collection page where users can pick a story to read. There is a side navigation var where there is a logo, icons to access the homepage, poetry collection, story collection, a contact page, and a light and dark mode. There are also socials in the footer[3].

It was kept in mind what creates a great website design which included usability (a focus on functionality) and aesthetics (artistic values and appeal). There had to be a balance of both.

In order to involve usability and aesthetics a cohesive theme was created for every page layout which included a logo, defined color palette, an easy to find and use navigation bar, and made sure to have white space to keep the website feeling balanced and uncrowded.

The Home Page has the official Lullaby Lit logo in the left-hand corner. The title and subtitle is centered on the page with two buttons linked to the poetry collection page, and the story collection page. White space was used to keep the environment clear for the user. The title page also only has two buttons to guide the user in their experience of getting to the content they came to see.

The Collection of Poetry page has a navigation bar and several cards in vertical position. There is a great deal of white space as well.

The Collection of Stories page also follows the poem page.

When considering where to put the navigation button, there were several options.

Left-column navigation was the standard in the beginning of the World Wide web, but is now used for link-heavy websites such as Wikipedia [2].

Right-column navigation is commonly used if most content is located to the left such as the website Reddit [2].

Most users expect navigation placement at the top of the web page [2].

The navigation bar ended up being placed on the left-hand side of the website. This choice was made since the content is centered, and decided to make the layout a modern aesthetic.

4.2 Accessibility-Dyslexia

There was research done to determine what would be a great font for users who have Dyslexia. Around 20 percent of the population has dyslexia. Dyslexia affects peoples perception of similar letters such as p and q or words that are closely packed together [1]. When choosing a font developers need to make sure to use a sans serif font and that there is enough letters between the letters in words [1].

The font used as the main text for the website is Philosopher, sans-serif. Arsenal, sans-serif was used for the poetry and story content that the users will read. The font size is above 12 pixels and averages around 20-30 pixels for readability.

4.3 Accessibility-Color Blindness

”Color blindness is also known as color vision deficiency. It is a deficiency in distinguishing between different colors. It occurs when light-sensitive tissue in the back of the eye—the retina—fails to properly respond to variations in wavelengths of light, which enable people to see different colors” [4].

When developing an application with color blind accessibility in mind, you should plan out your color scheme in advanced or use an accessible color blind palette generator, avoid color combinations that are incompatible, and use highly contrasting colors [4].

Venngage has a generator that was used to generate colors for the website. We used a combination of the two palettes in the figure below.



Figure 5: Pastel colorblind friendly palette 1 [9].



Figure 6: Pastel colorblind friendly palette 2 [9].

4.4 Mistakes to Avoid

There was an important focus to make sure certain mistakes were avoided when building the website since there are many pitfalls that can occur when creating an application. Here is a list of aspects implemented to avoid frequent pitfalls [5].

1. Not having too many windows or pages since it is harder to navigate.
2. Avoided the same title on different web page windows.
3. Made sure not to copy code in HTML files while forgetting to edit aspects for the specific web page.
4. Avoided having distracting off-path buttons and links / buttons with similar titles.
5. Avoided ambiguous terms / test terminology on users for the website.
6. Made sure the website avoided an inconsistent writing style. There was a focus on letter case, punctuation, avoiding terse language on some labels and wordy language for others, naming some commands after actions (verbs), and others after objects (nouns).
7. Made sure to make text easy to scan so users wouldn't be overwhelmed with content (This was done by avoiding verbose language and instructions.).
8. Website button links names were kept short.
9. Website graphics were made to avoid small and plain text.
10. The text in the website wasn't buried by images.
11. Made the website have chunks of information and used contrasting colors to help draw users attention.
12. The website also has spacing for the content, especially buttons and spaced a reasonable distance.

5 Results and Analysis

5.1 Usability Testing and Survey

After the website was implemented with UI/UX principles, several people participated in usability testing and 10 people participated in a survey. Usability testing is a method used to evaluate a product or application by testing it on users. The testing started with an introduction and summary of project. Then the testing had users go through a hypothetical scenario to complete a task. After the user completed their task feedback was collected.

Listed are what users provided as feedback.

1. Layout is accessible and easy to see everything.
2. Color scheme is relaxing and has a soft touch.
3. Preferred the vertical reading because it was easy on the eyes while another user suggested having a wider space for less scrolling which would make it easier to read and relax.
4. The website would benefit from a list of calming music or list of music recommendations.
5. The website would benefit from a contact us in the footer of the web page.
6. Make the toggle for light mode and dark mode more evident like the icons that give easy association.
7. Have the whole page enter dark mode or have the personal ability to change the themes of the website.
8. The web page would benefit from having instrumental music or sounds of ambiance, fireplace, or rain.
9. One user said that the book and pen icon for the stories and poems was efficient while another user felt that the pen icon represented the coming soon content while the book icon represented all works which made it a bit confusing.

10. Layout reminds the user of reading on a phone and is very vertical.
11. User wants more stories and poems.
12. User wants the navigation bar to stay in permanent version of either light mode or dark mode when traveling to different pages on the website.
13. User believes a useful feature to add would be to pick font size and font type.
14. The future of this application should be mobile since the design looks set up for mobile
15. When hovering over the collection of poetry or stories have an expander CSS or drop shadow or hover effect.
16. It would be beneficial for the website to have active resizing.
17. A user wanted to know what the homepage didn't have a navigation bar.
18. Title and buttons on homepage are slightly off centered.
19. Maybe only have one card that says more coming soon.
20. Giving access to socials may not be the best thing since the goal of the website is to calm people down.
21. Have a border or a square/rectangle around the title and buttons on the homepage.
22. Color scheme works.
23. Have a purpose statement on the homepage so people know what to expect
24. Pictures work well with the lullaby theme and is peaceful.

The survey was used to measure how users felt about the website made with UI/UX principles. These were the comments made about the website from the usability testing.

These were the results from the survey in the figures below.

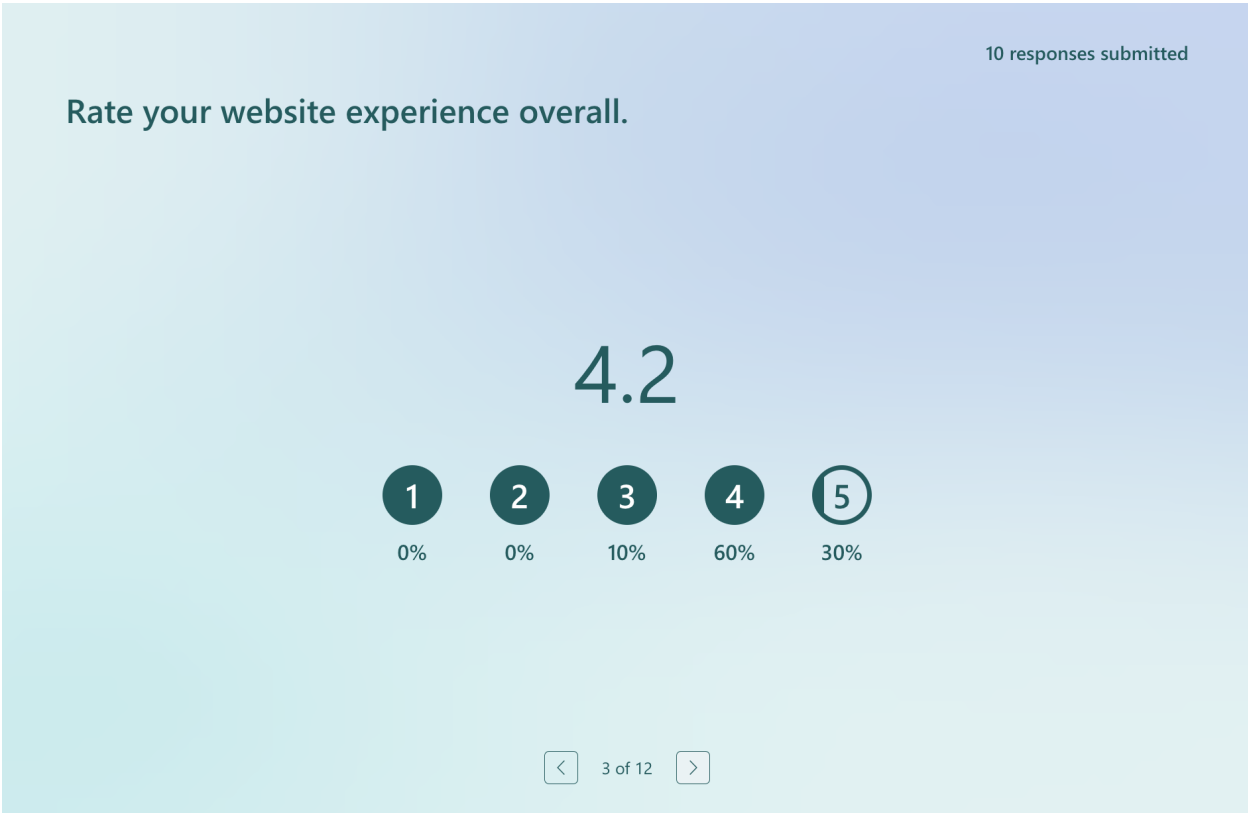


Figure 7: Website Experience.



Figure 8: Website Aesthetics.

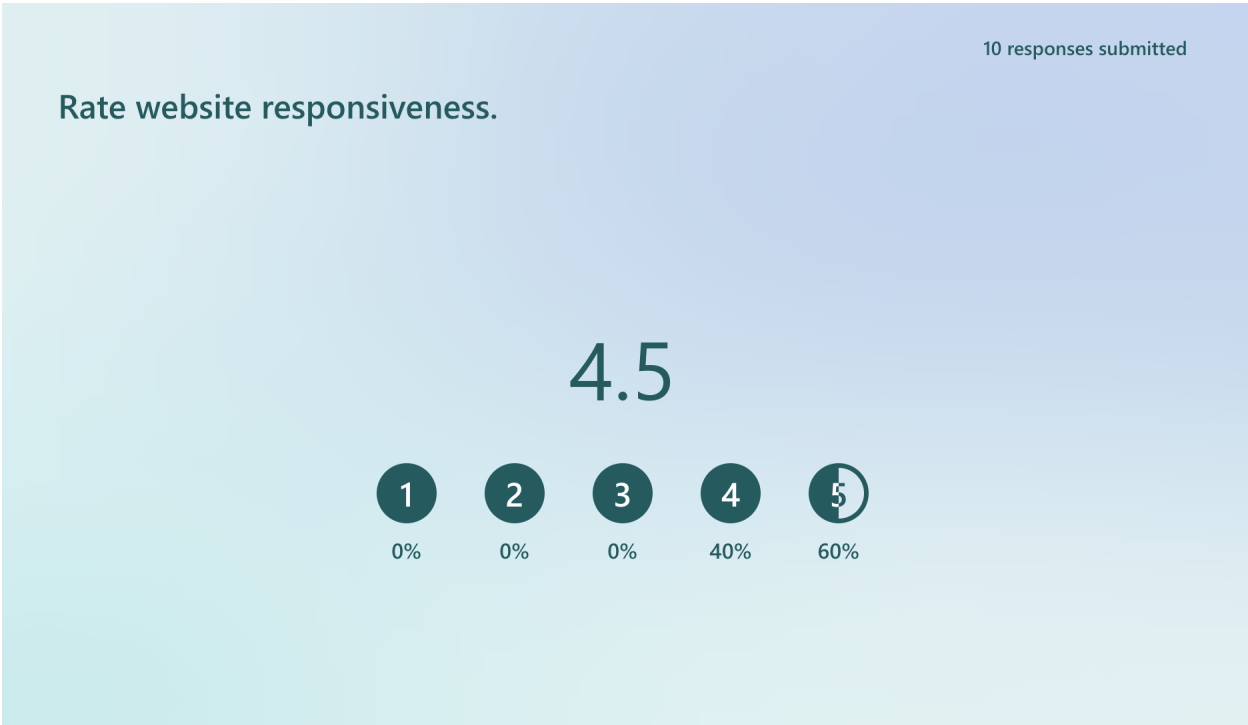


Figure 9: Website Responsiveness.

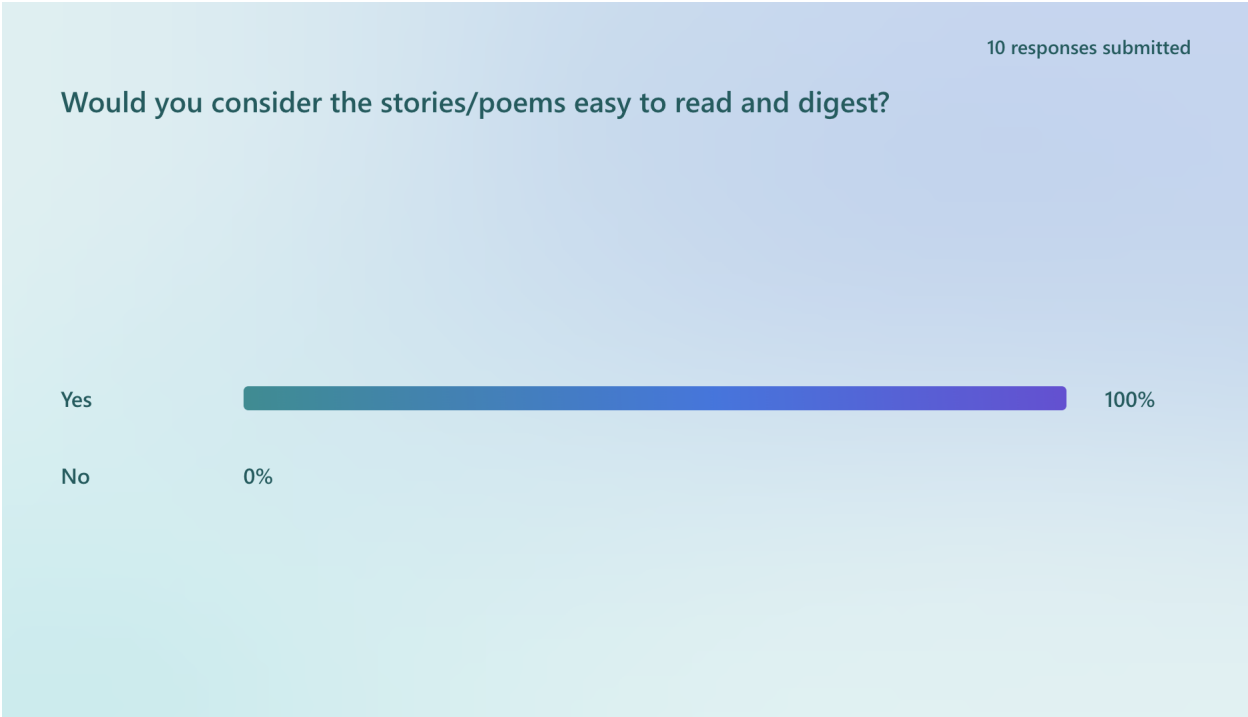


Figure 10: Content Readability.



Figure 11: Color Scheme Effectiveness.

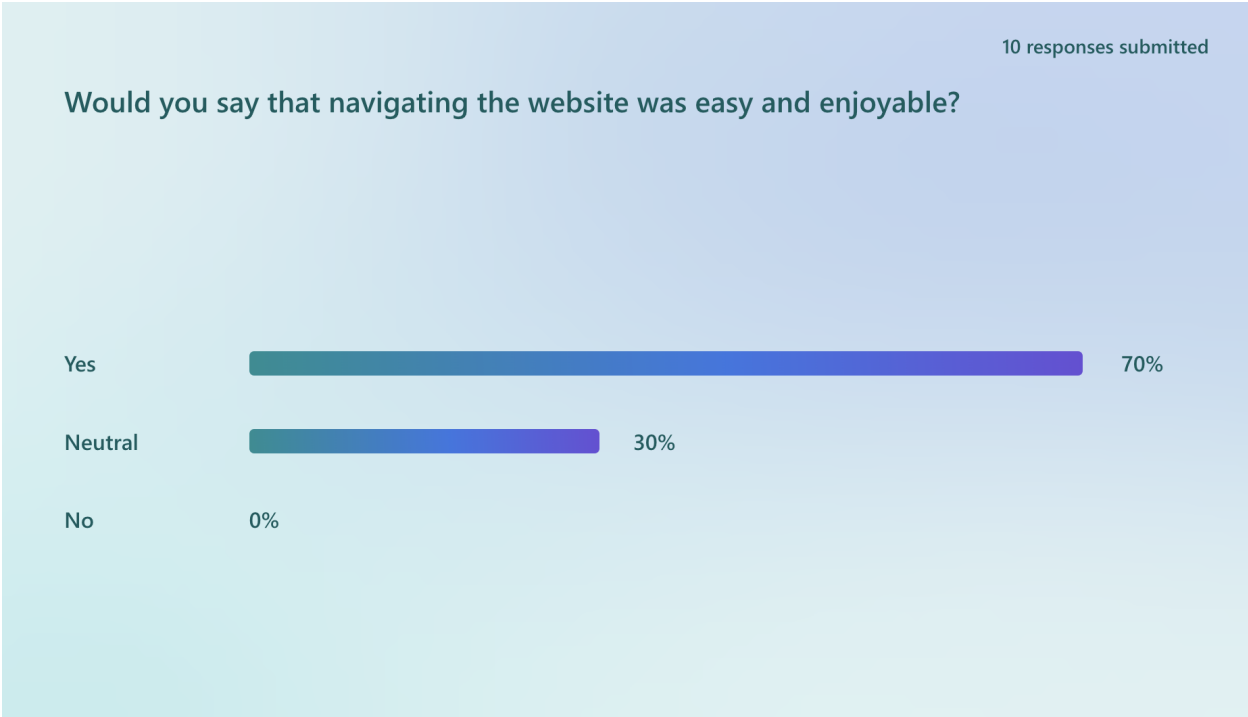


Figure 12: Website Navigation.

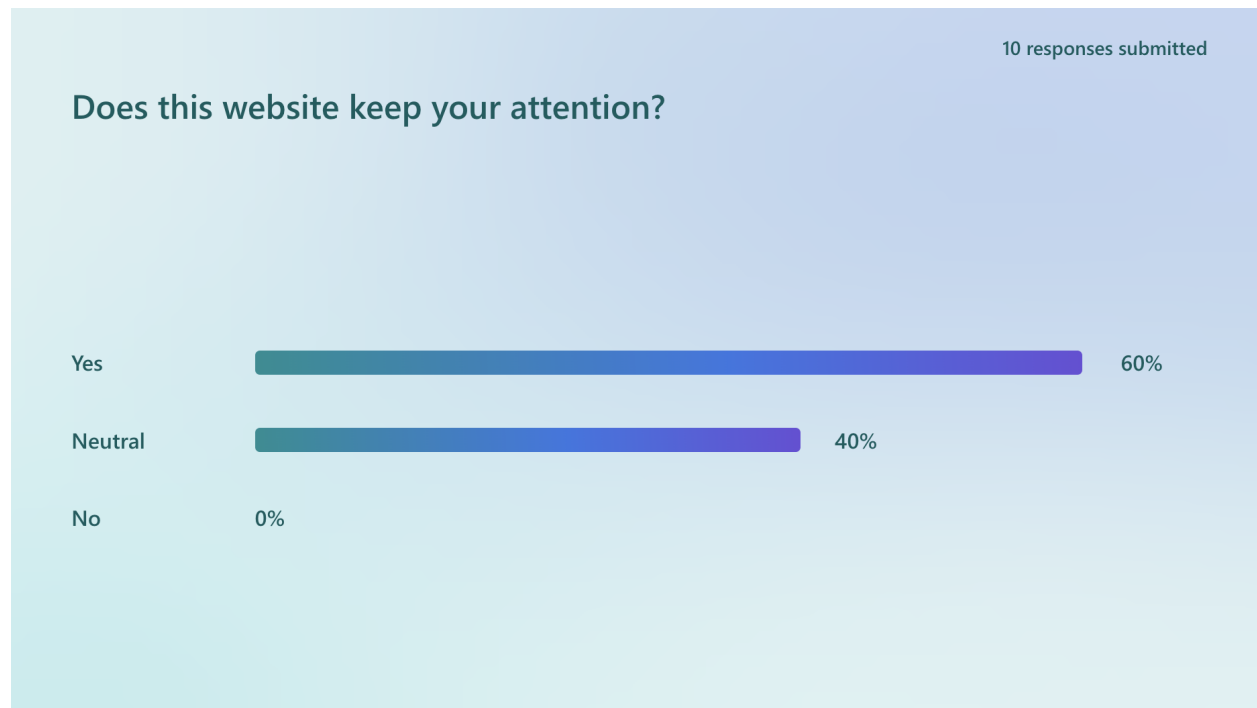


Figure 13: Attention Span for Website.

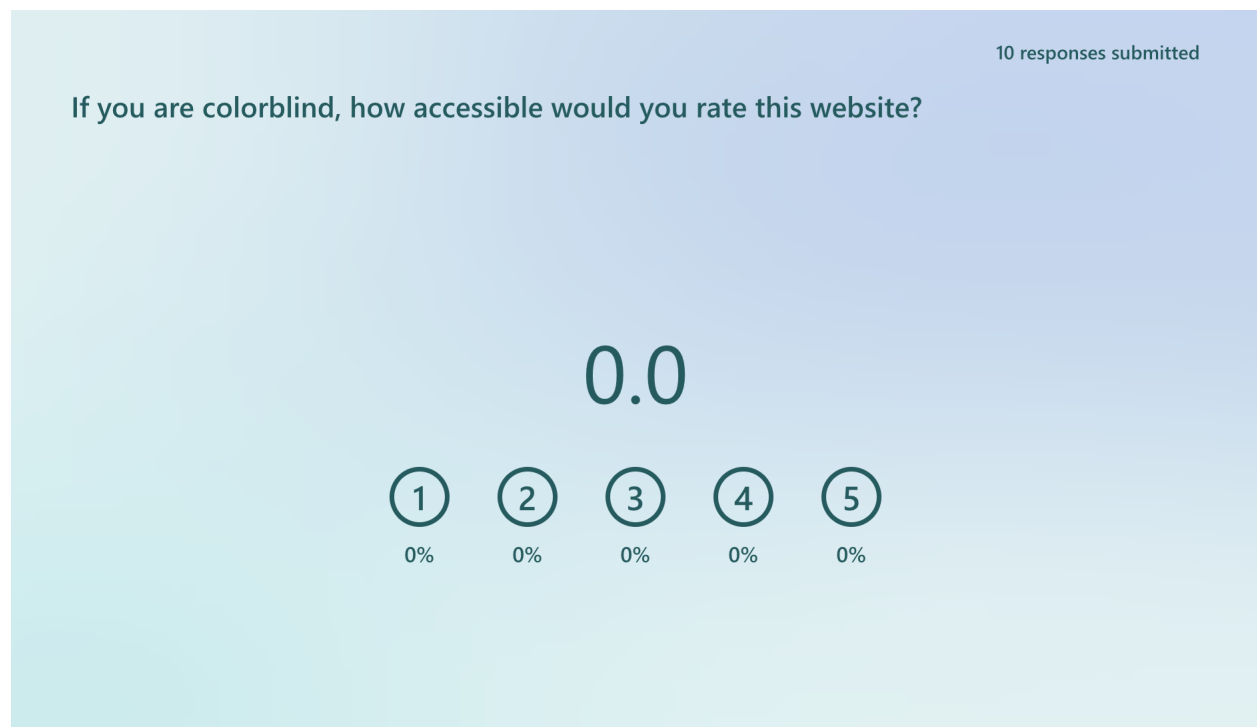


Figure 14: Colorblind Accessibility.

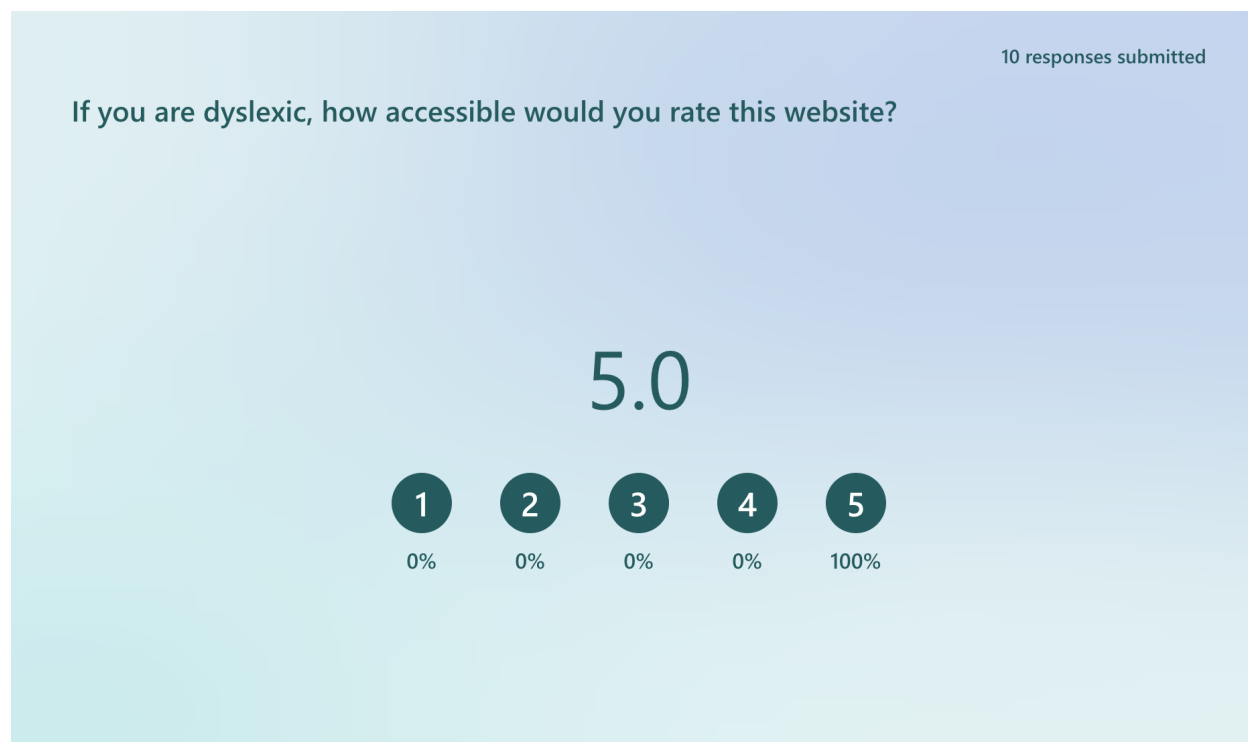


Figure 15: Accessibility for Dyslexia.

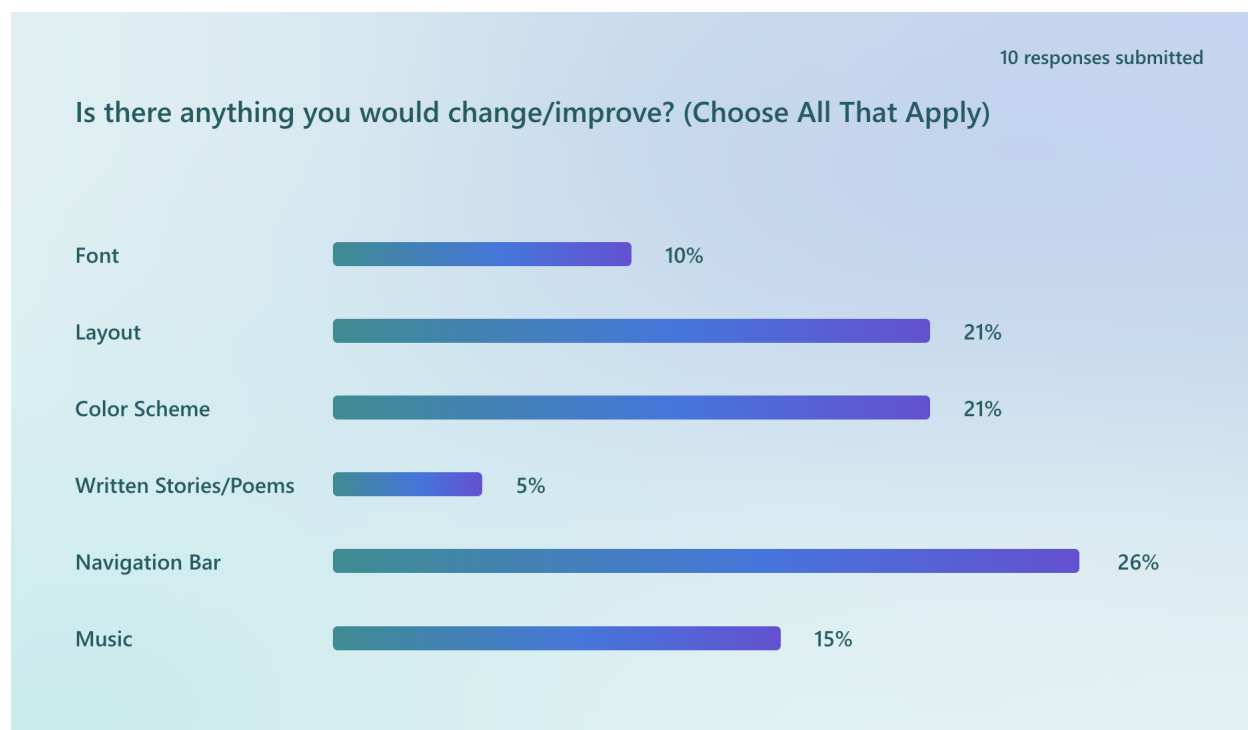


Figure 16: Aspects of the Website to Change or Improve.

Analyzing the data from the survey, it is evident that the website overall had standard success. Out of 10 responses the website experience average was a 4.2 percent. 100 percent of users considered the website functional and aesthetically pleasing. Website responsiveness received a 4.5 percent. 100 percent of users considered the readability of poetry and stories easy to read and digest. 70 percent of users said the website color scheme was calming while 30 percent were neutral on the matter. Website navigation for the users had 70 percent say the website was easy and enjoyable to navigate while 30 percent were neutral. For website attention, 60 percent said yes the website kept their attention while 40 percent were neutral on the matter. We did not receive any information to determine if the colorblind friendly palette is efficient. There was 100 percent rating for accessibility for users with dyslexia. Overall, the data shows a mixture of neutrality and high praise. Overall, it was a good experience for the users. The aesthetics worked well, and the functionality was decent. The content readability worked, and the website color scheme was calming which was one of the main goals. Website navigation was also a success, as well as it keeping users attention. The website also was accessible for users who are dyslexic.

Based on the results for aspects that can be changed or improved for the website we can look at usability testing feedback to analyze. It can be assumed that those who want to change the font are focused on the font sizing. The layout probably has to do with the sizing of content container for reading poems and stories. The color scheme has to do with the dark mode feature. The written stories and poems probably means adding more content. The navigation bar has to do with the icon clarification, and dark mode. The music as to do with adding music content.

5.2 Future Works

For future works, the plan is to incorporate a majority of feedback received from usability testing. Two major features that is planned are adding music and fixing dark mode. Adding music will enhance the calming atmosphere of the website. The reason dark mode only works for the navigation bar is because more research needs to be done on how to convert the light mode color palette to their darker variants. Simply making the colors darker on the color wheel, without research, may breach the accessibility standards.

6 Conclusion

Through building a website with UI/UX design implementation, Lullaby Lit had a decent amount of success. Users found the website functional, accessible, and easy to navigate. While the main goals were achieved such as making a calming website that is accessible and functional, there is more that can be done. Users made suggestions on ways to make the website even better. Some of the suggestions are enhancements such as music, while other suggestions are more functional such as implementing a full dark mode version or changing some of the navigation bar icons. For the future, the website will add a variety of the users feedback and continue to use UI/UX principles.

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