

Department of Digital Humanities

University College Cork

Declaration of Originality

DH4003: Research Project

Final Year Project Report

Website Accessibility From the Perspective of Individuals With Autism Spectrum Disorder (Asd)

Supervisor: Gavin Russell

In signing this declaration, I am confirming in writing that this submitted work is entirely my own original work, except where clearly attributed otherwise, and that it has not been submitted partly or wholly for any other educational award. However, aspects of this dissertation have reasonably emerged from and followed from the digital project plan submitted for DH4002.

Therefore, I declare that:

This is all my own work unless clearly indicated otherwise, with full and proper use of accreditation

None of my work has been submitted to any educational institution, contributing in any way to an academic award.

Concerning another's work: all text, resources, code, or even ideas, whether verbatim, paraphrased, or otherwise modified or adapted, have been duly attributed to the source in a scholarly manner, whether from books, papers, lecture notes or any other student's work, whether published or unpublished, electronically or in print.

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Date: 26-04-2024

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Introduction:

Motivation:

As a secondary school student, I spent much time considering what options were available in post-secondary school. I also spent a significant amount of time on college websites. Out of all of them, UCC's website was the most difficult to navigate.

The amount of information on the homepage alone was overwhelming. My attention was pulled in multiple directions. Several issues were encountered when navigating the course list:

1. The course list kept glitching while I was trying to scroll down it.
2. The organisation was unclear. Every course was organised alphabetically. It did not matter how different they were from each other or if different schools taught them. If they began with the same letter, they were together.
3. The columns were messy, and for individuals with eye-tracking issues, especially when it comes to text on devices, this makes a challenging experience far more cumbersome than necessary.

Only months later, when career guidance told me about Digital Humanities, I reconsidered UCC as an option. The notion that, as a student enrolled at UCC for four years, I might have never stepped foot on campus because the website was inaccessible to me is unthinkable. If something as simple as that could have hindered my education, could it have done that for others? It made me wonder how many other disabled people had lost out on experiences because they were on platforms they could not access due to their disability. What job opportunities might they have lost? Was there information they needed that they could not access because it was presented in a way they could not process or understand? Information about events and concerts that could have enriched their social experiences? It brought many concerns about web and internet accessibility and led to the decision about what my final project was going to be. What does web accessibility look like for an autistic individual, and was UCC's website Autism Friendly?

Relevance to Digital Humanities:

At the core of Digital Humanities (DH) is the exploration of the intersection between the humanities and technology/digital space. At its essence, this project is a creative use of technology to transform the human experience, particularly for individuals on the autism spectrum. It is widely known that the world we inhabit can pose challenges for many autistic individuals to navigate. The same can be said for our digital spaces. By addressing these challenges, we can significantly improve the digital experience for individuals with ASD, a population that often faces unique barriers in this realm.

Individuals with Autism Spectrum Disorder (ASD) have different sensory needs, which refers to their unique ways of processing and responding to sensory information. Some are more sensitive to certain senses, such as light sensitivity. Individuals who cannot handle bright lights on their devices for prolonged periods can switch to dark mode versions of apps, something the current UCC website does not have; this is one of a few issues I have encountered when using the website while also asking friends and relatives about their experiences with the website and the internet at large as autistic adults.

Numerous papers and journals have been published about ensuring accessibility in the digital realm. However, most of the research in this area has focused on assisting individuals with visual disabilities rather than those with mental disabilities such as ASD; DH prioritises the values of transparency and accessibility, which is the exact objective of this project. Due to how autistic individuals experience the world and digital realm, any website with autistic users in mind will be more user-friendly overall. These websites are required to be simple and straight to the point. If the user has to Google the specifics of what they are looking for from the website to find it, the website is unlikely to be ASD-friendly.

The project's initial aim was to enhance digital accessibility in general. However, it became evident that this broad scope would not be feasible within six months. By shifting the focus to accessibility through the lens of ASD, I was able to delve deeper into the topic and adopt a more user-centric

design. This approach, aligning with the core principles of DH, places human needs and technology experience at the forefront, making it a more fitting DH project.

Project Goal:

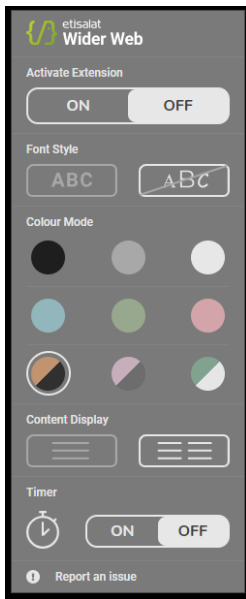
The project sought to objectively evaluate the UCC website to propose an alternative website design that would better cater to the needs of the autistic community. This endeavour encompassed thorough research to explore existing knowledge concerning autism and web accessibility, scrutinising the guidelines adhered to by UCC and pinpointing any deficiencies within those guidelines.

Abstract:

This project aimed to develop web accessibility guidelines that specifically focused on individuals on the autistic spectrum. It also aimed to evaluate UCC's website accessibility based on these guidelines to see how ASD-friendly it was. Most of the research on internet accessibility emphasises the need for web accessibility for individuals with physical disabilities, i.e., individuals with visual impairments. There is nowhere near the same level of attention to autistic internet accessibility. A large part of the research of this project involved researching not just published literature on the topic but also UCC's current internet accessibility guidelines and evaluating their compliance with said guidelines. It was discovered that UCC's website was not ASD-friendly and totally compliant with its own standards.

Current Existing Solutions:

Etisalat Wider Web is a browser extension tool that can modify websites slightly in order to make them more accessible to autistic users.



Things it can do:

1. Change the website into nine different colour modes while also turning all images to black and white until hovered over with the user's mouse.
2. Add a timer so the user is aware of how much time they are spending on a website at any given time.
3. Simplify the text style on the screen to make it more legible
4. Focus/Zoom screen in to minimise distractions.

Why it is not a perfect solution:

1. It cannot be added to UCC's uMail accounts on Google Chrome
2. Simplified text is not always easy to read; sometimes, it makes text harder to read.
3. The focus mode is ineffective for all websites, like the UCC one, which has a considerably large advertising section on the website homepage alone.

Problem Treatment:

The proposed project aims to assess the website from the perspective of individuals with Autism Spectrum Disorder (ASD) and find ways to make it more accessible for them. This would require understanding the specific requirements for creating a website accessible to autistic individuals, researching the topic, and implementing the necessary changes. If the website needs additional plugins to make the user experience less stressful for individuals with ASD, it is an apparent problem that needs to be addressed.

The Plan of Work:

The project development began in October 2023 and finished in April 2024 over six months. Some modifications had to be made very early, like changing the initial project proposal due to ethical concerns regarding seeking involvement from autistic students to gain feedback. The first two months involved gathering sources and reading materials on web accessibility, emphasising studies focused on autistic individuals and mainly looking for research that involved autistic individuals, deemed essential for the project's success. Over the next three months, time was

dedicated to crafting digital artefacts slated for presentation on the Open Day to showcase to the project supervisor, second reader, and other department members and colleagues.

The process encompassed testing code, analysing functionality, acquiring proficiency in programming functions not covered in prior computer science courses, and conducting revisions to develop a presentable output. The write-up of this report was worked on in small increments throughout these five months but was entirely focused on during the final month.

Literature Review/Justification of Literature:

Similar Projects:

Autism Accessibility Guidelines research project, Final Report for National Autistic Society published on September 23rd, 2019—conducted by Hassell Inclusion.

Hassell Inclusion for the National Autism Society conducted an Autism Accessibility Guidelines research project. Hassell Inclusion is an organisation whose entire ethos is website accessibility. They run dense research projects for different disabilities and offer free information on their company website to help others with similar goals. This project involved extensive research on website accessibility for individuals on the autism spectrum. Part of that research involved conducting a large study with autistic people from various backgrounds. They transformed their project findings into a detailed final report that explicitly outlines guidelines for website accessibility and underscores their importance.

This report helped to heavily inform the guidelines for the project as, while researching independently, it covered the same topics discussed within most of the reports of other researchers in greater detail. The report examines the reasons behind Hassell's proposed guidelines alongside comments made by autistic individuals during the study. The original intention at the beginning of the project was to conduct a survey to gather feedback from autistic individuals in Cork regarding the challenges they face while using websites. The study would have provided valuable insights into their unique perspectives and helped in creating user experiences that are more accessible and inclusive. Unfortunately, due to limitations and ethical concerns, I could not do so, making Hassel's report exceedingly helpful.

How Web Accessibility Affects People with Autism, published by the Bureau of Internet Accessibility on April 2, 2018.

The following is a blog article published by the Bureau of Internet Accessibility. It highlights the significance of Autism Awareness Day for autistic individuals and their families. The article explains the behavioural patterns and communication issues often seen within autistic individuals or those on the ASD spectrum and emphasises the importance of creating websites that they can navigate. The article then explains WCAG 2.0, one of the more popular sets of accessibility guidelines, and provides a link so individuals can examine them themselves. It also explains the significant procedures for supporting autistic individuals when creating a website. This article was very informative and helped me develop my project.

Recently, UCC's website updated its accessibility guidelines and now uses WCAG 2.0's guidelines. The way these guidelines were communicated on this website was more digestible than most sites I had seen explaining the procedures to general users. My supervisor advised me to use the same general guidelines that UCC was using when creating a mock-up of what a more ASD-friendly website might look like. Reading through the procedures in a way that was more digestible to me was very informative. It helped me develop a general plan for the next few months of web development while continuing to work on the project.

Inclusive Design and Web Accessibility for Autism and Cognitive Disabilities by Ashley Makenzie, published on the 3rd of May, 2021.

Makenzie's research project explores the impact of cognitive disabilities, including autism, on individuals' daily lives. The project focuses on the disparity in web accessibility for these individuals. Makenzie provides readers with background information on disability to aid their understanding of the project's purpose, then demonstrates the current guidelines for web accessibility, plugins that help aid accessibility and detailed explanations for various aspects of websites. The project also highlights where websites are falling short or need improvement in accessibility.

The research project provided helpful information and detailed explanations about accessibility guidelines that the author had not considered investigating before. The project included images that displayed examples of what to do and not to do when creating an ASD-friendly functional website without losing integral parts of the design. Makenzie also explained that a web page's brand design choices may be harmful and require improvement. This information will be helpful during the development stages of the project artefact to ensure the project does not stray from the end goal.

Current Literature:

Text 1: *Campoverde-Molina, Manuel, et al. "Accessibility of University Websites Worldwide: A Systematic Literature Review." *Universal Access in the Information Society*, vol. 22, 2023, pp. 133–168. <https://link.springer.com/article/10.1007/s10209-021-00825-z#citeas>*

The following literature review examines university websites from an accessibility perspective. It provides an overview of what a university web page is intended to be and touches upon WCAG 2.0 as web accessibility guidelines. The review then goes into how closely university websites conform to these guidelines. The literature review addressed a fundamental question: How do university websites compare to other sites regarding the standards to which they are held?

While this literature review does not explicitly revolve around web accessibility as it relates to ASD, it does provide a generous amount of information regarding digital accessibility in multiple countries and continents, explicitly relating to university websites. The review had four core lines of questioning with sub-questions for each of the four categories regarding the research. The study provided valuable data regarding the websites examined. It went through web accessibility standards based on continents such as Europe and Asia, whether they had laws relating to web accessibility, and what pages were accessed. The authors of the literature review examined 42 reports on web accessibility that analysed 9,140 universities distributed.

Text 2: *Georgakas, Dimitris. AllY Unraveled: Become a Web Accessibility Ninja. Apress L. P, Berkeley, CA, 2023, doi:10.1007/978-1-4842-9085-9.*

Written by Dimitris Georgas in 2023, this book is 317 pages long and is an excellent resource for learning about issues surrounding web accessibility. It goes into what laws govern certain countries regarding web accessibility, such as the UK, in both public and private sectors. It discusses the difference between usability and accessibility. It has a whole chapter on creating websites that cater to specific disabilities, including visual impairments, anxiety and, of course, Autism. The book is well written and provides helpful images that make Georgas' points easier to digest while still providing practical information.

The book provides an essential guide for ensuring that a website is accessible and stays that way throughout the development process. Despite being a lengthy text, the book is easy to read and navigate to find relevant information regarding any queries you might have while researching for a similar project or report. In particular, chapter 12 of this book was instrumental later on in the project development phase as it is about what to do in specific areas of web development like navigation, icons, colour, and contrast, along with other vital tidbits which were beneficial during the final phase of the digital artefact.

Text 3: *Yaneva, Victoria. Autism and the Web: Using Web-searching Tasks to Detect Autism and Improve Web Accessibility, no. 121, 2018, article 2, pp. 1, <https://doi.org/10.1145/3264631.3264633>. Published on 02 August 2018.*

Victoria Yaneva wrote this newsletter article on behalf of SIG Access to help improve awareness of the difficulties autistic individuals have when navigating the internet, particularly concerning eye-tracking problems. It highlights the shortcomings of current accessibility guidelines, which are explicitly concerned with ASD. It proposes potential solutions based on evidence Yaneva gathered by conducting a study using a group of controlled and non-controlled participants. The findings of this study and the data gained from it were valuable for the overall project.

The controlled research group navigated through the websites that were straightforwardly presented to them. They could navigate through the websites precisely, searching for any desired information to avoid the bombardment of visuals and other unnecessary text. The other group, however, had to navigate through the same websites without this form of assistance, which led to a lot of frustration for the group. The information provided is nothing new; the report contains the group study results that reaffirmed the need for the accessibility guidelines created for this project and its digital artefact. The article is an excellent source of evidence about why specific requirements, like decluttering web pages, are essential for accessibility.

Text 4: Valencia Katherine, Rusu Cristian, Quiñones Daniela, and Erick Jamet. *"The Impact of Technology on People with Autism Spectrum Disorder: A Systematic Literature Review."* Published on 16 October 2019

This literature review defines when ASD first became recognised in the modern world, the way we understand it, and the benefits technology can have on the quality of life for an autistic individual. As part of their research, the authors took articles spanning a decade (2009-2019) to develop general knowledge about the concepts they were working with. While this project's concerns are not concerning the direct education of autistic individuals, it is still worth considering for evidence as to why my final year project is essential. The authors of this literature review proved that autistic individuals could significantly develop essential living skills: conceptual, practical, social, and general skills through technology when it is provided in an accessible format.

The findings of this report serve as evidence that autistic people complaining about not being able to navigate websites is not a skill issue with them but rather evidence that those sites are not being built with their needs in mind. When evaluating how ASD individuals best learn skills using the internet, the authors discovered that the answer to that question for education was serious/literary games as that was the more straightforward method of delivery for the people in their study to engage with. If one can keep the site clear, one can avoid most of the challenges autistic people struggle with from the outset of the development process.

Text 5: Britto, Talita, and Edinaldo Pizzolato. *"Towards Web Accessibility Guidelines of Interaction and Interface Design for People with Autism Spectrum Disorder."* 2016.

While this text is one of the older resources referenced in the project, the guidelines proposed and the information provided in this source are still current, making it a practical resource. The authors went through 17 relevant authorities and used them to gather the universal guidelines surrounding accessibility for autistic individuals. Through their methods and lines of enquiry, the authors were able to learn what the ten critical categories of the policies were: Visual and Textual Vocabulary, Customization, Engagement, Redundant Representation, Multimedia, Feedback, Affordance, Navigability, System Status and Interaction with Touch Screen. The most relevant guideline category listed for this project is Customization.

One of the findings while researching what makes websites easier for different autistic web users is that there is a wide variety of visual needs. For the artefact (prototype of the UCC website) to be adequately accessible to the full spectrum of Autism, it must ensure that users can make small changes like simplifying the fonts, changing the background and text colours and more. This particular piece of content also mentions these things. Furthermore, it suggests allowing the option to change images, e.g., turning them into black and white, something I had not considered before and will now implement if possible.

Crucial Guidelines For Autistic Web Accessibility

Page Layout:

- Place critical information at the top and prioritise content from most to least important on the site.
- Ensure that the website is clear and uncluttered. Busy pages can be overwhelming for autistic individuals and make it difficult for them to focus on their tasks. Limit choices where possible to reduce stress.
- Set approximate page lengths to minimise scrolling and keep each page focused on its primary purpose.
- Keep different categories of content separate and avoid mixing them.

- Maintain consistency throughout the pages, using the same colour scheme, layout, and design elements.

Relevance to WCAG 2.1: 3.2.3 AA: Consistent Navigation

This section focuses on the importance of keeping a page layout on a website consistent for accessibility purposes. (This is also relevant in the discussion on Clutter and Navigation)

Brightness:

- Autistic individuals have a variety of issues related to light. Avoid overly bright colours where possible. Studies have shown that autistic users tend to have a preference for more muted colours, such as brown tones. Bright colours can also lead to overstimulation.

Font Style:

- The majority of autistic individuals prefer sans-serif fonts (simple). Some, however, find that these fonts to be more difficult to look at as they do not “flow” as well as serif fonts do. Regardless, it is best to stick to one font style for your website as autistic users tend to get distracted when they have too many variations of text style, mainly if it is a mix of sans-serif and serif fonts. As sans-serif fonts are easier for dyslexic users to read this is the more ideal font style when it comes to picking a font type.
- The font size should remain the same throughout the site, at least 12 pt. Larger font sizes are preferred.
- Allow font customisation where possible: changing sizes and style.

Relevance to WCAG 2.1: 1.4.8 Visual Presentation

This section of WCAG 2.1 touches upon the need for text to be customised to different colours and to change the size.

Clutter Free:

- The more information the autistic user is confronted with on the homepage, the more overwhelmed they will become and the less likely they will return to that website.
- Avoid large blocks of text where possible, as autistic individuals have a more challenging time with eye tracking, particularly with larger volumes of text.

- Allow autistic users to choose not to engage with clutter/mess. Allowing the user the option to click a small button to hide a certain portion of the website if it is too overwhelming is best as it means you can:
1. Avoid stressing the autistic user
 2. Still, display that information in a way that gives people more control.

Navigation:

- Keep It Simple. Create a consistent and simple navigation system. Overly complicated websites lead users to seek information from Google's parameters to avoid "junk." This reduces the users' willingness to return to the site. Confusing navigation is a common complaint amongst autistic web users.
- Keep all links clear and visible to users. Make sure all links are underlined and in a different colour from the text.
- Smaller menus. Design all menus with fewer options so they are less confusing. Fewer options mean easier decision-making. A sticky main menu makes it easier to navigate to other areas of the website.

Simple Images and Videos:

- Limit the number of photos used. Too many images can be overwhelming for most autistic users, so they should be limited.
- Do not have automatic image carousels. This creates a lack of control and means the user cannot take enough time to look at the photos to suit their needs.
- Make images black and white where possible. Less colour to focus on is easier for the eyes to manage and will mitigate potential issues regarding overstimulation.
- Videos on the website should not start automatically playing when the user enters the page without warning. This removes control from the user and will stress the user, especially if the video is not immediately in front of them and they are unaware of where the noise is coming from.

Relevance to WCAG 2.1: 1.4.2 A: Audio Control, 2.2.1 A: Timing Adjustable, 2.2.2 A: Pause, Stop, Hide

In these sections of the WCAG 2.1 Guidelines, it is mentioned that putting the user in control of audio and videos is an essential part of accessibility, along with being able to hide things where necessary to avoid being overwhelmed.

Forms:

- It is essential to use clear and unique names for forms related to your website and users so that they are easy to find; this is especially important for those on the autism spectrum who may struggle with unclear labels.
- Make sure the forms have a reasonable timeout for users. An alert should appear on the user's screen with a 5-minute warning that the site will auto-time them out of the form. This is to avoid potential frustrations and gently remind the user to keep going.

Text:

- Space things out properly. No big long paragraphs of text. Ensure there is enough space between paragraphs (not taken up by images). The denser the text, the harder it is to read, particularly for people with eye-tracking issues.
- Short paragraphs and lines.
- Avoid using images that disrupt the reading flow. Use bold text sparingly and only for short, critical pieces of information.

Relevance to WCAG 2.1: 1.4.12 Understanding Text Spacing

1.4.12 is the section of WCAG 2.1 that touches on the importance of ensuring web pages are evenly spaced and straightforward to understand by not having dense amounts of text and being readable.

Movement

- Disable autoplay on all videos and sounds on the website. Avoid using pop-ups and animated design elements when possible. Where not possible, offer a pause button to users so they can regain control of their viewing experience.
- Remove time limits on things such as images, videos and forms where possible or offer a clear way to extend the time.

Help Page

- Ensure autistic users are adequately supported by using multiple help options when looking at the help menu. Some users struggle with direct communication, while others prefer it because it makes them feel more comfortable hearing another person on the other side.

Relevance to WCAG 2.2: 3.2.6 Consistent Help

This section of WCAG 2.2 mentions that any mechanisms that users need to get help (either with the aid of a staff member connected to the site or their ability to help themselves) should be on every web page and appear in the exact same way every time.

UCC Website Evaluation:

On a scale from 1-10, 1 being very poor and 10 being excellent, where does the UCC Website rank in the main categories for website accessibility regarding autism-specific guidelines (for this review, it will be focused purely on the home page):

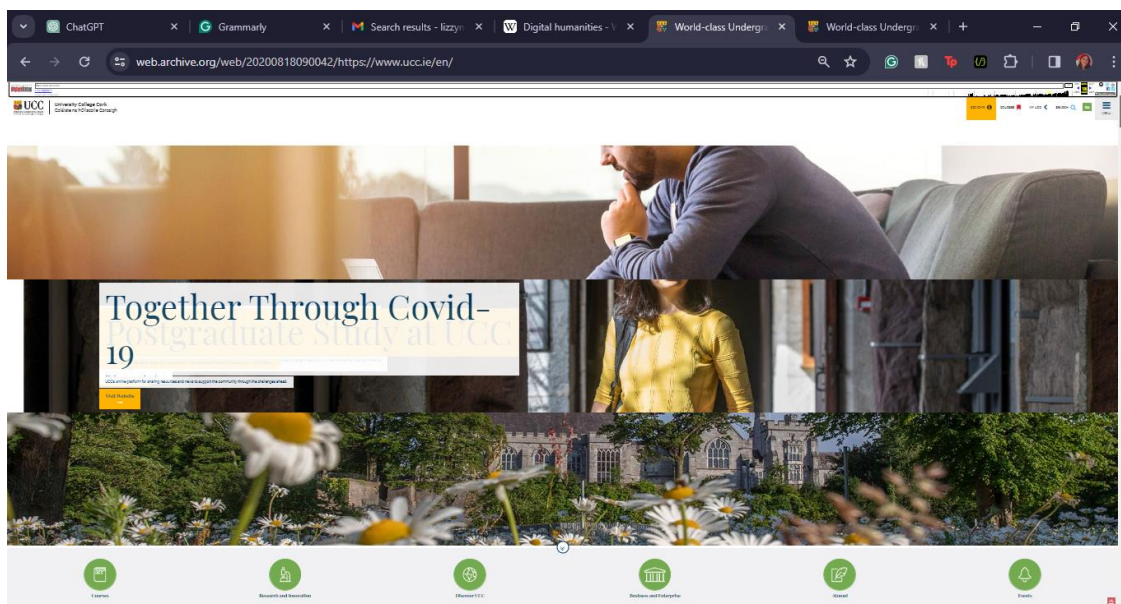
Category	1	2	3	4	5	6	7	8	9	10
Page Layout			✓							
Brightness		✓								
Font Style							✓			
Clutter Free				✓						
Navigation								✓		
Images and Videos					✓					
Forms		✓								
Text							✓			
Movement									✓	
Help Page						✓				

Adding up all the points together, the total rank is 53/100.

Explanation for each mark:

Page Layout: Initially, this was going to be lower. However, the search function at the top of the page led to the decision to rate it slightly higher. Unfortunately, that search function being at the top does not make up for the other issues.

The image carousel takes up a large portion of the computer screen. The images in this carousel are very intense in terms of colour, so having them be the first thing users are greeted with is less than ideal, especially for autistic users.

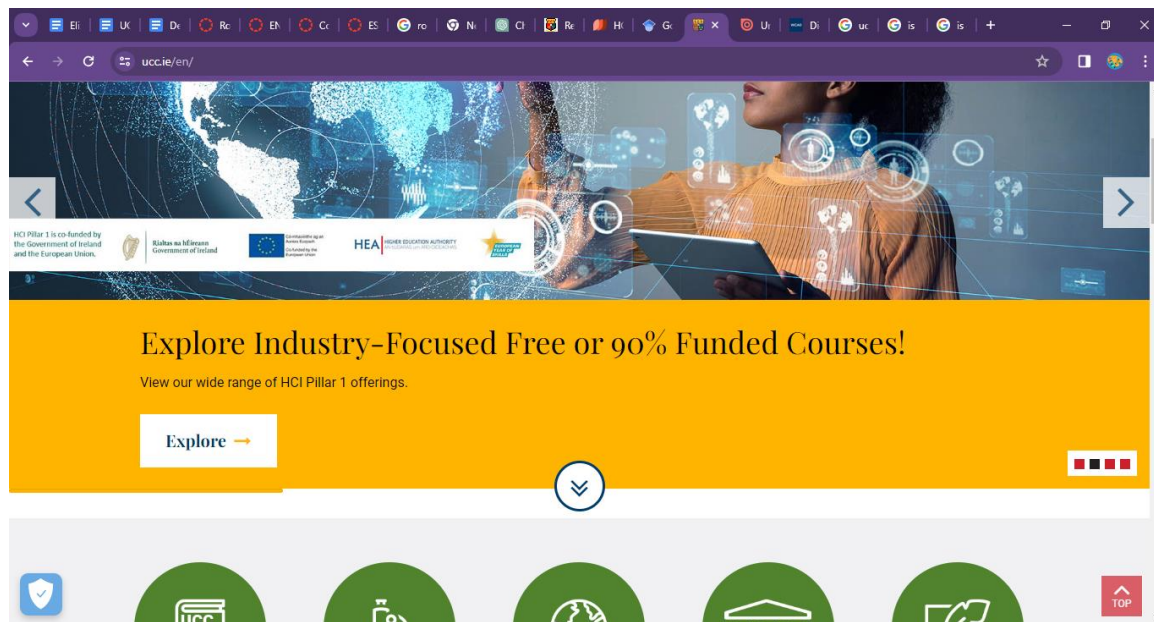


(the above is a screenshot taken on the wayback machine where the website was zoomed out of as much as possible. This was the only way to see more than just the image carousel)

The images outside of that image carousel are very scattered and inconsistent. The photos in the news feed are mostly the same size as each other, except for one image.

The layout is not consistent throughout the home page and is all over the place (this will be relevant more in the discussion of digital clutter)

Brightness: The UCC home page has many colour variations, which, while suitable for distinguishing between different elements of the website, make the colour palette too intense/bright, especially given that the website has a permanent white background.



Add Headings (Format > Paragraph styles), which will appear in your table of contents.

There needs to be less use of the colour yellow throughout the website. Generally, most people worldwide will say that yellow, orange, and red are some of the most annoying colours on the eye. While red is far more limited than yellow, its presence is still something to note.

The white background is also a separate issue. 0% white backgrounds and 100% black text (white and black colour levels) are known to be more intense on the eye. This is why most people will find their eyes dry while peering at computer screens all day. It is also why autistic internet users tend to be more drawn to dark mode as it is less overstimulating to the brain. The level of white on screens does not exist organically, making it intense for human eyes. If an individual were to look at most white things for long enough, they would notice that there are many shades of white due to their undertone colours. If the UCC background's default colour were given a slight undertone, it would immediately be less straining to the eye. Additionally, a dark mode would be recommended, if only to make the variety of colours less overstimulating.

Font Style: For accessibility purposes, there is an emphasis on not mixing Serif Fonts with Sans Serif Fonts. UCC's main fonts are Bauer Bodoni Bold (Serif Font) and Gotham (Sans Serif).

On the home page, a third font might have been introduced for the heading in the News & Views section, as well as a potential fourth font at the very bottom for the widgets under Connect with UCC.



(Samples of the variety of font types in the home page)

This was ultimately marked a 7/10 because while the fonts break the accessibility guidelines, the serif fonts and bold text are used sparingly. An excellent alternative font to Bauer Bodoni Bold might be Helvetica, which is widely considered one of the more pleasing sans-serif fonts.

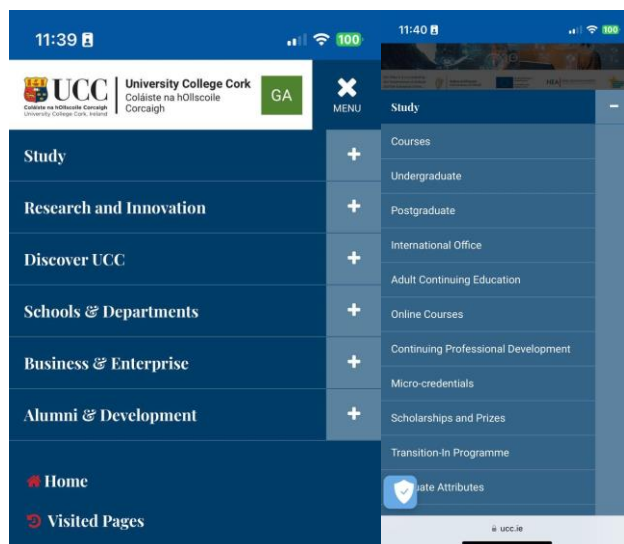
Clutter-Free: The UCC home page requires considerable scrolling due to the amount of information on it. While evenly distributed, the information segments nearly overlap one another with how close they are to each other.

The images used in the carousel are busy and overwhelming (which can lead to it being considered clutter to the brain of a neurodivergent person).

The menus are what drags down the overall marking of the website in terms of clutter. It is significant, and the font is small by default. Ideally, if it must stay this large, it would be better for the text to be more robust i.e. easier to read. In an ideal world, if it were possible to make the menu on the website appear more similar to how it does on mobile devices, it would make things so much more accessible as it is a lot stronger visually and far less messy.



(how the menu appears on PC)



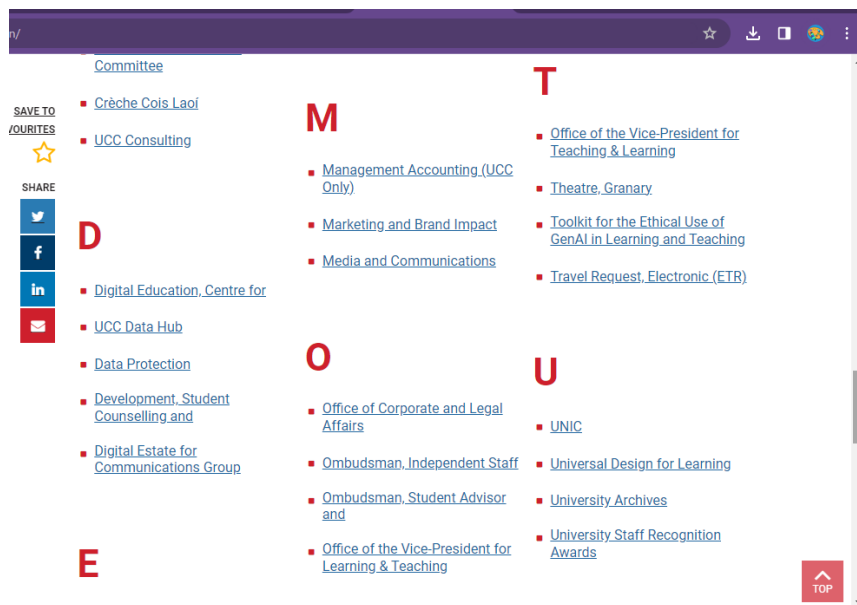
(How it appears on an iPhone)

Another issue found when examining the clutter is that the website layout could be more consistent, making it appear more chaotic at first glance than it is. It flips between busy and clean to busy and back to clean again as the user scrolls down through the website..

Navigation: The evaluation rated navigation so high because most of what prospective students need to know is easily found via links on the home page. However, it loses marks because it lacks more student services/resource advertisements.

UCC student support services such as the DSS, Counselling Services, and Career Guidance should be prioritised. These are services any student could need for various reasons, and the lack of adequate signposting on the home page should be considered.

Even the Support and Services page linked through the menu does not advertise the DSS, and even if it did, it is presented in a long, intimidating list, similar to how the original UCC courses list was presented.

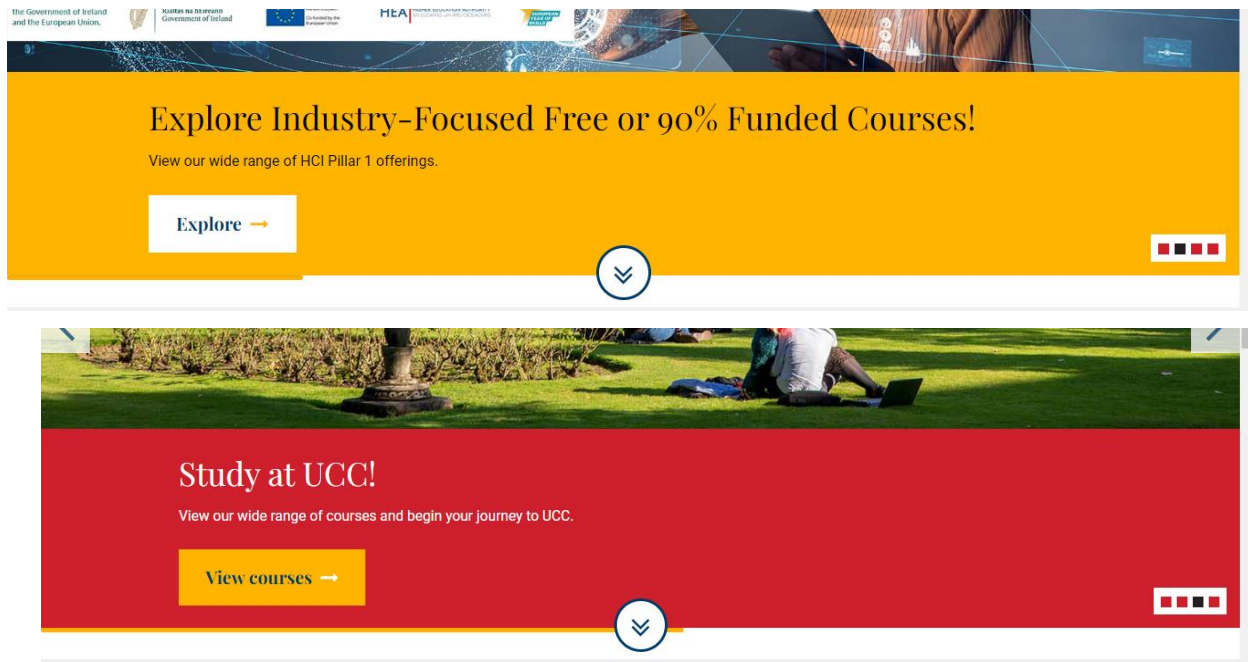


(for frame of reference when discussing the services section, see letter D where Disability Services is not listed.)

Images and Videos: The first issue found when evaluating the website's images was the images in the carousel:

1. Too big: regardless of what device the user is using, the image carousel takes up most of the screen.
2. Used for aesthetics, not practicality: the two images, in particular, clearly prioritise looking clever rather than considering how stimulating they might be to the user's eyes. When trying to make images accessible to everyone, it is essential to remember that keeping them relatively clean, while visually less attractive, is the best way to ensure they are accessible to everyone regardless of circumstance.

3. The way the images change automatically: first, the loading bar is not immediately apparent that it is there (especially when it is beneath the yellow banner as they are the same colour). The second issue with the automatic changes is that it is not immediately apparent that hovering over the image pauses it until one moves their cursor again (unless you have scrolled down far enough to see the bar). There is no way to choose to turn off the auto-scrolling at all.

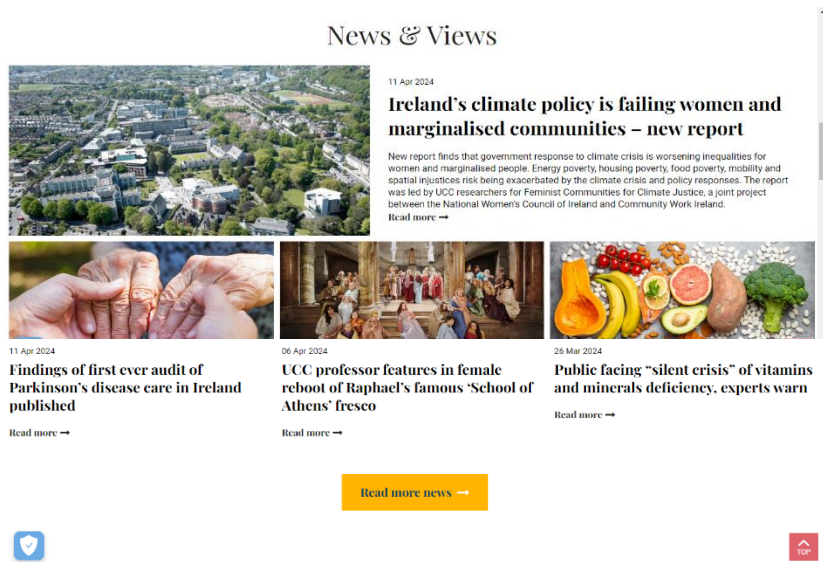


(As seen above, the loading bar is tiny; you would only notice it if you watched it move.)

The best solution would be to remove automatic scrolling altogether and allow users to manually scroll independently with the ability to click buttons. It would give the user back control of what they are looking at and reduce stress when trying to read what each of the images is advertising. Ideally, it would also be better to reduce the size of it as it is quite large; however, advertising is a significant priority for UCC at present, so it is understandable why it is such a large part of the home page.

If it were possible to put the UCC News and Views section into some information carousel, it would be best. For any website to be accessible, text over images must be prioritised. If the news section must be there, it would be better for it to be able to flick between the different stories just so that there are:

1. There are images to look at at any given moment.
2. There should be more text to provide a brief insight into the article's topic so the user can decide whether to read more.



(what the news & views section currently looks like for reference)

Forms: A forms link/tab on the home page must be on. This is an oversight on some level. This category is not 1/10 because it is possible to find the forms via the website's Search bar. However, people should not have to rely on this to locate basic information that should be easier to find.

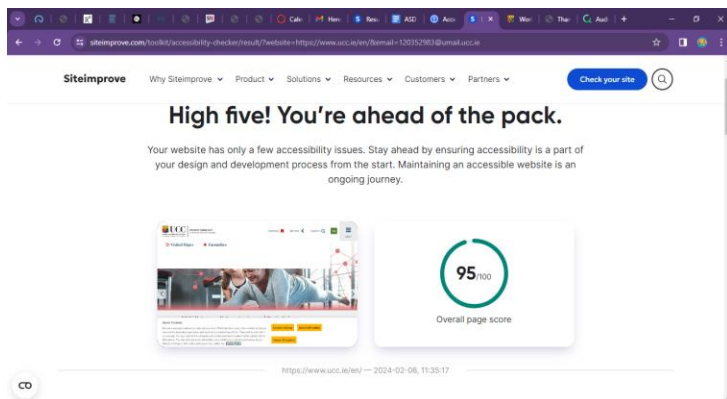
Text: While there is a reasonable amount of text on the home page, it needs to be given more prominence than the images. The switching of fonts for visual interest is understandable, but it should not come at the expense of accessibility. It's also advisable to increase the font size in areas where it's currently small for better readability and understanding of the content.

Movement: The home page does not have pop-up ads, videos, or sound effects. The only reason this is not 10/10 is the image carousel (which has already been explained in previous categories for accessibility issues).

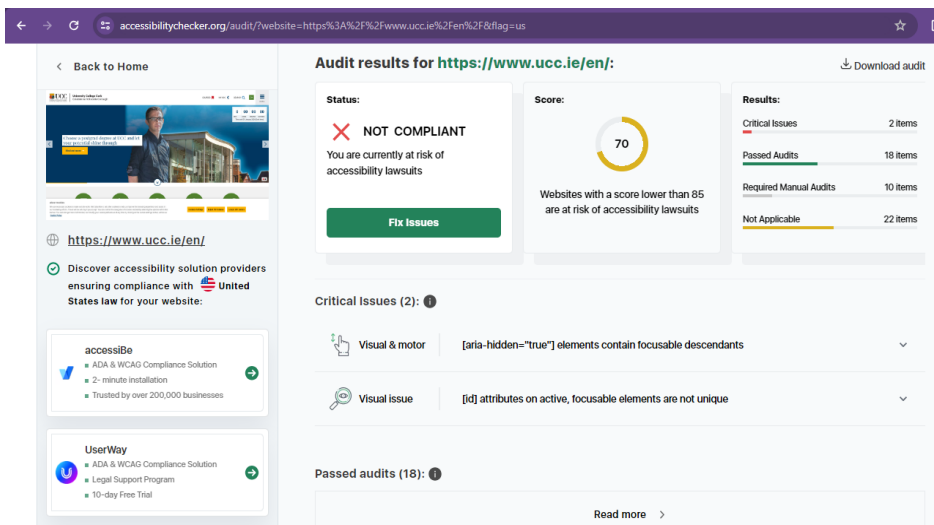
Help Page: The help section for the website should involve much less effort to find. There is no immediate help/contact us section at the top of the page. The only locations are in the densely populated menu or at the very bottom of the home page, which has much content to overstimulate and distract the user's brain before they even get to it, meaning there is a slight chance they could forget why they were on the page, to begin with, and might click off the site.

Additional Evaluations

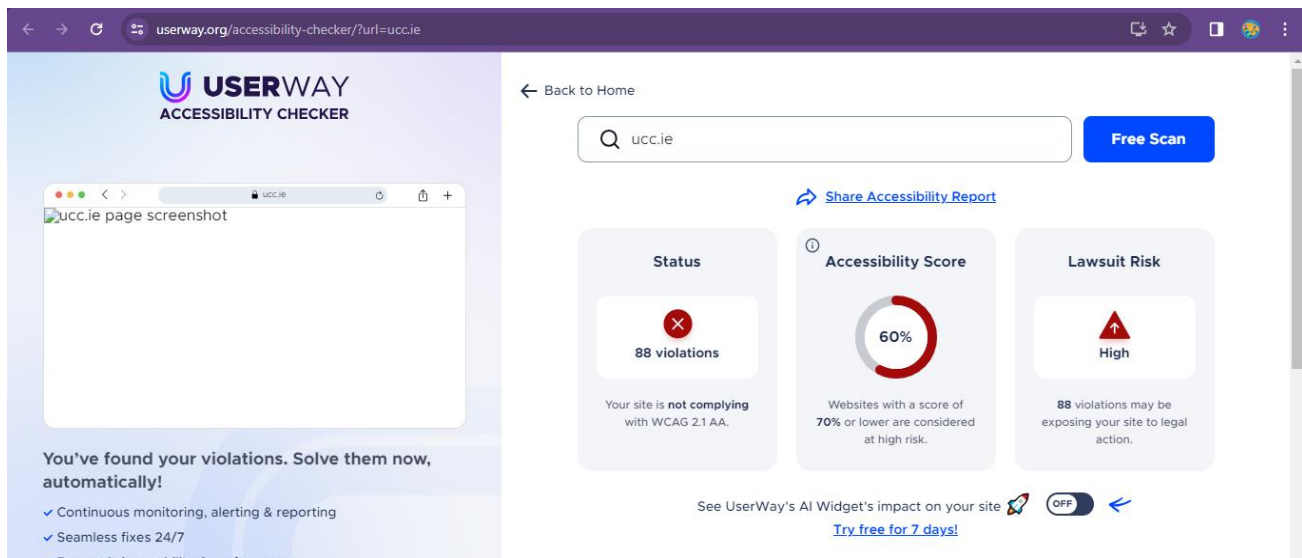
Along with the evaluation based on ASD-specific web guidelines, I also used different websites to evaluate the UCC website based on its current accessibility guidelines, WCAG 2.1, to see just how compliant the website was with the guidelines it was following.



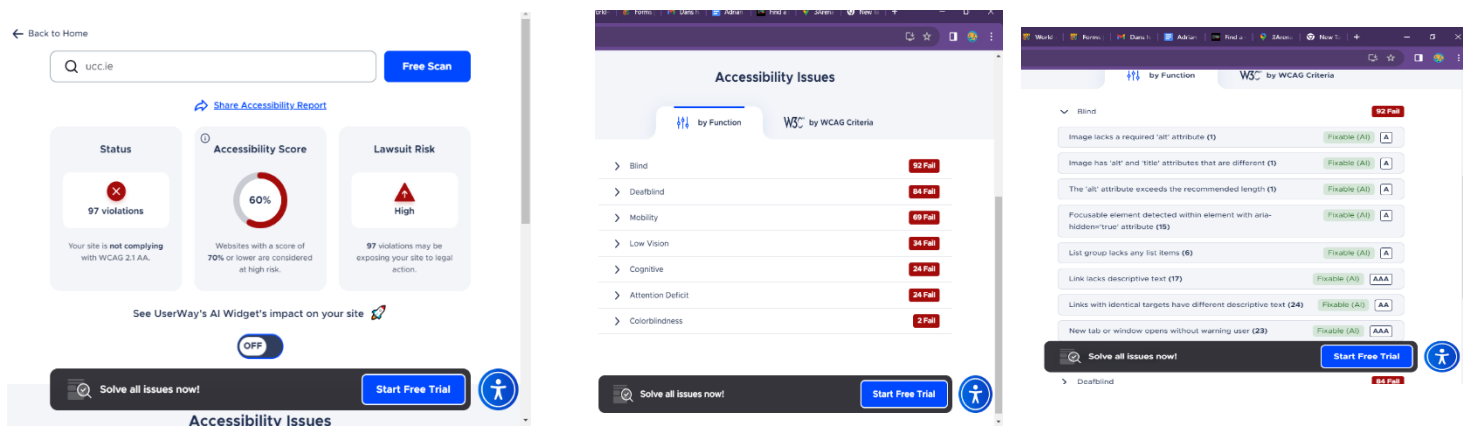
According to Siteimprove's evaluation, UCC's website scores relatively high in accessibility. However, it did not explain why it scored so high or lost points. Having had conversations in passing with other students registered with DSS about their ability to use the website, it was understood that this particular website was probably not capable of doing a proper evaluation.



The following website gave UCC a score of 70/100 (making the website ultimately not compliant with WCAG). It provided context on where it was vital in its approach to accessibility and where it was weak. It identified two potentially critical issues.



The website USERWAY.org gave the website a score of 60/100 and identified 88 violations with the website regarding accessibility guidelines, all of which were also identified as potential legal issues, marking the site as being highly at risk of a lawsuit. Given the amount of detail this review provided with just the accessible version of the report, it is safe to assume this is the most accurate review in terms of the UCC website's current ability to follow WCAG 2.1 as it was far too specific and detailed when explaining where potential issues were coming up; and that was just in the free version as there is a paid version as well that provides users with even more. As this report was the most specific and was done months ago, it seemed only fitting to check and see if it had improved. The score remains as 60/100 overall, but the violations of the guidelines have gone from 88 to 97.



As one can glean from just a glance at the report details, the website has many things to improve. Even if the review based on the guidelines written for this report was off, the reports from these websites outlining the issues with the UCC website are too specific not to be taken into account to prove that the current webpage overall is not as accessible as it could be. The majority of the

website's accessibility issues are in regards to its support for people who are blind/visually impaired. Overall 92 of the website violations concern just blind people, and 34 concern people with low vision. According to the evaluation, which breaks down the issues (see the third screenshot above), all of these issues are entirely fixable, which means there is no need to panic. However, there may be cause for concern because the website has only gotten worse and not better.

Development:

Research:

During this project's research phase, various journals and articles were consulted to acquire comprehensive insights into the prevailing landscape of website accessibility guidelines, explicitly focusing on the consensus regarding autistic web accessibility. At first, there appeared to be a scarcity of research on the topic. However, diligent efforts were made to amass a substantial array of sources by extensively utilising resources such as the UCC Online Library, Google Scholar, and various academic articles. The initial aim at the beginning of the research was to keep the sources for the project as current as possible. However, this proved to be easier said than done. While plenty of people were discussing web accessibility concerning autism and neurodiversity, a limited number of texts focused on these topics to the level required for the project. In the end, having older sources later became beneficial as it showed what had changed and stayed the same regarding the discussion surrounding autistic web accessibility.

In conducting research for this project, Maurice Ryder, the webmaster for the UCC website, was contacted to inquire about the current UCC website accessibility guidelines. After learning that the UCC website's guidelines followed WCAG 2.1 (a set of accessibility guidelines that came out in 2018.) While investigating them, it was discovered that a more recent set of guidelines (WCAG 2.2) had come out that year. Those guidelines were also consulted in case of any potential updates to the now outdated guidelines regarding Autistic users.

Home Page:

The entirety of the Home Page was programmed in Visual Studio Code. This was for two reasons: 1) Total customizability throughout the entire development period and 2) It was more cost-effective considering this was an individual project without any funding behind it. The first step

in developing the home page was learning to make the same carousel images as the ones on the UCC homepage without automatic changes. To accomplish this task, practical experience was gained by utilising W3Schools and using ChatGPT to fix the parts of the code that would not work for unknown reasons during the development process. Once the code was appropriately changed and implementation of the images began, it became evident that adjustments were necessary to prevent text and images from overlapping. Containers were generated for both text and images, and after several sizing adjustments and use of the `
`, the layout was successfully refined.

```
.carousel-container {  
  
    width: 60%;  
  
    margin: 0 auto;  
  
    overflow: hidden;  
  
    position: relative;  
  
}  
  
.carousel-images {  
  
    display: flex;  
  
    transition: transform 0.5s ease;  
  
}
```

(some of the code relevant to the image carousel)

Following the completion of text insertion, attention shifted to the subsequent phase: creating the dark mode button.

During the timetable mockup page development, attention was devoted to ensuring the functionality of the dark mode feature for the utilised table. As a precautionary measure, the decision was made to retain that function on the web page's dark mode version. When making the dark mode, it was essential to ensure that the black was not 100% black, as 0% white text and 100% black backgrounds can be overstimulating to the eyes, which was the main thing that had to be avoided at all costs throughout the development process.

```
<style>

  body {

    color: #2c2929;

    background-color: #e7e1c3;

    .dark-mode {

      background-color: #1a1a1a;

      color: #f5efef;

    }

  }
```

(The two sections of code that are relevant to the two different colour modes background and text colour schemes.)

After fully realising the dark mode function, a small bar for the UCC social media accounts, efforts were made to ensure that the desired resources were readily accessible, considering that navigating through the official site involved significant scrolling before the social media bar became visible. With the amount of content before arriving at the social media options on the home page, there is a high probability that potential users with autism would have already gotten overwhelmed and closed the website in favour of trying to google the social media pages. While understanding that UCC's website is not greatly concerned with advertising its social media presence on the website, it is still an important thing to have highlighted sooner as it shows off more of the fun things about attending UCC and gives a good insight into the environment of the college better than the website itself can. A style sheet was implemented to add icons.

The following function I wanted to add was a contrast mode. Initially, the intention was to make the contrast mode a more advanced version of the dark mode, turning bold text red with black text. Upon further consideration, it was determined that it would be optimal to restrict the function to altering text colours exclusively for customisation purposes. Ideally, allowing the user to pick more colours than just red would have been preferred for accessibility purposes. However, it was understood that limited time was available while working on the project, necessitating sacrifices to be made as necessary. There was also a consideration to utilise the UCC crest colours where

feasible on the website, aiming to pay homage to the current design to maintain a balanced aesthetic. The red colour in the UCC crest would achieve better visibility on both the website's default and dark mode versions. To bring in the other two core colours, the colours of the navigation bar for the homepage were made. Yellow was overly bright and was the primary colour of the navigation bar, so it ended up as the secondary colour.

After finalising the design of the navigation bar, the dark mode and contrast mode buttons were incorporated into it. This decision was made based on the belief that consolidating these buttons in one location would enhance the overall aesthetics and functionality of the interface. After consultation with the supervisor, links from the official UCC website were added to the home page, as there was insufficient time to program all website pages independently. The objective was solely to demonstrate an ASD-friendly website page without aiming for additional scope.

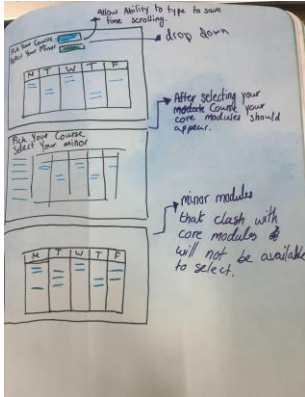
Challenges Faced:

The largest difficulty encountered when working on the artefact for this project was developing the timetable generator. Multiple variations of code were tried and tested to begin achieving the ideal layout of the UCC Timetable.

Module: LW1108		08:00	09:00	09:30	10:00	10:30	11:00	11:30	12:00	12:30	13:00	13:30	14:00	14:30	15:00	15:30	16:00	16:30	17:00	17:30	18:00	18:30	19:00	19:30	20:00	20:30	21:00	21:30	22:00	22:30
Mon									LW1108/T C_WGB_371* 0-10 20	LW1108/T C_ORB_64F 0-10 20					LW1108/T C_WGB_371* 0-10 20	LW1108/T C_AL_G32 0-10 20														
Tue		LW1108/T C_WW_8 0-10 20									LW1108/L C_BOOLEAN_4 0-10 302																			
Wed																			LW1108/T C_WGB_371* 0-10 20											
Thu									LW1108/T C_WGB_G17 0-10 20	LW1108/L C_BOOLEAN_4 0-10 302	LW1108/T C_WGB_302* 0-10 20					LW1108/T C_AL_G32 0-10 20	LW1108/T C_WW_8 0-10 20													
Fri								LW1108/T C_AL_G32 0-10 20																						
Sat																														
Sun																														

(sample of what the timetable looked like at the beginning of the project.)

There was a clear vision of what the Time Table Generator would have looked like by the end of completion and the necessary/ relevant things to go into it.

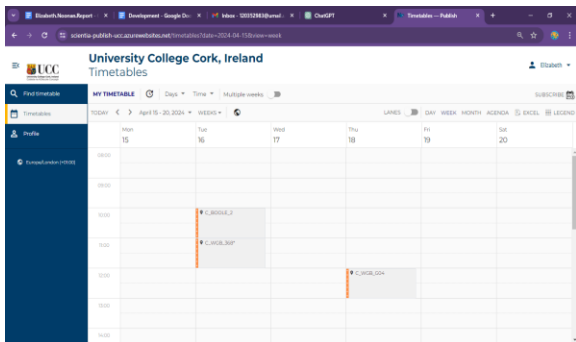


←This is a rough sketch outlining everything that had been intended to happen with the Student Time Table Generator.

The first part (top) is the initial phase. The user would first implement their degree and what course they were in (on a broader scale, it might make sense to have the student input their student ID, and they can confirm if the correct degree information comes up or not). The user would then have been able to specify whether they had a minor or not. Whether if the user had indicated if they had a minor or not, a timetable would have appeared with all their core modules. The days of the week would have been the top columns going left to right, whereas the times would have been top to bottom, as opposed to the timetable UCC had for students, which was the reverse, and they had to input everything themselves.

The second part of the plan (middle) demonstrates the system's intelligence in handling potential conflicts. If the user indicates having a minor, they would specify their minor, such as English. A list of lectures the student could take as part of their learning that year would appear. Importantly, if a minor clashes with a core module, it would be greyed out or not appear, ensuring that students do not inadvertently select classes that conflict with one another.

The third part (bottom) was then the final version of the timetable.



Despite being unable to create this version of the student timetable, after a meeting with the UCC webmaster, the timetable has since been updated to have the same layout as described. While the other ideas have yet to be implemented, this is still an enormous improvement over what students had beforehand. The students still have to scroll to find all of their subjects and insert all subjects themselves. However, this version is far easier to read.

Design and Implementation:

The final version of the digital artefact, which, as previously mentioned, is a stripped-back version of the UCC website homepage, is only partially complete. A few desired functions for the homepage and sample timetable were never made. Initially, the hope was to have four colour modes: Default Mode, Dark Mode, Calm Mode, and Hyper Mode.

Default Mode: This is the standard white screen most websites have when users first click on it; this colour mode is for people who prefer a white background or require it due to low vision.

Dark Mode: This is the black screen with white text, intended for users with sensory issues surrounding bright lights and requiring something less straining on the eye to process what they are looking at on screen.

The webpage prioritised these two colour modes as the most essential features. However, Calm Mode and Hyper Mode hold great potential to enhance user experience.

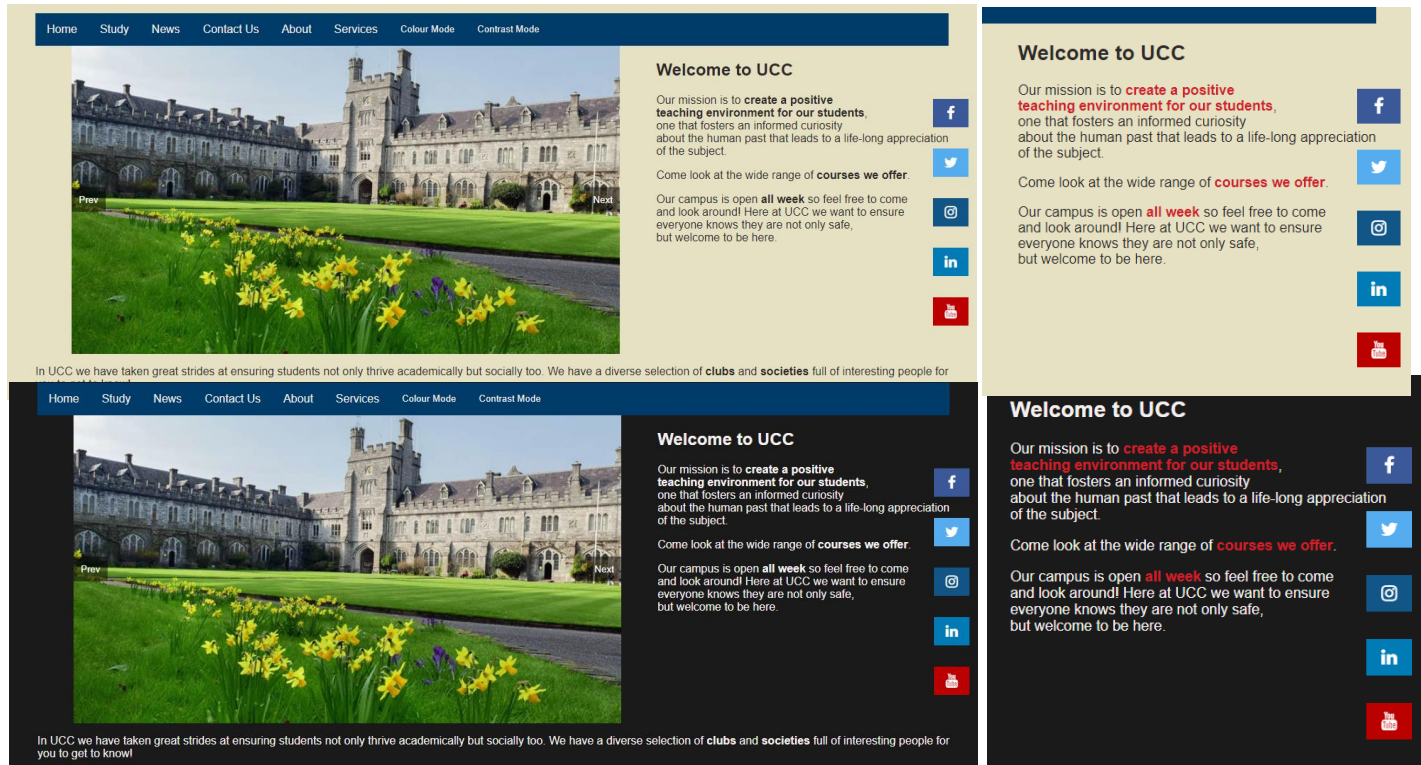
Calm Mode: This mode, with a neutral background (beige or grey) and soft text colour, was designed to provide a soothing browsing experience. It was particularly aimed at engaging autistic users' brains with a small amount of colour while maintaining a neutral environment.

Hyper Mode: Hyper mode is where the idea of contrast mode came from; this function would have been for users who need a more intense version of dark mode, i.e., a black background and vivid colours for text. The idea of this mode was essentially to be the opposite of Calm Mode

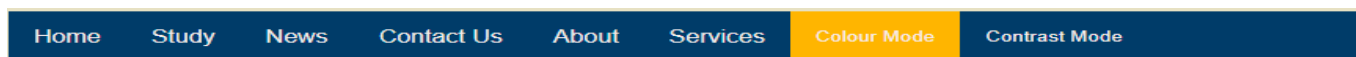


(The above is a sample of what all four colour modes could look like. It was made in connection with a different project during the academic year using what was learnt in the course of this project.)

While it was not possible to implement the level of customisation desired for the final version of the web page it still offers a more user-friendly experience for an autistic user than the current UCC homepage, which was the ultimate goal of it.



(The above shows what the digital artefact looks like in both colour modes default- white, and dark- black in and out of contrast mode.)



(The above is just to show what the navigation bar looks like when the user hovers over a button)

A crucial step in enhancing website accessibility is to incorporate a dark mode. This feature, beneficial for all users, not just those with autism, reduces eye strain by minimising exposure to blue light. Consequently, users can view the website longer without experiencing eye fatigue.

The next step would be to convert all text on the website to one text type: sans-serif or serif font. Sans-serif is preferred overall as it is easier to read for individuals with dyslexia and eye-tracking issues.

A final recommendation is to declutter the webpage as much as possible, with fewer variations of colours, fewer dense images, and a more consistent layout overall.

Conclusion:

The motivation for this project was to evaluate the UCC website from the perspective of autistic users and not simply say negative things; in other words, to explain where and why it falls short and, more importantly, how to solve the issues.

As a final-year project, this endeavour has been the most enlightening and fulfilling one I could have undertaken. As an autistic individual who frequently navigates the internet, I was already cognisant of my preferences and dislikes in web browsing. However, the research for this project delved deeper, revealing the underlying reasons for these experiences, particularly in the case of the UCC website. During the Open Day, I was challenged to articulate my neurotypical experience of the UCC website to a neurotypical person. Thanks to the comprehensive work I invested in this project, I could provide a succinct answer; it's akin to stepping into the home of a hoarder.

As an individual with a profound interest in design, the knowledge and skills I acquired in designing websites with the disabled community in mind through this project will undoubtedly be a significant asset post-graduation. This project has equipped me with a unique expertise in an often overlooked area, making me a valuable candidate for any web design role.

If there had been more time, it would have been great to design an example of what the news carousel would have looked like on the mockup of the UCC homepage. Additionally, it would have been great to have had the time to get the timetable generator to work. In hindsight, trying to work on two different HTML website pages was probably not the most strategic use of my time. Despite the hiccups throughout the project, it was a beneficial and positive experience.

The UCC website might not be ASD-friendly; however, now there is a blueprint on how one might go about solving the issue, along with the other issues presented in tests conducted on the websites that checked UCC's compliance with WCAG 2.1, so that in the future, potential students might be able to say with ease, "UCC is the place for me," without divine intervention.

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