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Group 7

COM109 CW2 – Website Development Project

Final PDF Report of Website Design and Development

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Introduction – Website Theme/Domain and Initial Setup

All code and outputs of my individual contributions are available in a separate document: DosSantosKellyAnnB01002226-Code_and_Output_Evidence.pdf

The concept of our team's website was centered around a Student Hub, an idea that I originally proposed. The vision was to create a platform where each team member could introduce themselves, highlight their interests, and share insights about their life.

As the Project Manager, I oversaw the development, ensuring tasks were completed and communication remained effective. My responsibilities included:

- Coordinating project tasks, delegating pages and responsibilities to team members, and tracking progress.
- Managing communication to facilitate collaboration which involved setting up a WhatsApp group and creating polls to set up meetings.
- Setting up and maintaining the Trello board, which involved creating lists for tasks, tips, rules, coursework specifications, progress tracking, and deadlines.
- Setting up the OneDrive folder to store essential documents and resources.
- Setting up and testing on Replit. I set up shared access and funded a month for smooth collaboration (See Figure 1). I also regularly debugged each team member's code, ensuring functionality.
- Acting as the team go-to.
- Planning and leading weekly meetings, setting agendas, guiding discussions, delegating tasks, and documenting minutes.

Through these efforts, I ensured a well-coordinated project development cycle, encouraging effective teamwork and project efficiency.

Requirements – Identification and Finalisation

Prior to meeting with the team, I established key features to ensure a structured and efficient process:

- Replit structure: I set up the project environment on Replit with a clear folder structure, including directories for assets (CSS, JavaScript), images, and HTML pages.

- CSS and JavaScript files: I created external CSS and JavaScript files, providing the team with a foundational structure for styling, interactivity, navigation, and branding. These files included initial styling elements and JavaScript functionality to streamline development.
- Navigation menu: I implemented a navigation system, ensuring that all pages were linked correctly. This included a dropdown submenu to access each team member's individual about page.
- Individual about pages: Each team member was assigned an about page, allowing for personalised content.
- About page: I set up a central about page that linked to each team member's individual section.
- Contact page: I developed a contact page with a secure, accessible form with validation.
- Index: I set up the initial index page with placeholders for images and text.
- Terms and Conditions: I created a terms and conditions page, using a legally compliant template.
- Interactive features on kelly.html: I incorporated engaging elements on my personal page, including an interactive quiz, map, and an image gallery.
- Responsive design: From the outset, I ensured cross-device and cross-browser compatibility.

After team discussions, we agreed upon the following additional elements:

- Logo (that links to the homepage) and favicon.
- Colour scheme: Initially sea-themed, later aligned with Ulster University's branding.
- Background images.
- Index page: Hero section, greeting message with date/time display, image carousel, and quiz.
- Contact page: Max character limit with counter, secure user data storage, accessibility features.
- Website name.
- Accessibility features: Greyscale mode.
- Call-to-action on each page.

These decisions ensured the website met project specifications while maintaining a user-friendly, interactive interface.

Website Structure and Design *(DOM, BOM, HTML, CSS, JavaScript, jQuery)*

Document Object Model

The DOM was structured for dynamic updates and interaction. I implemented:

- Semantic HTML: <header>, <section>, <nav>, <footer>, <main> elements and alt text.
- JavaScript interaction: Event listeners and query selectors.
- Contact form and Kelly quiz validation: To prevent incorrect input.
- Interactive buttons.
- Dynamic content updates without requiring page reloads.

Browser Object Model

I used the BOM to improve functionality by implementing:

- Back to top button using window.onscroll.
- localStorage to store cookie preferences for one year, retain contact form data, and store greyscale selection.
- sessionStorage to track if a user visited the terms and conditions and when Kelly's quiz was last completed.
- Cookie consent banner.

HTML Development

My contributions to HTML included:

- Initial Setup: Created all pages - Index, About, Kelly, Sean, Sebastian, Eoin, Contact Us, Terms & Conditions (see Figure 2).
- Index: Added a GIF and placeholder text (GIF later removed after team discussions).
- About: Created student cards with hover effects linking to individual pages (see Figures 4 & 4a).
- Kelly: Added a map, interactive quiz with placeholder text, confetti effect, hover-effect photo, and diamond-shaped gallery (see Figures 3 & 3a).
- Contact Us: Set up form with required fields, placeholder text, ARIA labels, and submit button (see Figures 5 & 5a).
- Terms & Conditions: Implemented a bulleted template (see Figures 6 & 6a).
- All Pages (including Sean, Sebastian, Eoin):
    - Structure & Accessibility: HTML5 template, meta tags (see Figure 7).

- Navigation: Titles, links, sub-menu (see Figures 7a–7b(i)).
- External Resources: jQuery (CDN), external JS & CSS, favicon (including IE link) (see Figure 7c).
- UI Elements: Cookie banner (see Figures 7d–7d(i)), page containers (see Figures 7e–7e(i)), placeholder text, header (Figures 7f–7f(i)), footer (Figures 7g–7g(i)), back-to-top button (Figures 7h–7h(i)), website name, and greyscale toggle (see Figure 9w).

CSS Development

I applied styles to:

- Design elements: Colour schemes, typography, button styles, shadows, spacing, hover effects, menus, forms, popups, cookie banner (with mobile adjustments), and borders.
- Interactivity: Hover animations, student cards on the About page, confetti effect on the quiz in kelly.html, quiz answer highlights, favourite section styling, character counters, and image effects on the Kelly and About sections.

See Figure 8 for all CSS I implemented.

JavaScript and jQuery Implementation

I played a critical role in implementing interactive elements using JavaScript and jQuery, such as:

- DOM Handling: Ensured JavaScript execution only after the full HTML document loaded (See Figure 9a).
- Kelly Quiz: Bot spam prevention, random spell responses, and actions for correct/incorrect answers (See Figures 9b, 9b(i), 9b(ii)).
- Cookies & Storage: Developed cookie functions, local storage, and session storage for data retention.
  - Contact form: Saved/retrieved form data, cleared on cookie rejection, remembered cookie selection (See Figure 9k).
  - Terms & Conditions page: Tracked user visits (See Figure 9l).
  - Kelly quiz: Stored last attempt time (See Figure 9l).
  - Greyscale toggle: Stored preference in localStorage (See Figure 9k).
- Form & Input Features:
  - Auto-resetting contact form upon submission (See Figures 9c, 9c(i)).
  - Auto-resetting Kelly quiz input fields (See Figures 9d, 9d(i)).
  - Success pop-up on contact form submission (See Figures 9f, 9f(i)).

  - Character counters for Kelly quiz input (See Figure 9g) and contact form message field (See Figure 9h).
  - Character count updates across fields with max limits on Kelly quiz and contact form (See Figures 9g(i), 9g(ii), 9h(i)).
- UI Enhancements:
  - Back-to-top button (See Figures 9e, 7h(i)).
  - Confetti effect on Kelly quiz (See Figures 9i, 9i(i)).
  - Cookie banner visibility based on user selection (See Figures 9j, 7d(i)).
  - Greyscale toggle (See Figures 9k, 9w).
    - Sean worked on the CSS for this. I supported him with the JavaScript code and HTML.
- Validation & Security:
  - Made cookies secure to prevent/mitigate CSRF attacks using Secure and SameSite=Strict (See Figure 9j).
  - Contact form: Ensured required fields were filled and email format was correct (See Figures 9m, 9m(i), 9m(ii)).
  - HTTPS redirection (See Figure 9o).
  - XSS prevention by sanitising contact and Kelly quiz form inputs before inserting into the DOM (See Figures 9p and 9q).
  - Regex validation for Kelly quiz and contact form (See Figures 9r, 9m, 9m(i), 9m(ii), 9n, 9n(i)).
  - Bot spam prevention on Kelly quiz (See Figure 9s).
  - Secure localStorage for contact form data (only if cookies were accepted) (See Figure 9t).
- Event Handling (refer to above information for Figures to review):

Selector/Element	Handler Description
$(document).ready(function()	To run the functions only after the DOM is fully loaded
#greyscale-toggle	Toggles greyscale class and updates localStorage
#accept-cookies	Sets cookiesAccepted to true, saves it in localStorage, and hides the banner
#reject-cookies	Sets cookiesAccepted to false, clears form data, and hides the banner
$("#name, #email, #message").on("input", function()	Saves form inputs to localStorage with sanitisation

window.onscroll = function().	Shows or hides back-to-top button, depending on scroll position
backToTopBtn.addEventListener('click', function()	Smooth scroll on back-to-top button
#contact-form and $('#message').on('input', function()	Updates character count on contact form
$("#close-popup").click(function()	Closes success popup and resets contact form
$("input[data-char-count]").on("input", function()	Updates character count on Kelly quiz
$("#submit-answer").click(function()	Answer submission on Kelly quiz

Accessibility and Compliance

For accessibility and compliance, I implemented:

- HCI golden rules
- Semantic HTML (e.g., alt text, Figure 9v)
- ARIA attributes (Figure 9u)
- Form placeholders on contact form and Kelly quiz (Figure 5a, 9b)
- Back to top button (Figure 7h, 7h(i))
- Greyscale toggle (Figure 9w)
- GDPR-compliant data handling
- W3C web standards

Challenges, Testing, and Future Improvements

Challenges and Solutions

Challenge	**Solution**
Character counters on forms conflicting	Implemented separate functions for each counter
Sub-menu navigation issue when on kelly.html (other sub menu items disappeared)	Updated the navigation links correctly
Cookie banner disappearing when cookies hadn't been accepted/rejected	Fixed CSS opacity issue
Sub-menu background colour wouldn't disappear	Applied correct CSS transparency settings
Page container expanding too far	Changed the padding

Contact form not allowing email addresses with '@' or '.'	Adjusted sanitisation function to preserve correct email format
Sebastian's quiz not functioning	Identified duplicate IDs and corrected them
Contact form character counter stopped working. Console log showing an error re: message field being empty	Updated JavaScript code to check if the message field is empty and, if not, update the character count
Contact form message field used default <textarea> font - inconsistent with other fonts	Updated CSS, specifically targeting <textarea> for #message
Sean couldn't get the greyscale toggle to work	Only the CSS was completed, not the HTML button ID or JavaScript. A solution was worked on and sent to him via WhatsApp (see Figure 9w)
Sebastian had issues with his map not showing up	Removed duplicate tags in HTML
Lighthouse reports	Some pages scored in the high 70s for performance and best practices. With more time and expertise, there's potential to further optimise these scores and improve overall site performance

Testing (Figure 10)

Using the checklist I set up on our Trello board, I conducted rigorous testing across all pages, covering:

- Functionality: Verified interactive elements (forms, transitions, animations). Reported issues like the broken link in the Index page hero section and Sean's quiz not resetting or providing feedback to Eoin and Sean for fixes.
- Responsiveness: Ensured mobile compatibility. Fixed layout issues like text overflow on greyscale toggle and stretched images and adjusted the navigation menu.
- Accessibility: Ensured W3C compliance with alt text and ARIA labels. Added missing alt text for images and videos.
- Cross-Browser: Tested functionality on Chrome, Edge, and Firefox. Unable to test on Safari.
- Consistency: Ensured consistent styling and commenting, fixed mismatched button on Eoin's page, and referred missing references on images to Sebastian, Sean, and Eoin to fix.

- Quality: Conducted a Google Lighthouse scan on each page, fixed spelling/grammar errors, and addressed blurry images by referring them to Eoin, Sean, and Sebastian for fixes.
- Cookies & localStorage: Fixed banner issue when cookies were rejected by updating code logic.
- Security: Ensured form validation and regex were working properly.

Eoin, Sebastian, and Sean were responsible for testing specific elements like the favicon, logo, background image, their individual pages, compatibility across browsers and devices, and contact form and homepage quiz functionality.

Future Improvements

Future improvements include segmenting JavaScript, jQuery, and CSS for better maintainability and debugging, using GitHub for improved version control, implementing server-side storage like node.js or SQL for secure form data storage, updating specific IDs and variables to avoid conflicts, rigorous testing to improve lighthouse stats, and adding more accessibility elements.