Bridging the Gap: A Comprehensive Website Renewal for the Satakunta Student Nation

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Abstract

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This thesis explores the development of a new website for the Satakunta Student Nation. It aims to overcome the limitations of an outdated design that affected user accessibility, engagement, and ease of maintenance. The project's primary objective was to create a modern, inclusive digital platform that improves accessibility and reflects the organization's dynamic community for current members, alumni, and prospective users. The scope encompassed a completely new website built on the foundations of user-centered design principles and accessibility compliance with the European Accessibility Act (EAA) and WCAG 2.1 standards, ensuring usability for users with varying needs.

The project employs an Agile methodology, using iterative development and feedback loops to guide responsive adjustments and ensure alignment with user expectations. React and Next.js were selected as primary technologies, supporting a modular, component-based architecture to improve development efficiency and maintainability. Directus CMS was integrated to simplify content management, allowing non-technical users to handle regular updates independently.

Key activities included initial requirement gathering with stakeholders, followed by a design and development process focused on improving navigation, accessibility, and performance. User testing—comprising heuristic evaluations and task-completion tests—provided quantitative insights and qualitative feedback, which were utilized to guide iterative updates to achieve high usability and accessibility standards.

The renewed website resulted in significant gains in usability, reducing user task completion times by an average of 64 percent and increasing heuristic usability scores by an average of 29 percent. Accessibility scores improved to meet WCAG 2.1 AA standards, with the additions of screen-reader and keyboard compatibility as well as better visual contrast.

The project has delivered a sustainable, adaptable platform that supports the Satakunta Student Nation's present needs and future growth. This work demonstrates the effectiveness of integrating modern web development practices with rigorous accessibility standards, offering a replicable model for enhancing user engagement and organizational efficiency in community-centered digital projects.

Key words
Web Development, User-Centered Design, Accessibility, Next.js, Student Nation, Fraternity

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1 Introduction

1.1 Glossary

Given the technical nature of this thesis, it is necessary to understand some key terms associated with web development, software engineering, and accessibility standards. This glossary provides brief definitions to help familiarize readers with these concepts before reading to ensure a clearer understanding of the topics covered.

- **CI/CD (Continuous Integration/Continuous Deployment):** A set of software development practices that automates testing, integration, and deployment to ensure the team can rapidly and reliably deliver product updates (GitHub, 2024).
- **CMS (Content Management System):** Software used to create and modify digital content, without requiring specialized technical knowledge (Oracle, 2022).
- **DevOps:** DevOps is a methodology that combines software development (Dev) and IT operations (Ops) to streamline the delivery and maintenance of high-quality applications. Through practices like Continuous Integration and Continuous Delivery (CI/CD), DevOps automates testing and deployment, enabling faster release cycles and improved collaboration across teams.
- **EAA (European Accessibility Act):** An EU directive aimed at making products and services more accessible to people with disabilities (European Commission, s.a.).
- **ISR (Incremental Static Regeneration):** A feature in Next.js and other modern web frameworks that enables regeneration of static pages at runtime. This offers performance and flexibility (Vercel, 2024).
- **POUR (Perceivable, Operable, Understandable, Robust):** Accessibility principles outlined by WCAG to make digital content accessible for all users (W3C, 2023a).
- **QA (Quality Assurance):** A process of testing and validation that aims to prevent bugs or defects and ensure functionality, reliability, and performance.
- **React Hook:** A feature in React that allows developers to use state and other React features without writing a class.
- **SEO (Search Engine Optimization):** Practices aimed at improving a website's visibility and ranking on search engine results pages.
- **SSG (Static Site Generation):** A method for building web pages at compile/build time, producing a set of static files for each page to improve load times and reduce server load (Vercel, 2024).

- **SSR (Server-Side Rendering):** A technique where pages are rendered on the server and sent to the client as fully formed HTML, which can improve performance and SEO (Vercel, 2024).
- **UX/UI (User-Experience, User Interface):** UX is the overall experience and satisfaction users feel when interacting with a product; UI focuses on the visual and interactive elements of the product.
- **W3C (World Wide Web Consortium):** The leading international standards organization for the World Wide Web, responsible for developing web standards (W3C, 2023b).
- **WCAG (Web Content Accessibility Guidelines):** A set of guidelines developed by W3C to make web content more accessible to people with disabilities (W3C, 2023a).

1.2 Background and Motivation

This section provides an overview of the topic and motivation behind the project.

1.2.1 Purpose of the Project

The primary objective of this project is to develop a new website for the commissioning organization the Satakunta Student Nation, officially known as Satakuntalainen Osakunta. The website will act as a digital hub for current members, prospective members, and alumni, providing them with essential resources, information, and community engagement opportunities. This project seeks to address the issues with the old nation website, better engage the target audience, improve the nation's overall online presence, and ensure the long-term support of the nation's website.

The target audience for this project includes a diverse group of individuals, including current members who require up-to-date information and resources; prospective members seeking to learn more about the organization and its activities; and alumni who wish to stay connected and engaged with their former student community. With the goal of catering to this broad audience, this project aims to enhance the member experience and foster a sense of community.

To achieve this objective, the project will be conducted using a loosely structured Agile methodology. This approach acknowledges that most participants are volunteers and as such, have limited time available to contribute to the project. The project team consists of:

- **Stephen Swanson:** lead developer, project manager, and UX/UI designer
- **Lennu Vuolanne:** CI/CD (DevOps) developer, quality assurance
- **Saga Jacksen:** UX/UI designer
- **Otava Huumarkangas:** advertisement secretary (photographs)
- **Samuel Lindberg, Mikaela Lindberg, and Matleena Kallio:** copywriter, translator

This team will collaborate with stakeholders to create a functional, user-friendly website that meets the current and future needs of the Satakunta Student Nation's community.

The motivation behind this project stems from the need for an updated digital presence that is modern, usable, and reflects the values and aspirations of the Satakunta Student Nation. As technology and user expectations evolve, it is essential for organizations to adapt and provide platforms that facilitate engagement. The new website not only aims to improve accessibility to resources, but also to strengthen connections among members, ensuring that the student nation remains a vibrant and inclusive community.

1.2.2 Context and Significance

The current landscape of Finnish student nation websites varies greatly, with a large disparity in the quality and functionality of these digital platforms. While some websites, such as the Varsinaissoumalainen Osakunta's website, are modern and engaging, others remain outdated and uninviting (Varsinaissoumalainen Osakunta, 2024). The Satakunta Student Nation's existing website is among those that have not kept pace with contemporary web design standards and user expectations. This project aims to address these shortcomings, enhancing the online presence of the nation and ensuring it meets the needs of its community.

Some statistics highlight the necessity of this project as according to Finland's official statistics, "12.9 per cent of the household population aged 16 or over experienced severe activity limitations in 2022" (Statistics Finland, 2023). Among the disabilities noted in this publication are sight, auditory, and cognitive (memory or concentration) disabilities. The current site has shortcomings regarding accessibility that must be addressed to better serve this group and create a more inclusive environment. Additionally, according to the *Stanford Web Credibility Project,* 75% of users judge a website's credibility based on design alone (Stanford University, 2002). Because of this, it is essential for the website to be user-friendly and aesthetically pleasing to retain visitor interest and engagement.

While the impact of this project may be localized, its significance cannot be overstated. By modernizing the website, the Satakunta Student Nation will not only enhance the appeal of its online platform but also improve accessibility for its members, prospective members, and alumni. This project stands to make a meaningful contribution to the organization's digital presence, fostering a more connected and engaged community.

1.2.3 Current State of the Website

The existing website for the Satakunta Student Nation is noticeably outdated in both technology and design. Its visual appeal and functionality do not align with contemporary standards, leading to a sub-optimal user and developer experience. Currently, users can access various features aimed at serving the community, including a calendar for upcoming events, contact information for key personnel, details about the nation and its house, access to official board meeting minutes, event registration, a communication portal with the governing body, a harassment reporting form, browsing options for the nation's archived collections, a link to the parent organization's housing page, and limited information about membership registration.

Despite these challenges, the overall user engagement remains relatively high, with the website bringing in 674 clicks and 53,900 impressions in the month of September 2024. However, user sentiment is at an all-time low as members have been quite vocal about their displeasure with the old site.

Technical performance assessments reveal further areas for enhancement. According to Lighthouse metrics, the website has a performance score of 53, an accessibility score of 87, a best practices score of 96, and a SEO score of 82. In the world of modern web development this is quite poor performance as Google's *Chrome for Developers* states that "To provide a good user experience, sites should strive to have a good score (90-100)" (Chrome for Developers, s.a.).

These scores reveal critical areas for improvement, particularly in performance and accessibility, which directly affect user experience and engagement. While there have been no significant recent updates to the site, the anticipated redesign aims to address these deficiencies and enhance both the functionality and aesthetic appeal of the website, ultimately fostering greater engagement from the community it serves.

1.3 Problem Definition

This section articulates the challenges that the project addresses.

1.3.1 Issues With the Current Site

The existing website for the Satakunta Student Nation contains several critical issues that significantly hinder user interaction and overall effectiveness. One of the primary concerns is the aesthetics of the website have drawn considerable criticism; many current members have expressed dissatisfaction with its outdated appearance, while some prospective members find the site off-

putting, which has impacted their decision to join. Additionally, some users may encounter difficulties navigating the site due to some unaddressed accessibility related issues.

Another pressing issue is maintenance. Currently, only one member of the nation possesses the knowledge to manage the old Django system, and with their eventual graduation, there will be no one left to ensure the site's upkeep. This raises concerns about the website's long-term viability. Furthermore, the outdated administrative panel presents several security and data-protection issues and challenges in managing user rights, event sign-up forms, and other essential functions.

The financial implications of maintaining the website are also noteworthy. For the limited traffic it receives, the hosting costs are disproportionately high at approximately €100 per month, which is burdensome for a non-profit student organization. In addition to these issues, the site is cluttered, making it difficult for users to locate information efficiently. This clutter contributes to a sense of disorganization that undermines the user's experience.

Moreover, the website fails to represent the vibrant nature of the organization. Its unappealing design does not accurately reflect the lively community it serves, which has deterred some prospective members from joining.

User feedback further accentuates the urgency of addressing these problems. Testimonials reveal a range of frustrations, with statements such as, "The old website is difficult to use and find information on," and "It is ugly, and I don't like having to use it." One user even noted that they "almost didn't join because of the appearance of the site." Concerns regarding maintenance are echoed in comments from the web and IT administrators such as, "It is difficult to maintain," and "I worry that future web admins will not be able to manage it."

1.3.2 User Requirements

User requirements for the new website of the Satakunta Student Nation have been defined based on feedback collected during the project's initiation meeting. The primary expectations of users include the retention of existing information and functionalities from the old site while also introducing a more polished interface, improved performance, logical information architecture, and better overall usability.

In terms of essential functionality, users expect the new site to include all the most frequently utilized features of the current platform. These features include a calendar for tracking events, registration capabilities for those events, accessible information regarding the organization, board meeting minutes, a harassment reporting form, contact information, a link to the housing page, details

about joining the organization, browsing options for archived materials, and access to the nation's magazine.

Beyond functionality, users have articulated a desire for certain quality attributes that are critical to the website's success. Key desired qualities include improved security measures to protect user data, enhanced usability to ensure a smooth and intuitive experience, and maintainability to facilitate easier updates and management of the site for years to come. Additionally, the web and IT administrators have shared their desire to reduce hosting fees in order to ensure that the website remains a financially viable resource for the organization.

1.4 Project Objectives

The primary objective of this project is to create a new website that effectively replaces the existing outdated platform for the Satakunta Student Nation. This goal contains several specific aims designed to ensure that the new site addresses the deficiencies of the old website while remaining aligned with the user requirements and expectations identified in earlier sections.

Firstly, the project seeks to redesign the website to provide a more polished interface and improve the overall aesthetic appeal. This aligns with user feedback indicating dissatisfaction with the current site's appearance, which has been described as unattractive and off-putting for prospective members. Enhancing the loading speed of the site is another key objective, as faster load times will improve performance and offer a more efficient user experience, directly addressing concerns raised by the community.

Accessibility improvements are a fundamental aspect of this project, assuring that the new website is usable by individuals with disabilities. This objective responds to the user requirement for a more inclusive platform that accommodates the diverse needs of the organization's community as well as requirements outlined in the *European Accessibility Act*. Additionally, creating a responsive design for mobile devices is essential, as it will allow users to access the website seamlessly from smartphones and tablets, enhancing the usability of the site.

Improving usability overall is another major focus, which involves making the website easier to navigate and information easier to locate. This addresses the current issues of clutter and poor information architecture that users have highlighted as obstacles to effective site use. Enhancing the user experience (UX) and design will further contribute to a more engaging and intuitive environment, which is expected to significantly improve user satisfaction and interaction with the site.

A streamlined development experience is also a critical project objective. This will guarantee that the new site is easier to maintain and update, alleviating concerns about the current website's

complexity, which only one individual presently knows how to manage. Additionally, the project aims to strengthen the overall branding of the Satakunta Student Nation. By aligning the website's design with the organization's vibrant culture, the new site will present a more accurate and appealing representation of the community.

These project objectives are designed to be specific, measurable, achievable, relevant, and time bound. Each objective targets a distinct area for improvement and addresses key issues identified through user feedback and analysis of the current site. Progress will be measured through metrics such as loading times, accessibility scores, user feedback collected via testing, and user engagement statistics (pending the launch of the new site). The goals are realistic given the resources and timeframe of the project, and milestones have been set to monitor progress and ensure timely completion. Ultimately, by aligning these objectives with user needs, the project aims to create a website that not only meets but also exceeds the expectations of the Satakunta Student Nation's members, prospective members, and alumni.

1.5 Scope and Limitations

The scope of this project is defined by the creation of a new website for the Satakunta Student Nation, which will incorporate the core functionalities present in the current site while introducing improvements in usability, design, and performance. The new site will be fully available in Finnish, Swedish, and English to cater to the linguistic diversity of its users. Key pages and features will include:

- Home page
- Nation Info page
- Karhunkierros Magazine page
- Official Documents page
- News page
- Calendar page
- Events page
- Archive page
- Contact Information page
- Harassment form
- Board contact form
- Link to parent foundation's rental page

The limitations of this project stem primarily from the nature of volunteer-based contributions and time constraints. As this project is being carried out by volunteers who are contributing their time

alongside other commitments, there may be fluctuations in availability that could affect the overall timeline. To mitigate this, the project scope has been deliberately restricted to essential functionalities. Additional features that were proposed during the project initiation meeting—such as a library management system and a photo gallery with an associated management system—are considered out of scope for this phase. These features are, however, planned for implementation in Q2 2025, following the completion of the core project.

The assumptions made during the project include the continued availability of volunteers for the duration of the project and the stability of the chosen technological stack. Any unforeseen changes in volunteer availability or technological requirements could potentially impact the project timeline and deliverables.

1.6 Disclosure of Artificial Intelligence Utilization

For the purpose of this thesis report, artificial intelligence (ChatGPT, model GPT-4o mini) has been used for spelling and grammar checking, particularly to refine the passive and third-person voice. AI assistance was also employed to enhance the logical flow of main headings and to help condense and organize the author's ideas into a clear, concise structure.

All content is originally authored or based on cited sources, and AI-generated suggestions are strictly reviewed for relevance, accuracy, and authenticity. For instance, the author may draft a rough draft of a chapter, organize and condense the material, then use AI for further refinement in terms of conciseness, structure, and passive voice. The author then revisits and revises the generated text to ensure alignment with the intended meaning, accuracy, and readability.

AI has been used responsibly, adhering to data protection and copyright regulations. Any source-related content generated by AI has been thoroughly cross-referenced with the original source to maintain accuracy, and no cited sources are AI-generated.

1.7 Structure of the Thesis

This thesis is structured into five distinct chapters, each building on the previous one to provide a comprehensive understanding of the project’s background, implementation, and evaluation. The first chapter, Introduction, sets the stage for the entire thesis. It begins by outlining the project’s background and motivation, highlighting the purpose of the project, its significance within the current landscape, and a detailed description of the existing website’s state. This is followed by a problem definition section that identifies the issues with the current site and establishes the user requirements that guided the project’s development. Chapter 1 also articulates the project

objectives and clarifies the scope and limitations of the work, providing a clear framework for what the project will cover and what falls outside its boundaries.

Chapter 2, Theoretical Framework, delves into the principles and theories that inform the website's development. This chapter explores the foundational practices in website development, emphasizing accessibility standards and compliance requirements, such as the European Accessibility Act and the Web Content Accessibility Guidelines (WCAG). Additionally, it covers user experience design principles, drawing on Nielsen's 10 Usability Heuristics, and discusses responsive design and information architecture. The chapter concludes with a review of best practices for student organization websites, which serves as a contextual reference for the development of the Satakunta Student Nation's new site. This theoretical grounding is crucial for understanding the project's design and implementation choices discussed in later chapters.

Chapter 3, Technological Foundations, shifts the focus to the technical aspects of the project. It introduces the component-based architecture used in the new website, including a detailed discussion of technologies such as React and Next.js, and explains the rationale behind adopting these tools. This chapter also introduces the islands architecture concept, which is employed to enhance site performance and maintainability. Additionally, Chapter 3 outlines the technological stack and tools used, offering a comprehensive overview of the development environment. This technical foundation is essential for understanding the decisions made during the development phase, which are discussed in the subsequent chapter.

Chapter 4, Implementation and Evaluation, provides a detailed account of how the project was implemented and evaluated. It begins with an overview of the project's initiation, including team formation and requirement gathering through stakeholder meetings. The chapter then walks through the planning and design phase, architecture planning, and component implementation. A major focus is placed on the iterative development process, including the presentation of a Minimum Viable Product (MVP) and subsequent adaptations based on feedback. The second half of this chapter is dedicated to testing and evaluation, where the testing methods are described, data collection and analysis are presented, and a comparative evaluation is conducted to assess the improvements made over the previous website. The chapter concludes with a discussion of the key findings, unexpected results, and the overall impact of the project.

Chapter 5, Conclusions, brings together the insights gained throughout the thesis. It summarizes the key findings and empirical results, evaluates how well the project objectives were achieved, and reflects on the effectiveness of the solutions implemented. This chapter also addresses any remaining limitations of the project and offers recommendations for future work, including potential additional features, further testing and evaluation, and long-term maintenance strategies. The

thesis concludes with final remarks and reflections, offering a holistic view of the project's contributions and its significance for the Satakunta Student Nation.

2 Theoretical Framework

2.1 Website Development Principles and Practices

The methodologies chosen for this thesis project are grounded in widely accepted best practices for modern website development, and their applicability to the redesign of the Satakunta Student Nation's website is due to their effectiveness in addressing both technical and user-centered challenges. Key methodologies include:

- Web Content Accessibility Guidelines (WCAG) 2.1 Compliance
- European Accessibility Act (EEA) Adherence
- Jakob Nielsen's 10 Usability Heuristics
- Responsive Design
- User-Centered Design

These methodologies and tools were chosen because they align with the project's dual objectives of creating a highly usable, accessible website while adhering to modern web development standards that ensure long-term viability. Technologies and tools relevant to these practices will be discussed further in the next chapter.

2.2 Accessibility Standards and Compliance

This section outlines the standards necessary for creating an accessible website.

2.2.1 WCAG and Levels of compliance

The Web Content Accessibility Guidelines (WCAG) are organized around four principles: Perceivable, Operable, Understandable, and Robust (POUR) (W3C, 2023a). The main levels of compliance are:

- **A (Minimum Accessibility):** This level addresses the most basic web accessibility features. Features may include tools to help those with the most significant accessibility needs, for example, screen readers or keyboard only navigation. Other guidelines include text descriptions for non-text content, audio control for any audio content, and no flashing content.
- **AA (Mid-Range Accessibility):** This level expands on the A level to provide a higher level of accessibility, addressing the most common barriers for users. Examples of standards may include text-background contrast ratios, the ability to resize text without losing functionality, consistent navigation, and error identification.
- **AAA (Highest Accessibility):** Being the most comprehensive level, the AAA standard aims to make content usable by as many people as possible, including those with more

severe or specific disabilities. This is achieved through higher contrast ratios, the elimination of time limits, closed captions for audio content, and more.

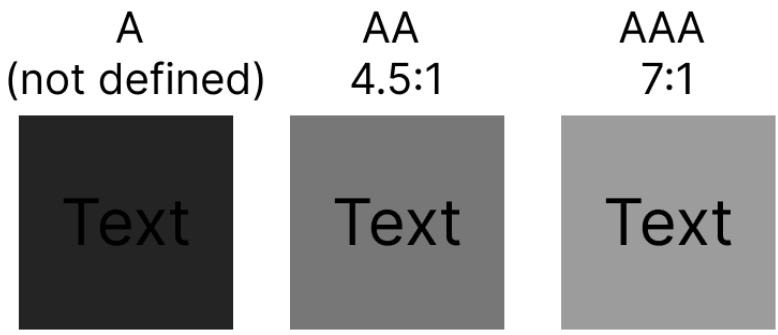

Figure 1: Example of WCAG 2.1 Standards for Text-Background Contrast (W3C, 2023a)

More complete documentation on the levels of WCAG 2.1 levels and their success criteria can be found at w3.org (W3C, 2023a). This project aims to achieve compliance with WCAG 2.1 AA standards, with efforts to approach WCAG 2.1 AAA standards wherever possible.

2.2.2 European Accessibility Act

The *European Accessibility Act* (EAA) is an act adopted in 2019 that aims to improve accessibility for people with disabilities within the European Union (EU). It establishes common accessibility requirements for a wide range of products and services, including websites and mobile applications. The EAA's main goal is to remove barriers that hinder the participation of individuals with disabilities in society and the economy.

Under the EAA, public sector websites, such as those operating under a non-profit organization or public university must be accessible to people with disabilities (European Commission, s.a.). This includes ensuring that:

- Content is perceivable, operable, understandable, and robust (POUR) for all users.
- Websites adhere to WCAG 2.1 level AA.
- Accessibility statements are provided, detailing how the website complies with accessibility requirements.

These standards must be met by all public sector websites by June 2025. For a student nation that operates under both a non-profit organization (Satalinnan Säätiö) and a public university (University of Helsinki) compliance with the EAA is crucial for several reasons:

- **Inclusivity:** Ensuring all students, including those with disabilities, can access organization resources and information promotes inclusivity.
- **Legal compliance:** Adhering to the EAA avoids potential legal consequences and penalties.
- **Enhanced user experience:** Accessibility improvements benefit all users.
- **Reputation:** Dedication to accessibility and inclusivity show the organization's motivation to build a community for all.

2.2.3 Application of Accessibility Standards

To ensure compliance, various accessibility checking tools will be employed, including:

- WAVE Web Accessibility Evaluation Tools.
- IBM Equal Access Accessibility Checker.
- Lighthouse Metrics: for performance and accessibility audits.

WAVE will be the primary tool for accessibility testing due to its ease of use via the Google Chrome extension. This allows the developers to easily toggle the tool on and off during development to diagnose and address any critical accessibility errors as they arise. WAVE provides both a high-level overview and specific error highlights, helping the developers prioritize fixes (WebAIM, 2021).

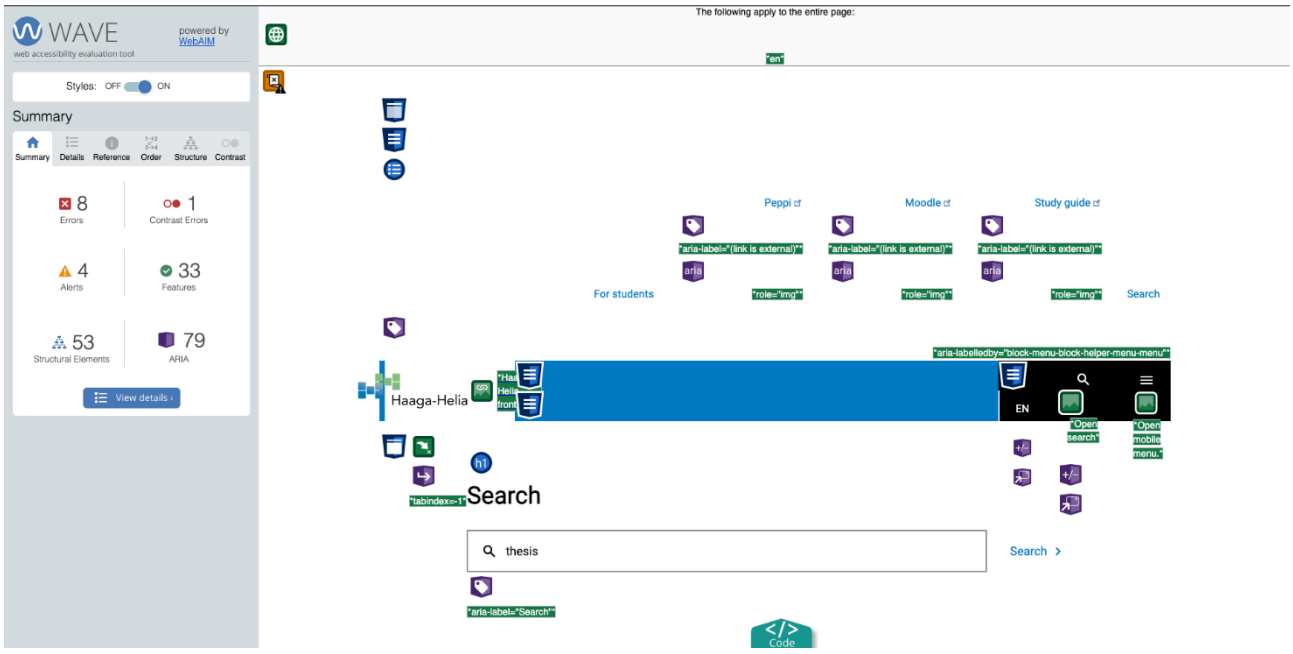

Figure 2: WAVE Accessibility Tool on Haaga-Helia's Website (WebAIM, 2021)

IMB Equal Access Accessibility Checker offers more in-depth audits than WAVE, identifying more subtle accessibility issues. This tool will be used to perform accessibility audits between major updates.

Lighthouse metrics, a tool provided by Google, will assess the website's overall accessibility score alongside other metrics such as performance, best practices, and search engine optimization (SEO). Lighthouse will be integrated into the project's continuous integration (CI) pipeline, running an audit on each pull request, and any updates to a pull request.

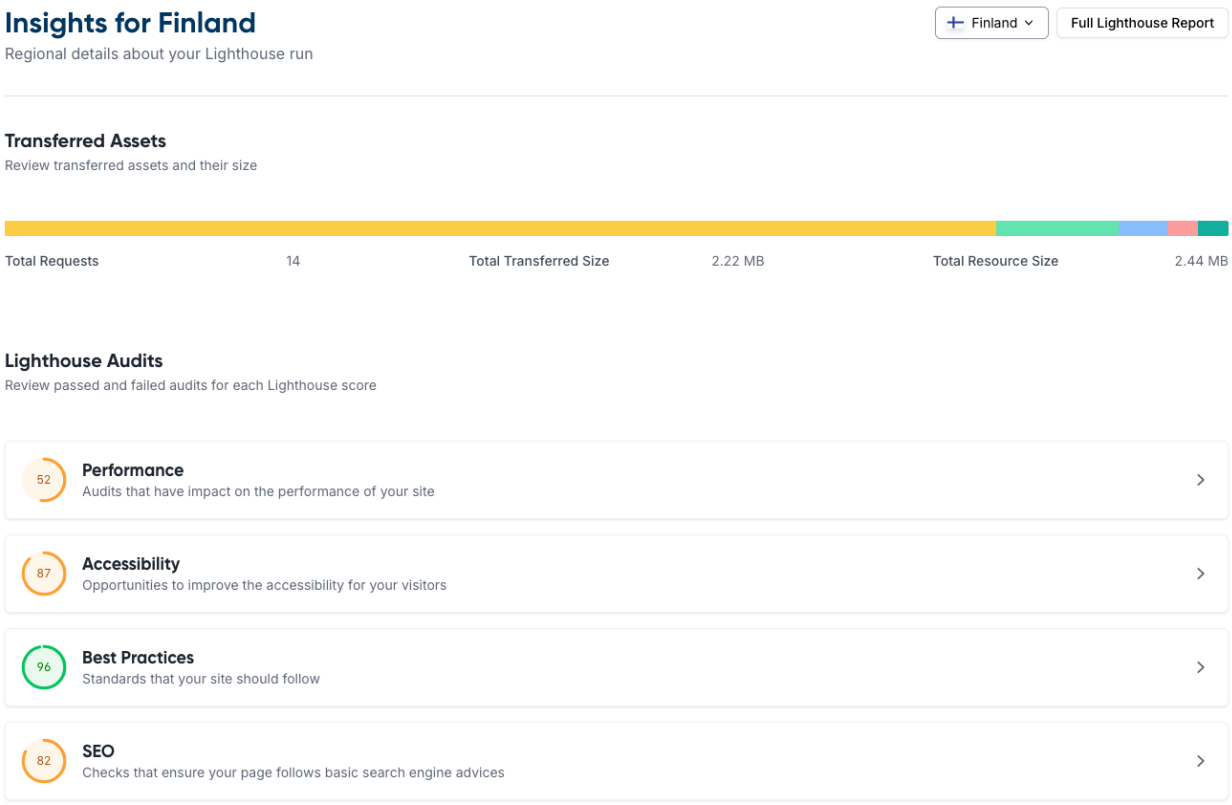

Figure 3: Lighthouse Metrics - Old Satakunta Student Nation Website (*Lighthouse Metrics*, s.a.)

In addition to automated tools, manual keyboard and screen reader testing will be conducted by the quality assurance team member. This testing will ensure the website is fully navigable by keyboard and screen reader, verifying logical tab order, focus visibility, the absence of keyboard traps, and the use of descriptive, accessible labels. Proper implementation of ARIA (Accessible Rich Internet Applications) tags will also be checked where necessary.

The UX/UI designers will consider contrast and color blindness during the design phase, validating their designs using tools like Coolors Contrast Checker and Colorblindly, a color blindness simulator.

Beyond automated testing, the design and development team will also gather feedback directly from users with disabilities via a feedback form, allowing real-world insights into areas where further improvements can be made.

2.3 User Experience Design Principles

This section emphasizes principles guiding user experience design.

2.3.1 Nielsen's 10 Usability Heuristics

Jakob Nielsen's usability heuristics, originally published in 1994, are foundational principles in user experience design, widely recognized for their role in improving website functionality and user satisfaction. These heuristics provide practical guidance for crating intuitive and accessible interfaces (Nielsen and Molich, 1990). Each of Nielsen's heuristic address a different aspect of user interaction:

1. **Visibility of system status:** Users should always be informed of what is happening through timely, often immediate feedback.
2. **Match between the system and the real world:** The website uses language and icons that are familiar to users, reflecting real world conventions. This includes labelling that makes sense in the context of a student organization and simplifying navigation.
3. **User control and freedom:** The site will allow users to easily undo or redo actions such as changing language, navigation, or cancelling an event registration.
4. **Consistency and standards:** Consistency in design will be a core principle, ensuring that navigation, layouts, and design elements behave in predictable ways throughout the site.
5. **Error prevention:** Efforts will be made to prevent errors by guiding users through elements, such as forms where errors may occur. For instance, input validation prompts with helpful feedback before form submission.
6. **Recognition rather than recall:** The interface will be designed to minimize the cognitive load placed on the user by making actions, objects, and options visible. We can further reduce this load by using common website layout conventions, for example, a logo that takes you to the home page in the top-left corner of the navigation menu, or a hamburger menu for mobile.
7. **Flexibility and efficiency of use:** The website will be designed to cater to both novice and advances users. For example, in the contact page advanced users will be able to use sorting and filtering to more quickly find information.
8. **Aesthetic and minimalist design:** The design will avoid unnecessary clutter, which can confuse or overwhelm users with irrelevant information. The goal is to create a clean, focused interface that prioritizes important content, such as event information and membership details.
9. **Help users recognize, diagnose, and recover from errors:** Error messages, often in the form of a toast message, will be clear and in plain language, helping users understand what

went wrong and how to fix it. For example, if a user's event registration fails the user will be provided with a plain explanation and actionable steps to correct the issue.

10. **Help and documentation:** Although the site itself should be self-explanatory, help options will be available where necessary. This may include tooltips, FAQs, and information to get in contact with one of the developers for bug reporting or further assistance.

These heuristics will be kept in mind during the design, development, and iterative phases of the project, guiding key-decisions made by the project team. By applying these principles, the website will become more user-friendly, increasing user engagement and satisfaction.

Additionally, during the testing and iteration phase of the project, heuristic evaluations will be conducted to review the website. The insights gained from these evaluations will guide iterative improvements and allow the team to identify areas the need further refinement before the final release.

2.3.2 Responsive Design

Responsive design is a critical aspect of modern web development, ensuring that websites function effectively across a wide range of devices and screen sizes. With the increasing diversity of devices used to access the internet, websites must adapt seamlessly to varying screen dimensions, resolutions, and input methods to provide a consistent and user-friendly experience. According to Statista, as of 2024, 57.8% of time spent online is on mobile devices, while 42.2% is on desktops or laptops, highlighting the necessity of responsive design to accommodate this shift in user behavior.

The Satakunta Student Nation website will be designed with responsiveness at its core, ensuring that it is accessible and fully functional on devices ranging from smartphones to large desktop monitors. A responsive design not only improves usability but also enhances engagement by allowing users to easily access the site's features and information, regardless of the device they are using. Given the organization's diverse audience, which includes current students, prospective members, and alumni, all of whom may access the site from different types of devices, ensuring a seamless experience across platforms is crucial.

The tools used on this project to ensure responsiveness include:

- **Flexbox:** Flexbox is a CSS layout module that provides a flexible way to arrange elements in a container. It allows items to automatically adjust and align based on the available space, ensuring that the layout adapts smoothly across different screen sizes and devices.
- **Media queries:** CSS media queries enable the website to apply different styles based on the user's device characteristics, such as screen width or resolution. This ensures that the

website's layout, fonts, and elements are optimized for various devices, from mobile phones to desktop screens.

- **Material UI:** Material UI (MUI) is a React component library that includes pre-built, responsive components. Its grid system and responsive utilities allow the site to dynamically adapt to different screen sizes, providing a consistent user experience across all devices.

Given the diversity of the Satakunta Student Nation's audience, from students to alumni, it is essential that the website functions equally well across a variety of devices. Many students and prospective members will access the site from their mobile phones, whether to check event updates, browse information about joining, or access resources on the go. Alumni may prefer using larger devices like tablets or desktops, particularly when navigating detailed sections like archived materials or official documents.

By implementing responsive design, the website ensures that every user, regardless of their device, has an optimal experience, leading to increased engagement and satisfaction. This, in turn, strengthens the organization's online presence and fosters a more connected community.

2.3.3 User-Centered Design

User-Centered Design (UCD) is a design philosophy and process that prioritizes the needs, preferences, and experiences of users throughout the development of a product. UCD emphasizes understanding the target audience by actively involving them in the design process, which helps create intuitive and effective user interfaces. This approach involves iterative testing, feedback collection, and continuous refinement to ensure that the final product meets users' expectations and improves their overall experience (User Centered Web Development, 2024).

Given that users have found the old website of the Satakunta Student Nation difficult to navigate and use, implementing a user-centered design approach is crucial for the success of the redesign project. By placing users at the heart of the design process, we aim to address their concerns and enhance their interaction with the site.

2.4 Review of Best Practices for Student Organization Websites

This section reviews best practices for student organization websites, examining usability, navigation, and design principles that enhance user engagement and accessibility. Findings from similar websites inform the design choices made for the Satakunta Student Nation website, ensuring it meets the specific needs of its diverse user base.

2.4.1 Review: Fraternity Website Analysis

The fraternity website analysis, conducted by a student team at Penn State, compared the usability of two fraternity websites: Phi Sigma Pi and Theta Chi. The research conducted by Smith, S. *et al.* (2007) focused on usability aspects like task efficiency, aesthetics, color schemes, and navigation, with specific usability metrics such as visual clarity, consistency, and error prevention. The study utilized task analyses (e.g., contacting executives and finding national history), where participants performed common tasks, such as sending messages or looking for information, and their interactions were measured in terms of time and efficiency (Smith *et al.*, 2007). Keystroke Level Model (KLM) and GOMS models were employed to compute the estimated time taken for task completion and to evaluate user behaviors.

Key Findings:

- **Task Analysis:** Users completed tasks quickly on both websites, although some challenges existed, such as the ease of finding the national history tab or contacting executives. Time predictions for these tasks were accurate, demonstrating the consistency between the actual design and user expectations.
- **Aesthetics:** Users generally preferred Theta Chi's website over Phi Sigma Pi's. The former used a clean and professional design with side navigation, which was more visually appealing and user-friendly, compared to the latter's less readable, blocky top navigation.
- **Color Schemes:** Blue hyperlinks, particularly on Theta Chi's site, were found to be more recognizable than red ones on Phi Sigma Pi's. This enhanced user experience by making navigation through hyperlinks smoother and more intuitive.
- **Navigation:** Theta Chi's website was more efficient in helping users navigate to important pages, while Phi Sigma Pi's site faced criticism for poor readability of links and navigation elements. However, both websites could improve the clarity of the contact form by clearly identifying the recipients.

The study concluded that a well-designed website with clean aesthetics, intuitive navigation, and consistent use of colors improves overall usability and user satisfaction. Recommendations for improvement included eliminating splash screens, improving form visibility, and ensuring that critical links are prominent.

2.4.2 Application to Satakunta Student Nation

The usability analysis of the Phi Sigma Pi and Theta Chi fraternity websites provides key insights that are directly applicable to the redesign of the Satakunta Student Nation (SatO) website. As the aim of this project is to create a user-friendly, accessible, and visually appealing digital platform,

the findings from the fraternity study offer a valuable reference for ensuring that the new SatO website addresses both functional and aesthetic user needs.

- **Aesthetic and Visual Design:** The fraternity analysis revealed that users favored clean and professional designs with clear navigation structures, particularly when those designs included side navigation and high-contrast visuals. For the SatO website, similar principles should be applied. The current site has received feedback regarding its cluttered and outdated design, which detracts from user engagement. Implementing a clean, minimalist interface with clear sectioning and consistent navigation, like Theta Chi's site, will enhance the site's visual appeal and user satisfaction. This also aligns with the goal of improving the overall aesthetic of the site to better represent the vibrant SatO community.
- **Color Scheme:** The analysis emphasized the importance of using color schemes that support quick identification of key elements, such as links and navigation items. Blue hyperlinks, a standard across many websites, were found to enhance the ease of use by making important links easily identifiable. Incorporating this standard into the new SatO site will help users navigate more intuitively, especially when scanning for information or engaging with interactive elements. Furthermore, maintaining a consistent and high-contrast color scheme will not only improve usability but also address the accessibility requirements outlined by WCAG 2.1 standards, ensuring that the site is inclusive to all users, including those with visual impairments.
- **Consistent Navigation:** The fraternity study demonstrated that inconsistent navigation structures hindered usability, particularly on Phi Sigma Pi's website, where users struggled with poor readability and misaligned text. For SatO, ensuring consistent, intuitive navigation across all pages will be critical. The website should feature a clear, hierarchical menu structure with easy-to-read labels, allowing users—whether current members, prospective members, or alumni—to quickly locate relevant information. This will directly address current user feedback regarding the difficulty of finding key content on the existing website.
- **Error Prevention and Feedback:** In the fraternity website analysis, users appreciated websites that provided clear feedback when completing forms or navigating to important sections. This feedback mechanism can be applied to the SatO website to enhance the user experience during critical interactions, such as event registration or contacting the board. Implementing informative error messages and confirmation prompts will ensure that users understand the results of their actions and can correct any mistakes, improving both functionality and user confidence in the system.
- **Task Efficiency:** The task analysis in the fraternity study measured how quickly users could complete common tasks like contacting executives or finding national history information. These insights suggest that for the SatO website, key actions—such as registering

for events, accessing board meeting minutes, or finding contact information—should be streamlined to minimize user effort. By optimizing the flow and reducing the number of steps required to complete tasks, the site can improve overall user satisfaction and reduce frustration.

By applying these usability principles from the fraternity website analysis, the redesigned Satakunta Student Nation website will be better equipped to meet the needs of its diverse user base. The improved design will not only enhance aesthetic appeal and navigation but will also ensure that the website is accessible, user-friendly, and aligned with modern web development best practices. Ultimately, these enhancements will contribute to a more engaging digital presence for the Satakunta Student Nation, fostering stronger community ties and increased member participation.

3 Technological Foundations

3.1 Component Based Architecture and Islands Architecture

This chapter covers the rationale behind adopting a component-based architecture, discussing the benefits of modular development for scalability, maintainability, and ease of testing. Additionally, the chapter explores Islands Architecture and its role in enhancing site performance and user experience by combining static and dynamic content.

3.1.1 Component-Based Development with React and Next.js

Component-based development focuses on breaking a web application into small, reusable, and self-contained pieces called components. In this project, React and Next.js were chosen to implement this architecture. In React, components act as the building blocks of the UI. Each component typically represents a distinct UI element, such as a button, form, or navigation bar, and components can be nested to create complex, yet maintainable UIs by reusing these building blocks.

In React, components are typically written as JavaScript functions. They can receive input data through props, which act like parameters, and manage internal state using state. React's hooks, such as useState for managing local state and useEffect for handling side effects, enable developers to create dynamic, interactive web applications without the need for complex class-based components.

Next.js enhances React by introducing features such as server-side rendering (SSR) and static site generation (SSG), enabling hybrid rendering. This allows specific components or parts of a page to be pre-rendered on the server while others are rendered client-side upon user interaction. This improves load times, reduces the initial rendering burden, and offers enhanced search engine optimization (SEO). Additionally, Next.js integrates API routes, making it easy to implement backend functionality directly within the application.

3.1.2 Islands Architecture

Islands Architecture is a web development approach that optimizes page rendering by combining static and dynamic content (Islands Architecture, s.a.). The idea is to pre-render as much of the page as possible on the server, with only specific interactive components—referred to as "islands"—being hydrated and rendered client-side after the page loads. This improves performance by reducing the amount of JavaScript that needs to be executed on the client.

In this architecture, static content (e.g., text, images) is served as pure HTML, which improves initial load times and is beneficial for SEO, as search engines can easily index the content. The

dynamic parts, or "islands," are typically interactive UI elements like forms, navigation bars, or carousels. These islands are rendered as static HTML first, and then JavaScript is loaded to make them interactive.

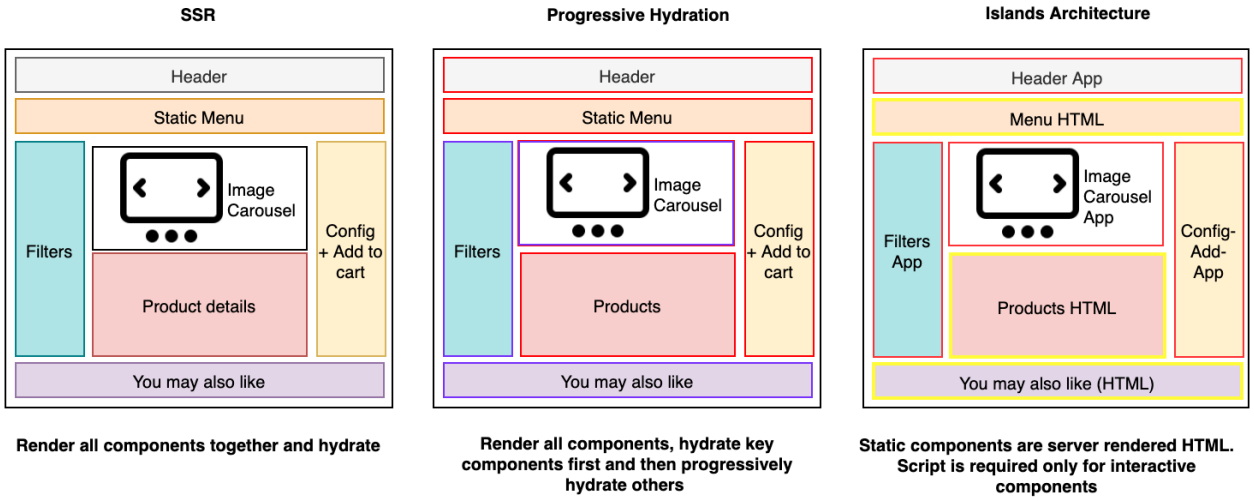

Figure 4: Visual Representation of Islands Architecture (*Islands Architecture*, s.a.)

For this project, Islands Architecture was chosen to improve both performance and SEO, as the site is content-heavy but also requires interactivity in key areas. By limiting the client-side rendering to only those components that require it, the approach minimizes the impact of JavaScript on load times, making the site faster and more responsive, while also keeping the benefits of static pre-rendering for search engines.

3.2 Technological Stack and Tools

This chapter provides an overview of the primary technologies, frameworks, and tools used for the project, including Next.js, TypeScript, Firebase, and Directus CMS. It discusses the rationale behind each selection and explains how these tools support the project's goals of scalability, accessibility, and maintainability.

3.2.1 Overview of Technologies

The technological stack used in this project comprises a well-balanced set of modern tools and frameworks tailored for both front-end and cloud based pseudo-back-end development. The main components of the stack include:

- **Next.js:** A React-based framework that supports server-side rendering, static site generation, and file-based routing. It serves as the foundation for the project. The product currently uses Next.js version 14.

- **TypeScript:** A strongly typed superset of JavaScript that adds static type checking to the codebase, improving code quality and reducing bugs. TypeScript was chosen to enhance the maintainability of the project and provide a more robust developer experience.
- **Firebase:** Google's comprehensive cloud platform, chosen for hosting the application and handling continuous integration/continuous deployment (CI/CD) pipelines. Firebase offers serverless capabilities, real-time databases, and easy integration with Google Cloud services.
- **Directus CMS:** A headless content management system (CMS) used to manage content and translations for the site. Directus was selected due to its ease of use, flexibility, and familiarity among the developers.
- **Google Cloud Platform (GCP):** Used to integrate APIs for Google Calendar and Google Forms. Since the organization's other projects are also hosted on GCP, it was a natural choice for the project to ensure consistency and streamlined operations.

In addition to these core technologies, a variety of libraries and tools are used to improve development efficiency and performance, including:

- **Directus SDK:** To interact with the Directus CMS.
- **React Material UI:** Initially chosen for UI components following Material Design principles.
- **Embla Carousel:** For implementing dynamic, responsive carousels.
- **React Full-Calendar:** For managing calendar events in the UI.
- **Formic and Yup:** For handling forms and validation with ease.
- **Husky and Prettier:** For code formatting and maintaining consistent coding standards.
- **Vitest:** A lightweight testing library for ensuring code quality.

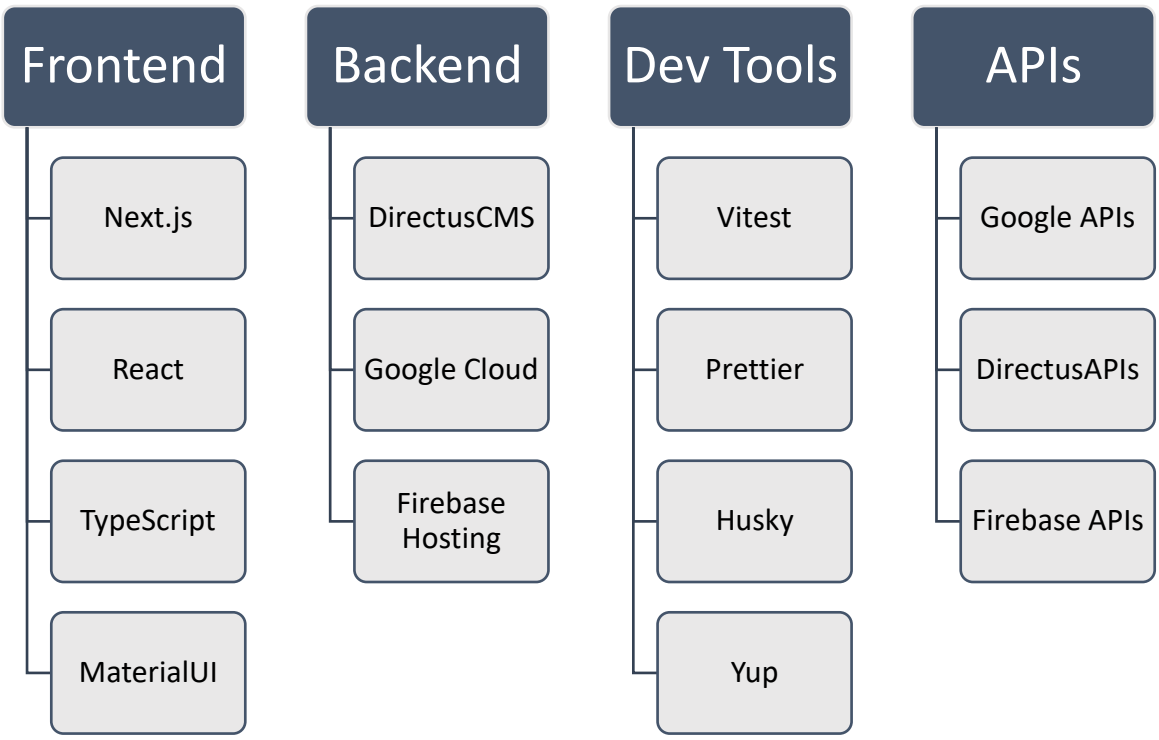

Figure 5: Architecture for New Website

3.2.2 Rationale for Technology Choices

The decision to utilize React and Next.js for this project was influenced by several factors that highlighted their strengths in terms of market share, developer familiarity, and alignment with project requirements.

1. **Market Share and Community Support:** According to recent statistics from Statista, React holds a substantial market share of 39.5% among client-side web frameworks, while Next.js follows as the second most popular framework with 17.9% (Statista, 2022). This dominance in the market indicates a strong community support ecosystem, abundant resources, and a wealth of libraries and tools. By choosing React and Next.js, the project benefits from a well-established community that can offer help and resources, making it easier for future web administrators—primarily volunteer student workers—to manage and maintain the site. This is particularly crucial given the nature of the team composition and the potential turnover of volunteers.
2. **Debate on Framework Selection:** During the requirement-gathering phase, the team engaged in an extensive discussion regarding the potential frameworks for the project. The primary contenders were React, Next.js, and Nunjucks. The debates encompassed several critical factors:

   a. **Server-Side Rendering (SSR):** Both Next.js and React 18 offer SSR capabilities, which are vital for improving initial load times and SEO.
   b. **Performance:** The ability to pre-render pages significantly affects user experience and search engine ranking, making performance a key consideration.
   c. **Developer Familiarity:** The team assessed how familiar new developers, especially volunteers, would be with each framework. Given React's popularity, it was clear that a React-based approach would be more accessible.
   d. **Learning Curve:** The complexity of learning new frameworks can hinder productivity. It was determined that Next.js, being built on React, would present a less steep learning curve than alternatives like Nunjucks, which is more abstract and unfamiliar to both the team and potential future developers.
3. **Final Decision for Next.js:** Ultimately, the team concluded that Next.js was the best fit for the project. While React 18 introduced server components that were competitive, the manual routing setup required for React, the complexity of implementing server components, and the absence of critical features like Static Site Generation (SSG) and Incremental Static Regeneration (ISR) tilted the balance in favor of Next.js. Next.js' built-in file-based routing simplifies the development process, allowing developers to create routes with minimal configuration. Furthermore, its support for SEO through SSR inherently provides an advantage in optimizing the application for search engines.

The decision to employ TypeScript over traditional JavaScript was primarily based on its type safety features, which enhance the robustness of the application. TypeScript helps catch errors early in the development process, reducing runtime errors and improving the overall reliability of the code. This added layer of safety also leads to better debugging experiences and promotes a more structured development environment, crucial for a project involving multiple volunteer developers.

For hosting the application, both Firebase and Vercel were considered. While Vercel offers native support for Next.js applications, Firebase was chosen as the preferred option. The rationale behind this choice was to maintain consistency, as all the organization’s projects are integrated within the Google Cloud ecosystem. Keeping everything in one place simplifies management and allows for seamless integration of various services, such as authentication and databases, which Firebase offers.

The selection of Directus as the content management system (CMS) over alternatives like Drupal was largely due to the development team’s familiarity with Directus. Its user-friendly interface and flexibility made it easier for the organization’s officers to manage content and translations

efficiently. This was crucial for ensuring that those responsible for content updates could do so without extensive technical knowledge.

Since the organization already operates within the Google Cloud ecosystem, it was a natural decision to choose Google Cloud Platform (GCP) for cloud-based services. This choice not only ensures compatibility with existing projects but also streamlines the process of utilizing Google APIs, such as those for Calendar and Forms, without needing to switch between different cloud providers.

Among the various libraries incorporated into the project, Material UI was initially selected to implement a Material Design aesthetic, which aligns with modern UI principles (React Components – Material UI, s.a.). However, after thorough deliberation, the decision was made to transition to ShadCN for the UI library. ShadCN was favored for its advantages, including superior accessibility, easier customization, and a significantly lighter bundle size. Unlike Material UI, which requires importing large node modules, ShadCN allows developers to include only the components that are actively being used in the project. This results in better performance and faster load times, contributing positively to the user experience.

3.3 Project Management and Development Methodology

This chapter describes the project management approach, focusing on Agile methodology adapted for a volunteer-based team. It explores the component-driven development workflow, the division of tasks, and the tools used for collaboration and iterative progress, such as Figma, Trello, and Git.

3.3.1 Agile Methodology

The project employs a loosely implemented version of Agile methodology to accommodate the volunteer nature of the development team (Beck et al., 2001). Since all contributors work on a part-time basis, strict adherence to short sprints is not feasible. However, the team follows monthly sprints and conducts weekly stand-up meetings to ensure alignment on tasks and objectives.

Agile’s flexibility is particularly valuable for this project, as it allows team members to focus on smaller, self-contained tasks, such as building individual components or pages. This component-driven approach fits naturally with Agile principles, enabling the team to incrementally build features while regularly gathering feedback and making adjustments. Additionally, Agile’s iterative nature ensures that the project can continue evolving and improving, even after the initial thesis goals are met.

The use of Figma, Trello, and Git for project management and collaboration ensures that designers and developers remain in sync. Trello is used to manage tasks and track progress, while Figma and Git facilitate collaboration, allowing the team to iterate on the UI/UX and the product as development progresses.

3.3.2 Component-Driven Development Workflow

The project utilizes a component-driven development (CDD) workflow, in which the application is broken down into individual components that can be developed, tested, and integrated independently. This workflow aligns with the modular architecture of React and Next.js, enabling parallel development across different features and facilitating collaboration among the team.

By focusing on building small, isolated components, the development process becomes more efficient. Each component can be designed, coded, and tested individually, reducing the complexity of integration later in the project. Tools like Storybook (if applicable) can be used to visualize and test components in isolation, ensuring that each piece works as expected before being assembled into the larger application.

The CDD workflow also supports Agile’s iterative approach, as components can be revisited and refined throughout the development process. This allows for continuous improvement of the UI and UX while maintaining a clean and organized codebase.

4 Implementation and Evaluation

4.1 Project Initiation, Requirement Gathering, and Planning

This chapter details the project's implementation, beginning with project initiation, requirement gathering, and team formation. It goes on to outline the iterative development process, architecture planning, component creation, and key challenges faced.

4.1.1 Project Initiation and Team Formation

The need for a complete overhaul of the Satakunta Student Nation’s website had been clear for some time. The outdated design, accessibility issues, and limited functionality were significant pain points for both users and administrators. The project was first conceptualized by Vuolanne, the former web administrator, who began preliminary discussions about potential technology choices and development strategies in 2023. However, due to time constraints and other priorities, the project stalled.

In January 2024, Swanson took over as web administrator and revived the project with a clear vision: to build a modern, accessible, and user-friendly website that would address the shortcomings of the old platform. The project was officially approved on March 21, 2024, during the Satakunta Student Nation general meeting. All 19 voting members endorsed the project, showing unanimous support for the initiative.

Once the project received approval, a team of volunteers stepped forward to contribute. Swanson assumed the role of lead developer and project manager, responsible for overseeing the entire development process. Vuolanne remained on board as the CI/CD developer and quality assurance specialist. Jacksen, a UX/UI designer, joined to lead the design efforts. Additional team members included photographers, translators, and copywriters, all contributing to various aspects of the project. The team was composed of volunteers, which necessitated flexibility in task management, as most participants had limited availability. The formation of a well-rounded team with diverse skill sets laid the foundation for the project's success, despite its volunteer nature.

4.1.2 Requirement Gathering and Stakeholder Meetings

The requirement-gathering phase involved two critical meetings. The first was a technical discussion between Swanson and Vuolanne, where they outlined the essential technologies, architectural preferences, and frameworks that would support the project. The second was the general assembly meeting, where members of the Satakunta Student Nation provided feedback on their expectations and needs for the new website.

During the assembly meeting, stakeholders—including the inspector, curator, and board members—emphasized the need for a modern, user-friendly, and accessible website. Feedback highlighted specific areas such as improved mobile responsiveness, ease of navigation, and adherence to the European Accessibility Act (EAA) standards. Additionally, the nation's branding guidelines were to be respected, and core functionalities of the existing site, such as event registration and calendar features, were to be retained. This input formed the backbone of the project's direction and ensured alignment with both technical and user expectations from the outset.

Regular stakeholder meetings were held throughout the project, including weekly stand-ups and sprint reviews, allowing for continuous feedback and refinement of the project's scope and deliverables.

Technical requirements included:

- Meets Accessibility standards outlined in the EEA (WCAG 2.1 AA)
- Uses a language framework that future developers are likely to be familiar with
- Implements a CMS that is easy for the nations officers to use
- Implements and Islands Architecture
- New site retains the core functionalities of the old site

End-user requirements included:

- A more appealing, modern design and layout
- Better site organization
- Improved ease of use
- Improved mobile responsiveness.
- Site should match the nation's official branding guidelines

4.1.3 Planning and Design Phase

The planning and design phase, initiated shortly after the requirement-gathering sessions, centered around translating stakeholder feedback into actionable designs and technical architecture. UX/UI designer Jacksen took the lead in creating the first prototypes, focusing on the homepage and the nation information page. These designs were created using Figma and went through multiple rounds of validation with stakeholders.

Despite near-unanimous approval of the initial designs, one stakeholder raised concerns about the site's color palette not adhering closely enough to the nation's official colors. However, the nation's official colors did not meet WCAG 2.1 AA contrast standards, which required minor adjustments to

ensure compliance. This iteration process took roughly two months to reach consensus, illustrating the importance of balancing legal requirements with stakeholder expectations.

Concurrently, Swanson and Vuolanne worked on finalizing the technical stack, opting for a component-based architecture using Next.js and TypeScript. This approach was chosen to facilitate future maintenance and ensure that the site would be easy for future volunteers to develop.

4.1.4 Architecture Planning and Component Implementation

After the finalization of the initial design. Swanson and Vuolanne began planning the project's architecture more thoroughly. This included decisions such as using Next.js' legacy page routing, rather than the app router as they believed it would be easier for new volunteer developers to navigate, and clearly defined files and folders within the product including components, docs (documentation), hooks (React hooks), lib (library for reusable functionality), pages, and styles.

The project's actual architecture is as follows:

- Next.js, site frontend and bits of backend.
- DirectusCMS functions as a pseudo database of the site's text copy and translations. The translations are retrieved at build time by a library function fetchTranslations and are then stored in a JSON file (Appendix 5-7). This is to reduce the amount of time the CMS is hit.
- Google Cloud is used to populate the calendars and to allow users to submit form and event registration data.
- Husky and prettier are used at product build time for formatting and validation.
- Vitest is also run at build time to ensure the product is error-free before attempting to deploy.
- Firebase is used for site hosting and CI/CD. This includes creating a demo link for every pull request or when the pull request is updated and publishing the main branch of the repository to a subdomain of the nation's website to allow stakeholders to follow development.

4.2 Development Process

Development proceeded in iterative sprints, with each sprint focusing on building and testing specific components of the website. The team embraced Agile principles, conducting weekly stand-ups to discuss progress and align on upcoming tasks. Regular demos were conducted to showcase new features and gather feedback, ensuring that the development remained in line with

stakeholder expectations. Between key milestones, such as project planning and Minimum Viable Product (MVP) presentation, Swanson completed 12 one-to two-week sprints.

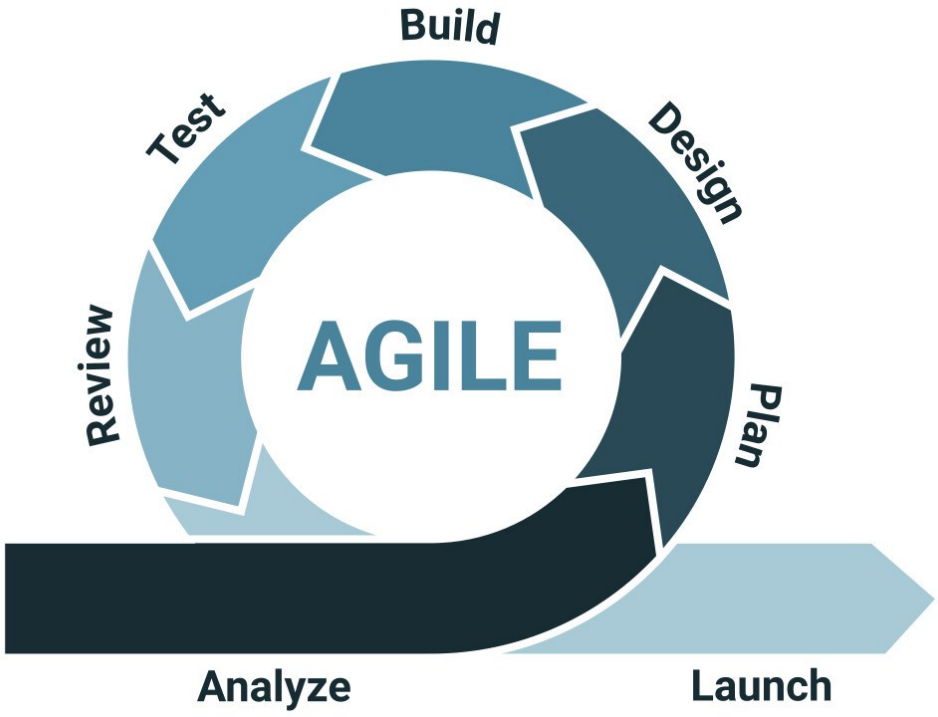

Figure 6: Agile Development Cycle (Kostiantyn, s.a.)

Each sprint focused on delivering one of the core pages, progressing toward the Minimum Viable Product (MVP) presentation on September 25th, 2024. The following subchapters will breakdown of each sprint, detailing the work completed and the results achieved. More screenshots of the site may be found in the appendices.

4.2.1 Sprint Breakdown

Homepage Development (Appendix 1):

The homepage development was an intensive, iterative process involving numerous design and accessibility adjustments over a span of several months. Initially, the primary goal was to design a homepage that would create a strong first impression, with visually appealing elements like a hero section, a reusable card component for events and news, a week-view calendar, and an image carousel. The intention was to align the page design with the Satakunta Student Nation’s dynamic and inclusive brand image.

However, early designs encountered setbacks when some stakeholders raised concerns that the design did not fully reflect the organization’s brand. Specifically, the colors needed to adhere more

closely to SatO's brand guidelines, but adjustments had to be balanced with WCAG and EAA standards, as some brand colors lacked sufficient contrast for accessibility. This led to several rounds of revisions in which colors and contrast were re-evaluated and refined to balance both brand alignment and accessibility.

To address these issues, Swanson in the absence of the primary UX/UI designer, created new wireframes that incorporated stakeholder feedback while also meeting WCAG and EAA standards. This revision period was roughly two-months and involved close collaboration between Swanson and stakeholders, as well as additional meetings to ensure all design changes met the nation's aesthetic standards and were approved by the board. The result was a functional homepage that balanced accessibility, design, and brand representation, setting a strong foundation for the rest of the website's development.

Nation Info Page (Appendix 2):

For the Nation Info Page, the main goals were to create a consistent layout for informational pages and implement forms with necessary security features like reCAPTCHA and honeypot fields for validation. The design initially encountered some responsiveness issues, as the layout was too complex for mobile. Swanson and Jacksen collaborated to streamline the layout, creating a standardized, responsive design that would be replicated across other pages. This approach not only improved mobile accessibility but also reduced duplicated styling, ultimately accelerating the development of future pages. The outcome was a clean, user-friendly Nation Info page ready for content population, serving as a reference for future content pages in the website structure.

Karhunkierros Magazine Page:

The magazine page required initial setup and collaboration with the DevOps team to create a script for scraping old issues from the legacy CMS. Using a template set during the Nation Info Page setup, the page development process remained straightforward. However, retrieving the magazine files became a complex task due to file dispersion across multiple platforms, including Google Drive, the legacy Django CMS, and various storage buckets. Lennu and Swanson continue to work on extracting these issues, formatting them for the new website, and uploading them to the CMS, with each issue's cover image serving as a clickable thumbnail. The magazine page's structure was completed, but data transfer remains an ongoing task.

Official Documents:

The creation of the Official Documents Page involved coordinating with the board and curator to confirm the list of essential nation rules and documents. This verification process ensured that all

content was accurate and up to date. Once confirmed, Swanson developed the page and replaced placeholder links with actual document links. A final review with the nation's board members ws conducted using a demo link to validate the page's accuracy, establishing it as a reliable source for official nation references and compliance documents.

News Page:

The News Page aimed to present current and archived news articles effectively. The initial design implemented a simple card display for the latest articles, but feedback highlighted that this approach was ineffective for browsing posts more than 2 weeks old. The team is currently experimenting with a tree-style navigation system, allowing users to browse articles by year and month, allowing users to more efficiently access to historical content. Concurrently, the DevOps team is working on migrating old news articles from various platforms into the CMS. This process is ongoing at the time of writing as there are more than a decade of announcements that must be scraped, formatted, and transferred.

Calendar Page:

In developing the Calendar Page, Swanson selected the react-fullcalendar library, integrating Google Cloud APIs to sync with the nation's public events calendar. While the initial setup went smoothly, the challenge emerged in styling the calendar's weekly view on the homepage without impacting the monthly view on the Calendar Page. Swanson is currently exploring ways to isolate these styles without risking stability in future library updates. This page provides users with an intuitive, real-time calendar updated via Google Cloud, enhancing event discoverability.

Events Page (Appendix 3):

The Events Page aimed to create an engaging and information-rich space for upcoming social and official events, including general assembly meetings and other nation gatherings. Initial designs for this page proved too simplistic, leading to a more elaborate approach. Swanson and Jacksen collaborated on a new horizontal card component, which allowed for a denser information layout while maintaining readability. This component features the events title, time, date, a brief description, and a button that links to the event's sign-up and information page. The page itself is divided into two sections, divided by social and official events, making it easier for users to distinguish between types of events. The final design utilizes different color backgrounds to separate event categories, creating to a user-friendly visual hierarchy that is ready for Google Form integration for event sign-ups.

Archive Page:

The Archive Page development required consultation with the nation's historian and librarian to accurately compile and digitize archival content, including books, documents, and articles. Structurally similar to the Events Page, this section used a streamlined layout to facilitate user access to archived resources. However, compiling and formatting the content for digital display presented logistical challenges. Several physical documents still need scanning, file compression, and digital organization, a process still ongoing at the time of writing. Once completed, these materials will be accessible on the website through the CMS, enabling users to engage with the nation's rich historical content in an easily accessible digital format.

Contact Page:

The design and implementation of the Contact Page required thoughtful planning to ensure information was easy to locate, given the extensive list of contacts within the nation. Feedback from team members and stakeholders highlighted issues with the legacy site's contact page, which was long and cumbersome to navigate, particularly so on mobile. Swanson proposed a table format for contact information, allowing users to search and sort through contacts quickly and efficiently. While unconventional, this approach received positive feedback for improving usability and accessibility. The table design was implemented successfully and contact details, and their translations are currently being populated and verified, ensuring users can find the information they need with minimal effort.

Harassment Form (Appendix 4):

The harassment form was a crucial feature in the redesign, intended to give members a confidential and easily accessible way to report issues to the nation's curator. Because the form addresses sensitive information, it was essential that it be secure, anonymous, and protected from spam and bot submissions, which could clutter the curator's inbox and potentially expose the curator to security risks. To meet these requirements, Swanson implemented several layered security measures.

One of the primary security enhancements was the use of a honeypot field. A honeypot field is an invisible form field designed to trap spam bots. While legitimate users don't see or interact with this field, bots typically attempt to fill all form fields by default. If the honeypot field contains any input, the form submission is flagged as spam and discarded, preventing unwanted entries from reaching the curator's inbox. This solution complements the use of Google reCAPTCHA, which the site still uses, albeit v3 rather than the v1 implemented on the old site.

For additional security, the harassment form was developed using the Formik library for form structure, with the Yup validation library to ensure required fields were completed correctly before

submission. This setup enhanced the form's functionality, making it straightforward for users to submit without errors while ensuring each submission contained complete, valid information.

To further streamline data handling, the form submissions were set up to forward data to a Google Form. This step provided a secure, organized way for the curator to manage and review submissions, as entries are logged in a Google Sheet linked to the form. This setup offers several advantages: it organizes entries in a manageable format, sends alerts only when new entries are submitted, and prevents the curator's inbox from being overwhelmed by unstructured, duplicate, spam, or potentially malicious submissions. Upon completion, the development team transferred ownership of the Google Form and Sheet to the curator once testing was complete, ensuring that the data remains private and accessible only to those responsible for addressing reported concerns.

Translations:

Given the Satakunta Student Nation's commitment to inclusivity and its linguistically diverse membership, translation support was a priority in the website redevelopment. The website needed to be fully accessible in Finnish, Swedish, and English, aligning with the linguistic diversity within the nation. To ensure high-quality translations that reflected the tone and cultural nuances of the organization, the translation and copywriting team, which included board members, was engaged early in the development process.

Translations were compiled in an Excel file, allowing the team to work collaboratively on translating and refining text for each section of the site. This structured approach also allowed for easy updates and revisions as the project progressed. Once the main translations were finalized, Swanson imported the data into the Directus CMS, which functioned as a centralized storage system for all language-specific content.

To enable seamless language switching on the website, Swanson and Vuolanne developed a comprehensive language context and translation-fetching system. They created a CMS client within Directus to manage the text in each language, as well as a useTranslate hook to enable translations on any given page. The translation data was then compiled into a JSON file and fetched at build time using the getStaticProps method, optimizing loading efficiency and reducing server requests to the CMS.

In practical terms, each translation entry in the CMS was given a unique key, with corresponding text fields for English, Finnish, and Swedish. This structure allowed the developers to call specific translations dynamically within the site's code using the useTranslate hook, referenced simply as t("key:pseudoClassName"). This setup not only streamlined development but also made future

updates easier, as content managers could add or revise translations directly in the CMS without requiring changes to the codebase.

Final Checks Before MVP Presentation:

The final sprint focused on preparing the website for the MVP presentation, addressing key areas like device responsiveness, accessibility, and minor functionality adjustments. Swanson verified responsiveness across 12 common screen sizes, ensuring consistency on mobile, tablet, and desktop. Accessibility audits using WAVE, IBM Equal Access, and Lighthouse were conducted, with critical issues addressed to ensure WCAG compliance. Additional quality assurance tests across various devices and connection speeds identified minor bugs, which were promptly fixed. With these final checks, the website was deemed ready for MVP presentation, showcasing the substantial progress achieved and receiving stakeholder approval to proceed.

4.2.2 Additional Team Sprints

Other team members conducted four, month-long sprints in the preparation for the MVP presentation.

DevOps Developer: Built a robust CI/CD pipeline with automated testing, error checking, code formatting, Lighthouse evaluation, and deployment workflows. These additions ensured a streamlined development environment and high-quality code.

1. Basic deployment setup for the production.
2. Implementation of coding standards with mandatory testing and automated code formatting.
3. Enhanced workflows for test link deployments and performance metrics.
4. Site-wide QA to ensure stability before MVP presentation.

UX/UI Designer: Created layouts and prototypes for all key pages, with iterative designs based on stakeholder feedback. Each sprint ended with a presentation to and subsequent approval by the board.

1. Homepage and generic page layout for other pages.
2. Nation info, magazine, and documents pages.
3. News, calendar, events, and archive pages.
4. Contact and harassment form pages, final tweaks redesigns for MVP readiness.

4.2.3 MVP Presentation

The Minimum Viable Product (MVP) or proof-of-concept was presented in September 2024 during the Satakunta Student Nation General Assembly meeting. The MVP included core functionalities

such as event registration, a functional calendar, and key informational pages. Stakeholder feedback was overwhelmingly positive, with many members expressing satisfaction with the design and usability improvements. However, a few suggestions were made regarding the placement of certain elements, which were incorporated in later iterations.

4.2.4 Testing and Iteration

A sprint focused on testing was conducted after receiving approval for the MVP, which was essentially the first iteration of the website, the website underwent a series of usability tests detailed in the next chapter, and a user feedback form was opened. This offered valuable insight into what areas of the site needed improvement. This feedback is being used in the current sprint at the time of writing to iterate the site before it will undergo two to three more rounds of testing and iteration, before being finalized for the product's handoff as the product must receive unanimous approval from its stakeholders.

4.3 Testing and Evaluation

This chapter delves into the testing and evaluation process, detailing the methodologies used to assess usability, accessibility, and task efficiency. It covers heuristic evaluations, task completion time analysis, and qualitative feedback, along with data insights that informed iterative improvements.

4.3.1 Testing Methods and Approach

For the initial testing and iteration, two methods were used, and an anonymous feedback form was opened. These tests were a heuristic evaluation, when the users were given brief instructions on the format of the evaluation and were left alone to review both the old and new site. They would then score each of the sites, old and new, from 1-10 based on the prompts:

- I am aware of where I am within the site and what is currently happening on the page.
- Words, phrases, and concepts used on the site are familiar to me.
- I can freely and easily navigate the site. There are no areas where I get "stuck".
- The site is consistent, and I understand what actions, situations, and words mean.
- The site helps guide the user away from making errors.
- I intuitively know where to find things/what to do on the site.
- There are many ways to accomplish a given task on the site.
- The design is both aesthetic and does not contain irrelevant information.
- If I do run into an error, I am able to understand what went wrong and recover.
- I did not need help understanding/navigating the site. If I did, the information was available.

In addition, each prompt has a free response for users to describe any potential issue they faced (Appendix 9).

To test the efficiency of each user interface, a task completion time test was conducted. In this test, users were instructed to complete four tasks on each of the websites. The time each task took was recorded and analyzed to assess what is going well and where the new website could be improved further (Appendix 8). These tasks were:

1. Find the Verkkovastaava's (web administrator's) contact information
2. Tell when the Osakunta Appro is
3. Locate the harassment form and write "hi" in the first field
4. Locate the nation's principles for a safer space

These tasks were chosen as finding contact information and checking the calendar are two of the target audiences primary use cases. The second two tasks were chosen due to their importance. The board and other key stakeholders such as the nation's curator and host (Isäntä) have stressed that the safe space principles and harassment forms must be easy to access to ensure that the nation remains a welcoming and inclusive environment.

4.3.2 Data Collection and Analysis

This section focuses on gathering quantitative and qualitative data to assess improvements made in the new Satakunta Student Nation's website. Data collection was conducted using two main methods, a heuristic evaluation, and a task completion time test.

During heuristic evaluations, participants rated their experience based on Jakob Nielsen's 10 Usability Heuristics. Each heuristic was rated on a scale of 1-10, and users could additionally provide feedback for any specific difficulties encountered.

The new website consistently scored higher than the old website in all 10 heuristics, with a particularly large increase in ratings for the heuristics "Aesthetic and Minimalist Design", and "Error Prevention". While testing the old site, users noted that the link to the foundation's rental page in the navigation menu was confusing. Additionally, the navigation categories of the old site were found to be confusing, and multiple users did not understand why logging in was necessary to access a feature in the old navigation menu.

While users found the new navigation, and overall content of the site easy to use and engaging, some had issues with the calendar page, which was undergoing maintenance at the time of testing. Other users highlighted that keeping an external link in the navigation menu was confusing

and it should be removed. The navigation menu's information hierarchy was also mentioned as an area that could be improved by moving more frequently visited pages upward in the list order.

Overall, the new website seems to be a success so far with an average evaluation improvement of about 29 percent. However, additional testing and iteration are needed to ensure all potential issues can be addressed. After updating the website to satisfy current user feedback additional testing should be done.

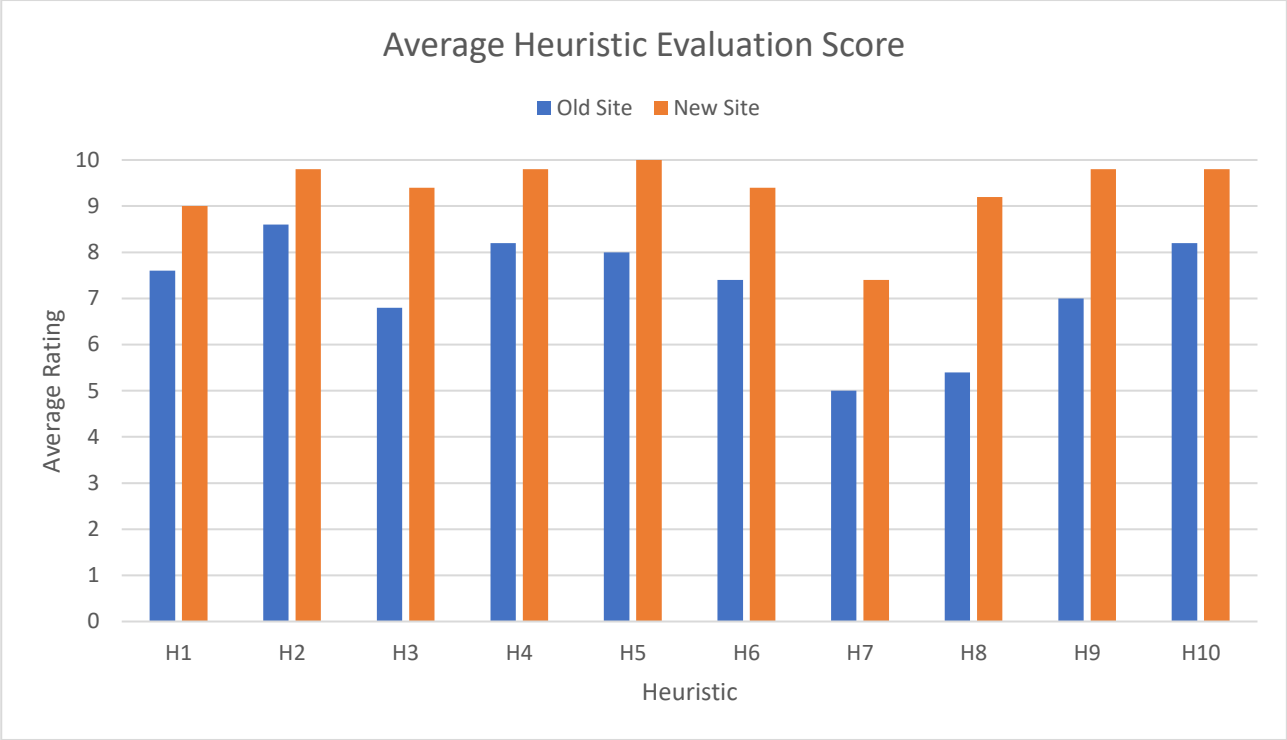

Figure 7: Comparison of Average Heuristic Evaluation Scores for the Old and New Websites

Task completion times were recorded to measure how easily users could complete common or necessary tasks. The tasks chosen were finding an official's contact information, finding the date of an event, locating an official document regarding the nation's regulations, and finding the harassment form. The results for the tests are as follows:

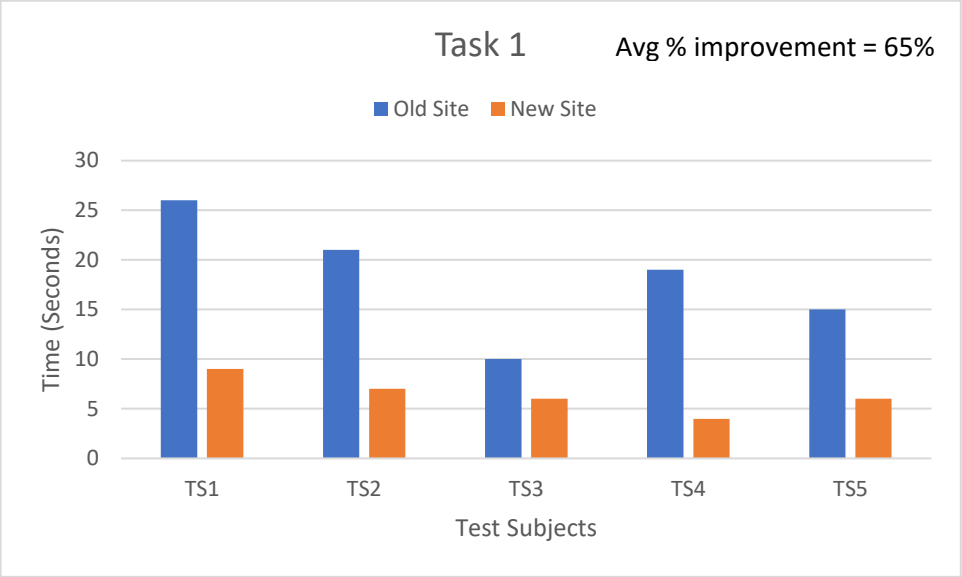

Figure 8: Comparison of Time to Locate Contact Information

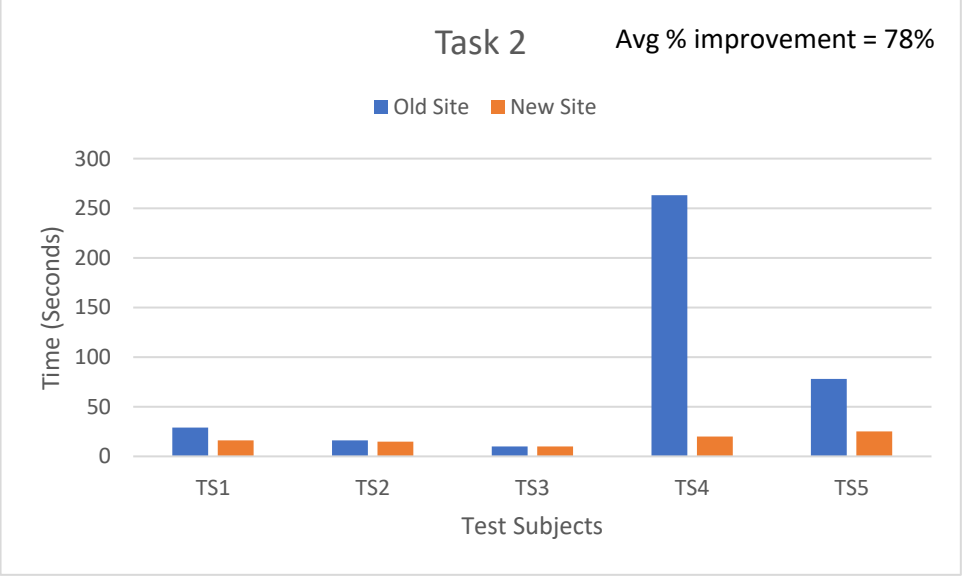

Figure 9: Comparison of Time to Locate the Date of an Event

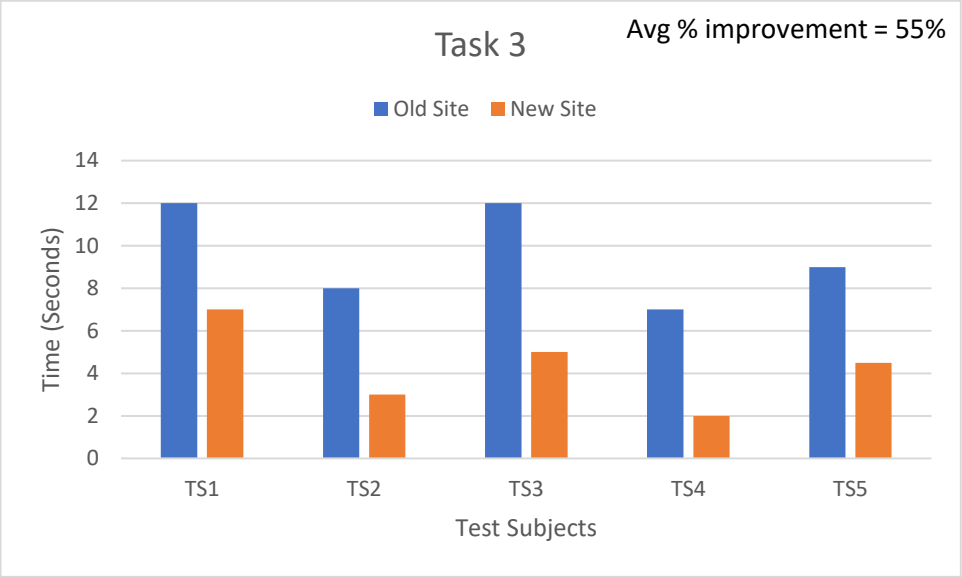

Figure 10: Comparison of Time to Find Harassment Form

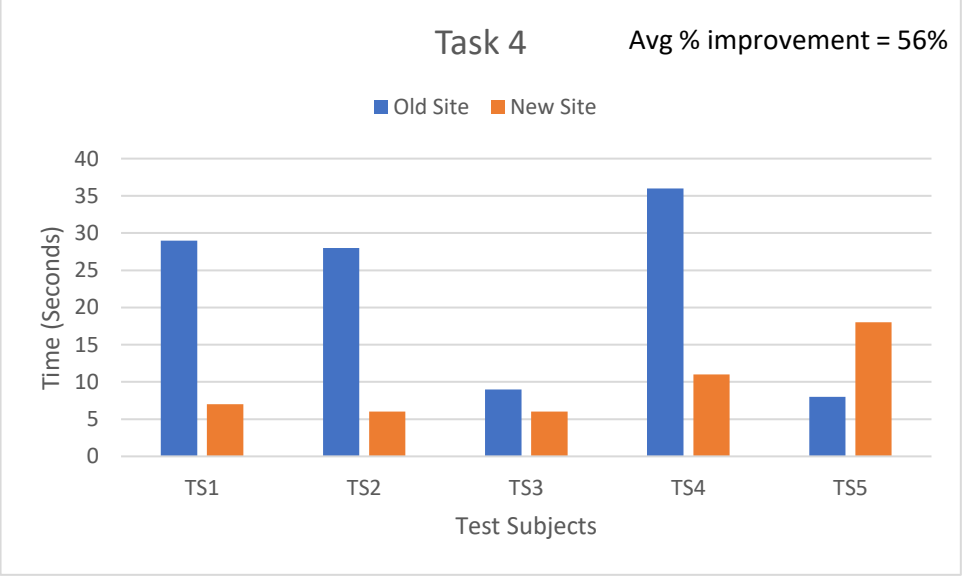

Figure 11: Comparison of Time to Locate a Nation Regulation

Task completion times decreased by an average of 64 percent on the new website. Notable improvements include:

- The new search function in task one aiding the users in finding contact information on average 65 percent faster than the old site.
- Improved semantics allowing the users to locate the calendar, this was particularly useful for a new member and prospective member who represent the outliers in task two.
- Less clutter and improved information hierarchy in the navigation menu again led to decreased times to find the harassment form.

- Improved semantics regarding splitting the old archive page into “official documents” and “archive” led to a reduction in time finding the nations rules and regulations for all users except a recent alumnus, who has been using the old site for more than 7 years. Their learned behavior led them to search the archive page before accessing the official documents page, increasing their time. This could suggest that older members and alumni may need some additional instruction or time to adjust due to learned behaviors.

Additional feedback provided in the feedback form includes the suggestions to:

- Add more info for prospective members alongside a form to allow them to get in contact with the member secretaries to sign-up.
- Place the language localization buttons at the top of the nav for easier access.
- Add symbols on external links to indicate to the user they are leaving to a new site.
- A recommendation for an additional feature, a form to reserve rooms at the nation house.

Overall, data collection results indicate that the new website enhances usability, reduces user frustration, and aligns with user-centered design goals. Qualitative feedback also confirmed this as all test users commented positively on the aesthetic and functional improvements made on the new site. Qualitative feedback also highlighted important critiques regarding information hierarchy, additional information that is needed, providing visual cues, and possible additional features for the site. These critiques will be used to further improve the site before launch and or, add new features after the launch of the core product.

4.3.3 Comparative Evaluation

To assess the effectiveness of the website redesign, a comparative analysis was conducted. This evaluation involved direct comparisons between the old and new websites across key metrics: navigation and usability, accessibility, and performance.

Navigation and ease of use were identified as primary areas needing improvement. The comparative evaluation showed that the new site’s menu structure and updated layout substantially increased user efficiency. Usability scores increased by an average of 29 percent on the new site, reflecting enhancements in both ease of access and content organization. Several users noted that they could quickly locate necessary sections of the site.

The new website was developed to align with WCAG 2.1 AA standards, addressing the requirements laid out in the EAA. Comparative evaluation using accessibility tools revealed that while the new website still has some work to be done regarding meeting the accessibility goals laid out

during the project planning phase, the new site does meet the requirements of the EAA and successfully addresses the accessibility issues of the old site.

Lastly, a comparative analysis of the site's performance, accessibility, best practices, and search engine optimization (SEO) saw an increase in performance from 52 to 86, an increase in accessibility from 87 to 90, and an increase in best practices from 96 to 100. The score for search engine optimization remains unchanged. While these results are positive and suggest that the new website has indeed improved, the feedback provided by lighthouse metrics for the new website will be used to further improve the website before launch. The final goals being performance and SEO scores of at least 90, and accessibility and best practices scores of 100.

5 Conclusions

5.1 Summary of Key Findings and Results

This chapter summarizes the core outcomes of the project, highlighting improvements in usability, accessibility, and overall user satisfaction. It reviews key achievements in user experience and outlines the benefits realized through the updated website design and enhanced functionality.

5.1.1 Key Findings and Improvements

The development of Satakunta Student Nation's new website has resulted in significant improvements in usability, accessibility, and user satisfaction. Test results confirm that the new website has effectively addressed the issues identified in the product's early stages, such as navigational difficulties, outdated aesthetics, and accessibility limitations. Key findings include:

- **Enhanced Usability:** task completion times were reduced by an average of over 64 percent, demonstrating that the new layout is easier for users to navigate. The introduction of a more intuitive menu, localization to Finnish, Swedish, and English, and improved information hierarchy enables quicker access to essential resources like contact information, event details, rules and regulations, and forms.
- **Improved Accessibility:** Compliance with WCAG 2.1 AA standards has made the website more inclusive. Adjustments in contrast, alongside efforts made to make the site keyboard and screen reader compatible enables users with disabilities to navigate the site more easily. This compliance aligns with, and in some areas, exceeds the standards mandated by the EAA.
- **User Satisfaction:** Both heuristic evaluations and qualitative feedback from an anonymous indicate a high level of satisfaction with the new site's modern, aesthetic design and minimalist layout The updates look and feel resonate well with the community and accurately represent the vibrant Satakunta Student nation.
- **Performance:** The site's performance, accessibility, best practices, and SEO were previously analyzed using Google's lighthouse metrics. These results were less than optimal, especially a previous performance score of 52, which has increased to a score of 85. The new results show improvement but highlight areas that require further attention before the product's finalization.
- **Developer experience:** While this is subjective matter, the switch to a React-based framework should mean that potential future web administrators, who may be newer developers, are familiar with the framework used based on the insights gathered at the project's inception.

- **Security:** By eliminating almost all sensitive data from the website and reinforcing the spam reduction measures in key forms the security concerns of the previous site have been addressed. Additionally, using a more up-to-date framework ensures that code security vulnerabilities, such as outdated dependencies, are less likely to occur. When they do occur, the site's repository is set to automatically bump up the necessary dependencies to the newest version as a pull request to be reviewed.

5.1.2 Unexpected Results or New Issues

Diplomacy and Design Consensus:

- **Issue:** During the design phase, achieving unanimous agreement on design choices—especially color adjustments—was challenging. Although necessary for accessibility compliance (WCAG 2.1), the color changes did not initially receive full support from some stakeholders, leading to delays.
- **Solution:** Negotiations and prototype iterations were conducted to balance accessibility standards with stakeholder expectations, ultimately reaching a compromise that met both design and legal requirements.

Resource Availability:

- **Issue:** The project's volunteer UX designer was unexpectedly unavailable for two months, requiring the lead developer to take on additional design responsibilities. This delay impacted the planned timeline and workload distribution.
- **Solution:** The project team adapted by reallocating responsibilities, which allowed for continued progress while awaiting the designer's return.

Calendar Integration:

- **Issue:** Integrating the calendar component, particularly styling the react-fullcalendar library, proved more complex than anticipated. Significant time was needed to align both weekly and monthly views with the overall design specifications.
- **Solution:** Custom CSS and class overrides are currently being investigated as a potential solution to resolve styling conflicts and ensure design consistency without compromising dependency integrity.

Approval Processes and Launch Delay:

- **Issue:** Given the nation's regulatory requirements and approval processes within the organization, each change had to be reviewed and approved by multiple stakeholders, leading to a delay in the final launch. As a result, the official launch date was moved to Q1 2025.

- **Solution:** Project timelines were adjusted, and the team set up a structured review and feedback schedule to streamline future approvals.

5.1.3 Project Impact and Contribution

The redesigned website for the Satakunta Student Nation has significantly enhanced the organization's digital presence, fostering a more accessible, cohesive, and engaging platform for all members. This project's impact can be seen not only in the tangible improvements in usability and accessibility but also in the strengthened sense of community that the website now supports. By integrating WCAG 2.1 AA standards, the redesign has made the site inclusive to a broad range of users, including those with visual, cognitive, or mobility-related challenges, who may have found the previous website difficult to navigate. This commitment to accessibility aligns with the organization's values of inclusivity and reflects its desire to create a welcoming online space for everyone within its community.

The project is also expected to improve member engagement by making essential resources, event information, and registration options easier to locate and navigate. Users can now access key information more intuitively, thanks to the newly organized navigation structure and clean, minimalistic design. Feedback from usability tests indicates that users find the updated design both visually appealing and straightforward to use, contributing to an overall boost in user satisfaction and a greater willingness to interact with the site.

The decision to adopt Next.js and a component-based architecture provides significant long-term benefits as well. The modular structure of the code and the choice of a popular framework ensure that future volunteers and administrators will find the site straightforward to maintain and expand. Unlike the old system, which relied on the expertise of a single administrator, the new site is structured to allow easier updates and content management, even for those with limited technical knowledge. This shift enhances the site's sustainability, reducing the potential for disruptions in the future and making it easier for new developers to contribute to the site's upkeep. In this way, the project's contribution goes beyond immediate functional improvements; it has laid a solid foundation for the Satakunta Student Nation's digital presence that will continue to support its growth, adaptability, and mission well into the future.

5.1.4 Project Objectives and Achievements

The website redesign project successfully met and, in many cases, exceeded its primary objectives. One of the core aims was to create an updated design that aligns closely with the branding of the Satakunta Student Nation, reflecting the organization's identity while also appealing to a modern audience. This was accomplished by implementing a cohesive visual aesthetic that resonates

with members, prospective members, and alumni, replacing the outdated interface with a polished and user-friendly design that has received positive feedback from both stakeholders and users.

A major objective centered on accessibility, which was achieved through full compliance with WCAG 2.1 AA standards. This improvement addresses user concerns and meets legal requirements, while also ensuring that the platform is inclusive to individuals with disabilities. Efforts to enhance accessibility included adjustments in color contrast, improvements to keyboard navigation, and screen reader compatibility, and the inclusion of features such as ARIA tags, all of which have increased usability for a broader audience. These changes contribute to a more inclusive and responsive user experience, particularly valuable given the diversity within the Satakunta Student Nation community.

Performance was also significantly enhanced in the new website, with improvements in Google Lighthouse metrics reflecting faster load times and better efficiency. Previous performance scores that indicated a need for optimization were boosted to a higher level, providing a seamless browsing experience. While the new site does not yet meet the standards the team is aiming for, these gains support an efficient and engaging platform, especially critical as the site attracts increased traffic, and ensures that users can interact with the website quickly and reliably.

Feedback collected during usability testing demonstrated high satisfaction rates, confirming that the redesigned navigation and information architecture improvements have made it easier for users to locate and access resources. Efficiency in task completion times has also increased, directly addressing prior user concerns about the cluttered and confusing layout of the old site. In addition to improved usability, the switch to a more familiar, modular development framework has facilitated better site maintenance and ensures that future updates can be managed with greater ease by both novice and experienced developers alike.

Ultimately, these achievements reflect a well-rounded and impactful project that has created a sustainable foundation for the Satakunta Student Nation's digital presence. The new website now stands as a more accessible, aesthetically pleasing, and functional platform, well-positioned to support the organization’s evolving needs while fostering a more connected and engaged community upon launch.

5.1.5 Empirical Findings and Evaluation results

Empirical findings from the heuristic evaluations and usability testing demonstrate the success of the redesign in improving user experience, as well as provided valuable critique on minor areas for future iterative improvement. Increased heuristic scores and shortened task completion times validate the approach taken in restructuring the site’s architecture, streamlining content, and

implementing modern design principles. The testing confirmed the effectiveness of the user-centered design and accessibility improvements.

These findings validate the approach taken in the redesign, specifically in improving website architecture, streamlining content, and applying modern design principles. Heuristic evaluations indicated significant advancements in core usability areas, showing marked improvements in navigation, system visibility, and user control compared to the previous version of the website. Users reported that the redesigned site was more intuitive, aesthetically pleasing, and efficient for accomplishing tasks, confirming that the application of design heuristics aligned well with real user needs.

The usability tests further demonstrated the efficacy of the design, with task completion times decreasing by an average of 64 percent for most core actions, such as locating event details, finding contact information, and accessing important documents. This dramatic reduction in completion time reinforces the importance of a user-centered design approach. By prioritizing ease of use and effective information hierarchy, the new design allows users to engage more fluidly with essential resources. The improved layout and reduced cognitive load mean that users can navigate the website more efficiently and with greater satisfaction.

In terms of accessibility, the new website now fully meets WCAG 2.1 AA standards, ensuring inclusivity for users with diverse abilities. Adjustments, such as enhanced contrast ratios and improved keyboard navigation, contributed to this accomplishment, allowing individuals with visual or motor impairments to navigate the site more effectively. Notably, empirical data from accessibility testing confirmed the effectiveness of these adjustments, which surpassed the standards set by the European Accessibility Act. In addition, feedback from a small group of users with disabilities confirmed that the new website provides a more inclusive and welcoming experience than the previous version.

Overall, the combined insights from heuristic evaluations and usability testing underscore the project's success in transforming the Satakunta Student Nation website into a more usable, accessible, and visually appealing platform. These empirical findings validate the design and technical choices made during development, demonstrating the significant impact of the redesign on both user experience and satisfaction.

5.2 Addressing the Initial Problems

This chapter reflects on the challenges identified at the start of the project, evaluating how each issue was addressed through design and development decisions. It also discusses lessons learned, focusing on unexpected challenges and the adaptations made to ensure project success.

5.2.1 Problem Resolution

The previous website had a cluttered layout and unintuitive navigation, making it difficult for users to locate key resources like contact information and event details. This issue was resolved by implementing a streamlined menu structure, intuitive layout, and consistent navigation paths. New visual hierarchy principles guide users to essential sections, reducing the time spent searching for information.

Accessibility was a major concern, particularly for users with visual, auditory, and cognitive impairments. The redesign incorporated WCAG 2.1 AA standards, enhancing accessibility through high-contrast design, keyboard navigation, and screen reader compatibility. Tools like WAVE and IBM Equal Access were used to ensure compliance, effectively resolving previous barriers to accessibility.

Only one member of the organization had the technical skills to maintain the old website, creating risks for long-term sustainability. This was addressed by transitioning to a Next.js framework paired with a user-friendly Directus CMS. Now, content management can be handled by officers with minimal technical experience, ensuring ongoing site upkeep and continuity as team members change.

The previous site had suboptimal performance scores and security vulnerabilities due to outdated frameworks and dependencies. By using Firebase for hosting and implementing Google Lighthouse metrics in the CI/CD pipeline, the developers were able to better monitor and optimize the website, improving the scores, although further optimization is still needed.

5.2.2 Challenges and Solutions

During the project's development, several challenges emerged that required adaptability and creative problem-solving:

- **Stakeholder Consensus on Design Choices:** A primary challenge involved balancing accessibility compliance with stakeholders' design preferences, particularly with the color palette, as the organization's official colors did not meet contrast requirements. This was resolved by slightly adjusting the color palette to meet WCAG standards while keeping the overall aesthetic aligned with the organization's brand.
- **Calendar Component Styling:** Styling the react-fullcalendar component was challenging, as its default styles limited flexibility. Custom CSS overrides and classing techniques are being investigated as a possible solution to maintain consistent aesthetics and functionality.
- **Spam Prevention in Form Submissions:** With an increase in user engagement, preventing spam submissions became essential. Google reCAPTCHA v3 was implemented

alongside honeypot fields for additional security. This solution should effectively reduce spam without adding friction for legitimate users.

- **Volunteer Availability and Task Distribution:** Due to the volunteer nature of the project team, availability fluctuated, especially when the UX/UI designer was unavailable for two months. Responsibilities were redistributed, with the lead developer assuming design duties temporarily. This flexibility kept the project mostly on track, minimizing delays despite resource limitations.

5.3 Limitations of the Project

The products' initial scope was defined clearly during the project planning phase. Because of this, the team has been able to eliminate scope creep, while keeping a backlog of additional features requested by the nation or its members. This includes features like:

- A library management system
- Photo gallery
- Games

Several constraints that impacted the project scope and implementation including:

- **Volunteer-Based Development Constraints:** The reliance on volunteers limited availability for regular meetings and consistent contributions. Consequently, the project adopted a loosely structured Agile approach with monthly sprints, allowing progress but limiting the depth and breadth of certain features.
- **Time Constraints:** Given the anticipated graduation and other commitments of team members, some additional features (e.g., a library management system and photo gallery) were postponed. These limitations required the team to prioritize core functionalities and defer non-essential features for future development phases.
- **Technical Scope Constraints:** Due to time and resource constraints, the team chose not to implement complex backend systems, opting instead for Firebase hosting and Directus CMS integration. While this achieved the project goals, the reliance on third-party tools limits its future customization compared to a fully custom backend solution.
- **Learned User Behavior:** Long-time users accustomed to the old website design encountered a learning curve with the new layout and navigation. Despite positive feedback on improvements, some users expressed initial confusion navigating the updated structure. This adjustment period underscores the need for ongoing support as users become familiar with the new site.

5.4 Recommendations for Future Work

This chapter offers recommendations for ongoing improvement and maintenance of the website, including suggestions for future testing, additional features, and strategies for sustainable site management. It also outlines potential expansions to ensure the website continues to meet user needs and organizational goals.

5.4.1 Further Development and Features

Future development should focus on additional functionalities and improvements, including the library management system, photo gallery, and games. These are currently scheduled to be worked on in Q2 2025 by the same team that lead the design and development of the new website. The aim of these supplementary features are as follows:

- **Library management system:** The implementation of a library management system could ease some of the burden currently placed on the nation's librarians and historians while encouraging nation members and alumni to learn more about the nation's rich history.
- **Photo gallery:** A photo gallery to show off the nation's members and events would function both as a resource for nation members, as well as serve as marketing for potential new members.
- **Games:** Including fun, interactive elements like games and leaderboards could foster friendly competition and increase member involvement.

5.4.2 Future Testing and Evaluation

Post-launch, additional usability testing and subsequent iteration should be conducted with a broader user base. Gathering feedback through surveys and A/B testing can guide iterative improvements. It is also recommended to conduct ongoing accessibility audits, ideally annually, to ensure the site continues to meet WCAG and EAA standards.

Routine content updates will also be essential to keep the website relevant and up to date. To maintain content quality and relevance, training material for the CMS needs to be created and provided to the relevant nation officials who would be updating the site's content (e.g. advertisement secretaries, member secretaries). In addition to the material, training sessions should be held, perhaps bi-annually, for new content managers.

5.4.3 Future Maintenance

Comprehensive training materials and documentation should be drawn up before final delivery to provide to future web administrators. Training sessions should occur over multiple sessions in the

first three months of the new web administrators volunteer period. This is to ensure future maintenance of the site goes smoothly as the old web administrators graduate and pass on their title. While the site's repository is set up to auto update dependencies, run unit tests, deploy demo sites, and ensure code formatting, future maintenance is still needed.

To sustain the site's usability and accessibility regular updates and audits will be essential. Recommendations for future maintenance include accessibility audits and content updates mentioned above. Additionally, continual performance monitoring should be conducted to optimize loading times and ensure the site remains no-cost to the nation.

5.5 Final Remarks and Reflections

The Satakunta Student Nation new website has achieved significant milestones, fundamentally reshaping the organization's digital presence into an accessible, inclusive, and engaging platform that will serve current members, prospective members, and alumni for years to come. This project demonstrates how a commitment to accessibility, usability, and forward-thinking design can profoundly impact an organization's relationship with its community, building a stronger, more connected network.

This new site was not just a technical update; it was a reimagining of how the Satakunta Student Nation connects with its diverse audience. By embracing WCAG 2.1 AA standards and adopting best practices in user-centered design, the project reflects the organization's dedication to inclusivity and its readiness to adapt to the evolving needs of its community. The decision to overhaul outdated navigation structures, enhance accessibility features, and improve content management reflects a strategic vision that goes beyond immediate improvements—it establishes a sustainable foundation for future growth and adaptability.

Reflecting on the journey, several key lessons emerged. First, the importance of iterative, user-centered design cannot be overstated. Consistently gathering user feedback and adjusting based on real-world interactions allowed the team to address specific pain points while fostering a product that resonates with its users. The improvements in task completion times, usability scores, and accessibility metrics validate the effectiveness of this approach, showing the power of thoughtful, data-driven design in creating a seamless user experience.

Secondly, flexibility in project management was crucial, especially in a volunteer-driven setting. The Agile-inspired approach allowed the team to accommodate varied availability and expertise levels among contributors. The project's success speaks to the dedication of the volunteers and their adaptability, qualities that drove the project forward despite the inherent constraints. This

experience highlights the value of collaborative, resilient project management practices in similar community-based or volunteer-driven projects.

Another invaluable takeaway was the balance between accessibility compliance and aesthetic appeal, a challenging yet rewarding aspect of the design process. By carefully navigating stakeholder preferences and accessibility standards, the team created a visually cohesive and compliant website that faithfully represents the vibrant community it serves. This balancing act drives the importance of prioritizing accessibility in digital design, reinforcing that inclusivity can coexist with appealing aesthetics when given thoughtful consideration.

Looking forward, the new website is not a static endpoint but a dynamic platform with the potential to evolve alongside the organization's needs. Future enhancements—such as the planned library management system and interactive features—will only add to the website's role as a living resource, empowering the Satakunta Student Nation to remain adaptable, engaged, and inclusive. The groundwork laid here equips future administrators to manage content and functionality confidently, ensuring that the platform remains a relevant, responsive asset to the community.

In sum, the success of this project reaffirms the transformative impact that an accessible, user-friendly website can have on an organization's culture, communication, and community engagement. The redesigned Satakunta Student Nation website stands as a testament to what can be achieved through a shared vision, commitment to user-centered design, and the dedication of those who worked to bring it to life. By fostering a deeper sense of belonging and accessibility, this project not only meets the immediate needs of its users but also positions the Satakunta Student Nation for continued success and unity in the digital era.

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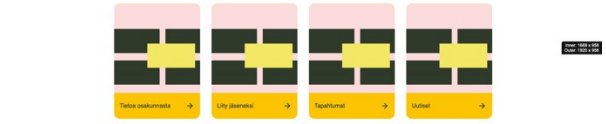
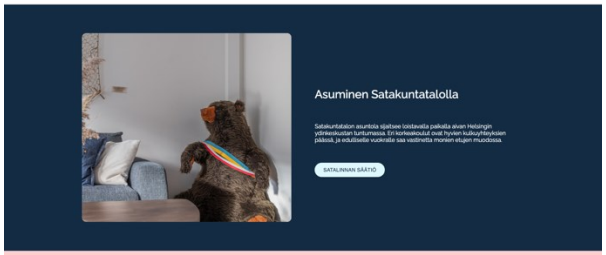
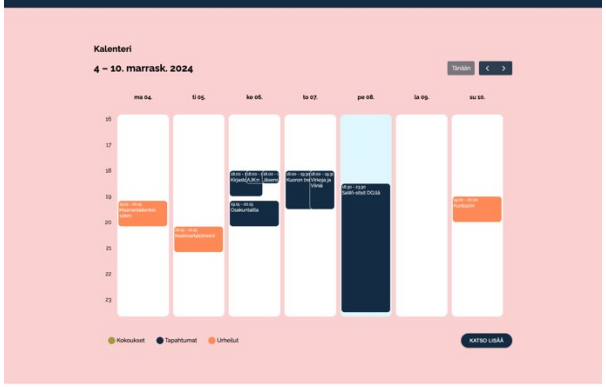
Appendices

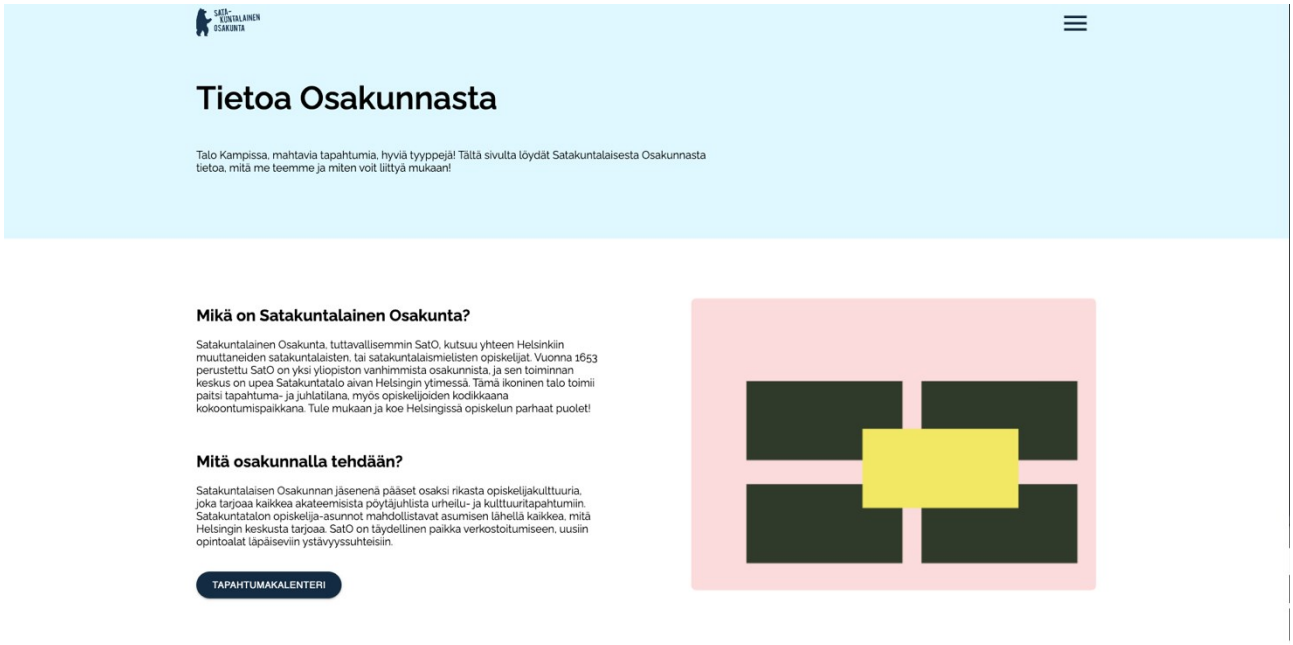
Appendix 1. Satakunta Student Nation Homepage



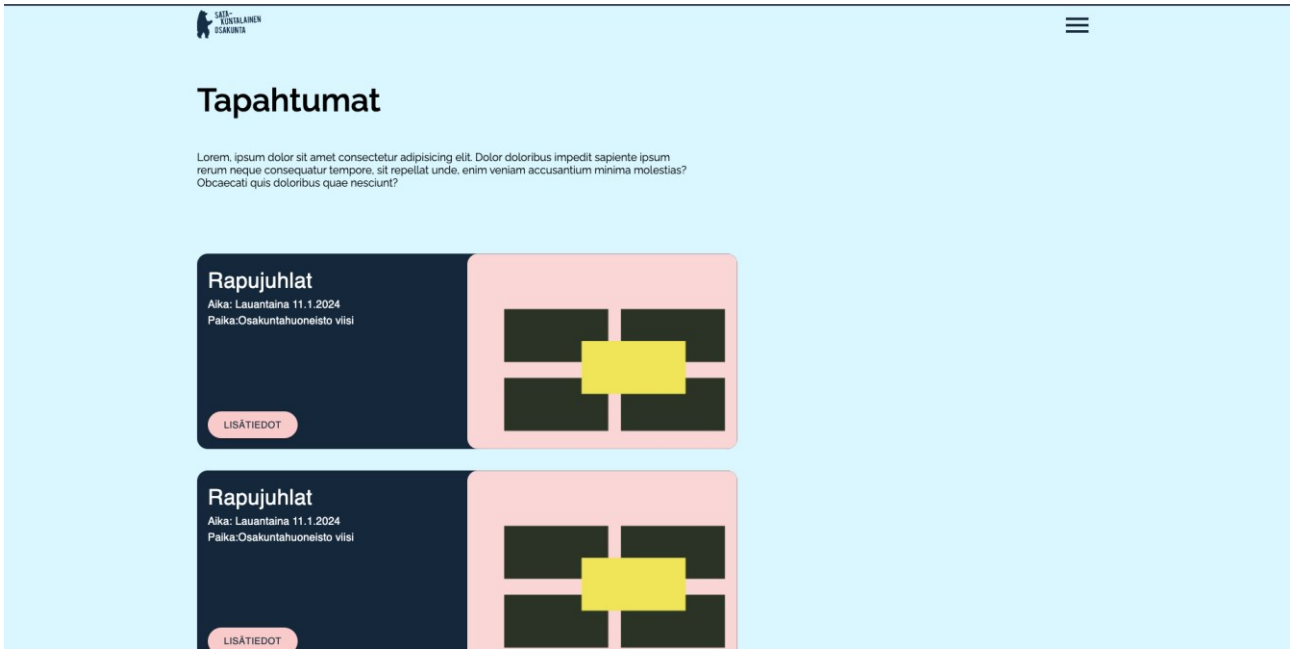




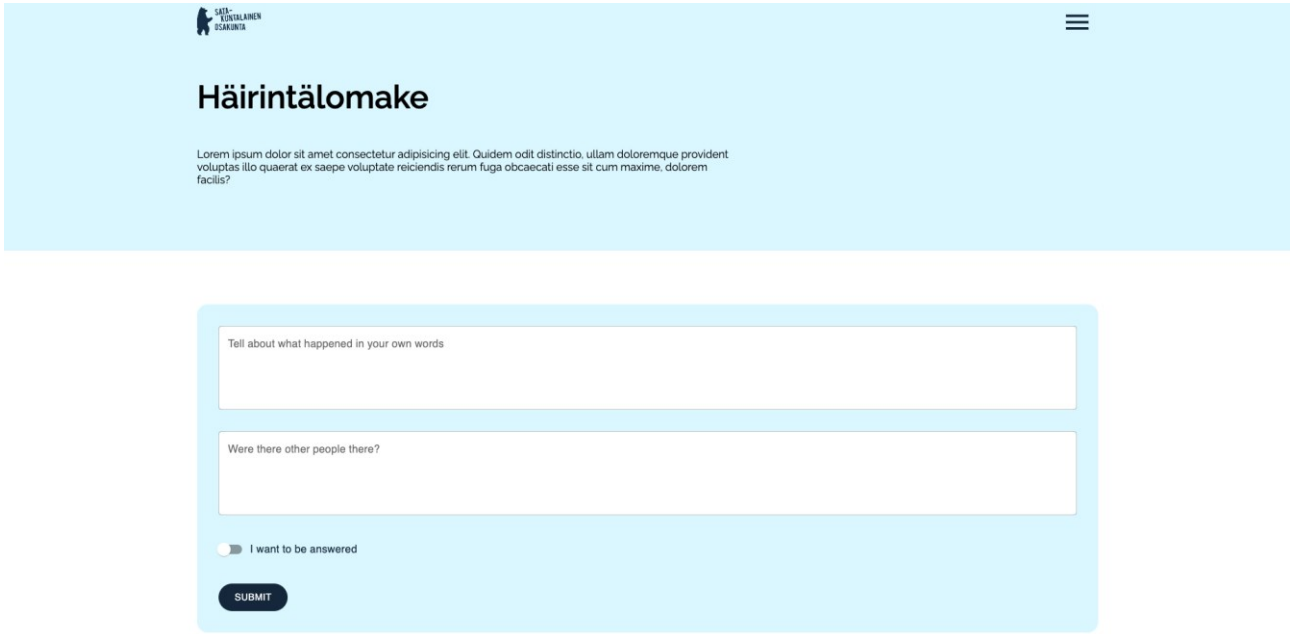
Appendix 2. Info Page Layout



Appendix 3. Card Page Layout



Appendix 4. Form Page Layout



Appendix 5. Language Context

```tsx
export type Language = "fi" | "sv" | "en";

// Define the context type
interface LanguageContextType {
  language: Language;
  setLanguage: (lang: Language) => void;
}

// Create the context
export const LanguageContext = createContext<LanguageContextType | null>(null);

// Create a provider component
export const LanguageProvider: React.FC<{ children: ReactNode }> = ({
  children,
}) => {
  const [language, setLanguage] = useState<Language>("fi");
  const value = useMemo(
    () => ({ language, setLanguage }),
    [language, setLanguage],
  );

  return (
    <LanguageContext.Provider value={value}>
      {children}
    </LanguageContext.Provider>
  );
};

// Custom hook to use the language context
export const useLanguage = () => {
  const ctx = useContext(LanguageContext);

  if (ctx === null) {
    throw new Error("could not find LanguageContext");
  }

  return ctx;
};
```

Appendix 6. CMS Client

```
import { TranslationKey } from "@/hooks/useTranslate";
import { createDirectus, rest } from "@directus/sdk";

type Schema = {
  NavigationLink: NavigationLink[];
  Contact: Contact[];
  Translation: Translation[];
};

export type NavigationLink = {
  label_key: TranslationKey;
  url: string;
  category: "GENERAL" | "FOR_MEMBERS";
};

export type Contact = {
  label_key: TranslationKey;
  first_name: string;
  last_name: string;
  contact: string;
  id: number;
};

/*
 * You shouldnt use this type, use the better typed one in useTranslate.tsx instead
 */
export type Translation = {
  key: string;
  fi: string;
  en: string;
  sv: string;
};

const createClient = () => {
  if (process.env.DIRECTUS_URL === undefined) {
    throw Error("Environment variable DIRECTUS_URL not defined");
  }
  return createDirectus<Schema>(process.env.DIRECTUS_URL).with(rest());
};

export default createClient;
```

Appendix 7. Use Translation

```
import translations from "./translations.json";
Click to collapse the range.
, useLanguage } from "../lib/LanguageContext";

export type TranslationKey = keyof typeof translations;

const translate = (key: TranslationKey, language: Language): string => {
  const translation = translations[key];

  if (translation === undefined) {
    throw new Error(
      `Could not find translation ${key} (try running "npm run fetchTranslations")`,
    );
  }

  return translation[language];
};

const useTranslate = () => {
  const { language } = useLanguage();
  return (key: TranslationKey, languageOverride?: Language) =>
    translate(key, languageOverride ?? language);
};

export default useTranslate;
```

Appendix 8. Time to Task Data

	TS1	TS2	TS3	TS4	TS5
Task 1 (old)	26	21	10	19	15
Task 2 (old)	29	16	10	263	78
Task 3 (old)	12	8	12	7	9
Task 4 (old)	29	28	9	36	8
Task 1 (new)	9	7	6	4	6
Task 2 (new)	16	15	10	20	25
Task 3 (new)	7	3	5	2	4
Task 4 (new)	7	6	6	11	18

Appendix 9. Heuristic Evaluation Data

	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10
Old Site	8	8	5	8	9	7	7	8	8	9
Old Site	8	10	7	10	10	10	10	7	10	10
Old Site	8	10	9	8	6	7	2	2	5	9
Old Site	10	10	10	10	10	10	1	7	7	10
Old Site	4	5	3	5	5	3	5	3	5	3
New Site	8	9	7	9	10	8	9	9	9	9
New Site	9	10	10	10	10	9	10	10	10	10
New Site	9	10	10	10	10	10	10	9	10	10
New Site	10	10	10	10	10	10	1	10	10	10
New Site	9	10	10	10	10	10	8	8	10	10