2024

TRU RESEARCH HUB KIOSK APP

PROJECT PROPOSAL

PREPARED BY
ROODS PIERRE -T00653099

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1. Introduction

Name: Roods Bensly Pierre

Student #: T00653099

Program: Bachelor of Science

Major: Computer Science

Institution: Thompson Rivers University

Background and Specialties:

I am a final year Computer Science student with a focus on mobile and web application development. Through my coursework at TRU and my recent co-ops in software development, I have gained extensive experience in full-stack development, with proficiencies in modern technologies such as HTML5, CSS3, JavaScript, and frameworks like React.js and Angular. I also have expertise in backend development and database management with Firebase, Oracle and MySQL as well as expertise in building applications using Microsoft Power Platform using PowerFx, YAML and JSON.

2. Problem Statement

The TRU Research Hub currently uses a paper sign-in sheet to track visitors, which presents several issues. With many visits each day, manual data entry becomes time-consuming and prone to errors. Additionally, visitors often neglect to fill out the sheet due to its inconvenience, leading to incomplete records. This lack of comprehensive data hampers the hub's ability to accurately report visitor statistics and maintain accountability. Here is a more the detailed breakdown of the challenges attributed to the manual sign-in sheet:

1. **Manual Data Entry**: Staff members must spend significant time transcribing handwritten entries into digital formats, which is both inefficient and error prone.
2. **Visitor Compliance**: Visitors may not see the sign-in sheet or might find it cumbersome to fill out, resulting in incomplete data collection.

3. **Data Accuracy**: Handwritten entries can be illegible, and transcription errors further reduce data accuracy.
4. **Reporting**: Incomplete and inaccurate data complicates the process of generating reports for accountability and resource allocation.

The introduction of a digital sign-in/sign-out kiosk application on a mobile tablet aims to address these problems by automating visitor tracking, reducing manual entry, and improving data accuracy and accessibility.

The challenge lies in creating a cross-platform application that runs efficiently on mobile tablets and web browsers to serve as a sign-in/sign-out kiosk that will involve ensuring seamless integration with existing systems, maintaining user-friendly interfaces, and adhering to data privacy and security standards. This project will leverage the Microsoft Power Platform and Power Apps, as TRU Research Hub already utilizes the Microsoft 365 suite.

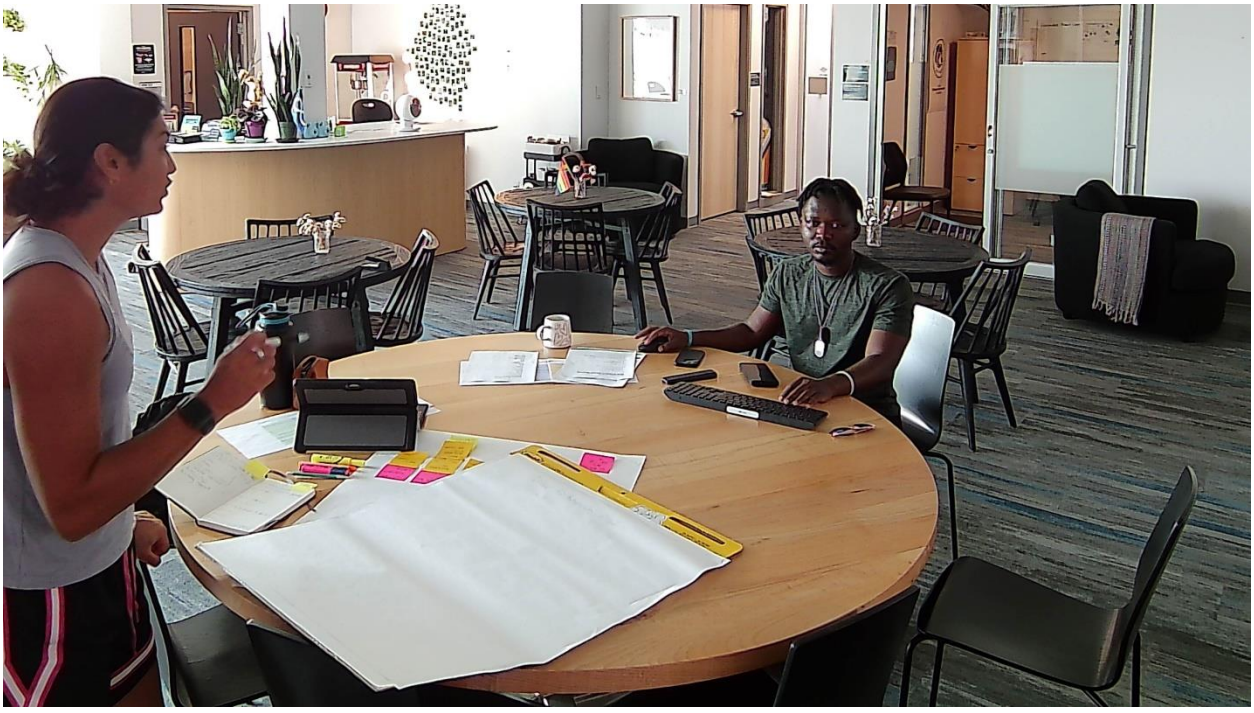
3. Motivation

Having been a frequent user of the Research Hub, I know from personal experience that the current sign-in sheet has been a hassle for both visitors and staff. Through my involvement at the Research Hub, I learned that the staff was actively looking for a software solution to streamline the sign-in/sign-out process but many of the available software were either too complex or too expensive. This fueled the idea for the development of this project.

Additionally, this project aligns with my interest in creating practical technology solutions that improve operational efficiency and user experience. Having worked extensively with mobile and web applications, I am motivated to apply my skills to develop a solution that will have a tangible impact on the TRU Research Hub.

Lastly, proficiency with the Power Platform has been a key being highlighted by employers in my recent job hunt. This project offers an opportunity to demonstrate my ability to leverage the Power Platform to design and implement a cross-platform application that integrates with existing organizational systems. It also addresses a real-world need for improved visitor tracking and data management, enhancing the hub's operational efficiency and reporting capabilities.

4. Brainstorming Session and Summary



The TRU Research Hub team believes in gathering student input in the development of their projects. In the conception of this project, a group of students in the Student as Partners Fellowship (SPF) program were made available to give their input and brainstorm what the ideal sign-in system would entail. During the brainstorming sessions, several ideas were discussed with peers, potential users, and stakeholders. The key points included:

- Ensuring the application has an intuitive interface to encourage visitor engagement.
- Integrating the application with Microsoft 365 for seamless data synchronization.
- Implementing security measures to protect visitor data.
- Designing the application to be adaptable for various screen sizes and devices.
- Gathering continuous feedback from users to refine and improve the application.

The consensus was to utilize Microsoft Power Apps due to its robust integration capabilities with the Microsoft 365 suite, ease of development, and ability to create responsive, cross-platform applications which easily integrates with the systems at TRU.

5. Research

5.1.1. Background Knowledge

Visitor Managements Systems (VMS) have become commonplace in many organizations. These systems have evolved significantly, especially since the COVID-19 pandemic. There are many reasons why an organization would use a VMS such as contact tracing, security and accountability. Alkhodary et al. (2022) highlight that VMS can enhance security & safety and efficiency by automating the visitor registration process, reducing manual data entry, and ensuring accurate visitor tracking. They emphasize the importance of integrating such systems to minimize physical contact and streamline operations.

User-centered design (UCD) is critical in application development. According to Omonigho (2023), UCD focuses on designing applications that cater to the needs, preferences, and limitations of end-users, enhancing overall usability and satisfaction. This approach is supported by Nielsen (2012), who emphasizes that user-centered design significantly improves user satisfaction and product effectiveness. To ensure the development of this application meets user needs and industry standards, extensive research was conducted on existing visitor management systems, user-centered design principles, and relevant technologies. This research provides the foundation for developing a visitor management system that enhances user experience, accessibility, and functionality.

An analysis of commonly available task management applications suggests that effective visitor management tools should provide intuitive interfaces, seamless data synchronization, and robust accessibility features, ensuring all visitors, including those with disabilities, can easily interact with the kiosk.

Oktaviandri and Foong (2019) further discuss the critical aspects of designing and developing VMS, noting that these systems must be user-friendly and capable of handling high visitor volumes. Their research underscores the importance of real-time data processing and integration with other systems to improve the overall visitor experience and operational efficiency.

Studies have shown that users prefer having access to their applications across multiple devices, as it enables better task continuity and flexibility. Petcu, Frunzete, and Stoichescu (2023) highlight the importance of providing web-based and decentralized applications that offer

flexibility and accessibility. Leveraging Microsoft Power Platform allows for creating applications that can be accessed anytime, anywhere, ensuring a seamless user experience.

Incorporating these design principles into the kiosk app will not only meet the functional needs of users but also provide a superior user experience that enhances engagement and satisfaction. Key aspects include:

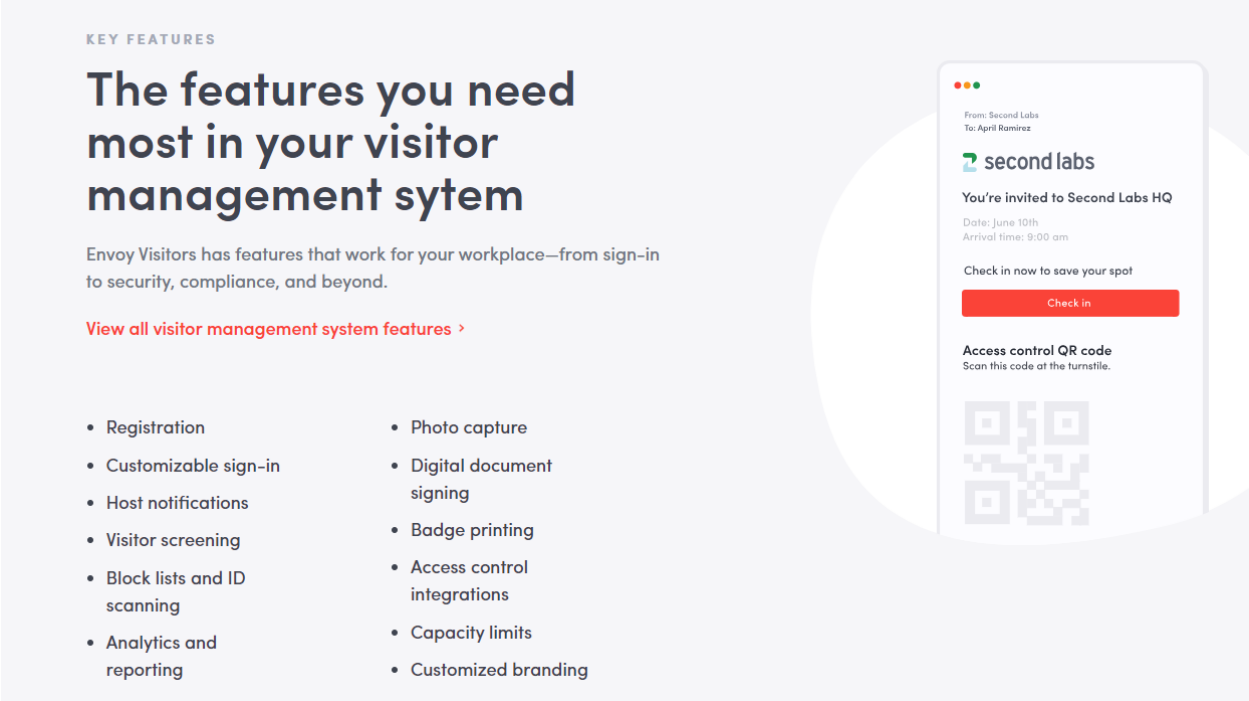
- Ease of Use: Ensuring that the interface is straightforward and easy to navigate, with clear instructions and minimal learning curve (Nielsen, 2012).
- Consistency: Maintaining a consistent look and feel across all platforms to help users seamlessly transition between devices (Garrett, 2011).

In essence, the studies highlighted in this research indicate a strong preference among users for accessing applications across multiple devices. This preference is driven by the need for better task continuity and flexibility, enabling users to maintain productivity regardless of the device they are using. Furthermore, user-centered design significantly impacts the effectiveness of applications, emphasizing the need for designs that cater to the specific needs and behaviors of users.

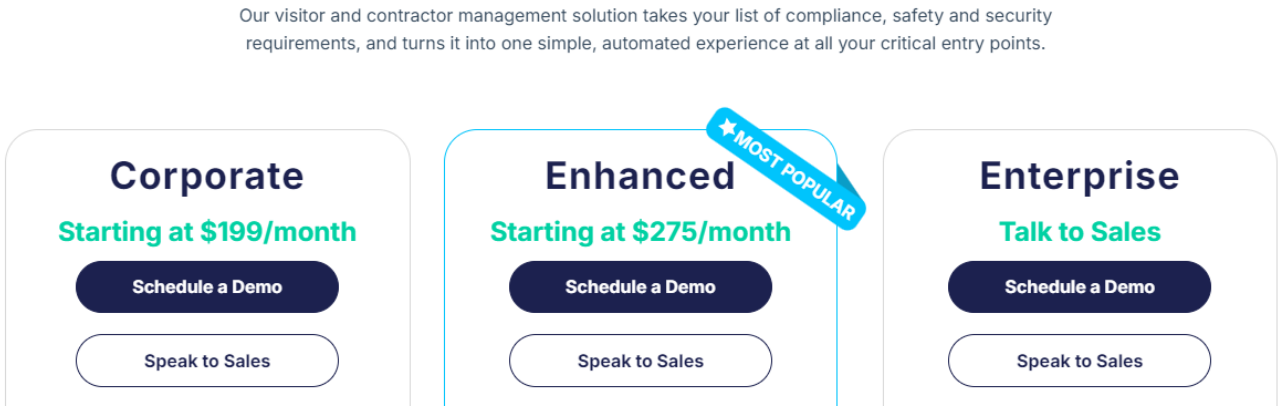
5.1.2. Existing Products:

Several visitor management applications, such as Envoy, iLobby and Proxyclick offer cross-platform access, allowing users to access their tasks from any device. These applications have set a standard for cross-platform functionality and user experience. The Research Hub Kiosk aims to not only match but also enhance these standards by providing additional features that are specific to the research hub.

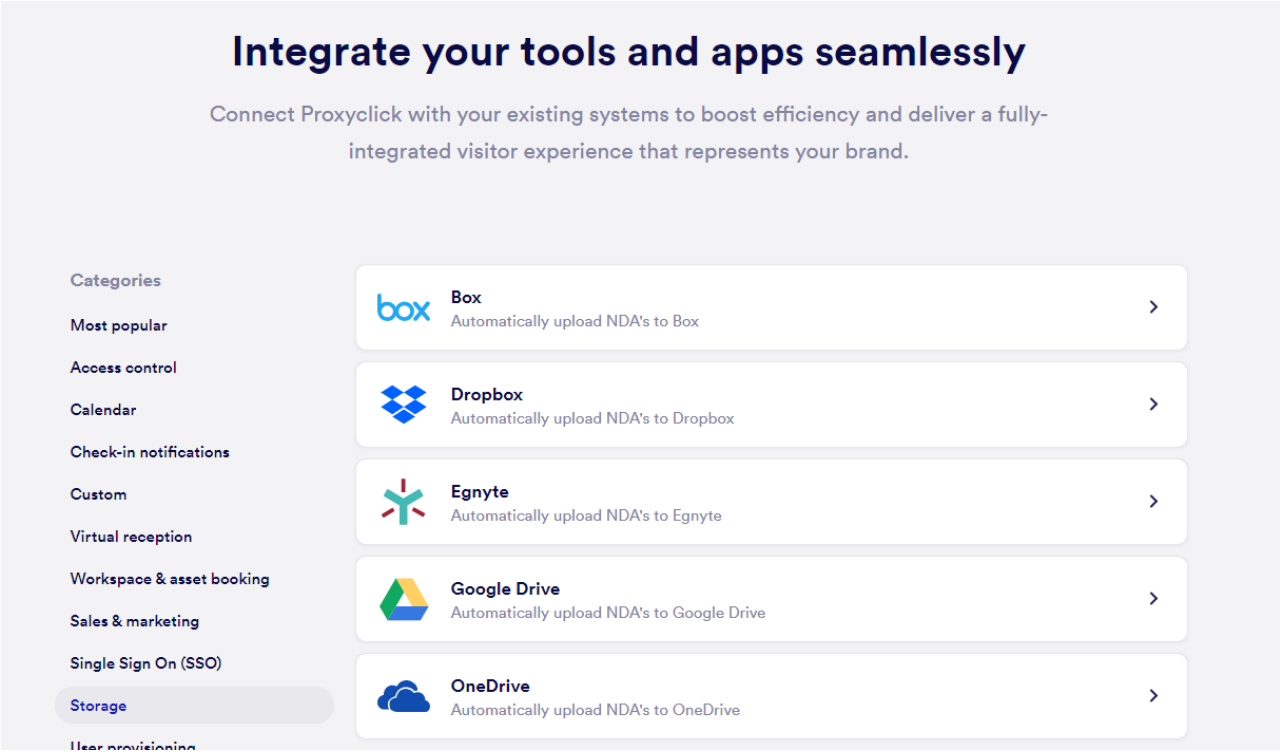
- Envoy offers a comprehensive VMS with features such as visitor sign-in, badge printing, and visitor notifications (Envoy, 2024). While robust, Envoy is primarily geared towards large enterprises and may be more complex than necessary for the TRU Research Hub.



- iLobby provides visitor tracking, compliance management, and security features (iLobby, 2024). However, it requires a subscription and lacks the customization and flexibility provided by Microsoft Power Apps.



- Proxyclick focuses on visitor management with a strong emphasis on security and compliance (Proxyclick, 2024). It offers integration with various enterprise tools but may not integrate seamlessly with Microsoft 365.



6. Support (Service/Solution)

The TRU Research Hub kiosk application will provide the following support/services:

- **Automated Sign-In/Sign-Out**: Streamlining the process for visitors, reducing manual data entry which is often time-consuming and prone to errors. Automated systems ensure that all entries are legible and correctly formatted, improving the overall accuracy of visitor logs. Furthermore, an automated sign-in/sign-out process minimizes the workload for staff, allowing them to focus on more critical tasks. This feature will also enhance visitor compliance as the digital interface can be more visible and engaging compared to traditional paper sheets.

- **Data Synchronization**: Real-time updates and synchronization with Microsoft 365 for efficient data management. This synchronization facilitates efficient data management, allowing staff to access and analyze visitor information promptly and accurately. Real-time updates eliminate the risk of data loss or discrepancies, ensuring that the hub maintains a comprehensive and reliable record of all visitors.

- **Reporting and Analytics**: Utilizing Microsoft Power BI for generating insightful reports on visitor data. These insights are invaluable for making informed decisions regarding resource allocation, staffing, and operational improvements. Comprehensive reporting also enhances accountability, as detailed logs and analytics can be used to demonstrate compliance with regulatory requirements and organizational standards.

- **Enhanced Engagement**: An intuitive interface that encourages visitors to sign in and out, ensuring complete and accurate visitor logs. By providing a user-friendly experience, the application ensures that visitors are more likely to comply with sign-in/sign-out procedures. Features such as touch-screen compatibility, clear instructions, and interactive elements make the process straightforward and engaging. Enhanced engagement not only improves data accuracy but also ensures that visitors feel welcomed and valued during their visit to the hub.

7. Technical Feasibility

The technical feasibility of the TRU Research Hub kiosk application is underpinned by the robust capabilities of Microsoft Power Platform and its seamless integration with Microsoft 365. By leveraging Microsoft 365 Dataverse for data storage, the kiosk application will integrate seamlessly with the web, ensuring data consistency and real-time updates with the following technologies:

- **Microsoft Power Apps**: Power Apps will be used to build the cross-platform application, providing a responsive and dynamic user interface that can be accessed on various devices, including mobile tablets.
- **Microsoft Power Automate**: For workflow automation and data integration.
- **Microsoft Dataverse**: For secure data storage and management.
- **Microsoft Power BI**: Power BI enables advanced data analytics and reporting. By integrating Power BI, the application can generate detailed reports and visualizations that provide actionable insights into visitor patterns and hub operations.

8. Usability and User Experience Goals

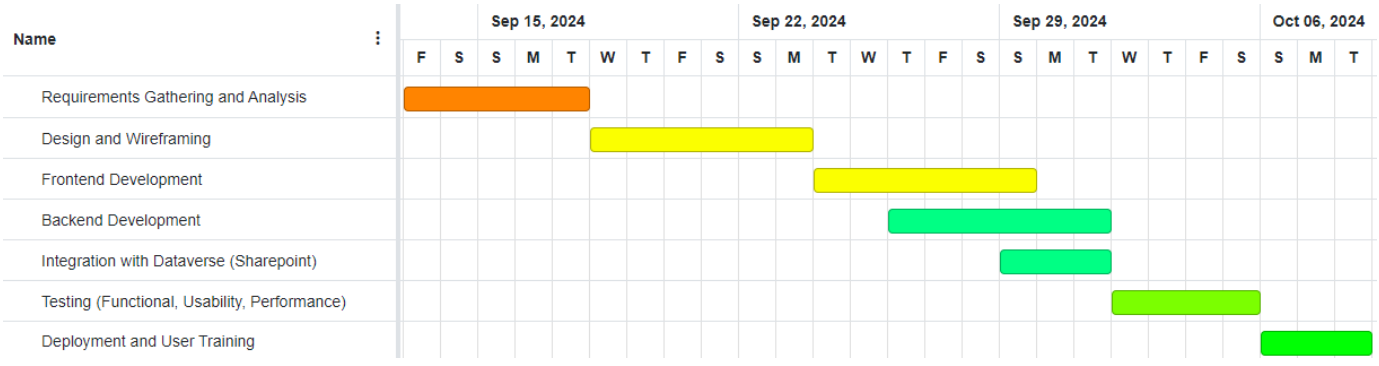
The target user for this system will include both visitors to the Research Hub and the staff members who manage the sign-in process. Therefore The usability and UX goals are centered around creating an intuitive and user-friendly interface. The kiosk app will adhere to the following goals:

- **Effectiveness & Efficiency**: The interface should be intuitive, with clear instructions and minimal steps required to complete the sign-in/sign-out process *effectively*.
- **Learnability & Memorability**: Visitors tend to become regular users over time, so the kiosk should be *easy to learn* for first-time users while offering an efficient and familiar experience for repeat visitors.
- **Efficiency**: The kiosk should reduce duration of the user sign in process.
- **Engaging**: The design should be *engaging*, interactive and user-friendly, encouraging visitors to complete the sign-in/sign-out process without hesitation.

9. Project Plan

The project plan for developing the TRU Research Hub kiosk application is structured to ensure systematic progress and timely completion. The project spans five weeks, beginning with requirements gathering and analysis in week one. Weeks one and two focus on design and wireframing, followed by frontend development in weeks two and three. Backend development occurs in weeks three and four, with integration of Microsoft 365 services in week four. Testing for functionality, usability, and performance is also conducted in week four, culminating in deployment and user training at the end of week five. This structured approach ensures that all aspects of the project are addressed comprehensively, leading to a robust and user-friendly application.

Week	Deliverable
1	Requirements Gathering and Analysis
1-2	Design and Wireframing
2-3	Frontend Development
3-4	Backend Development
4	Integration with Microsoft Dataverse (SharePoint, etc.)
4	Testing (Functional, Usability, Performance)
4-5	Deployment and User Training



10. Conclusion

The TRU Research Hub Cross-Platform Sign-In/Sign-Out Kiosk project aims to address significant issues related to manual data entry, visitor compliance, data accuracy, and reporting through the development of a digital kiosk application. Extensive research on existing visitor management systems and user-centered design has informed the development process, ensuring that the application meets industry standards and user expectations.

By leveraging the robust capabilities of Microsoft Power Platform and its seamless integration with Microsoft 365, this project will automate visitor tracking, reduce manual entry, and improve data accuracy and accessibility. The application will enhance operational efficiency and user experience, providing an intuitive, secure, and user-friendly interface that meets the diverse needs of the Research Hub's stakeholders.

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