Individual Learning Project

Proposal for a Real-time Web Application for Monitoring and Resource Allocation in an Early Childhood Centre

February, 2024

Zhi Wang
1159798

Proposal for a Real-time Web Application for Monitoring and Resource Allocation in an Early Childhood Centre

Industry Overview

The selected organization for this project is an early childcare centre located in Auckland with a capacity of 70 children. The centre operates Monday to Friday from 7 am to 6 pm. It comprises two rooms: one for children under 2 years old (Tui Room) and another for those over 2 years old (Koru Room). The capacity of the under 2 room is 30 children, while the over 2 room can accommodate 40 children.

Parents have the flexibility to book morning sessions (any 4 hours between 7 am to 1 pm), afternoon sessions (any 4 hours between 1 pm to 6 pm), or full-day sessions (covering all hours between 7 am to 6 pm). This allows children to be dropped off or picked up at different times throughout the day to accommodate varying schedules.

As per the regulations set by the Ministry of Education, the teacher-child ratio must be 1 to 5 for the under 2 room and 1 to 10 for the over 2 room.

Problem Statement

The centre manager and head teachers must continuously monitor the real-time teacher-child ratio in each room and across the entire centre to ensure compliance with Ministry regulations. Due to the dynamic nature of children being dropped off, picked up, and absent throughout the day, this task becomes labour-intensive. Currently, they rely on manually counting children on attendance sheets, which are printed on paper and attached to clipboards. This process proves burdensome for teachers on the floor who are tasked with caring for and engaging with children while also maintaining educational environments to meet their diverse needs.

Additionally, the centre manager is responsible for ensuring the appropriate number of teachers is allocated to each room to maintain compliance with Ministry regulations regarding the dynamic teacher-child ratio throughout the day. This entails managing situations where there are fewer children present than expected, requiring the manager to redeploy surplus teachers to non-contact tasks or reduce the scheduled hours of relievers. Conversely, if there are more children present than anticipated, the manager must arrange for additional teachers or relievers to be deployed to the floor to ensure compliance with the mandated ratio. Currently, the centre manager relies on walkie-talkies to communicate with head teachers regarding the real-time

count of children and teachers. However, this method proves both time-consuming and ineffective as there are delays in head teachers reporting the numbers or the manager initiating inquiries in a timely manner. The consequence of this issue is twofold: there is a potential waste of human resources when there are surplus teachers on the floor during periods of low child attendance, or a breach of Ministry regulations may occur if there are insufficient teachers present to meet the required ratio.

The manager and head teacher aspire for an application to handle the counting tasks for them. This application would automatically monitor the attendance of children and teachers across all time slots throughout the day. Additionally, the manager hopes that the application can provide recommendations regarding the optimal number of teachers required on the floor at any given time.

Addressing the aforementioned issues would free up valuable time for the manager and head teachers, allowing them to focus on more essential management tasks and activities aimed at enhancing the wellbeing and development of the children under their care, rather than spending time on unnecessary counting duties. Furthermore, the centre can prevent the wastage of human resources by consistently maintaining the optimal number of teachers or relievers on the floor. Additionally, the centre can enhance compliance with Ministry regulations as the application facilitates real-time monitoring of the teacher-child ratio. This enables the centre to promptly adjust the number of teachers as needed to ensure adherence to regulations.

Solution Approach

To address the challenges faced by the early childcare centre and meet the objectives outlined, we propose the development and implementation of a comprehensive web application tailored to the specific needs of the organization. This application will automate the monitoring of the teacher-child ratio, streamline communication between staff members, and provide real-time insights to facilitate efficient resource allocation.

1. Parent-Child Sign-in interface

The web application will feature a user-friendly interface accessible via iPad displays placed outside each classroom. Parents will be able to sign in and sign out their children with a simple click of the buttons, providing real-time attendance data that is crucial for accurate monitoring of child numbers.

2. Database Management

A relational database will be implemented to store essential information such as child booking sessions, start and finish times, as well as teacher and reliever roster details. This database will serve as the backbone of the application, ensuring seamless data access and retrieval for all authorised users.

3. Real-time Monitoring of Teacher-Child Ratio

The proposed web application will incorporate features to automatically track the number of attending children and teachers in each room throughout the day. The application will calculate the current teacher-child ratio in real-time and display this information on a dashboard accessible to authorised personnel such as the manager, head teachers, and the administrator.

4. Dynamic Resource Allocation:

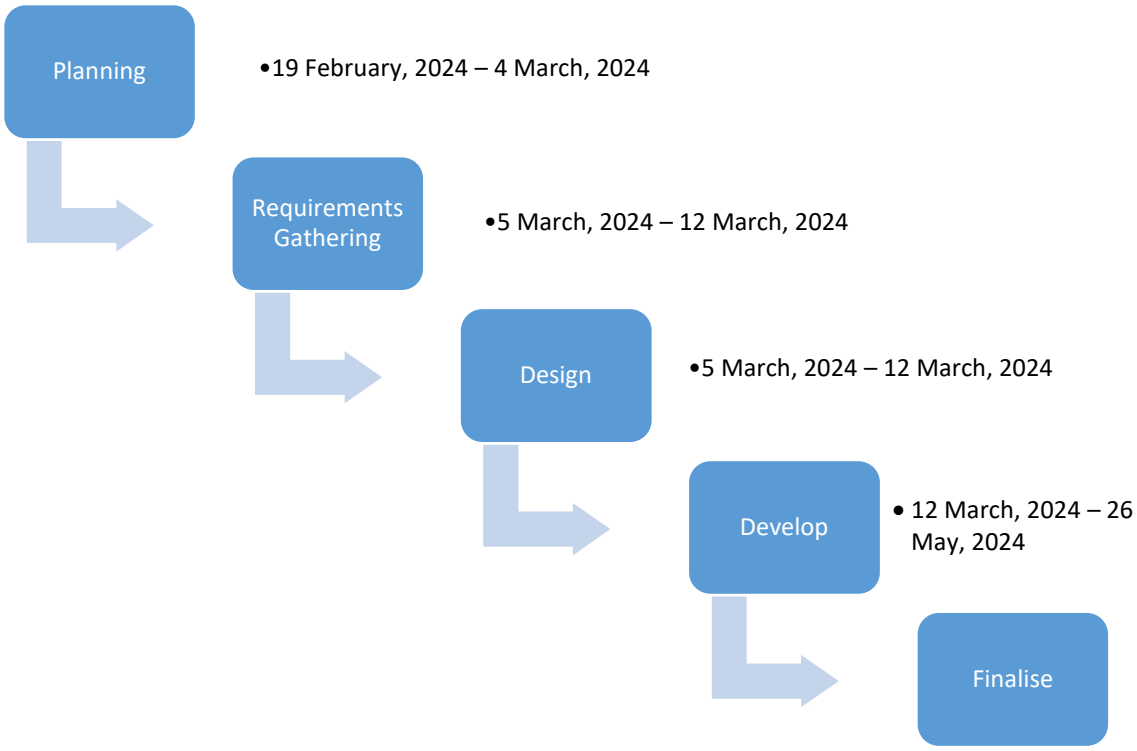
Utilizing data collected by the application, algorithms will be employed to analyse staffing needs based on the current number of attending children. The application will generate recommendations regarding the optimal number of teachers required on the floor at any given time, taking into account Ministry regulations and the specific capacities of each room.

5. User-friendly Interface and Accessibility:
The web application will feature a user-friendly interface designed to be intuitive and accessible to all parents and authorised staff members. The manager and administrator can easily access the application via computer or laptop desktop to view the dashboard and adjust the roster as needed. Parents can conveniently sign in and sign out their children using the iPad. Similarly, the head teacher can use the iPad to monitor the real-time ratio or correct any input errors made by parents.

Project Milestones

Week	Activity	Deliverables
1	Planning • Plan out project • Determine technologies to use and how to learn these	• Project Proposal
2	Requirements Gathering • Use different methods to gather requirements	• List of Functional and Non-Functional Requirements. • User Stories
3	Design • Design System • Design user interface • Design Database Structure	• User flow diagram • Wirefram es of screens • ERD design
4	Develop – Test - Deploy	• Code – test – deploy in PythonAnywhere • Get user feedback
5		
6		
7		
8		
9		
10		
11		
12	Finalise	• Deliver product

Project Milestones



Summary

In conclusion, the proposed web application offers a comprehensive solution to the challenges faced by the early childcare centre in monitoring teacher-child ratios and optimising resource allocation. By automating attendance tracking, streamlining communication, and providing real-time insights, the application will significantly reduce the administrative burden on centre staff and enhance compliance with Ministry regulations.

.