

OPTIMISATION OF PATIENT SCHEDULING AND FACILITY LAYOUT IN A DAY REHABILITATION CENTRE

Project Supervisor: Prof Tang Loon Ching

Industrial Supervisor: Mdm Loh Wei Chin

Group Members: Li Chenxi, Pei Chang Hong, Sylvester Chin Si Wei, Vo Hoang Khai, Wong Si Ying



Problem Overview



Singapore's ageing population brings about higher demand for rehabilitation services.

This project aims to help SACH DRC by revamping their scheduling process and proposing better facility layouts.



OBJECTIVES

To improve quality of outpatient rehabilitative services by:



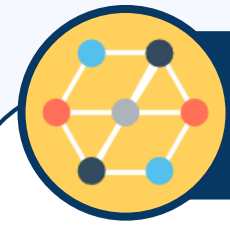
Reducing inefficiency in scheduling tasks



Enhancing patient therapy experience

KEY SKILLSETS

- ★ Project management concepts are applied to management of time and resources.
- ★ Software development skills and human factors engineering concepts used in the proposed scheduling system.
- ★ Knowledge in facility layout contributed to the designs of facility arrangements.



Project Methodology & Key Findings

METHODOLOGY



Problem Investigation

Identify key problems faced by the team



Data Collection

Gather information to serve as base case



Statistical Analysis

Analyse data and propose solutions



Develop Solutions

Evaluate outcomes of proposed solutions



User Feedback

Improve solutions based on user feedback

KEY FINDINGS

Problem 1:



Repetitive and time consuming scheduling process



Inconsistency in scheduling methods



Difficulty in balancing the team's workload

Problem 2:



Uneven utilisation of gym equipment due to suboptimal facility layout



Proposed Solutions

1. Integrated Scheduling System using Google Sheets

Automation of time consuming steps

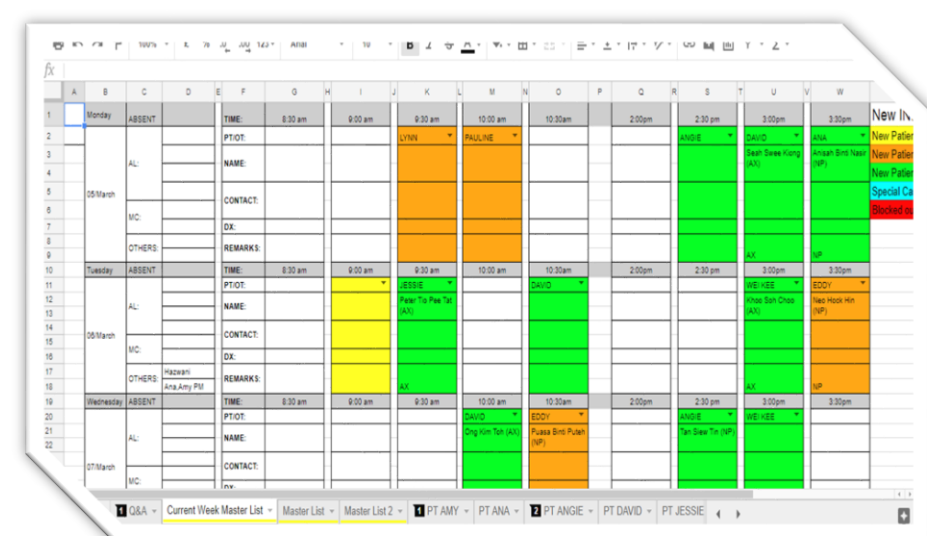
- ❖ Reduce time needed for scheduling

Standardisation of documentation

- ❖ Improves communication

Data Analytics Dashboard

- ❖ Provides manager with insights on operations and workload distribution



2. Optimal Facility Layout using Simulation

Process Layout

Machines with common functions are grouped

Product Layout

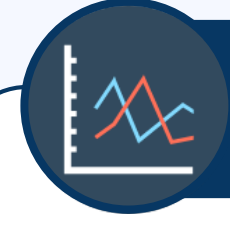
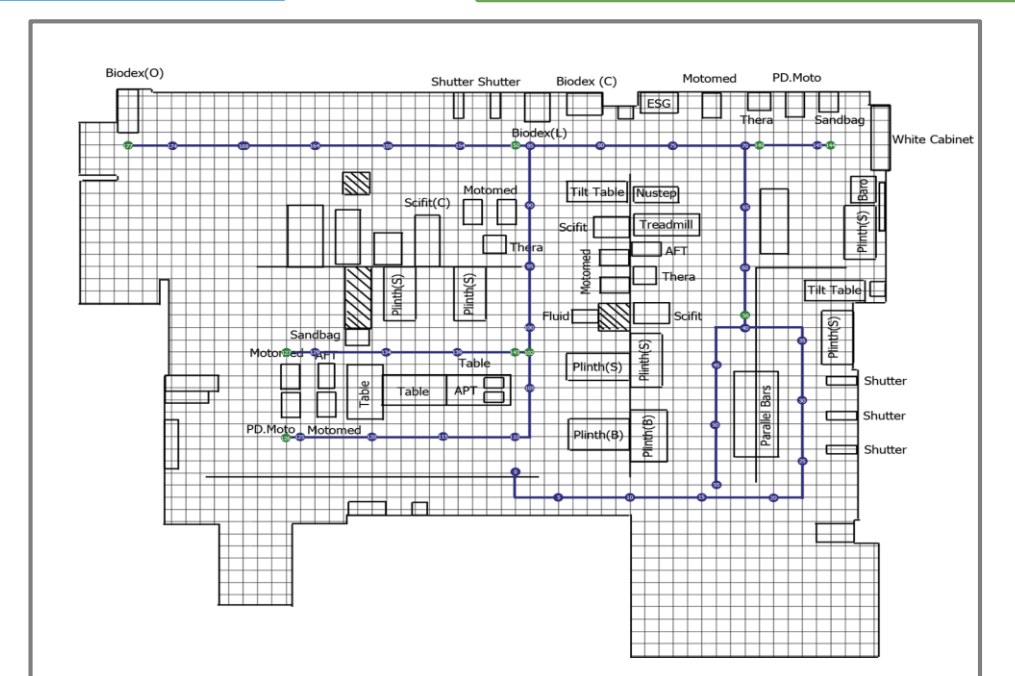
Machines are arranged in clusters according to patients' need

Group Technology

Dissimilar machines are grouped for patients with common needs

Simulation Approach

- I. Model equipment utilisation behaviour
- II. Calculated the average walking distance per patient per therapy session



Evaluation & Results

1. Improvement in Scheduling Tasks

From 120 mins to

↓59s

Allocating
new patients
(From 80s)

↓54s

Sorting
Therapist schedules
(From 60s)

37
mins

Total time spent/week

↓9s

Swapping
alternating patients
(From 10s)

↓4s

Opening
new slots
(From 6s)

2. Forecasted Improvement in Various Facility Layouts

Current walking distance per patient per session : 64.2m

Process Layout : 61.8m (↓4%)

★ Product Layout : 35.3m (↓45%)

Group Technology: 45.1m (↓30%)

↓45%

Overall decrease in walking distance

Future Directions

1. Build a demand forecasting model when more data on patient referral case is available
2. Expand simulation model to consider more patient types