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# Improve Space and Manpower Utilisation

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**PROBLEM STATEMENT**

From weeks 11 to 14, the library sees a surge in the percentage of hogged seats to up to 31% of its capacity, which diverts manpower from its main operations to deal with both the problem and complaints from users that ensue.

D.M.A.I.C

**OUR SOLUTION**

**Objective:** Decrease the % of hogged seats by creating a seat-hog free zone for users

**How does it work?** The area with cubicle-seats will be available for booking via a booking kiosk. Booking is made with users' matric cards to ensure efficient use of the system and to allow for punitive measures to be taken

**Impact:** Decrease in seat hogging, manhours needed, putting an opportunity cost of \$1,240/sem to better use

DEFINE

**WHAT ARE WE IMPROVING?**

Y: Library Seats Utilisation

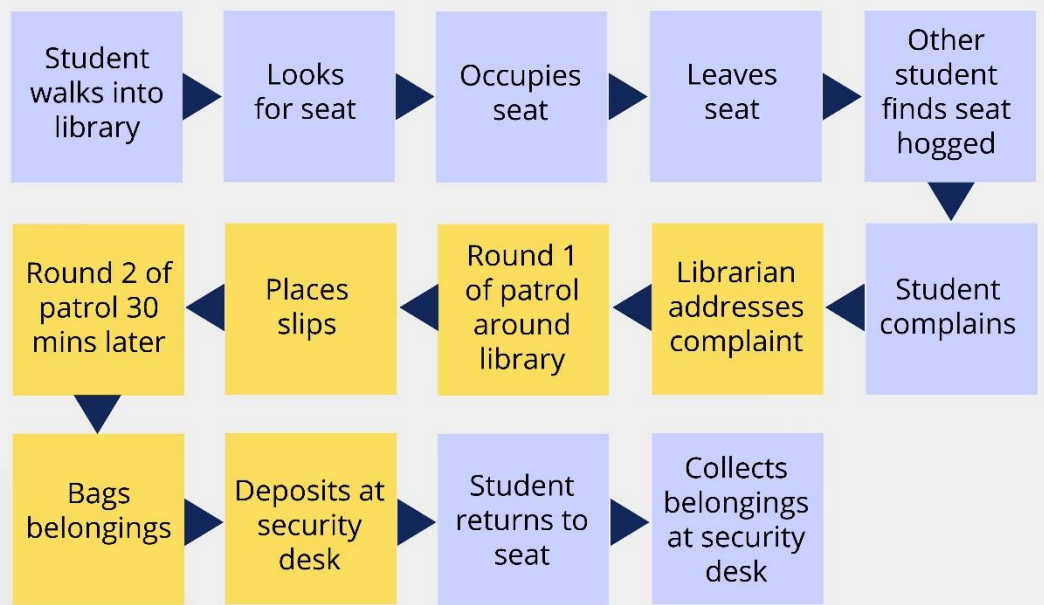
**QUALITY METRICS**

Y1: Percentage of Hogged Seats  
Y2: Number of Complaints Related to Seat Hogging  
Y3: Number of Man Hours Taken to Clear Hogged Seats

**FINANCIAL BENEFIT**

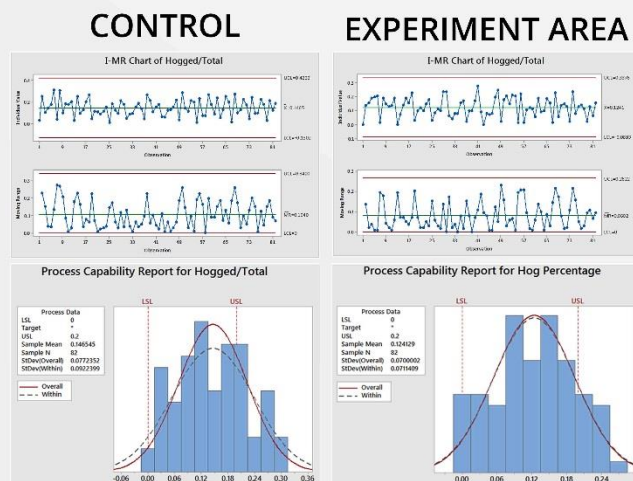
Better utilisation of man hours, putting an opportunity cost of \$1,240/sem to better use

**PROCESS MAP**



MEASURE

**PROCESS CAPABILITY STUDY OF CURRENT PATROL + BAGGING MEASURE**  
*Used as a baseline for improvements.*



14.7%	◀	<b>MEAN</b>	▶	12.4%
0.36	◀	<b>CP</b>	▶	0.47
0.19	◀	<b>CPK</b>	▶	0.36
0.43	◀	<b>PP</b>	▶	0.48
0.23	◀	<b>PPK</b>	▶	0.36

- Both processes are in control
- The bagging process reduced the % of hogged seats by **2.24%**
- Bagging helps to control the spread
- Both processes are off target and not within the customer specification limit

**KJ ANALYSIS: WHY DO STUDENTS HOG SEATS?**

*First step in finding out why*

**Need for a permanent space**

**Students are afraid of not having a seat**

Students want to secure a seat as there are many people in the library

Library gets very packed during peak hours

Students intend to return to the library after their group meetings

**Students feel attached to the library as a study haven**

Students want to secure their favourite spot for studying

Students need a space to study and complete their revision for the day

**No hassle to students**

**Students use the library to store their belongings**

Students without lockers have no place to store their belongings temporarily

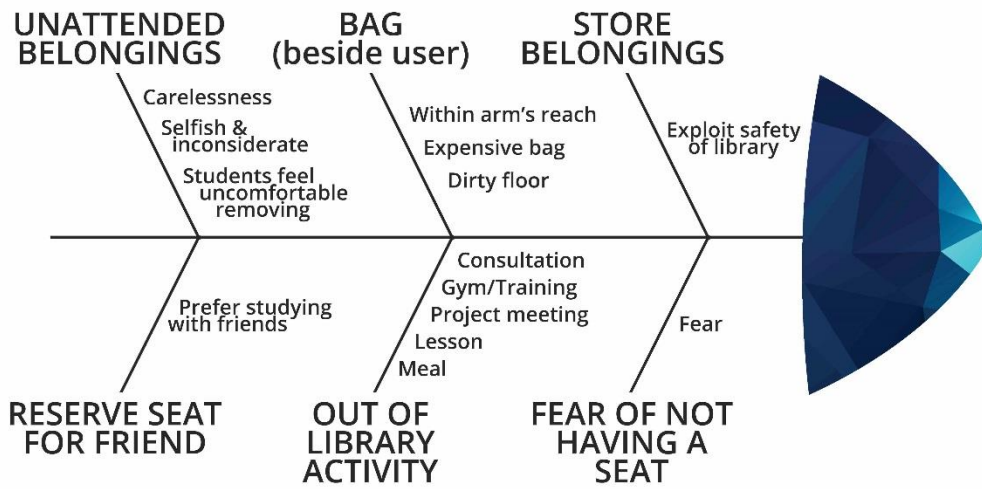
Students feel that no one (besides library staff) will remove their items should they store them in the library

**Students do not have to make a prior booking if they want to use the library**

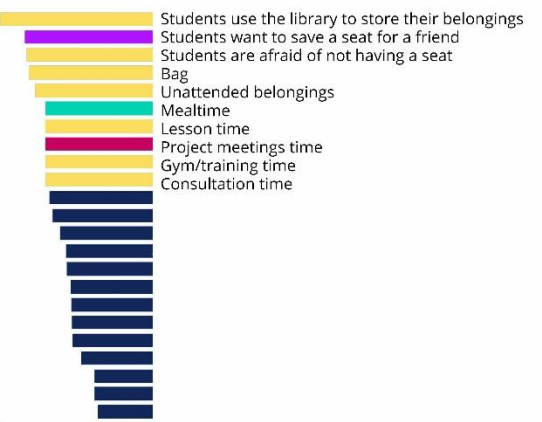
**Students want to save a seat for a friend who is joining later**



# ANALYSIS



# CAUSE AND EFFECT MATRIX



## STATISTICAL SIGNIFICANT FACTORS FROM MULTI-VARIATE ANALYSIS

"I want to reserve a seat for my **friend**"  
**P-Value=0.0016**

"I want to secure my seat while I go out for a **meal**"  
**P-Value<0.0001**

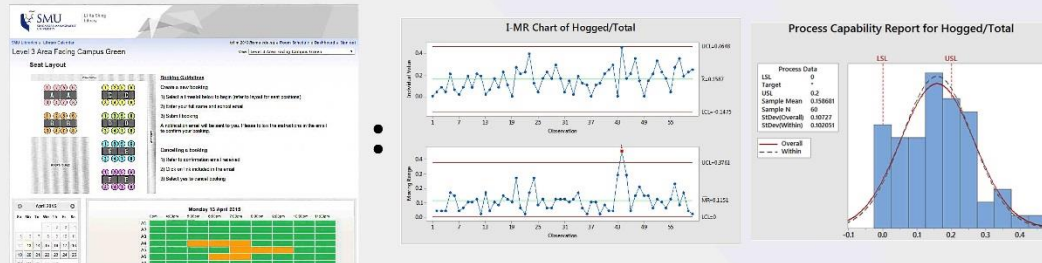
"I want to secure my seat while I attend a **meeting**"  
**P-Value=0.0446**

## TOP FAILURE MODES IDENTIFIED FROM FMEA

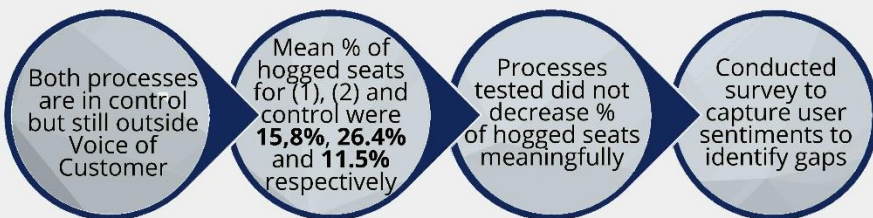
CAUSE	FAILURE MODE
Fear	Fear makes student want to reserve a seat
Selfish and inconsiderate students	When belongings are left intentionally to reserve the seat
Mealtime	When belongings are left intentionally to reserve the seat
Students like to study with friends	Reserved seat can't be utilised by another student

# IMPROVE

## 1. SEAT BOOKING SYSTEM



## 2. ADDITIONAL NON-PERMANENT SEATS



## MAIN FINDINGS FROM EXPERIMENTS

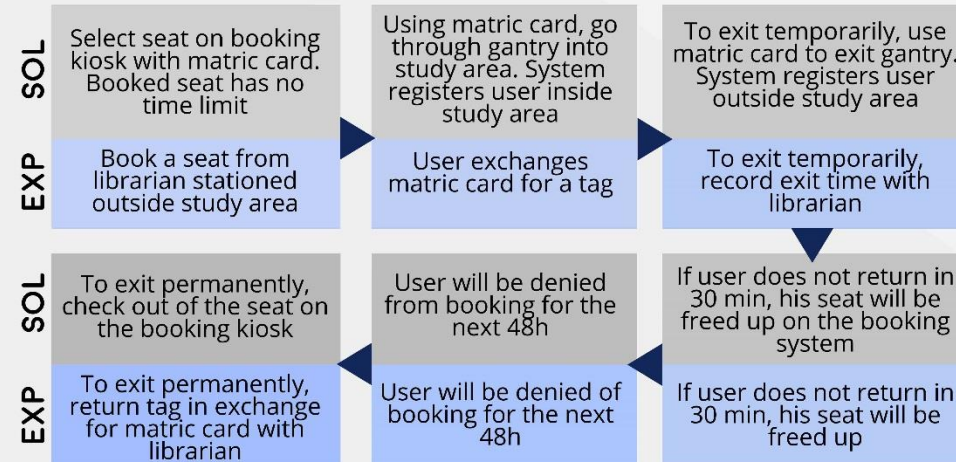
- ✗ Students do not plan where to sit in advance
  - ✗ 3-hour booking limit was too short
  - ✗ Area used was not suitable
  - ✗ Additional seats were placed in awkward locations
  - ✗ No controls in place to make booking compulsory
  - ✗ No measures in place to prevent abusing of system
- ✓ Booking has to be spontaneous
  - ✓ Booking duration limit has to be long enough
  - ✓ Area for booking has to be non-communal
  - ✓ Tablet arm chairs need to be suitable for prolonged usage

# CONTROL

## CONTROL PLAN: AN EXPERIMENT TO TEST REVAMPED SOLUTION

### 1. ENSURE FAIR SEATING

**How?** Instant seat booking kiosk + Gantry **Where?** L.4 individual study cubicles

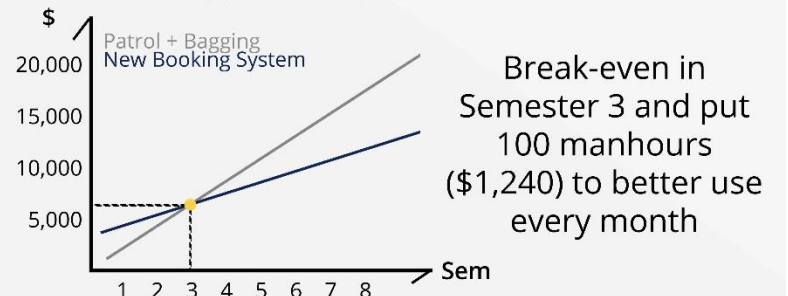


### 2. PROMOTE GRACIOUSNESS

**How?** Education and raise awareness

- 'No Hogging' posters around Library
- Heavier-toned emails during peak study periods
- Regular emailers to remind students not to hog
- Use of social media to highlight ugly behaviours

## BREAK-EVEN ANALYSIS OF PROCESS' TOTAL COST



- ✓ Reduce Y1: Hogged seats by 100%
- ✓ Reduce Y2: Number of complains related to seat hogging
- ✓ Reduce Y3: Number of man hours taken to clear hogged seats