TEXAS STATE **UNIVERSITY**

The rising STAR of Texas

Problem Statement

A predicted increase in traffic flow of 75% from Ingram School of Engineering's new Mechanical Engineering Program poses a facilitative concern to accessibility and safety within the Ingram Hall Makerspace tool room. Limited space within the tool room requires optimization of shelf and tool placement to improve the convenience of tool usage for a growing user population.

Objectives

- Optimize a floor plan for shelf placement within the tool room for accessibility using a prioritization Matrix comparing 4 different layouts.
- Use an initial and final time study to compare the original layout to the final layout design.
- Analyze data for tool usage within IHM for optimization of tool placement on the shelves based on distance to front desk and from walking space.
- Optimize tool organization on shelves to allow for a larger capacity and room for tool expansion.

				20)21						2022
Task	Start	End	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
SOW 1st Draft			-	1							
(SOW 1st Draft)	01-Sep-2021	29-Sep-2021									
Kickoff Meeting											
(Kickoff Meeting)	07-Sep-2021	07-Sep-2021									
Measurements of IHM tool room											
(Measurements of IHM tool room)	07-Sep-2021	07-Sep-2021									
Senior Design Binder 1st Semester											
Data Analysia	07-Sep-2021	29-Nov-2021		_							
(Data Analysis)	15-Sep-2021	10-Nov-2021									
Textbook & Literature Reviews	13-36p-2021	10-1404-2021									
(Textbook & Literature Reviews)	24-Sep-2021	03-Dec-2021									
Initial Time Study											
(Initial Time Study)	27-Sep-2021	22-Nov-2021									
SOW 2nd Draft											
(SOW 2nd Draft)	29-Sep-2021	13-Oct-2021									
Final Power Point Presentation											
(Final Power Point Presentation)	04-Oct-2021	06-Dec-2021									
Prioritization Matrix (Prioritization Matrix)	04 Oct 2021	01 Nov 2021									
SOW Final Conv	04-000-2021	01-NOV-2021									
(SOW Final Copy)	13-Oct-2021	27-Oct-2021									
Poster Design											
(Poster Design)	17-Oct-2021	29-Nov-2021									
Floor Layout Design											
(Floor Layout Design)	25-Oct-2021	15-Nov-2021									
Gantt Chart Completion											
(Gantt Chart Completion)	01-Nov-2021	26-Nov-2021									
Initial Design Review											
(initial Design Review)	01-Nov-2021	22-Nov-2021									
(Senior Design Binder 2nd Semester)	18-Jan-2022	02-May-2022									
Implementation of Layout Design 2nd Semester	10-341-2022	02-10189-2022									
(Implementation of Layout Design 2nd Semester)	24-Jan-2022	21-Feb-2022									
Final Time Study 2nd Semester											
(Final Time Study 2nd Semester)	21-Feb-2022	14-Mar-2022									
Senior Design Day											
(Senior Design Day)	12-Mar-2022	12-Mar-2022									
Senior Design Day 2nd Semester											
(Senior Design Day 2nd Semester)	03-May-2022	03-May-2022									
				1	1						

Schedule

Methodology

Plan – Do – Check - Act



I1.04- Ingram Hall Makerspace

Ryan Powell, Jacob O'Neill, Jeff Davis, Daniel Ebuzeme

Mr. John Ivey

Current Layout [Plan]





- Poor Visibility (not an open layout) when searching for tools.
- Tight walking space (areas less than 2'6").
- Human Factor concerns with removing/replacing tools.
- Less than 20% additional tool capacity for future growth. Limited Labeling on Shelves for finding tools.
- Barcodes are becoming worn causing scanning issues when checking out tools.

Tool Data Analysis [Plan]



checked out with 1 or 2 addition tools at the same time. The data above will be used as a deciding factor

on where tools will be within the new layout



Proposed/New Layout [Do]









- Current tool data from IHMMS database, divided into tool categories. The data above indicates tools with the most use
- to aid in tool placement within the new layout

Adjustments

Categories	Weights	Layout 1	Layout 2	Layout 3	Layout 4	Current Layout
Distance/Time	2	5	4	4	4	3
Visualization	2	2	3	4	5	1
Safety	6	4	4	5	5	4
Lighting	4	3	4	5	5	5
Accessibility	3	5	4	2	3	4
Capacity	4	2	3	4	5	1
Walking Space	5	1	3	4	5	1
Total Weighted	78	93	108	122	73	





Human Factors [Do]



Visualization

- Average eye height of US adult male is 68" (upper 95%).
- Open floor layout allows adequate room to view bottom shelves (4') without bending down.

Safety

- Average elbow height of US adult female is 36.9" (lower
- Adjusting middle shelves to a height of 36.9" will account for smaller users and give an optimal location for most used tools.

Future Plans



Updating/Adding tool location to IHMMS system (shelf row and column labeling). Addition internal shelf lighting (motion activated).

Finding optimal location for mounted tools.

Team Members



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