

Enhance Mobility for People with A Walking Disability

Background

Each day tens of thousands of people move around the Purdue University campus. Biking, walking, and skateboarding are just a few ways to get around. Unfortunately, some individuals have a walking disability that limits their mobility. This disability can stem from an injury like a sprain, strain, fracture, or even a chronic pain issue. The campus safety committee is seeking innovative ideas to enhance mobility for people with a walking disability.

Design Challenge

Develop a process and scheduling system using Excel, that will enhance mobility between two destinations on campus for the walking disabled. Your client wants creative engineering students to **collect data** from as many unique stakeholders as possible and use their analytical skills to **develop evidence-based proposals** for new ways of enhancing mobility for the walking disabled on campus. They are requesting proposals for new approaches that will be effective and will harmoniously integrate into the campus culture. To succeed at this project, you must engage in **informed design**. See the last page of this document for additional details on informed design.

Your Final Solution

Your final solution should meet the following criteria:

Desirable	<ul style="list-style-type: none">• Solution will attract users• Solution is appropriate for a campus community
Effective	<ul style="list-style-type: none">• Mobility is demonstrably enhanced by the solution• The solution is safe for all users• The solution is safe for all non-users

Your final solution should stay within the following constraints:

Economically viable	<ul style="list-style-type: none">• Solution may not affect the affordability of education on campus
Technically feasible	<ul style="list-style-type: none">• Solution must be developed using Excel• Solution must be implemented with existing infrastructure

You will work through this project in multiple steps or “milestones” as outlined on the next page and as specified by your instructor.

Tip: For each task and activity that you work on it is a good practice to take pictures and videos that can be incorporated into your final project deliverables. Pictures and videos can make a strong contribution to data collection. Document when and where all photos and videos are captured. In addition, you should document any testing, all prototypes, and every design idea.

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Class	Milestone	Description	Assignment	Due
9A	1 Needfinding/Problem Scoping	Generate need or problem statements that clearly describe specific needs or problems.	A16: Design Template [I, II, III]	Class 9B
9B	2 Idea Generation	Use different concept generation strategies to generate solution ideas .	A17: Design Template [IV, V]	Class 10B
10A	3 Thought Experiments & Pros/Cons Evaluation	Reduce your number of solutions by discussing Pros and Cons of ideas against the criteria and constraints as a team	Continue A17	
10B	4 Prototyping & Testing Protocol	Develop appropriate prototype(s) and a test plan that will generate information and/or data	A18: Design Template [VI]	Class 11B
11A	5 Testing and Analysis & WDM	Use prototype(s) and/or models to generate data and information Synthesize and analyze evidence to support your top solution ideas.	Continue A18	
11B	6 Reflection, Iteration, & Re-design	Make informed revisions based on new knowledge	A19: Design Template [VII]	Class 12A
12A	7 Prep for Preliminary Presentation	Present your initial design solution for review by your peers and the teaching team	A20: Preliminary Presentation	Class 13A
13A	8 Peer Review	Solicit feedback from peers and provide feedback to another team	A21: Peer Review	Class 13B
13B	9 Iteration & Re-design	Make informed revisions based on new knowledge and finalize communication to client	A22: Final Report [I, VIII, IX, X] A23: Final Presentation	Class 15A
15A	10 Communicate Your Work	Communicate results and recommendations to your client		
15B	Course Wrap Up			

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Beginning Versus Informed Designers

	Beginning Designers	Informed Designers
Understand the challenge	Treat design task as a well-defined, straightforward problem that they prematurely attempt to solve .	Delay making design decisions in order to explore, comprehend, and frame the problem better.
Build knowledge	Skip research and pose or build solutions immediately.	Do research on the problem and test solutions.
Generate ideas	Work with few or just one ideas , which they can get fixated or stuck on, and may not want to change or discard.	Practice idea fluency in order to work with lots of ideas by doing divergent thinking, brainstorming, etc.
Represent ideas	Propose superficial ideas that do not support deep inquiry of a system and that would not work if built.	Use multiple representations (words, sketches, and prototypes) to explore and investigate design ideas.
Weight options & make decisions	Make design decisions without weighing all options .	Use words and graphics to display and weigh both benefits and tradeoffs of all ideas before picking a design.
Conduct experiments	Do few or no tests on prototypes, or run confounded tests by changing multiple variables in a single experiment.	Conduct valid experiments .
Troubleshoot	Use an unfocused, non-analytical way to view prototypes during testing and troubleshooting of ideas.	Focus attention on problematic areas and subsystems when troubleshooting and proposing ways to fix them.
Revise/iterate	Design in haphazard ways where little learning gets done, or do design steps once in linear order.	Do design in a managed way , where ideas are improved iteratively via feedback, and strategies are used multiple times as needed.
Reflect on process	Do tacit designing with little self-monitoring while working or reflecting on the process and product when done.	Practice reflective thinking by keeping tabs on design strategies and thinking while working and after finished.

Reference:

Crismond, D., & Adams, R. (2012). The informed design teaching and learning matrix. *Journal of Engineering Education*, 101(4), 738-797