Project 1: One Fingered Mug

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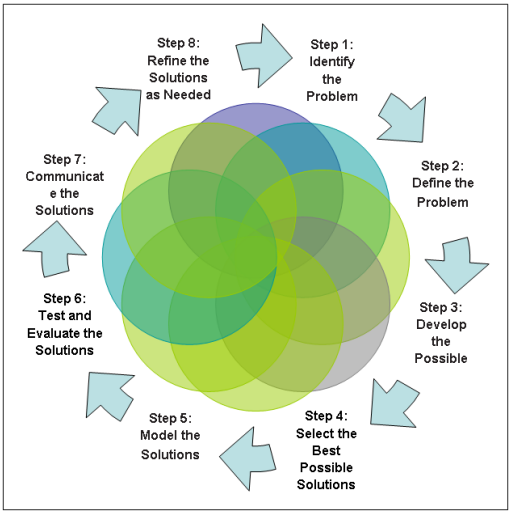
For the first project in engineering design, we were instructed to create a mug that people with only one finger could use without any hassle. In order to create this mug, it took teamwork, an intense design process, prototypes and more. We began this project by learning the eight steps in the design process. These eight steps were to: Identify the problem, define the problem, develop the possible solutions, select the best possible solutions, model the solutions, test and evaluate the solutions, communicate the solutions, and finally refine the solutions as needed. To identify our problem and define it in designing the first project of the semester we had to create a thorough mission statement that put all of our goals, descriptions, consumers, and assumptions onto one easy to read and interpret table.



Mission Statement	To design and create a one-fingered coffee mug to provide disabled customers with the easiest and most effective way to enjoy a refreshing coffee.
Product Description	a handheld device that aids the consumption of warm beverages
Key Business Goals	add simplicity to the lives of the disabled
Primary Market	one fingered people
Secondary Market	open minded consumers
Assumptions	user friendly, convenient, flexible
Stakeholders	user, retailer, production

After we created this mission statement it was time to decide which customer needs were most important. To do this we created a customer needs generation table which establish our top five customer needs were that the mug was lightweight, portable, easy to clean, reliable grip, and dishwasher safe. We also used the AHP table to generate these customer needs. The AHP table

gives rankings to each need and shows a pair wise comparison. Below is an example of how an AHP table is generated. Now that we had these needs in mind we searched internally, externally, and explored all of the possible designs. We created a concept classification tree and a concept combination table that gave us a total of thirty two possible designs. We then created a concept selection chart that showed which design would establish the goal best and which design we should create into a prototype. This concluded the design process on paper and pencil and then it was time to move to solid works. We created the model in solid works and were able to 3D print this model. Our result was a mug with a palm slot in the middle with a traditional cylindrical body. Its versatility made it possible to be used by someone with no fingers or even a family member with all of their fingers that was visiting someone with this mug. The mug met all of our customer needs and followed each step in the design process.

The Fundamental Scale for Pairwise Comparisons		
Intensity of Importance	**Definition**	**Explanation**
1	Equal importance	Two elements contribute equally to the objective
3	Moderate importance	Experience and judgment slightly favor one element over another
5	Strong importance	Experience and judgment strongly favor one element over another
7	Very strong importance	One element is favored very strongly over another; its dominance is demonstrated in practice
9	Extreme importance	The evidence favoring one element over another is of the highest possible order of affirmation
Intensities of 2, 4, 6, and 8 can be used to express intermediate values. Intensities 1.1, 1.2, 1.3, etc. can be used for elements that are very close in importance.		

3D printed mug:

Solid Works design mug: