

Design Project 1: Coffee-Mug for People with One Finger

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Objective: To create a coffee mug that is fully functional for people who have one finger

Mission Statement:

Description: A mug that can easily be used by a person with a hand with one finger

Business Goals:

- Make a product marketable to individuals with the disability of one finger
- Make the product cost efficient while achieving a 20% gross margin
- Work toward attaining a 30% share of the disabled drinking container market within one year

Primary Markets:

People who each have only one finger

Secondary Markets:

People who each have only one hand, only a few fingers or people with all fingers

Assumptions:

- Able to function when a person uses it with one hand
- Not easily spillable

Stakeholders:

- Person with one finger
- Caretaker
- Family
- Sales force
- Service center
- Production
- Legal Department
- Person without disabilities
- Person with only a few fingers
- Other people who have other types of disabilities

Customer Needs Hierarchy

1. Durability (0.190149):

- 1.1 Shatter resistant(0.511727079;0.097305)
- 1.2 Microwave safe (0.159914712;0.030408)
- 1.3 Dishwasher safe (0.093816631;0.017839)
- 1.4 Ability to contain a variety of beverages (0.234541578;0.044598)

2. Safety (0.396144):

- 2.1 Easy/safe to pick up (0.51725412;0.204907218)
- 2.2 Easy/safe storage (0.113278652;0.044874681)
- 2.3 Suitable size to lift for use (0.369467228;0.146362298)

3. Comfort (0.193662):

- 3.1 Suitable size to hold in hands for extended period of time (0.096429;0.018675)
- 3.2 Dense outer layer for user protection from mug contents (0.130552;0.025277)
- 3.3 Lightweight for regular mobility (0.255738;0.049527)
- 3.4 Easy to clean (0.109216;0.021151)
- 3.5 Low maintenance (0.101224;0.019603)
- 3.6 Easy to fill (0.255738;0.049527)
- 3.7 Fairly simple design (0.051132;0.009902)

4. Insulation (0.136432):

- 4.1 Can withstand a variety of both high and low temperatures (0.5;0.068216031)
- 4.2 Keeps liquid hot for a sufficient amount of time (0.5;0.068216031)

5. Appearance (0.083613):

- 5.1 Unique, yet attractive structure (0.308824438;0.025821687)
- 5.2 Resembles regular coffee mug in shape (0.16176224;0.0135254)
- 5.3 Colors and designs for visual appeal (0.528413322;0.044265749)

ANALYTICAL HIERARCHY PROCESS

First Layer	Durability	Safety	Comfort	Insulation	Appearance	Total	Weight
Durability	1	0.2	1	3	2	7.2	0.190149
Safety	5	1	3	3	3	15	0.396144
Comfort	1	0.333	1	2	3	7.333	0.193662
Insulation	0.333	0.333	0.5	1	3	5.166	0.136432
Appearance	0.5	1	0.333	0.333	1	3.166	0.083613
Total Weight						37.865	

DURABILITY	Shatter Resistant	Microwave Safe	Dishwasher Safe	Ability to contain variety of beverages	Total	Weight	Total Weight
Shatter Resistant	1	4	5	2	12	0.511727079	0.097305
Microwave Safe	0.25	1	2	0.5	3.75	0.159914712	0.030408
Dishwasher Safe	0.2	0.5	1	0.5	2.2	0.093816631	0.017839
Ability to contain variety of beverages	0.5	2	2	1	5.5	0.234541578	0.044598
Total					23.45		

SAFETY	Easy/safe to pick up	Easy/safe storage	Suitable size to lift for use	Total	Weight	Total Weight
Easy/safe to pick up	1	5	1	7	0.51725412	0.204907218
Easy/safe storage	0.2	1	0.333	1.533	0.113278652	0.044874681
Suitable size to lift for use	1	3	1	5	0.369467228	0.146362298
Total				13.533		

COMFORT	Suitable size to hold for extended time	Dense outer layer for protection	Lightweight for regular mobility	Easy to clean	Low Maintenance	Easy to Fill	Fairly simple design	Total	Weight	Total Weight
Suitable size to hold for extended time	1	3	0.2	0.5	1	0.333	5	6.033	0.096429	0.018675
Dense outer layer for protection	0.333	1	0.333	1	2	0.5	3	8.166	0.130522	0.025277
Lightweight for regular mobility	5	3	1	1	2	1	3	16	0.255738	0.049527
Easy to clean	2	1	1	1	0.5	0.333	1	6.833	0.109216	0.021151
Low Maintenance	1	0.5	0.5	2	1	0.333	1	6.333	0.101224	0.019603
Easy to Fill	3	2	1	3	3	1	3	16	0.255738	0.049527
Fairly simple design	0.2	0.333	0.333	1	1	0.333	1	3.199	0.051132	0.009902
Total								62.564		

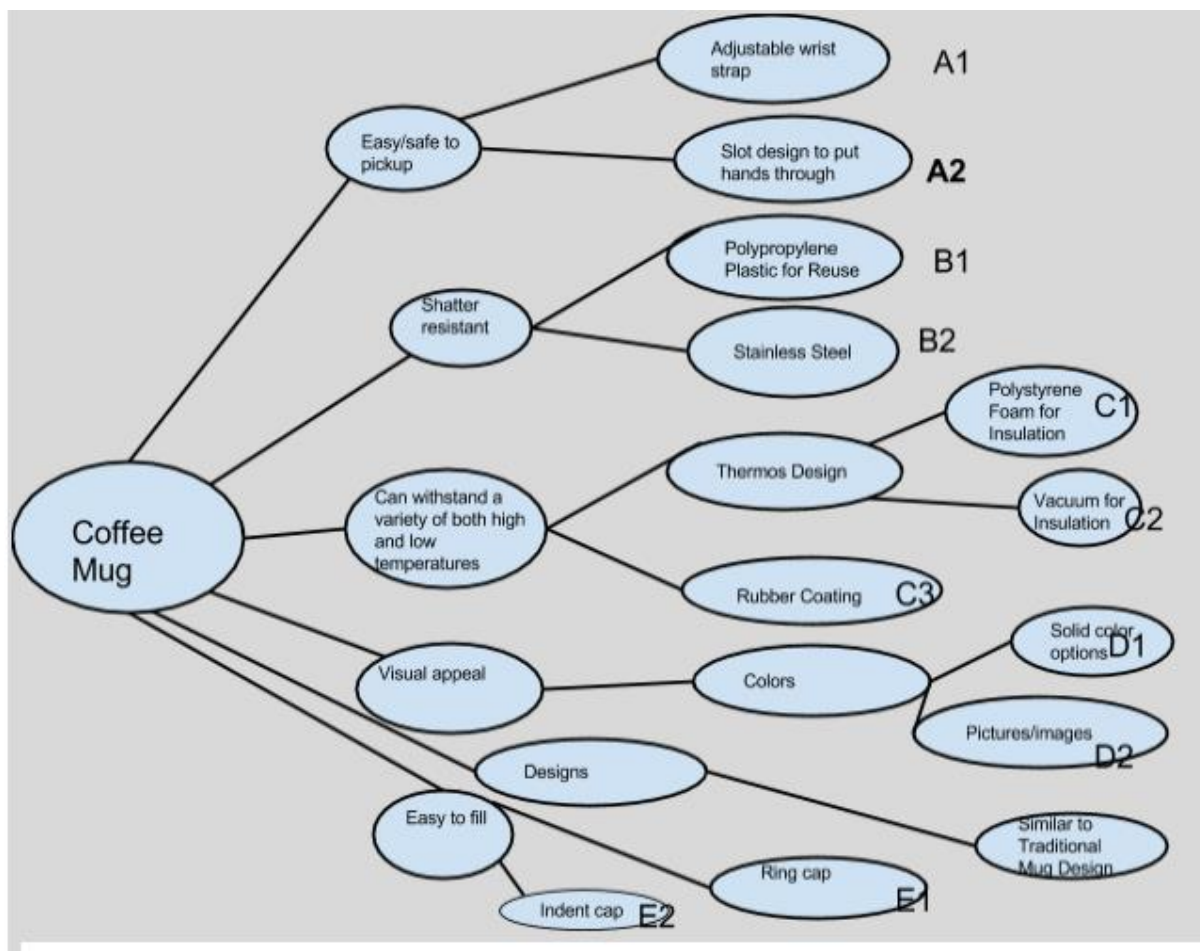
INSULATION	Can withstand a variety of both high and low temperatures	Keeps liquid hot for a sufficient amount of time	Total	Weight	Total Weight
Can withstand a variety of both high and low temperatures	1	1	2	0.5	0.068216031
Keeps liquid hot for a sufficient amount of time	1	1	2	0.5	0.068216031
Total			4		

APPEARANCE	Unique but Attractive Design	Resembles regular coffee mug	Colors and designs for visual appeal	Total	Weight	Total Weight
Unique but Attractive Design	1	2	0.5	3.5	0.308824438	0.025821687
Resembles regular coffee mug	0.5	1	0.3333	1.8333	0.16176224	0.0135254
Colors and designs for visual appeal	2	3	1	6	0.529413322	0.044265749
Total				11.3333		

Concept Generation

Five Key Customer Needs:

- Easy/safe to pick up
- Shatter resistant
- Can withstand a variety of both high and low temperatures
- Visual appeal
- Easy to fill



Concept Selection

Selection Criteria	Concepts														
	A1, B1, C2, D1, E1	A1, B2, C2, D1, E1	A1, B1, C1, D1, E2	A1, B2, C1, D1, E1	A1, B1, C1, D2, E2	A2, B1, C2, D1, E1	A2, B2, C2, D1, E1	A2, B1, C1, D1, E2	A2, B1, C1, D2, E1	A2, B2, C1, D2, E1	A2, B2, C2, D2, E1	A1, B1, C2, D2, E1	A2, B2, C2, D2, E2	A1, B1, C1, D1, E1	A2, B1, C3, D1, E1
Easy to Pick up	+	+	+	+	+	0	0	0	0	0	0	+	0	+	0
Shatter Resistant	0	-	0	-	0	0	-	0	0	-	-	0	-	0	0
Withstands Temps	+	+	-	-	-	+	+	-	-	-	+	+	+	-	0
Visual Appeal	0	0	0	0	-	0	0	0	-	-	-	-	-	0	0
Easy to Fill	0	0	-	0	-	0	0	-	0	0	0	0	-	0	0
Total (+)s	2	2	1	1	1	1	1	0	0	0	1	2	1	1	0
Total (-)s	0	1	2	2	3	0	1	2	2	3	2	1	3	1	0
Total Zeros	2	2	2	2	1	4	2	3	3	2	2	2	1	3	5
Net Score	2	1	-1	-1	-2	1	0	-2	-2	-3	-1	1	-2	0	0
Rank	1	2	8	8	11	2	5	11	11	15	8	2	11	5	5
Continue?	Yes	Yes	no	no	no	Yes	no	no	no	no	no	Yes	no	no	yes

Concept Scoring

Concept Scoring												
Selection Criteria	Weight	Concept										
		A1, B1, C2, D1, E1		A1, B2, C2, D1, E1		A2, B1, C2, D1, E1		A1, B1, C2, D2, E1		A2, B1, C3, D1, E1		
		Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score	
Easy to Pick Up	30%	4	1.2	4	1.2	3	0.9	4	1.2	3	0.9	
Shatter Resistant	20%	3	0.6	2	0.4	3	0.6	3	0.6	3	0.6	
Withstands Temps	25%	5	1.25	5	1.25	5	1.25	5	1.25	3	0.75	
Visual Appeal	5%	3	0.15	3	0.15	3	0.15	2	0.1	3	0.15	
Easy to Fill	20%	3	0.6	3	0.6	3	0.6	3	0.6	3	0.6	
Total Score			3.8		3.6		3.5		3.75		3	
Rank			1		3		4		2		5	
Continue?			Develop		no		no		no		no	

DECISION:

After going through Concept Screening and Concept Scoring, we have decided to use concept A1B1C2D1E1 as the final concept for our product. We selected this based on the results of the concept scoring process. The properties of this concept are:

- **An adjustable wrist strap.** With this feature, one-fingered disabled people won't need to worry about using hands to hold the mugs as they can just strap the mug to their wrist. The adjusting mechanism will be made as simple as possible to make it easy to adjust the strap.

- **Polypropylene body.** Polypropylene is both shatter resistant and reusable, so it will be safer to use and will be more environmental-friendly.
- **Vacuum Space.** The use of vacuum space between the inner surface and outer surface of the mug will be able to insulate the heat of the beverage inside the mug.
- **Solid Color Design.** The mug will be colored with solid colors such as blue, red, and any other colors. This design is more neutral than putting a picture design on the mug and customers can customize the mug however they like.
- **A ring cap.** A ring cap will be a lot easier to open compared to other kinds of caps. This cap is a part of the mug to prevent spills.