

Design Project 1: Mug for Disabled Individuals

Mission Statement: Mug for Disabled Individuals

Product Description	A light, insulated coffee mug designed for disabled individuals (one finger one stub)
Key Business Goals	Product in manufacturing within six weeks 20% share of disabled cups on market within 1 year
Primary Market	Disabled individuals (Individuals with one finger and one stub)
Secondary Market	Any individual that wants to purchase a mug
Assumptions	Held by disabled individuals, lightweight, insulation for hot and cold beverages, washable, has a lid to contain liquids
Stakeholders	Disabled users, Retailer, Caregiver markets, Retirement/Nursing homes, Veterans organizations, Hospitals, other assisted living environments

Customer Needs Hierarchy

1. Portable (0.207)

- 1.1 Lightweight (0.107, 0.517)
- 1.2 Fits in Cupholder (0.0286, 0.138)
- 1.3 Lid/no Spill (0.0571, 0.276)
- 1.4 Holds 16 oz. (0.0143, 0.0690)

2. User Friendly (0.310)

- 2.1 Safe (0.0558, 0.180)
- 2.2 Easy to wash (0.0418, 0.135)
- 2.3 Small ecological footprint (0.00697, 0.0225)
- 2.4 Comfortable (0.0523, 0.169)
- 2.5 Can be held by disabled individual (0.0628, 0.202)
- 2.6 Grip texture (0.0418, 0.135)
- 2.7 Aerator (0.0209, 0.0674)
- 2.8 Simplistic use of lid (0.0279, 0.0899)

3. Durable (0.241)

- 3.1 Withstands dropping (0.0142, 0.0588)
- 3.2 Reliable over lifetime of product (0.0994, 0.412)
- 3.3 Withstands heat (0.128, 0.529)

4. Appearance (0.0345)

- 4.1 Simple Design (0.0307, 0.889)
- 4.2 Looks relatively normal (0.00383, 0.111)

5. Flexible (0.207)

- 5.1 Insulates (0.179, 0.867)
- 5.2 Ambidextrous (0.0276, 0.133)

Analytical Hierarchy Process (AHP)

Main Attribute	Appearance	Portable	Flexible	Durable	User Friendly	Total (Ri)	Weighting (Wi)
Appearance	1	0.166666667	0.166666667	0.1428571429	0.1111111111	1.587301587	0.03448275862
Portable	6	1	1	0.8571428571	0.666666667	9.523809524	0.2068965517
Flexible	6	1	1	0.8571428571	0.666666667	9.523809524	0.2068965517
Durable	7	1.166666667	1.166666667	1	0.7777777778	11.11111111	0.2413793103
User Friendly	9	1.5	1.5	1.285714286	1	14.28571429	0.3103448276
Total R:	46.03174603						

Appearance	Normal Look	Simple Design	Total (Ri)	Weight (Wi)
Normal Look	1	0.125	1.125	0.1111111111
Simple Design	8	1	9	0.8888888889

Total: 10.125

Portability	Holds 16 Oz	Fits in Cupholder	Lid/No Spill	Lightweight	Total (Ri)	Weight (Wi)
Holds 16 Oz	1	0.5	0.25	0.1333333333	1.883333333	0.06896551724
Fits in Cupholder	2	1	0.5	0.2666666667	3.766666667	0.1379310345
Lid/No Spill	4	2	1	0.5333333333	7.533333333	0.275862069
Lightweight	7.5	3.75	1.875	1	14.125	0.5172413793

Total: 27.30833333

Flexibility	Ambidextrous	Insulates	Total (Ri)	Weighted (Wi)
Ambidextrous	1	0.1538461538	1.153846154	0.1333333333
Insulates	6.5	1	7.5	0.8666666667



Total: 8.65384614

Durability	Withstands Dropping	Reliable over lifetime	Withstands Heat	Total (Ri)	Weight (Wi)
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Withstands Dropping	1	0.1428571429	0.1111111111	1.253968254	0.05882352941
Reliable over lifetime	7	1	0.7777777778	8.777777778	0.4117647059
Withstands Heat	9	1.285714286	1	11.28571429	0.5294117647

Total: 21.31746032

User Friendly	Small Ecol. Footprint	Aerator	Simplistic Lid	Gripping Texture	Easy To Wash	Comfortable	Safe	Usable by Disabled	Total (Ri)	Weight (Wi)
Small Ecol. Footprint	1	0.3333333333	0.25	0.1666666667	0.1666666667	0.1333333333	0.125	0.1111111111	2.286111111	0.02247191011
Aerator	3	1	0.75	0.5	0.5	0.4	0.375	0.3333333333	6.858333333	0.06741573034
Simplistic Lid	4	1.333333333	1	0.6666666667	0.6666666667	0.5333333333	0.5	0.4444444444	9.144444444	0.08988764045
Gripping Texture	6	2	1.5	1	1	0.8	0.75	0.6666666667	13.71666667	0.1348314607
Easy To Wash	6	2	1.5	1	1	0.8	0.75	0.6666666667	13.71666667	0.1348314607
Comfortable	7.5	2.5	1.875	1.25	1.25	1	0.9375	0.8333333333	17.14583333	0.1685393258
Safe	8	2.666666667	2	1.333333333	1.333333333	1.066666667	1	0.8888888889	18.28888889	0.1797752809
Usable by Disabled	9	3	2.25	1.5	1.5	1.2	1.125	1	20.575	0.202247191

Total: 101.7319444

Concept Compatibility

Top 5 concepts

insulates

lid

lightweight

reliable over lifetime

usable by disabled

Usable by disabled	Insulates	Lightweight	Reliable Over Lifetime	lid
finger on the bottom (This would allow for the disabled to put	double wall stainless steel	ceramic - is a commonly used material for	Washable material (dishwater safe)	hinge with button

their finger through the bottom and support the mug with their stub on the side) A1	(The double wall can function as a good insulator because heat cannot escape easily) B1	coffee mugs that also helps insulates C1	- to be reused over time you need to be able to wash it, to make sure it is clean D1	(The button is pressed to release a spring holding the hinge to open the lid) E1
two handles (One larger handle would be used for the stub and a smaller handle opposite of the stub hole would allow the user to adequately balance the cup and would provide stability for raising and lowering the mug) A2	polystyrene (Is a material that retains heat due to its chemical composition) B2	plastic - is not a dense material that is also reliable over time (many travel mugs are made with plastic) C2	Resists breaking - because for the mug to be reliable over time it needs to be durable last so it needs to survive being dropped D2	slide lid (use finger to slide latch to release spring to open lid) E2
underhand (A handle placed under the mug would allow for the user to hold the mug by the base to support it from the bottom through the use of gripping material) A3	rubber (known insulator that is ecologically friendly and retains heat.) B3			
handle for stub (A single handle would allow for the user to hold the mug in their stub through the use of a gripping material or ratcheting strap) A4				

Concept Scoring

		A: A2, B1, C2, D1, E2		B: A4, B3, C2, D1, E2		C: A3, B3, C1, D2, E1		D: A4, B1, C1, D2, E2		E: A4, B2, C2, D1, E2	
Selection Criteria	Weight	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score

Usable By Disabled	0.30	4	1.2	3	0.9	5	1.5	3	0.9	3	0.9
Insulates	0.20	5	1	4	0.8	4	0.8	5	1	3	0.6
Lightweight	0.15	2	0.3	2	0.3	3	0.45	2	0.3	3	0.45
Reliable over Lifetime	0.25	3	0.75	3	0.75	2	0.5	2	0.5	3	0.75
Lid	0.10	3	0.3	3	0.3	2	0.2	3	0.3	3	0.3
Total Score		3.55		3.05		3.45		3		3	
Rank		1		3		2		4		4	
Continue?		Develop		No		Possibly		No		No	

Prototype and Testing

A2 – Two handles (one larger/one smaller)

B1 – Double wall stainless steel

C2 – Plastic

D1 – Washable Material

E2 – Slide Lid

