Assignment 10
Design Analysis

Week 13

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EE 322 - A

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We pledge our honor that we have abided by the Stevens Honor System

Revisit the morphological chart in Assignment 7 (Synthesis) and

- Develop a KT decision matrix for design alternatives and goals with weighting, rating, and decision factors
- Develop a KT evaluation matrix for design alternatives and adverse consequences with probability, severity, and threat

With Design 1

Goals	Performance	Minimum maintenance	Aesthetics	Cost	Availability of parts	Ease of use	Versatility	Portability
Performance	—	.5	0	0.5	0	0	0	0
Minimum maintenance	.5	—	0	.5	.5	0	0	0
Aesthetics	1	1	—	1	.5	.5	1	.5
Cost	.5	.5	0	—	.5	0	0	0
Availability of parts	0	.5	.5	.5	—	0	0	0
Ease of use	1	1	.5	1	1	—	.5	.5
Versatility	1	1	0	1	1	.5	—	.5
Portability	1	1	.5	1	1	.5	.5	—
Total score	5	5.5	1.5	5.5	4.5	1.5	2	1.5

Priority	Weighting Factor	Design Goal
Critical	100	Minimum Maintenance
	90	Cost
	80	Performance
Important	70	Availability of Parts
	60	Versatility
	50	Ease of Use
	40	Portability
Optional	30	Aesthetic
	20	
	10	
	0	

Design 2(Non lithium ion batteries, plus cheaper cleaning parts, Navigation system complexity changes to have less computation and this cheaper computer components)

Goals	Performance	Minimum maintenance	Aesthetics	Cost	Availability of parts	Ease of use	Versatility	Portability
Performance	—	.5	1	1	1	0	1	0
Minimum maintenance	.5	—	0	1	1	0.5	1	0

Aesthetics	1	1	—	1	1	1	1	.5
Cost	0	0	0	—	.5	0	0	0
Availability of parts	0	0	0	.5	—	0	0	0
Ease of use	1	.5	0	1	1	—	.5	.5
Versatility	0	0	0	1	1	.5	—	.5
Portability	1	1	.5	1	1	.5	.5	—
Total score	3.5	3	1.5	6.5	6.5	2.5	4	1.5

Priority	Weighting Factor	Design Goal
Critical	100	Cost
	90	Avail. Parts
	80	Versatility
Important	70	Performance
	60	Min. Main.
	50	Ease of Use
	40	Portability

Optional	30	Aesthetic
	20	
	10	
	0	

With Design 3 - Same Navigation, Cheaper battery

Goals	Performance	Minimum maintenance	Aesthetics	Cost	Availability of parts	Ease of use	Versatility	Portability
Performance	—	.5	0	1	1	0	0	0
Minimum maintenance	.5	—	0	1	.5	0	0	0
Aesthetics	1	1	—	1	1	.5	.5	.5
Cost	0	0	0	—	.5	0	0	0
Availability of parts	0	.5	0	.5	—	0	0	0
Ease of use	1	1	.5	1	1	—	.5	.5
Versatility	1	1	.5	1	1	.5	—	.5
Portability	1	1	.5	1	1	.5	.5	—
Total	4.5	5	1.5	6.5	6	1.5	1.5	1.5

score								

Priority	Weighting Factor	Design Goal
Critical	100	Cost
	90	Availability of Parts
	80	Minimum Maintenance
Important	70	Performance
	60	Versatility
	50	Ease of Use
	40	Portability
Optional	30	Aesthetic
	20	
	10	
	0	

For All designs

Goals	Weighting factors (*W*)	Rating factors (*R*)			
		Design 1	Design 2	Design 3	
Min Main.	100/60/80	8	6	6	
Cost	90/100/100	4	10	8	
Performance	80/70/70	10	7	9	

Avail. Parts	70/90/90	7	10	10	
Versatility	60/80/60	5	8	6	
Ease of Use	50/50/50	8	4	7	
Portability	40/40/40	3	3	3	
Aesthetics	30/30/30	4	3	3	
Decision factors ($D = W \times R$)		3390	3800	3730	

Adverse consequences	Probability (P)	Severity (S)	Threat ($T = P \times S$)
Design 1			**6.6**
May fail because of cost	.30	5	1.5
May not be activated properly	.3	9	2.7
Lack of ease of use(setup difficulty)	.6	4	2.4
Design 2(substitute comp)			**11.75**
May fail because of cost	.05	1	.05
May not be activated properly	.8	9	7.2
Lack of ease of use(setup difficulty)	.75	6	4.5
Design 3			**6.95**
May fail because of cost	.05	1	.05
May not be activated properly	.5	9	4.5
Lack of ease of use(setup difficulty)	.4	6	2.4