

Concept Selection

Lecture #5

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Information

- Meeting Room for the overcrowded.
- PDS and Final Mission Statements Due 02/02.
- Design Show requirements.

Today

- Progress Reports + Quiz
- Patents and other info.
- Chapter 7, Concept Selection

Progress Reports

- Be specific.
 - What did you do?
 - What day?
 - When will you be done?
 - Did you work with anyone? Name names.
- Be direct.
- Be honest.
 - Paperwork counts!
- Be succinct.
- Most important things go first...not in chronological order!
- Use Timelines.
- If you put a problem in writing – it becomes permanent.
- BE AWARE that you affect the grade of other members of your team --- Ex. Robotic Arm (only 3/7)...

Quiz #1

1. Which of the 7 concept selection methods is explained in detail in Chapter 7?

External decision
Product champion
Intuition
Multivoting
Pros and cons
Prototype and test or
Decision matrices

2. List two of your concepts and three selection criteria in table form. First Rate them using relative scoring and then rank them.

Patents, ETC.

- Designer Resources on ME4054 webpage.
- Google scholar
- www.pubmed.gov

Concept Selection

- Agree on Product Design Specifications
- Examine ALL concepts at the same time....

Selection Methods

- External decision
- Product champion
- Intuition
- Multivoting
- Pros and cons
- Prototype and test
- Decision matrices

Structure

- Customer-focused product
- Competitive Design
- Better product-process coordination
- Reduced time to product introduction
- Effective group decision making
- Documentation of the decision process

2 Stages

- Concept screening
- Concept scoring

6 Step Process

- Prepare the selection matrix.
- Rate the concepts.
- Rank the concepts.
- Combine and improve the concepts.
- Select one or more concepts.
- Reflect on the results and the process.

Step #1 – Prepare the Matrix

Pick your medium

Enter concepts and criteria on the matrix

- keep detail uniform

-use written and graphical descriptions.

-if you have >12, use multivoting



- Choose one concept as a reference or benchmark against which all others are rated.

- Industry standard
- Straightforward/familiar concept

Step #2 Rate the Concepts

Unweighted Matrix (Pugh)

Relative score

- 0 = 'same as'
- (+) = 'better than'
- (-) = 'worse than'

Unweighted Selection Matrix

Criteria	Battery	Pneu.	Elec.	Int.Cmb
Ease of Use: Setup	+	s	+	+
Ease of Use: Oper	+	s	s	+
Weight	-	s	-	-
Manuf Cost	-	s	-	-
Time to Market	-	s	-	-
# Pluses	2	0	1	2
# Minuses	3	0	3	3
Keep?	Y	N	N	Y

Weighted Selection Matrix

Criteria	Weight	Battery	Pneu.	Elec.	Int.Cmb
Ease of Use: Setup	20	5	1	2	4
Ease of Use: Oper	20	4	2	2	3
Weight	30	2	4	3	2
Manuf Cost	20	3	4	3	2
Time to Market	20	3	4	3	3
Total Score		360	340	290	300
Rank		1	2	4	3

Step #4 – Combine and Improve the Concepts

- Is there a generally good concept which is degraded by one bad feature? Can a minor modification improve the overall concept and yet preserve a distinction from the other concepts?
- Are there two concepts which can be combined to preserve the 'better than' qualities while annulling the 'worse than' qualities?

Step #5, Select one or more concepts

- Determine if further benchmarking, research or background is required.
- Determine if resolution of your screening matrix is good enough – continue to update criteria to reflect new knowledge.

Step #6, Reflect on the results and the process

- ALL TEAM MEMBERS SHOULD

"See EYE TO EYE"

"BUY-IN"

"BE ON THE SAME PAGE"

"Be prepared to take a bullet"

"Be able to stand up and give solid reasons why this makes sense."

Concept Scoring

Prepare the selection matrix

Rate the concepts

Use a finer scale: 1-5 (page 135)

Rank the concepts.

Combine and improve the concepts

Select one or more concepts

Reflect

Common Pitfalls

- Not doing it
- Running with the first idea
- Selection chart criteria don't correspond to PDS
- Letting an "experienced" designer make the choices
- Going by gut feel
- Letting a manager decide
- Not buying into the process as a team
- Forgetting the customer

Final Words: Concept Gen & Selection

- Write the PDS *first* !!
- Generate *lots* of ideas!
- Resist temptation to run with first idea
- Use a selection process
- Check "Common Pitfalls" lists:
Is your group "guilty"?

Contributions to Your Report

- Concepts Appendix
- Selection Chart
 - Unweighted: Chap. 6, Appendix A
 - Weighted: Chap. 6, Appendix B

02/02/06 Lecture #6 Concept Selection

- Product Design Specification (due 02/02).
- Mission Statement (due 02/02).
 - Paper copy to Pat Meyer
 - Electronic to Wei and to guio0001@umn.edu
- Read Ulrich and Eppinger Text, Chapter 16, pg. 334-352