Concept Generation

ME 4054W
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Reference: Ulrich & Eppinger, Chapter 6
Product Concept Generation

• The goal of product concept generation is to come up with many (scores of) possible ways to implement a design.

• The product concept selection process will help you determine which one is best.
Product Concept Attributes

• A product concept is an idea that addresses the product design specification
• Concept generation is cheap and easy
• Initially, the product concept can be fragmented, complete, abstract, or detailed
• Portions of concepts can be combined to generate new concepts
• Concept selection is harder

Work the processes and they will work for you!
Concept Generation (aka Ideation)

• Is a process
• Can be learned
• Is not predictable
• You are trying to find things that are not apparent
• Is easy if attitudes are positive
Guidelines for Brainstorming

1. Suspend judgment – all ideas are accepted without feedback

Resist the urge to judge. Don’t say things like:

- “That will never work…”
- “That will cost too much…”
- “How many pounds of unobtainium are needed…”
- “That’s a great idea…”
Guidelines for Brainstorming

2. Generate lots of ideas
   • Leverage / combine ideas where appropriate

3. Welcome “wild” ideas that may not seem feasible
Guidelines for Brainstorming

4. Use written, graphical and physical media

- *Document everything*: 3x5 note cards, design notebook, 8.5x11 paper – whatever works
- Use key word descriptors and sketches
- Be able to track the date and who generated the idea (e.g., add initials or team members use different colored pens (keep a key of who had each color))
- The brainstorming should be compiled and uploaded to your Google website. It will also be in your final report.

**The goal is to create ***scores of ideas***
Ideation - Example

What is half of 8?
What is half of 8?

$8 \div 2 = 4$

This is one possible solution, but ...
What is half of 8?

... so is this ...
What is half of 8?

... and this.
Motor pulls cart on a string. When cart reaches its destination, it tips and spills its contents into receiving box.

Motor winds string.
Concept Generation Methods

• Make analogies
• Change the scale
• Wish and wonder
• Set quantitative goals
• Use related stimuli
• Use unrelated stimuli
• How would you achieve the opposite goal? Better yet, does anything achieve the opposite goal today?
Brainstorming Process

- Assign a facilitator
- Define the topic
- Agree on a stop time
- Agree on recording method(s)
- Build on ideas of others
- No judging or stopping to evaluate
- Interruptions are OK

Your team should have at least two brainstorming sessions
Organize, Combine, and “Cross-Pollenate”

• Concept classification tree
• Combination table
• Other methods for exploring ideas:
  – Catalog
  – Sort (affinity grouping)
  – Combine
  – Post on a wall
  – Revisit
Common Problems that Limit the Concept Generation Process

- PDS is not well defined prior to concept generation
- Insufficient external search
- Existing concepts not leveraged
- Not enough ideas (think 100+)
- Judgment occurs during brainstorming
- Going with the first idea
Go Forth and Brainstorm!

http://www.clamlynch.com/blog/brainstorm.jpg