Tools for Moving Beyond Incremental Innovation

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Goals of a Science of Innovation

• Discontinuous Innovation is valuable
  – Swiffer: Over $150M in sales in first year
  – Breath Strips: A $225M industry by 2002

• Much mythology surrounds innovation
  – Stories of the lone inventor
  – Products that (seem to) spring from out of nowhere
    • Steam engine; Cotton Gin; Radio

• Understand the processes involved in innovation to make it repeatable
Repeatable Innovation

Vs.

• How can innovation be made repeatable?
• Modes of innovation
  – Serendipity (Post-it Notes)
  – Basic Research (Pharmaceuticals)
  – Finding prior solutions to current problem
    • Similarity: A solution exists in the same domain
    • Analogy: Solutions exist in other domains
      – Kris Wood will discuss this issue as well
Barriers to Innovation

• Poor problem representation
  – This will be our focus
• No known solutions in design group
  – Expand design group; Use Databases
• No known solutions at all
  – Need Basic Research
• Difficulties evaluating potential ideas
  – Need for multidisciplinary teams
Problem Representation

• Statement not sufficiently detailed
  – Illusion of Explanatory Depth (Rosenblit & Keil)
    • Design groups believe the problem statement is more explicit than it really is

• Statement too vague
  – Increase effectiveness; Increase repeat purchase

• Statement too narrow
  – Improve scent of rug shampoo
    • What is causing the odor?
    • Maybe an anti-bacterial shampoo would be better.

• Group dynamics may force early consensus
Retrieving analogies

• Analogical retrieval is often difficult
  – Problem representations are often domain specific
  – Analogies come from different domains

• Memory retrieval is based on content
  – Overlap between information in cue and information in memory drives retrieval
  – Solution to problem is not known
  – So, retrieval is based on the overlap of the cue with problem statement

• Solutions are only obvious in retrospect
Goal of Tools for Innovation

• Work with each group member prior to consensus
• Make elements of problem statements explicit
• Allow design groups to consider problem at a variety of grainsizes
  – Focus on task/product/parts
  – Consider alternatives to the product
• Optimize for analogical retrieval
  – Domain general relations
  – Abstract descriptions of objects