

## Creativity and Creative Thinking

- What is creativity?
  - Novelty
  - Quality
  - Regularity
- Creativity continuum
- Are people creative or are actions creative?

## Lateral and vertical thinking

- Lateral thinking
  - Digging a deeper hole
- Vertical thinking
  - Digging other holes



## Genius and everyday creativity

- Example:
  - Alexander Calder
  - Creative genius but exposed to many things that influenced his work
- Rick Knowledge base is needed.
- Suzuki Violin Schools

### Sensitivity

- Noticing relevant information
- Especially if not obvious
- For finding solutions and also for finding and defining new problems
- Creative people might “notice” more things

### Synergy

- Bringing together two unrelated domains
- Example: The GUI
  - *Visio-spatial ability and data entry*
  - *Mouse, Desktop, Trashcan, window, folder, Icon*
- One way to foster creativity is to bring together diverse experts
  - *The Beckman Institute*

### Serendipity

- Happy accidents
- But happy accidents only matter when someone notices them and realizes what has happened.
- The Lazy guy and the wheelbarrow

### Investment in Creativity

- Buy low and sell high
- Creative people often work in unpopular or unknown domains and move on when the domain is popularized
- The difference between “Starsky and Hutch” and the “The Passion”

### **Creativity as a System**

- Peer review is important
- Creative things must be good as well.
- There might be many uncreative movies and music now, but there always was, we just don't remember them

### **Stretching and Rejecting Paradigms**

- Paradigm is an example used as a pattern, a way of thinking about problems.
- Wireless phones
  - *Text messaging and cameras have changed the paradigm*
- MTV
  - *Promotional videos were internal industry things*
  - *MTV created a new paradigm*

### **Problem definition**

- Creativity sometimes means creating new problems
- Especially obvious in marketing
  - *Instant messaging/text messaging*
  - *Chicago's "cows on parade"*
  - *Viagra*
  - *Psychological drugs and selling the disease*

### **Selecting relevant information**

- Creativity often means solving a slightly different problem
- Counselor and therapists
  - *Example: Marital problems*

### **Generation, Exploration, Evaluation**

- Creativity is good problems solving.
- A cycle
  - *Generate new problems and solutions*
  - *Explore new possibilities*
  - *Evaluate efforts*
- Creativity is time consuming and is hard work

### **Insight and Incubation**

- Richer knowledge structures
- Creativity might depend of being knowledgeable
- The Lord of the Rings
  - *Creative*
  - *Tolkien knew his mythology*

### **Analogical Thinking**

- Creative Analogies
  - *Two concepts are seen as similar one very deep structures*
- Archimedes and Eureka
  - *Taking a bath is an analogy for volume*

### **Making the familiar seem strange**

- Sometimes too much familiarity is bad
- Experts can get in a rut
- Approaching a familiar problem from a strange angle can encourage creative thinking
  - *Cubist art, abstract expressionism*
  - *Pop art and Andy Warhol*
  - *Punk Rock Music*

### Remote associations test

- River, Note, Blood
- Board, Duck, Dollar
- File, Head, Toe
- Boiled, Lid, Flower
- Ball, Malaria, Butter
- Class, Stage, Soccer

### Encouraging Creativity

- Critical thinking and problems solving can be taught
- What about creativity?
- Creative people vs Creative activities
- The “creative” class
  - *Artists and Musicians or Engineers and investment bankers*

### Creativity as a goal

- In Public schools?
  - *Roman Numeral in Kindergarten*
  - *Handwriting in grade 1*
  - *Writing number from 1 to 100*
  - *Winnie the pooh CD-ROM*
- Montessori schools, Waldorf Schools

### Environmental Factors

- Intrinsic motivation
  - *You do it because you love to do it*
  - *e.g. research*
  - *Fosters creativity*
- Extrinsic Motivation
  - *You do it because you have to*
  - *Your boss decides*
  - *Does not foster creativity*
- How to kill intrinsic motivation
  - *Constant evaluation*
  - *Surveillance*
  - *Reward*
  - *Competition*
  - *Restricted choice*
  - *Extrinsic orientation toward work*
- School is not all bad
  - *Creativity needs a rich knowledge structure*
  - *Sometimes that can only be gained through extrinsic work*
  - *Picasso was a skilled and trained realists first*

### **Personality**

- Non conformity
- Self confidence
  - *The eccentric genius?*
  - *The eccentric regular guy?*
  - *The regular genius?*
- G.W. Bush is creative in this sense

### **Basic strategies for creativity**

- Rules for breaking the rules?
- No, just guidelines
- All these strategies encourage deeper thinking

### **Productive thinking Program**

- In the 1970's for 5th and 6th graders
- Solving mysteries along with reading a book
- Many current PC and Video games are similar
- Might encourage some creativity, but no hard evidence

### **Quantity**

- Brainstorming
- Have many ideas can encourage novel ideas
- Also encourages synergy

### Creative Ideas Checklist

- "Forcing" people to think of different angles
  - *Put to other use?*
  - *Adapt?*
  - *Modify?*
  - *Magnify?*
  - *Minify?*
  - *Substitute?*
  - *Rearrange?*
  - *Reverse?*
  - *Combine?*
- Would this help you design a better class?

### Attribute listing

- Every attribute of an item is listed and considered for combination
- Cooking a creative dinner in 30 minutes
  - *Canned Tuna*
  - *One Piece of Left over chicken breast.*
  - *Deli Meat (ham, roast Beef)*
  - *Frozen peas and frozen corn*
  - *Milk, butter and eggs*
  - *Cheese*
  - *Some rice and pasta*
  - *Canned Tomatoes*
  - *Ramen Noodle soup*
  - *Garlic, onions, spices*
  - *Tortillas*

### Other possibilities

- Crovits's Relational Algorithm
- Plus, Minus, Interesting
- Activating inert knowledge
- Browsing
- Visual Thinking