Cultural Diversity, Technology and Usability

1st Multidisciplinary Summer School on
Design as Inquiry
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Workshop E

- The workshop explores how culture influences cognition, and how culture affects the way we work and use technologies. The aim of the workshop is to get a better understanding of the embodied aspects of culture through practical exercises and experimental design tasks. There will be a short introduction to theoretical understanding of re-engineering of cognition. Most of the time is spent on discussion and hands-on exercises.

Outline

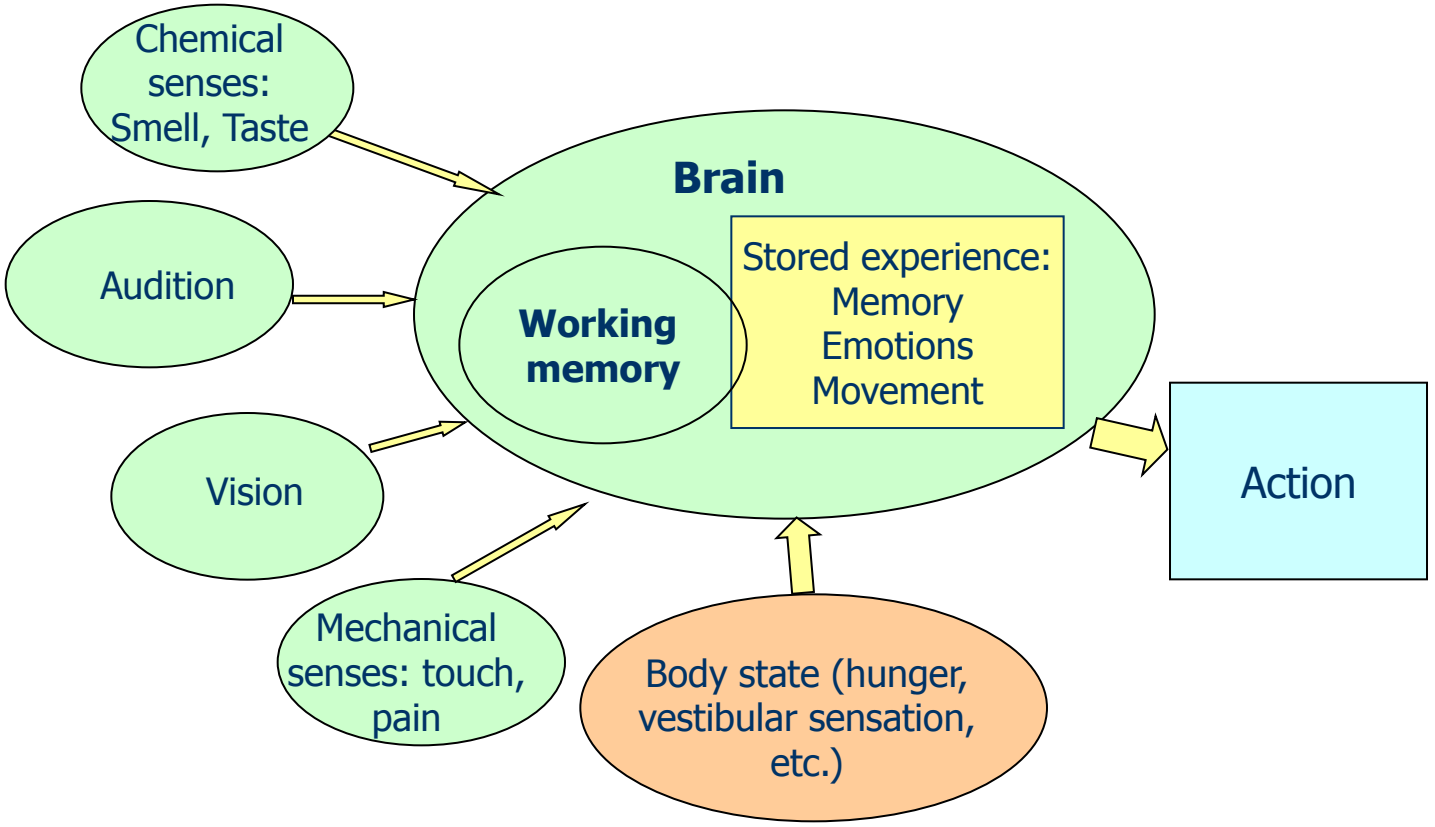
- Introduction
- Understanding the human mind
- Cultural schemas – hands on
- Retooling of cognition
- Culture and technology - practice

Introduction

Fields of science:

- Cross-cultural psychology
- Cognitive anthropology
- Cognitive science - neuroscience

The human mind
Modalities: perception



Embodied knowledge and feeling:
Antonio Damasio

Body, emotion, the feeling brain and consciousness

1. Emotion (physical response)
2. The feeling of that emotion
3. Being aware of the feeling of that emotion

- Primary emotions: happiness, fear, anger, surprise, sadness, and disgust
- Conscious and unconscious feelings
- Cognition, feeling and body are inseparable

A.Damasio: The feeling of what happens; Looking for Spinoza; Self comes to mind

Example

- Music: http://www.youtube.com/watch?v=f7aJOdA4428&feature=related
- List your feelings, perceptions, what makes you comfortable right now?

Damasio: maintaining balance

All living organisms try to maintain homeostasis:

- ”We should seek joy, by reasoned decree, regardless of how foolish and unrealistic the quest may look.”
- ”Feelings of pain or pleasure or some quality in between are the bedrock of our minds. We often fail to notice this simple reality because the mental images of objects and events that surround us, along with the images of the words and sentences that describe them, use up so much of our overburdened attention.”

Culture: Embodied feeling and culture

"Culture is the pattern of beliefs, behaviors, and values maintained by groups of interacting people"

- It refers to observational constructs of cultural experience rather than to the experience itself
- Reification of culture, culture as cognitive construct is only a partial view
- Embodied feeling of the culture, feeling of appropriateness:
  do you feel comfortable in this environment, with these people? (Bennett)

What can you observe?
Cognition?
Feeling?

Etiquette
Taste
Tools
Clothing
Sitting position
Smells
Table setting

Human cognitive capacity

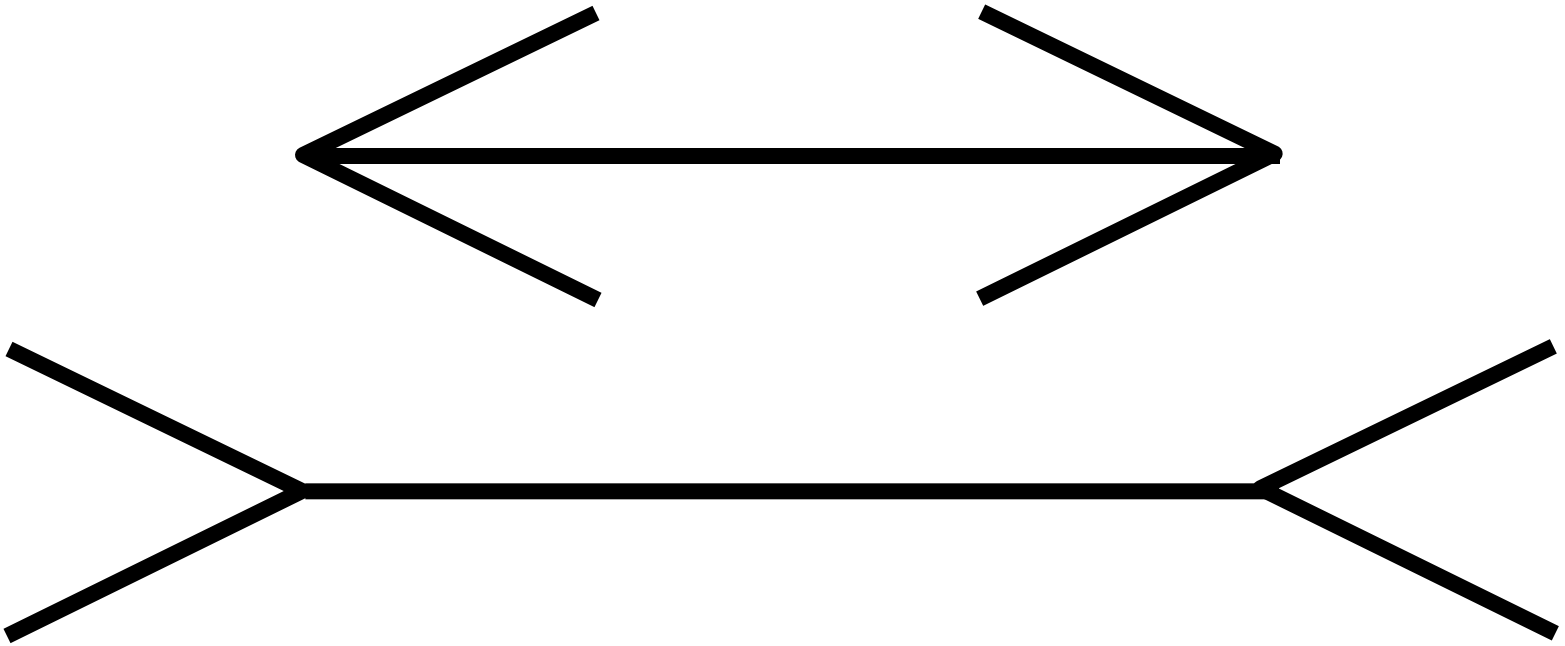
- Attention: selective perception
- Object and background:
  discrimination,
  exceptional features
- Attention is directed to one object
- Memory registers also unconscious perception
- Automatic actions (bicycle riding) do not need attention;
  but then action becomes fixed, difficult to modify (changes in interface)

Human perception – cultural variation

- People can discriminate color and lighting
  - Different color categories in languages
- Object and background
  - Western preference for objects (?)
  - Collective vs. individualistic
- Borders and continuity
- Shapes and interpretations

Interpretation

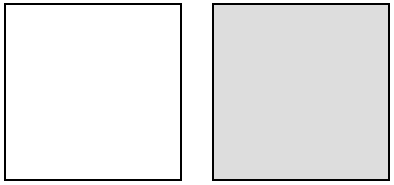
- Müller-Lyer -illusion



Culture specific?

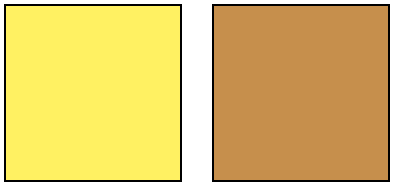
Cultural feeling of colors

cold, pure, innocence, empty, death, age, West, misfortune



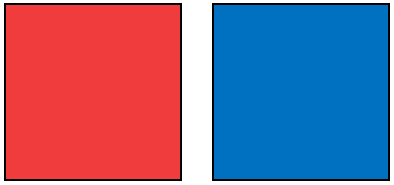
neural, independent

happiness, creativity, sun; earth, center; envy



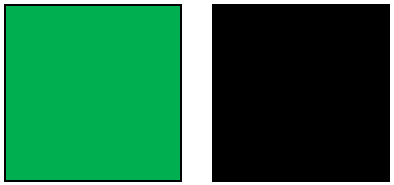
safety, warmth, dirt

action, danger, excitement; blood, life, fire, love; good fortune



hygienic, cold, calm; intellect, low emotion; bad fortune

calm, natural; growth, vitality



modern, death, darkness

Photos

- Orientation
- Left – right
- Cognitive overload:
- Speed
- Amount of signals and signs

Practice: comparing web sites

Universities:

- http://www.usm.my/
- http://www.univ-provence.fr/public_html/univ-provence/
- http://www.columbia.edu/

Governments:

- http://government.ru/eng/
- http://government.fi/etusivu/en.jsp
- http://www.governor.state.nm.us/
- http://www4.city.kanazawa.lg.jp/kankou/index.html
- http://www.shanghai.gov.cn/shanghai/node2314/index.html
- http://www.shanghai.gov.cn/shanghai/node23919/index.html
- http://www.sierraleonepolice.org/
- http://www.assemblee.ne/
- http://www.gouvernement.gov.bf/spip.php?page=membresdugouvernement&hd=14&menu=14
- http://www.immigration.go.kr/
- http://www.bmukk.gv.at/

Re-engineering of cognition

Margaret Wilson (2010):

- Culture influences the contents of cognition,
- but culture can in addition exercise a profound effect on how cognitive tasks get done.
- Cognitive tools are invented and culturally transmitted, a transmission of cognitive practices.
- Cognitive technology: such as number vocabulary (fünfzehn, quatre-vingt-dix)
- Four main claims on re-engineering of cognition.

Claim 1: Cognitive tools are ubiquitous

Representations of number:

- Mental number line
  - Direction and scale
- Finger-counting and body-based counting
- Decimal, vigesimal, base-60, base-14 number systems
- Calculation techniques (multiplication, derivation)

  5427 x 57 =
- Slide rule, abacus

Cognitive tools are ubiquitous

- Spatial representations of time:
  - Calendars
  - Clocks
  - Circular time – linear time
- Writing and literacy
  - Manifold effects on thinking and cognition
- Musical cognition
  - Based on notation/ playing an instrument/ dance steps

Cognitive tools are ubiquitous

- Maps
  - Survey vs. route map
  - Micronesian navigation maps (stars, islands, time)
- Memory aids
  - Non-literary cultures have epic stories, recital, ”dreaming” stories and pictures

Claim 2: Use of cognitive tools alters neuro-cognitive architecture

Brain development:

- The process of neurogenesis populates the brain until the maximum number of neurons has been reached at age 2,
- then programmed cell death cuts the growing brain down to size.
- During adolescence the brain goes through a process of synaptic pruning.
- Frontal cortex develops last, until over 20.
- Brain plasticity decreases in time, the localization of functions stays fixed in adults.

Use of cognitive tools alters neuro-cognitive architecture

Alteration of brain systems based on the plasticity of the brain

- Expert musicians
  - Violin or piano players have an enlarged brain area to control finger movements
- Spatial ability
  - London taxi drivers develop a larger hippocampus
  - Mathematicians and gamers learn to think in 4D
- Meditation practice
  - Changing brain waves on long-term basis

Use of cognitive tools alters neuro-cognitive architecture

- Language and writing
  - Chinese employ visuo-motor brain areas for reading and writing to a much larger extent than alphabet users;
  - writing Chinese characters requires lots of hand movement control and visual memory
    安
  - http://en.wikipedia.org/wiki/Stroke_order#General_guidelines

Use of cognitive tools alters neuro-cognitive architecture

- Language and writing
  - Handwriting improves students' thinking ability
  - Blind people allocate visual brain areas to touching and hearing
  - Deaf people allocate language areas to sign language (but not to other hand movement)

Claim 3: Cognitive retooling exploits body representations

- Cognitive retooling is grounded in embodied cognition
- The use of perceptual, motor and spatial representations to facilitate cognition.
- Abstract thinking
  - Originates in concrete metaphors
  - Uses graphs, diagrams, etc.
  - Body counting,
  - Gesturing in speech

Brain: large areas of the cerebral cortex are specialized in processing perceptual information, motor planning and perception – action links

Claim 4: Flexible voluntary control permitted the emergence of cognitive retooling

- Animal behavior is largely stimulus-bound and stereotyped.
- Humans can deceive, play theatre, and exercise voluntary control over their body.
- They can invent new physical tokens (movements, sounds) that carry new meanings.
- Example: how many different ways of greeting we know?

Technical cultural schemas

- Embodied experience
  - Water faucets
  - Light switches
  - Opening doors
- Physical feeling as part of the work
  - Hearing from the sound of engine that something went wrong
  - Touchpads vs. keyboards
  - Clicking the mouse: double-clicking

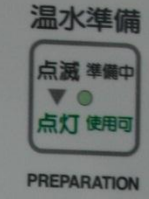
INAX

※客室に備えてある使用説明書をよくお読みになり、正しくお使いください。
Read all of these instructions carefully before using this Shower Toilet.

シャワートイレのご使用方法
How to Use the Shower Toilet

●便座に座ります。

To prepare the warm water rinse:
便座に座ると温水準備動作が始まり、便器内に給湯管内の冷水を排出します。
温水準備ランプが点滅から点灯に変わったらご使用になれます。
Sit down on the seat. When the PREPARATION indicator lamp stops blinking and shows a steady illumination, the warm water rinse is ready.



●おしり（ビデ）スイッチを押します。

To begin rinsing, push the SHOWER or BIDET button as desired.
洗浄強さダイアルを回して、おしり・ビデ洗浄の強さを調節します。
Adjust the shower or bidet spray pressure by turning the SPRAY STRENGTH dial.

●止スイッチを押します。

Push STOP button.
洗い終わったら止スイッチを押して、おしり・ビデ洗浄を止めます。
When you want to stop the shower or bidet spray, push the STOP button.

◎暖房便座の温度を調節します。(暖房便座付の場合)

Push the SEAT TEMP. button to choose the seat temperature HIGH or LOW.
(Seat heater type only)

Shower toilet　シャワートイレUシリーズ　GCW-1038

Technology as a cultural schema

- Children learn through their bodily experience already before birth
- Numeracy skills develop at an early age
- Systematic vs. divergent approach
- Analytic thinking is produced by culture and long training
- Epistemological and ontological views
- Familiarity with technical devices creates a caring relationship and a habit of maintenance

Creative hands-on task

- Design a prototype for a mobile device for a foreign culture, such as a device for Kalahari San or Canadian inuit or a Mongolian herder. Nowadays mobile phones have very dull, technology driven design, but maybe future takes user needs better into account?

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