# GUI universal and global design

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# Metaphors in user interface

Words

Images

Sounds

Touches

Operating systems

Applications

Data

# Metaphor

- **Metaphor** is an important figure of spoken and visual communication (disciplines: semiotics, communication technique, rhetorical trope)
- **Metaphor** is a fundamental component of all user interfaces (*Carroll and Thomas 1982*, statement arguable by other professionals in UI design)

There is a need to agree on fundamental metaphors for communication interfaces - formalization, standardization.

# Future of metaphor

- Future interfaces (eg. virtual headsets, virtual or augmented reality displays) wouldn't require metaphors *(Jaron Lanier in late 1980s)*
- Neural input or signals would not need metaphors for communications:
  - no physical visual or acoustic displays

Fundamental notions (such as desktop metaphor) are said to me coming to an end *(Loebl 2011)*

Metaphor is said to be culture biased *(Chavan 1994)*

# Content oriented approach

- Users tend to focus more rather on content than tools

- “As smart watches and other wearables, driverless vehicles, robots, and the internet of Things become more ubiquitous and absorbed into our lives, all of us, in the development and consumer communities, will be challenged to invent and to accommodate to new, sometimes unfamiliar and unexpected metaphors.” - *Marcus and Baradit 2015*

# Cultural aspect

Dimensions of all cultures *(Hofstede 1997)*:

- Power distance: a culture's acceptance of the differences between leaders and followers
- Individualism *vs* . collectivism: self- *vs* . group orientation
- Femininity *vs* . masculinity: merged or distinct traditional gender roles
- Uncertainty avoidance: lack of tolerance for ambiguity
- Short *vs* . long- term time orientation: the degree to which a culture takes a longterm view.

# Western and eastern worlds

- 5 world cultural groups:
  - USA, Europe, China, Korea and Japan

A Japanese computer-science researcher commented that he thought Japanese developers preferred software applications from Europe, specifically the Scandinavian countries of northern Europe, to those developed in the USA. The reason? According to this person, European software seemed more “elegant, sensitive, and in tune with Japanese culture” than the “impolite software from the USA, which sometimes turned out to be vaporware due to USA marketing habits.” - *Aaron Marcus, 2004*

# Universal market orientation

- Culture-oriented research
- Localization (adaptation to local cultures)
- Changing/adapting the overall menu hierarchy, not just the terms
- Physical adaptation of hardware
- Testing user interfaces in “distant lands”

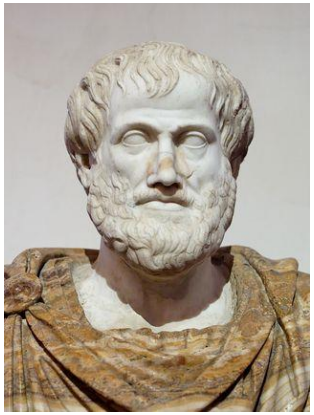
Standard def. “usability” may not be universal or world-wide

Differences in approach of information between different cultures (China, US, Korea) – “**geography of thought**” – a term by *Nisbett et al.*

# Human behavior is a function of culture

- Explanations for varying world perception:
  - differing ecologies
  - social structures
  - philosophies
  - educational systems that date back to ancient Greece and China
- Holistic way of thought of East Asian peoples – based on perception and relations among objects
- Focus on salient objects or people by westerners – categorization of attributes and application of formal logic to understand the behavior of things

# Eastern and western world background

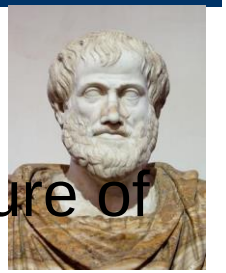


# Eastern and western world background

## CHINESE: TAO

- Three philosophies: Taoism, Confucianism and Buddhism
- Sense of “collective agency”
- Self perception through social relations, contributing to group goals and carrying out prescribed roles.
- Things as part of their environments

## GREEK



- Fundamental nature of world
- Sense of personal agency – individualism
- Cultivation of social and leisure activity
- Explanations for phenomena and the objects’ properties
- “Things do not change because things have properties, and properties cannot vary”

# Think differently

## East Asians

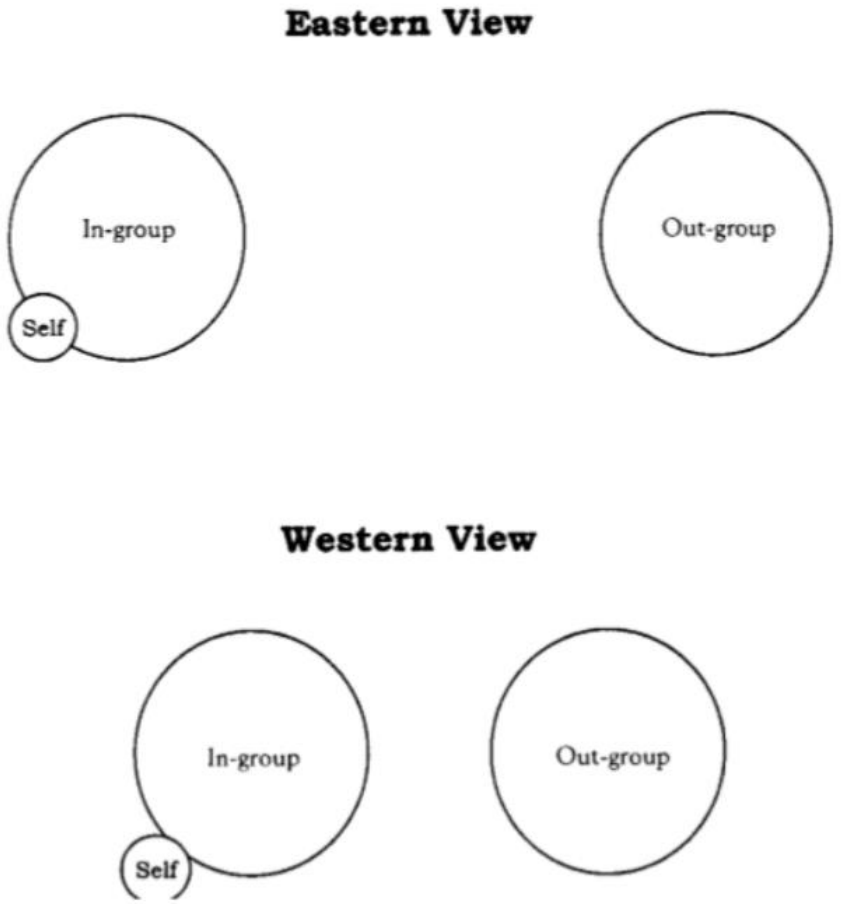
- believe in constant change
- things always moving back to some prior state
- pay attention to a wide range of events
- search for relationships between things
- think you can't understand the part without understanding the whole

## Westerners

- simpler, more deterministic world
- think they can control events because they know the rules that govern the behavior of objects
- focus on salient objects or people instead of the larger picture
- strong interest in categorization, which helps them to know what rules to apply to the objects in question
- formal logic plays a role in problem solving

# Relashionships among itself

- **In-group =** close circle of friends or family
- **Out-group =** people who are mere acquaintances



# User interface research includes

- Cognitive science
- Computer science
- Graphic design
- Hardware development
- Human factors
- Information architecture
- Social science
- Software psychology
- Software development
- Web development

Among others …

# User interface theories

- study of patterns of architectural form *(Alexander et al. 1977)*
- general systems theory (*Ludwig Von Bertalanffy, 1962*)
- semiotics, the science of signs - *Prof. Umberto Eco (1979)*
- Understanding intelligence as 7 ± 2 dimensions of human cognition and emotion *(Howard Gardner ( 1993 ))*
- five dimensions of all cultures, which affect work, education, and family life *(Hofstede 1997)*
- presence of metaphors within most human communication *(George Lakoff and Mark Johnson ( 1983 ))*
- classic elements of urban form as information representations *(Kevin Lynch ( 1960 ))*
- 18 fundamental functions modeled on those of biological organisms *James Miller ( 1985 )*

# UI design activities

- Applied semiotics
- Computer-based communication design
- Computer-based theater design
- Computer-human interaction design
- Experience design
- Human-computer interaction design
- Information architecture
- Information design
- Interaction design
- Interactive media design
- Narrative design
- User-experience design
- User-interface design
- Visual design,

to name a few.

# UI Lexicon

- **Information Visualization -** tables, forms, charts, maps, and diagrams
- **Interaction -** input/output techniques, status displays, and other feedback (keyboards, mice, pens, or microphones for input; visual display screens, loudspeakers, or headsetsfor output; and the use of drag-and-drop selection/action sequences.)
- **Metaphor** - words, images, sounds, tastes, smells, and tactile experiences.

# UI Lexicon

- **Mental Models -** user models, user cognitive models, user task models, and designer models
- **Navigation -** movement through the mental models, i.e., through content and tools (eg. enable dialog, such as menus, windows, dialog boxes, control panels, icons, and tool palettes)

# UI Lexicon

- **Semiotics -** science of signs *(Eco 1979 )*. It identifies 4 dimensions of “meaning” information visualizations that communicate through “signs.”
  - *Lexical:* how are the signs produced?
  - *Syntactic:* how are the signs arranged in space and time, and with what perceptual characteristics?
  - *Semantic:* to what do the signs refer?
  - *Pragmatic:* how are the signs consumed or used?

# UI Lexicon

- **User Interface (UI) -** A computer-mediated means to facilitate communication between human beings, or between a human being and an artifact (definition by Aaron Marcus (2014) )

*Synonyms* for user interface:

- human-computer interface
- human-human interface (appropriate for smart era)

- **User-Interface Components:**
  - metaphors
  - mental models
  - navigation
  - interaction
  - appearance

# UI Lexicon

- **User-Interface Design**
- **User-Interface Development** includes the following processes:
- plan, research, analyze, design, implement, evaluate, document, train, maintain, and recycle/replace
- **User-Interface Platform** is physical home of the user interface (i.e., hardware and software)

# Universal design

In the context of disabled and elderly.

World leaders for realization of design are Scandinavia and Japan, and some groups in the USA.

In Europe, movement is called “universal access or usability for all”.

# Tbc...