
Understanding and serving users

Individual differences among users

Users as social beings

Discussion groups

- Devise 3 guidelines from the literature on user psychology
- Be as specific as possible
- Provide context where necessary
- Guideline should allow designer to make a decision without further information
- Cite appropriate references

Sample

- Users learn by doing and will make mistakes so provide short, meaningful instructions that are natural-language based, explanatory, and indicate how to rectify problems. (Norman, 1988)
- Users will view the initial look and feel of an information resource as indicative of its usability and quality, so design all aspects of the user interface to present a tidy and visually appealing front to the user (Tractinsky, 1997)

Individual differences in people

- In typical tasks, after training, there is a 2:1 ratio between best and worst performers
 - Test scores, exam performance
 - Memorization
 - Speed of learning
 - Nielsen's data on expert usability evaluators
- Though in computer tasks it is often higher
 - Egan (1988), Weinberg (1971)

Why do we care?

- Selection purposes
 - Recruit the best and you'll outperform the rest!
- Training purposes
 - Increase performance of the 'rest'
- Design purposes
 - If users vary, then the resources they need will likely vary accordingly.

Major sources of difference

- Intelligence or cognitive ability
- Personality
- Cognitive style

Obviously ignoring:

- life history
- experience etc.

Three Stratum Intelligence View:

Intelligence (G) is made up of:

- crystallized intelligence
- fluid intelligence
- general memory and learning
- broad visual perception
- broad auditory perception
- broad retrieval ability
- broad cognitive speed
- processing speed.

see Carroll (1993)

Carroll's 3 Stratum model:

Each level can be decomposed:

1. General Memory

1.1. Associative

1.2. Episodic

1.3. Span

1.3.1 digit span test

1.4. visual memory.

Personality

- Generally stable disposition to feel and behave in certain ways
- Multiple personality variables have been proposed
- Scientific evidence is mixed!
- Construct has validity for people however

“ The Big 5” factors

- neuroticism,
- extraversion,
- openness to experience,
- agreeableness, and
- conscientiousness

(Digman, 1990)

In psychological terms

- High neuroticism (low stability)
 - less attentional resources
 - easily distracted
 - classify neutral stimuli as more threatening
- May need more support in learning
- Limit competing demands on attention

Introversiion/Extraversiion

- Most reliable variable
- Introversiion display higher cortical arousal
 - though time of day effects operate
- Tend to be slower (but more methodical) in STM retrieval
- Extroversiion more affected by external variables

Cognitive Style

- Specific information processing characteristic, stable over time
 - field independence/dependence
 - holism/serialism
 - passive/active
 - visualiser/verbaliser

Field independence/ dependence

- FI's are less likely than FD's to show distortions and inaccuracies in perception under difficult conditions
- FD's much more influenced by context
- FI correlates positively with IQ

What differences predict performance?

| <u>Individual difference</u> | <u>r</u> | <u>Var exp</u> |
|------------------------------|----------|----------------|
| Work sample test | 0.54 | 29% |
| General ability tests | 0.53 | 28% |
| Personality and Style tests | 0.03 | <1% |

But....depends on precisely what you want to predict!

Designing interface for Wall St?

- High stress
- Lots of visual discrimination tasks
- Rapid response required by user

Then:

FI/extraverts likely to outperform
FD/introverts

So: contextual knowledge enables better
application of these variables

Aging

- Increasing proportion of the population
- Cognitive speed diminishes
 - LTM retrieval significantly slowed
- Perceptual capability is diminished
- Decision making quality is better
 - lifetime of experience to call upon
- Vast redundancy of CNS helps us!

Task effects

- Rapid information processing most affected (fluid intelligence)
 - Computer game (and IQ) performance deteriorates with age (from 18 to 36!!)
- Language skills do not (crystallized intelligence)
- Shifting balance between speed and quality!

Challenge for Information specialists

- Design information systems and resources to overcome, not merely to accommodate.....

Users' learning difficulties (1)

- Blame themselves for errors
 - leads to frustration and poorer learning
- Lack basic knowledge about technology
 - Designers assume users have 'common-sense'
- Make elaborate ad-hoc interpretations
 - Confirmation bias, familiarity bias

Users' learning difficulties (2)

- Tend to generalize from what they know
 - assume consistency beyond its relevant limits
- Have trouble following instructions
 - Tendency to ignore help, fail to see prompts
- Fail to see how problems interact
 - Consequences are not foreseen

HCI at the Organizational and Social levels

Socio-technical systems

Diffusion and Resistance theories

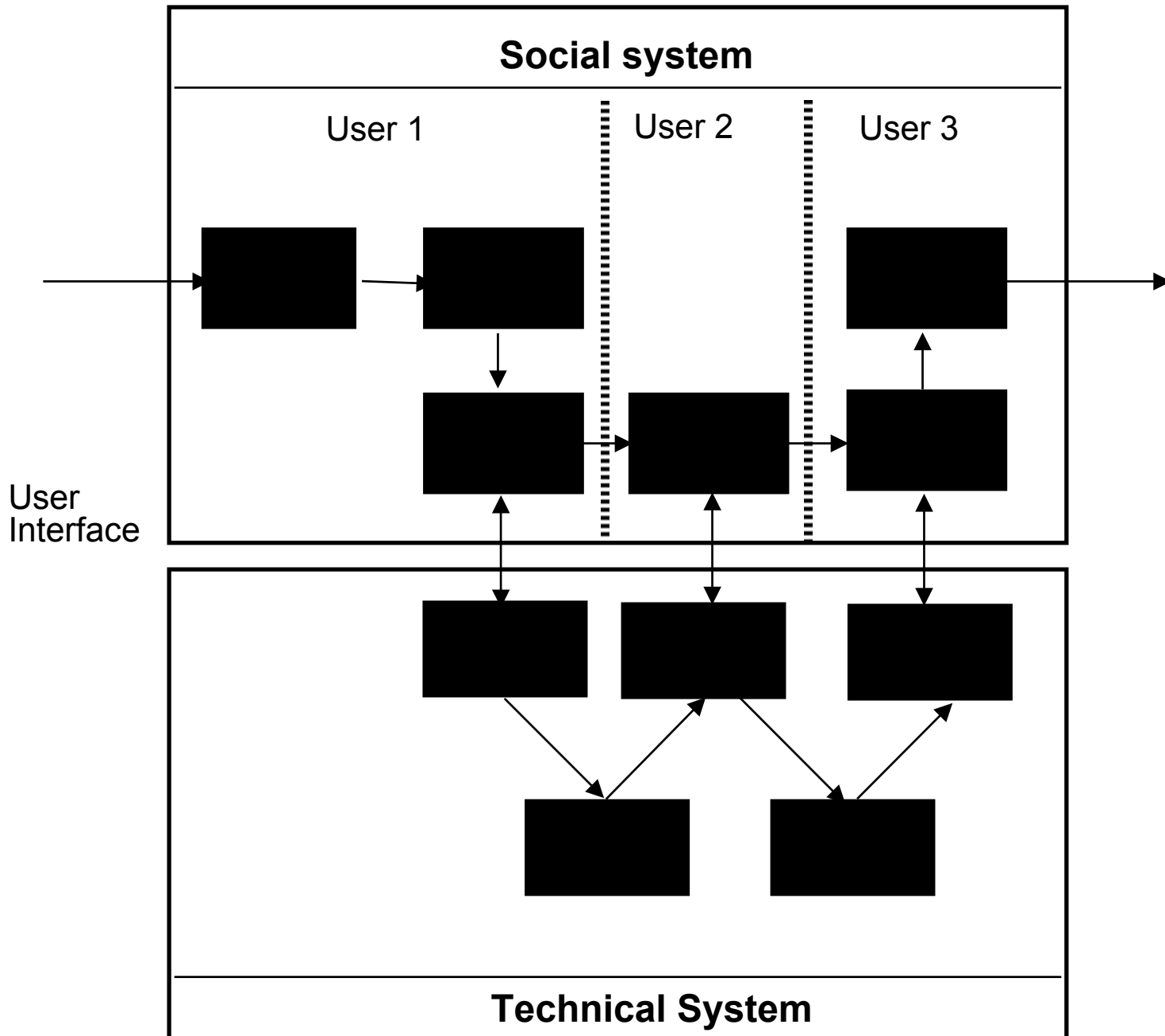
User acceptance models

Context of use

- Information systems exist in a context
 - group
 - organization
 - society
- Individual behavior is shaped by context
- Collective behavior more than simple sum of individual acts

Socio-technical systems theory (STST)

- All organizations are open systems of inter-dependent sub-units
- Organizations transform input to outputs
 - raw material to finished product
 - students to professionals
 - requirements to software
- Understanding the process requires a system-wide view



STST perspective

- An organization has both social and technical components
- These exist at all sub-units
- Technology changes the organization
- More than direct users are affected by technology
- Need to evaluate technology in terms of the organizational transformations it serves

Assumptions of STST

- Humans are well-intentioned
 - seek to serve the organization's goals
- Unconscious desires drive behavior
 - wish to develop skills/mastery
 - seek personal growth
 - desire co-operation
 - desire autonomy