

# Understanding and serving users

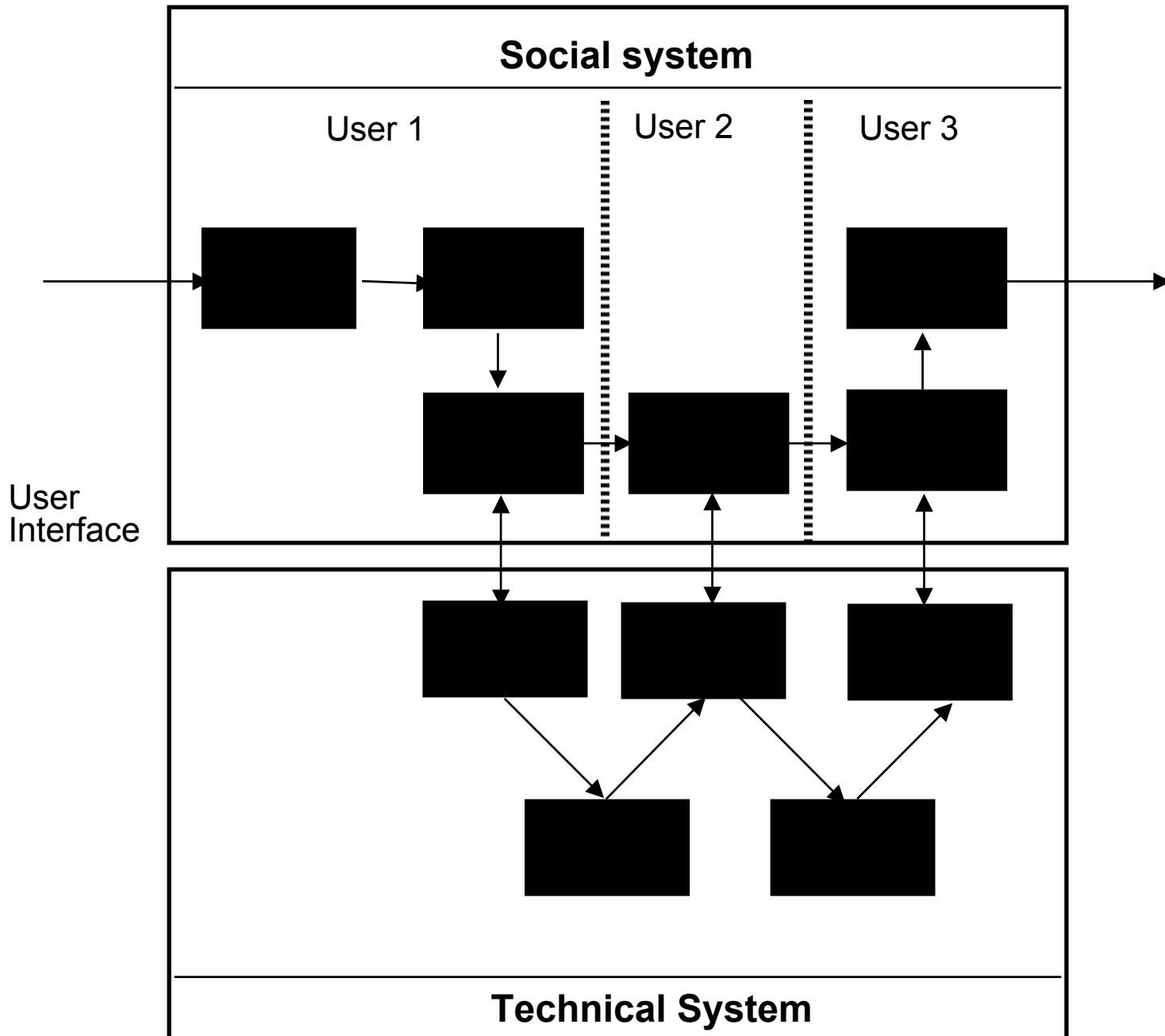
Users as social beings

Acceptance and resistance theories

Usability

# 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

- Any organization has both social and technical components
- These exist at all sub-units
- I.T. changes the organization
- More than direct users are affected by I.T.
- Need to evaluate I.T. 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

# User acceptance depends on:

- Perceived level of Control
  - Users resist outside control over their work
  - I.T. often seen as enabling outside control
- Perceived level of Enhancement
  - Users want to increase skill content of their job
  - want ability to act informally
  - have discretion over task procedures

# Resistance occurs when:

- There is increased perception of outside control through:
  - pacing
  - mandatory procedures
  - lack of reliability
  - monitoring of performance
  - limitations on access

# Acceptance higher when:

- Users see task and role as more challenging
- Requires more (provided) skill to perform
- Users have discretion over task procedures
- Users can co-operate

# Eason's (1988) 10 Propositions

1. Exploitation of resources depends on ability and willingness of users
2. IT must serve organizational goals
3. Introduction to be planned as process of change
4. All relevant stakeholders to be involved
5. IT only works where it solves problems or exploits opportunities to serve goals
6. Tasks must be seen by users as worthwhile

# Eason's (1988) 10 Propositions

7. Must be usable
8. Exploiting IT requires organizational and individual learning
9. Exploitation is evolutionary
10. Should complement existing design processes and change procedures

# Resistance theories

- Three basic classes of resistance theory which vary on underlying cause:
  - User variables
  - System variables
  - Interaction of system and organization

# User determined resistance

- Resistors are a certain type of person
  - Cognitive style
  - Personality
  - Human nature
- To overcome resistance:
  - Coerce use (threat, extra pay etc.)
  - Change users (training, replace users)

# System determined resistance

- Users resist any poorly-designed resource
  - Badly designed interface
  - Poor or limited functionality
  - Unpleasant or complicated interaction
- To overcome resistance
  - Improve the human factors
  - Modify design of the user experience
  - Engage in participative re-design

# Interaction Theory of Resistance

- Conflict in organizational change is the cause
  - Change may shift power balance
  - Division of labor may be inappropriate
  - Competing goals (local vs global) at work
- To overcome resistance:
  - Fix organizational problems first
  - “re-structure incentives”

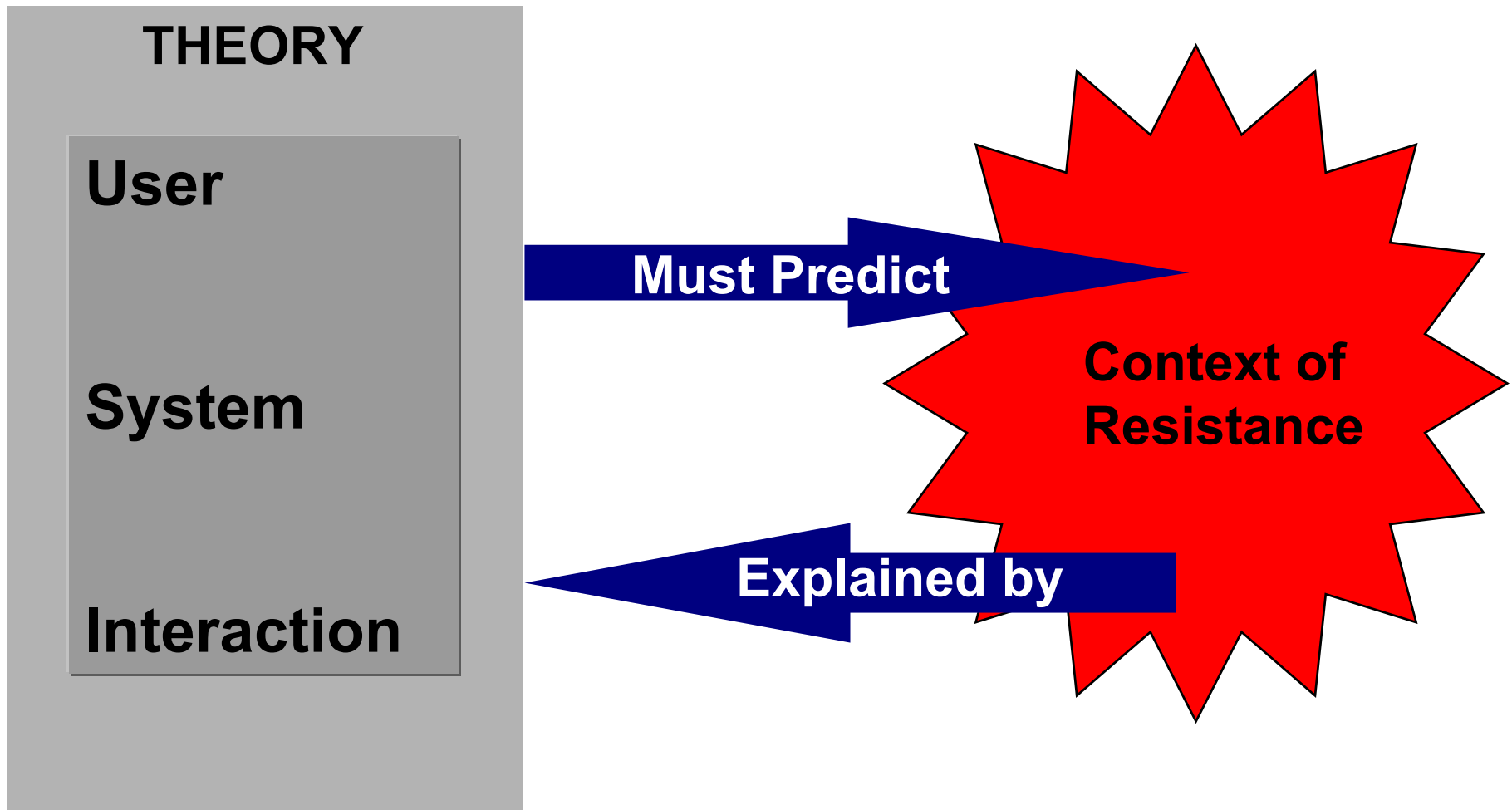
# Alternative assumptions about organizations

- Non-rational theory
  - objectives differ across organizational hierarchy levels
  - units/individuals value local over global goals
- Technical specialist group behind the info system -
  - gains control,
  - reduces dependence on others,
  - gain funding,
  - discourage external intervention

# Alternative takes

- Socio-technical systems theory is limited:
  - can be exploited by managers claiming UCSD
  - fails to account adequately for power
  - Participation can be complicated for users
- Political variant:
  - all organisations have conflict between units
  - Information systems may change power structure

# Nature of theory - Predict and Explain



# Acceptance Theories

- Group of theories which attempt to predict the human response to various information technologies
- All assume that individual behavior is (to some extent) predictive of collective behavior
  - Innovation diffusion theory
  - Technology Acceptance Model

# Innovation Diffusion (ID) theory

- Rogers (1995) posits 5 characteristics of adopted resource:
  - Relative advantage\*
  - Compatibility\*
  - Ease of use\*
  - Trialability
  - Observability of outcome

\*Most important (but concepts are ambiguous)

# Criticisms of ID Constructs

- Relative advantage (but in what sense?)
  - cheaper?
  - easier to use/less complex than alternative?
- Observability of outcome (by whom?)
  - in complex organization this may be impossible
  - task gains?

# Additional constructs

- Voluntary use
  - discretionary usage more acceptable
- Image
  - “degree to which an innovation is perceived to enhance one’s image or status in one’s social system”

Moore and Benbasat (1991)

# The nature of 'users' in ID

- Innovators
- Early adopters
- Early majority
- Late majority
- Laggards

These are 'ideals', few humans are one and only one

# Innovators

- ‘Obsessively venturesome’
- Form social networks with other innovators
- Wealthy
- Understands complex technical issues
- Gatekeeper role
- Favor change

# Early adopters

- Locally integrated
- Opinion leaders
- Aware of influence
- Serve to decrease uncertainty in group

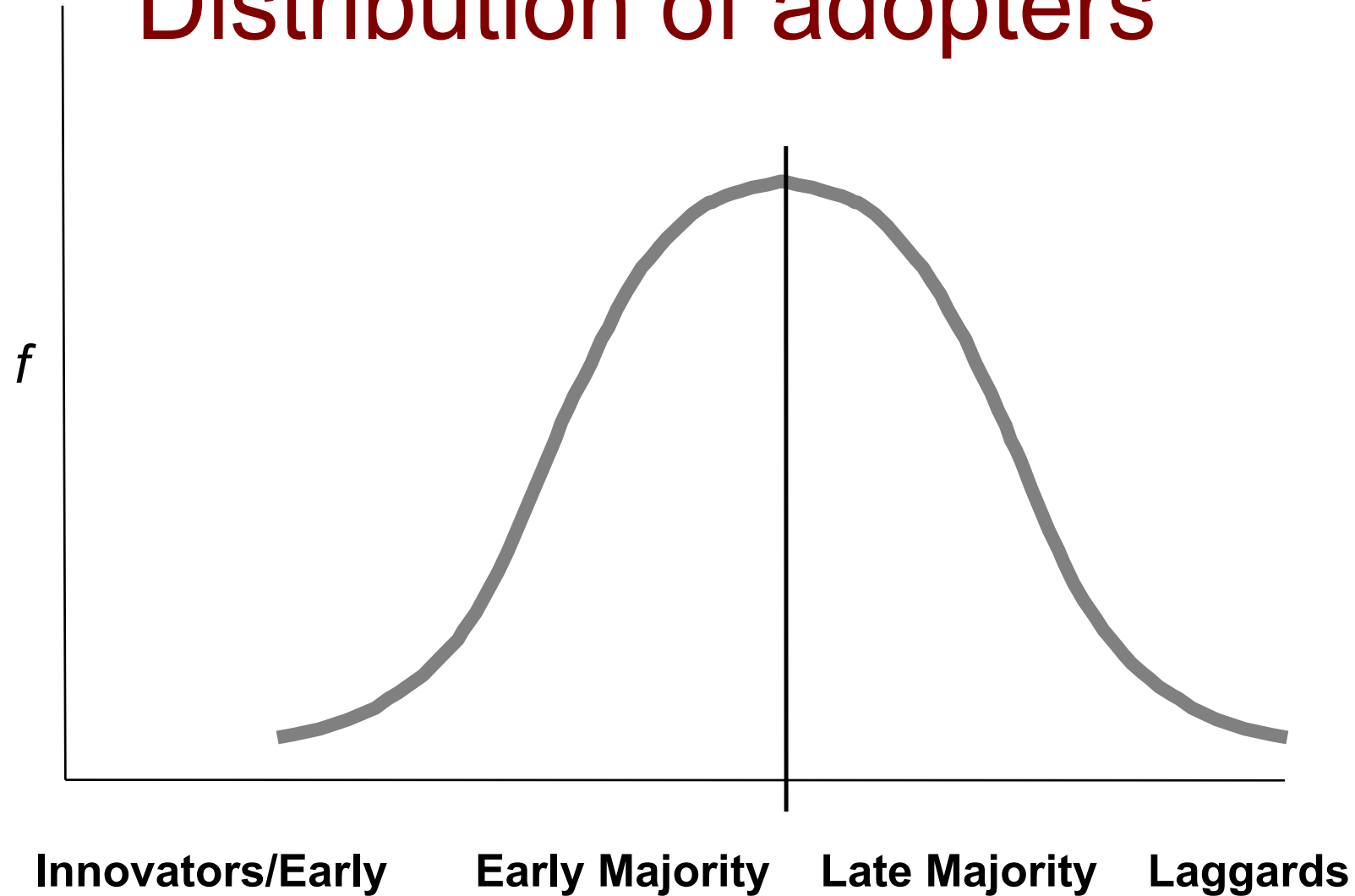
# Early/late majority

- Approximately 68% of users
- Take longer to reach decision to adopt
- Late majority have less exposure to (and less influenced by) media and information channels

# Laggards

- More dogmatic than others
- Low tolerance for uncertainty
- Less contact with change agents/opinion leaders
- Less social participation
- Exhibit greater sense of fatalism (low locus of control)

# Distribution of adopters



# Contextual factors

- Social and group norms
- Communication structure
- Presence of opinion leaders
- Nature of adoption style
  - Consensus
  - Authority
  - Discretionary

# A rich description but....

- Diffusion theory has limited applicability in organizations:
  - Assume widespread use will take time?
  - Target interventions at laggards?
  - Hire wealthy risk-takers if you want change?

# Predictive power?

- Explanatory models are fine post-hoc tools
- Offer insights to theorists
- STST prescribes process to follow
- ID highlights issues to emphasise
  - may work well if constructs are unambiguous

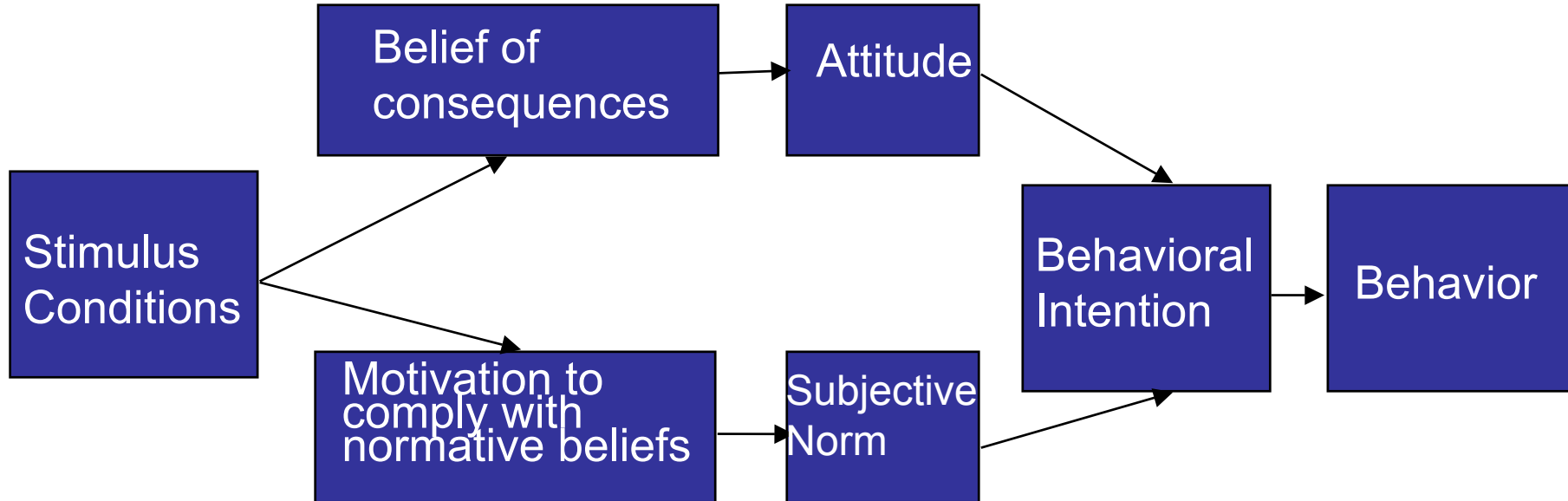
But neither predicts well if any user will accept or resist

# Social science models of behavior

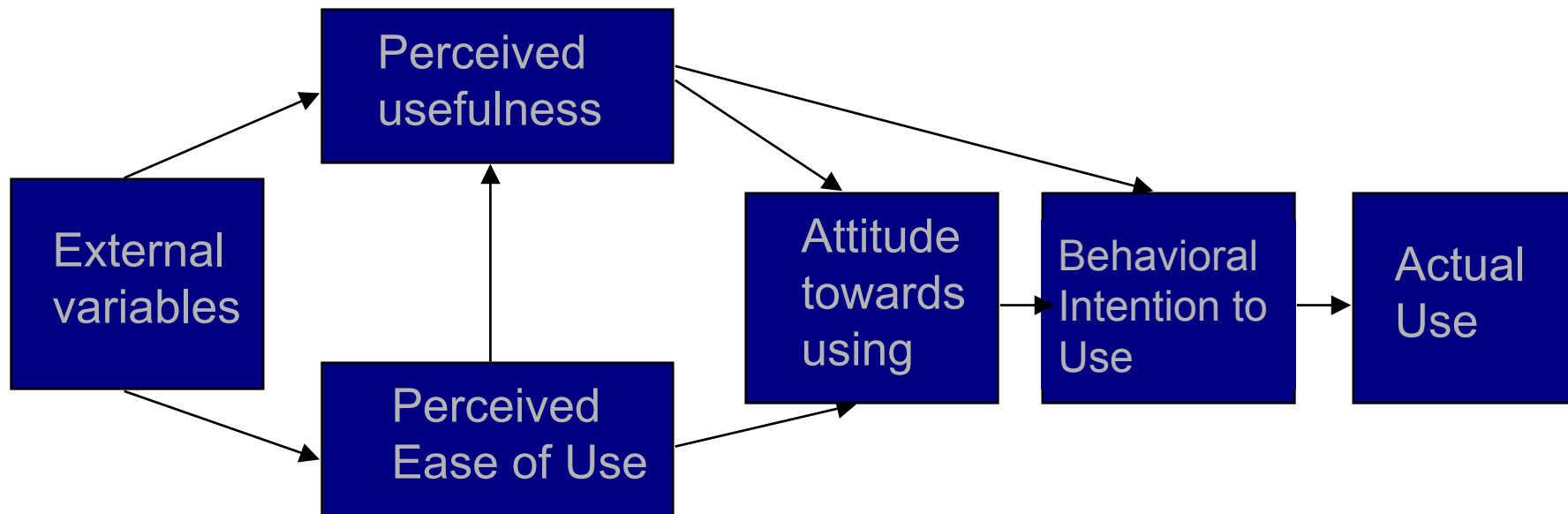
- Role of attitudes on behavior
- Effect of group norms
- Decision making in context
- Perception of consequences

Theory of Reasoned Action & Theory of Planned Behavior (see Readings)

# Theory of Reasoned Action (Fishbein and Azjen, 1975)



# Technology Acceptance Model (Davis, 1989)



# Differences between TRA and TAM

- TAM removes Subjective norm
  - in Davis' tests, the technology was personal
- Direct path from usefulness to intention
  - not mediated by attitude
- Direct link from Ease of use to Usefulness
  - given equal usefulness, ease of use dictates choice

# Sample TAM items

- “Using (insert tool/resource) would improve my performance at work” (PU)
- “I would find it easy to get this (tool/resource) to do what I want it to do” (PEOU)
- “I would find this (tool/resource) useful” (PU)
- “I would find using (tool/resource) pleasant” (ATT)
- “I intend to use this (tool/resource) in my work” (BI)

all scored on 7pt Likert scale:

<b>Variable</b>	<b>Definition</b>	<b>Reported Reliability</b>
<b>Perceived Usefulness</b>	The degree to which a user believes that using the system will enhance performance.	.92
<b>Perceived Ease of Use</b>	The degree to which a user believes that using the system will be free from effort.	.90
<b>Attitude Toward Using</b>	Feelings of favorableness or unfavorableness towards using the technology.	.85
<b>Behavioral Intentions to Use</b>	The strength on one's intentions to use the technology in the future.	.91

# Sample results

- TAM:  $r^2$  in range of .5 for email, and WP type applications
- Reports U is more significant than EoU
- Usually based on single time slice

# So what?

- TAM significantly predicts user behavior in discretionary usage (not task) contexts
- Pre-implementation application possible
- Coupled with Usability Test can offer strong guidance
- Suggests user behavior and choice is simply determined?

# Issues to consider

- How does TAM's constructs reflect or counter the theory of socio-technical systems design?
- What about TAM and various resistance theories?

# Recap

- What can we say about all users?
- What are the key differences between users?
- How can we understand the impact of social and organizational context on users?