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Models, Theories and Risks

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SPRING 2020

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Week	Topic	Reading
1	Introduction to HCI; Design Principles	Chapter 1
2	User-Centred Design Process	Chapter 2 & 3 / Gould et al. (1987)
3	User Interaction and Interfaces	Chapters 4, 5 & 6 / Shin et al. (2017)
4	Interaction Design and Development I	Chapters 7 & 8
5	Interaction Design and Development II	Chapters 9 & 10
6	Interaction Design and Development III	Chapters 11 & 12
7	Information Presentation and Design Patterns	
8	Usability Evaluation Methods I	Chapters 13 / Borsci et al. (2015)
9	Usability Evaluation Methods II	Chapter 14, 15 & 16
10	Accessibility and Special Issues in HCI	Online: WCAG2.0
11	Models, Theories and Risks	MacKenzie (1992)
12	Mixed Reality and Future HCI	
13	Subject Revision	

This Week

Models

Theories

Risks

- Social Implications
- System Failures

Subject Description

- The subject provides students with an understanding of Human Computer Interaction (HCI) principles and practices, and how to apply them in the context of developing usable interactive computer applications and systems. The subject also emphasises the importance of taking into account contextual, organisational, and social factors in the design of computer systems. Students will be taken through the analysis, design, development, and evaluation of user interfaces. They will acquire hands-on design skills through an interaction design project. The subject will cover topics including user-centred design, the development process, prototyping, usability testing, measuring and evaluating the user experience and accessibility.

Subject Learning Outcomes (SLOs)

- On successful completion of this subject, students will be able to:
 1. Identify and describe HCI principles and design issues.
 2. Discuss and justify HCI solutions based on design principles.
 3. Demonstrate an understanding of the HCI design process.
 4. Acquire skills to design and implement user-centred design.
 5. Select and use suitable methods of measuring and evaluating the user experience.

Models

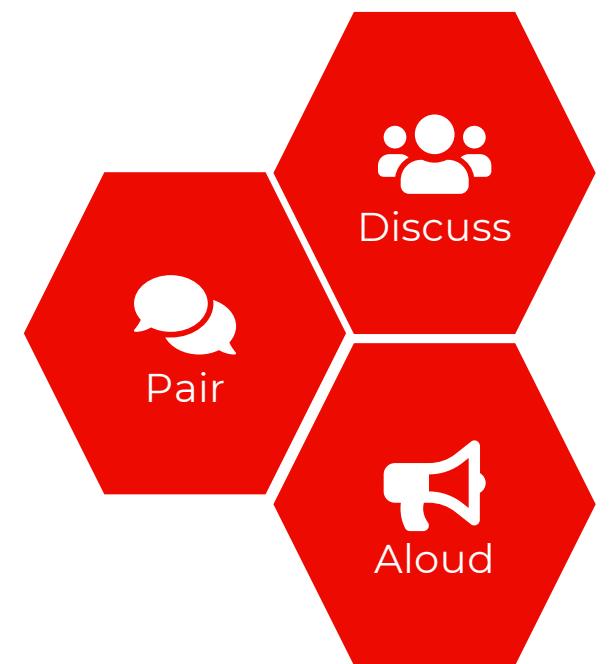
WE HAVE COVERED A NUMBER OF MODELS WITH REGARDS TO HCI
OVER THE SESSION



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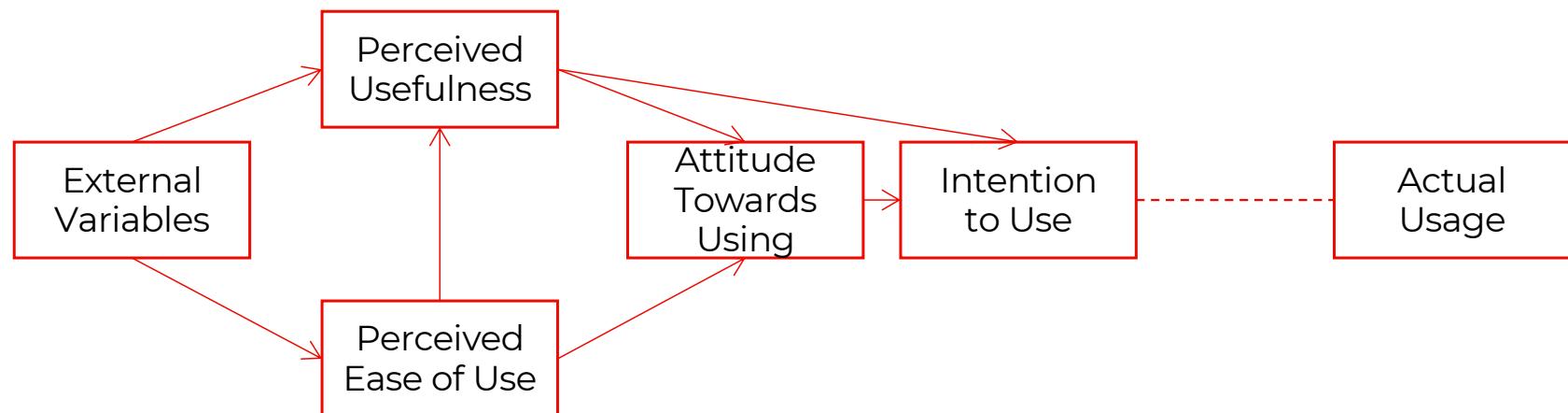
Technology is Disruptive!

What does this mean?



Models in HCI

- Acceptance of Technologies
 - Technology Acceptance Models



- Multiple models build on this concept
- Was historically used in a number of studies
 - The questions based on this model were used in a lab activity

NASA TLX: Task Load Index

- A subjective workload assessment tool to allow users to perform subjective workload assessments on operator(s) working with various human-machine interface systems.
- Developed as a paper and pencil questionnaire by NASA Ames Research Center's (ARC) Sandra Hart in the 1980s, NASA TLX has become the gold standard for measuring subjective workload across a wide range of applications.

<https://humansystems.arc.nasa.gov/groups/TLX/>

NASA TLX: Task Load Index

- Incorporates a multi-dimensional rating procedure
- NASA TLX derives an overall workload score based on a weighted average of ratings on six subscales:
 - Mental Demand
 - Physical Demand
 - Temporal Demand
 - Performance
 - Effort
 - Frustration

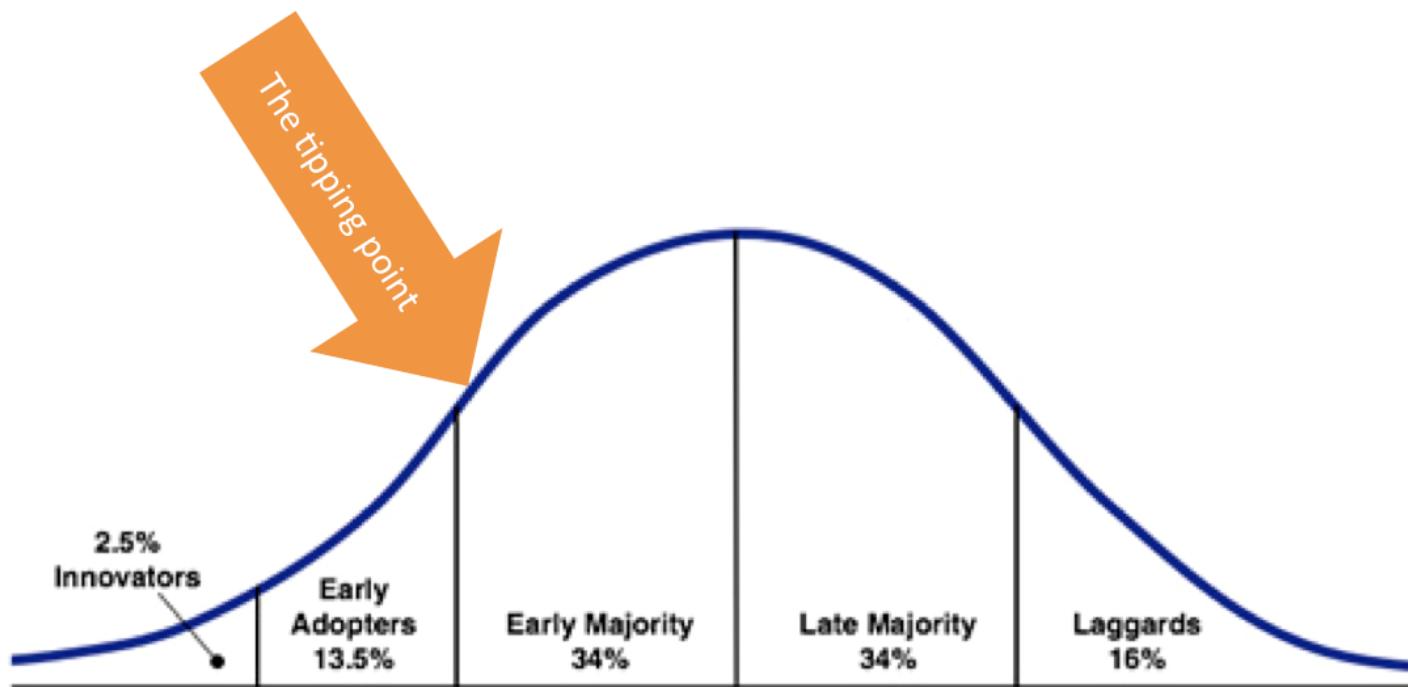
<https://humansystems.arc.nasa.gov/groups/TLX/>

Digital Convergence at 4 main levels

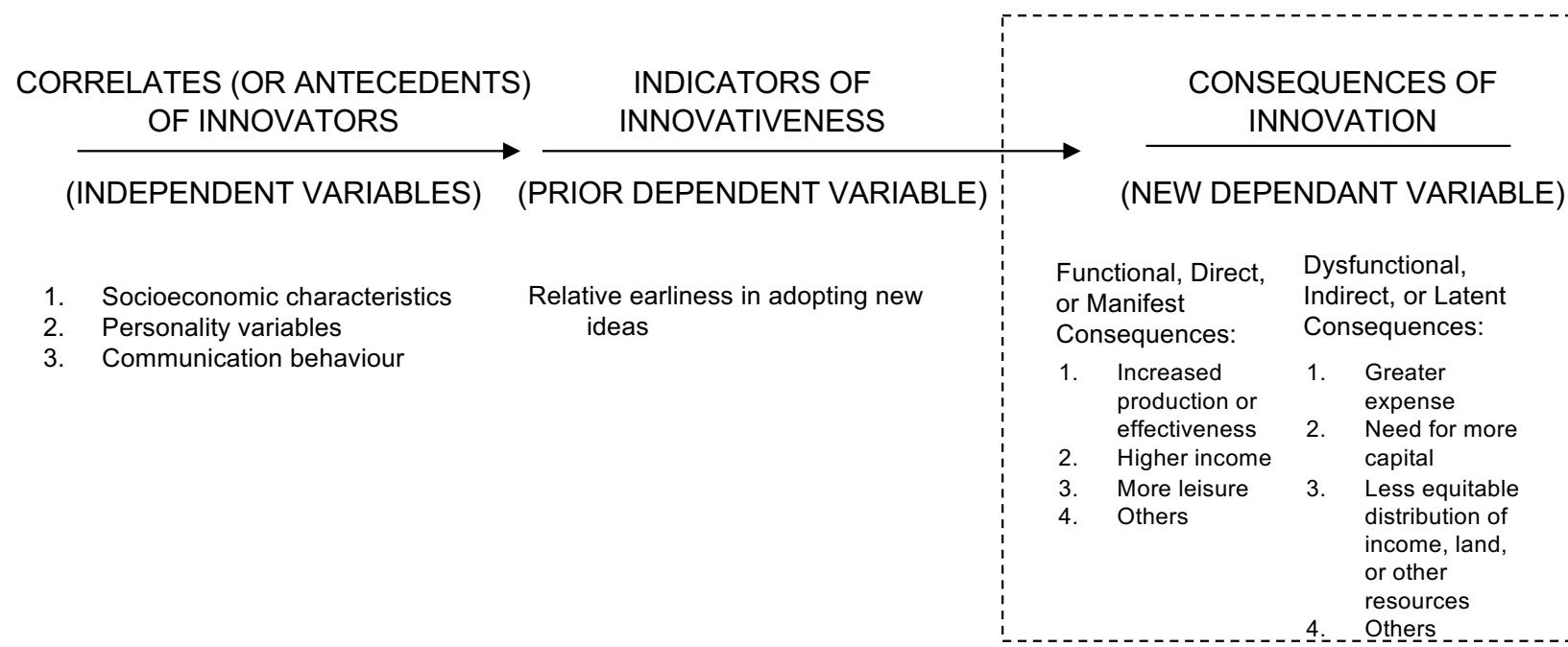


- Devices
 - E.g. Smart Phones
- Applications
 - E.g. Portal-related
- Infrastructure
 - E.g. VoIP
- Industry
 - E.g. automatic identification

Diffusion of Innovations (Rogers)



Roger's Model of the Consequences of Innovation



NOTE: The area outlined in dotted lines represents the additional element of consequences that should be emphasized in diffusion research.

Design Approaches in HCI

- Anthropomorphic approach
 - Designs having ‘human form’
 - Are systems that incorporate anthropomorphic attributes better at interactivity with a user than systems that do not use such attributes? Do these systems allow a user to interact with the system in a natural way; or can the system cause more frustration than aid? (Howe, 2009)
- Cognitive approach
 - Considers the abilities of the human
 - We have looked at the issue of Cognitive Load before
- Empirical approach
 - Designed to compare alternatives
 - Example A/B testing

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Theories



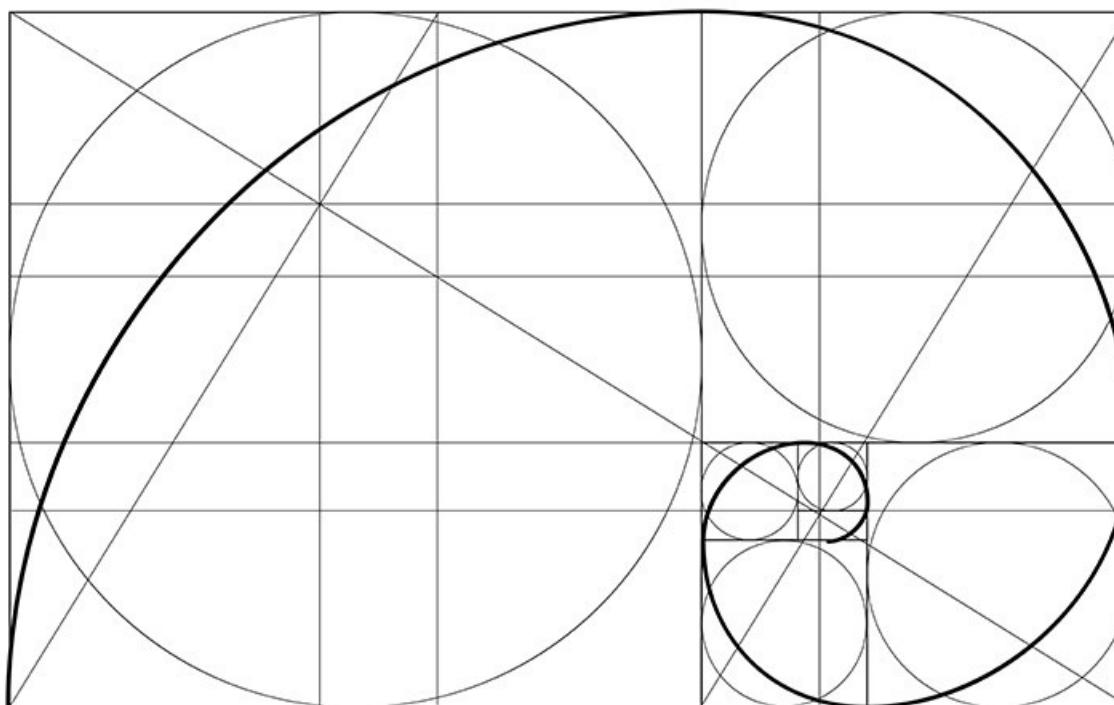
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Theories

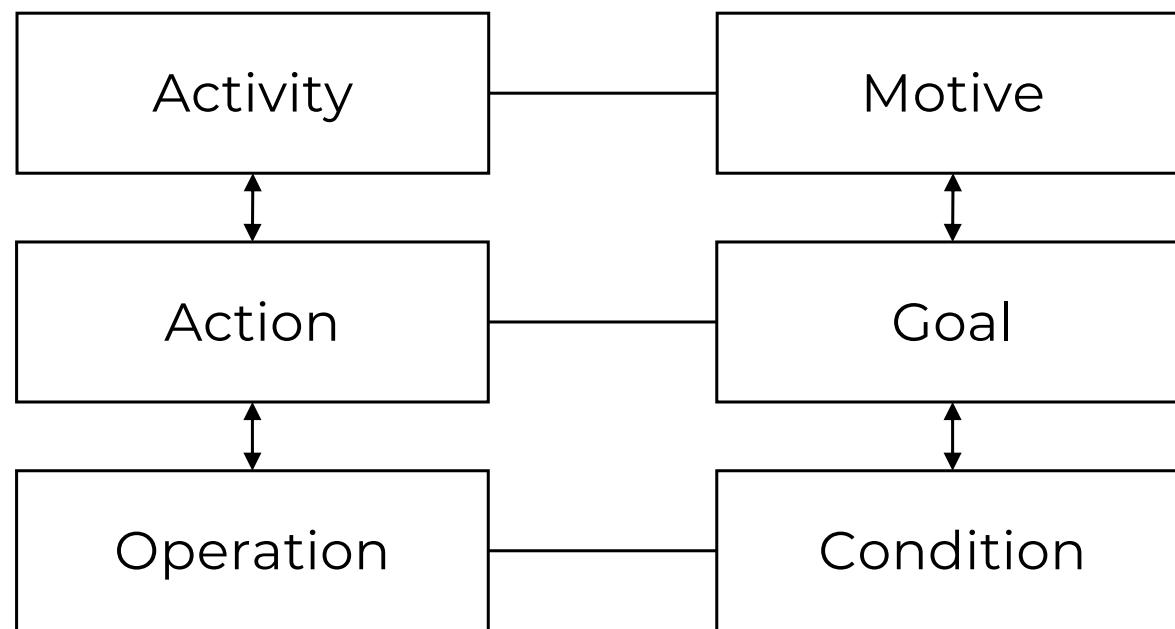
- Already Reviewed
 - User Centred Design
 - Cognitive Load Theory
 - Fitt's Law
- Activity
 - As a class review the 19 'Laws of UX'
 - <https://lawsofux.com>

The Golden Ratio



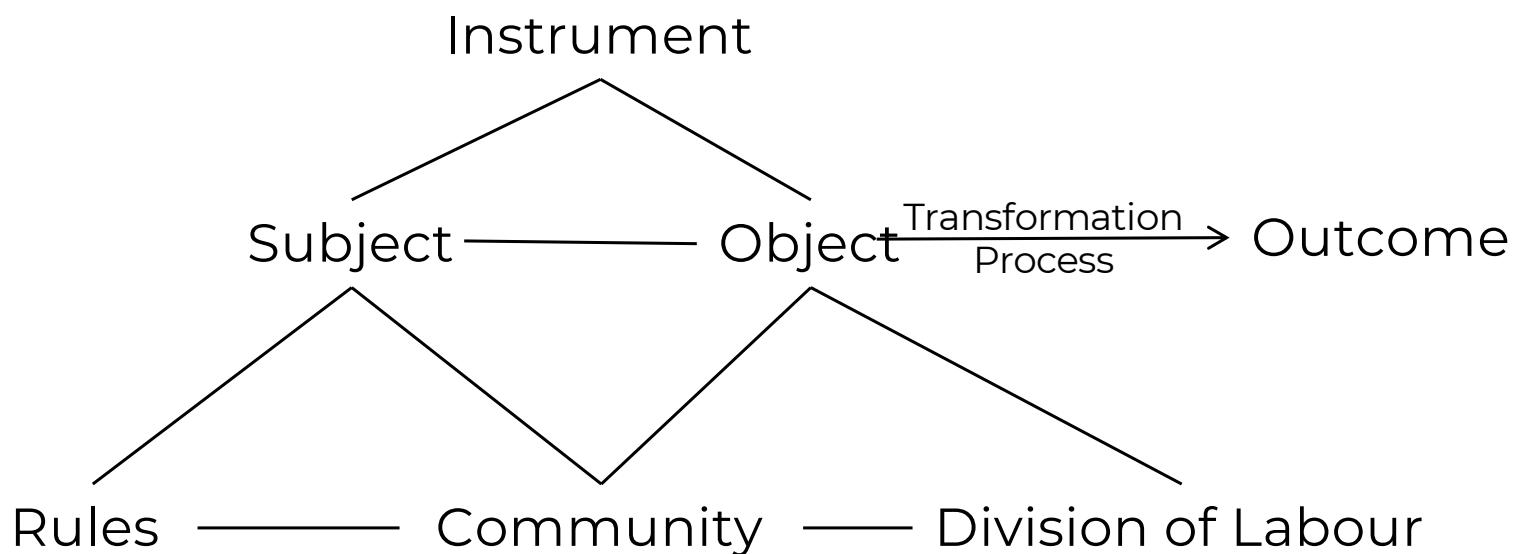
<https://uxdesign.cc/design-system-based-on-the-golden-ratio-ui-%C9%B8-e45eb98655cb>

Activity Theory



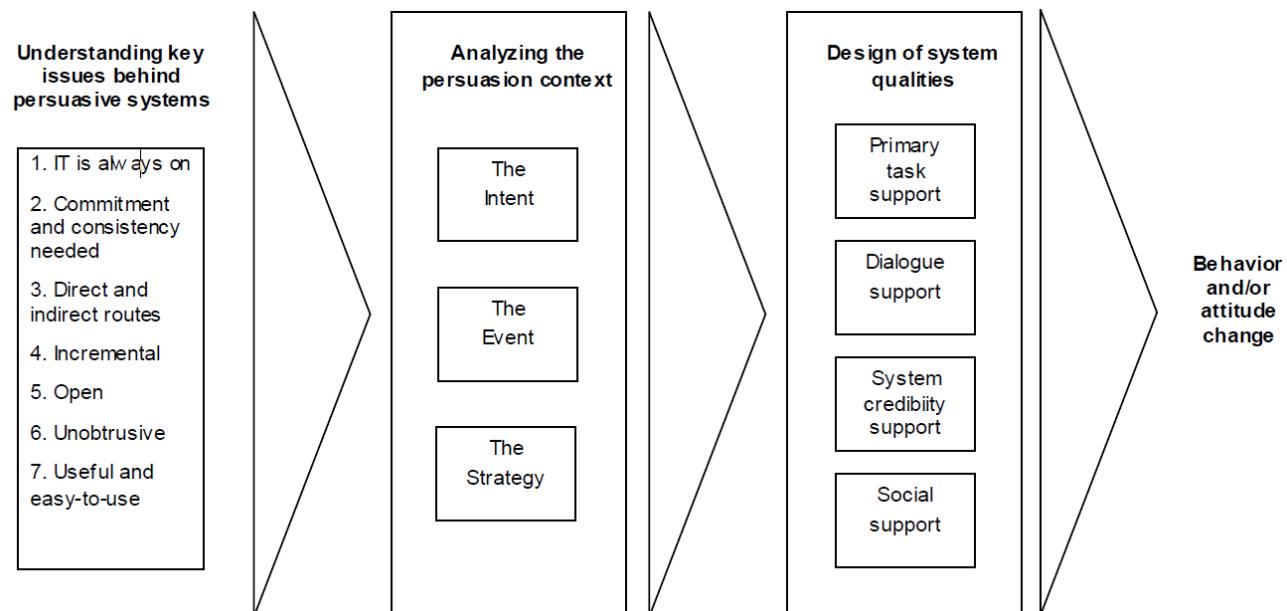
(Leont'ev 1978)

Activity Theory



(Engeström 1987)

Persuasive Systems Design (Oinas-Kukkonen & Harjumaa (2009))



Persuasive Systems Design (Oinas-Kukkonen & Harjumaa (2009))

Table 1. Postulates behind Persuasive Systems

1. Information technology is never neutral.
2. People like their views about the world to be organized and consistent.
3. Direct and indirect routes are key persuasion strategies.
4. Persuasion is often incremental.
5. Persuasion through persuasive systems should always be open.
6. Persuasive systems should aim at unobtrusiveness.
7. Persuasive systems should aim at being both useful and easy to use.

Persuasive Systems Design - Summary

PERSUASIVE DESIGN FEATURES				
PERSUASION CONTEXT	PRIMARY TASK SUPPORT	DIALOGUE SUPPORT	CREDIBILITY SUPPORT	SOCIAL SUPPORT
The Intent <i>Persuader</i> <i>Change type</i>	Reduction Tunneling Tailoring	Praise Rewards Reminders	Trustworthiness Expertise Surface credibility	<i>Social learning</i> <i>Social comparison</i> <i>Normative influence</i>
The Event <i>Use context^a</i> <i>User context^b</i> <i>Technology context^c</i>	Personalization Self-monitoring Simulation Rehearsal	Suggestion Similarity Liking Social role	Real world feel Authority <i>Third party endorsements</i> Verifiability	<i>Social facilitation</i> <i>Cooperation</i> <i>Competition</i> <i>Recognition</i>
The Strategy <i>Message</i> <i>Route</i>				

^a Problem domain dependent features

^b User dependent features e.g. goals, motivation, lifestyles, and others

^c Technology dependent features

Risks

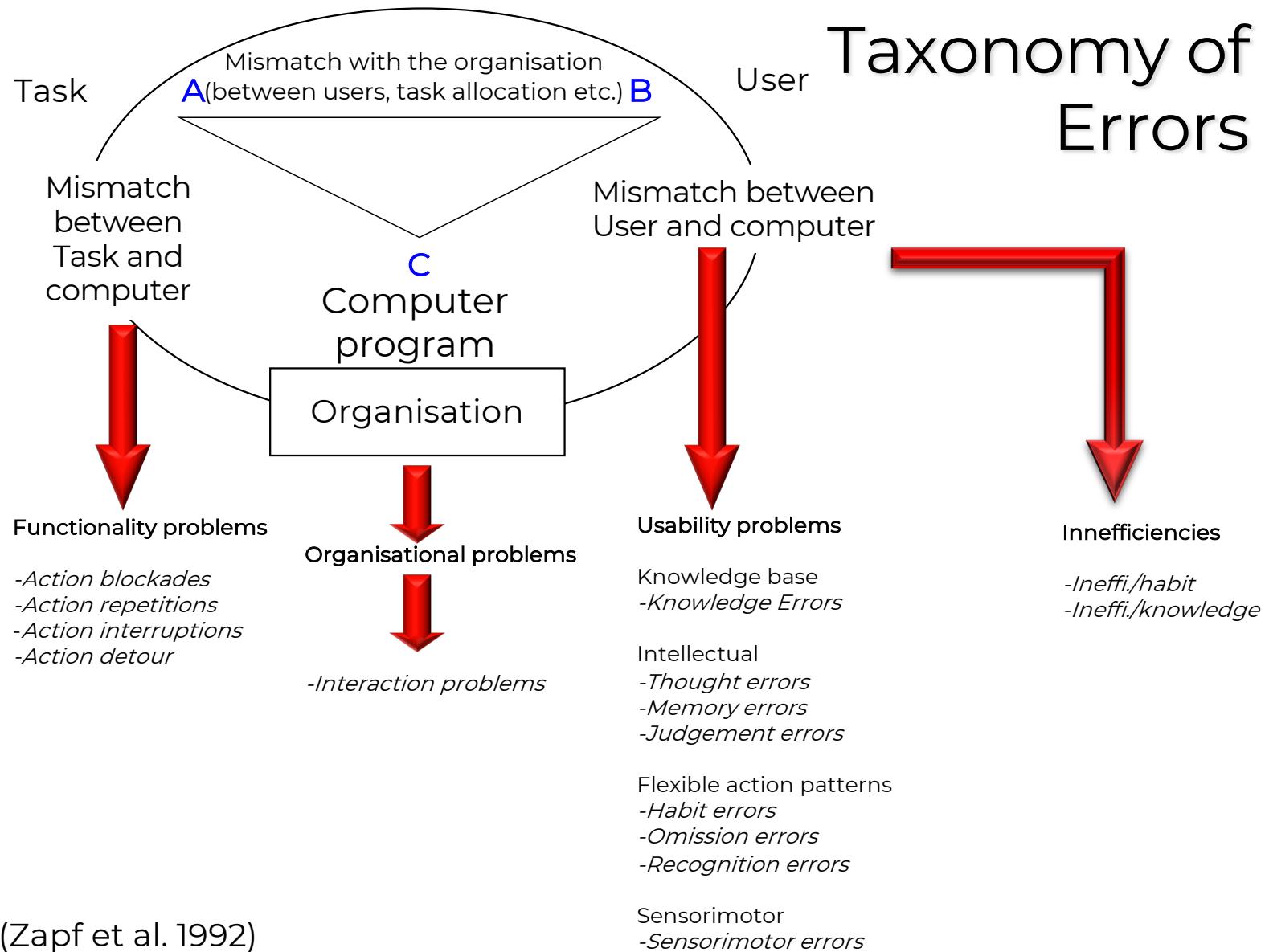
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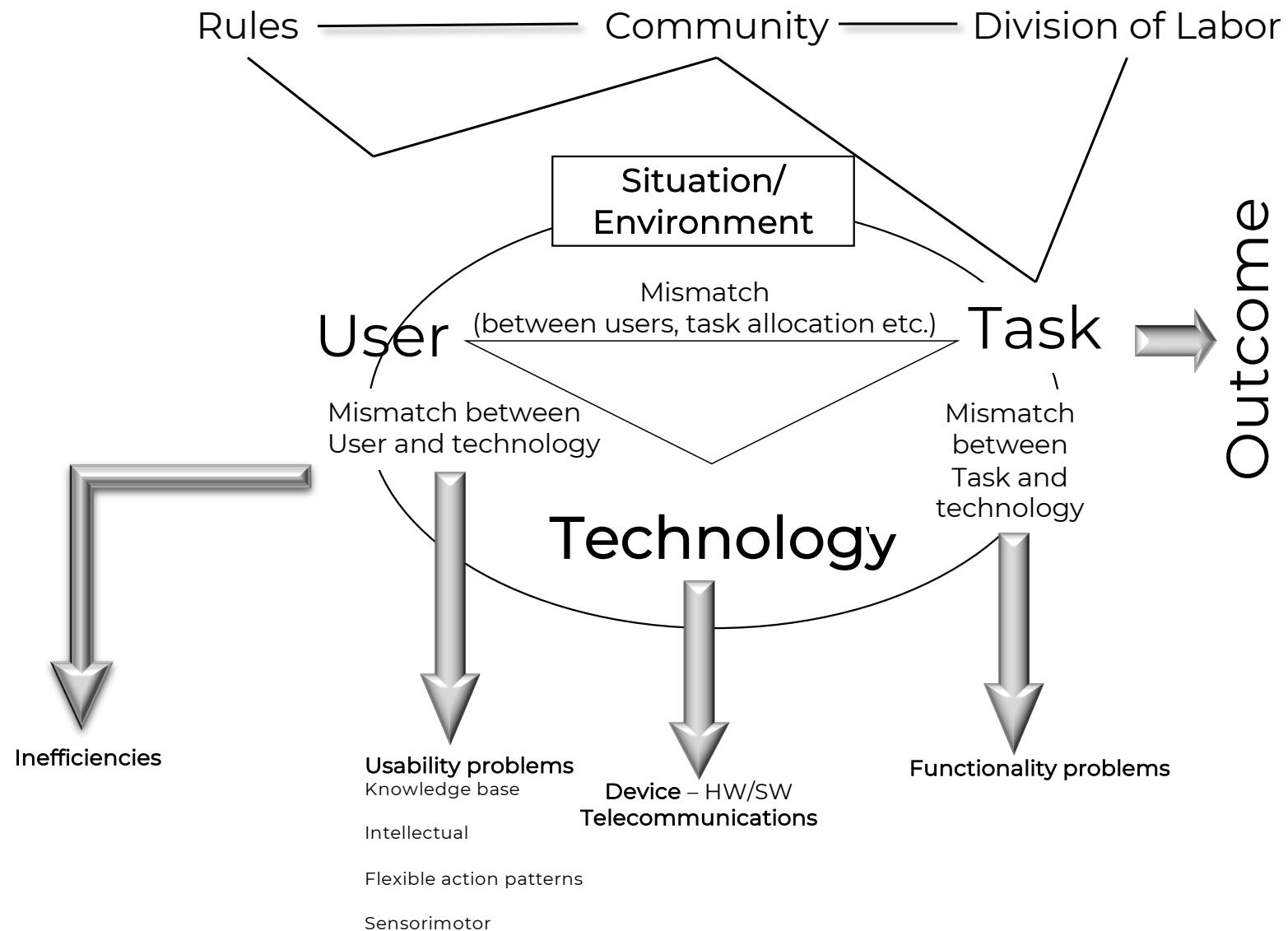
(*TO ERR IS HUMAN*)



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Taxonomy of Errors

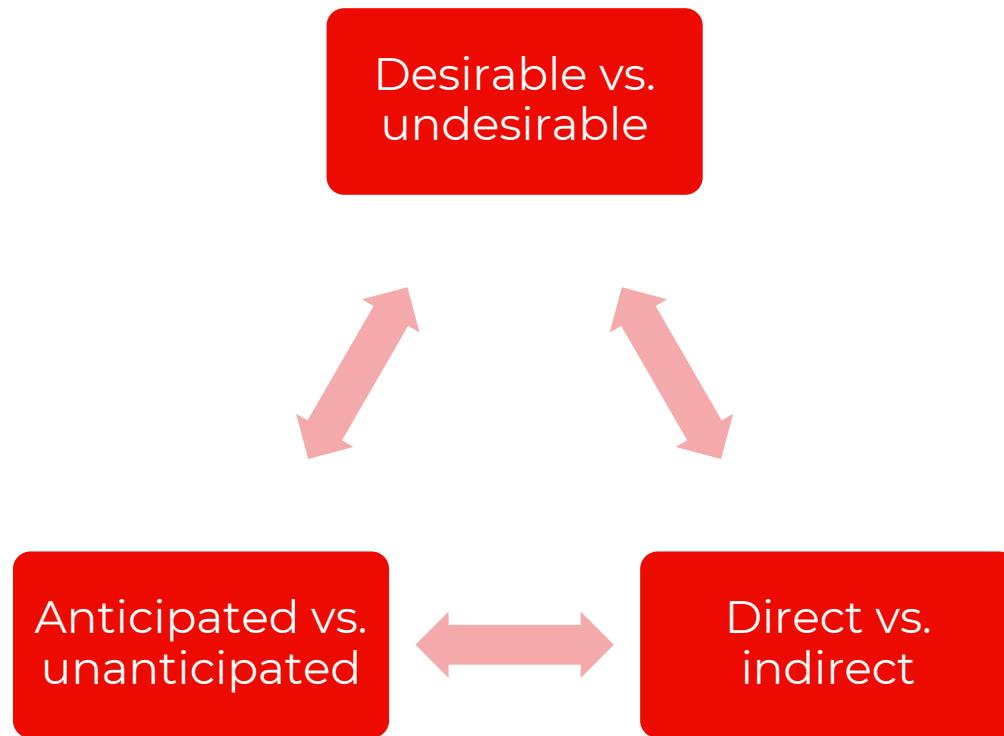




Consequences

- “Consequences are the changes that occur to an individual or to a social system as a result of the adoption or rejection of an innovation.” (Rogers, 1995)
- Importance
 - Consequences are difficult to generalise
 - Categories have been established to classify consequences
 - However, we cannot predict how and when these consequences will happen

Consequences of an Innovation: 3 Classifications



Desirable vs. Undesirable

- Desirable consequences are the functional effects of an innovation for an individual or for a social system
- Undesirable consequences are the dysfunctional effects of an innovation for an individual or for a social system
- Windfall profits or losses can occur with the adoption of products
- Desirable:
 - Increased effectiveness
 - Increased efficiency
 - Increased confidence
- Undesirable
 - Changes in social values/norms

Direct vs. Indirect

- Chain reactions often occur with the introduction of a new technology
- Direct Consequences are changes that occur to an individual or social system in immediate response to an innovation
- Indirect Consequences are changes that occur to an individual or social system as a result of an innovation (Consequences of Consequences)

Anticipated vs. Unanticipated

- Anticipated consequences are the changes that have been brought about by an innovation that are recognised and intended by the social system
- Unanticipated consequences are the changes that have been brought about by an innovation that are neither intended nor recognised by the social system

Novel User Interfaces

WHAT ARE THE RISKS?

HOW NOVEL IS TOO NOVEL?



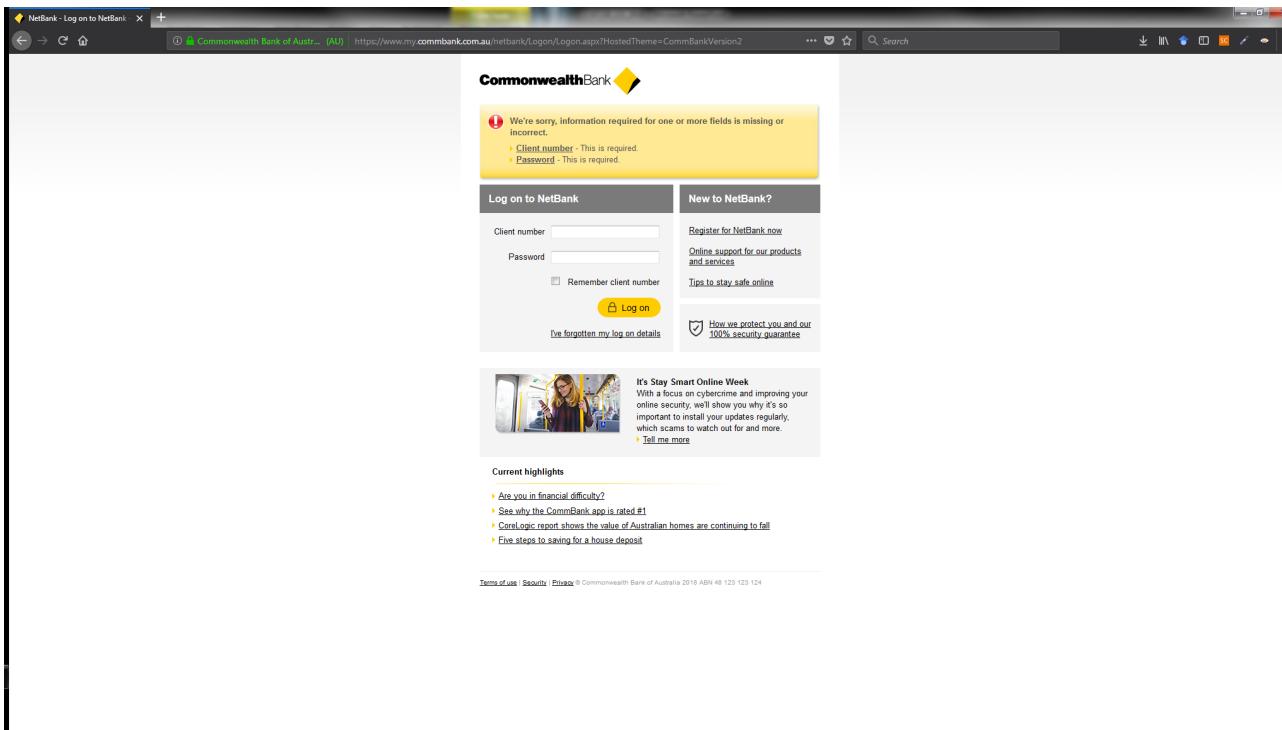
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Inconsistency



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Example



5 of the Worst User-Interface Disasters

- David Pogue, 2016
 - Windows 8
 - BMW iDrive
 - Most TV Remotes
 - The Apple Watch
 - The USS *Vincennes* control system

<https://www.scientificamerican.com/article/pogue-5-of-the-worst-user-interface-disasters/>

Top 10 worst user interfaces

- Apple Watch
- The Fluent UI - Microsoft's ribbon interface
- LinkedIn
- Microsoft Windows 3.1
- Symbian S60
- Microsoft Bob
- Amstrad PenPad PDA600
- Apple iTunes
- Windows 8
- Lotus Notes

<https://www.theinquirer.net/inquirer/feature/2459940/top-10-worst-user-interfaces>

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Take Home Message...

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How will you design interfaces in the future to include access
for all?



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Questions

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