Activity theory

Shaoke Zhang
Olivier Georgeon
Frank Ritter
March 2012

Outline

• Introduction
• Philosophical background
• Main concepts and principles
• Implications for human-computer interaction
Information-processing approach

Critics (even before IP existed!)

- Martin Heidegger (1889-1976)
  - Behavior is prior to knowledge
  - Phenomenology

- Jean Piaget (1896-1980)
  - Constructivist Epistemology
  - Bottom-up constructed patterns of behavior

- Lev Vygotsky (1896-1934)
  - Psychological tools
Activity-centered approach

Activity Theory

- The theory evolved from the work of Vygotsky (1896-1934)
- Vygotsky was contemporary of Pavlov, the father of reflexology and then behaviorism
- Vygotsky criticized the mentalist tradition
  - Individual consciousness is built from the outside through relations with others... it must be viewed as products of mediated activity
Historical background

- Influenced by the Theory of dialectic materialism developed by Marx and Engels

"For Marx and Engels, labor is the basic form of human activity ... Their analysis stresses that in carrying out labor activity, humans do not simply transform nature: they themselves are also transformed in the process ... The tools that are available at a particular stage in history reflect the level of labor activity. New types of instruments are needed to carry out the continually evolving new forms of labor activity" (Wertsch, 1981 p. 134-135)

Philosophical background

- Vygotsky appropriated ideas about how tools or instruments mediate the labor activity and extended those ideas to include how psychological tools mediate thought

- He plays with the similarity between Marx's notion of how the tool mediates human labor activity and the semiotic notion of how sign systems mediate human social processes and thinking

- His point is that instruments are not only used by humans to change the world but also they transform and regulate humans in this process
Vygotisky's statements

- Psychological tools - language, writing, maps etc. - are artificial formations. By their nature they are social.

- They are directed toward the control of behavioral processes... just a technical means are directed toward the control of processes of nature.

- Emphasis on the mediation by psychological tools in the study of thinking and consciousness.

Activity Theory's Critique of HCI

- The role of artifact between user and task is ill-understood.

- Focus on one user - one computer vs. collaboration, work site, team, organization.

- Interaction with system seen as end in itself vs. a small part of a work/activity system.

- Task analysis for user interface design fail to capture the complexity and contingency of real-life action.
Activity examines

Developing situations/systems

• All the elements of the system are continuously changing.
• Subjects not only use tools, they also adapt them.
• They obey rules, and transform them.
• They divide work and innovate.
• "finger painting"

A Perspective of Human Development

• People are socio-culturally embedded actors
  — not processors, or system components
• Appropriateness of tools for a collective practice
  — we design new conditions for collective activity
  — qualifications, work environment, division of labor
• Conflicts/contradictions in human development
  — growth of expertise as solution to conflict in use
• Hierarchical analysis of motivated human action
  — dynamically integrating levels of activity analysis
Main concepts

- **Subject**: the individual/subgroup chosen as the point of view in the analysis.
- **Tools**: physical or psychological.
- **Community**: individuals/subgroups who share the same general object.
- **Division of labor**: division of tasks between members of the community.
- **Rules**: explicit/implicit regulations, norms, conventions that constrain action/interaction
- **Object**: "the 'raw material' or 'problem space' at which the activity is directed and which is molded or transformed into outcomes"
Vision for human computer interaction

- Human
  - Users are actors having intentions/motivations/needs

- Interaction
  - There is a psychological relation between the user and the tool
  - What develops or is important is not always time, but emotions, social connections, trust

- Computer
  - A technical system does not immediately constitute a tool for the user. Even explicitly constructed as a tool, it is not, as such, a tool for the user.
  - A technical system only becomes a tool through the user's activity.
  - A tool is never given, the user contributes to its design.
  - A tool in use is not the object of the user's activity.
  - Tools can have real and important impacts on human activity

References