

SEC(R)
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Beyond User-Centered Design

Supporting Human Activity

Professor, Director, LabUSE, University of Madeira

Universidade da Madeira

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Larry Constantine, IDSA
Director | Laboratory for Usage-Centered Software Engineering
University of Madeira | Funchal, Portugal

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Constantine & Lockwood, Ltd.
Lucy A. D. Lockwood, President | Larry L. Constantine, Chief Scientist
email: llockwood@forUse.com | email: lconstantine@forUse.com | www.forUse.com


58 Kathleen Circle, Rowley, MA 01969, U.S.A. | tel: 1 (978) 948 5012; fax: 1 (978) 948 5036

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Of Revolutions

- Technology-centered
- User-centered
- Usage-centered


What's wrong?
What's next?



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Где Я?


- In the pursuit of detail and precision in software engineering, something is lost...



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Interaction in Context

- Work, for example telephone customer support, takes place in a context, such as within a call center.
- User tasks are performed in varied order and combinations within the context of larger activities, both related and unrelated to the immediate work.
- Different activity contexts impact users and how they perform using tools and artifacts differently.
- Interaction design needs to reflect understanding of the activities in which users are engaged within the context in which they are performed.



How do we understand this larger work context?


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The Business Process Perspective

Business process

- Set of interconnected "activities" transforming information or artifacts into more valuable forms.
- Performed by human actors and/or systems.
- Decomposable into elementary business processes:
 - one person at one time adding significant value and resulting in a consistent state.
- Series of steps to produce a product or service
 - ordered in time and space
 - structured, bounded
 - embodying business logic
 - defined inputs and outputs
- Various notations, but primarily
 - process decomposition
 - process flow


now in UML



An Activity Perspective

Human activity

- a loosely ordered collection of actions having distinct but disparate goals contributing to a shared or common purpose
 - performed by human actors
 - mediated by artifacts
- flexible, adaptive, changeable
- shaped by and highly dependent on conditions, context
- operationalized through practice
- organized by established and emergent social, cultural, and personal rules and guidelines as well as formally defined ones



Why Activity Theory

Donald Norman is a troublemaker. (So am I!)** But... Are user-centered design principles** betrayed?

- Make it easy to determine possible actions.
- Make things visible, including the conceptual model of the system, alternative actions, and results of actions.
- Make it easy to evaluate the current state of the system.
- Follow natural mappings between intentions and required actions; between actions and resulting effect; and between [visible information and the system state].

WANTED for Apostasy & Blasphemy


"Focus upon humans detracts from support for the activities themselves."*
—Donald Norman

* "Human-Centered Design Considered Harmful" www.jnd.org
 ** "Beyond User-Centered Design" www.foruse.com
 *** *Psychology of Everyday Things*, 1988

Activity Theory Condensed

- Created by early 20th century Russian psychologists Rubinshtein, Leontiev, and Vygotsky.
- More recently popularized by Bonnie Nardi and others.*
- Not so much a theory as a conceptual framework.
- Some prior attempts to systematize and operationalize.**
- Hierarchical structure of activity (three levels of analysis):
 - activities are motivated, purposive, and consist of
 - actions directed toward a distinct, specific conscious goal, comprising
 - operations—ways of executing actions, either deliberately or reflexively, adapted to conditions

ACTIVITY - PURPOSE
 ↓ ↑
 ACTION - GOAL
 ↓ ↑
 OPERATION - CONDITIONS

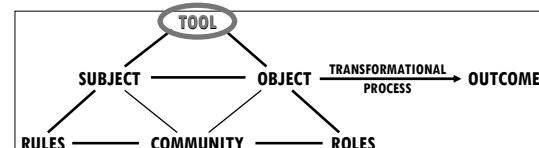


Somewhat complicated and a little vague!

* Nardi (ed.) *Context and Consciousness*. 1996.
 Gay & Hembrooke. *Activity-Centered Design*. 2004.
 Nardi & Kaptelinin, *Acting with Technology*. 2006.
 Duijnman, Noble, & Biddle, 2006
 ** Kaptalinin, Nardi, & Macaulay, 1999

Activity Theory Condensed

Human activity* is performed by **actors** (subjects) motivated by **purposes** (objects) and mediated by **tools** (artifacts) in a transformational process yielding a **result** (outcome) constrained by **rules** and differentiated responsibilities or **roles** within a **community**.



- All human activity is mediated by **tools**.
- Supporting activity requires designing effective **tools**.
- Designing effective tools requires insight into **activity**.

* after Engeström, 1999

Modeling Interactive Activity

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In practice, must model, connect, and distinguish activities that include user-non-user and user-system interaction:

- interacting and non-interacting participants
- relationships among participants, artifacts, and systems
- relationships among activities and interactive tasks and among external activities and actions

EXTERNAL ACTIVITY	INTERACTIVE ACTIVITY (with system of reference)
*player (non-interacting participant) *artifact tool *activity purpose *action goal operation conditions	actor roles system actor *activity purpose task intention operation process <div style="border: 1px solid black; padding: 2px; display: inline-block;"> INTENTIONS RESPONSIBILITIES </div> * new notation

Activity-Based Design Overview

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- Focal and related **activities** are described and mapped.
- Participation is modeled by **actors** in **activities** playing **roles** with other **players** and **artifacts** (tools) plus **system actors**.
- **Performance** is modeled as **actions** and **tasks** (essential use cases) composed of **operations** in **process** (intentions, responsibilities).
- Interface **organization** and functional **contents** is modeled by **navigation map** and canonical **abstract prototypes**.
- **Visual/interaction design** derives from **abstract prototypes**.
- Models drive entire process. Design elements trace directly to content supporting tasks to perform roles within activities.

Activity Map, Activity Profile

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Purpose - solve customer problems efficiently and effectively; reduce costs, promote customer satisfaction
Place and Time - clustered cubicles in complex; lots of people, activity, noise; restricted, intermittent interaction; daily shift, scheduled breaks
Participation - trained technicians with problem-solving orientation; supervisors, associates, escalation team; varied resources (knowledge DB, software, manuals, FAQs, Web, intranet,...)
Performance - bursts of successive calls interspersed with lulls; complex, unpredictable practice emphasizing polite creative problem-solving, adherence to guidelines

Participation Map

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actor system actor player artifact (tool, material, resource)

Process Modeling or Activity Modeling


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Process modeling promotes

- software in charge
- embedding process in software, executable, simulated
- lock-step performance
- dumbing down human activity
- complicating the software

Activity modeling promotes

- human in control
- flexible performance
- thoughtful boundaries
- people do what people do best
- software does what software does best




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Human Activity Modeling in Sum

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- Activities provide the larger context of use within which tasks or actions performed by actors in roles are embedded.
- Human Activity Modeling anchors usage-centered use case modeling in foundations of activity theory.
- Systematic, integrated definitions and notation enable concise models of complete context highlighting salient attributes most relevant to interaction design.
- Human Activity Modeling guides sound user interface architecture and content organization.




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Activity Modeling Potential

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- Highlights and clarifies varied and unpredictable relationships among collections of tasks without requiring excess precision/constraints.
- Models compositions of tasks into larger, more loosely or variably defined collections.
- Highlights relationships among user actors and other players and between participants and artifacts.
- Helps clarify system boundary decisions:
 - actions (outside, manual)
 - tasks (inside, supported or automated).
- Better organizes contextual and socio-cultural aspects of use known to be important in guiding user experience design.



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Selected Resources

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