

This text appeared in Chapter 8 (section 8.6.3) of the Fourth edition of Interaction Design. Activity Theory is not covered in the fifth edition, and so this text is offered on the website in case readers find it useful.

Activity Theory

Activity theory (AT) is a product of Soviet psychology that explains human behavior in terms of our practical activity with the world. It originated as part of the attempt to produce a Marxist psychology, an enterprise usually associated with Vygotsky (e.g. 1926/1962) and later Leontiev (e.g. 1978, 1989). In the last 20–30 years, versions of AT have become popular elsewhere, particularly in Scandinavia and Germany, and interest is now growing in the USA and UK. The newer versions of AT have been popular in research investigating applied problems, particularly those to do with work, technology, and education.

Activity theory provides a framework that focuses analysis around the concept of an activity and helps to identify tensions between the different elements of the system. For example, in what is now viewed as a classic study of the use of AT in HCI, Mackay *et al* (2000) analyzed a 4-minute excerpt from a video of users working with a new software tool. They identified 19 shifts in attention between different parts of the tool interface and the task at hand. In fact, some users spent so much time engaged in these shifts that they lost track of their original task. Using the theory helped evaluators to focus on relevant incidents.

AT outlines two key framings: the individual model that constitutes an activity and one that models the mediating role of artifacts.

The Individual Model

AT models activities in a hierarchical way. At the bottom level are operations, routinized behaviors that require little conscious attention (e.g. rapid typing). At an intermediate level are actions, behavior that is characterized by conscious planning, e.g. producing a glossary. The top level is the activity, and that provides a minimum meaningful context for understanding the individual actions, e.g. writing an essay (see Figure 8.16). There may be many different operations capable of fulfilling an action, and many actions capable of serving the same activity.

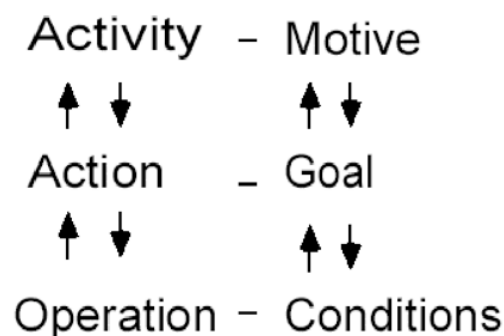


Figure 8.16 The original activity theory model

Activities can be identified on the basis of the motives that elicit them, actions on the basis of conscious goals that guide them, and operations by the conditions necessary to attain the goals. However, there is an intimate and fluid link between levels. Actions can become operations as they become more automatic and operations can become actions when an operation encounters an obstacle, thus requiring conscious planning. Similarly there is no strict demarcation between action and activity. If the motive changes, then an activity can become an action. It is also important to realize that activities are not self-contained. Activities relate to others while actions may be part of different activities, and so on.

The Role of Artifacts

Artifacts can be physical, such as a book or a stone, or they can be abstract, such as a system of symbols or a set of rules. Physical artifacts have physical properties that cause humans to respond to them as direct objects to be acted upon. They also embody a set of social practices, their design reflecting a history of particular use. Leontiev describes the process of learning what these inherent properties are as one of appropriation, signifying the active nature of the learning that is needed. The kind of learning involved is one of identifying and participating in the activity appropriate to the artifact. Consider an infant learning to feed with a spoon. Leontiev (1981) observed that, at first, the infant carries the spoon to its mouth as though it were handling any other object, not considering the need to hold it horizontal. Over time, with adult guidance, the spoon is shaped in the way it is because of the social practice – the activity – of feeding. In turn, the infant's task is to learn that relationship – to discover what practice(s) the object embodies. By contrast a spoon dropped into the cage of a mouse, say, will only ever have the status of just another physical object – no different from that of a stone.

The idea of abstract artifacts follows from the idea of mediation, i.e. a fundamental characteristic of human development is the change from a direct mode of acting on the world to one that is mediated by something else. In AT, the artifacts involved in an activity mediate between the elements of it.

AT also emphasizes the social context of an activity. Even when apparently working alone, an individual is still engaged in activities that are given meaning by a wider set of practices.

The classic view of an activity has a subject (who performs the activity) and an object (on which the activity is performed). Engeström (e.g. 1999) and Nardi and Kaptelinin (2012) have widened the focus from the individual triangle of a single activity (subject, activity, and object) to include supra-individual concepts – tools, rules, community, and division of labor. By tool is meant the artifacts, signs, and means that mediate the subject and object; by community is meant those who share the same object; by rules is meant a set of agreed conventions and policies covering what it means to be a member of that community (set by laws, parents, managers, boards, and so forth); and by

division of labor is meant the primary means of classifying the labor in a workplace (e.g. manager, engineer, receptionist). The extended versions allow consideration of networks of interrelated activities – forming an activity system (see Figure 8.17).

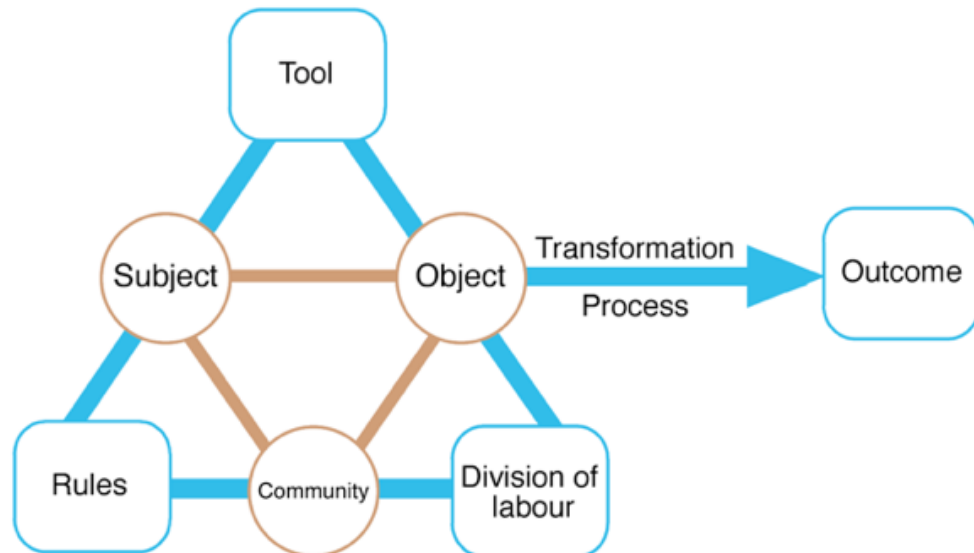


Figure 8.17 Engeström's (1999) activity system model. The tool element is sometimes referred to as the mediating artifact

Source: Reproduced from Engeström, Y. (1999) *Perspectives on Activity Theory*, CUP.

Performing an Analysis Driven by Activity Theory

AT does not present a clear methodological prescription for the description or analysis of behavior as a set of procedures to be followed. The model shown in Figure 8.16 is the main framework that is used to describe levels within an activity. This means that identifying elements will be highly dependent on individual interpretation. Christiansen (1996, p. 177) summarizes: “Methodologically . . . the ideal data for an application of AT consist of longitudinal ethnographic observation, interviews and discussion in real-life settings, supplemented by experiments.” She continues that you “cannot interview people directly through rote questions but must interpret their actions and opinions after some careful reflection,” which is a difficult process. Nevertheless, the original and later versions of the AT framework have become popular amongst researchers and some practitioners as a way of identifying needs for new tools and to analyze problems that are present in a work or other setting. For example, Saguna and Chakraborty (2013) point out that AT has much to offer in the development of mobile applications where analyzing users’ activities and particularly changes in activities can inform design. However, they also point out that there is a lack of a unifying theoretical framework which fully addresses all aspects of the activity and activity domain.

One of the biggest problems with doing an AT analysis is working out when something should be described as a top-level activity and when something is better described as a lower-level action.

Performing an AT analysis enables researchers and designers to identify the tensions in a workplace leading to specific needs for new technological tools; it is also used in evaluation studies. It can be difficult, however, getting to grips with the concepts and being able to determine how to label the points raised in the interviews. Expertise and a good background in the Soviet version of activity theory are recommended to become competent in AT. Similar to the distributed cognition approach in the commercial world, where deadlines and budgets are always looming, it is unlikely to be practical. Where more time and resources are available, it can be a valuable analytic tool.

ACTIVITY 8.4

How does activity theory (AT) analysis differ from and how is it similar to distributed cognition (DC) analysis?

COMMENT

1. AT focuses on describing the tensions between parts of the AT system, using quotes to back them up, whereas a DC analysis focuses on drilling down on the way representations and technologies are used for a given distributed activity.
2. AT provides a set of concepts by which to label and instantiate specific observations for an activity system, whereas DC represents the sequence of events (often in a diagrammatic form), making explicit how the various media support the way information is propagated across different representational states.
3. Both AT and DC analyses reveal problems with existing technologies.

For those interested in exploring activity theory and distributed cognition further, Baumer and Thomlinson (2011) provide a comparison of them, including examples of the use of these theories in video analysis.

References

- Baumer, E. P. S. and Thomlinson, B. (2011) Comparing Activity Theory with Distributed Cognition for Video Analysis: Beyond Kicking the Tyres. *ACM Proceedings of CHI'11*, 133–142.
- Christiansen, E. (1996) Tamed by a rose: Computers as tools in human activity. In B. A. Nardi (ed.) *Context and Consciousness*. MIT Press, Cambridge, MA, pp. 175–198.
- Engeström, Y. (1999) *Perspectives on Activity Theory*. Cambridge University Press, Cambridge.
- Leontiev, A. N. (1978) *Activity, Consciousness and Personality*. Prentice Hall, Englewood Cliffs, NJ.
- Leontiev, A. N. (1989) The problem of activity in the history of Soviet psychology, *Soviet Psychology* **27**(1), 22–39.

- Mackay, W. E., Ritzer, A. V. and Janecek, P. (2000) Video artifacts for design: bridging the gap between abstraction and detail. In *Proceedings of DIS 2000*, pp. 72–82.
- Nardi, B. and Kaptelinin, V. (2012) *Activity Theory in HCI: Fundamentals and Reflections*. Morgan & Claypool.
- Saguna, A., Z. and Chakraborty, D. (2013) Complex Activity Recognition using Context-Driven Activity Theory and Activity Signatures. *ACM Transactions on Computer-Human Interaction* **20**(6), Article 32.
- Vygotsky, L. S. (1926/1962) *Thought and Language*. MIT Press, Cambridge, MA.