

## **Learning: as Activity**

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By

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# Learning as Activity

*Purpose drives human existence and perceptions of it.*

## Introduction

Until recently, if you asked most educators to define learning, they would say that it was a relatively permanent change in behavior. Why? Because that was the definition that they remembered from their learning theories courses. And because behaviorism was the theory they likely studied first, that was the definition they remembered best (a phenomenon known as primacy in the verbal learning research). That definition, or any other, I believe, is inadequate for explaining the phenomenon of learning. Learning is a complex process—much more complex than the stimulus-response connections envisioned by behavioral psychologists or the information processes conceived by the cognitive psychologists who succeeded them.

For the past decade, the study of learning has been engaged in a paradigm shift. Many of the assumptions of behavioral and cognitive theories of learning have been challenged by a combination of more socially and constructively oriented theories. Contemporary theories of learning, including socially shared cognition, situated learning, everyday cognition and everyday reasoning, activity theory, ecological psychology, distributed cognitions, and case-based reasoning share many beliefs and assumptions about learning (Jonassen & Land, 2000). These theories are based on similar ontologies, epistemologies, and phenomenologies. Together, they provide a consonant and coherent theory of meaning making. In this paper, I will attempt to integrate those theories into a clearer understanding of the complexities of learning.

More than any other theory, this paper will characterize learning as activity that occurs within purposive and integrated activity systems. Analysis of activity systems is supported by activity theory. Activity theorists claim that conscious learning and activity (performance) are interactive and interdependent (we cannot act without thinking or think without acting; they are the same). Activity and consciousness are the central mechanisms of learning. The important distinction is that in order to think and learn, it is necessary to act on some entity (physical, mental, or social).

My integration of theories also relies substantially on ecological psychology, which claims that learning results from the reciprocal perception of affordances from the environment and actions on the environment (Gibson, 1977; Young, Barab, & Garrett, 2000). Integrating activity theory and ecological psychology, I conceive of meaningful learning as a willful, intentional, active, conscious, constructive, and socially mediated practice that includes reciprocal intention—action—reflection activities (Figure 1). Humans are distinct in their abilities to articulate an intention, then to willfully plan to act on it, and reflect on their actions in terms of their intentions.

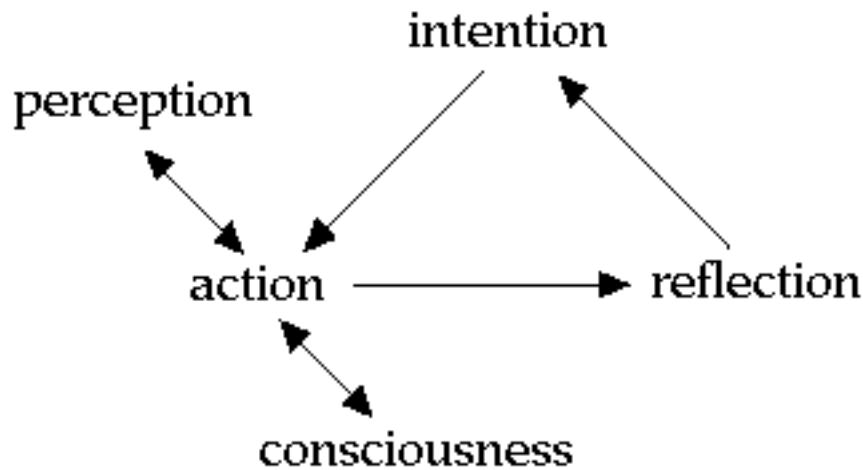


Figure 1. Learning as intention—action—reflection.

There are at least three fundamental changes in our understanding of learning that are entailed by these contemporary theories. First, learning is a process of meaning making, not of knowledge reception. Humans interact with other humans and with artifacts in the world and naturally and continuously attempt to make sense of those interactions. Meaning making (resolving the dissonance between what we know for sure and what we perceive or what we believe that others know) is a very natural process that results from a puzzlement, perturbation, expectation violations, curiosity, or cognitive dissonance. This dissonance ensures some ownership of the knowledge by learners because it is their discrepancy that they are trying to resolve. Knowledge that is personally constructed or socially co-constructed is necessarily owned by and attributed to the meaning makers, whether they are acting individually or collaboratively. So when encountering a puzzlement or problem, learners must articulate an intention to “figure out” the phenomenon and then act on it, consciously reflecting on the meaning of those interactions. The underlying epistemological revolution here is the rejection of dualistic beliefs that mind and behavior are separate phenomena. Rather mind and behavior and perception and action are wholly integrated. That is, we cannot separate our knowledge of a domain from our interactions with that domain. Nor can we consider the knowledge that is integrated with the activity outside the context in which it was constructed. Context adds meaning because it is an essential part of the activity system. It is impossible to know something in a completely abstract, decontextualized way.

Second, contemporary learning theorists focus increasingly on the social nature of the meaning making process. Behavioral and cognitive theories focused on the individual as the agent of learning who store, retrieve, and apply information. How individual agents process information can be compared, but it cannot be shared. However, just as the

physical world is shared by all of us, so is some of the meaning that we make from it. Humans are social creatures who rely on feedback from fellow humans to determine their own existence and the veridicality of their personal beliefs. Social constructivists have believed for many years that meaning making is a process of social negotiation among participants in any activity. Learning, from this perspective, is dialogue, a process of internal as well as social negotiation. Learning is inherently a social-dialogical process (Duffy and Savery, 1995).

The third (and highly related) shift in assumptions relates to the locus of meaning making. Many psychologists cling to the belief that knowledge resides only in the head. Not only does knowledge exist in individual and socially negotiating minds, but it also exists in the discourse among individuals, the social relationships that bind them, the artifacts that they use and produce (the physical entities they work with, the social or biological systems in which they work, or a body of expression to which individuals contribute), and the theories, models, and methods they use to produce them. Knowledge and cognitive activity is distributed among the culture and history of their existence and is mediated by the tools they use (Jonassen & Henning, 1998). As we engage in communities of practice, our knowledge and beliefs about the world influence and are influenced by that community and their beliefs and values. Through legitimate peripheral participation (Lave & Wenger, 1991), we absorb part of the culture that is an integral part of the community, just as the culture is affected by each of its members. So is our identity formation, which is also a major outcome of learning. So, when we investigate learning phenomena, we are obligated to consider not only the performances of the learners, but also the sociocultural and sociohistorical setting in which the performance occurs and tools and mediation systems that learners use to make meaning.

Learning always occurs in some activity system. Whether that system is a single individual trying to assemble a new barbeque grill on which to cook supper, a classroom studying romantic poetry, or corporation planning an IPO (Initial Public Offering of a stock, for instance), the activity system constrains and defines the nature of the learning that can occur. In this paper, I will examine learning as activity in activity systems.

## **Activity Systems**

Activity theory is a form of sociocultural analysis that focuses on the system as the unit of analysis, rather than human behavior or information processing. Activity systems are collective human constructions that are not reducible to discrete individual actions (Leont'ev, 1972). In order to understand learning as a phenomenon, it is necessary to understand the activity system in which it occurs because that system with its goals, beliefs, and processes necessarily affects what is learned and how learning occurs. An activity system is any system of ongoing, object-directed, historically-conditioned, dialectically-structured, tool-mediated human interactions (Russell (1997). So, it is necessary to understand the objects, history, conversations, and tools employed within the system.

Activity systems contain interacting components (subject, tools, object, division of labor, community, and rules, as shown in Fig. 2) and are organized to accomplish the activities of the activity subsystems (Engeström, 1987). Activity subsystems (production,

distribution, exchange, and consumption, as shown in Fig. 3) describe the higher order functions, interactions, and relationships between the components of the triangle (Holt & Morris, 1993).

In this brief paper, I will use the three cases mentioned earlier (single individual trying to assemble a new barbeque grill, a classroom studying romantic poetry, or corporation planning an IPO) to exemplify learning activity systems. Each of these cases calls on a diversity of prior knowledge and clearly requires a lot of learning as each activity is fulfilled.

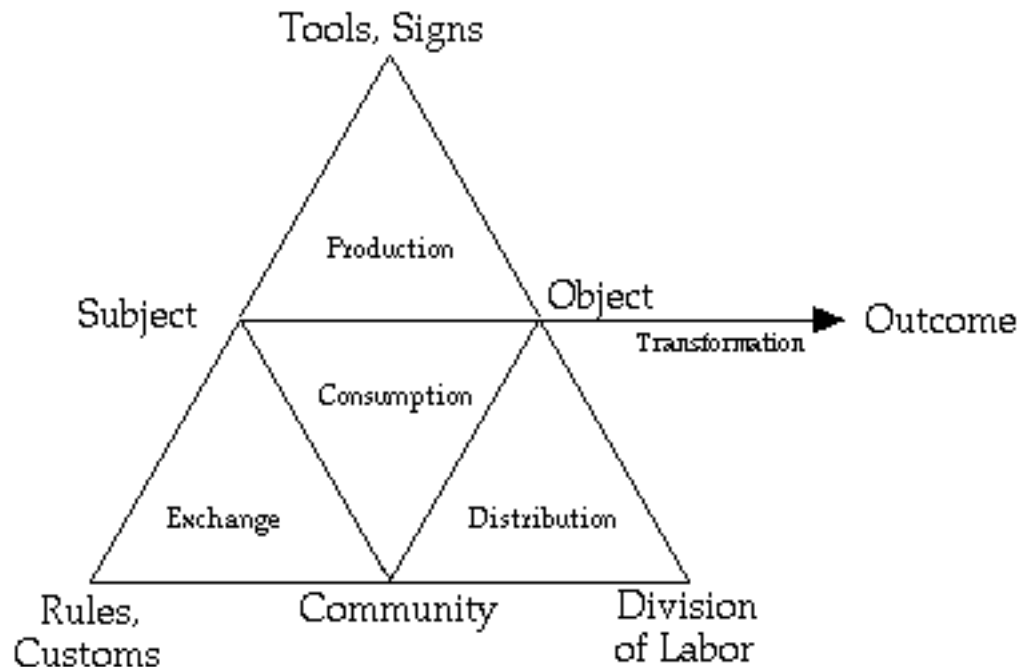


Figure 2. Activity system (Adapted from Engeström, 1987)

### **Assumptions of Activity Systems**

**Unity of Consciousness and Activity.** One of the most fundamental assumptions of activity theory is the integration of consciousness and activity. Activities include both the human interactions with the objective world and the conscious activities that are embedded in those interactions. Thinking and learning are internalized forms of activity, just as manipulation of physical artifacts are externalized forms of activity. The human mind emerges and exists as a special component of interactions with the environment, so activity (sensory, mental, and physical) and conscious processing (learning) cannot be separated. Individuals cannot understand something without acting on it. Conscious meaning making is engaged by activity. What individuals know is the interaction of conscious meaning making and activity, which are dynamically evolving.

**Intentionality.** Activity theory focuses on the purposeful actions that are realized through conscious intentions. Every aspect of human behavior is intentional or goal-directed.

Activities from going to the refrigerator for a snack to pursuing a Ph.D. rely on intentions. Intentions are not necessarily rigid descriptions of the intended action but rather are always incomplete and tentative yet evolving. According to activity theory, intentions emerge from contradictions that individuals perceive in their environment, such as differences between what they believe they need to know in order to accomplish a goal and what they do, in fact, know at any point in time. Their intentions, however, can exist only in the context of the intended activity. The phenomenal growth of activity theory itself has emerged in response to internal contradictions in the field of psychology.

**Mediated Action.** Activity is mediated by the instruments, signs, procedures, machines, methods, models, theories, laws, and forms of work organization. Whereas psychology traditionally has focused on mental representations, ignoring artifacts or mediating tools and signs, "activity cannot be understood without understanding the role of artifacts in everyday existence, especially the way that artifacts are integrated into social practice" (Nardi, 1996, p. 14). This focus is one that has long been recognized in anthropological research and one that can be useful to instructional designers. Although activity theory accepts that human actions have a psychological dimension, it argues that psychology is conditioned by mediating artifacts as well as cultural, institutional, and historical contexts (Wertsch, 1998).

**Historicity.** Activity is a historically developed phenomenon. That is, activities evolve over time within a culture. In order to understand the dynamics of a particular context, it is necessary to grasp the changes or evolutions of that situation over time. Activity theory itself, like most theories, is an activity system where researchers from different disciplines contribute to a socially constructed conception. For example, cognitive psychology has undergone significant changes since the information processing conceptions that dominated work in the 1970s.

## **Components of Activity Systems**

### **Production Subsystem**

The primary focus of activity systems analysis (especially for learning) is the top triangle of Figure 3 (the production of some object in order to achieve some outcome). If we examine schools or classrooms as activity systems, we must first determine what the real outcomes are. Is the purpose of the system to engage meaningful learning, ensure the passing of standardized tests, social conditioning, or custodial incarceration? In reality, all of these outcomes are normally involved, implicitly or explicitly.

The production subsystem consists of the objects that attempt to produce the outcome of the system. Analyzing the artifacts that are generated by the activity system (outcome) is important to understanding the purpose of the system. What are the outcomes of public schools? What are the objects that are manipulated? That depends on who we see as the subject in our analysis. It will vary in our three examples.

The production process in any activity system involves a subject, the object of the activity, the tools that are used in the activity, and the actions and operations that affect an

outcome (Nardi, 1996). The production subsystem is generally regarded as the most important, because in the production process, the object of the system is transformed into the outcome, that is, the intentions of the activity system are manifest. Its goal is to transform the object of activity into an outcome. It is important to note that concurrent with the production of physical objects, the subject is also producing (constructing) knowledge about the activity, its components, assumptions, and contradictions. The conscious understanding is an essential part of the activity that cannot be separated from it.

**Subject.** The subject of any activity is the individual or group of actors engaged in the activity. Activity systems are perceived from their point of view. For example, with the individual trying to assemble a new barbeque grill, the subject is the individual, unless he or she solicits the help of a spouse, neighbor or friend, in which case they become the subject attempting to assemble the grill so that they can barbeque supper. In the classroom studying romantic poetry, the subject may be the teacher or the students in the classroom. If the teacher is the subject, the outcome of the activity system likely focuses on managing the students and enabling them to proceed to the next grade. We would normally think of the students as the subjects who are trying to learn (the outcome) and the teacher as a mediator (wouldn't it be nice if teachers and students saw themselves and each other collectively as actors in a single learning community, rather than the polarized roles they normally assume). With the corporation planning an IPO, the subject is probably the upper level of corporate management, including the CEO, financial officer(s), the board of directors, and so on.

**Object.** All activity is object-oriented. Objects of activity systems are artifacts that are produced by the system. Whether physical, mental, or symbolic, they are the product that is acted on by the subject. The transformation of the object into the outcome represents the purpose or intention of the activity. With the individual trying to assemble a new barbeque grill, the object is the box of grill parts purchased from the store. In the classroom studying romantic poetry, the object of study is the poetry contained in the various books being used or the poetry that students create. In the corporation planning an IPO, the object consists of the announcement of the IPO, the plans to support it, and the company itself. Whatever it is, the object is transformed in the course of activity, so it is not immutable (Nardi, 1996). Keats may have intended (or at least hoped) that readers of his poetry might experience it a certain way, however, the sense that American ninth graders make of it may be considerably different. Just as the object is transformed during the production process, the subject may also be transformed by the object. As individuals engage in activity systems, they are changed by those systems. Despite the intended object of activity, the form and function of that object is likely to be modified as the activity unfolds. For instance, students in the classroom may become devotees of romantic poetry, or they gain avoidance, time management, or other skills and knowledge.

**Tools, Signs, and Other Mediators.** The production subsystem is completed by the tools, sign systems, theories, and procedures that mediate the activity. Most generally, tools and signs are the means that actors (subject) use for acting on the object. They can be anything used in the transformation process (physical, like hammers or computers, or

abstract or mental, like sign systems, programming languages, models or heuristics). The use of culture-specific tools shapes the way people act and think. For the individual trying to assemble a new barbecue grill, tools may include the physical tools (screwdriver, wrenches, etc.), the instructions included with the grill (which may vary considerably in their use of signs), and any special assembly methods that may be advocated in those instructions. In the classroom studying romantic poetry, tools include textbooks, reference books, the style of the poetry itself (which may be the most problematic), reporting styles or assignments required by the teacher, or the paper, pens, or computers used to produce an object. In the corporation planning an IPO, tools include accounting systems for generating reports, public media for communicating the offering (and all of the sign systems they use), or the computers and software used to analyze financial positions. The tools alter the activity and are, in turn, altered by the activity. For example, assembling the grill with worn-out tools may result in a poorly assembled grill and a frustrated subject who swears never to attempt to assemble anything ever again. Activity theory itself is a mediating tool for researching phenomena. An activity theory analysis will result in a different outcome than an experimental analysis, for example.

### **Consumption Subsystem**

The consumption subsystem (Fig. 3) describes how the subject and the surrounding community collaborate to act on the object. The consumption process represents a contradiction inherent in activity systems. Social, cultural, and organizational factors in activity systems often produce inherent contradictions in those systems. The contradiction is that even though the goal of activity systems is to transform an object, those production activities also consume energy and resources from the subject and the community of the activity system (Holt & Morris, 1993). So, the subject must operate within a community that reciprocally supports the production activities of the subject but also consumes effort from the subject. What causes changes in activity systems are contradictions that emerge within them. Although contradictions are usually internal to the activity system, they may also be external, as when values, beliefs, or activities of one activity system conflict with those of another. The nature of the activities performed in one or both activity systems must change.

**Community.** Very little, if any, meaningful activity is accomplished individually. People may perform individually in different contexts, but their ability to perform is predicated on groups of people. That is, individuals are concurrently members of different communities. As an example, the the corporation issuing the IPO consists of accountants, financial managers, marketing people and a host of support people as diverse as the janitors and management. They rely on their immediate community of workers to fulfill the activity. Therefore, "the human individual's activity is a system of social relations. It does not exist without those social relations" (Leont'ev, 1981, pp. 46-7).

The community consists of the individuals and subgroups that focus at least some of their effort on the object. Within activity systems, the community functions to distribute cognitive responsibility among participants and artifacts. Knowledge in any activity system is distributed among the members of the subject group and community with whom it interacts, the tools they use, and the products they create. Human cognition



is always situated in a complex sociocultural world that affects individual cognition. The individual trying to assemble a new barbecue grill is supported by the workers who assembled and placed (hopefully) all of the parts in the box, the workers who constructed his or her tools and wrote the instruction manual, as well as the neighbor who helps to assemble it. The classroom studying romantic poetry is supported by a community of people, including the teacher, school secretary, janitor, principal, and many others. The classroom of students themselves represents a community of learners who may assist each other or stimulate performance through competition. In the corporation planning an IPO, their community consists of stockholders, creditors, suppliers, customers, etc. What binds this community together, assuming that it is a community, is the shared purpose. It is important to note that we are at any time members of several communities (e.g. work, church, soccer league, etc.) each with its own intentions. Occasionally, those communities interact.

Again, although the goal of learning communities should be learning, communities often consume effort that may impede that process. In schools, state-mandated testing, immunization, school lunches, and many other contradictions inhibit learning. These contradictions may occur within a specific activity system or result from contradictions between activity systems, in this case, the state department of instruction and public schools. Why? Because, as mentioned before, the individuals involved in a particular activity are also simultaneously members of other independent or overlapping activity groups that have different intentions. Individuals naturally are caught up in some of the unrelated activities of their collaborators. Students, for instance, may interact in several activity systems, such as church groups, social clubs, street gangs, or sports teams, each of which engages different activities and cultures that often contradict each other. Because people are all simultaneously members of various communities (the community in which we live, the community within which they recreate, and the professional community in which they work), they must continuously alter their beliefs and actions to adjust to the socially mediated expectations of different groups. Conflicts between roles in the various communities often arise, leading to transformational activities required to harmonize those contradicting expectations.

### **Distribution Subsystem**

The distribution subsystem ties the object of activity to the community by defining a division of labor. That is, it divides up activities according to social laws or expectations.

*Division of Labor.* The division of labor refers to the horizontal division of tasks between cooperating members of the community but also to the vertical division of power and status (Engeström, 1999). Most organizations in which work is done evolve both horizontally and vertically. However, organizations vary in terms of the flexibility with which their divisions of labor are administered. In some organizations, those divisions are negotiated on an activity-by-activity basis, whereas in other more vertical organizations, divisions are mandated from the top down. With the individual trying to assemble a new barbecue grill, responsibilities may vary. The spouse may be assigned to watch the children so they do not bother the assembler, or the children may be assigned as go-fers to retrieve needed tools. In the classroom studying romantic poetry, the

division of labor is normally vertical. The teacher assigns and evaluates while the students complete the assigned work. In the corporation planning an IPO, different groups are normally responsible for manipulating different objects. The financial director generates financial reports, the marketing director determines the media and methods for the announcement, while the CEO orchestrates their activities. Learning is an essential activity in all of these other activities.

How flexibly any work organization can adapt to circumstances will determine the ability of the activity system to engage in different activities. That is, how work is distributed throughout the organization determines to some degree the nature of the work culture and the climate for those involved in any activity system. Classroom activity systems are seldom flexible enough to assume activities that are not traditionally associated with classroom learning (listening to the teacher, studying, taking tests, etc.)

### **Exchange Subsystem**

The exchange subsystem engages the subject and two contextual components: the rules that constrain the activity and the community with which the subject interacts. It regulates the activities of the system in terms of personal needs. The exchange of personal, social, and cultural norms in any work community also determines the nature of the work culture and the climate for those involved in any activity system. In the exchange subsystem, those norms are negotiated by members of the community and become the rules by which the activity system and subject regulate their performance.

**Rules.** Activities are socially and contextually bound. The rules that operate in any context or society refer to the explicit regulations, laws, policies, and conventions that constrain activity as well as the implicit social norms, standards, and relationships among members of the community. Rules inherently guide (at least to some degree) the actions or activities acceptable by the community, so the signs, symbols, tools, models, and methods that the community uses will mediate the process. For the individual trying to assemble a new barbecue grill, the rules are very local. They may pertain to quiet time for children's naps or no cursing. The classroom studying romantic poetry is very constrained by rules. Whatever learning occurs must be accomplished in seats in rows within 50-minute periods. Corporations are constrained by laws governing their operation as well as industry norms. Those may be well established, or in the case of e-commerce, emergent. Any activity system can be described only in the context of the community in which it operates.

### **Activity Structure**

Activity within and between subsystems consists of a goal-directed hierarchy of actions (see Fig. 3) that are used to act on the object—the activities, actions, and operations that transform the object. Activity is conscious process that consists of chains of actions that consist of chains of operations.

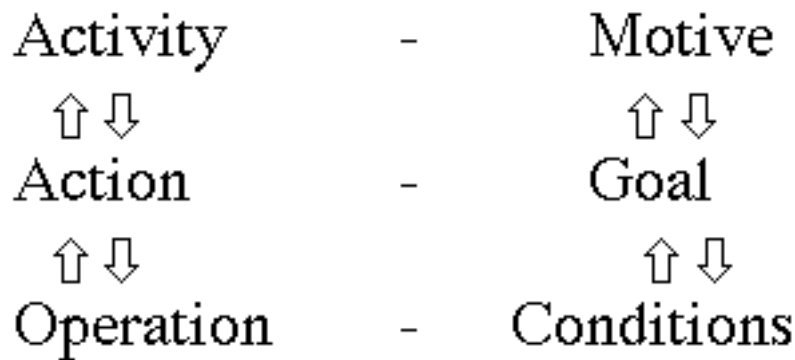


Figure 3. Hierarchical nature of activities, actions and operations

As argued before, meaningful learning is inextricably tied to activity. The more authentic and purposeful the activity, the more likely meaningful learning will result. This is not to suggest that many activities produce unintended, serendipitous results. However, had the individual or community not been involved in some intention activity, it is very unlikely that any outcome would have resulted, intentional or otherwise. The activity provides the motive for the activity system as well as the purpose for all actions (cognitive, social, physical, and others). Activity system components are oriented by the goal of transforming the object into the outcome. When all system components are oriented by the same object and process with few contradictions between and among those components, the activity system functions more productively.

In the activity where the individual is assembling a new barbeque grill, actions include unpacking materials, inserting bolts and nuts into holes, visualizing how components will fit together, reconciling parts that do not fit as well as they should (applying different forces to the parts to make them fit), interpreting verbal directions into physical actions, sequencing activities, and so on. The actions would differ if the person were assembling a lawnmower. While the activity may be similar, the actions are always driven by the activity. In the classroom studying romantic poetry, students are engaged in reading poems, interpreting lines of poetry, inferring the author’s intentions, guessing what the teacher is looking for, writing lines of poetry, determining rhyme schemes, and so on. In the corporation planning an IPO, actions include determining profitability, predicting growth patterns, analyzing market trends, enhancing the image of the company through marketing, and so on. I have an ongoing project aimed at cataloguing actions and operations from a diverse set of activities (Fig. 4).

Operations are the automated performances that are comprise in the actions. In the barbeque assembly task, operations include turning nuts on bolts, lining up objects, following sequences, and so on. These operations support each action. In the poetry class, operations include reading, following directions, writing ideas on paper, and so on. In the corporate planning sessions, operations include making spreadsheet entries, completing calculations, writing summaries, and so on. All of these operations were learned at one time. At that time, they were actions rather than operations. As learning is practiced and overlearned, it becomes an operation, an action that requires little conscious mental effort.

This activity structure (activity, actions, and operations) is dynamic. With each new activity in a new context, the structure is adapted as new actions are added and

practiced, later becoming operations. That is, creating a new action out of previously automated operations may, after some time of applying it, start automating that action, which then becomes an operation, but at a higher level of complex organization. Learning is a dynamic process. The requirements and outcomes are constantly being altered. In order for the learning to be useful, it must be embedded in some authentic activity system.

### **Summary**

Learning is a complex cognitive and social process that necessarily interacts with the world around it. Activity theory provides an alternative lens for analyzing learning processes and outcomes that captures more of the complexity and integratedness with the context and community that surround and support it. Rather than focusing on knowledge states, it focuses on the activities in which people are engaged, the nature of the tools they use in those activities, the social and contextual relationships among the collaborators in those activities, the goals and intentions of those activities, and the objects or outcomes of those activities. Rather than analyzing knowledge states as detached from these entities, activity theory sees consciousness as the mental activities that suffuse all of these entities. Concepts, rules, and theories that are not associated with activity have no meaning. Articulating each of these entities and their dynamic interrelationships is important when designing instruction, because the richer the context and the more embedded the conscious thought processes are in that context, the more meaning that learners will construct both for the activities and the thought processes.

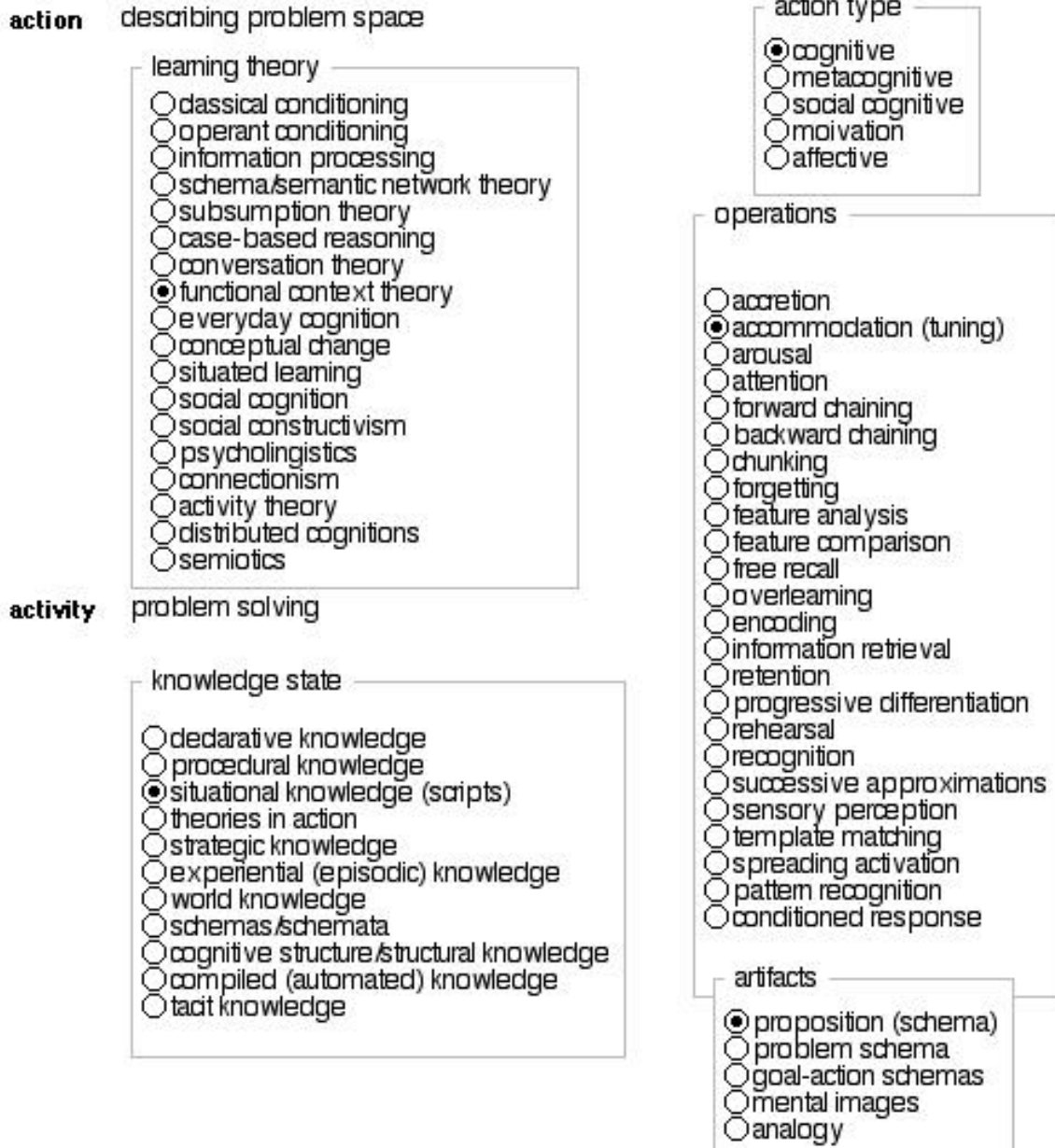


Figure 4. Database entry cataloging actions.

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