Self-constructed activity, work analysis, and occupational training

An approach to learning objects for adults

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What do people learn in occupational education and training? This question expresses a major concern of instructors, but is not necessarily interesting to education scientists. For the latter, learning objects—what one learns—are independent of the learning process—how one learns—and the material to be learned is considered to depend on practical rather than scientific decisions. This is not the position defended in the activity-centered approach, developed in particular by French-speaking researchers. This chapter is devoted to presenting this approach.

When we learn we are always learning something, and that something is related to social practices. For a job-training instructor, this involves knowing these practices, particularly those serving as a reference for the training. This topic will be addressed in Section 1. In the scientific analysis of work, the theoretical object of study is activity, which is conceptualized differently in the various activity-centered theories. This topic will be addressed in Section 2. The activity-centered approach recommends not separating learning and work, and can be used to design fruitful new learning objects for training. This topic will be addressed in Section 3.

1 Knowing social practices and analyzing work

Our acts differ at every moment: we change the place of action, the pace and frequency, the extent of involvement, the partners, the cultural context, the value system, the mode of relating to others, and so on. This diversity of social practices and life contexts brings about varied experiences, each involving specific learning processes and objects. This implies that instructors must not only know these practices well, but also know how to analyze them.

1.1 Diversity of practices and occupations, and the need for a work analysis

Human experience is constantly changing in accordance with the practices and actions in which the actor is engaged. These in turn are partially defined by the actor. Social practices are highly diverse and apply to work, study, sports, art, tourism, family, politics, and religion, to mention only a few. They differ according to what they imply in terms of values and norms shared by various actors, the extent of cognitive or bodily
demands, the person’s knowledge and know-how, individual or group decision-making modes, methods for evaluating actions, emotional repercussions and risk-taking, the degree of uncertainty and event predictability, the precision of the actions, the need to cooperate or not, rewards sought, actor responsibility and accountability, etc.

Each society has its own system of organized social practices, composed of entities that are both differentiated and interdependent (Baubion-Broye, 1998). Actors find their bearings, act, and move within this system, which means that they must learn the skills and competencies it demands. Today, this learning process extends across the life span due to rapid social change, frequent job relocation, and sometimes multiple career modifications.

When it comes to work, occupational practices are fully predefined, and some professions such as airline piloting, caring for the sick, or speculating on monetary exchange rates are highly specialized and therefore call for specific knowledge and skills (Durand, 2008). Professors and instructors in charge of occupational education and training must therefore have a thorough knowledge of the job for which their students or trainees are bound, so as to come up with relevant learning objects. This knowledge is often acquired through past experience (e.g. an engineering teacher may have worked as an engineer before going into teaching). But, when prior work experience is lacking, instructors must have the necessary methods and concepts at their disposal to help them analyze and understand the work they are to teach (Durand, 2009; Durand and Filliettaz, 2009).

1.2 Analyzing work in order to develop learning objects

In all jobs, there is a gap between the prescribed work and the actual activities carried out by the actors. This gap is not a sign of incompetence, ill will, negligence, or lack of commitment on the part of workers. It is rather the result of their efforts to accomplish the job “in spite of it all,” that is, in spite of its complexity, unfavorable conditions, flaws in planning and organization, intangibles, and unforeseen events (Zarifian, 1995). The gap corresponds to the fact that the reality of a work activity does not readily lend itself to being captured by a set of job specifications or instructions. There are always unforeseen hazards and mishaps, an impossibility not thought of, an unanticipated phenomenon, etc. And the actions carried out—especially when they are as complex as work actions often are—are neither contained in a job procedure, nor completely specified or controlled by job instructions. In order for work to be accomplished, a fundamental factor comes into play: the human factor (Dejours, 1999).

According to a high-level manager in the French National Railroad Corporation, the complexity of the train–traffic network in his country has increased so much (France has one of the most complex railroad systems in the world) that he wonders how it can operate on a daily basis without too many errors or accidents. The answer to his question, as elsewhere, is straightforward: it is simply because the human factor enters into the picture, that is to say, individual efforts, tricks of the trade, compensations, inventions, deviations from instructions, and so on, all done locally and daily by each of the 170,000 employees of this organization who enable it to operate “in spite of it all.”

Observing the interplay of human factors reveals an unsuspected complexity and an irreducible uniqueness. This is why Schwartz (1998) said that all work is a puzzle. Every day each actor does his/her work, yet a great part of that work escapes our superficial understanding of the occupations and their ways. This means that, to understand the work that gets done, it must be analyzed. This requires precisely identifying (i) what the actors are supposed to do (what is asked and imposed on them, their list of duties and tasks, their mission, their assignments, etc.), (ii) the real activity of those actors (what they actually do), and (iii) how these two elements are related to each other (Leplat, 1997).

Work is a puzzle because, as indicated in the above example, it cannot be known in advance. It is as much the product of the ingenuity of its designers, as it is the result of the inventiveness of the people who are doing the work. This is true for occupations requiring specialized qualifications and advanced training.
it is also true for simpler trades requiring little in the way of skills. Even so-called “manual” work demands precise on-the-job reasoning and decisions that are often quite complex. And even in assembly-line work or jobs in Taylorian organizations, which try to reduce or eliminate the human factor, employees demonstrate a certain degree of autonomy in their activities and depart from the procedures outlined in their job descriptions. For example, assembly-line workers have a tendency to “move up the line,” i.e. they start working on the part being manufactured before it arrives directly in front of their workstation. The price paid for this is reduced accuracy (due to shifted positions and also hastiness) and sometimes even physical pain caused by the leaning body posture it entails. But there is a positive side too: it is a safeguard against faulty work (because missed operations can be redone) and a reflection of respect for the workplace culture (persons working farther down the line are not penalized). It can also give the work a play-like dimension (seeing how far up the line one can go, experimenting with shifting left and right) and may generate a feeling of power and superiority over the machinery. Here, the real activity is infinitely richer than the simple repetition of the automatic movements needed to manufacture a part as it passes at optimal speed in front of the actor.

Work is becoming increasingly complex, and the search for profitability, ongoing competition, and demands for productivity in all occupations force workers to make subtle adjustments, and to exhibit new reactivity and decision-making abilities at all times. They must be capable of coping with what Zarifian (1995) called events, that is, major unexpected happenings that take the job out of its routine, in such a way that the actors can no longer operate at their cruising speed. A case in point is that of floor managers supervising an automated production line at a cement plant, who have to determine whether a particular alarm message on their control panel is a sign of a major breakdown or a minor malfunction. The decision they must make (on their own) is fundamental for the company: if their diagnosis is wrong—i.e. if they choose to stop production in the case of a minor malfunction, or decide to keep it going following a breakdown that proves serious—the consequences on line productivity, the factory, and also on themselves will be far reaching. The complexity of work also lies in its inherent injunction of subjectivity (Clot, 1999). All workers are expected to “get involved” in their job and to do more than just simply follow routines in a measured and neutral way. The case of the assembly-line work presented above illustrates this idea: even in apparently simple and automatic tasks, the actors still invest themselves in their jobs. This is especially true when the job requires the use of discretion, or is defined as a mission whose objectives are specified, but the means to attain them are not. The actors themselves must figure out how to do their work, so they are in fact responding to this paradoxical demand for autonomy. This can take its toll in the form of individual responsibility, which is sometimes accompanied by personal suffering and health problems (Dejours, 1998).

2 Work activity

Activity can be broadly defined as everything an actor is doing at a given moment. It takes on different forms and meanings, which depend upon social practices. Analyzing activity involves breaking down the ongoing flow into a sequence of discrete units, each with a meaning and an identifiable organization. Some examples of discrete units are machining a metal part, ordering from a supplier, anesthetizing a patient, or presiding over a board meeting (Durand, 2008). As a theoretical object, activity allows us to account for social practices without over-simplification, while still maintaining their meaning and structure.

In the French-speaking tradition, the approach to work activity is supported by an interdisciplinary movement emerging mainly out of ergonomics. In the various definitions of activity proposed so far, each one supported by its own underlying assumptions and epistemological and philosophical traditions (constructivist, historical-cultural, phenomenological, etc.), different points are emphasized (Durand, 2008). In the domain of vocational education and training, the main theories are occupational didactics (Pastré, 2007), the clinical approach to activity (Clot, 1999), and course-of-action theory (Theureau, 2004).
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2.1 Properties of work activity

Here, we will focus on the common elements of these activity-centered theories, while presenting the key properties of work activity.

Work activity is constrained, goal-oriented, and productive. It is constrained by (i) the surrounding culture, which specifies the norms, values, and concrete or symbolic tools and instruments that apply to it, (ii) the state of the actor (his/her alertness or fatigue, personality and skills, etc.), and (iii) the task to be accomplished, as dictated by the work organization and instructions coming down from hierarchical superiors. It is goal-oriented in the sense that it is not erratic and there is a desired result. It is productive in that it is aimed at producing goods or services, and results in a transformation of the actors, their culture, and their task.

Work activity is a whole. It cannot be understood by being broken down into single, separate processes (decision making, problem solving, sensorimotor coordination, perception, emotional control, regulation of motivation, etc.). These processes are interdependent; they become meaningful and take on structure in relationship to the activity as a whole.

Work activity is organized. It has an order and regularities, and there are relationships between its constituents: similar actions are performed or conducted “in view of” achieving something, and causally or temporally dependent relations between components can be identified.

Work activity is dynamic. It is formed and transformed in accordance with events occurring in the environment in which it unfolds. But its dynamic quality is not merely reactive: it is fundamentally endogenous or intrinsic. Certain transformations are short lived. Others are irreversible, in such a way that, afterwards, the activity is never the same, in which case we speak of learning and/or development.

Work activity is the realization of certain potentials. What the actors do is not equal to everything that they could do. They follow the job instructions when they have to, but there always exists what Clot (1999) calls “prevented” activities, ones that could have or should have come to be but did not. The actors continuously assess their real activities in relation to these prevented activities. This process generates various kinds of affect, and because of the regret and dissatisfaction it may cause, can also generate work-related suffering (Dejours, 1998).

Work activity is meaningful. Its meaning resides in the relationship between the activity and the task’s constraints and objectives, and also in each actor’s own dynamics, which assign meanings to the experiences being lived through, which are linked to the history of that actor’s past activity. For example, in our observations of educational advisors and job counselors who are helping applicants validate their work experience, we have noticed that some of them talk to the applicants in a metaphorical mode, using wordings like (i) “it’s an obstacle course with a target at the end” (the desired diploma), (ii) “filling up a container with one’s experience,” (iii) “searching for an overlap between the applicant and the diploma,” and so on (Salini and Durand, in press). The guidance such counselors provide falls right in line with the metaphors they use.

Work activity is situated—culturally, spatially, temporally, and bodily. It is made to fit into the organizational, spatial-temporal, and cultural environment in which it takes place. What’s more, it expresses the actor’s own point of view on that environment, i.e. the situation that the actor constructs or makes emerge. Work activity, then, cannot be understood unless the links with the environment are considered from the actor’s viewpoint.

Work activity is both unique and general. It is never reproduced in exactly the same way, so each occurrence is one of its kind. But it also manifests a degree of generality (for example, it is the activity of a fisherman, a teacher, a pilot). It expresses and is structured by components that are general (within the actor) and shared (by a group or a community of practice). Depending on the theory, this generality results from constructs that are not only cognitive (Pastré’s pragmatic concepts, 1999), but also social (Clot’s genres, 1999), and experiential (Theureau’s types, 2004).
2.2 Analyzing work activity in view of occupational education and training

Analyzing work activity consists of identifying its properties as they are specified for a particular job. The analysis relies on observations in the field, supplemented by various kinds of interviews generally consisting of showing workers samples of their activity (audio or video recordings, written reports, etc.) and asking them to describe, comment upon, analyze, justify, or explain their activity, either alone or in the presence of co-workers (Durand, 2008). Once this material has been collected, the analyst proposes a model of the work, which then serves as documentation for designing the training plan. The model highlights different aspects, depending on the theory upon which it is based.

According to occupational didactics, work activity is organized around scientific, technical, and pragmatic knowledge. Scientific knowledge is taught during training; technical and pragmatic knowledge is acquired through experience. Pragmatic knowledge, which can only be identified by analyzing real work activity, is made up of pragmatic concepts, e.g. “filling” for plastic industry technicians setting injection molding machines (Pastré, 1999), “the front line” for firemen controlling a forest fire (Vidal-Gomel and Rogalski, 2007), “balance” and “load” for winemakers pruning their vineyards (Caens-Martin, 1999). These concepts are combined into sets that form what Pastré (1999) calls the conceptual structure of an occupational situation.

According to the clinical approach to activity, two aspects are crucial. The first is the organization of work activity into three levels and their interrelationships: the activity, which is related to the subject’s motives for transforming his/her environment (e.g. participating in a group hunt), the actions and associated goals that enter into carrying out the activity (e.g. for the beater, driving the game), and the operations specific to the particular environmental conditions, which contribute to performing the actions (e.g. shooting the rifle). Each level is part of an integration process: the operations become meaningful in relation to the actions, which become meaningful in relation to the activity (Leontiev, 1972). The second aspect is the relationship between generic and specific elements. The activity is prepared in a social matrix made up of occupational “genres.” These genres (similar to Bakhtin’s (1986) speech genres) are sets of rules governing how the work is to be performed. They constitute the collective resources available to each person, who then brands them with a personal marker: his/her style. Learning a trade thus means internalizing the rules of the genre while asserting one’s personal style. It is also, secondarily, maintaining the generic dynamic by taking part in occupational controversies and developing one’s own activity within a dialectic between the job’s individual and collective dimensions. In illustration, we have observed two opposing styles in counselors in charge of training programs for future high school teachers. One counselor recommended handling the class in a gentle and progressive fashion, ensuring the transition between events that occurred right before class, and helping students move gradually into the lesson. The other advised drawing a clear line between what came before, rushing the students, and taking the least possible amount of time to get them to start work. When asked to comment on the video recordings of their work and to explain it to student teachers, both counselors emphasized these controversial differences, but they also insisted on something they had in common: “handling the class.” This genre consists of getting the students’ attention and adherence, synchronizing their activities, and explaining how the current lesson fits into the scheduling and progression of the curriculum.

According to the course-of-action framework, work activity consists of an actor–environment coupling endowed with an essential property: autonomy. It has its own dynamic, such that ongoing transformations of the activity result from transitions from one state of coupling to another: state S1 determines state S2, and so on. These successive states are disrupted by outside events, but they are not controlled by them. The coupling is accompanied by pre-reflective awareness through which the actor has a conscious experience of what he/she is living through. The coupling is never radically new, in the sense that it recapitulates its own history while updating certain possibilities that this history has opened up in the here and now. The actor draws benefit from past experiences that have become typified, and each occurrence is
assigned to “a type”: such and such an event, a particular chain of actions, a given emotion, a certain perceptual-cognitive-emotional pattern—all become typical of the job. These types help the actor interpret current situations and invest available resources in order to plan his/her course of action. Typified elements are found across actors, and learning a trade or occupation consists precisely of building or acquiring them. Such “typical” elements have been observed on numerous occasions. In the area of teaching, for example, we find group activity patterns in the classroom (Veyrunes et al., 2008), emotional patterns typical of beginning teachers (Ria et al., 2003), and recurring conflict-management sequences in the classroom (Flavier et al., 2002). They have also been found for other occupations, such as among managers in the way they organize their own work (Dieumegard et al., 2004) or even among top-ranking athletes (Durand et al., 2004).

3 Transformation of activity, learning, and training

A work analysis allows one to indirectly understand the learning achieved by the actors. The learning process always involves individual/group transformations of activity that are closely tied to the requirements of the job. Instructors rely on the results of work analyses to design training materials that bring to bear the constructive properties of the activity as it is implemented naturally, and then use these results to propose learning objects geared to the job in question.

3.1 Self-construction of work activity and “encouraged-action spaces”

Some of the transformations that take place during work are irreversible and have effects that usually (but not always) make the activity more effective (faster, more accurate, etc.), efficient (economical), and risk-free. In this case, we speak of learning and/or development of the work activity, which has a self-construction function.

When transformations take place, elements drawn from the cultural environment show up in the work activity. This is a manifestation of the appropriation of artifacts, procedures, technical objects, etc., which become the actor’s instruments for perceiving, thinking, interpreting, and acting. These new tools are combined with the former ones and reorganize the actor’s occupational repertoire. When development takes place (a topic which is beyond the scope of the present chapter), enhancing changes occur. Components of the activity undergo expanding transformations that broaden the domain on which they bear and reorganize the intrinsic dynamics of the activity.

The transformations brought about go hand in hand with the job’s requirements. They do not take place “in addition to” or “on the side of” the job, but “within” it, in such a way that one can doubt the usefulness of theoretically distinguishing a work activity and a learning activity (Sève and Leblanc, 2003). Studies on work activity suggest instead that all activity is self-transforming on various time scales (micro- to macro-transformations), both in work environments and in the context of vocational education and training. These two types of environments are not fundamentally different, and, as a consequence, the learning that takes place is not different in nature. It is the environment and the objects learned by the actors, and not the learning processes per se, that make the difference. This hypothesis challenges the classic opposition between informal and formal learning (on the job vs in a classroom).

All activity is unique, and what is done in work situations does not differ in nature from what is done in an educational or training context. In both cases, the actors learn, and their learning is inherent in the activity that is unfolding in accordance with certain specific prescriptions. In terms of their nature, then, there is no reason to make the distinction between productive activity and learning activity.

Some environments are nevertheless more conducive to here-and-now performance, while others are better for learning. The latter, however, are a promise of more skillful, safer, more economical, more creative and inventive, and more effective accomplishments in the future. Accordingly, the instructor
designs environments that are favorable to a given activity, and these in turn promote learning. We call such environments “encouraged-action spaces” or EASs (Durand, 2008).

EASs are environments set up by the instructor to promote activities and experiences likely to induce learning. They actualize the instructor’s intention to influence the learner’s activity by disrupting it, triggering transformations, and selecting the desired change. The instructor discourages certain actions by stating what is impossible or prohibited, and encourages others by making them possible, easier, and more rewarding. EASs are generated by transformations of the targeted work environment. These include reformulation of objectives, euphemizing the consequences of actions, addition of artificial performance criteria, simplification or complexification, alleviation or elimination of accessory components of tasks, changes in the natural pace (slowing down or speeding up), focusing on particular aspects of the work, elicitations of emotions, and overt teaching methods (prompting, demonstration, explanation, reinforcement of experience by stating rules for action, instigation of cognitive conflict, fueling of controversies and debates, analysis of practices, going through the motions or walking through tasks with the learner, tutoring, coaching, scaffolding, etc.).

3.2 Designing learning objects for work

Spontaneous learning occurs on objects that are known only through a work analysis. The durability of these acquisitions, along with their resemblance across actors with different levels of experience, shows that they are indeed critical. This fact has led instructors to design training situations that are closely tied to the work analyses performed (Durand and Filliettaz, 2009). The two cases given below illustrate training approaches of this type.

Pruning a grapevine is a complex task that is difficult to learn. It consists of a spring cutting of the year’s vine shoots, except for two canes which are left in place. The pruning must promote the growth of a high-quality, plentiful annual crop, and facilitate the balanced development of the vine stock over several decades. Learning this skill is difficult because the pruning of the shoots is anticipatory, and a mistake can jeopardize the annual harvest and the growth of the stock (Caens-Martin, 1999). The activity of experienced grapevine growers revolves around two pragmatic concepts: load (related to the annual crop) and balance (related to the development of the vine stock). Caens-Martin designed a simple simulator that shows a vine on a computer screen and asks the learner to indicate the pruning points. The simulator is organized in relation to the different categories of problems found in this occupation: simple problems where the vine is balanced and/or the load is what must guide the action; complex problems where the vine is not balanced and/or the pruning has to restore the balance; and dilemmas where a trade-off must be found between load and balance. The simulator has two advantageous features: (i) critical elements of the grapevine grower’s job are involved, even though it is not real work, and (ii) errors are possible and have no consequences since the learner is in a virtual situation. This case illustrates the merits of precisely identifying the learning object, and the fact that, in simulation-based training devices, a rigorous replica of reality is not required: it is more useful to have an environment that calls upon the pragmatic concepts, genres, and types that are crucial to the target job.

The second case concerns a training program we conducted for beginning teachers. The teaching instructions they had been given to conduct their classes (derived from the practices of experienced teachers) turned out to be quite ineffective. The experienced teachers’ expertise did not make sense to these new teachers because it was so far removed from their understanding of classroom situations (Leblanc et al., 2008). Their idea of what makes a successful class included discipline, student involvement in tasks, and following the lesson plans (Leblanc, 2007). The training brought out a clear-cut gap between two opposing views of the teacher’s job: a realistic one corresponding to what the teachers were actually experiencing on a daily basis, and an unrealistic one corresponding to what they had learned as students when they were earning their teaching degree. The type of training we proposed avoided this opposition because the
learning objects we designed were derived from the typical components of the real activity of beginning teachers, namely: the classroom as an opportune social place where teachers seek to gain control over the situation so as not to “lose face;” the classroom as a place where conflicts emerge and are facilitated by supervision at a distance; the teacher’s multiple and simultaneous actions that provoke intense dilemmas and emotions; the classroom environment as a spatial device, an artifact offering opportunities for the teacher to take a stand and interact in order to detect, assess, and prohibit rule breaking; the teaching process itself as a way of building the “story” of the teacher/student rapport; the classroom as a place where everyone potentially learns from everyone else, etc. (Leblanc, 2007).

A databank of cases and occurrences like these was compiled by Ria (2010): based on a model of teachers’ professional development. It takes into account the context of the work situation, and includes video and audio recordings, verbatim records of verbal exchanges in class and during interviews, analytical reports by instructors, and so forth. For example, the databank user can choose “the most promising entry activities,” i.e. those most highly related to the targeted practices and types of occupational concerns and interests of beginners, including (for a teacher) letting the students run the show to avoid being “a sage on stage,” asserting one’s authority while creating a kind of complicity with the pupils, instilling good classroom habits, etc. The training materials are video simulations in which the actors are called upon to act (i) from the point of view presented in the video, and (ii) from their own point of view by putting themselves in the shoes of the beginning teacher being viewed. Such training situations are likely to prompt learners to observe and describe the observed activity, interpret the situation presented while taking the actor’s viewpoint into account, analyze their own activity compared to that being presented, conceptualize the situation while incorporating the instructor’s or experienced teachers’ contributions, and devise approaches for intervention that are more effective, relevant, and recognized by the entire professional community (Leblanc et al., 2008). This method shows promise and is currently part of a nationwide program at the National Institute of Pedagogical Research in France.

In conclusion, the analysis of work activity is a source of innovation and can transform long-standing vocational education and training methods, in the sense that it can lead to an in-depth revision of the very concepts of work, learning, and the purpose of occupational training.

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