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Contradictions in Theorizing and Implementing "Communities"

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Keywords: community, learning, dialectical materialist, cultural-historical activity theory.

1. Introduction

In this paper, we return to a topic that was the focus of a special issue of another EARLI journal, *Learning and Instruction*, during its first year of publication: the role of culture in the shaping of the individual (e.g., Cole, 1991; Säljö, 1991). Until the early 1990s, consistent with the reigning Piagetian, constructivist, and information processing paradigms, most educators and educational researchers focused on the individual learner as the essential unit of instruction and analytic concern in research. This apparently changed when, following publications such as *Cognition in Practice* (Lave, 1988) and *Situated Learning* (Lave & Wenger, 1991), many researchers (e.g., Brown, Collins, & Duguid, 1989) and classroom educators (e.g., Roth & Bowen, 1995) switched to the idea that knowing and knowledgeability are better thought of as cultural practices that are exhibited by practitioners belonging to various communities. Those who implemented the then novel idea of practice encouraged students to share their ways of doing mathematics, science, or history and make them accessible to public reflection; classrooms were thereby thought as constituting knowledge-building communities (Scardamalia & Bereiter, 1994). As a result, researchers concluded that "children fit their . . . actions to the actions of others and thus contribute to the construction of consensual domains—as they participate in the process of negotiating and institutionalizing . . . meanings" (Cobb, 1989, p. 34). Despite these laudable innovations in the way students learned subject matter, the application of popular sociocultural concepts such as "community of practice" and "community of learning" in educational circles has introduced some fundamental contradictions.

Stated simply, a collection of individuals—such as a group of students put together into the same room and taught by the same teachers—does not inherently constitute a genuine community (of practice). Communities instead emerge when its members sustain the same activity system (i.e. a community) or produce the same outcomes (i.e. a community of practice).[1] Individuals and the collective here stand in a mutually constitutive (dialectical) relationship: What the individual does defines and has repercussions for the collective, for example, in defining what are legitimate or illegitimate practices. In this way, individuals are related to others in a reciprocal relation, so that what matters is the collective as much as individual achievement. Commonplace in out-of-school settings, people in such communities have the choice whether they want to participate in this or that practice; they enjoy freedom regarding the specific ways in which they want to contribute. Furthermore, legitimate communities generally can lay claim to an institutional history that transcends the participation of any individual member. The situation is turned on its head in everyday schooling when children are assembled into classes for administrative reasons and convenience. Now, classrooms generally do not experience institutional history nor do students exercise much choice over the objects of their tasks. In the end, all that matters are pupils' *individual* achievements.

The differences between these two blueprints for communities are starker when placed side by side. Everyday out-of-school communities are united by the following characteristics:
1. Objects of activity are the result of a division of labor, which contributes to the maintenance of the collective just as it mediates the maintenance of individuals;
2. Participation increases the action possibilities and control over life conditions generally;
3. Participants choose to participate in one primary community among other choices;
4. The subject's vision of the object of activity orients the activity and members learn when they recognize a need for expanding their action possibilities;
5. Motivation is an derivative phenomenon, arising from the higher emotional valence generated from the greater control over life conditions experienced and greater action possibilities;
6. Participation in collectives enhances overall action possibilities, control, and learning possibilities;
7. The knowledge built collectively is relevant and useful to others, who capitalize on the resources created through the actions of fellow members as much as their own.

In contrast, school-based communities often exhibit something very different:

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[1] Throughout the paper we maintain the difference between these two terms. A business firm might, for instance, constitute a community that is made up of myriad communities of practice such as salespersons, clerks, technicians, and managers. Simultaneously, any technician from that organization can also claim allegiance to a community *of practice* constituted by all those who work to produce similar results in different organizations and settings. Educators frequently overlook that although a classroom can be considered a community, it does not necessarily comprise a single community of practice but several because of the different object/motives individual members pursue.

1. To use a caricature, every student is essentially a monad—with respect to curricular objects—existing nearly independently of all other monads;
2. Individual success is valued and rewarded above the success of particular others (individuals) and generalized others (collective). The accomplishment of each student is irrelevant to the success of the collective;
3. School knowledge often has little bearing on how learners frame and solve problems in everyday life (e.g., in mathematics; theory–praxis gap in the professions)
4. Learning is encapsulated; learning is for its own sake. Learners often do not know why they are asked to learn something and do not see (understand) what they learn expands their action possibilities other than things related to school (Engeström, 1991);
5. The knowledge others create is nearly irrelevant to students' own knowledge and students' knowledge is immaterial to the construction of knowledge by others;
6. As a result of the previous points, high achieving students frequently do not want to work in collaborative groupings with much lower achieving students who, they feel, are a hindrance and slow them down (e.g., Roth & McRobbie, 1999).

To date, educators and educational researchers have not seriously attended to these contradictions in learning. In part, these difficulties arise from the fact that the concepts of *practice*, *community*, *community of practice*, and *learning in practice* have their origins in dialectical materialist theory—as Jean Lave's references in the aforementioned books to Karl Marx and Marxist scholars including Pierre Bourdieu, Ole Dreier, Yrjö Engeström, Evald Il'enkov, Klaus Holzkamp, Marshall Sahlins, and Paul Willis amply testify—but have been fitted into dualistic ways of thinking about knowing and learning. This unnatural grafting changes the attendant conceptual relations to the point whereby theoretical contradictions emerge and whereby educational situations modeled on the basis of these concepts share little with those communities from which the notions have been abstracted. The purpose of this paper then is to revisit the concept of community with respect to learning in schools from a dialectical materialist perspective and thereby prepare the ground for the educational research community to resolve the contradictions in productive ways. It will be shown that fundamental to the notion of community is the notion of practice. This category, however, does not stand on its own for it is intimately tied to culture. As we clarify later, culture is produced and reproduced in concrete ways by real (material) individuals who form collectives (group, communities, societies).

2. Individual and collective: Society and history as the middle terms

The notions *community of practice* and *community of learners* have been used to analyze learning and development at the individual and, to a somewhat lesser extent, at the collective level (Lave & Wenger, 1991). It is less appreciated that the community concept has its origins in the dialectical relation of individual and collective (Jean Lave, personal communication, August 23, 2000), which is the product of history and the mediation of individual life by society (Holzkamp, 1985). Instead of a polar (dualist) opposition of individual and collective, there was an original unity, which unfolds into (from which emerge simultaneously) individual and collective, self and other, which are nonidentical

aspects of an identity. Diverse intellectual schools have made salient different pairs of mutually negating yet mutually constituting elements including agency and structure (Sewell, 1992), habitus and field (Bourdieu, 1990), or individual and society (Holzkamp, 1983). An understanding of this unity of the seemingly oppositional entities of individual and collective, a unity that is at the heart of Vygotsky's (1986) "unit analysis," necessitates taking a dual historical perspective that also demands explaining the mediation of individual life by society. To these twin ends, a integrative theory such as cultural-historical activity theory explains the idea of community rather well.

On the one hand, we can show how in the process of becoming human, societies emerged that were characterized by division of labor and social relations so that, for example, in exchange for contributing to the survival of the society, individuals were able to pursue activities other than hunting or gathering food (Holzkamp, 1983). This framing assist us in understanding how psychological characteristics, such as motivation, dispositions, and responsibility are grounded both in the individual and collective, personal and societal dimensions of life; these dimensions are intrinsic to the relation of subjects and the objects of the activities that they truly pursue (Leont'ev, 1978). On the other hand, we show the mediational role that culture plays in understanding the relationship between the individual and collective.

2.1. Emergence of the individual\collective dialectic

Consistent with the cultural-historical approach taken in this article, we assume that one cannot talk about a situation outside of its historical context, which is the outcome of a process of development. To understand communities—both as phenomenon and as theoretical notion—we therefore need to understand how individuals are related to collectives from a sociocultural-historical and evolutionary viewpoint. In the course of human evolution, the relationship between individual and collective changed (Mikhailov, 1980). In biology, the individual usually is taken as the unit responsible for the adaptation of the species; individual life processes have to be appropriate to the individual organism's setting. Broader developmental patterns arise first from genetic variations that cause an individual to fit better with its niche. Human beings, however, do not just react to conditions: they change them. More so, humans practice division of labor at an enormous scale; and they bequeath their (material, intellectual) tools to their offspring. Among humans, therefore, the collective entities (groups, society, "global village") have overtaken biology as the prime mediator between species and the environment and hence historically developed societal processes have to be appropriate for the setting. Major developmental patterns are now such that an individual concretely realizes and modifies prevailing societal processes, thereby contributing to the collective control over the environment more generally.

Evolutionary and cultural-historical processes diverge along different paths in this light. At some point in human evolution, therefore, developmental patterns changed from being environmentally determined or evolutionary towards favoring the societal or historical. This transition could have arisen from the increasing use and production of tools and the development of learned social relations, divisions of labor, in which single individuals

assumed partial functions in the collective production of conditions (Roth, 2003). Additionally, it does not matter which partial function a specific individual takes on, as long as collectively, all the societal functions are fulfilled—which leads to a freedom of choice. These two processes allowed two qualitative leaps in anthropogenesis—the production of tools for generalized rather than particular purposes (as observed by cultural primatologists) and the eventual shift from mere adaptation to the environment towards the collectively achieved manipulation of the environment. Collective, societal control thereby mitigates the conditions under which natural selection operates in the evolution of species and favors the determination of conditions through historically situated societal processes.

Not only does this fundamentally change the way in which humans relate to their environment, but also it alters how an individual relates to others that we explain more in Section 3. Individual human beings can therefore satisfy their needs by contributing to the maintenance of society so that general needs are met rather than by dealing directly with the environment to satisfy individual, particular needs (Holzkamp, 1991). Being able to control one's life conditions therefore requires moving beyond individuality and toward participation in collective control over societal processes. Consequently, there is a double relation at work: humans produce and reproduce the conditions in which they live, on the one hand, and are subject to these same conditions, on the other. Because there was an overlapping phase during which both natural selection and societal development were active, biology and society became enfolded into one another: "human nature is not an abstraction inherent in each single individual. In reality, it is the ensemble of *societal* relation" (Marx & Engels, 1845/1978, p. 6, our translation, our emphasis).[2]

To elaborate, not only Marxian but also classical philosophers have come to realize that the individual becomes both an individual and social subject by relating to and in union with society consisting of myriad overlapping communities (e.g., Ricœur, 1992); such relating-to always requires communication and the implied reciprocal social relations, which allows the conscious creation of life conditions rather than merely being subject to them (Osterkamp, 1999). That is, individual subjectivity emerges simultaneously with intersubjectivity—personhood arises whenever someone experiences him- or herself as an other to fellow beings, who also experience themselves in the analogous situation with reversed roles (Hegel, 1977). Again, when a biologist teaching children in one of our research studies uttered "Turn the dial to 'dissolved oxygen'!," he already and implicitly assumed that our students not only heard sounds but heard the sounds as words and understood these words as intended; more so, he produced this utterance presupposing that it was heard not as a statement but as an instruction; and finally, he produced this utterance presupposing that it had a particular consequence, namely students turning the dial of the oxygen probe to a certain position. The students do what they understand the expert instructed; in fact, they take such an utterance as a command, neither as a description of something to be looked at nor as an explanation of a process. That is, even

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[2] The German adjective "gesellschaftlich(e)" (societal) is most frequently rendered in English as "social," which in German would be "sozial(e)." Marx and Engels used the former German adjective, not the latter. As the senses of the two German words are very different, I use "societal" because it better corresponds to the spirit of cultural-historical activity theory.

before their interaction, the biologist and the students assumed intersubjectivity to exist—or rather, they acted as if it existed, thereby accepting it as *the* unproblematic, normal state of affairs. We thus arrive at the fact that human subjectivity is never just individual subjectivity but always and already intersubjectivity—human nature is dialectic (Fay, 1996). Such a conceptualization, which dialectically relates individual and collective, leads to the fact that in *communities*, individual actions always constitute concrete realizations of action possibilities that exist at the collective level. The individual thereby becomes accountable toward the other (Bakhtin, 1993), and, in the action of the other, recognizes itself.[3]

2.2. Actions and the production and reproduction of individual and collective

In the foregoing section, we articulated how individual and society, subjectivity and intersubjectivity, possibly emerged together in a process whereby natural selection was replaced by sociocultural-historical processes. In each act, sociocultural processes are not only reproduced but also new processes are produced; this leads to the co-development of individual and society in historical time. However, societal processes stand in a dialectical relation to individual processes; the former exist insofar as individuals concretely realize old while creating new processes. That is, individual and societal developments emerge together in mutually constitutive (dialectical) fashion thereby making history while being subject to history.

Human beings today are born into a world not only pre-structured in a material sense but also in the way other human beings transact with one another and with new recruits (e.g., children) in patterned ways that concretely realize sociocultural, historical possibilities (Cole, in press). Parents act towards their infants and children in ways that have a relation of sense to the present society: they simultaneously perform and reinforce social norms. These norms change over time, so that acting toward an infant and children today is rather different than it was fifty or 100 years ago. Infants and children reciprocate by creating with their own actions, resources and conditions that their parents recognize and address in turn. Infants and children therefore immediately produce and reproduce current societal forms rather than historical earlier forms. They thereby contribute in active ways to society.

Human actions are mediated by objects, tools, and signs (e.g., language) and always occur in and with respect to a physical-material space (Vygotsky, 1986). Object, tools, and space are therefore inherently marked, predisposed for particular ways of use. (It is often when we travel that we experience others doing things and using objects and space in different ways; we experience that we perform differently than we have always done

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[3] This immediately allows us to make predictions about such phenomena as the killing sprees committed by adolescents in their schools—as witnessed recently in the USA, France, and Germany. Locking them up or even subjecting them to the death penalty will not bring about any significant change because it only removed the individual but not the generalized possibility, always societally mediated and therefore existing at the societal level. (The U.S. experience, whereby murder rates are still higher than in other countries despite the enforcement of the elsewhere abolished death penalty, only((?)) supports such a theoretical frame.)

without ever having reflected upon our ways of doing.) When the students in the experimental curriculum on the environment described below experienced a dissolved-oxygen meter for the first time, it was with the biologist, who used it in particular ways, which are both his, here concretely realized, and not his, designed and built by others, providing generalized action possibilities at the collective level. Each new student using the meter concretely realizes cultural-historical possibilities of the present, reproduces this practice, and, in his or her own way, produces change by opening up new action possibilities for the future. (There was a time when the dissolved-oxygen meter and associated practices did not exist, and there may be other meters in the future that make this device obsolete.)

Through actions, made possible because we have the bodies, human beings participate in historically situated, sociocultural events; the body is the hinge between knowledgeability and reproduced, sociocultural, material practices. That is, because the human body is open and therefore exposed to the social and material world it is also susceptible to be fashioned in the image of the sociocultural and material conditions at the current historical moment (Bourdieu, 2000). The individual is therefore subject to a process of socialization, a process that even underlies, as we have shown, the formation of our sense of self, other, and community. But with each individual, human society is itself reproduced but never exactly the same. There is therefore a dialectical relation between individual development and cultural-historical development (Mikhailov, 1980).

2.3. Communities are defined by collective motives while served by different communities of practices

Currently observable societal forms have historically developed as a result of an increasing division of labor, which led to the differentiation into different activities— including separation of theory and practice within activities—all of which support collective life as each activity does part of the overall work that is required. Each activity therefore serves the ultimate motive of guaranteeing the survival of society, but, as a consequence of the division of labor, does so by pursuing sub-ordinate motives. Communities (characterized by specific motives) and communities of practice (characterized by common ways of doing things) therefore are the result of a process of differentiation of activities that support collective life into networks of activities (Engeström, 1987). As long as individuals contribute to sustain collective life by participating in some activity system, they sustain their own lives, because they can exchange what they produce for currency and thereby satisfy their needs; they control their own life conditions by participating in realizing both specific and general collective motives (Holzkamp, 1983). Any individual in a some community therefore has a double choice: he or she can choose the type of community and overarching activity in which to participate, and within the activity, the particular job or role characterized by specific practices.

In contrast, students in school have far fewer choices: the curriculum, forms of participation, and life conditions are often tightly controlled. It is a community that bears little resemblance to what we will explain shortly as characterizing a true community. At

the same time, students are described as being "unmotivated." However, such an analysis seems to miss the forest for the trees. What in fact appears to be happening is that students do not accept realizing the motive of this particular activity form, in which they not only have little control but also are treated as the object of activity. The same students, however, may be highly motivated learning to do moves on the skateboard, trail bike, or musical instrument. Motivation therefore is not a personal trait that can be activated on and off like a light switch. Furthermore, motivation *cannot be* a universal category; in the way it is used in education it certainly is a false category. This is also the case in the most laudable curriculum interventions (Cobb, Roth), unless the ubiquitous system of using grades for advancement in school and society is revised. The *real* motive of schooling (an activity) is the hierarchical ordering of individuals (Foucault, 1979) and the unequal (differential) distribution of opportunities for entering subsequent educational opportunities (college, university) and work (Roth & McGinn, 1998). It is not surprising, then, that for students the desired objective of a course are usually the grades that they achieve rather than the knowledge the course is supposedly to deliver. There is an apparent contradiction in that going to school is supposed to increase knowledge, when in fact the real object students pursue is the exchange value of grades (Lave & Wenger, 1991). Participating in this activity system does not inherently increase the action possibilities of all students, but in fact penalizes those who end up on the lower ranks.

2.4. An integrative framework for communities

We can now integrate these theoretical strands into a comprehensive framework (Figure 1), using data from a large-scale study of science learning at one local municipality (see Section 4.2 for more details). At its heart, this framework builds on cultural-historical activity theory (Engeström, 1987). In the study described, we observed anything that had to do with environmentalism both out-of-school and in school. One activist group (*subject* of activity) focused its actions on Hagan Creek, the quantity and quality of its waters, and the ecological health of the watershed it drained (*object/motive*). With others in environmentalism, the group we observed shared a common object. Environmentalists therefore constitute a true *community*—during conferences or during an annual open-house event, many of them actually get to meet and celebrate their communality. Within the activist group, there is a *division of labor*, where certain people actually *produce* the same things—this production is *mediated* by the production *means*. For example, some environmentalists monitor creek health parameters using specific tools (e.g., stopwatch to measure flow rates), instruments (e.g., dissolved-oxygen meter, colorimeter), and concepts (e.g., "ecological health"); with these *means of production*, they engage in patterned actions. As an *outcome* of these actions, they produce representations to be used in garnering funding for more environmental action, such as building structures ("riffles) in the creek that increase oxygen levels or change the *rules* for accessing water in the creek and local aquifers. As the products of environmentalism are taken up in the community, *exchanged* with other groups and town council, they come to be "*consumed*" and thereby bring about changes in the village. As a result of the knowledge they gain, and because the knowledge and products are exchanged only with some village members, these are *distributed* unevenly within and across the village and its inhabitants. Systems

such as this do not occur over night: they are the result of developmental (i.e., historical) processes both at the individual and collective levels.
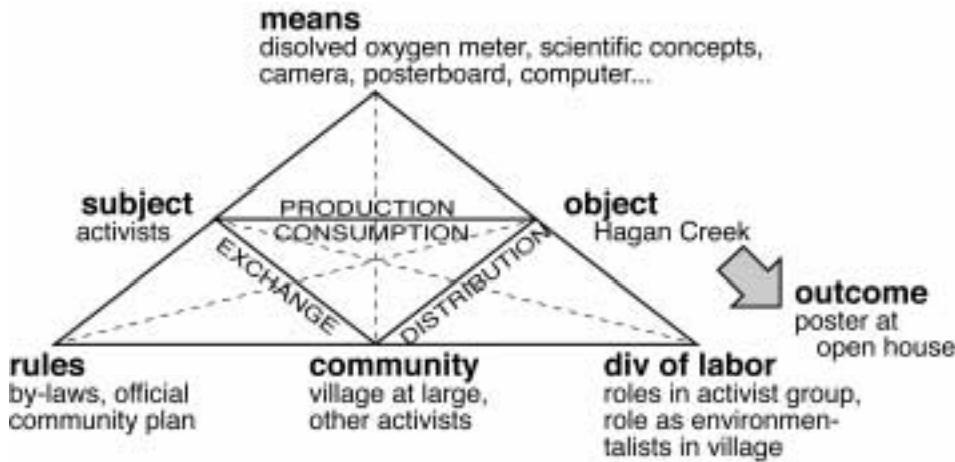

Figure 1. An activity system and its object/motive define a *community*; those on the inside of an environmental activist group engaging in the same practices (e.g., the biologists) constitute a *community of practice*.

This framework constitutes a molar unit of analysis. That is, one cannot begin analyzing or thinking about the object as if it were an element, a building stone of the larger unit. "Unlike elements, units are capable of retaining and expressing the essence of that whole being analyzed" (Vygotsky, 1986, p. 211). An object, instrument, human subject, or division of labor, when considered in a different activity, is associated with very different sense-making processes (the same person is a professor at the university but a father in the home). It is only through the analysis of the activity unit as a whole that the specific sense of the entities identified in Figure 1 becomes apparent, including the relationship between individual and collective so essential to communities.

The figure also clarifies the relationship of the critical notions of community writ large and community of practice. A community is a collective, a company, village, or country in which a division of labor is enacted to accomplish a larger object/motive. Such communities inherently are heterogeneous in terms of the activities, competencies, rules, and means that can be observed; they are therefore heterogeneous with respect to the practices that they actualize. A community of practice, on the other hand, is a collective characterized by the common ways of looking at, thinking about, and acting toward the same or similar object. The notion of *culture* properly pertains to collectives that are characterized by such common ways, which pertain both to individual and collective. This allows us to understand why the notion of community in the context of classrooms is inappropriate and even false—unless the students concretely realize the collectively defined motive and have some control in the matters, they are not constitutive part of a unit relating individual and collective in a dialectical unit of the type Vygotsky and Leont'ev envisioned. Rather, classrooms are collections of bodies assembled for administrative purposes; whatever the nature of the existent communities of practice might sometimes be at cross-purposes with the embedding collective. Thus, a student whose true motive is to avoid punishment in the form of low grades or suspension has a

very different motive, involving very different cognitive practices, and engaging in defensive forms of learning, than a student who sees in the expansion of his or her action possibilities with respect to interesting mathematics problems.

3. Culture and community

We are now at a stage in this article to place the educational notion of community within the context of culture. In the relation between individual and society, culture takes a central position, for it is a "crucial, mediating, role in the process of human development" (Cole, 1988, p. 137). In this dialectical approach that we speak about, the terms "mediating" and "mediation" refer to the function some entity has in relating two mutually constitutive and mutually negating aspects of reality (e.g., theory–praxis) or theoretical terms (e.g., individual–collective [e.g., society]). According to Hegel (1977), the mediating aspect or term constitutes an entirely new, irreducible unit of analysis ("mediation is nothing beyond self-moving selfsameness" [p. 11]) that contains the mutually negating and constitutive aspects or terms as an elemental pair.[4] Here, culture is one such term that mediates individual and collective, neither of which can be reduced to the other and the relationship of which is given in, and described by the term, *culture*. The latter is therefore is a universal dialectical category, from which other aspects and theoretical terms derive. It is therefore a notion that allows us to theorize both individual *and* collective (cognitive) practices and changes therein.

3.1. Culture as universal dialectical category

The concept of culture has been identified as one of the two or three most difficult concepts in the English language (Williams, 1983). There are two fundamentally different senses in which the term has been used: (a) as a "theoretically defined category or aspect of social life that must be abstracted out from the complex reality of human existence" and (b) as a "concrete world of beliefs and practices" (Sewell, 1999, p. 39). As the history of the category culture showed, both senses have their limitations because they exclude important dimensions of culture. Fundamentally, a dialectical approach to culture emphasizes that it is both a system of structurally related symbols and artifacts and a complex of patterned actions (i.e., practices). The key is not whether culture should be conceptualized in terms of symbols/artifacts *or* practices, but how to theorize the joint articulation of practices and structure (Sewell, 1999). There are many ways of cutting a cake but the following constitutes a way that seems most reasonable to us.

In a dialectical approach (e.g., Hegel, 1977; Il'enkov, 1977), culture is a concrete universal. That is, it constitutes both a generalized set of action possibilities and a set of actions through which some of these possibilities are concretely realized. My actions therefore always also are not mine; I recognize in my actions the actions of others; or

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[4] The concept of negation makes thematic the mutually exclusive nature of paired or complementary concepts in the unfolding concrete world: light never expresses itself as particle *and* wave simultaneously but always as one or the other. The concept of mutual constitution makes thematic that there is a unit of higher order—light—that can be thought as mutually constituted by the lower order concepts/phenomena.

again, in the actions of others I always recognize my own. Paraphrasing Hegel (1977, p. 112), we might say that in our actions we always mutually recognize one another.[5] Culture therefore always exceeds the ensemble of observable actions. The possibilities reside in—but are not *determined* by (Roth, Hwang, Lee, & Goulart, 2005)—existing structure consisting in symbols, tools, and artifacts. Concrete actions are directed toward—but are not *determined* by (e.g., Suchman, 1987)—conscious goals, which, in turn, are concretely realized by unconscious actions (Leont'ev, 1978).

Concrete patterned actions (practices) realize abstract (i.e., generalized) culture-specific possibilities; they therefore reproduce culture. But patterned actions have outcomes (results), which add to the existing structures in more or less permanent ways. Concrete patterned actions therefore also produce culture by bringing about change in available resources for subsequent actions. Because an action both reproduces and produces culture, action constitutes a dialectical category (see Section 3.2). Transformation is built into this concept, both practically (an action may differ from anything else observable in the culture) and theoretically (in dialectical logic, *inner* contradictions such as that of the simultaneous production and reproduction are the engines of change [Il'enkov, 1977]). Culture is therefore continuously reproduced and produced anew, which leads to its constant evolution. These developmental changes normally are slower at the level of the individual person, but are accentuated when new individuals join a group who may introduce larger variations in the way possible actions are concretely realized. (Adults much slower to adopt new technology, to change their practices, than are newcomers, young people.)

Culture, properly understood, therefore is a dialectical phenomenon—the term denotes actions and action possibilities that have histories that realized by and simultaneously transcend the individual. The category implies (human, simian) societies in which patterned ways of doing something (practices) are reproduced across generations (Cole, in press). That is, practices exist at a *collective* level; they are characteristic of society or particular groups. But, of course, collectives do not act: *individuals* always realize these practices in concrete ways. Because practices and structures (rules, tools, symbols, language) are characteristic of the collective life form, their lifespan is not tied to any individual and they are therefore preserved even though some members depart and others arrive across time.

In their trajectory towards knowledgeability, recruits to a society do not have to relive cultural-historical development—a position epitomized in the adage "ontogeny recapitulates phylogeny"— but "merely" have to dovetail into producing and reproducing action possibilities currently available, which may be very different than those that existed but a few decades ago. The increasingly early age at which children become computer literate is but one of these examples—when the first author first worked with computers in the 1960s, only a small elite of (academically) trained people were able to work with and use them. To provide another example, it took James Clerk Maxwell an entire book and complex mathematics to articulate his theory, which now is encapsulated

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[5] Recent neuroscientific findings on the role of mirror neurons in (social) cognition (e.g., Kohler et al., 2002) support these philosophically grounded conjectures.

in four equations. Undergraduate physics students no longer have to repeat the arduous way in which Maxell worked out the relation between electrical and magnetic fields, but they begin with the four equations and the vector properties expressed.

3.2. Embodied (individual) and distributed (collective) aspects of practice

From another level, individual and social phenomena like communities are theorized simultaneously in cultural-historical activity theory—there are no psychological processes formed independently of social processes nor are social phenomena separate from human psychology (Leont'ev, 1978). Neither can be reduced to the other despite the long disciplinary balkanization of the fields of psychology and sociology. Rapprochement can be achieved by beginning theory construction or data analysis with the dialectic of productive human behavior. In cultural-historical activity theory, productive human activity heuristically occurs at three levels simultaneously: activity, action, and operation (Figure 2). Activities such as farming, art, engaging in environmentalism, or urban gardening are associated with a conscious, collective (social) motive; actions, such as sowing fields or measuring water levels in the creek are coextensive with conscious individual (group) goals; and (embodied) operations, such as shifting the gear while driving a tractor or reading the output of a dissolved-oxygen meter are linked with the conditions, which are perceived in particular but unconscious ways. Although at the individual level, operations (e.g., perception, words) are deeply cultural, for they have been copied via mimetic processes or have been previously conscious actions that have become subsumed into the unconscious. Operations therefore correspond to that unconscious collective consciousness that has emerged from the embodiment of experiences in an inherently social and material world (Bourdieu, 2000).
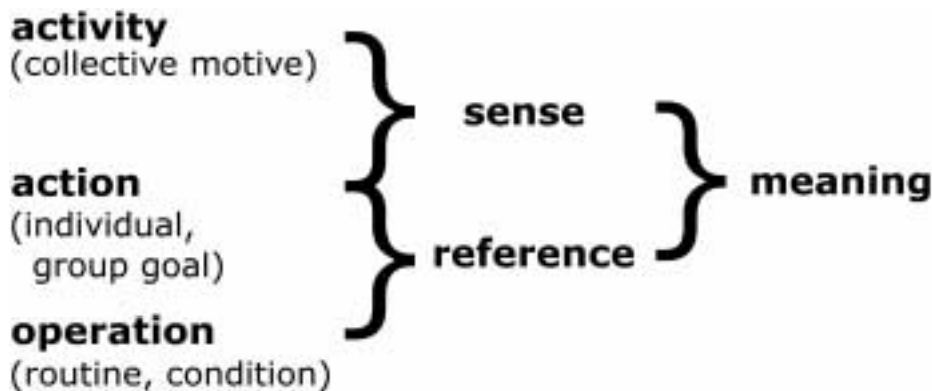
Figure 2. A double dialectic gives meaning in both individual, embodied and collective, distributed dimensions: actions realize a collectively motivated activity, which orients individual/group goal-oriented actions; unconscious operations realize a goal-directed action, which orients the operations in a human being.

These three levels of human productive activity are not independent but connected in the form of two relations that arise from the dialectic of an action; that is, when analyzed, every action has a double orientation (see Figure 2 above). First, every action is synthesized from sequentially assembled operations, which themselves do not have

conscious goals as mentioned. That is, the relation between action and operation is one of *reference*, the former orienting the production and sequencing of embodied operations (Roth, in press-a). Second, the relation of sense links each individual action and the collective activity that encompasses it (Leont'ev, 1978). An action is meaningful—though never in an exhaustive way—when the individual who produced the action (e.g., an uttered directive, a material action) and the generalized others in the collectivity who perceive it attribute *sense* to the action. In other words, they interpret it in terms of its intentions, or account for it: Each individual "sees the *other* do the same as it does; each does itself what it demands of the other, and therefore also does what it does only in so far as the other does the same" (Hegel, 1977, p. 112). Seen in this manner, each patterned action involves the dialectic of self and other, arising from a self, which itself is the product of a double historicity (see below) and providing a resource to the collectivity, self and other (community). Finally, *meaning* is the relation between sense and reference; that is, meaning is both grounded in the bodily synthesis of operations into actions, and in the social significance of actions with respect to the encompassing activity. Perhaps the most important point is that sense and reference, and therefore meaning, are associated with *actions* rather than things; that is, for example, words or representations have neither sense nor meaning. Sense, reference, and meaning emerge in and are the results of utterances, as when a biologist instructs some students "Turn the dial to 'dissolved oxygen'!" Here, the words surface from his unconscious and the sentence they constitute, heard as an instruction, leads the students around him to immediately engage with the black equipment box in front of them.

This again allows us to understand why the notion of community is inappropriate and even false to theorize in most classroom situations. Sense and meaning are related to the collective motive, and unless students consciously relate to and realize it, they do not properly produce and reproduce a practice. What they do therefore remains without sense and meaning—an assessment that many students make to describe school in general and their science and mathematics experiences in particular. There are curriculum interventions, however, where students have considerable control over the motives and the framing of goals to realize them in particular ways. We turn to the description of two such interventions, which therefore constitute something like best-practice examples for the contexts in which the community notion is more appropriate.

4. Learning communities are motivated by a need to contribute to society

At the back of every educator's mind lies the nagging question: "Does the learning intervention work 'in practice' rather than just 'in theory'?" We do not know of any school or classroom where all the features consistent with the theoretical framework outlined in Sections 2 and 3 have been implemented. But we are very familiar with two situations that deviate noticeably from mainstream practice and truly build on the innate theoretical strengths of communities as a context for learning—the village school of

Moussac, Poitou-Charentes (France), and several middle-school science classes that the first author taught in Central Saanich, British Columbia (Canada).[6]

4.1. The village school of Moussac (Poitou-Charentes, France)

4.1.1. Documentary evidence

The school, which counts about 20 students in total each year, is based on six main elements: heterogeneity (age, interests), space (freedom to define curricular activities), time (student decides how much time to spend in any particular activity), collectivity, presence of educational structure in the home of the children, and communication within the school and with the outside. The children develop in a self-sustaining structure that has now existed for about two decades, in which learning occurs through interactions between the children and the material setting (school, materials, garden), with other children, and with adults that they encounter both in the school and outside of the school. In addition to the school and education being situated in village life, the reverse is also true: village life has organized in and around the school, which has led to the motto "une école, un village [one school, one village]."

A television documentary film produced by *France 2* shows the children on a typical school day. In the morning, they come to school at a time of their own choosing. Their teacher, Bernard Collot, does not want all of them to arrive simultaneously. In the school, the camera shows children working with computers to publish their own newspaper or to correspond with their pen pals around the world. There are shots of children composing music using homemade percussion instruments and a tape recorder. In terms of facilities, there is a discussion room with a long table, a classroom for the younger ones (K–3), and another for older students (about fourth through sixth grade). There is also a chalkboard where each child writes their own curriculum for the day—which is constrained in the sense that they participate in activities that have existed prior to their arrival in the class.

Journalist:	So, if I understand well, the children in this class do what they want?
Collot:	Not entirely, not entirely. It's not what they want, but what the collective activity of the class, what the events globally bring about. So what I try is to order these events somewhat.
Journalist:	Because I get the impression that they, by and large, get by without you?

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[6] I((The first author)) draw my information about the Moussac village school from several sources: A documentary shown by France 2 as part of its *Envoié special* program, several internet sites, the book *Une école du 3ième type* (Collot, 2002((no reference))) written by the originator and one-time teacher of the school, and my exchanges with Bernard Collot over a period of years. The second set of case materials derives from a five-year ethnographic effort in one community, which included three teaching experiments in which I taught science to seventh-grade students through involvement in environmentalism. The research program documented knowing and learning (a) in the school (Roth & Barton, 2004; Roth & Lee, 2004) and school-based community action (Roth & Désautels, 2004; Roth & Lee, 2002a) and (b) in the community, where our ethnographic efforts focused on environmentalists (Lee & Roth, 2001, 2003a), science-based controversies (Lee & Roth, in press; Roth et al., 2004), community action (Lee & Roth, 2003b), and general involvement of citizens in science (Lee & Roth, 2002, 2003c; Roth & Lee, 2002b).

Collot: Yes, they do well without me. My own problem is to make this group function as a community.

Throughout the school day, one can see five-year olds mounting a puppet show or gathering for one of their collective meetings with a weekly-changing chairperson. In these discussions Bernard Collot is but one of the members, who waits for his speaking turn as any other member of the community. There is the "chess lady," who comes every Wednesday. Collot emphasizes that her presence is more to provide for interactions with the children than for learning the rules of chess. The camera also follows three older kids leaving the school to bring their letters to the post office where the official indicates that the class has become part of normal village life. In the workshop, children engage in realizing projects they designed; the teacher watches the youngest ones, but without interfering. He explains that it is only when people get nervous about failure and accidents that failure and accidents come about. There also is a parent, who works on the garden with the children. In the music room, besides those composing, a boy sits by himself listening to music with his headphones. In the corner of one of the rooms, a boy writes a letter while some of the older children read with a group of "small ones." Asked whether he was afraid that children would not learn,

Slowly I learned that when the children are part of a group that really exists as community, when there is a real setting, when the interactions with this setting, with other children and adults, when this context really exists, at that point, all children without exception learn to read.

In the end, Bernard talked about school failure. In his view, schools and school systems fail students. Learning, he suggests, emerges from participation in the collective activities of this *community,* which exists prior to and after any particular child is part. Learning and participation cannot be separated; they are irremediably bound up with each other.

In 2002, the association "Une école, un village" included 280 of the 500 residents. According to the association, the survival of the village depends on the existence of the school. The village residents describe the relationship as a collaboration of students, parents, elected officials, and teachers. Town council and school jointly sponsor and finance the employment of young people (without work) to tend to the smallest children in the village. Villagers meet in the school to participate in a local choir, in theater productions, the printing of a village newspaper, and other collective activities. The school building has been reconstructed so that a diverse set of village activities can take place there. There are also intergenerational events. Calling it "Arbres de Connaissances" (Trees of Knowledge), children and adults of all ages learn together with the intention of involving the entire village, neighboring villages and other rural schools in collective learning endeavors.

The existing community does not even depend on any particular lead teacher. In 1996, when Bernard Collot retired, another teacher took his place and the life in the village and school continued and continue to evolve. The school community not only outlasted its originator, but also, as the teacher, mayor, and village association director state, "continues to develop naturally toward new perspectives, in the same spirit, driven by the same object/motives" (Galland, Petit, & Villessot, 2002, ¶4).

4.1.2. Analysis

Daily life in the village of Moussac and its school contains many elements that have become central to our thinking about powerful but often misinterpreted notions of "communities of practice," "learning communities," and "knowledge-building communities." What we see here is a school where the boundaries between everyday village life and school life nearly have been blurred. School has become part of village life just as village life has become part of school. Even within school, learning endeavors operate in an open community in which members pursue activities at different levels of competencies; the teacher and other adults are only part of that community. The fact that children of different ages work together in the same open classroom contributes to the wide distribution of competencies observed as in everyday life within the village itself. Adults do not "teach" as such, that is, inculcate students with pieces of information that they need to memorize to succeed. Rather, the teacher and the entire village of Moussac allow the children to engage in routine activities, that is, to develop into increasingly competent members of the community at large by active participation from young. It is by *participating* in ongoing activities that both precede and outlive their own presence that children become competent and literate village members.

In Moussac, children learn as part of engaging in real activities, activities that constitute "forms of life" (Wittgenstein, 1958), and which evolve over time. Because the children have a choice about what to do, which sometimes means taking time out to dream, the problem of motivation does not arise. The children select which of the different activity motives to realize, and then select how to realize them in a concrete way. The children therefore have a sense of self-determination and control over their activities, and with it, over their own learning, because they decide what they need to know to achieve their goals and thereby the motive of the activity.

The various activities of individual children are not independent of each other, not an odd collection of individualistic activities disconnected from those in which other children engage. Rather, the activities of individual children are in part determined by the "sum total" of the collective activity. Individual and collective motives mutually constitute each other, in the sense that collective motives constitute possibilities, which individuals realize practically: they are mutually constitutive. Coming to school at their own time, going to the post office, or determining their daily curriculum are but a few of the outward signs of the children's ownership over their learning contexts. In this community, teachers' activities change from those they traditionally performed. Teachers do not have to disseminate information, but only help order the emerging collective activity. Collot's comment that children learn inevitably when the community really exists—i.e., in a personally sense-establishing way—resonates with Lave's (1993) assertion that we do not need to force children to learn. Learning occurs inevitably, as part of our being-in-the-world and participating in collective activities with everyone else.

4.2. Environmentalism in Central Saanich

4.2.1. Documentary evidence

In the late 1990s, we designed a project that was to integrate aspects of school science and village life to form an open community with active exchanges among its parts (see Note 1). We were particularly interested in environmentalism, a type of activity that is practiced around the globe, realized in many different ways (e.g., environmental activism, [stream, coast, ocean] stewardship, sustainable [organic] gardening, or nature clubs), and exists in many villages and urban centers. More so, not only students and community members alike can engage in it but also students and community members can do it together.

The particular realizations of environmentalism that the students researched all are concerned with water, water quantity and quality, and ecological, watershed health. The community of Central Saanich is located in the Hagan Creek watershed. Despite its location on the southern most tip of Vancouver Island (British Columbia, Canada), Central Saanich has a relatively dry climate (about 850 millimeters of precipitation per year) with hot dry summers—there are water-use restrictions every year of different severity—and moderately wet winters. As the resource is depleted, water quality has been affected by human activity in qualitative ways as well. Storm drains and ditches channel rainwater—along with the pollutants of suburbia, lawn chemicals and car leakage—into Hagan Creek and its tributaries. One environmental activist group in the village concerned with the water problems actively works to bring about changes in community policy and farming practices and to modify the creek and its riparian areas to improve the quality and quantity of water available as trout habitat.

Given the water-related problems in Central Saanich, it was not difficult to convince teachers to participate in a study where seventh-grade students would learn science by investigating Hagan Creek and its watershed. Everybody appreciated the severe water situation since it impacted everyday life, particularly in the summers. After reading an article, in which the environmentalists called for community involvement in bettering the creek through actions and creation of knowledge, students were excited about being able to do something that was of value to their community. Their work, which legitimately contributed to an issue important to the village, was characterized by a motive that existed prior to and after their involvement through the science class, and it existed as a legitimate endeavor in the community as a whole. This provided for a context in which they learned while pursuing worthwhile motives/goals such as cleaning up sections of the creek or studying some aspects of it; the learning needs evolved, when students realized that they needed to increase their action possibilities to reach the goals they had set. Increased action possibilities meant greater control over those aspects of the setting that constrained their participation.

Over a period of two years, the first author cotaught science with resident seventh-grade teachers for up to four-month periods.[7] When the students first read about the sorry state of their watershed, they spontaneously wanted to do something about it. With a little scaffolding, students began to design and conduct their own research projects with the intent to report their findings at a yearly open-house event organized by the environmentalists.[8] Other students at the middle and high school also conducted research in the watershed as part of their involvement in regionally funded "Streamkeepers" program or in science-fair competitions. In this way, students already participate in creating knowledge for their community and the activists.

Residents became involved in the project in numerous ways. Members of the environmentalist group, parents, aboriginal elders, high school students, and graduate students—at different times—all accompanied the seventh-graders into the field. Some parents provided transport, others participated in supervision, and yet others participated in teaching by asking productive questioning and serving as resource persons. Members of the environmentalists sometimes participated to show how to research some aspect, introduce children to specific tools (e.g., Serber samplers, dissolved-oxygen meters, colorimeters, or D-nets), provided workshops and talks, and assisted children in framing research and data collection or in data interpretation.

Taking the lead from other activities in the community, where different representational forms were legitimately used, the teachers began to encourage students to define goals and investigate on their own terms, choosing their data collection and representational tools that best fitted their interests and needs. Audio-recorded descriptions, videotaped records of the watershed and student activities, photographs, drawings, and other representations began to proliferate. This change provided forms of knowing and learning that led to an increasing participation of previously excluded students. It also meant that one had to abandon traditional conceptions of what science and science education in the community ought to look like. Ultimately, the children showcased the results of their work at an open-house event. It is in this that they actively contributed to the *production*, *exchange*, *distribution*, and *consumption* of knowledge in Central Saanich; it is also in this that they reproduced ordinary everyday citizenship.

4.2.2. Analysis

In this science unit, students participate in environmental activism, a legitimate and authentic activity system (see Figure 2). The people and groups that make up Central Saanich constituted their *community* rather than the teacher and other students. The *division of labor* went far beyond traditional group work in that the students contribute

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[7] Coteaching, too, is based on practice theory and its dialectical tenets, whereby a lot of learning to teach occurs while two or more individuals enact all parts of a curriculum together. Implicit (tacit) and discursive (explicit) modes synergistically work together to lead to learning to teach (e.g., Roth, Tobin, Carambo, & Dalland, 2004, 2005).
[8] Such scaffolding was in part necessary, because the students—in contrast to the Moussac children featured in the France 2 documentary—initially were not used to this form of learning environment.

knowledge to the activists' cause and thereby to Central Saanich at large. Many of the *tools* and *rules* for pursuing their goals are the very same ones that mediate the actions of other adult individuals and groups in the village. Thus, the students have moved beyond the school and learn science by participating in an activity system that is an integral part of their local community. They do not solve fake problems but contribute their share to solving problems that authentically belong to Central Saanich just as in the Moussac example. The students do not only learn to measure dissolved-oxygen levels and turbidity, identify organisms, collect samples and determine coliform levels but they also become agents of reproduction in a double way—they reinforce these practices and teach (in the open-house event) others in the community and thereby contribute to yet another reproduction.

4.3. Commentary: Another look at communities in Moussac and Central Saanich

In the light of the foregoing theoretical proposals, let us take another look at the nature of the learning communities in Moussac and Central Saanich. In both, there exist at some levels a collective responsibility taken by society more broadly, that is, the responsibility for learning is distributed across the community, students, teacher, parents, elected officials, and others. We understand "distributed" not in terms of being divided up whereby each individual or group assumes a little bit of responsibility. Rather, distributed means that there is a collective responsibility concretely realized by different members in the group. Individual and collective responsibilities are therefore related in the same way as individual and collective (generalized) possibilities for action, motives, or dispositions. That is, individual responsibility is the concrete realization of the generalized responsibility. At the same time that teachers and others in the village take responsibility for learning and development, each child takes charge for his or her actions, beginning a lesson with the outline for the daily program for instance. These actions and projects are not designed willy-nilly but are in part determined by the sum total of the collective actions in the class. Thus, we observe a mutually constitutive interaction between individual and collective actions, and between individual and collective responsibility for the context in which children learn. Closest to the children during the day, the teacher enacts his own part of the responsibility, which, concretely, consists in regulating what is going on to make the group really function as a community. Parents and other adults (like the local environmentalists, aboriginal elders, biologists) and village officials, too, take their respective parts, each enacting a concrete realization of the generalized responsibility.

Production and reproduction are always an integral aspect of practice. The hardest part may possibly be the initial group formation phase although this has been resolved through the multi-age classrooms in Moussac. In these situations, once the collective existed, the number of individuals joining or leaving the group was relatively small compared to the entire group. This was helpful because it delimited the amount of effort the teacher had to spend at the beginning of each new school year to socialize students into particular patterns of desired behaviors. Interestingly, the Moussac experience continues although Bernard Collot has retired from teaching and another has taken his place. That is, just as in the "natural" communities of practice studied by anthropologists

of work, such groupings provide newcomers with an existing, relatively stable, inherently meaningful, social structure into which they can be enrolled without any great effort on the part of the instructor.

It is quickly evident that existing cultures (communities) embody institutional memories. With each new participant, the extant action possibilities are both reproduced (due to collective memories, routines, and artifacts) and extended leading to individual and collective development. In one-room schools like in Moussac where there are many grade levels, a similar memory exists (Roth, 2002), as old practices are reproduced and new practices produced from variations of existing ones. Similarly, when experienced students became facilitators for new classes of students doing an environmental unit, they constituted part of memory, which is the historically developed knowledgeability surrounding watershed health and knowledge that exists in this community. In most schools, however, such valuable forms of memory do not exist. At the beginning of each year, teachers are assigned to new classes assembled according to administrative convenience rather than on the basis of facilitating the dialectic of individual and collective development. There has not been a school in our experience without teachers complaining about the amount of effort they have to spend to get children "on track," that is, familiar with particular routines, rules, and practices at the beginning.

Once a particular collective exists, the motive is embodied in the shared object of activity: by participating with their older classmates in the ongoing practices, the younger children in the Moussac village school also take on board the inherent goals, motives, responsibilities, and dispositions. In the process, they experience the need to learn to read, write, and do arithmetic even though the teacher never has to motivate them (or worse, force them). Once the group interacts with children in other schools in their district, their country, or countries around the world, newcomers to the classroom experience from their first day "writing to pen pals" as a common everyday practice.

In the environmental unit, students also take an active role in learning. Rather than merely responding to fixed external conditions, as cultural dopes that blindly follow rules and do what the teacher tells and wants to hear from them, students contribute to producing and reproducing the conditions necessary for meaningful learning to occur. In the first place, they reproduce the environmentalist activity in their village characterized by particular practices. In collective activity, individual possibilities of action are viewed as the concrete realization of generalized (collective) possibilities. Because they are agents rather than dopes, teacher and students have the capacity to change the conditions that frame their activity. However, this agency and therefore control over the context is not unlimited. Objectively experienced structures in the village constrain what teachers and students can do. There are always social and material determinants of action. Teacher and students learn and their group develops, as they increase their control over the events in the classroom.

Another important aspect of schooling in Moussac is the heterogeneity (i.e. many communities of practice) that comes with the composition of the class even in a one-room school, with the personally set choices in the daily curriculum, and with the

interpenetration of school and village life. That is, the heterogeneity that seems to be at the core of the success of the Moussac or our Central Saanich experience, challenges common assumptions about the homogeneity of school classes as a prerequisite of efficient teaching and learning. In real communities, knowledgeability (a) is not a stable but a changing state, (b) is an integral and constitutive part of ongoing activity systems, (c) involves individuals related in multiple, different, and heterogeneous ways, (d) includes individuals with very different (levels of) expertise, and (e) embraces people with very different ensembles of leading and subordinate activities.

Ultimately, therefore, learning opportunities arise in the formation of collectives with their attendant activities and motives. Participation in these activities constitutes the motives, which are nevertheless realized in different concrete ways by the different communities of practice. In the collective realization of a collective motive, new actions become possible, which can be learned, become embodied in routine operations, and are thereby appropriated by (groups of) individuals. The need for learning arises from personal engagement, as individuals appropriate the collective motive in the formation of individual goals to realize the activity in a personally relevant way. And now, the question of satisfying personal needs integrates seamlessly with satisfying collective or societal needs. It follows that our social identities, that is, who we are with respect to others, are integral aspects of the individual|society dialectic. In each act, we not only reproduce collectively possible actions, but also we exteriorize ourselves, open ourselves to the other, drawing on resources (e.g. discursive, material) that are always already resources for the other. When Davie, a Central Saanich student who was identified as learning-disabled was jerked out of his classes, he no longer participated in the collectivity activity that he identified with including his peers, the individuals from class, the schoolyard, in the street after school, and in his hockey club. When this happened, he no longer had the same opportunities for producing and reproducing an identity; rather, a new form of identity slowly emerged, one related to school failure and disability. The environmental unit, on the other hand, gave Davie new opportunities for participating and contributing to the collective, new opportunities to exteriorize himself, and thereby new prospects to reproduce himself as a member in the community.

5. Moving ahead

New proposals in a domain should be fruitful in that they cause a rethinking of old problems and stimulate fresh research. The theoretical linkages explained in this paper between individual and collective leads to environmentally determined evolutionary, and, cultural-historically grounded psychological categories, including emotionality and motivation. The latter are indeed two concepts that require considerable transformation in the light of our dialectical materialist approach in activity theory (e.g., Lompscher, 1999). Both Vygotsky and Leont'ev believed that these phenomena were central aspects of cognition although this integration has yet to be accomplished in mainstream and cultural-historical research (Roth, in press-b, in press-c). We now offer an initial attempt to use motivation to show how it is tied up with and resultant of the individual|collective relationship, which is inherently embedded in the subject|object relation.

Psychologists and educators desire to better motivate students because the latter often do not perceive a relevant motive in their school activities. We recently heard about a successful student who, after saying that school was all very fine and that she had no trouble, commented something like, "But what has it got to do with anything?" There was no relationship of sense between socially relevant activity and students' actions in school. Motivation now becomes something equivalent to making students do voluntarily what someone else compels them to do—this is the motivational formulation of external determination (locus of control). The pedagogical question, "How do I motivate students?" therefore inherently contributes to the external locus of control rather than a more desirable situation whereby motivation is inherent in the object of meaningful activity chosen by students. Here, it is an integral and constitutive aspect of activities that "cannot be reduced to its energetic or dynamic aspects" (Lompscher, 1999, p. 12).

Historically, we can understand motivation to arise from a projection whereby individual needs could be satisfied by participating in the satisfaction of collective needs (Holzkamp, 1983). Taking the well-known example of collective hunting activity in which beater actions (frightening the game) and hunter actions (killing game) are coordinated, individual and collective motives coincide (Leont'ev, 1978). The individual who thus recognizes that the contribution to the collective activity also opens up control over and improvement of the individual's situation is certainly motivated. Truly collective activities, the elusive notion of communities, are always characterized by the coincidence of individual and collective motivation—this is most clearly evident in competitive team sports. When individual and collective motivations do not coincide in the course of collective activity, there then exists a contradiction, entailing different coping mechanisms that sustain or remove the contradiction. (Recall the shortsighted solution to school violence resulting in the removal of individuals rather than the making of changes to society as a whole.)

We are now able to generalize, therefore, that learning is motivated when the subject of learning anticipates that learning will lead to greater control over his or her conditions or quality of life, that is, to an increase in his or her action possibilities. It is now more than reasonable to learn because it expands one's possibilities. Learning, motivated in this way, is inherently expansive (Holzkamp, 1993). Learning for the sole purpose of avoiding a diminishing control or quality of life is defensive, which is associated with an external locus of control focused on avoiding or coping with menacing situations. Expansive learning is however generally associated when individuals form collectives to deal with problematic situations to capitalize on the greater control they have as a collective (Engeström 1987). This, in essence, is at the heart of genuine learning communities. For education, the idea of genuine learning communities has consequences:

Only by changing circumstances purposively can man himself be changed, [and] the fostering of individuality lies in serious and vivid (i.e. creative) activity together with the pupil, activity in which the pupil is not "the object of the pedagogical process" but an equal subject of it. (Mikhailov, 1980, p. 170)

Such inclusion of students in the active shaping of their learning environment has been central to our work in inner-city schools. At regular intervals or in response to needs,

students, teachers, administrators, university supervisors, and other stakeholders meet to frame the problems, analyze them, and discuss possible actions to bring about long-term solutions (e.g., LaVan, 2005). There have been some French high schools ("lycées autogérés" [e.g., www.l-a-p.org]), where such complete coparticipation in the running of schools and defining the curriculum is not only practiced but also has a high level of success in terms of student retention and achievement on the national examinations. Fundamentally, this may involve assisting students to learn some social scientific theories that they can use reflexively to understand and explain their own situation (LaVan & Beers, 2005). That is,

to achieve this the [pedagogical] activity itself must be understood in real historical definitions. And in this latter case it turns out that in the historically developed system of the social division of labor which has relegated most of humanity to machine-like reproduction functions and artificially restricted the range of their intercourse, thus depriving them of direct and varied contact with the history of culture, in this system of "alienation of the human essence from man himself", people's individuality is considerably restricted in its development. (Mikhailov, 1980, p. 170)

Meaningful change in current educational endeavors requires that students participate in the collective control over the conditions of their learning, determine the motive, which, reflexively, allows them to participate in motivated ways. When one thinks about the students in Hagan Creek, we remember that the students are not just tasked to accomplish specific tasks, like measuring stream speed and stream cross section, which they subsequently have to plot to see whether there is a mathematical relationship. In fact, the initial attempt to have all students work on the same kind of investigation, heavily slanted toward a traditional conception of school science and science literacy, failed. Especially distressing were that some of the female and aboriginal students began to disengage from the lessons. It was only when the teachers realized that there were heterogeneous ways of contributing to understanding and changing the health of the watershed that they were able to change and provide students with fresh opportunities to frame how they wanted to participate. In a context where cultural practices include photographing the creek, measuring stream speed, counting and inventorying the different organisms, cleaning up and protecting the riparian areas, participation in cultural practices is coextensive with changing practices in a continuously changing world. That is, participation in communities is coextensive with learning. Motivation to learn is also inbuilt in the cultural practices and the objects towards which they are directed. The exact moment of time when learning is needed depends on the trajectory that the particular individual takes, itself a function of the current state, for every future moment on the trajectory depends on where the individual is at the moment, which itself depends on the prior history of the trajectory; that is, during learning, the trajectory integrates over its own history.

6. Coda

The approach to learning in communities advocated here turns traditional educational philosophy around by putting the collective nature of human experience as the starting point; or rather, it begins with the holistic nature of knowing and experience and

theorizes the relationship between individual and collective as a dialectical one. Participating in ongoing social practice then becomes the leading activity students engage in with the concomitant development of identities and expertise (Lave, 1997). It would be worthwhile to view the aims of education in terms of collective praxis, which may require abandoning the current system of producing scientists and engineers for the workforce depending on economic contingencies. Instead, the educational system would allow each individual to learn and develop democratic citizenship that contributes to the overall project of maintaining collective life in a society.

The power of the learning communities in Central Saanich and Moussac may be derived from their strong orientation toward others in society, particularly in helping and supporting the collective to deal with its salient problems, which is an important learning motive (Lompscher, 1999). At no time do we advocate a naïve return to the ideals of American progressivism whereby students' interests and the emphasis on meeting real-life problems in society dominated the school curriculum and pedagogy. Nor do we espouse that all students engage in environmentalism as in the Central Saanich case study. Rather, the latter is but an example that demonstrates how (science) education can be a form of collective praxis. We are aware that what happened there or in Moussac cannot be grafted onto other settings without modification and without taking account of the respective cultural-historical context, for there are historically situated practices, deeply interconnected with other practices that bind that village into Canadian society generally. Furthermore, we are mindful that every school district, town, and city is characterized by their own practices, laws, population configuration, and contingencies. Nevertheless, we invite policy makers to accord greater trust in allowing teachers and students more control over their learning and thus partake of significant learning experiences. Students' learning and development thereby becomes connected and mutually constitutive of collective life in wider pluralist society. It is at this point that a collection of monads—essentially what characterizes most classrooms situations— becomes a community of learners, which in turn constitutes a learning community.

A learning community is a different conception of knowing that arises from the special relation between individual and collective, which is nicely captured by the phrase, "all for one, and one for all." Because of this, learning in these situations is at variance with the modes of learning that underlie much of mass schooling around the world today. For one, underlying the idea of communities of practice is the fundamental assumption that learning involves a changing subject|world relation on the part of the learner. Here subject and world are not conceived in terms of content and container, two separate entities, but a dialectical relation from which each emerges in and as of praxis. Learning to become a contributing member of society can then be understood as part of students' changing participation across the multiple contexts of their daily lives. Secondly, it compels us to rethink the role of educators, too. Present day organization of school life is antithetical to object-oriented expansive learning; they interfere with learning rather than supporting it (Holzkamp, 1993). To a considerable part, this is the result of the role that society demands of teachers, or equivalently, what they feel beholden to—responsible for imparting something to students. That is, in most schools, the subject of learning is the teacher, who configures the learning environment to make students learn; rather, the

student is thought to be the object of activity. Typically, teachers rather than students ask questions, though it seems intuitively evident that we ask questions when we don't know rather than when we are aware of something. In the community of practice type of learning environments, students ask meaningful questions and others, teachers and peers provide the support in answering these.

In genuine learning communities, teachers are oriented both (a) to the maintenance of the community and ultimately society, and (b) to the object that characterizes the practice rather than to influence, constrain, and control students. Concerning the first point, the village school in Central Saanich provided an example for how such an orientation allows learning to occur because it is inherent in the practices of the community. As part of the second orientation, a teacher engages or talks about problems with the object rather than talking about it. The problem of current schooling practices is that they have no direct resemblance with the practices of the fields that they are intended to teach. Rather, than doing science, mathematics, or history, teachers do questioning, controlling, preparing for tests, and marking and students do responding, submitting to control, getting ready for tests, and ask "what'd I get?" As long as science, mathematics, or history is not the leading activity to be engaged by teachers and students alike, expansive learning cannot occur. Fundamentally, as educators it is imperative to get to a point where students no longer ask, "What has school got to do with anything?" but where they contribute, in their own particular ways, to the production of change toward a better world.

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Contradictions in Theorizing and Implementing "Communities"

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Running Head: Contradictions in "Communities"