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The individual|collective dialectic in the learning organization

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Abstract

Purpose – The purpose of this paper is to answer two interrelated questions: "Who learns and how in the learning organization?". By implication, many theories of the learning organization are adressed that are based on a static and erroneous separation of individual and collective.

Design/methodology/approach – Four episodes from a larger case study exemplify the theoretical arguments. These were based on a longitudinal ethnographic study of a salmon hatchery and the public-sector organization to which the former was accountable. Conceptual framework is strongly dialectical: in their actions individuals concretely reproduce the organization and, when actions vary, realize it in novel forms; organizations therefore presuppose individuals that concretely produce them. However, without an organization, there would be no aim or orientation to individual actions to speak of in the first instance.

Findings – The paper finds that individuals learn, through the production of socio-material resources, notions of organizations which are not abstract. These resources increase action possibilities for the collective, whether realized concretely or not. Expansive learning in individuals is co-constitutive of learning in organizations and decreasing interest in individual learning constitutes decreased levels of action possibilities for the collective.

Research limitations/implications – The paper shows that using this framework, it becomes problematic to separate individual and collective learning.

Originality/value – The paper shows that access to participation by all members is a key component as are affordances given by the organization for the development of individuals.

Keywords Learning organizations, Public sector organizations, Fish farming, Canada

Paper type Research paper

Introduction

> We had these workshops and everybody [went], well, not everybody – one or two people from the hatchery. Well to me, that's not trying to solve the problem. Well, you're not getting everybody involved because there's people out there that are just feeding [fish] that don't know anything really about fish that might see something. So, let's say one of these people wasn't there and all of these people [at the workshops] are banging their heads and not getting anywhere when this person wasn't invited. But if he was there and say, "Well, I saw this". And then all of a sudden the light comes on and everybody starts, "Oh, wow! We'd better look at that!" So, the more people looking, doesn't matter what your education is or who you are, you never know (part of interview transcript from Jack, an experienced fish culturist from Shallow River Hatchery).

As researchers who are situated in the broad discipline of adult learning, we have become intrigued with the notion of learning in organizations. However, our ongoing

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fieldwork in a rather unique workplace – a salmon hatchery – has reinforced our growing suspicion that scholars have tended to neglect how organizations and their members presuppose each other rather than the former being a box for – and deterministically shaping the actions of – the latter. The nature of this relationship has been a major riddle even across other academic disciplines besides being an obstacle towards better theorizing and training initiatives in firms wanting to transform themselves into learning organizations.

By saying that organization and members presuppose each other, we mean that they are interdependent. The organization exists only through each member's actions insofar as members act because of their roles within the organization. That is, the individual and collective as well as their learning and development are mutually constituted during times of expansion, amplified choices and possibilities that are said to characterize organizational learning. This dynamic relationship is also present during periods of stasis when learning processes are largely invisible to an observer. Our account here is characterized by its vigorous emphasis on the continuous dialectical relationship of the individual and collective in periods of learning as well as its absence in organizations.

In the opening interview excerpt, Jack, one of the main informants from the hatchery, had inadvertently articulated for us what we feel is the essence of learning in organizations by stating that everyone in the organization be given a chance to participate in its collective life. This is because the presence or absence of individuals mediates what the organization can learn collectively: "all of a sudden the light comes on and everybody starts …" And in the same vein, everybody also means everybody: collective learning inherently means learning of the individual. In his own way, the above quote discloses that Jack had appreciated the importance of micro-macro linkages in the learning organization that we find highly agreeable with our framework that forges individual and collective into one irreducible unit.

As we shall elaborate below, learning individuals make learning organizations what they are while the latter simultaneously provide necessary affordances or action possibilities for its members to develop. We affirm with other researchers that individuals learn, not abstract organizations, through the production of sociomaterial resources. Otherwise known as physical and social artifacts (e.g. routines, documents, rituals, equipment), these can increase action possibilities in and for the collective. This is because each action or even verbal sentence produced becomes a potential growth point for the actions or talk of other colleagues. We also show how decreasing interest in individual learning constitutes decreased levels of learning or action possibilities for the collective. The implications here are to increase the access to participation by all organizational members, as is the need to increase the various affordances given by the organization for the development of individuals.

Who learns and how in organizations

Much has already been achieved in recent years regarding the understanding of learning in organizations (Yeo, 2005). Pertaining to the elemental but problematic definitions of "organizational learning" and "learning organization," for example, these are generally believed to be related constructs associated with different communities of practice (Sun and Scott, 2003; Wang and Ahmed, 2003). Researchers in the sociocultural tradition now view learning as forms of changing participation in a

changing world, that is, in terms of person-in-context transactions rather than in terms of knowledge or skill housed within human minds. Accordingly, notions such as "organizational learning" are downplayed in favor of "learning-in-organizing" because of the supposed inability of the former to capture the situated, dynamic, and relational nature of knowing (Gherardi, 1999).

Other closely related phenomena – such as identity – previously believed to be pertinent only at the level of individual members are now considered to be coextensive with learning in groups. While the track record of translating most of these landmark findings into practice has been mediocre, this has not deterred many private and public-sector corporations in attempting to become learning organizations. In fact, there appears to be an evolutionary (societal and market-related) context that puts much pressure on firms to convert themselves into learning organizations, for corporate failures and breakdowns are quickly pinpointed down to deficiencies in organizational learning.

However, some scholars have stated that many of the change initiatives to become learning organizations are premised on a mistaken dichotomy between individual and collective theorized as polar opposites (Child and Heavens, 2001; Huysman, 1999; Kim, 1993). Leading theorists in the discipline have long differentiated for analytical purposes individual and collective learning in learning organizations (Matlay, 2000). Theoretical accounts of learning therefore usually begin from either pole and then reduce the other dimension to a causal consequence: either individual learning is said to constitute the basis for organization learning – the fallacy of reductionism – or organizations are believed to analogously learn like persons – the fallacy of reification and anthropomorphization (Stacey, 2003). Neither option fully captures the true dynamics of learning within organizations, which reinforces our contention that: "the current literature on organizational learning does not adequately explore the micro-level relationships or linkages between individual and organization learning and, as a result, may be obscuring some of the most powerful potential value of organizational learning theory" (Richter, 1998, p. 300).

To elaborate, grounded in technical, behavioral or resource theories of the firm, many scholars focused on how knowledge is acquired, interpreted, processed and stored thereby objectifying it. With striking congruence to classical psychological theories of learning, disciples in this field concluded that "[a]ll learning takes place inside individual human heads; an organization learns in only two ways:

(1) By the learning of its members.

(2) By ingesting new members who have knowledge the organization didn't previously have" (Simon, 1991, p. 125).

This way of thinking has been a dominant paradigm at least in earlier years, which sees organizational learning as little more than a collectivity of individual learning within a firm (Wang and Ahmed, 2003, contra Fiol and Lyles, 1985).

On the other hand, models of organizational learning based on group learning processes have been appraised negatively by critical psychologists, for a "psychology that deals with averages in the hopes of achieving generality through abstraction can never become relevant to the particular individual" (Tolman, 1991, p. 5). Similarly, a formal and top-down approach that ignores local contingencies is implicit in recent knowledge-creation paradigms of organizational learning (Engeström, 2001).

It can be argued that both these viewpoints concerning the locus of learning in organizations are at extreme ends of a spectrum but at the same time these ideas are not uncommon in the literature. We believe that these unsatisfactory conceptualizations of learning in organizations has reached such a stage now whereby it is possible to conceive of learning at the individual level that occurs independently of the collective level (Curado, 2006; Ikehara, 1999) and vice versa (Kim, 1993; Romme and Dillen, 1997). We have also not been convinced by existing attempts to circumvent these grave difficulties in explaining individual and organizational learning by appealing to metaphors or archetypes.

The individual|collective dialectic in learning

In this article, we bring together various insights from critical psychology (Holzkamp, 1983; Roth, 2003) and cultural sociology (Giddens, 1984; Sewell, 1992; Tobin *et al.*, 2005) to propose an alternative solution to two interrelated questions, "Who learns and how in the learning organization?" A strongly dialectical approach, in which individual and collective stand in a dialectical relation and therefore presuppose each other, distinguishes our analyses from those that take polarizing and reductionist perspectives. By so doing, we avoid theorizing learning in organizations beginning with the individual or the collective that has been a persistent shortcoming in other studies.

To exemplify our arguments, we draw on four episodes from a study of a public-sector organization known as the Salmonid Enhancement Program in British Columbia. We show how actions performed by individuals and the ensuing sociomaterial resources produced can be seen as simultaneously constituting individual and collective learning. Hence it is methodologically and ontologically unwise to separate these two levels. In addition, these processes are pervasive throughout the lifespan of the organization and can occur either during periods of stasis or development.

Our explanations are based on the dialectical relation between individual and collective: in their actions individuals concretely reproduce the organization and, when actions vary, produce it in novel forms; the idea of an organization therefore presupposes individuals that concretely realize it. However, without an organization, there would be no aim or motive to individual actions in the first instance. Individuals orient toward the organization (however ephemeral it might exist for them as a collective body), which therefore provides a framework within which each individual action makes sense. That is, the actions of each individual or constitutive member presuppose the organization.

In trying to convey something of this very counter-intuitive notion, we will sometimes adopt the Sheffer stroke represented by "|" to create new concepts that transcend the contradictions entities embody in the joining of mutually excluding terms (Roth *et al.*, 2005). Thus, by writing: "individual|collective," we create a new term that incorporates mutually exclusive concepts into a new one that overcomes the inherent contradiction. The entities both presuppose and are the products of each other. The new concept expresses the fact that the two entities concerned exist not in an either-or relationship but concurrently stand in an X and not-X relation. According to traditional logic, this would be inadmissible for it constitutes a logical contradiction.

However, in a dialectical perspective, this unity of non-identical entities represents their necessary interplay and reciprocal nature.

Although coming from different starting points, some scholars have come rather close to our understanding of the individual|collective dialectic in learning put forth here. After taking inspiration from the works of Mead and Elias, Stacey (2003) concludes that learning is the activity of interdependent people with concomitant transformations of individual and collective identities. Seen in this manner, organizations then exist because they comprise thematic and recurring patterns of (power relating) behavior by agents in interaction – interdependent people.

Other studies have also shown how organizational learning arose from social practices that were creatively realized by knowledgeable individuals while being enabled and constrained by those very social structures (e.g. Berends *et al.*, 2003). These frameworks, which embodies the inseparable duality of agency and structure, is similar to our position in this paper. Indeed, learning here is considered here to be produced from the interactions between agency and structure (Nonaka and Toyama, 2003) whereas others (e.g. Hargadon and Fanelli, 2002) called it a dialectic between tangible action and intangible possibilities, between latent and empirical knowledge. For example, creating a heart valve inspired a shampoo bottle design that in turn produced a novel configuration for a water bottle. Organizational knowing is therefore simultaneously a social and individual phenomenon as it is manifested in the production of sociomaterial resources as a result of a person's actions. These then shape how other individuals may view their environment, which has been already transformed due to the previous actions.

However, we argue that these researchers perhaps do not go far enough in that their analyses favor the action of particular individuals who have the means of enacting change for overcoming existing structural properties of social systems. It is no wonder then that organizational theorists have long scrutinized managerial elites as powerful change agents rather than the deeds of more "ordinary" workers. We seriously want to problematize any hint of structural determinism because in the dialectic of the individual|collective that we describe here, everybody makes the learning organization not just a select few. This has been amply demonstrated for example in studies showing how people in middle or lower management (Friedman, 2001), labor unions (Drinkuth *et al.*, 2001), and vocational occupations (Orr, 1996) can effect (and impede) profound organizational learning.

Again, business management studies which have used cultural-historical activity theory (e.g. Blackler *et al.*, 2000; Virkkunen and Kuutti, 2000) maintain objectives similar to ours, including viewing the agents, social structures, community, rules, and tools as a whole instead of in piecemeal fashion. Thus, organizational learning cannot be understood to be the result of individual actions nor their sum total. Yet in most western interpretations of this complex sociocultural learning theory, dialectical thinking is absent or incorrectly applied thus robbing activity theory of its analytical power for true praxis (Roth *et al.*, 2005). In what follows, we first describe the background to the Salmonid Enhancement Program and then explain our research methods. We next interweave four chosen case study episodes with our critical psychological and sociological theory before summing up our case for learning in organizations.

The Salmonid Enhancement Program – a non-learning organization?

Begun in 1977, the Salmonid Enhancement Program (SEP) initially was a joint federal-provincial venture entirely managed by the Department of Fisheries and Oceans Canada (DFO) two years later. Following a century of equivocal progress in the artificial rearing of Pacific salmon, DFO-SEP was heralded as the culmination of best practices in fish rearing and biological science. Using a variety of strategies ranging from habitat restoration, spawning channels, fish ladders to strongly interventionist (though efficient) approaches like fish hatcheries, the original mandate was to double the catch of salmon, which would have translated into desirable socio-economic, environmental and recreational objectives.

Organizationally, the program now consists of more than one hundred staffed hatcheries and several research laboratories at different locations in British Columbia. Although the organization has been plagued with fiscal constraints and cuts from the time of its inception, DFO-SEP still consumes most of DFO's annual budget for its Pacific region, which gives an indication of the importance attached to this fish by the government and local citizens. As described below, these issues about spending were implicated in the learning trajectory of DFO-SEP. Besides the rank-and-file workers in the hatcheries – the fish culturists – there is also a veterinarian on staff and several support biologists to bridge the gap between "big" laboratory science research and the hatcheries. Fish culturists and government scientists work largely independently though there are occasions when the hatcheries serve as important project sites in scientific experiments.

The report card for DFO-SEP seems to be mixed after a quarter of a century; fish numbers have not reached targeted figures while the program has been plagued at various times with deep controversy especially with regard to the hatcheries that it operates. In the public debate about salmon enhancement, DFO-SEP has been blamed more than once for being an organization that does not learn from experience (Hilborn and Winton, 1993; Hume, 1996), and for having censored or revised information that was damaging to its corporate image (Glavin, 2000; Thorne, 1997). Whether DFO-SEP was truly a learning organization remains an empirical question; the purpose here is to demonstrate how these issues were salient by describing four episodes from our larger case study.

Method

Because we wanted to generate greater explanatory richness concerning our proposal about individual|collective learning in organizations, a case study method was chosen. In particular, we followed the principles of structured, focused case studies in our investigation (George and Bennett, 2005). What distinguishes this variant of case study research is its attention to:

- Asking standardized, general questions pertaining to the research problematic in each case(s) (e.g. what is the relationship between individual and collective in organizations, how do wider socio-political factors influence organizational behavior) – the "structure".
- Dealing with only a theoretical subset of the historical case(s) that are examined (e.g. employee learning, identity, commitment) – the "focus".

Two pitfalls are avoided due to the former requirement, namely that of idiosyncratic theory testing and researcher bias, whereas the latter condition helps to minimize straying from the phenomenon of interest.

In the course of our research, we adopted participant observation and forms of apprenticeship as preferred data collection strategies (LeCompte and Preissle, 1993). One of the hallmarks of ethnography, the former entailed long-term involvement in observing and trying to make sense of social life from participants' perspectives. This was still insufficient for gaining an insider's understanding of work practices and hence we sought various forms of participation in everyday work life. In enacting apprenticeship as ethnographic method (e.g. Coy, 1989), we assisted the hatchery staff and DFO-SEP personnel in work activities such as the taking of eggs, tagging, feeding fish, seeding lakes with chemical nutrients, taking measurements on fish and in the environment, sampling returning salmon, and releasing smolts. These experiences permitted us to develop a clearer, embodied sense of the technical and craft skills in fish culture that mere observation or verbal enquiry would never have been able to achieve.

Nearly all these events were written up in fieldnotes, audiotaped or, more commonly, videotaped. The transcriptions of these events where dialog was present as well as our own notes formed the basis of our analysis of the work of fish culturists. In addition, we interacted with numerous members of DFO-SEP (e.g. veterinarians, statisticians, laboratory staff, senior administrators) about various aspects of salmonid enhancement, collected and photographed artifacts (forms, minutes, notes on scratch pads), and copied fish culture manuals, experiments, and newspaper clippings relating to the hatchery and DFO. Though laborious, transcribing the semi-structured interview data ourselves was an avenue to an intimate familiarity with what the participants had articulated. Over a five-year period, we thus examined present and past work practices of the Shallow River Hatchery (a pseudonym) fish culturists in detail – especially that of Jack – and yielded over a thousand pages of transcribed data and reports. We follow others in assuming that learning is reflected in the "actions, commitments and justifications which follow what individuals identify as learning" (Richter, 1998, p. 310).

To ascertain the quality of descriptions and validity of conclusions from the data, we adopted the quality criteria of fourth generation evaluation (Guba and Lincoln, 1989). The procedures that guarantee quality included three components:

(1) Prolonged engagement and observations in the field, which was realized by having spent five years at the field site.

(2) Peer debriefing with disinterested parties, which occurred as we presented our initial understanding to other members of our research group, who provided critique and comments.

(3) Member checks with the research participants, who read draft versions of the analyses we had conducted.

During our analyses, we first developed tentative hypotheses, which were subsequently tested in the entire project database. Based on these tests, we refined and evolved these hypotheses. Besides, we actively searched for negative cases in the data, that is, instances that would disconfirm the hypotheses, and kept written notes

that recorded the emerging constructions, thereby realizing a form of progressive subjectivity necessary for validity and reliability.

Findings

In this section, we introduce four episodes from our larger study of learning in the workplace and salmonid enhancement (see Lee, 2005). The first two show how individual learning constitutes collective learning; the subsequent two episodes demonstrate how the lessening interest in individual learning constitutes decreased learning opportunities for the collective. Together, these episodes clarify the dialectical nature of the individual|collective and leads to an important practical implication for organizations wishing to transform themselves into learning organizations.

Performing experiments in Shallow River Hatchery

One aspect of the workplace in Shallow River was the freedom and encouragement management gave in the early 1980s to the fish culturists to seek scientific solutions in improving their fish husbandry practices. In this context, each action therefore produced outcomes that constituted new sociomaterial resources for future actions at the individual and collective levels. For example, one of Jack's experiments that showed that easily obtainable carbon dioxide gas was equivalent in efficacy to the ubiquitous "MS-222" anesthetic used at the time provided new options for the individual fish culturist who ran the investigation and for all those who found out about the experimental results. Such increases in affordances (i.e. action possibilities or room to maneuver) constitute learning at both the individual and the collective level, because there are now more and different options for dealing with attendant problems. Likewise, Hargadon and Fanelli (2002) found that these changes in sociomaterial artifacts were associated with organizational learning and innovation in their study of two leading product development consultancy firms. The production of these tangible resources therefore allows valuable glimpses whereby individual|collective learning can be frozen or captured for the analyst to examine.

Fish culturists could now choose various options, according to personal preferences and accounting for other constraints such as toxicity to humans and purchasing costs. Therefore, although based on and starting with the interests of one particular fish culturist, the outcome led not only to that individual's learning but also to learning of the hatchery collective: individual and collective learning occurred simultaneously and – because of the previously articulated, dialectical relation between individual and collective – presuppose one another. In fact, different action possibilities always exist even though none of the fish culturists may use either carbon dioxide or "MS-222" at any given moment. That is, we understand organizational culture in terms of the universe of real action possibilities rather than in terms of the actually observed practices.

Devoting a large part of the day to feeding fish had contributed towards an embodied knowledge of salmon in these workers. Some fish culturists could even tell the temperature of pond water without using thermometers while others could estimate the flow rates there merely by observing the behavior of the fish. Possessing these prior understandings and a curiosity for what made their fish "tick," the fish culturists formulated various hypotheses that could be tested scientifically whenever time and funding permitted. Basically concerned with optimizing production, the experiments

had centered on issues of fish nutrition, health, growth, and behavior. Some were of short-term duration over a few months or weeks while a few stretched over many seasons.

The fish culturists initiated and performed the scientific experiments largely on their own (with some planning assistance from DFO biologists), constructing knowledge that were unknown to the DFO-SEP scientists in particular and the scientific community more generally. At the same time, the fish culturists' knowledgeability of fish husbandry deepened because the experiments invited them to articulate and make explicit their know-how of fish husbandry. It certainly comes as no surprise to hear that the practitioners at Shallow River are widely acknowledged to be among the most skillful in the province.

This expertise nonetheless, did not remain confined to certain fish culturists but diffused in various forms to the rest of Shallow River and throughout DFO-SEP. During weekly meetings in the hatchery for example, experimenters often shared details about progress in their projects and thus kept other colleagues updated. Although sometimes the outcomes enjoyed a wider audience during DFO organized meetings, usually news that someone was working on, or, had solved a particularly tricky problem got around to other DFO-SEP facilities by word of mouth. Occurring whenever somebody dropped by in Shallow River or through the support biologists who moved around the many DFO-SEP facilities under their charge, this became an informal though efficient communicative network. Hence, relying on the telephone or occasionally coming down in person for some hands-on experience, other DFO-SEP staff who faced similar fish husbandry problems as that encountered in Shallow River could readily benefit from the latter's experience. This network was more than a localized phenomenon for all the support biologists in the province once shared a common office in DFO-SEP headquarters, which led to a spread of action-supporting resources and therefore to the expansion of action possibilities at the collective level. Coupled with other facilities performing their own experiments in seeking local solutions, it constituted an overall increase in the affordances or action possibilities within DFO-SEP. Yet, there was another tool whose very existence directly contributed towards making DFO-SEP a learning organization – the InfoMemos.

Mass-circulation of Resources for Action: DFO-SEP InfoMemos

In what follows, we describe how an artifact, the InfoMemo, produced by individuals or groups of individuals assisted in making DFO-SEP a learning organization with greater action possibilities for the collective. Not only did these InfoMemos furnish sociomaterial resources in that every facility had access to this rapidly expanding database of fish husbandry but also it catalyzed changes in overall work practices. Consisting of brief reports (usually a single page of text or diagrams), they were aimed at offering a "rapid, informal means of communicating new or useful information at a preliminary or pre-publication stage" (Alderdice *et al.*, 1984, p. vii). This practice of producing and sending around InfoMemos began when a DFO-SEP biologist recognized that some forms of knowledge about fish husbandry derived from the fish culturists' experiments was useful although these studies might never pass the gatekeepers of "proper" scientific journals. Therefore, rather than risk the chance of tentative and potentially useful knowledge claims being lost, InfoMemos were created

as a means to articulate the knowledge and thereby make it available at the collective level.

Submission criteria were kept intentionally simple: results were written up briefly in a technical language accessible to all fish culturists and sent to the part-time editors (three DFO scientists) before redistribution throughout the DFO-SEP organization. Participation rather than exclusion seemed to be the rule, as whoever had potentially useful information to share did so in the hope that somebody else would find a vital clue to solving their own problems. InfoMemo topics from the years 1979 to 1984 for example, spanned a huge spectrum from water quality issues, feed quality, growth rates, incubation techniques to fish diseases among many others. Some contributions were less than a hundred words in length (InfoMemo No. 11) while others even shared what they observed when visiting an overseas aquaculture facility (No. 27), advertised useful books (No. 12) or just gave tips on what had worked in their particular workplace (No. 53).

Similar to the previous situation with scientific experimentation at Shallow River Hatchery, members contributed to their own and collective learning through the InfoMemos (a sociomaterial resource) while the structure of DFO-SEP (management, scientists, funding) enabled and sustained its inception and flourishing. The actions within the organization were thus twofold in nature: they reproduced the existing organization and produced new structures at the same time, which increased the affordances within the organization, and therefore constituted organizational learning. One should not forget that individuals rather than the organizations performed the actions, which therefore constituted their own learning, but the actions were possible and made sense at the collective level of the organization.

Here, the collective level actually exceeds the sum of actions concretely realized – in the organization, there are always action possibilities that are not concretely realized by any one individual, though the possibility always exists (Il'enkov, 1977). These action possibilities exist in, arise from, and constitute the organizational culture. What we know as learning organizations are thus constituted by possible actions that are enacted and expanded with both social (e.g. new personnel at various levels of competency) and material resources (e.g. new machinery). Innovations such as the InfoMemos were thus important elements to extend new action possibilities from an individual to his or her local organization (hatchery) and to the entire DFO-SEP organization.

In opposition to traditional conceptions of learning, it seems best to consider it as a form of changing participation in a changing world that the InfoMemos and hatchery experiments seemed to exemplify (Lave, 1993). By freely sharing solutions on an organization-wide basis without putting barriers on who was qualified to do so, it was partly responsible in allowing DFO-SEP to overcome many fundamental problems in fish rearing in the early years. Through their participation, variously placed individuals in the organizational hierarchy from professional biologists to technicians to high-school educated fish culturists all facilitated in making DFO-SEP continually responsive to ongoing challenges that characterizes what is termed a learning organization. It was interesting to note that although the Americans enjoyed extensive experience in their own enhancement programs, just two years into DFO-SEP a number of fish culturists were traveling north to learn from the Canadians (Kadera, 1979).

Participation, it must be added, is not a matter of "being present" or "doing something" but of joint ownership and joint responsibility to that community that has been united by a common object (Garratt, 2000). By engagement in collective life, individual learning leads to an expansion of general (collective) possibilities because individuals always co-constitute the very organizations to which they belong. While such positive transformations are always welcomed, individuals may in all likelihood produce and reproduce an organization in stasis, which is how the next two episodes now unfold.

Withdrawing from Hatchery experiments

In the following accounts, we trace part of Jack's learning trajectory as he limited the affordances for himself and DFO-SEP by neither participating in major experiments in the hatchery nor in locally organized conferences for fish culturists. One underlying paradigm in the literature on learning organizations emphasizes the role that key personnel and management play as the primary agents of change (Elkjaer, 2003). From our analyses, however, this position has to be reassessed for we show how the agency of "ordinary" workers like Jack can deprive themselves and their organization of new sociomaterial resources. Indeed, our argument finds no conflict with a small but growing recognition that all individuals up and down the corporate hierarchy have the potential to facilitate or to impede learning organizations as mentioned.

The Jack of old can hardly be more different from the present person that one encounters during a visit to Shallow River Hatchery. His current behavior and attitude can perhaps be summed up when he told us that giving "300 percent" to the organization was a thing of the past. Now, he merely works to rule for he declares: "I just don't have the drive anymore to do it, I don't have the fire to get down there and really get it going."

What circumstances had led to this transformation? From our interviews, we discovered that in the mid-eighties he had initiated an extensive series of investigations on a mysterious fish disease known as crib death. Especially lethal, it killed huge numbers of juveniles without warning and as such was dreaded throughout all DFO-SEP hatcheries. After planning the investigations, doing the fieldwork and collecting data for five years, the results were handed over to a hired biologist to write for publication. When asked the reason for this, Jack replied that writing, especially scientific texts, was a task totally beyond him. After some time, the biologist resigned and the findings never saw the light of day. Jack said, "I was kind'a let down with that, I was really disappointed" and from that point onwards, he devoted less and less energy to doing experiments.

From a sociocultural approach to organizational learning, this diminishing of interest in learning leads to a negative spiral; a limiting of self-agency modifies the work environment, which prescribes the freedom to maneuver (Friedman, 2001). Jack earnestly wanted to pinpoint the cause of crib death even though the findings from his experiments were merely suggestive and inconclusive. Hence, not getting a piece of the puzzle disseminated to the wider community was a major setback, which he responded by withdrawing gradually from participation in research. Such setbacks led to a negative emotional valence with respect to the collective in general and management in particular. His attribution of incongruities to the culture and structure of the corporate unit led to his withdrawal. According to sociologists of emotion (e.g. Turner, 2002), the

lowering of both individual commitment to the collective and willingness to play roles in the corporation is a typical outcome of such setbacks in some situations.

In Jack's withdrawal, mediated by his deteriorating relationship with the hatchery managers and DFO-SEP, learning was therefore diminished both at the individual and collective level. First, Jack no longer actively expanded his own action possibilities by conducting experiments and articulating his own practices. Prior to this incident, he had even constructed Plexiglas equipment by hand so that he could study the behavior of the fish in his makeshift laboratory in Shallow River such was the enthusiasm that he possessed. Jack certainly continued to be a competent fish culturist and therefore a valuable (constitutive) member of the hatchery organization, but he no longer engaged in active learning. Second, at a collective level, there were fewer new sociomaterial resources that expanded the affordances in the hatchery. This decreased the learning potential of the hatchery and the DFO-SEP organization as a whole. That is, the organization certainly did not collapse due to the actions of the other colleagues who sustained it but it experienced stagnation when Jack consciously diminished his possibilities for action and chose instead to reproduce the status quo. If this type of phenomenon were thoroughly pervasive, all learning would cease both at the individual and collective levels.

Two further points are germane: first, Jack's withdrawal was both influenced by his negative emotional valence; but all future actions that made the withdrawal visible further (re)produced the negative emotional valence. Second, because Jack is a constitutive member of the hatchery collective, the overall emotional valence also decreased. For some time, the situation in the hatchery was best described by the term "morose," and each shared break or lunch constituted a moment of reproducing negative emotions, individually and collectively. But the collective emotions – here morosity – presuppose individual emotions (e.g., Collins, 2004), so that the workplace as a whole lost in its drive to become a learning organization. As Hargadon and Fanelli (2002, p. 295) put it, "knowledge . . . is made empirical in one person's actions and made latent again by another's experience of that action."

Boycotting the conferences

In our final episode, we focus on events at the collective level that mediated the learning of individuals and ultimately learning at the general level. Again involving Jack, we see how severe cost-cutting measures in DFO-SEP decreased opportunities for participation and constituted obstacles for individual and collective learning.

About 20 years ago, DFO-SEP organized conferences for the fish culturists whereby they could come together and, as insiders described it, "talk fish." These conferences were motivated by a vision similar to that behind the InfoMemos: to facilitate knowledge exchange within DFO-SEP, within and between hatcheries and between hatcheries and the scientists. Presentations were kept informal; fish culturists briefly shared their successful practices or the interim results of their experiments in language that was free of scientific jargon. In common with other conferences, most of the truly useful knowledge exchanges about fish culture were made over refreshments instead of within the official program. Attendance was initially open to all fish culturists in the early years but due to supposed budgetary cutbacks, participation soon dwindled down to a single person from each hatchery. At this stage, Jack, for example, registered his extreme annoyance about the lack of representation by boycotting the conferences

entirely for he believed that everybody had something to contribute whatever their level of education as we read in the opening interview excerpt. He had implicitly understood that the conferences contributed to both individual and collective learning.

The corporate history of DFO-SEP revealed that cost-cutting drives have plagued hatcheries almost from the time that they were built thirty years ago. These macro-level contradictions have had repercussions in that it was increasingly difficult for planners to maintain normal operations with shrinking budgets. Thus, the loss of a single attendee at a conference (which was salient in Jack's explanations that opened this article) might not seem remarkable from the perspective of management. However, this reasoning is indefensible in the light of the individual|collective dialectic that links the micro-macro levels in the learning organization. Where previously fish culturists like Jack were active contributors in the conference, DFO-SEP now forfeited his experiences in fish rearing that could have made a difference to somebody while Jack also lost the chance to extend his own understanding of fish culture through interacting with other colleagues. Here again, the mutually constitutive nature of individual and collective learning comes to the fore.

Conclusions

The purpose of this paper was to articulate the relationship between individual and organizational learning in a dynamic way that eschews the dichotomies and reductions inherent in other approaches. By doing so, we join the few studies that have emphasized the roles of individuals as agents of learning in organizations (Friedman, 2001). Drawing on detailed case study material, we illustrated a way of framing individual and collective learning as coinciding as soon as individual and collective are theorized dialectically: in each individual act, the organization is both presupposed and constituted. Hatchery experiments, InfoMemos, and fish culture conferences constituted tools for individual and collective learning, for they expanded the action possibilities of all individuals in the collective. Because these sociomaterial resources were freely circulating in the organization, the practice of fish rearing was continuously changed as new action choices evolved throughout DFO-SEP. The distinction between individual and the collective learning is erased, as both levels exist dialectically – individuals constitute the organization while the latter enables or constrains the former. On the other hand, stasis in organizations also involves occasions of non-learning in individuals and collective. We exemplified this situation in the accounts of the withdrawal of one fish culturist both from experimenting and attending conferences. Both Jack and the organization as a whole contributed to and mediated this withdrawal and the reduction in individual and organizational learning.

We began this paper by posing two interrelated questions, "Who learns and how in the learning organization?" Previous theories about learning organizations that analytically begin at the individual or organization pole ignore the fact that both are different but mutually supporting expressions of each other. Action possibilities always are collective; but individuals concretely realize actions. But each action has an outcome and as such produces new growth points for future actions, thereby both reproducing existing possibilities and opening up new ones – learning therefore is inherently a dialectical process. We can summarize our conclusions into one sentence: dynamic and expansively learning organizations presuppose dynamic and expansive individuals; dynamic and expansive individuals presuppose dynamic and expansively

learning organizations. This then calls for freedom of participation in the collective by all members and the need to increase organizational affordances for the learning and development of individuals.

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