The Practice-Based Learning of Educators:
A Co-Emergent Perspective

Tara J. Fenwick, ***University of Alberta***

Abstract

Practice-based or experiential learning has come to be dominated by mentalist models of reflection on experience. The argument here is that these models split mind from body and subject from environment in ways that yield problematic practices. An alternate conception of practice-based learning is offered here, based on the notion of 'co-emergence.' According to complexity theory, co-emergence is a key dimension characterizing complex adaptive systems such as classrooms, schools, and communities of practice.

Introduction

Since the influential work of Donald Schön (1983, 1987), the importance of experiential learning in the uncertain, messy "swamps" of practice has attracted many advocates in education. Development initiatives for educational professionals over the past 20 years have often emphasized 'reflective' practice, focusing on the learning processes unfolding in experience and encouraging formal recognition of knowledge produced through experimentation in educational practice. Descriptions of learning in practice tend to be inherently positive, and indeed, its acknowledgment has arguably represented a progressive movement in professionals' continuing education. First, most would agree that practice-based learning recognizes and celebrates knowledge generated outside institutions. If learning can be defined as change or transformation, in the sense of expanding human possibilities and action (Davis & Sumara, 2000), learning through practice is expansion that

challenges the hegemonic logic of expert knowledge: this learning refuses disciplinary knowledge claims of universal validity, and resists knowledge authority based solely on scientific evidence. Second, this focus on learning in practice has foregrounded the multiple difficulties of theorizing the very nature of experience and knowledge production in different socio-political contexts, difficulties that can be easily overlooked in a rush to privilege 'experience' or discuss the purposes of its education. Third, it is well documented that valued personal knowledge of practicing educators derives from lived experience, and thrives on shared stories of experience (Clandinin, 2002; Schubert & Ayers, 1992). This is why, despite the philosophical problems in accepting practiced-based experience as a primary and authoritative source for learning (Norris, 2000; Usher, Bryant, & Johnson, 1997), its significance in educators' development should not be underestimated.

However, as critics (Fraser, 1995; Griffin, 1992; Harris, 2000; Michelson, 1996, 1998; Sawada, 1991; Usher & Solomon, 1999) have contended for over a decade, experiential learning has developed its own unfortunate orthodoxies. These may be argued to stem at least partly from a fundamental separation of body and mind in certain discourses of learning in practice. The body is often overlooked in examinations of learning, along with the body's enmeshments in its social, material and cultural nets of action. Learning that is harvested from bodies in action through reflective processes is often subjected to measurement according to normalizing categories, commodified, and credentialed: "an object of institutional policy and professional good practice" (Griffin, 1992, p 31). In such cases the purpose of experience is determined by its relevancy to existing standards of practice. An example is when teachers must submit annual professional growth plans to a supervisor documenting specifically how their experience has contributed to their professional competency (Fenwick, 2002). But experience also can reproduce structural inequities and reinforce entrenched beliefs or traditions of practice that may be harmful or repressive. Learning through practice, particularly for educators who typically practice in isolation, may simply naturalize prevailing conditions and dim the potential to recognize alternative possibilities including acting collectively with others for systemic change.

But how then shall those wishing to support educators' development through ongoing learning in practice position themselves within the complex webs of practice and learning? And how can educators' practice-based knowledge be championed towards widening equitable participation in development opportunities, challenging unitary institutionalized notions of 'good' teaching practice and teacher knowledge, and encouraging collective challenges to these? A first step may be to critically examine theoretical assumptions related to experiential learning. Three problems are outlined in the first section below, related to the disembodiment and subsequent rationalization of learning. Then, towards more expansive and embodied understandings of learning, practice-based learning may be theoretically re-configured drawing from concepts offered by complexity

science. What is called here a *co-emergent perspective* is developed in three themes in the second section. These themes indicate more integrative approaches to enabling practice-based learning among educators, which are described briefly in the final section of this argument.

Problems in Current Conceptions of Experiential Learning

Reflection is emphasized in treatises about adult experiential learning (i.e., Boud, Keogh & Walker, 1996; Caffarella, Barnet, & Bruce, 1994) and the ubiquitously popular 'reflective practice.' Both Schön (1983, 1987) and Kolb (1984) popularized the assumption that experience is "concrete" and split from "reflection," implying that doing and thinking are separate states occurring in linear sequence. In such renderings mentalist reflection is treated as the conduit from event to knowledge, as Sawada (1991) has shown, transforming 'raw' experience into worthwhile learning. Theories of action are excavated from experience, becoming objects of knowledge severed from location and embeddedness in the material and social conditions that produced the knowledge.

Inseparability of Experience, Reflection, and Knowledge

In such mental representations, fluid dynamic events become static and separated from the interdependent commotion of people together in action with objects and language. Experience is cast as a fixed thing, separated from knowledge-making processes. Yet reflection itself is experienced, and experience as event cannot be separated from the imaginative interpretation and re-interpretation of the event. Michelson (1996) asks, "Where, precisely, are we standing when we 'reflect', and what kind of self is constructed in the process?" (p. 449). In fact, she argues, experience, reflection and knowledge are mutually determined and in continuous dynamic flux. Experience itself is knowledge-driven and cannot be known outside socially available meanings. What is imagined to be 'experience' is rooted in social discourses which influence how problems are perceived and named, which experiences become visible, how they are interpreted, and what knowledge they are considered to yield. Usher et al. (1997) write that "to see experience as originary in relation to learning fails to recognize that any approach to using experience will generate its own representations of experience and will itself be influenced by the way experience is conceived or represented, by the framework or interpretive grid which will influence how experience is theorized" (p. 100). Lather (2000) shows how the reflective act itself a performance of remembered experience, rather than a realist representation of it. She writes about the "undecidability" of lived experience, given the interplay of language, audience, purpose, and identity with memory. What we think we see, when we reflect, "is always already distorted":

> [Remembrance is] less a repository for what has happened than a production of it: language, writing, a spectacle of replication in an excess of intention. Remembrance is not about taking hold but a medium of experience, a theatre for gathering information. (p. 154)

These insights illustrate three problems in conceiving learning as deriving objects of knowledge (whether conceptual or pragmatic) from 'authentic' memories of a 'concrete' experience. First, these memories depend upon those truths that can be acknowledged within particular cultural values and politics. Second, many slippages between the named and the invisible occur in meaning-making, and further disjunctions occur between the so-called learner and those other readers of experience who allot themselves the authority to do so under the title of educator. Third, concrete experiences do *not* exist separate from other life experiences, from identity, or from ongoing social networks of interaction.

Furthermore, the individual person becomes the central cognizing agent, as though the learning process ultimately is conducted internally within autonomous knowledge-making units. Person is often split from environment in these conceptualizations, with context or situation portrayed almost as an inert container in which a person experiments, interprets the results to construct knowledge, and then applies this acquired knowledge to new situations. Critics such as Edwards (1994), Griffin (1992) and Lather (1991) argue that this valorizing of reflection effectively centers learning in a rational knowledge-making mind, somehow rising above messy bodily dynamics to fix both experience and a singular experiencing self.

Politics of Recognizing Experience

Assessment processes employed in experiential learning reveal contested politics at play in recognizing and judging complex nets and structures of experience. One example is Prior Learning Assessment and Recognition (PLAR), a process intended to grant advance credit for experience for purposes of entry to jobs or certificate programs. Critics argue that PLAR creates a disjuncture between private experience and public discourse, which produces a fundamental paradox when the private journey of discovery and learning is brought under public scrutiny and adjudication (Fraser, 1995; Harris, 2000). The assessment process compels adults to construct a self to fit the PLAR dimensions, and celebrates individualistic achievement: "adults are what they have done" (Fraser, 1995).

Perhaps more common examples in educational circles are professional portfolios or growth plans. Like the reflective journals often required of pre-service teachers, portfolios and growth plans comprise textual representations of practice-based learning that are often reviewed, even assessed, by a supervisor. Tensions abound in determining worthwhile knowledge and experience, criteria for its adjudication, and language for its representation (Fenwick, 2003). Valuing experience may be a well-intentioned gesture to diminish the power of institutionalized knowledge, but ultimately employs disciplinary mechanisms of language, mea-

surement, and knowledge legitimation to render local knowledge into institutional vocabulary. When experiential learning is thus judged and managed, both 'experience' and human subjectivity are translated into calculable resources serving what some have argued are ultimately utilitarian notions of knowledge, whether organizational productivity or school improvement. The experiential learning discourse, observe Usher and Solomon (1999), "intersects happily with the managerial discourse of workplace reform . . . since both shape subjectivity in ways appropriate to the needs of the contemporary workplace" (p. 8).

For individuals too, Michelson (1999) argues, "the management of experience has become a way of regulating how people define themselves and construct an identity" (p. 144). Reflection orders, clarifies, manages and disciplines experience—which internalizes relations of ruling. Perhaps this is precisely why individuals find refuge in reflective periods, to creating meaning and pattern in chaotic fragments of experiences, through narrative, snapshots, justifications, or causal patterning. As Miller points out (2000), people try to manage the uncertainty and undecidability of their experiences by selectively imposing reflective structures to mentally represent and consider them.

Excluded and Invisible Experiences

Ultimately practice-based learning emphasizes what is or can be represented as visible experience. In drawing boundaries around experiences to produce this visibility, something important is always excluded. First, only those experiences deemed relevant to culturally-specific notions of 'good practice' are under consideration. In education, Popkewitz (1998) argues that particular notions of "the good teacher" (activity-oriented instruction, reflective practitioner) combined with particular assumptions about teacher knowledge (celebrating practical wisdom and "recipe knowledge") and practices that make teachers "visible" (through self-revelation), all work to produce particular teacher identities and behaviours by normalizing teachers' inner beliefs: teachers' "thought is organized, perception directed, and action controlled" (p. 56). But even when broader notions of good practice prevail, practice-based learning will be understood according to normative categories that determine which sorts of experiences are educative, developmental, knowledge-producing, and worth enhancing. Those experiences in what Deborah Britzman has called "difficult knowledge" for educators are excluded from consideration: deep desires for and resistances to different objects, fantasy, uncomfortable truths about oneself, and contradictory or taboo experiences. Non-conscious or intuitive knowledge, and the ongoing subtle learning of body, emotion, identity and relationship through everyday negotiations in webs of action also tend to remain invisible. In discourses of practice-based learning emphasizing naming and recognition of experience, these unnamed phenomena are non-existent, and therefore, ontologically excluded.

Second, experiences depend partly on inhabited environments and bodily

capacity. Those who have been socially, physically, economically or politically excluded from particular experiences may be judged as lacking social capital, remedied through expanding their access to 'rich' experiences and networks. But this approach colonizes their own knowledge and reifies the normalizing categories of those whose values control the dominant cultural meanings of 'practice' and 'learning,' This also perpetuates an acquisitive conception of experience, where development is construed as possessing increasingly higher-level orders of experience or objects of knowledge discerned from 'prior' experience.

Third, as Osberg and Biesta (2003) have argued, conventional conceptions of practice-based learning exclude two important elements: time and chance. The model of an agent experimenting with the environment to produce personal theories of action does not appreciate how meanings become apparent to the agent in the midst of action, in ways that not only continually redefine how both action and intention are perceived, but also continually reshape how the agent acts. A temporal element therefore operates in practice that escapes representation, such that we renegotiate our actions, theories and place in the world simultaneously with our experimentation. The chance element is also temporal: whether the focus of learning is on a single person or a group of people (a system) experimenting in practice, at each moment it can never be known which, among the possible choices available to the person or system, is selected for the next action. Thus among the elements making up the experience, *something is always not present*, and therefore not representable. When these elements of time and chance are excluded, practice-based learning remains problematically conceptualized as fixed moments, rationally analysed to produce knowledge objects, without acknowledging the unrepresentable forces that determine them.

Feminists such as Michelson (1998) maintain that these conceptual problems in experiential learning are consequent to the Cartesian bifurcation of mind and body in a western epistemological tradition that privileges mental detachment, the observation and calculation of the world from a disembodied and abstract rationality. This is what Haraway (1991) calls "the god trick of seeing everything from nowhere" (p. 188). Bai (2001) suggests that it is precisely this problematic illusion of a floating rationality rooted in a fundamental western split of subject and object that produces "the predominance of the conceptual mind sustained by preoccupations with symbolic manipulation and a corresponding eclipse of the nonconceptual, that is, unmediated sensory, consciousness" (p. 86). Michelson (1998) argues that in the movement to rationalize experiential learning the body is not so much transcended as rendered completely invisible.

Embodied Learning: A Co-Emergent Perspective

Yet the embodiment of experiential learning is an ancient concept: indigenous ways of knowing, for example, have maintained that spirit, mind and body are not

separated in experience, that learning is more focused on being than doing, and that experiential knowledge is produced within the collective, not the individual mind (Castellano, 2000; McIsaac, 2000). Julia Cruikshank's (1998) research, for example, shows how the life stories and knowledge development of the Yukon First Nations people are completely entangled with the glaciers around which they live. The glaciers are not inert environment, but alive and moving, rumbling and responding to small human actions. In the collective ways of knowing among these Tlingit and Tagish peoples, the lines between human and non-human, social history and natural history, are fluid. Writers on Africentric knowledge (i.e., Collins, 1990), so named to distinguish it from Eurocentric perspectives that fragment and rationalize experience, have also shown how learning is embodied and rooted in collective historic experiences of oppression, pain and love which are inseparable from the emotional, the spiritual, and the natural.

The difference here from mentalist or reflection-dependent understandings of experiential learning is accepting the moment of learning as occurring *within* action, within and among bodies. An embodied approach understands the sensual body as a site of learning itself, rather than as a raw producer of data that the mind will fashion into knowledge formations. Michelson (1998) shows that the mind's insight is after all only a late 'catching up' to what the body has already learned in the interactive moment of experience. In fact,

> Observation is embodied—literally so—in human sensory apparatus and techno-artefacts that interact with one another in specific relationships . . . Learning is an active, world-creating process inscribed on the body and at the same time, subject to particular material and discursive conditions that constrain the body within culture and in history. (p. 225)

The crucial conceptual shift of an embodied experiential learning is from a *learning subject* to the larger collective, to the systems of culture, history, social relations and nature in which everyday bodies, subjectivities and lives are enacted. This shift is towards what Davis (2003) calls a "complexified" view of cognition. Complexity science, examining webs of action linking humans and non-humans in complex adaptive systems, is one area of contemporary theory and research that informs a re-embodied view of experiential learning. A second area focuses on dynamics of desire and resistance evolving at subsystem levels, currently being explored in feminist and psychoanalytic learning theory. A third area studies learning as struggle evolving in the body politic, evident in social action movements.

These three perspectives are outlined in the following section. All three emphasize fluidity between actions, bodies, identities, objects and environments. They point to complexities and contradictions in experiential learning that can be obscured through paradigms of transparent reality, individual meaning making or domination and oppression. All three share a focus on learning as complex choreography transpiring at different nested levels of complex systems adapting to

and affecting one another: bodily subsystems; the person or body biologic; collectivities of social bodies and bodies of knowledge; society or the body politic; and the planetary body (Davis et al., 2000).

Co-emergence: Experiential Learning as Collective Participation in Complex Systems

Discussions of embodied learning informed by complexity science (Davis & Sumara, 1997; Fenwick, 2003; Varela, Thompson, & Rosch, 1991) highlight the phenomenon of co-emergence in complex adaptive systems. The first premise is that the systems represented by person and context are inseparable, and the second that change occurs from emerging systems affected by the intentional tinkering of one with the other. Humans are completely interconnected with the systems in which they act through a series of "structural couplings" (Maturana & Varela, 1987). That is, when two systems coincide, the perturbations of one system excites responses in the structural dynamics of the other. The resultant coupling creates a new transcendent unity of action and identities that could not have been achieved independently by either participant. Varela (1999) explains,

> Perception does not consist in the recovery of a pre-given world, but rather in the *perceptual guidance* of action in the world that is inseparable from our sensorimotor capacities . . . cognition consists not of representations but of embodied action. (p. 17, italics added)

A classroom project, for example, is a collective activity in which interaction both enfolds and renders visible the students and teacher, the objects mediating their actions and dialogue, the problem space that they define together, and the emerging plan or solution they devise. As each person contributes, she changes the interactions and the emerging object of focus; other participants are changed, the relational space among them all changes, and the looping-back changes the contributor's actions and subject position within the collective activity. This is 'mutual specification' (Varela, Thompson, & Rosch, 1991), the fundamental dynamic of systems constantly engaging in joint action and interaction. The 'environment' and the 'learner' emerge together in the process of cognition, although this is a false dichotomy: *context* is not a separate background for any particular system such as an individual actor. Davis, Sumara and Luce-Kapler (2000) describe co-emergence as "a new understanding of cognition":

> Rather than being cast as a locatable process or phenomenon, cognition has been reinterpreted as a joint participation, a choreography. An agent's knowing, in this sense, are those patterns of acting that afford it a coherence—that is, that make it discernible as a unity, a wholeness, identity. The question, 'Where does cognition happen?' is thus equivalent to, 'Who or what is perceived to be acting?' In this way, a rain forest is cognitive—and humanity is necessarily participating in its cogitations/

> evolutions. That is, our habits of thought are entwined and implicated in unfolding global conditions. (p. 74)

Most of this complex joint action leaks out of individual attempts to control behavior through critical reflection. And yet, individual reconstructions of events too often focus on the learning *figure* and ignore the complex interactions as 'background.' Complexity theory interrupts the natural tendency to seek clear lines between figures and grounds, and focuses on the *relationships* binding humans and non-humans (persons, material objects, mediating tools, environments, ideas) together in multiple fluctuations in complex systems.

All complex adaptive systems in which human beings are implicated learn, whether at micro-levels such as immune systems or at macro-levels such as weather patterns, a forest or the stock market. Human beings are part of these larger systems that are continuously learning, and bear characteristics of the larger patterns, like the single fern leaf resembling the whole fern plant. But individuals also participate, contributing through multiple interactions at micro-levels. At the sub-system level, for example, the human immune system, like organs and other sub-human systems, functions as an autonomous learning system that remembers, forgets, hypothesizes, errs, recovers, and adapts (Davis, Sumara, & Luce-Kapler, 2000). The outcome of all these dynamic interactions of a system's parts is unpredictable and inventive. The key to a healthy system—able to adapt creatively to changing conditions—is diversity among its parts, whose interactions form patterns of their own.

Learning is thus cast as continuous invention and exploration, produced through the relations among consciousness, identity, action and interaction, objects and structural dynamics of complex systems. New possibilities for action are constantly emerging among the interactions of complex systems, and cognition occurs in the possibility for unpredictable shared action. Knowledge cannot be contained in any one element or dimension of a system, for knowledge is constantly emerging and spilling into other systems. For example when a group of teachers decide to collaborate to develop new instructional units, they form a system as they align their activities around a shared objective. They bring to their dialogue all the perspectives and experiences emanating from their own classrooms, another set of systems. A story shared about a child struggling with punctuation touches off someone else's story, causing the first story teller to view that child and her own actions differently. Someone recalls a news story about a class sending a teddy bear around the world, which causes a flurry of suggestions about learning activities using teddy bears. The principal wanders in and offers to supply a teddy to each class, suggesting that a day be set aside to play with it and study it in each class. In the subsequent classroom activities throughout the school on that teddy day, children experiment differently in science, language arts, math and music. Many go home to tell family members and even involve them in the new delights of teddies. The day becomes a tradition in the school, and when one of the teachers eventually moves into a career as a teacher educator, she tells others about it, and they carry it with them to use in other classrooms.

There is nothing particularly unique about this story, as any educator can attest. The point is that when objects, people and learning are viewed as co-emerging systems rather than as individual parts, the focus moves onto the relationships between the parts and the ways that knowledge circulates through them. Learning begins to appear inseparable from fully embodied nets of ongoing action, invention, social relations and history in complex systems.

Desire:
Negotiating Sub-System Dynamics

Embodied systems of behavior and knowledge also are influenced in part by dynamics of desire, love and hate, according to psychoanalytic theorists of learning. In education, theorists Todd (1997) and Britzman (1998) suggest that analysis of learning should focus less on reported meanings and motivations and more on what is occurring under the surface of daily encounters: things resisted and ignored, the nature of longings and lack, and the slippages among action, intention, perception of self and experience. While not easily aligned with the tenets of complexity theory, psychoanalytic learning theory shares its ontological propositions that relations and interconnections among items nested in systems are central acting phenomena in learning, that experience is not contained in the body, and that the individual mind does not perceive the totality of micro-interactions in which it participates. One particular contribution of psychoanalytic learning theory is highlighting desire for and resistance to different objects (Todd, 1997), which can be argued to occur in both micro-interactions and larger movements of co-emergence. Desire may be manifested in longings to possess or be possessed by another, creating urges to act towards such longings. The complex influence of these urges on consequent actions arguably affects the directions in which systems involving humans co-emerge.

For Britzman (1998), desire and learning are conflated in daily, disturbing experiential encounters carried on at psychic levels that individuals manage to ignore using various cognitive strategies. But while these levels can't be known directly, their interactions interfere with intentions and conscious perception of direct experience. These workings constantly 'bother' the (individual and collective) mind, producing breaches between acts and wishes. Despite varied and creative defenses against confronting these breaches, the conscious mind is forced to notice random paradoxes and contradictions of experience, and uncanny slips into sudden awareness of difficult truths about itself. These truths are what Britzman (1998) calls 'lost subjects,' those parts of self and its communities that people resist, then try to reclaim and want to explore, but are afraid to. Full knowledge of these lost and perhaps disturbing subjects jeopardizes the conscious sense of identity as self-determined, sensible and knowledgeable. But in learning processes, claims Britzman (1998), individuals and groups notice the breaches between acts, dreams, and responsibility. Learning is coming to tolerate conflicting desires, while

recovering the subjects that are repressed from the terror of full self-knowledge. As Bion (1994) observes, the implicit difficulty in learning from experience—forcing people to tolerate frustration and uncertainty, to reconsider meanings of past experiences and change their relationship to their past knowledge—is the unconscious 'hatred of development' it produces.

Experiential learning is thus posed as the opposite of acquiring transparent experience—it is entering and *working through* the profound conflicts of all the desiring events burbling within experience that comprise what Britzman calls "difficult knowledge." Britzman's (Anna) Freudian influence ultimately produces a somewhat deterministic conception of humans bifurcated as conscious/unconscious beings, helplessly controlled by simple drives. Nonetheless, the important effects of desire in human systems are undeniable. Psychoanalytic theory offers useful analytic tools that highlight, in human participation in systems of experience, the learning dynamics of working through psychic conflicts at the fulcrum of desire.

Struggle: Disequilibrium and Change Emerging in Complex Systems

In critical circles, experience is often understood to be shaped by received meanings that reproduce existing oppressions and inequalities. From this perspective education is necessary to free individuals from the norms of practice that may occlude new possibilities available to them. Certainly many systems, unless interrupted, continue to produce toxic or exploitive conditions that benefit a few members at the expense of many. However, as Usher et al. (1997) argue, the emancipatory position taken up by some to counter these norms and conditions is

> patronizing in so far as selves have to be seen as normally in a state of false consciousness. In stressing the negative and overwhelming effects of social relations and social structures, persons are made into social 'victims,' dupes and puppets, manipulated by ideology and deprived of agency. (p. 99)

Furthermore, emancipatory learning models that depend upon critical rational detachment from one's sociocultural webs of experience appear to overlook the fact that detachment is never possible even if it were desirable: rational critique of individuals' culturally-located beliefs is itself inescapably embedded in their historical nets of discourse and action.

An alternate perspective notes that complex adaptive systems generate the seeds of their own transformation. According to complexity theory, learning is the continuous improvisation of alternate actions and responses to new possibilities and changing circumstances that emerge, undertaken by the system's parts. More sudden transformation can occur in response to a major shock to the system, throwing it into disequilibrium. A shock might originate in abrasions with external systems, or through amplification (through feedback loops) of disturbances occurring within a system. Computer-generated images of systems undergoing disequi-

librium show that they exhibit a phase of swinging between extremes, before self-organizing gradually into a new pattern or identity that can continue co-habiting with and adapting to the other systems in their environments. Examples of social disequilibrium abound in grassroots movements affecting education, ranging from parental campaigns for smaller classes to teacher strikes, from students' anti-globalization movements to gay-straight alliances. In such movements, the diverse patterns of growth and activity defy explanation limited to notions of educating consciousness. Multiple interactions at different systemic levels, leading out from disturbance, are influenced by system shocks, desire, diversity among system parts, and mediators such as internet communication. In these interactions it is clear that people are not necessarily docile dupes of their systems, but struggle against forces that threaten their freedom.

Social action demonstrates processes of collective experiential learning that emerge through struggle. Foley (1999), speaking from the tradition of historical materialism, presents case studies that refute notions that conscientization is rational deliberation reframing 'distorted understandings' and 'false ideology.' Radical transformation in both social order and consciousness, as praxis or dialectic of thought and action, are embedded in complex systems that interact, adapt and influence one another: the body politic, diverse collective bodies, and persons as body biologic. As people enact solidarity, strategizing and learning together about unjust social arrangements in a choreography of action, they recognize new problems and possibilities for action. Each action opens alternate micro-worlds, while expanding people's confidence and recognition of the group's capacity to influence other systems. This experiential learning is continually inventive, and also filled with conflict and contradiction.

Then, how is the educator implicated in these processes? Radical action emerges in social movements in ways that it cannot in educational institutions, themselves contested spaces of transformative and reproductive impulses, to create spaces for inventive transgressive knowledge and alternate visions for society. Taylor, Barr, and Steele (2002) argue that an important catalyst for radical impulse within education institutions lies in its alliance with social movements: just as institutions need the political energy and grounded struggle that social action engenders, social movements need the resources of formal education. Their argument can be read not just as plea for bilateral collaboration, but also perhaps as a complexified awareness that struggle and social change is possible when educators view themselves as diverse parts of the system, not its rescuer, and when mutual interaction and adaptation is enabled with other system parts.

Enabling Practice-based Learning

These theoretical dimensions of co-emergence, desire and struggle encourage a view beyond an individual learning subject separated from the objects of her

environment, to understand knowledge as constantly enacted as she moves through the world. In some ways this discussion is reminiscent of a formulation by Bentz (2000) of mindful inquiry, drawing upon critical social science (analysing the history and larger structures of experience), phenomenology (clarifying the meaning and centres of lived experiences), hermeneutics (interpreting texts and one's interaction with them), and Buddhism (reflexivity, with awareness of one's desires and position). A co-emergent perspective, however, understands one's reflective capacity as only a small slice of the systems in which one is participating and in which one's body and practices are learning in interconnection with other actors and objects. The focus is on the *relations*, not the components, of systems, and on learning as produced within the evolving relationships among particularities that are dynamic and unpredictable. They help explain how part and whole co-specify one another, and how participation in any shared action contributes to the very conditions that shape these identities. These dimensions also suggest useful starting points for enabling the practice-based learning of educators. The question of how to do this might be framed in two questions: *How can change be induced in complex systems? How can we listen to hear the change?*

To the first question, complexity research has identified several conditions that must exist for co-emergent adaptive systems to flourish, which can be applied to induce co-emergence and thus, learning, in systems like educational institutions. These conditions include internal diversity, redundancy among agents (sufficient commonality to ensure communication), interaction, decentralized control, liberating constraints, and structured feedback (Davis, 2003). One important way that practice-based learning emerges is through occasions that encourage interaction and that have liberating constraints, or some focus and simple governing rules that do not strangle emergent possibilities. Not all events naturally offer occasions for co-emergence. Diversity among members of a school, for example, may be a given but may not be recognized, and diverse individuals may have too little in common to interact. Facilitators or supervisors can help amplify diversity, develop sufficient redundancy for diverse individuals to understand one another, and introduce guidelines and limitations for activity that promote organization while encouraging diverse expression and improvisation. Also important is feedback within a system: feedback that amplifies activities which expands a group's possibilities in healthy directions, and feedback that challenges negative loops which threaten to kill a system. The objective is open-ended design but not control: making spaces, removing barriers, introducing and amplifying disturbances. This conception resembles the now-popular notions of 'professional learning communities,' although a reasonable discussion of these would require critical analysis of their multiple versions and prescriptions, which is not the purpose here.

To the second question, the importance of *listening* derives from complexity research about what supports full and flexible participation in complex systems, but also feminist/psychoanalytic research about working through difficult knowledge,

and social action research about learning through struggle. To listen in these contexts is to be completely attuned: attuned to larger systemic movements, to psychic conflicts, and to personal entanglements in the fluctuations and perturbations in which the educator is embedded. Too often, educators might be suspected of approaching others with an anthropologist's gaze—with external 'expert' knowledge attempting to penetrate and represent the internal knowledge of a community to which they do not belong. A wiser approach might be learning to listen to the poetics of experience. Clandinin (2000) writes of listening "with a stance of trying to live within the other's world" (p. 65). Her stories of learning are of teachers listening closely to one another's stories, concentrating on what is said as well as what is unsaid, to feelings, gaps, and silences, believing rather than doubting. This is listening without constructing the other in ways the listener desires, but instead, opening to what the other may be on its own terms, and *how it may construct the listener*.

As witnesses, practitioners also listen to interpret interdependencies. Within organizations, story-making is one way that practitioners listen and interpret a system's relationships and activities, and mirror it back to itself. The interpreter helps trace the complex interactions of actors and objects in expanding spaces. Some educators listen to encourage others to interpret their oppressive experiences through dialogue, creating the redundancy or shared understanding that can ensure interaction and mobilization, while promoting the diversity that enables a group to improvise actions through which can emerge alternate futures. In writing about complexity science in education, Karpiak (2000) describes this as 'attuning.' She suggests that educators can help most by attuning students to the patterns and conflicts emerging among the complex systems of their lives, and to their involvements in these patterns. Most of all, educators might listen to their own entanglements in learning systems. The language brought to groups, the gaze used, and the interactions promoted all become incorporated into the system's changing texture. These countless consequences of educators' actions within a complex system cannot be predicted or even observed, but at least awareness of one's footprints can be attempted to avoid stepping destructively.

Listening in psychoanalytic learning theory suggests that educators examine themselves as nested within larger systems of cultural desire, on levels inaccessible to everyday conscious awareness, asking: What desires configure our practice and our own experiential learning? What lines do we seek to draw around the world to feel secure and meaningful in our contribution? Britzman (1998) maintains that educators ought to listen to what they *actively ignore* in their own experiences. Rational mind cannot be relied upon to explore these, only attunement to subtle disturbances: listening to what bodies do or resist, or to uncanny slips in consciousness, or to emotional insights that lead into difficult knowledge that may be personally resisted.

The re-embodiment called for here is an expansion: from a mentalist world privileging reflection and representation, to materially and cognitively co-emer-

gent worlds; from the purely intersubjective to what Davis (2003) portrays as a beckoning frontier of interobjectivity. Amidst their continual (com)motion, boundaries creating bodies, objects, identities and knowledge are highly suspect. Here is where our theorizing of practice-based or experiential learning should continue, examining what appears to materialize and when and for whom, what compels interaction (human and non-human) and its consequences, what ideas are performed, and what is ignored.

The shift to embodied, co-emergent configurations of experiential learning such as those suggested by complex systems, desire and collective struggle does not erase pedagogy or dissolve political commitments, nor does it denounce rationality. Educators are, partly at least, rational systems, inescapably nested within systems of the body politic, employing creative rationality as part of their capacity to act within these systems. As active flexible agents educators can resist the over-rationalizing of learning, and participate as consciously as possible in a fully embodied and collective pedagogy of practice-based learning: as Sumara and Davis (1997) suggest, "enlarging the space of the possible" (p. 310).

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About the Author

Tara Fenwick is an Associate Professor in the Department of Educational Policy Studies, University of Alberta, Canada. Her research and teaching focuses on learning and education in work, with particular interest in learning processes, identities, equity and knowledge politics in changing work structures.