Chapter 11
An Epistemology of the Hand: Putting Pragmatism to Work

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People have always learned at work, but the specific character of workplace learning has changed remarkably in relation to changing societal and organizational structures.[1] From the workshops of medieval times, through the bureaucratic organizations of industrial society, and towards the flexible post-bureaucratic organizations of the knowledge society, notions of learning, work, and subjectivity have been transformed (see Elmholdt and Brinkmann (2006), for an unfolded version of the story that is summarized here). The craftsmen of medieval Western societies banded together in guilds, valued tradition-bound professional knowledge, and insisted on apprenticeship as an educational form in order to hand down expertise from one generation to the next. Guilds and apprenticeship enhanced social recognition, security, and stability. With the industrial revolution of the eighteenth century, the manufacturing of goods moved from craft production towards industrial production in huge factories organized by hierarchical division of labor. The goal of the industrial worker was to learn as little as necessary in order to fulfill simple tasks efficiently at the assembly line. Scientific management introduced time and motion studies to optimize the performance of tasks and simplify the jobs to such an extent that workers could be trained to perform a specialized sequence of motions in a single optimal way. In today's knowledge economy, industrial work is gradually being displaced by knowledge work that requires attentiveness and an ability to reflectively analyze problems and make decisions. Now, a characteristic of the new innovative economy is a market-driven demand for flexibility and change that has put reflection and lifelong learning high on the agenda.

[1] This chapter reworks an article of ours that appeared in 2010 in the journal *Studies in Philosophy and Education*, *29*(3), 243–257, entitled "Toward an epistemology of the hand." Materials from the article are reprinted here with permission from Springer.

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P. Gibbs (ed.), *Learning, Work and Practice: New Understandings*,
DOI 10.1007/978-94-007-4759-3_11, © Springer Science+Business Media Dordrecht 2013

In this chapter, we argue that too much of our thinking and acting, even in today's knowledge society, is dominated by what we will refer to as an "epistemology of the eye." This has not just influenced our theories of knowledge, truth, learning, and the mind, but, perhaps more significantly, it has had enormous practical implications, not least in educational contexts. We shall present an approach to pragmatism, in particular that of John Dewey, which sees it as aiming to replace the epistemology of the eye with an epistemology of the hand that is very useful in contemporary society and work life. The argument will work on three levels: First, we will introduce Dewey's epistemology of the embodied knower and use recent work by Mark Johnson to map the main metaphors that are at work in our current approaches to learning and understanding. Next, we argue that epistemology, according to Dewey, is itself historical and related to social practices and their values, and we briefly refer to Richard Sennett's new book on craftsmanship to outline the existential and moral values that an epistemology of the hand may promote. Finally, we turn to the social practices of education and ask – with the aid of Gert Biesta – how such practices would look, had they been built on an epistemology of the hand. They would not be arenas where knowledge is presented or represented (both of which draw on an epistemology of the eye) to learners, but such arenas would need to become communities of creation – or creative communities.

What Is Pragmatism?

In his Pulitzer Prize winning history of American pragmatism, Louis Menand characterizes pragmatism as a single idea that was shared among Charles Sanders Peirce, William James, John Dewey, and also the (philosophically less known) supreme judge Oliver Wendell Holmes, namely, an idea about ideas: "ideas are not 'out there' waiting to be discovered, but are tools – like forks and knives and microchips – that people devise to cope with the world in which they find themselves" (Menand 2002, p. xi). In many ways, this pragmatist idea about ideas was, and is, a revolutionary proposal that turns Western thought on its head. Ideas are not representations or copies of how the world is but are tools, with which we transform, engage with, and cope with the world.

All the major pragmatist points follow from this: Truth, for example, can no longer be seen as correspondence with reality but becomes something that "*happens* to an idea," as James put it (James 1907, p. 92), "something essentially bound up with the way in which one moment in our experience may lead us towards other moments which it will be worthwhile to have been led to" (ibid., pp. 93–94). And morality, consequently, can no longer be deduced from unchanging ethical values but becomes related to our capacity for changing and adjusting our habits in ways that are conducive to human growth, communication, and flourishing (LaFollette 2000). Also, Dewey's famous educational theory springs from the idea about ideas. Education is not – or ought not to be – simple transmission of stable ideas across generations but should be a way of reconstructing social relationships

in ways that enable human beings to respond to the changing world in which they find themselves. In other words, education is not confined to scholastic contexts but takes place everywhere that social practices are reconstructed, and it can be considered as society's way of making sure that fruitful new ideas will be devised in the future, something that is achieved only through communication.

All this is antithetical to the major strands of Western philosophy. Since the Greeks, the notion that ideas are "out there" has been fundamental. For Plato, ideas are "out there" as the basic, unchanging constituents of being (the Platonic "Forms") that we humans may come to recognize since we are endowed with immortal souls that stem from the same realm of ideas. The process of learning is here seen as a "turning of the souls" away from mere phenomena so that humans may come face to face with the eternal ideas. Plato's guiding imagery thus draws on light and visual metaphors of knowledge. Ultimately, as illustrated in the famous allegory of the cave, the sun is likened to the overarching idea of the good as that which brings light to all other ideas so that they may be seen. Knowing is seeing. Learning happens through visual confrontation with something. And the mind – the soul – is that which sees, a "mirror of nature" in Richard Rorty's illuminating (notice again the light metaphor!) words (Rorty 1980).

Although Aristotle transformed much of Plato's philosophy into a more viable, scientific approach, the visual metaphors lived on, for example, in his "hylomorphic account of knowing" (Rorty 1980, p. 35), according to which reality impinges on our senses, just as wax can receive an impression of a signet ring. With the subsequent ideational and representational epistemologies of Descartes and the British empiricists (John Locke, George Berkeley, and David Hume), ideas are finally transformed from outer cosmic constituents and become inner mental entities that humans build up "in their minds" in order to know the world. Needless to say, modern cognitive science has continued the project of charting how ideas (mental representations) copy the world.

Dewey Against the Epistemology of the Eye

Throughout his numerous books and articles, Dewey diagnosed the problems inherent in the epistemology of the eye, even if he did not use this exact designation. Instead, he would talk about "the spectator theory of knowledge." For Dewey, philosophical problems and positions – such as the spectator theory of knowledge – do not suddenly fall from the sky but are ideas that grow out of the lives of historical communities (Dewey 1920, p. v). Thus, he traces the dualisms of knowledge and action, ends and means, the ideal and the real, and theory and practice to the birth of science and philosophy in the Greek community in which there was a sharp division of labor between slaves and women on one side, who took care of practical work, and free men on the other side, who could spend their time with philosophy and pure theoretical thinking (ibid., p. x). According to Dewey, it was the social separation of the working class and the leisure class that "became a

metaphysical division into things which are mere means and things which are ends" (Dewey 1925, p. 124). This social, cultural, and economic division has since influenced our philosophical ideas and has in particular given rise to "the spectator theory of knowledge" (Dewey 1929, p. 23): the theory that says true knowledge arises through passive observation of reality, which allegedly is as it is in independence of being observed.

Dewey was keen to demonstrate not only how this epistemological idea is wrong as a philosophical thesis but also how it has led to problematic social consequences in its separation of those who know (e.g., those educated in theoretical forms of thinking) and those who do not know but may work if they are instructed appropriately by those who do know (e.g., those with practical forms of education). This separation should be replaced, Dewey argued, with one that insists on the fact that people know *different things* and that everything we know – if it is to deserve the term knowledge – must have some connection with practical action. We should only count something as knowledge if it enables us to make a fruitful difference to human experience. This goes for even the most abstract forms of theory. What we call theory, thinking, and reflection are forms of human activity that are necessitated when our habits are disturbed and eventually break down. We are then forced to step back from our immediate engagement in the world and develop ideas, thoughts, and theories that must be tested in practice to see if they can solve the problem for us. This stepping back does not give us knowledge in itself but is merely an instrumental moment in the process of inquiry, which ultimately results in giving us a better grasp of the world in a way that involves moving closer to things, rather than away from them (more about this below). Theories are thus valid to the extent that they succeed in solving problems, and it should therefore be borne in mind that the "so-called separation of theory and practice means in fact the separation of two kinds of practice" (Dewey 1922, p. 69). The Greek word for theory – *theoria* – shares a root with *theatron* or theater, which literally means "a place for seeing" (Sennett 2008, p. 124). Seeing in this sense is a theoretical affair that must ultimately prove its worth in practice, as a kind of *doing*. There is such a thing as seeing incorrectly, and the proof of whether one "sees" correctly or not is found in the practical actions that ensue. Or, to put it in other words, the epistemology of seeing with the eyes describes only a small moment in the process of inquiry, namely, that which involves the tentative formulation of ideas, but these must be put to use in practice, with the hands so to speak, if they are to qualify as knowledge.

From very early on in Dewey's career did he try to overcome the view of the knower as a passive spectator that we have inherited from the Greeks. Already in his seminal reflex-arc article from 1896 was the intent to demonstrate that stimuli do not passively impinge on the human senses but instead arise when active knowers are engaged in various activities (Brinkmann 2008). This is clear in the following quote, where Dewey discusses the stimulus of a noise:

> If one is reading a book, if one is hunting, if one is watching in a dark place on a lonely night, if one is performing a chemical experiment, in each case, the noise has a very different psychical value; it is a different experience. (Dewey 1896, p. 361)

This simple example should alert us to the idea that stimuli are constituted only on the background of activities and practices (see also Brinkmann 2004). Experiences are not simply passive happenings but aspects of human beings' doings and engagements with the world and each other. Contrary to the epistemology of the eye from Descartes and the empiricists, it means that there are no experiential elements that are simply *given* in the mind of a spectator. Dewey wants to replace the image of something being *given* to the eye with the image of something being *taken*:

> The history of the theory of knowledge or epistemology would have been very different if instead of the word "data" or "givens", it had happened to start with calling the qualities in question "takens" […] *as* data they are *selected* from this total original subject-matter which gives the impetus to knowing; they are discriminated for a purpose: - that, namely, of affording signs or evidence to define and locate a problem, and thus give a clew to its resolution. (Dewey 1929, p. 178)

We see with the eyes, but we *take* with the hands. Experiencing the world and knowing it are functions of our practical activities and of our *handling* the world and its problematic situations. What we experience and know about the world are primarily aspects of things that we interact with and manipulate (literally "operate with our hands"). Things are not first and foremost entities independent of organisms that have objective physical characteristics that can be *seen*. Rather, "things are objects to be treated, used, acted upon and with, enjoyed and endured, even more than things to be known. They are things *had* before they are things cognized" (Dewey 1925, p. 21). According to Dewey, we normally encounter and know things in those contexts of use where they belong, and it is only through active manipulation that we discover their properties: Things "*are* what they can do and what can be done with them, – things that can be found by deliberate trying" (Dewey 1920, p. 115).

We can here briefly turn to a contemporary illustrative example. The Danish-Icelandic artist Olafur Eliasson, known among many other things for his temporary physical transformation of New York City through the work The New York City Waterfalls, recently expressed how ideas are not given to him but actively taken and then embodied. In an interview with the Danish magazine *Weekendavisen* (no. 14, March 2009), Eliasson talked about the need to manipulate ideas before knowing the value of them. The journalist asked the question "How do you get your ideas?":

> It is not like ideas are created in a vacuum after finishing one piece of work until a new idea arises. Ideas come up as a continuation of the works - as the result of a dialogue. Surely, I do not mean that creativity comes from within, and rather than having an idea, you embody ideas and, in this way, you are testing if they are okay.

If we are to follow Eliasson's phenomenological description, ideas are not seen as coming from within or resulting from a clear vision. Rather, they are embodied as part of our practical work in the world.

Definitely, for Dewey, our knowledge of the world is a practical affair and is something grounded in our habitual conduct. We "*know how*," Dewey says, "by means of our habits" (Dewey 1922, p. 177), and the knowledge involved "lives in the muscles, not in consciousness" (ibid.). When we develop habits of handling the

world, we thereby develop an understanding of the world, which, therefore, cannot be ascribed to a disembodied "mind":

> The reason a baby can know little and an experienced adult know much when confronting the same things is not because the latter has a "mind" which the former has not, but because one has already formed habits which the other has still to acquire. (Dewey 1922, p. 182)

The world appears to human beings in contexts of activity or social practice, when they have acquired habits of movement, interaction, and communication. According to Dewey, everything in human culture – including science, philosophy, law, religion, politics, art, and history – are social practices that need to be contextualized in order to be understood (Kivinen and Piiroinen 2006, p. 305). It is within such practices that ideas and concepts have been developed as tools through attempts to cope with the problems humans have confronted in the course of history. Thus, science should not be thought of as revealing the true essence of a world "out there" that we may *see* but rather as something practical, like a complex extension of our hands that make possible a fruitful *manipulation* of things and events. There is no split between the mind and the world – or between scientific theories and the world in itself – for, as Menand has put it, it "makes as little sense to talk about a 'split' that needs to be overcome between the mind and the world as it does to talk about a 'split' between the hand and the environment" (Menand 2002, p. 361). The epistemology of the hand avoids the problems otherwise inherent in representationalist epistemologies of the eye, and the debates about realism and idealism (do our representations correspond to the real or not?) turn out to be largely irrelevant, for the hands cannot represent (or misrepresent) the world. They can only handle or mishandle it. And "mishandle" should here be taken in an unabashedly moral sense, which implies that narrow epistemic criteria concerning truth should be supplemented with moral criteria concerning improvement of human affairs in a broader sense. Dewey claimed that all sciences from physics to history "are a part of disciplined moral knowledge so far as they enable us to understand the conditions and agencies through which man lives" (Dewey 1922, p. 296). Moral science, therefore, "is not something with a separate province," as he put it (ibid.). In Dewey's pragmatic framework, all sciences and all kinds of reason and rationality are species of practical reasoning; the pattern of practical reasoning is the pattern of all inquiry (Garrison 1999, p. 291).

Metaphors of the Eye and the Hand

After having introduced the general Deweyan critique of the epistemology of the eye, we can begin to unfold in greater detail the alternative in the form of the epistemology of the hand. We will begin by engaging with the pragmatist Mark Johnson's (2007) recent exploration of the bodily basis of meaning in *The Meaning of the Body: Aesthetics of Human Understanding*, in which he continues to develop the theory of metaphors that he and George Lakoff have worked on for years (Lakoff and Johnson 1980, 1999).

The body takes center stage in Johnson's Deweyan account of meaning. According to Johnson, we need to approach the body as an experiencing, phenomenological subject and not just as a biological organism or physical object, which, of course, are wholly legitimate approaches to the body in the medical sciences. But, as also Maurice Merleau-Ponty stressed, when we view the body in terms of traditional scientific methods, it becomes an object and cannot find a place in our system of experience (Merleau-Ponty 1945, p. 63). The phenomenological body in contrast is "the living, moving, feeling, pulsing body of our being-in-the-world" (Johnson 2007, p. 276). It is the body as experienced, as ground for experience of the world, prior to the scientific theories we formulate about it (e.g., about the body as physiological object). Merleau-Ponty analyzed motility as our basic form of intentionality, and, like Dewey, but against the epistemology of the eye, he understood consciousness not as an "I think" but as an "I *can*." We *can* before we *think* about what we can. It is an *operative intentionality* that grounds our everyday understanding and "produces the natural and antepredicative unity of the world and of our life, being apparent in our desires, our evaluations and in the landscape we see, more clearly than in objective knowledge" (Merleau-Ponty 1945, p. xx)

Basically, the body does not move because a disembodied mind has ordered it to do so. We do not perceive something as a passive process, and then, as a subsequent process, set our bodies in motion. Rather, our perceivings are functions of embodied movements and actions. But although this phenomenological insight – that there is a basic form of bodily intentionality, which was also expressed in Dewey's reflex-arc article – may be acceptable to some, it is rather more difficult to accept the stronger point made by Johnson that *all* of our mental operations are conceivable in terms of the moving and experiencing phenomenological body. What about our capacities for abstract and reflective thought?

Johnson argues that even mathematics, logic, and reason more broadly are embodied (Johnson 2007, p. 102). This argument is developed through his theory of metaphors. Metaphors enable human beings to go from meanings that are embodied in a very concrete sense (e.g., "pain is bad") to abstract thought (e.g. "a free press is a democratic necessity"). Johnson's pragmatic-phenomenological theory implies the radical thesis that *all* theories and abstract concepts are metaphorically defined – and therefore ultimately grounded in embodied experience. What does this mean? A metaphorical understanding is one where we understand one phenomenon in terms of another in such a way that there is no literal connection between the two. "The mind is a computer" is such a metaphor, all too familiar in the cognitive sciences. We can say "she took the first step toward medical school" without therefore implying that she moved in physical space. Traveling through physical space is here the metaphorical source domain that structures our understanding of beginning a purposeful activity.

But let us look more closely at the central concept of understanding itself. Understanding is what we want to convey to learners through educational practices. We want people to understand mathematics, democracy, history, literature, and numerous other things that we value in our culture. And the epistemology of the eye is centrally important in our understanding of understanding, as this concept is structured by a basic visual metaphor: Understanding is seeing. Although

understanding is not literally bound up with seeing, we say such things as "can you see what I mean?" (meaning "do you understand me?") and "do you see the logic of the proof?" According to Johnson, it is an immediate, concrete, and embodied activity (seeing) that structures this abstract notion of what it means to understand something. He makes the following formal analysis of source domain (vision) and metaphorical target domain (understanding) (adapted from Johnson 2007, p. 165):

Source Domain (Vision) → Target Domain (Understanding)

Object seen → idea/concept
Seeing an object clearly → understanding an idea
Person who sees → person who understands
Light → "light" of reason
Visual focusing → mental attention
Visual acuity → mental acuity
Physical viewpoint → mental perspective

This analysis may appear commonplace at first sight, but if we look at the implications of this metaphor for philosophy, pedagogy, and science in the Western world, it is clearly quite significant (beware that this preceding sentence itself drew on the visual metaphor three times – "at first sight," "if we look at," and "clearly quite significant" – which testifies to the pervasiveness of this metaphor in our understanding of understanding!). In fact, we may here have one of the most fundamental metaphysical assumptions behind the scholastic educational system that plays a key role in the ways that modern societies reproduce themselves. Children have for centuries been expected to sit down and receive knowledge. People are often removed from their everyday work surroundings to take a course that is meant to improve how they work. Johnson's point is that such educational practices, grounded in what we call an epistemology of the eye, derive their obviousness from our immediate embodied visual experiences, where we know what it is to strive for a clearer view of something.

However, Johnson is not content simply to make this point. Although the visual metaphor is dominant, it is not the only one that is important in our culture. A competing metaphor lies behind the epistemology of the hand: Understanding is grasping. We do sometimes say things such as "do you grasp what I mean?" Schematically put, an analysis of this alternative metaphor looks as follows (adapted from Johnson 2007, p. 166):

Source Domain (Grasping) → Target Domain (Understanding)

Object grasped → idea/concept understood
Grasping an object → understanding an idea
Strength of grip → depth of understanding

Losing one's grip → failing to understand
Object out of reach → idea that cannot be understood

Other bodily image schemas are activated, Johnson says, when we use the metaphor of grasping than when we use the metaphor of seeing. Our whole attitude to processes of understanding is different with an outset in this metaphor, and it is obvious that Dewey's "learning by doing," that is, learning by manipulating the material to be appropriated and building up the appropriate habits, becomes a central approach to learning, when we think of it from the metaphor of grasping. Since we grasp with our hands, this metaphor tells us, we genuinely learn only by experiencing life *at first hand*.

Two very different kinds of bodily experiences, thus, support the respective epistemologies of the eye and the hand. That is why both epistemologies have been able to survive through the centuries, and, in our view, the task for epistemologists of the hand should not be to demonstrate that the visual metaphors behind the epistemology of the eye are *false*. Instead, for pragmatists, the interesting question becomes what kinds of action and experiences are made possible if we base our practices on one idea rather than another. What form of life will we develop if we structure our practices, institutions, and work organizations around the belief that understanding is like grasping something? Will this form be more conducive to human flourishing, equality, and problem-solving than simply staying with the epistemology of the eye?

These questions of practice and value lead us to the next section on existential dimensions of the epistemology of the hand. However, from the pragmatist viewpoint, it may still be possible to argue that those approaches to knowing and understanding that conceive of the knower as an *active* being are more helpful than those that portray the knower as passive spectator. For example, humans do not simply *see*. Rather, we *look*, as an active, explorative activity, and this is often missed by those who rely solely on visual metaphors. "We must," says Jim Garrison, "overcome the 'spectator' stance and realize the only access we have to reality is through our practical, *active* participation in it" (Garrison 2001, p. 289). Although a pragmatist will not say that the epistemology of the eye is *untrue* from some God's eye perspective (itself a visual metaphor, of course), she or he will, like Garrison, insist that it does not respect the basic anthropological idea that humans are principally actors (and only secondarily spectators), which is an idea that in other respects is foundational for modern democracies. Two points must be made in this context. First, we do obviously not wish to deny that people may learn from observing or from listening to a teacher speak in a classroom or at a course (indeed, this can be an important way to learn), but the Deweyan epistemology of the hand teaches us that also such learning has an active element. Again, we very rarely, if ever, simply *see or hear* something as in a flash without preceding or following happenings, but we *look and listen* as part of our ongoing activity, especially when we feel a need to take in information in order to redirect our habits. Second, it should be borne in mind that the metaphor of the epistemology of the hand is exactly that (a metaphor), and, as a metaphor, it is in a sense really a metaphor for the whole active body

as that with which we manipulate things and operate in the world. It is important to remember this so as not to trivialize the Deweyan approach into something like a celebration of "doing" at the expense of "thinking." The point is rather that thinking is itself an activity in the ongoing process of taking care of problems encountered in everyday life.

Existential Dimensions of the Epistemology of the Hand

In his recent book on *The Craftsman*, Richard Sennett places his own work squarely within the pragmatist camp. His book contains systematic historical and phenomenological descriptions of the exercise of craft knowledge, for example, in a chapter simply entitled "The Hand." In Germanic languages, a craft is a *Handwerk* (in German) or *håndværk* (in Danish), literally "the work of the hand." But Sennett's book is also a thorough defense of the existential and ethical values of craftsmanship, of craftsmanship as a form of life. In our terms, he demonstrates that the epistemology of the hand is not a value neutral depiction of "how it is" with human knowing but rather a viewpoint that takes part in the moral conversation concerning what is good and proper for human beings. Epistemology as traditionally conceived is concerned with the so-called *cognitive* values (truth, validity, justification, etc.), but, as pragmatists such as Hilary Putnam have argued, cognitive values and ideals "only make sense considered as part of our idea of human flourishing" (Putnam 1995, p. 43). As Charles Taylor has shown in numerous works, but perhaps most clearly in *Sources of the Self*, the values promoted by the epistemology of the eye are quite consistently individualist with a focus on personal autonomy and rights and constantly run the risk of collapsing into subjectivism (Taylor 1989). This is hardly surprising given that knowers are here depicted as isolated atoms, whose only evaluative contact with the world is through subjective affect. Few writers, however, have developed an account of the values inherent in the alternative epistemology of the hand, but Sennett can be seen as having begun this vast task.

In previous works, Sennett articulated a particularly influential critique of contemporary consumer culture and its "flexible capitalism." He has analyzed how this culture leads to a "corrosion of character" in our workplaces (Sennett 1998) and how it forces us to consider ourselves as consumers rather than citizens (Sennett 2006). His work on craftsmanship can be seen as a rather more constructive attempt to point to existential resources and moral practices that are still with us, but that we have forgotten in our times with our incessant focus on flexibility and the short-lived. Craftsmanship, for Sennett, is not just a name for old production practices such as carpentry or masonry. It "names an enduring, basic human impulse, the desire to do a job well for its own sake" (Sennett 2008, p. 9). Doing something well for its own sake has been forgotten as a basic human value, Sennett claims, in our instrumental approach to life, where most things that we do are stepping-stones to further success in the future. People who aspire to be good craftsmen today, Sennett says, are therefore often "depressed, ignored, or misunderstood by social

institutions" (ibid., p. 145), perhaps because they do not square with the reigning subjectivist ethos of our times. For what it means to do something well, according to the craftsman's form of life, is not a subjective issue, that is, something that an isolated individual may decide for herself or himself. Rather, as Sennett says, "craftsmanship focuses on objective standards, on the thing in itself" (ibid., p. 9). There must thus be a superior who sets standards and trains newcomers in the arts and practices of the craft, that is, someone who inculcates the proper habits in apprentices (ibid., p. 54). Good skills, for a craftsman, are inseparable from ethics since work skills involve such virtues as perseverance, loyalty, and commitment to standards that transcend an individual's perspective. First and foremost, the craftsman represents the special human condition of being *engaged*, and Sennett advocates the kind of modern pragmatism that "could be said to take on faith Jefferson's belief that learning to work well is the foundation of citizenship" (ibid., p. 290).

If an isolated theoretician is the ideal human character inherent in the epistemology of the eye, the craftsman incarnates the practices and values of the epistemology of the hand. The values here are at once cognitive and ideally result in useful products, but also ethical, with the craftsman being committed to historical traditions and communities. For the early Greeks, as Sennett recounts, craft and community were indissociable (Sennett 2008, p. 22), and he applauds pragmatism for having reinvigorated the compound of ideas that depict the human being as a working and acting creature in communities. Learning to work well, however, is not something that one does in a day or a week. It requires years of practice and skill formation. But from a political point of view (particularly Sennett's avowed leftism), there is the great advantage of craftsmanship and working well that the capacity to do so is shared rather equally among humans (ibid., p. 285). In principle, anyone can acquire the skills of working well and doing something well for its own sake, but our educational systems are often more geared to fostering individual intelligence and creativity, and Sennett laments the modern managerial ideology that urges even the lowliest worker to work creatively and demonstrate originality (ibid., p. 73). Learning to work well, unfortunately, is antithetical to much that goes on in current educational practices:

> Modern education fears repetitive learning as mind-numbing. Afraid of boring children, avid to present ever-different stimulation, the enlightened teacher may avoid routine – but thus deprives children of the experience of studying their own ingrained practice and modulating it from within. (Sennett 2008, p. 38)

Today's ideal of teaching implies that it must be fun and entertaining. Learners are used to high speed and stimulation from television and computers, and some teachers may feel pressed to ensure the same amount of stimuli in class. Repetition and imitation are often viewed as anachronisms and as barriers to fostering creativity and learning. Paradoxically, recent research on how to foster creativity within a classroom underlines the importance of absorption in and staying with a particular domain (Tanggaard 2008). Contrary to widespread opinion, creativity does *not* seem to be antithetical to craftsmanship and hard, engaged work. And further, viewed from the epistemology of the hand, creativity is not confined to some particular elite

"creative class" or special sectors of the economy but is an inherent aspect of practical work. In a study that asked whether creativity can be taught, Lindström (2007) reports how students in the final year of comprehensive school, who attended Stockholms Bild och Formklasser (The Stockholm Visual Arts and Craft Classes), completely outdistanced students of the same age in ordinary classes. In the Stockholms Bild och Formklasser, children were given the opportunity to get deeply involved in and complete their various projects, and the art and craft teachers, whose classes are half the size of regular classes, "are in constant dialogue with the students about their work as it evolves" (from teacher interviews) (Lindström 2007, p. 62). Five hundred students participated in the study, and their student portfolios were assessed independently by both the student's own teacher and another teacher. On this background, Lindström proposes that creativity is fostered in schools when learners are given assignments that extend over a significant period of time and when teachers emphasize the process as well as the product and provide ample opportunity for research, experimentation, and revision. Also, learners should be encouraged to integrate production with perception and reflection by looking for models to emulate and finding links between those models and one's own work. Finally, feedback from peers and teachers is an important key. These dimensions are all important in crafts and in the epistemology of the hand.

We would argue that experimentation, training, and an adequate amount of feedback can be viewed as "a pedagogy of reiteration," as the basis of creative retransformations within an epistemology of the hand. No human being is able to be creative or original out of the blue, although this idea may serve as a captivating fantasy for the lazy person. The basis for creativity is not flexibility in a vacuum or simply "thinking out of the box" but is found in the ability to "dig deep" within a particular field, which requires considerable time and hard work. The implicit values of craftsmanship that point towards virtues such as working hard and staying with the same are not in opposition to creativity but conditions for its realization.

Education and the Epistemology of the Hand

In contemporary consumer society with its constant experiential bombardment, the eye becomes more impatient than ever. The hand, in contrast, must be patient if it is to acquire adequate habits and skills. Sennett's critique of the contemporary labor market and educational system, both of which eschew routines, leads us to ask how education will look if we base it on the epistemology of the hand rather than that of the eye. Obviously, in practical terms, it may look something like Dewey's laboratory school, where children used their hands to work together as small apprentices – building houses, growing crops, and making clothes – under the guidance of teachers and where they would consult books and received knowledge only when they ran into problems (Condliffe Lagemann 1989; Dewey 1900). Such pedagogy is the concrete result of taking very seriously the move away from the spectator theory of knowledge, but here we wish to dig a little deeper.

Recently, pragmatism as an approach to education has been taken up in quite a radical way by Biesta and colleagues (Biesta 2004, 2006; Osberg et al. 2008). One line of argument that these authors pursue follows the pragmatist insistence that educational processes should not prepare people to participate in a world that is finished and static. The epistemology of the eye has a tendency to favor theoretical knowledge of a reified world, in the extreme case of Platonic Forms, but the problem is – as we have known at least since Darwin – that the world is not finished and static. Instead, for pragmatists, the world is "unfinished, growing in all sorts of places, especially in the places where thinking beings are at work" (James 1907, p. 116). Thus, *the* educational goal for pragmatists will involve a formation of humans that enable them to participate in the creation of this unfinished world (Osberg et al. 2008). This is a world for which there is no manuscript prepared in advance but where we must adjust and reconstruct ideas and practices as we go along.

To return to the historical narrative that opened this chapter, we can say that premodern educational practices were structured as ways of *presenting* knowledge to newcomers (Osberg et al. 2008). In medieval times, for example, children would participate directly in the practices that were of societal value and which thus needed to be reproduced (farming, masonry, etc.). With modernity, nation states arose with mass educational systems, for nations needed educated people to participate in the administration and the army, and it was of course impossible to squeeze "the real world" in its entirety into the new scholastic system, which meant that it became an important task to decide which elements of the world that should be *represented* in schools. To simplify a very long and complex historical development, the premodern notion of direct *presentation* gave way to a modern notion of knowledge as *representation*. This has been supported by the epistemology of the eye according to which schools are supposed to show learners what the real world looks like outside schools. Consequently, at examinations, learners are evaluated in terms of how well they in turn represent the world as it is in itself.

Against this, the pragmatists claim that neither presentation nor representation is a useful model for teaching and learning, in schools as well as in workplaces where much contemporary education and learning takes place. The reason is, as we have argued, that knowledge is not a representation of the world but rather a tool for manipulating and coping with the world. In this sense, we can say that the pragmatists offer us a postmodern account of knowledge as *manufactured* (literally "made by the hand"). Knowledge is not about being presented with something or being able to represent something but is about being able to create. Accordingly, teaching should not simply reproduce the world as it is, for the world "is" not in any fixed form. Instead, education should cultivate skills of creation and moral responsibility for what we create. The implications are quite radical: For the pragmatist, the central educational goal is creativity, but creativity is always connected to actions within social groups and communities (Joas 1996).

In our view, learning to create particular things is not so much a matter of having an extensive portfolio of abilities without reference to communities of practice. Surely, what is acknowledged as creative, valuable, and thoughtful depends upon the values within particular communities. If we are right in assuming that learning

and education are not primarily about the reproduction of fixed worlds, but about the continual manufacturing and recreation of new worlds in which people may flourish and continue to live better lives, we recommend a rehabilitation of pedagogies of craft such as Dewey's and also Lev Vygotsky's. We should also continue to study the organization of learning and education within an epistemology of the hand, and studies of workplace learning would be ideal places to start such inquiries (see e.g., Elkjær 2008). Both Dewey and Vygotsky emphasized learning through practical activity and experimentation, and in particular Vygotsky (1962) underlined the importance of the social organization of learning, facilitated by guidance from more competent others. Both authors can be seen as educators working within the epistemology of the hand in which knowing and learning are aspects of the development of social groups and persons working and participating within communities. Obviously, there are also differences between Dewey and Vygotsky, notably concerning the latter's distinction between everyday and scientific concepts, which is a distinction that sits uneasily with Dewey's insistence on the continuities of everyday and scientific modes of inquiry. But they are definitely united in the emphasis they put on practical activity and on the social and cultural dimensions of learning and human development.

Consequently, historical experience and the past is the horizon for the acquisition of new experiences and the continual recreation of new kinds of products and knowledge. In this respect, it becomes meaningful to view learning through a metaphor of apprenticeship and to view acquired experience, knowledge, and authority as a ground upon which the formation of personal experience and meaning is realized. In this case, the road to freedom and creative independence is built out of social regulation and the cultivation of relations between hands, bodies, and the world. However, the Western Cartesian splits between the hand and the head, and between the self and the world, have made it difficult to think of learning as a continual movement *into* the world. When it comes to the question of learning, the dominant picture has been one of learning being a subjective and mentalist movement *away* from the world, visualized in the image of the philosopher isolating himself in a tower room to speculate about the world (Lave 1988). According to this image, we should move away from something in order to get a clear *view* of it, a *perspective* on it. Against this, we wish to point to the fact that if we use the hands to get better acquainted with the world, to get a better grip, learning involves moving *closer* to things, moving *into* the world. The metaphor of learning as a question of movement away from the world makes it difficult to recognize that even the production of valued thinking is also a matter of craftsmanship.

One ambition of the epistemology of the hand presented in this chapter is to deconstruct all distinctions between the free and meditative (and creative) thinker of the mind and the mindless worker of the hand. To do so, one can draw on recent studies showing us that not only traditional crafts such as carpentry or hairdressing are learned by hand in communities that reassemble the organization of a traditional craft workshop. In an interview study about the narratives of artists, Mishler (1999) underlines how art is often learned by doing a lot of craftwork. And Kvale draws on studies of the lives of Nobel laureates to make the point that education and training

within their fields is frequently based on what has been termed "a pedagogy without words" (Kvale 1999). For example, in a research lab or workshop, little formal teaching takes place. On the contrary, research is learned by doing research, learning from mistakes, experimentation, and feedback. Feedback can be provided to the novice as a pat on the shoulder, and it can be felt by the novice as the right kind of feeling in the stomach. All of this is a matter of developing the novices' sense of quality. Feeling as such is important in the epistemology of the hand, although it is something we have not been able to describe in detail in this chapter. Basically, we do not simply grasp something, we also "feel" it when grasping it, and not just in the sense of having sensations but also in the emotional sense, because something (and often a lot) is at stake when we learn. Dewey himself described reflection as "the painful effort of disturbed habits to readjust themselves" (Dewey 1922, p. 76), which underlines the affective dimension of human inquiry.

An interview study of seven Nobel Prize laureates within the field of economics recently showed that the basis of their success was long-term training and education in the lab or workshop of a former Nobel Prize laureate whose work they had transformed (Jalil and Boujettif 2005). Of course, one problem with apprenticeship in this respect is that it may be quite elitist. A certain amount of selection has already taken place before the training is begun, and this may explain why the masters need not teach formally the skills of research. Another and related problem may be that the sense of the value of repetition and long-term training may in fact be acquired as a kind of habit, which means that those predisposed to participate in these kinds of communities are also those who gain access to these valued communities where the standards of good research are at hand (Bourdieu 2004).

Surely, getting access to learning and education will always contain problems of selection whether at school or in workplaces. An epistemology of the hand cannot remove such issues. However, to see education as a matter of reconstructing social relationships in order to become able to adjust to the world in which we live could revitalize our ways of doing, and thinking about, education and work. If ideas and theories are tools to cope with the world, they should be learned as such. We should educate for the future, but on the background of a past that we must learn to understand so that we can reconstruct social relationships for the better. Although an epistemology of the hand will not in itself solve social problems of classism and other inequalities in contemporary learning society, it may alert educators to the fact that there are many legitimate forms of knowing and that specific historical conditions have been instrumental in developing our culture's lack of respect for craft knowledge and practical forms of education. Focusing more on the capacity to work well (addressed by Sennett), and working well *together*, rather than simply augmenting the contemporary focus on individual talent and learning styles, could also in our eyes have fruitful consequences for both school- and work-based learning policies informed by the epistemology of the hand. We should never ignore the possibility that negative effects may result when epistemologies and pedagogies filter down to classrooms and workplaces, and this also applies to our suggestions, but we believe that a pragmatist ethos is in a unique sense self-correcting. When one gives up the quest for fixed ends to pursue – in philosophy as well as

in education – one can instead engage in gradual amelioration of social and educational problems, and we have argued that the epistemology of the hand can today be instrumental in such amelioration.

Concluding Perspectives

We have argued that an epistemology of the eye underlies much of Western philosophy and education, and we have presented Dewey's critique of this, and also outlined what we find is his very useful alternative, which we have called the epistemology of the hand. Furthermore, we have shown through the work of Mark Johnson how epistemologies and their conceptions of knowing and understanding are rooted in various embodied experiences, and we have also addressed the existential and moral aspects of the epistemology of the hand (with the help of Sennett) and discussed some implications for education, learning, and creativity (following Biesta).

In conclusion, we can summarize and say that the epistemology of the hand offers us first and foremost a temporal understanding of knowing. This is in stark contrast to the epistemology of the eye that was built around a spatial understanding of knowledge: Knowledge is correct representation in a spatial sense – and something counts as knowledge only if there is some kind of isomorphism between representation/description/theory and how the world is (Osberg et al. 2008). The eye gives us a certain concrete *perspective* on the world, and one common metaphor for theory is perspective – clearly a spatial notion. But for pragmatists, theories are not perspectives that enable us to *see* the world in a certain way. Theories are not perspectivist standpoints. Rather, they are renegotiation tools (ibid., p. 218). They are tools that we use in our transactions with people, things, and nature. As tools, they are *manufactured* by human beings, and we use them to *manipulate* things and *handle* situations. Knowledge is about the relationship between what we do (actions) and what subsequently happens (consequences), and, for pragmatists, theories are evaluated according to how well they mediate this relationship. Knowledge is thus a temporal process rather than a spatial one, a process that signifies a form of doing. It is also a process that necessarily involves creativity, not as a romantic notion pointing to the lonely individual genius but as creativity of action – a creativity of the hand. Education should supply arenas in which to collectively create new worlds rather than simply replicate the past (Biesta 2006).

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