Mind the Gap: Dewey on Educational Bridge-building

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This commentary discusses John Dewey's short essay, "Education as engineering." The essay provides a fascinating model of how the example of engineering could guide the interaction between educational research and practice. It has much in common with Herbart's ideas on how "pedagogical tact" bridges the gap between theory and practice. Reintroducing both Dewey and Herbart's ideas could help to overcome the current naivety of "evidence-based" school improvement.

When I first came across Dewey's wonderful piece "Education as engineering" (Dewey, 2008), it proved to be very helpful in my day-by-day work at the NTNU at Trondheim. Most of my partners in projects and university affairs came from engineering; indeed, one of my closest colleagues was a bridge-builder in the original sense of the word, having designed and built bridges across Norway and elsewhere. He often complained about the misconceptions of engineering that many of my social science colleagues seemed to have. "Of course you've got to do the math right," he said:

> but when it finally comes to building a bridge, you've got to understand the uniqueness of the site you are approaching. This requires a deep understanding of what this bridge will be, how it will fit into the landscape and to the needs of its customers, an understanding, which we can't teach at universities, which only can be acquired by doing bridges.

For him, the argument in Dewey's short essay about the nature of knowledge in engineering and about the shortcomings of an educational theory not firmly rooted in preceding practical improvement seemed to be a perfect fit—and to confirm his everyday experience of my education colleagues at NTNU ("all theory, no practice," he would say).

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Having now moved to a department at the University of Vienna, which considers itself one of the last strongholds of educational philosophy as the center of any science of education (Bildungswissenschaft), it is harder to communicate Dewey's idea. For some of my neo-Kantian colleagues, pragmatism has always been suspected of compromising the pure reasoning of transcendental skepticism by short-sighted practical arguments. Alluding to Kant's saying that "there is nothing more practical than a good theory," they do not feel that educational theory has much to gain from making itself dependent on the state of the art of current practice. Of course it helps when I point to the Aristotelian subtext in Dewey's argument (techne as the wisdom of poiesis) or its similarities with Schleiermacher's (1983) construction of the theory-practice relation (e.g., pointing to the theory-independent "dignity" of practice in his 1826 lectures). However, seeing themselves in the business of episteme does not change their position at all. In their view, applied sciences like school pedagogy might well gain something from being involved in real human action, but not the science of education as such.

The idea of education as some kind of engineering sounds even worse for those of my Austrian colleagues who feel themselves deeply embedded in the Continental tradition of Reformpädagogik, i.e., "reform pedagogy." Reformpädagogik differs from "progressive education" by (not least) its critical stance toward the impact of industrialization and technology on education, which is seen as a fundamental threat to the always unique "personal pedagogical relation" (der pädagogische Bezug) as the core of education. Such "humanistic pedagogy" considers every influx of technology (like information technology or standardization) as an imminent threat to "authentic" teaching. Of course, they don't like me pointing out that many of the most cherished tools of such "individualized" teaching (like the project method) are deeply rooted in the history of engineering.

However, I feel that both positions, that of my former colleagues from engineering and that of my current colleagues from educational philosophy or Reformpädagogik, don't really get to the core of Dewey's argument. On the one hand, his argument is neither reductionist in the sense that it limits educational theory to a "reflective practitioner" mode of thinking nor does it repudiate the concept of an independent science of education (which, in fact, all his work aims to establish)—and he points clearly to how much practitioner development of new knowledge depends on theoretical

input. Nor is it simply an attempt to invalidate "untimely" theories and models because they do not (yet) fit into the educational practice at hand. To understand the peculiar construction of the implied theory–practice relation in "Education as engineering," it helps to remember Dewey's flirtation with Herbartianism in the 1890s (see e.g., Cruikshank, 1993) and the deep impact Herbart had throughout his work (as it is clearly visible in, e.g., The Child and the Curriculum (Dewey, 1990) or in the construction of subject matter in Democracy and Education (Dewey, 1967)). If not by the letter, Dewey elaborates 'education as engineering' in the spirit of Herbart's attempt to clarify how educational theory and practice might relate to each other.

Herbart's understanding of this relationship is already clear in his first lecture on education, given at the University of Göttingen in 1802 (Herbart, 1991). There he outlines four different approaches to theory and practice: First, he talks about a "science of education" dealing with general matters and not with the particulars of each single case, a science that the "art" of an experienced educator would have to take into account. However, most practitioners do not listen to theory, he says, but rely on their own "experiences and observations." However, and this is his second argument, being stuck in the jog-trot of average practice, such practitioners will never get to lasting improvement. A young educator can succeed with a "well-calculated experiment" in his first experience of teaching. However, such lucky experiments do not provide a sound basis for long-term development of educational knowledge if they are not firmly rooted in a general theory. Each time and place has its specific conditions, Herbart's third argument goes, which does not allow simple copying of something that worked nicely at one place or time or another.

This leads Herbart to a fourth type of theory—practice interaction, which he calls "tact." This tact has not much to do with the "tacit knowledge" of experience or the psychological tact of empathy. It is rather the intellectual ability to understand something particular as a case of something general, a "fast" practical judgment based on experience as well as on theoretical knowledge. Theory can "prepare" one for going into the practical field, but it cannot alone provide the necessary tact, which only can be gained within the practical field itself, guided by theory but based on experience. Tact does not invalidate theory, nor does it belittle practical experience. If developed,

it allows for a professional judgment of how both might inform each other under given circumstances.

Turn this argument around and you arrive at Dewey's "education as engineering." It is not an argument against specific theories or a given practice; it claims that a meaningful interplay between both requires the possibility of developing a "tact" that fits both. Thus, a theory might have no meaningful lasting impact on teaching if it meets practical circumstances in which no tact appropriate to this particular theoretical enterprise could be developed. Teaching the theory extensively or the requirements needed to follow its creed will not help because, without an appropriate tact, there could be no "fast judgement" that the particulars at hand are a case of the general insights of that theory. New theoretical insights have to be preceded by changes in the conditions and constraints of practical teaching, which then allow for new kinds of tact to emerge. This is what Dewey (2009) observes has happened in engineering, where he calls something very similar to Herbart's tact a "pattern":

> so deep-seated and clearly outlined that the ease of its recognition gives rise to the deceptive sense that there is something intellectual in the pattern itself. In engineering the pattern is mental in a quite different sense. It summarizes a distinctively intellectual type of behaviour. (Dewey, 2009, p. 2)

Accordingly, "[t]here is at present no art of educational engineering. There will not be any such art until considerable progress has been made in creating new modes of education in the home and school" (ibid., p. 3). Herbart's preparation of practice by theory resurfaces as a "need" for "an extensive and severe intellectual equipment" (ibid., p. 3), but one different from the current attempt "to evolve a body of definite, usable, educational directions out of the new body of science" (ibid., p. 4), rather one that gives practitioners a "creative courageous disposition" (p. 5) to open the field of education for new ways of seeing and doing. Without changing the institutionalized "habits" from within, there will be no evolution of a new "pattern," a new tact appropriate for change of whatever kind.

Applying this to the current showering of the educational field with all kinds of models of "data-driven decision making" and "evidence-" or "research-based" teaching, Dewey gets quite a lot of empirical confirmation. In ways similar to the results of the acclaimed "scientific management

revolution" of his days, research proves time and again that most of the "new science" does not lead to significant improvements over time, that the impact of these reforms on actual teaching is rather limited, and that more often than not the collateral damage of these reforms is larger than the intended effects. The few successful implementations, which are often cited as evidence, have more in common with Herbart's lucky young teacher than with proven systemic reforms. The current research on "school capacity" points to the fact that schooling is a quite stubborn entity that cannot be changed at will.

Thus, to impose new structures based on research or politics will not do the job. Without a fitting tact based on former practical experience, old "habits' cannot be put away. Only if practitioners are freed to develop new circumstances allowing for a new kind of tact will lasting change occur. This requires, in Dewey's words, "creative adventurous minds," who will have to combine "individual courage" with "the aid of non-educational sciences," if the aim is "achieving education as science and an art" (Dewey, 2009, p. 5). Thus, education as engineering requires a dialectical approach in which "tact" bridges the gap between ongoing practice development and future directions in research. To quote another German philosopher, often misused and now as forgotten as Herbart, who puts it more "radically" this way:

> The materialist doctrine that men are products of circumstances and upbringing, and that, therefore, changed men are products of changed circumstances and changed upbringing, forgets that it is men who change circumstances and that the educator must himself be educated. Hence this doctrine is bound to divide society into two parts, one of which is superior to society. The coincidence of the changing of circumstances and of human activity or self-change [*Selbstveränderung*] can be conceived and rationally understood only as *revolutionary practice*. (Marx n.d., emphasis in original)

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