

## Integrating Arts/Humanities and Sciences/Engineering

Jim Garrison

*Virginia Tech University*

I am not a good respondent for Larry Hickman if by “good” one means what I have elsewhere called “playing the doubting game.” Our interpretations of Dewey are too similar for that. It was not until I published “Dewey’s Philosophy and the Experience of Working: Labor, Tool, and Language” in 1995 that I seriously entered Deweyan scholarship.<sup>1</sup> Back then, I had decided Dewey’s philosophy of technology was crucial to understanding his entire philosophy. I knew nothing of the secondary scholarship on Dewey so was embarrassed when one of the reviewers mentioned I should read Larry Hickman’s *John Dewey’s Pragmatic Technology*.<sup>2</sup> It is an exhaustive text I have taught many times and recommend to this audience as a major contribution to Deweyan scholarship. However, it left me with nothing to say regarding Dewey’s philosophy of technology.

My own work turned to the notion of practical means-consequence reasoning as a useful architectonic for capturing Dewey’s philosophy. Dewey writes, “Rationality as an abstract conception is precisely the generalized idea of the means-consequence relation.”<sup>3</sup> Since Aristotle, practical reasoning involves reasoning for those things, situations, or simply values, we desire. We gather data, construct facts, and create logical forms in the course of pursuing values we desire. Eventually, I emphasized the role of *eros* in practical reasoning to derive an aesthetic reading of Dewey. One educational payoff lies in Dewey’s use of practical intelligence to educate *eros* to value the truly good. Part of the education of *eros* involves learning to distinguish between objects of immediate desire and the genuinely desirable. Sciences/engineering provides the means for securing valued consequences helping us to secure our ends, but when used wisely it also helps us evaluate those ends. Hickman is correct, long before philosophers of science realized the fact/value dualism was false, Dewey had shown that an *ought* implies an *is* of action. Further, Dewey also clearly recognizes the ought of the ethically “*is possible*” even though not actual proclaiming, “But limiting the question as best I can, I should say (first) that the ‘ought’ always rises from and falls back into the ‘is,’ and (secondly) that the ‘ought’ is itself an ‘is’ — the ‘is’ of action” (*EW* 3, 105). Sciences/engineering as Dewey understood it imparts imaginative intelligence to the *is* of action. Wise action influences a holistic convergence of moral, cognitive, and artistic action.

My response mostly underscores some of the themes Hickman discusses because they remain widely misunderstood. I will call attention, though, to Dewey’s carefully drawn distinction between the words “artistic” and “aesthetic.” Dewey’s distinction allows us to discern an artistic unity between the arts/humanities and sciences/engineering. After all, Dewey does assert, “Thinking is preeminently an art; knowledge and propositions which are the products of thinking, are works of art, as much so as statuary and symphonies” (*LW*, 283).

Let us begin with those aspects Hickman admires in the work of Martin Heidegger. He reminds us that Heidegger provides an insightful analysis of human

situatedness and tool use that, initially, involved inverting the Greek hierarchy rising from production and practice to theory. Because Dewey arrived at the same analysis sooner while never recanting, it is a good place to begin.

Dewey too has a wonderful account of situatedness. Instead of calling it *Dasein*, however, he called ignoring situatedness “the contextual fallacy” (*LW* 6, 3-21). Among other things, context includes “the background of the experimenter,” the “antecedent state of theory,” “the researcher’s purposes in performing the research,” and “culture.” Situatedness, associated with the work of Brown, Collins, and Duguid, Lave, and activity theorists such as Engeström, has become a major topic among educators.<sup>4</sup> Oddly, no one remembers Dewey or Heidegger.

Dewey also gives a brilliant account of tool use in which he defines a tool as “a thing used as means to consequences” (*LW* 1, 146). Tools have rationality as means-consequence connection built in. Logical tools like inference are mediating means to ends; they function, as Dewey proclaims, just like “plowing, assembling the parts of a machine, digging and smelting ore” (*MW* 10, 91). Dewey urges us to consider that “tools and works of art give the key...that works and tools of art are precisely the sought-for alternative” to thinking of logic as some sort of transcendent entity (*MW* 10, 92). Please keep the phrase “tools of art” in mind; it will become important later. Logical essences and ontology are the products of the functional processes of sciences/engineering.

Sciences/engineering allows us to take and use naturally occurring events for our purposes while creatively transforming them in the process. The most important instance of taking and using is language. Dewey states: “As to be a tool, or to be used as means for consequences, is to have and to endow with meaning, language, being the tool of tools, is the cherishing mother of all significance” (*MW* 10, 146). We make meaning just as we make machine parts, logical essences, and ontology.

Hickman seems to make an outrageous statement when he suggests that technology blurs the distinction between what is internal and external to the organism. The key to grasping this insight lies in understanding tools as contributing to sustaining and enhancing our life functions. Dewey believes that “a living organism and its life processes involve a world or nature temporally and spatially ‘external’ to itself but ‘internal’ to its functions” (*MW* 10, 212). Oxygen, food, and water are external to our existence, but internal to our functioning. According to Dewey, “Any operative function gets us behind the ordinary distinction of organism and environment. It presents us with their undifferentiated unity, not with their unification. It is primary; distinction is subsequent and derived” (*MW* 13, 376). Tools serve living functions such that “some parts...of the environment become... ‘extra-organic’ organs; that is to say, all the tools and devices of all the arts, although outside the body, operate in behalf of the functions of life just as do the eye, stomach, hands” (*MW* 6, 439). The cultural function of sciences/engineering is to serve as a tool that, while external to our existence, remains internal to our functioning and growth.

Like Heidegger, Dewey inverted the Greek hierarchy of knowledge; he too issued a potent challenge to accounts that located science as temporally prior and

ontologically superior to technology, or that characterized knowing as divorced from and superior to action. Technology in Dewey's sense is not applied science. That is why Hickman adopts the term sciences/engineering. In fact, Dewey goes Heidegger a couple better. First, having inverted the classical hierarchy, he shows that the theory/practice distinction is unsustainable; instead, they are equal partners in the production of new consequences.<sup>5</sup> Further, distrusting hierarchies of all kinds, he plays all three domains of science, aesthetics, and ethics off each other. There are moments of the other two in every one of Dewey's categories. For instance, sciences/engineering can contribute to the ethical art of statecraft, which may have its aesthetic moments.

Dewey's theory of rationality is instrumentalist; unfortunately, most read him as a follower of a brand of instrumentalism having its roots in the thought of David Hume. Dewey completely rejects "straight line instrumentalism." Indeed, Dewey explicitly sates, "As a general term, 'instrumental' stands for the relations of *means-consequence*, as the basic category for interpretation of logical forms" (LW 12, 22 fn.). Dewey often uses the word "coordination" to describe the act of creatively transforming a dysfunctional situation. We may perhaps better understand Dewey's instrumentalism as the means-consequence coordination of confused contexts.

Since the sixth century, scholars have referred to Aristotle's logical treatises as the "*organon*" or "instrument of thought." The "New Instrument" or *Novum Organum* of Francis Bacon represents one of the major achievements of the so-called scientific revolution. Dewey asserts: "There is nothing novel nor heterodox in the notion that thinking is instrumental. The very word is redolent of an *Organum* — whether *novum* or *veterum*." Regarding his own instrumentalism, Dewey states "it deviates from the Aristotelian Organon which it professes to follow" (MW 10, 367).

Dewey's instrumentalism, as Hickman indicates, sought to unite the arts/humanities with sciences/engineering while maintaining a useful distinction between them. Let us begin by considering Dewey's distinction between the words "artistic" and "esthetic:"

Since "artistic" refers primarily to the act of production and "esthetic" to that of perception and enjoyment, the absence of a term designating the two processes taken together is unfortunate....Art denotes a process of doing or making. This is as true of fine as of technological art....The word "esthetic" refers, as we have already noted, to experience as appreciative, perceiving, and enjoying. It denotes the consumer's rather than the producer's standpoint (MW 10, 53).

Artistic activity is a process of creative mediation that embraces "technological art" as well as "fine" art. Logical forms are the products of "technological art" just as aesthetic forms are the products of fine art. In his 1938 *Logic*, Dewey writes, "What I have said in *Art as Experience*, in chapter seven, on 'The Natural History of Form' can be carried over, *mutatis mutandis*, to logical forms" (LW 12, 372). When we make those small changes, it is easy to see that aesthetic and logical forms are very similar because both arts/humanities and science/engineering are instances of *artistic* production. Both are mediational processes coordinating means to the consequence of producing beautiful aesthetic and logical forms. Meanwhile, the

aesthetic permeates the artistic process just as the artistic process permeates the aesthetic product. Dewey is making a rather typical move for him. He is constructing a very finely wrought and useful *methodological* distinction within a functioning *existential* unity in such a way as to avoid an artificial dualism. Dewey declares that “the distinction between esthetic and artistic cannot be pressed so far as to become a separation” (*LW* 10, 54).

At the start of chapter seven of *Art as Experience*, Dewey asserts, “Art expresses, it does not state; it is concerned with existences in their perceived qualities, not with conceptions symbolized in terms” (*LW* 10, 139). Earlier, Dewey had asserted, “Science states meanings; art expresses them” (*LW* 10, 90). At first, these statements seem to conflict with the claim that artistic production is common to both arts/humanities and sciences/engineering. It seems Dewey is saying they really are two cultures. However, it is easy to follow what Dewey is up to if we track the small changes that distinguish logical from aesthetic forms. I do not have the space on this occasion to identify and discuss these changes, but can readily sum them up. Artistic expression of aesthetic form involves immediate and direct manipulation of uniquely particular, concrete, and emotionally charged qualities that, when successful, yields a desirable sense of dynamic unity in diversity. By contrast, an expression of scientific art involves the manipulation of general, abstract, and purely cognitive formal signs that have only mediate and indirect connection to existential qualities. What the *artistic* processes of aesthetic or “fine” art and scientific or “technological” art have in common is that they both denote an active process of making that produces desired consequences. In both cases, the forms produced are similar, *mutatus mutandis*.

Now we can see why Dewey says, “Scientific thought is...in its turn, a specialized form of art” (*LW* 10, 252). And why he insists that “science itself is but a central art auxiliary to the generation and utilization of other arts” (*LW* 10, 33). In an earlier work, Dewey notes that “art, the mode of activity that is charged with meanings capable of immediately enjoyed possession, is the complete culmination of nature, and that science...conducts natural events to this happy issue” (*LW* 1, 269). Hickman helps us understand why in “The Sources of a Science of Education” Dewey concludes:

[I]n concrete operation, education is an art, either a mechanical [technological] art or a fine art, is unquestionable. If there were an opposition between science and art, I should be compelled to side with those who assert that education is an art. But there is no opposition, although there is a distinction (*LW* 5, 6).

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1. Jim Garrison, “Dewey’s Philosophy and the Experience of Working: Labor, Tools, and Language,” *Synthese* 105, no. 5 (1995): 87-114.

2. Larry A. Hickman, *John Dewey’s Pragmatic Technology* (Bloomington: Indiana University Press, 1992).

3. John Dewey, *The Later Works 1925-1953*, vol. 12, ed. Jo Ann Boydston (Carbondale: Southern Illinois University Press, 1981), 17. The works of John Dewey will be cited according to *Early Works 1882-1898 (EW)*, *Middle Works 1899-1924 (MW)*, and *Later Works 1925-1953 (LW)* for all subsequent references. Volume and page number follow the initials of the series. See also Leonard Waks, “The Means-Ends Continuum and the Reconciliation of Science and Art in the Later Works of John Dewey,” *Transactions of the Charles S. Peirce Society* 35, no. 3 (1999): 595-611.

4. J. S. Brown, A. Collins, and P. Duguid, "Situated Cognition and the Culture of Learning," *Educational Researcher* 18, no. 1 (1989): 32-42; J. Lave, *Cognition in Practice* (Cambridge: Cambridge University Press, 1988); Y. Engeström, *Learning by Expanding: An Activity-Theoretical Approach to Developmental Research* (Helsinki: Orienta-Konsultit Oy, 1987).

5. For instance, Dewey observes, "It would then be seen that science is an art, that art is practice, and that the only distinction worth drawing is not between practice and theory, but between those modes of practice that are not intelligent, not inherently and immediately enjoyable, and those which are full of enjoyed meanings" (*LW* 1, 268-69).