PHILOSOPHER-AS-LIASION? LESSONS FROM SUSTAINABLE KNOWLEDGE AND AMERICAN PHILOSOPHY

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With the purpose of extending recent discussions on the need for—and barriers to—publicly engaged research and scholarship, this article links recent discussions emerging within interdisciplinary studies and sustainability science with American Philosophy and research on wicked problems. Sustainability science, as a domain for problem-inspired, participatory action research, can be seen as an effective counter-point to disciplinary divisions. In order to gain entry into the epistemological and practical challenges within such practices, the article extends recent work by Robert Frodeman that suggests philosophers have a critical role to play in the field (whether political, social, or environmental). The linkages that Frodeman identifies can be used to diagnose critical issues facing efforts towards transdisciplinary work and the academy more broadly. We argue his recommendations can be fruitfully expanded upon by more direct engagement with the American Philosophic tradition. We conclude by showing how the interplay between these fields helps to identify fruitful avenues for affecting systemic change.

Keywords: American Philosophy; Sustainability; Transdisciplinarity; Robert Frodeman

"Philosophy recovers itself when it ceases to be a device for dealing with the problems of philosophers and becomes a method, cultivated by philosophers, for dealing with the problems of men."[1]

With the purpose of extending recent discussions on the need for—and barriers to—moving beyond inter- and trans-disciplinarity and towards publicly engaged research, this article reviews and links discussions emerging within interdisciplinary studies and sustainability science with doctrines from classical American Philosophy and research on wicked problems. Philosophers working in the philosophy of science argue key barriers to successful interdisciplinary science reside in a failure to recognize the way that epistemic values, methodological traditions, and both metaphysical and meta-ethical commitments tend to be shared within disciplinary traditions, while divergence is observed when different disciplines are compared. Sustainability science (SS) can be seen as an effective counter-point to these divisions. Conceptualized as neither applied nor basic curiosity driven research, it is seen as a domain for problem- or use-inspired research that requires significant breakthroughs and advances in understanding to resolve. Sustainability science is also characterized as science undertaken in response to "wicked problems": challenges with large social and economic stakes, irreversible consequences, multiple stakeholders, high levels of uncertainty, low tolerance for error and little agreement about the fundamental problem definition.[2]

In order to gain entry to the epistemological and ethical issues involved we begin by providing a brief overview of the relevant fields, including interdisciplinarity, transdisciplinarity, and sustainability science. Given its relevance to these discussions, we next analyze Robert Frodeman's recent work. Frodeman refers to the trends noted above in developing his critique of the institutional setting of

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[1] John Dewey, "The need for a recovery of philosophy," *The Middle Works*, 1916-1917. Vol. 10. Edited by J. A. Boydston (Carbondale: Southern Illinois UP, 1980), 3-48, 46.

[2] While not characterized as interdisciplinary in Proceedings of the National Academy of Science literature, the sustainability science section often does have authors from more than one discipline.

disciplines in contemporary research universities. He argues that philosophy must take on the task of challenging the barriers that current institutions pose to genuinely sustainable knowledge production.[3] The role philosophers play in facilitating interdisciplinary conversations can, he suggests, be augmented by critique of the organizational and incentive structures currently being perpetuated in universities and disciplinary organizations. For instance, with narrowly framed structures for what counts as legitimate knowledge, efforts to shift the system are stymied.

While Frodeman offers a useful starting point, we argue his work can be fruitfully enhanced by American philosophy as well as systemic and participatory engagement practises. Participatory engagement with people who are not ensconced in disciplinary institutions reminds researchers that they are involved in problem solving. Disciplinary researchers who forget this may obtain data that allows them to publish results, but they will not secure or maintain the interest and cooperation of their community collaborators. It is the focus on problem-solving that provides the impetus for integration across disciplines, an observation well made by John Dewey in the first half of the last century.[4] Yet Frodeman's analysis of the institutional setting is relevant here as well, for there are disincentives for engaged scholarship. As such the linkages that Frodeman identifies can be used to diagnose even further critical issues facing efforts towards transdisciplinary work and the academy more broadly. Such diagnoses identify fruitful avenues for affecting systemic change. First, then, we briefly summarize the dangerous paradigms embedded in disciplinarity.

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[3] Robert Frodeman, *Sustainable knowledge: A theory of interdisciplinarity* (New York: Palgrave MacMillan, 2014).

[4] Zachary Piso, "Integration, values and well-ordered interdisciplinary science," *The Pluralist* 11 (2016), 49-57.

Disciplinarity (aka "Navel Gazing")

In *Sustainable Knowledge*, Frodeman asks his reader to critically consider what role knowledge should play in our lives[5]; he rejects the assumption that limitless knowledge production, disconnected from application, is an intrinsic good. The disciplining and sub-disciplining of knowledge operates, he says, under the mistaken assumption that specialization and innovation are limitless goods. We must remain cognizant of the fact that "without interpretation, the data carried by the increasing flows of information are as meaningless as they are overwhelming."[6] To the extent that disciplinary knowledge encourages an "internal gaze", to the extent that it comes to "trump the priorities of society at large" and forestalls engagement with those outside of the academy, we have a serious problem.[7]

Frodeman's use of the term "internal gaze" is intended to summarize a complex set of factors that influence knowledge production in academic disciplines. Disciplinary research builds upon prior findings within a given discipline, and in doing so presupposes that the audience for research results has both the vocabulary and a prior understanding of established findings.[8] What is more, as Josiah

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[5] Frodeman, *Sustainable Knowledge*, 4.

[6] Frank Fischer, *Citizens, experts, and the environment: The politics of local knowledge* (London: Duke University Press, 2000), 13.

[7] Frodeman, *Sustainable Knowledge*, 24.

[8] See Katri Huutoniemi, "Interdisciplinarity as academic accountability: Prospects for quality control across disciplinary boundaries," *Social Epistemology: A Journal of Knowledge, Culture and Policy* (2015), http://dx.doi.org/10.1080/02691728.2015.1015061 and Stephan Fuchs, *Against essentialism: A theory of culture and society* (Cambridge, MA: Harvard University Press, 2001).

Royce noticed more than a century ago[9]—and as a half century of work in the philosophy of science after Thomas Kuhn has firmly established—scientific practice is shaped by implicit ideas or paradigms that reflect the values shared within a disciplinary community. These values are expressed through procedures for grantmaking and peer-review, as well as standards for tenure and promotion. As such, a broad array of standards and practises within science are fixed by processes that are internal to the disciplinary community. It is in this sense that discipline-based knowledge reflects an "internal gaze".

Although Frodeman's study concerns knowledge production within universities, navel-gazing is not confined to the academic world. Bryan Norton discusses the Balkanization of knowledge production within different administrative units of the U.S. Environmental Protection Agency. Here, knowledge developed to perform regulatory functions also operates with something like an internal gaze. Norton refers to this phenomenon as towering, reflecting the way that divisions of the EPA were at one time housed in a labyrinth of office towers. As with Frodeman's study of the university,[10] the creation and maintenance of sharp distinctions between the disciplines and their institutionalization in bureaucracy creates a barrier to integrated thinking that serves public interests poorly.[11]

We are facing, Frodeman says, an impeding knowledge "crisis." This crisis is caused in part by a shift in power: an ongoing "loss of control over knowledge."[12] However, a crisis is also an

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[9] Jacquelyn Kegley, "Peirce and Royce and the betrayal of science: Scientific fraud and misconduct," *The Pluralist* 5, Issue 2 (2010): 87-104.

[10] Frodeman, *Sustainable Knowledge*. See also Frodeman and Adam Briggle, "When philosophy lost its way," *The New York Times Opinion Pages* (January 11, 2016), http://opinionator.blogs.nytimes.com/2016/01/11/when-philosophy-lost-its-way/?_r=0.

[11] Bryan G. Norton, *Sustainability: A philosophy of adaptive ecosystem management* (Chicago: University of Chicago Press, 2005), http://dx.doi.org/10.7208/chicago/9780226595221.001.0001.

[12] Frodeman, *Sustainable Knowledge*, 27.

opportunity for systemic change.[13] As Huutoniemi points out, "disciplinary networks can interact and communicate, even learn from each other, when there are actual relations and bridges between them."[14] The question then moves to whether interdisciplinary research is a fruitful response to this crisis.

Interdisciplinarity (aka "looking out from within")
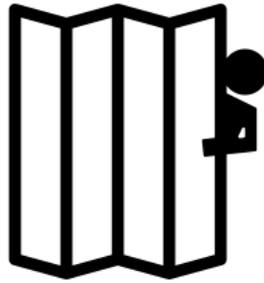
The oft neglected underlying value of interdisciplinarity, according to Frodeman, is that it reminds us of both the "inherent limitations to knowledge" and its role in addressing "societal needs."[15] Current university structures fail to take seriously the fact that knowledge is practically limited by our capacity to understand, by "time and money," and by "research itself."[16] Thus we should judge both "the overall intellectual merit" of possible research projects and their potential for "broader impact" before we commit resources to them.[17] The US's National Science Foundation now requires grant applications explain the broader impact of the research on society; this shift is an example of emerging changes currently underway.

Understood as a shift towards looking "outward, away from a

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[13] C. M. Alpaslan and I. I. Mitroff, *Swans, swine, and swindlers: Coping with the growing threat of mega-crises and mega-messes* (Stanford, CA: Stanford University Press, 2011).

[14] Huutoniemi, "Interdisciplinarity as academic accountability," 5.

[15] Frodeman, *Sustainable Knowledge*, 42.

[16] Ibid., 55.

[17] Ibid., 26.

group of peers", interdisciplinarity is a step in the right direction.[18] According to Allen Repko, "the interdisciplinary enterprise is about building bridges that join together rather than erecting walls that divide."[19] "*Interdisciplinary study,*" Repko goes on to say, "*is not about who can win the argument, but about who can bring together the best ideas of all stakeholders to get the job done.*" While Repko concludes interdisciplinary scholars are primed to play the role of recruiter, facilitator, or mediator in work on real world problems.[20] Frodeman calls this argument into question. Interdisciplinarity has limitations.

The shift to interdisciplinarity has—Frodeman says—left us with a number of problems. For one, "the whole system is [still] set up to pin our careers on the judgment of disciplinary peers" and this again incentivizes navel gazing.[21] Many prominent interdisciplinary scholars tend to mimic disciplinarity, seeking to acquire all the tools of the disciplines (a canon, their own conferences, journals and associations, degree programmes, and departments).[22] Secondly, it is not at all clear that "interdisciplinary research does a better job… at addressing societal problems". Although granting agencies in the industrialized world have increasingly favored projects conducted by multi-disciplinary teams, Frodeman notes that the internal gaze of the disciplines nonetheless continues to shape the refereed journal articles that are the primary product of even interdisciplinary science.[23]

The third problem with interdisciplinarity is that it continues to seek methodologies when instead it should focus on "sharing… particular insights and rules of thumb that have developed in a piecemeal manner."[24] Frodeman calls this "Methodism," saying it is a mistake because it "forces a given situation to live up to pre-established standards rather than allowing the situation to suggest its own

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[18] Ibid., 36.

[19] Allen F. Repko, *Interdisciplinary research: Process and theory.* 2nd ed. (Los Angeles, CA: Sage Publications, 2012), 325.

[20] Ibid., 332.

[21] Frodeman, *Sustainable Knowledge*, 37.

[22] Ibid., 40.

[23] Ibid., 39.

[24] Ibid., 45.

standard for evaluation"[25] and "allows us to bracket discussion of purposes and goals," giving us "the patina of objectivity."[26] Wicked problem scholars emphasize this same point, concluding that efforts on messy, real-world problems "cannot be standardized."[27] Unacknowledged by Frodeman, a number of different approaches are—and have been—underway, including systemic engagement practices,[28] feminist pragmatism,[29] and participatory action research.[30]

Frodeman, to be fair, does highlight a couple of projects underway. For example, O'Rourke and Crowley's Toolbox Project is one particularly valuable method for interdisciplinary collaboration. These interdisciplinary workshops go beyond a standard set of procedures, "culminating in introspection, dialogue, and adjustment."[31] Designed to help us collaboratively address multi-scaled, value-laden, messy social and ecological issues that resist "formulaic responses", the Toolbox Project seeks to be a "highly contextual" process "that makes use of heuristic strategies targeted at overcoming specific types of challenges."[32] The project is prefaced on the belief that a failure to communicate is one of the primary

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[25] Ibid., 47.

[26] Ibid., 49.

[27] Gerald M. Allen and Ernest Gould, Jr. "Complexity, wickedness, and public forests," *Journal of Forestry* (April 1986): 20-23, 23.

[28] M. A. McNall, J. Barnes-Najor, R. E. Brown, D. Doberneck, and H. E. Fitzgerald, "Systemic engagement: Universities as partners in systemic approaches to community change," *Journal of Higher Education Outreach and Engagement* 19, Issue 1 (2015): 1-26.

[29] Danielle Lake, "Jane Addams and wicked problems: Putting the pragmatic method to use," *The Pluralist* 9, Issue 3 (2014): 77-94.

[30] O. Fals Borda, "Participatory (action) research in social theory: Origins and challenges," in *Handbook on Action Research*, edited by P. Reason and H. Bradbury, 27–37 (London, England: Sage, 2001).

[31] Frodeman, *Sustainable Knowledge*, 48.

[32] T. E. Hall and M. O'Rourke, "Responding to communication challenges in transdisciplinary sustainability science," in *Heuristics for transdisciplinary sustainability studies: Solution-oriented approaches to complex problems*, edited by K. Huutoniemi and P. Tapio, 119-139 (Oxford: Routledge, 2014), 119.

challenges to effective collaboration on wicked problems. There are frequently multiple and conflicting, yet valid interpretations of our shared problems. This conclusion (that poor communication is one of the primary reasons effective responses are so rare) is also supported by wicked problem scholars. Indeed, interdisciplinary work across our differences takes enormous effort, time, and money. It also forces an often painful examination of our own assumptions, values, and commitments.

The Toolbox Project seeks to redress these communication failures by employing facilitation techniques, surveys, and various deliberative tools. This project, then, begins to do the work Frodeman recommends by fostering a set of skills and virtues grounded in the consideration of the "political, rhetorical and psychological nuance" of each case and yet also likely to be adaptable in other contexts.[33] Extrapolating from this example, we can conclude interdisciplinarians should seek to operate as boundary spanners by holding themselves accountable to others so they can cogenerate, and widely disseminate knowledge to all those involved.[34] Frodeman calls this boundary spanning work transdisciplinarity. However, with few-to-no incentives to interact across disciplines and outside of the academy, vastly different perceptual understandings and narrow commitments to self-interest proliferate.[35] Undeniably, a failure to collaborate across disciplinary boundaries has consistent cognitive, social, and institutional causes.[36]

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[33] Frodeman, *Sustainable Knowledge*, 47.

[34] See J. A. Ramley, "The changing role of higher education: Learning to deal with wicked problems," *Journal of Higher Education Outreach and Engagement* 18, Issue 3 (2014): 7–22, http://openjournals.libs.uga.edu/index.php/jheoe/article/view/1286; S. S. Batie, "Wicked problems and applied economics," *American Journal of Agricultural Economics* 90, Issue 5 (2008): 1176-1191, http://dx.doi.org/10.1111/j.1467-8276.2008.01202.x; and D. H. Guston, "Boundary organizations in environmental policy and science: An introduction," *Science, Technology and Human Values* 26, Issue 4 (2001): 399–408, http://dx.doi.org/10.1177/016224390102600401.

[35] Lake, "Jane Addams and wicked problems."

[36] E. Van Bueren, E. Klijn, and J. Koppenjan, "Dealing with wicked problems in networks: Analyzing an environmental debate from a network perspective," *Journal of Public Administration Research and Theory* 13 Issue 2 (2003): 193-212.

On this interpretation, the Tool Box Project moves in the right direction, fostering a weak transdisciplinarity; but it does not go far enough for at least two reasons. For one, these workshops are largely targeted at and designed for interdisciplinary academic teams. This is a still too narrow framing of accountability. In "Interdisciplinarity as Academic Accountability" Huutoniemi expands this framework by asking her reader to more broadly consider <u>what</u> academics should be accountable for, to <u>whom</u>, and by what <u>mechanisms</u>. By expanding who counts as a peer we would make our research more visible and hold ourselves responsible for the outcomes of our work;[37] we would begin to move beyond interdisciplinarity and into the community.

Disciplinarity as Feedback

To the extent that the Toolbox Project operates within the academy and under institutional pressures of disciplinarity, then, it does not go far enough. These workshops are conducted within a system that still incentivizes disciplinary "navel gazing." That is, scholars are caught up in a self-reinforcing feedback loop that discourages engaged scholarship whatsoever (displayed in figure one). This concept of feedback, originally developed to describe the behaviour of electronic circuits, was significantly expanded and developed in the early days of cybernetics. It is now a basic concept in systems analysis approaches to complex and wicked problems, as articulated in the work of Jay Forrester and Donnella Meadows.[38]

Paul B. Thompson uses the idea of self-reinforcing feedback to demonstrate how perceptions of risk can be amplified through a series

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[37] M. J. Dubnick and H. G. Frederickson, "Introduction: The promises of accountability research," in *Accountable governance: problems and promises*, edited by M. J. Dubnick and H. G. Frederickson (Armonk, NY: M. E. Sharpe, 2011), xiii-xxxii.

[38] J. W. Forrester, *Principles of systems,* 2nd ed. (Waltham, MA: Pegasus Communications, 1968) and

D. Meadows, *Thinking in systems: A primer* (White River Junction, VT: Chelsea Green, 2008).

of plausible (if not necessarily valid) inferences.[39] If one begins with a judgment that the scientific community is not taking its responsibility to assess technological risks seriously, it is reasonable to infer that it would be risky to rely on them. From this judgment it is reasonable to infer that buying or using a product derived from that work is risky, and from this judgment it is reasonable to infer that the product itself is risky. If the product is risky, then the scientists are not doing their job, and the cycle of risk amplifying feedback begins again. Thompson argues that resistance to GMO's leads opponents to the belief that key ethical concerns are not being examined, which in turn leads them to question the moral character of supporters, which then reinforces not only the idea that the product is risky, but also that GMO supporters lack strong moral character. In general, feedback loops demonstrate how various mechanisms (whether thought-processes, institutional procedures or structures, individual habits or social customs) can reinforce one another, ultimately perpetuating vicious cycles that make intervention efforts incredibly challenging.
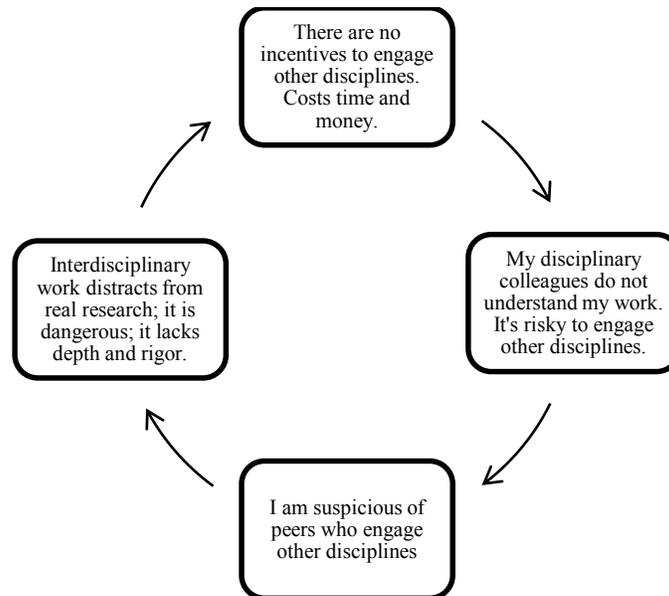
Here we argue that the same idea can help us understand the dominance of disciplinary science within contemporary research institutions. What does a mutually reinforcing values-risk disciplinary feedback loop look like?[40]

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[39] Paul B. Thompson, *From field to fork: Food ethics for everyone* (New York: Oxford University Press, 2015).

[40] Huutoniemi also characterizes this loop by briefly tracing the history of disciplinarity. As disciplines form, experts narrow their focus and resist efforts to engage outside of their cohort.

Figure 1: The Disciplinary Value Risk Feedback Loop

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        ┌─────────────────┐
        │  There are no   │
        │ incentives to   │
        │ engage other    │
        │ disciplines.    │
        │ Costs time and  │
        │     money.      │
        └─────────────────┘
    ↗                          ↘
┌─────────────────┐      ┌─────────────────┐
│ Interdisciplinary│     │ My disciplinary │
│ work distracts  │      │ colleagues do not│
│ from real       │      │ understand my work.│
│ research; it is │      │ It's risky to   │
│ dangerous; it   │      │ engage other    │
│ lacks depth     │      │ disciplines.    │
│ and rigor.      │      └─────────────────┘
└─────────────────┘
    ↖                          ↙
        ┌─────────────────┐
        │ I am suspicious │
        │ of peers who    │
        │ engage other    │
        │ disciplines     │
        └─────────────────┘
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To begin, the way disciplines are situated within the academy creates a value-risk feedback loop that prohibits or penalizes scientists—and scholars more generally—from actively intervening. As the diagram shows, the still dominant tenure and promotion system provides no incentive to engage one another across our disciplinary expertise. That is, since those outside the field do not understand the field as experts do, they have to—at best—answer basic questions and respond to additional concerns. Isolation and the resultant lack of understanding across disciplinary divides tends to encourage the conclusion that interdisciplinary work lacks depth and rigor, which then leads to suspicion of colleagues who do engage across disciplines. Disciplinary training encourages junior faculty and graduate students not to move beyond recognized, legitimate disciplinary methods (which are often very formulaic).

Indeed, the very "process of socialization into a profession" tends to instill not simply "knowledge and skills but also a fundamental reorientation of one's identity." This reorientation, according to David Kolb, is "pervasive," leading to a certain "standard and ethics," as well as particular ways of thinking and behaving that come to shape

our subsequent judgments about what is good and bad.[41] Disciplinarity, by operating under the assumption that prolific knowledge production is an ultimate good, fails to acknowledge the real limitations of time and resources; it ignores the need for work-life balance.

In addition, disciplinary training and its proscriptive methods yield success within the system: publications, grant funding, and advancement. Taking a Deweyan frame on this situation helps the observer to see how both unreflective habits of thought developed through disciplinary training and institutional rigidity exacerbate this loop, reinforcing one another. Indeed, macro, meso, and micro structures and processes all contribute to the dominant attractor. That is, assumptions, policies, and structures that question the quality of the research and categorize interdisciplinary scholarship as illegitimate, reinforce the status quo and exacerbating change efforts.

In the end, positive interventions in the feedback loop are unlikely since reference to one's peer group is necessary for publication. Interdisciplinarity, as constructivist and boundary-spanning, fallible and context-dependent, as well as inherently pluralistic, is not valued within the dominant ideological and institutional framework.[42] Aligning with our argument, Huutoniemi shows that "disciplinary boundaries are claimed, maintained, and challenged mainly for other than epistemic reasons, but that they do have epistemic consequences."[43] This value-risk feedback loop powerfully illustrates Frodeman's overarching message: "the whole system is set up to pin our careers on the judgment of disciplinary peers."[44]

Examining Frodeman's analysis through the value risk feedback loop makes his question to the reader even more pressing:

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[41] David Kolb, *Experiential learning: Experience as the source of learning and development* (Upper Saddle River: NJ Prentice Hall, 2003), 182.

[42] Kelly A. Parker, "Interdisciplinary Research and Problem Solving: A Guide for Students," 2016, http://www.academia.edu/14982806/Interdisciplinary_Research_and_Problem_Solving_A_Guide_for_Students.

[43] Huutoniemi, "Interdisciplinarity as academic accountability," 5.

[44] Frodeman, *Sustainable Knowledge*, 37.

"How do we avoid capitulating to the disciplinary impulse that is so deeply woven into both our intellectual habits and our institutional structures"?[45] Well, mostly, we don't. Shifting the momentum within such a loop tends to require we replace one of its variables, dampen the effects, limit the factors feeding the loop, or add negative feedback into the system. Combining these intervention strategies with Frodeman's examination of the meta-situation, however, yields the conclusion that a disciplinary knowledge culture is undergoing some change.[46] The 2016 *Slow Professor: Challenging the Culture of Speed in the Academy* is one such prominent example.[47] Frodeman, though, calls on scholars to do more, to not simply question our methods, but to also engage in "cultural and philosophical critique" and to "rethink… the functions and institutions of knowledge."[48] In a similar vein, Kolb—by hearkening back to John Dewey—recommends the academy do more to develop the "whole person."[49] It can do this by encouraging "creativity, wisdom, and integrity" and by requiring scholars work in teams, collaborate with other scholars and the community, and apply their expertise to complex projects.[50] This boundary spanning work is necessary for blurring our current divides and fostering connections that encourage meliorative action.[51] However, as seen in figure two, scholars are also caught up in a value risk feedback loop that discourages engaged scholarship whatsoever.

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[45] Ibid.

[46] Frodeman references the rise of student debt, new and disruptive technologies like Google and MOOC's, the near financial collapse of many colleges, the incredibly high rate of scholarly publications alongside the indicators that show many of these articles are not being cited, a shift towards neoliberalism (towards private goods), as well as dangers resulting from new knowledge and technology (i.e. genetics and defense).

[47] Maggie Berg and Barbara Seeber, *Slow Professor: Challenging the culture of speed in the academy* (Toronto, ON: University of Toronto Press, 2016).
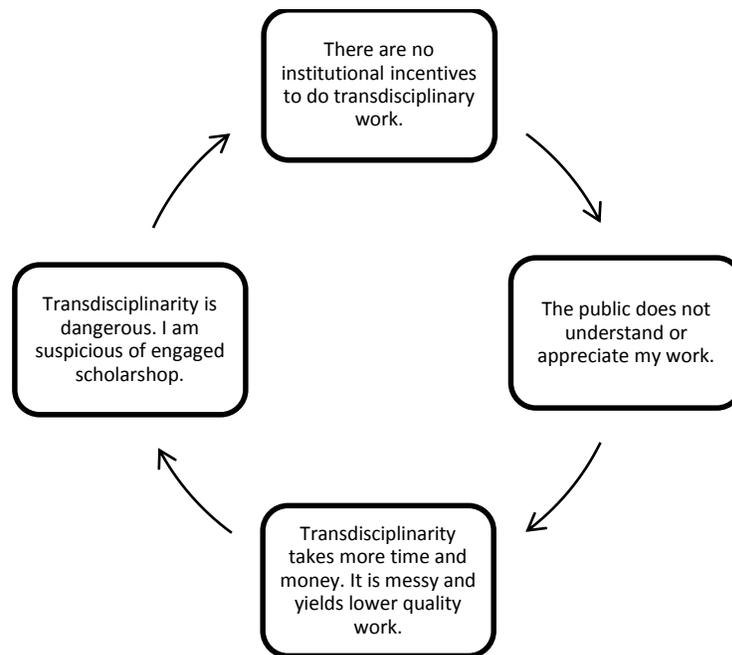
[48] Frodeman, *Sustainable Knowledge*, 70.

[49] Kolb, *Experiential learning*, 162.

[50] Ibid., 184.

[51] Guston, "Boundary organizations in environmental policy and science," 399.

Figure 2: The Transdisciplinary Value Risk Feedback Loop

In large measure, community-based teaching, research, and service do not count in personnel policy decisions. There are few-to-no mechanisms that incentivize transdisciplinary work. In addition, research shows that scholars perceive heavy obstacles to community-based scholarship, generally concluding this work is risky within the current tenure and promotion process.[52] These perceptions easily feed into conclusions that engaged, transdisciplinary work itself is non-ideal, those who do it lack rigor, and thus that other scholars should be suspicious of their work. Put another way, "the pull of the traditional ways of defining individual goals, professional practises, and organizational cultures can be stronger than the push of the need to change."[53] Thus, public education—as an agency meant to serve the public needs—is instead making that work more difficult to

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[52] C. M. Orr, "Women's studies as civic engagement: Research and recommendations," Prepared on behalf of the Teagle Foundation Working Group on Women's Studies and Civic Engagement and the National Women's Studies Association, 2011.

[53] V. A. Brown and J. A. Lambert, *Collective learning for transformational change: A guide to collaborative action* (New York: Routledge, 2013), 3.

accomplish. On this interpretation, one of the biggest mistakes we continue to make is to separate intellectual from ethical and experiential learning. According to American philosopher John Dewey, this separation results from a "failure to conceive and construct the academy as a social institution, having social life and value within itself."[54] The point of education should be to respond more *intelligently* to our environment, "thereby transforming the world as we transform ourselves."[55] (Garrison, Neubert, and Reich, 2012, xiii).

While scholars are caught within these loops, it is nevertheless still the case that when we never stop to consider how the methods are relevant or not—how they help solve problems or not—then we not only risk irrelevancy, we also risk wasting limited resources on misjudging the nature of our collective, systemic problems. Also building upon the work of Dewey, Frank Fischer calls this "the tyranny of expertise" and suggests this loop tends to perpetuate, instead of alleviate, injustice.[56] Like Frodeman, he suggests we need to radically reconstruct our "professional practice" so that it promotes critical discourse among competing knowledges, both "theoretical and local, formal and informal."[57] These loops exemplify a number of wicked dimensions surrounding transdisciplinary scholarship in need of further attention. Academics must wrestle with what it means to be accountable in different contexts.[58] We begin to intervene in these loops by recognizing the dangers and the costs of this narrow focus on isolated and prolific knowledge production.

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[54] John Dewey, (1983). *Moral principles in education* in *The Middle Works*, 1899-1924, Vol. 4. Edited by J.
A. Boydston. Carbondale: Southern Illinois UP: 267-292, MW 4:273.

[55] L. Garrison, S. Neubert, and K. Reich, *John Dewey's philosophy of education: An introduction and recontextualiation for our times* (New York: Palgrave MacMillan, 2012).

[56] F. Fischer, *Citizens, experts, and the environment: The politics of local knowledge* (London: Duke University Press, 2000), 31.

[57] Ibid., 27.

[58] Huutoniemi, "Interdisciplinarity as academic accountability."

Sustainability (aka "Spanning Boundaries")

Sustainable knowledge production aimed more directly towards meliorating wicked problems would operate under a collaborative, transdisciplinary model where knowledge is both coproduced and more directly linked to its application. That is, while disciplines manage knowledge through breaking it "into discrete domains," transdisciplinary wicked problems require we resist this temptation. In fact, wicked problem scholars argue that disciplinarity (and the individual and institutional structures behind it) contributes to and exacerbates our social messes.[59] In contrast, transdisciplinary work steps outside the castle-like infrastructure of higher education, intentionally coordinating "knowledge production with parties beyond the ivy walls of the academy."[60] It is "engaged work" and as such "draws upon many perspectives to frame questions, explore options, and develop and then apply solutions to challenges."[61] The university as a boundary spanning institution would operate as a flexible and stable force for change; it would be a hub around which effective networks operate.[62]

Given our current challenges, the goal, according to

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[59] See Alpaslan and Mitroff, *Swans, swine, and swindlers*; V. A. Brown, P. M. Deane, J. A. Harris, and J. Y. Russell, "Towards a just and sustainable future," in *Tackling wicked problems: Through the transdisciplinary imagination*, edited by V. A. Brown, J. A. Harris, and J. Y. Russell, 3–15 (New York: Routledge, 2010); and Norton, *Sustainability.*

[60] Frodeman, *Sustainable Knowledge*, 3.

[61] J. A. Ramley, "The changing role of higher education: Learning to deal with wicked problems," *Journal of Higher Education Outreach and Engagement* 18, Issue 3 (2014): 7–22, http://openjournals.libs.uga.edu/index.php/jheoe/article/view/1286, 9.

[62] Guston, "Boundary organizations in environmental policy and science."

Frodeman, is "more gentle progress."[63] Current and impeding crises place us in a position of urgency where we nevertheless need to "exercise precaution" and "preserve options for continual course correction."[64] There are, that is, serious opportunity costs to our current trajectory of prolific knowledge production. We must ask ourselves what the "economic, social, and ethical" costs of this knowledge proliferation are.[65] We must ask what we are seeking to sustain and "what we are going to let go by the wayside."[66] We must expand our framework, acknowledging a responsibility not only to our own "disciplinary cohort," but also to the "larger community." These same conclusions lead Fischer to argue for a particular form of public participation: advocacy research. Fischer recommend we follow in Dewey's wake and "transcend the 'value-neutral' ideology of expertise by explicitly anchoring research to the interests" of others, to public issues, and policy work. Advocacy research can make implicit assumptions explicit and uncover hidden practises; it tends to encourage those involved to "speak for themselves."[67] It also raises red flags for traditional scholarship and its value-commitments to expertise. Here, sustainable knowledge can and should ultimately operate as a "regulative guide."[68] So how then does sustainability science measure up?

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[63] Frodeman, *Sustainable Knowledge*, 63.

[64] M. J. Cohen, "When sustainability bites back: Cautionary lessons from the field of public health," *Sustainability: Science, Practice, and Policy* 10, Issue 2 (2014): 1-3, 2.

[65] Frodeman, *Sustainable Knowledge*, 65. Even "philosophical reflection" is a "zero sum game. Time spent… keeping up on the scholarly literature is time not spent thinking about" the very real problems in one's "local community" (Frodeman 2014, 97).

[66] Ibid., 72.

[67] Fischer, *Citizens, experts, and the environment*, 38.

[68] Frodeman, *Sustainable Knowledge*, 74.

A Case in Point: Sustainability Science as Sustainable Knowledge?

Dewey noted long ago that separating science from the social milieu "encourages irresponsibility" and a disregard of the social consequences.[69] Science, that is, gets it wrong when it loses sight of the fact that it comes from – and should return to – the world around us.[70] Sustainability science, as problem-focused and use-inspired research, requires significant breakthroughs and advances in understanding. It seeks to be socially relevant in at least three ways: by (1) working to analyse its practises, (2) consistently assessing the interactions between epistemology and ethics within its research, and (3) fulfilling a responsibility to improve the situation of others.[71] As a response to wicked sustainability problems, it also tends to challenge current social practises and institutions.

This field has grown explosively over the last thirty years (since the early 1980's); it has, according to a 2011 meta-study, cultivated collaboration across space, time, and discipline. In fact, a review of the literature demonstrated that in 2000 "a giant cluster of collaboration" was formed, unifying SS as a field across a wide range of disciplines. The study illustrates that the rate of growth has been exponential; the field has been doubling approximately every 8 years.[72] Given its commitment to grounded research and real-world impact, this exponential growth is seen as an encouraging development.

Analyzing the "Evolution and Structure of Sustainability

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[69] John Dewey, *Logic: The theory of inquiry,* in *The Later Works,* 1925-1953, Vol. 12. Edited by J. A. Boydston (Carbondale: Southern Illinois UP, 1996), LW 12: 483.

[70] See M. J. Brown, "John Dewey's logic of science," *HOPOS: The journal of the International society for the history of philosophy of science* 2, Issue 2 (2012): 258-306; and C. Fehr and K. S. Plaisance, "Socially relevant philosophy of science: an introduction," *Synthese* 177, Issue 3 (2010): 301-316.

[71] Fehr and Plaisance, "Social Relevant Philosophy of Science," 310-311.

[72] L. M. A. Bettencourt and J. Kaur, "Evolution and structure of sustainability science," *Proceedings of the national academy of the sciences* 108, Issue 49 (2011): 19540-19545, http://www.pnas.org/content/108/49/19540, 19541.

Science"[73] with Frodeman's recommendations firmly at hand yields some red flags. The first red flag focuses on the exponential growth of SS scholarship. Is this a limitless good? According to the authors, it is a great thing: they say the growth of SS "bodes well for its future success at facing some of humanities' greatest scientific and societal challenges"[74] They also say the creation of a new field, "a conceptual and practical whole", around SS is *necessary* in order for it to "achieve… ambitious and urgent goals… and tangible socioeconomic impact."[75] This leads one to ponder a subsequent question: to what extent is the creation of a field of study/discipline (and the structural and logistical supports that come with it) necessary for effective, collaborative networks to flourish and sustain themselves? Indeed it would not be too hard to argue that SS is currently seeking to acquire "all the tools of the disciplines: its own conferences, journals, degrees, and departments."[76] To what extent has the movement of SS fed into the "logic of the cancer cell," operating under the assumption that explosive growth is an unlimited good? Or to what extent does SS escape this critique because it is almost always grounded in real world application, operating with its own impact in mind? And, finally, while it is clear that SS has been successful in disseminating itself, Frodeman's *Sustainable Knowledge* encourages the concerned reader to turn a more critical eye towards the outcomes of SS. Its success must also be measured by how it has addressed our sustainability challenges. How engaged in the community is SS? How connected is it to policy and governance? To business or the non-profit sector? Focusing on creating and growing a new academic field within the current system can easily lead scholars away from ensuring their work is practically relevant.
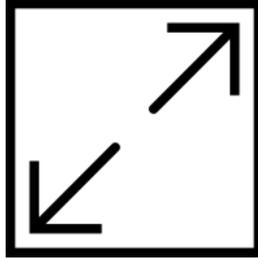
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[73] Ibid.

[74] Ibid., 19545.

[75] Ibid., 19541.

[76] Frodeman, *Sustainable Knowledge*, 40.

Dedisciplinarity (aka "blurring boundaries")

With this guide in mind, Frodeman and Briggle argue that the disciplining of philosophy within the academy was a mistake. They suggest philosophers are capable of acting as "synthesizers," "formalists," "translators," and "specialists," but that the structures of the academy have narrowed the scope of philosophic work, purifying it as a narrowly framed specialty.[77] In *Sustainable Knowledge*, Frodeman ultimately concludes that philosophers should actively engage in public problems, proposing active and engaged roles for the philosopher and the humanist more broadly: the philosopher bureaucrat and the field philosopher.[78] The philosopher bureaucrat works within public or private institutions on problems as they emerge.[79] The field philosopher starts in the world at the project level and through a messy, "problem-oriented" collaborative process integrates "knowledge production" with its use.[80] As field philosophers themselves, Thompson and Whyte provide recommendations for working in this way, suggesting the traditional philosopher's task of creating and judging the most persuasive arguments can be fruitfully reinvisioned. For instance, environmental philosophers could initiate and facilitate philosophical research through conducting community dialogues around local issues of

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[77] Frodeman and Briggle, "When philosophy lost its way."

[78] Frodeman, *Sustainable Knowledge*, 87.

[79] Robert A. Frodeman, Adam Briggle, and James Holbrook, "Philosophy in a neoliberal age," *Social Epistemology* 26, Issue 3 (2012): 18-36.

[80] Frodeman, *Sustainable Knowledge*, 108.

concern.[81]

John Dewey, responding to the problems of "over-specialization" and isolation within the academy in the early 20th century, presents remarkably similar arguments about the role of philosophy in society. He argued that philosophers should see themselves as "liaison officers."[82] In particular, Dewey suggested philosophy should interpret and utilize science in order to help envision possibilities for the future, and then facilitate movement toward those possibilities.[83] According to Dewey, philosophy should critically examine the "best available knowledge of its own time and place" in order to consider how "beliefs, institutions, customs, [and] policies" can more directly bear upon the "good."[84] Philosophy as liaison is boundary spanning, directing philosophers to consider how new knowledge is linked to possible effective and ethical uses.[85] According to Larry Hickman, Dewey "recognized that in order to solve the problems generated by our technologies in particular, and by our attitudes toward our technological milieu in general", we must cultivate a "specialized set of techniques." Hickman says Dewey "championed a new way of thinking about traditional philosophical problems designed" to address the "pushes and pulls of life in industrial democracies," especially the problems of "technology-as-culture."[86] This conception of philosophy effectively utilizes its "critical mind against the domination" of "prejudice, narrow interest, routine custom" and the divide between institutional goals and human needs.[87] Within a Deweyan framework philosophy "functions as a

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[81] Paul B. Thompson and Kyle P. Whyte, "What Happens to Environmental Philosophy in a Wicked World?" *Journal of Agricultural and Environmental Ethics* 25, Issue 4 (2012): 485-498, DOI: 10.1007/s10806-011-9344-0, 1.

[82] John Dewey, *Experience and Nature*, in *The Later Works*, 1925-1953, Vol. 1, Edited by J. A. Boydston (Carbondale: Southern Illinois UP, 1981), LW 1: 306-307.

[83] Ibid., 249.

[84] Ibid., 306.

[85] R. L. Chapman, "How to think about environmental studies," *Journal of Philosophy of Education* 41, Issue 1 (2007): 59-74.

[86] L. A. Hickman, *Pragmatism as post-postmodernism: Lessons from John Dewey* (New York: Fordham University Press, 2007), 155.

[87] Ibid., 249.

kind of go-between and translator."[88] Frodeman's recommendations for philosophy and the academy can be enriched by Dewey's pragmatism, Kolb's experiential learning model, and by recommendations derived from research on wicked problems.

For example, crucial to Frodeman's definition of field philosophy—and similarly aligned with recommendations from both Dewey and wicked problem scholars—is both its goal to lessen our problems (not resolve them)[89] and to widely disseminate the lessons learned.[90] These goals align with systemic action research practises and the public philosophy movement.[91] Success is defined by the difference one makes "on the ground," by the extent to which one changes "the world."[92] In Dewey's words we can then explore "methods for their realization in the homely everyday experience of mankind."[93] We can subject our decisions to "constant and well-equipped observation of the consequences they entail when acted upon, and subject them to ready and flexible revision in the light of observed consequences."[94] Studying the work necessary for meliorating our wicked problems, yields the conclusion that "the antidote for fragmentation is coherence, shared understanding, and shared commitment, shared meaning for terms and concepts, shared

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[88] Ibid., 155.

[89] Dewey also recommends we do more to meliorate problems. He says, "to abandon the search for absolute and immutable reality and value may seem like a sacrifice. But this renunciation is the condition of entering upon a vocation of greater vitality" (LW 4:249).

[90] While applied philosophy has demonstrated that real-world problems can benefit from philosophical reflection, it has not fully assisted "people and institutions in all walks of life with the philosophical challenges they face" (Frodeman 2014, 104). To the extent that applied philosophy works by applying top-down theoretical principles to particular situations, it gets it wrong.

[91] See the recent development of *The Public philosophy journal* and the Public Philosophy Network.

[92] Frodeman, *Sustainable Knowledge*, 111.

[93] John Dewey, *The quest for certainty: A study of the relation of knowledge and action*, in *The Later*
Works, 1925-1953, Vol. 4, Edited by J. A. Boydston (Carbondale: Southern Illinois UP, 1996), LW 4:250.

[94] John Dewey, *The Public and Its Problems*, in *Later Works*, 1925-1927, Vol. 2, Edited by J. A. Boydston (Carbondale: Southern Illinois UP, 1984), LW 2:362.

commitment for solutions that are <u>good enough</u> to get on with the real business of learning through action."[95]

On this front, there is widespread concern that philosophers working on socially relevant science are not truly engaged "on the ground." Indeed, in 2010 an entire issue of *Synthese* was devoted to this concern. A lack of interaction between philosophers of science and scientists (and the public) is especially confounding and disturbing precisely because it is a field intentionally developed to bridge the divide between the disciplines, between knowledge production and knowledge use. Like Dewey and Frodeman, Heather Douglas argues that clarity about the complex situations we confront is best achieved through "the crucible of application." Through application we "test" our "theories, see their pitfalls, and develop new approaches to old problems."[96] Further extending Dewey's work, feminist pragmatism— involving both place-based local activism and global outreach—can be harnessed as a form of participatory action research. It highlights how we might work in the community under inherently messy, dynamic situations and demands mutuality and reciprocity. As a process for flexibly and collaboratively responding to our shared problems in real time, it builds upon Dewey and Addams' work, offering much of value to engaged scholars seeking to work across diverse interests.[97]

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[95] H. Salwasser, "Confronting the implications of wicked problems: Changes needed in Sierra Nevada National Forest planning and problem solving," *Proceedings of the Sierra Nevada Science Symposium: Science for Management and Conservation*, USDA Forest Service (Albany, CA: Pacific Southwest Research Station, 2004), 7-22, 21.

[96] Heather Douglas, "Engagement for progress: Applied philosophy of science in context," *Synthese* 177, Issue 3 (2010): 317-335, 323.

[97] Lake, "Jane Addams and wicked problems."

Conclusion

In the end, Frodeman says that we should measure our success "by the extent to which" we "address the needs of others as they define them," by the extent to which we literally "change the world."[98] On this front, legitimate critiques can be raised about even the most practical fields of study. As the Value Risk Feedback loops illustrated, there are clearly overlapping institutional (including economic, political, and cultural) and individual (including, but not limited to, self-interest, limited perspectives, time, and resources) reasons for our failure to engage. With these causes in mind, we can and must value interventions along a variety of fronts; we can, for instance, do more to address the assumptions, values, and belief-systems underriding the current situation; we can seek to change current policies and procedures. We can also call for systems changes.

As Dewey noted long ago, "the only way to [really] prepare for social life, is to engage in social life."[99] Further resources can be acquired through the literature on wicked problems, participatory action research, soft systems modeling, and systemic engagement practises. Grounding this literature and the tools, processes, and recommendations it provides is a Deweyan pragmatism. Thus, it is valuable to engage Dewey's articulation of the role of philosophy, his critique of institutional lag and unreflective habit, and his pragmatic philosophy more broadly (with a focus on context, experimentalism, iterative problem-solving, fallibility, and reciprocity). While engaged, transdisciplinary scholarship does not "automatically solve more problems, nor resolve perplexities," it does enable us to grapple with our problems, to "courageously and intelligently" meliorate suffering. And while engagement does "not assure us against failure," it turns our failures into "a source of instruction."[100] And since the lag between the

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[98] Frodeman, *Sustainable Knowledge*, 111.

[99] John Dewey, *Moral principles in education*, in *The Middle Works*, 1899-1924, Vol. 4, Edited by J. A. Boydston (Carbondale: Southern Illinois UP, 1983), 267-292, MW 4:272.

[100] John Dewey, *Human nature and conduct*, in *The Middle Works*, 1899-1924, Vol. 14, Edited by J. A. Boydston (Carbondale: Southern Illinois UP, 1983), MW 14:11.

needs of our time and our dominant institutional responses is still great, since our problems are still urgent, and our responses still largely inadequate, there is a lot more work to be done.

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