Experiments in Experience: Aligning Design Inquiry with John Dewey's Pragmatism

According to Richard Buchanan, three broad strategies of design research can be seen to have emerged in the twentieth century. These include the dialectic, design science and design inquiry.[1] Within the dialectic, design is examined from a social and cultural perspective. In contrast, design science—as formulated by Herbert Simon[2]—aims to analyse and identify the underlying elements and mechanisms of the design process. Lastly, design inquiry pursues two closely related lines of investigation, focusing on either the creative power of the designer or the discipline of making.

While design science dominated from the 1970s through to the early 1990s, recent decades have seen a shift towards the strategy of design inquiry. This reorientation can, in part, be attributed to the perceived failure of design science to adequately address newly emergent problems within the field.[3] Perhaps more significantly, however, the academization of design has resulted in new communities of design research. In countries such as the UK and Australia, for example, the incorporation of art and design institutions within the university system has led to demands for practice-orientated faculty to become research active and theoretical engaged.[4] Concurrently, across the globe, the provision of

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[1] See Richard Buchanan, "Thinking About Design: An Historical Perspective," in *Philosophy of Technology and Engineering Sciences*, Vol. 9, Anthonie Meijers ed. (Amsterdam, NH: Elsevier, 2009): 409-453; and Richard Buchanan, "Strategies of Design Research: Productive Science and Rhetorical Inquiry," in *Design Research Now*, Ralf Michel ed. (Basel: Birkhäuser-Verlag, 2007): 55-66.

[2] Herbert Simon, *The Sciences of the Artificial* (Cambridge MA: MIT Press, 1969).

[3] Buchanan, "Strategies of Design Research: Productive Science and Rhetorical Inquiry": 58.

[4] Gavin Melles, "An Enlarged Pragmatist Inquiry Paradigm for Methodological Pluralism in Academic Design Research," *Artifact* 2:1 (2008): 3-11; Kristina Niedderer, "Relating the Production of Artefacts and the Production of Knowledge in Research," in *Reflections and Connections: On the Relationship between Creative Production and Academic Research,* Nithikul Nimkulrat and Tim O'Riley eds. (Helsinki: University of Art and Design, 2009): 59-67.

doctoral education in design has expanded rapidly,[5] with many students looking

to incorporate design practice within their research projects.[6]

Over the last two decades, these latter developments have given rise to a vast

literature questioning the relationship between practice and research,[7] as well as

the validity of 'practice-based' contributions to knowledge.[8] Gradually, initial

confusion[9] has given way to efforts aimed at a methodological formalization of

design inquiries undertaken within academic contexts. Here, some have

considered the extent to which 'experiential' factors can be seen to legitimately

inform the research process and its outcomes,[10] while others have sought to

reposition the tools of conventional research as directive aids for design-based

knowledge production.[11]

Though many of these contributions offer viable conceptualizations of design

practice as a method, discussions relating to the epistemological frameworks or

concerns underpinning them have been relatively limited. In place of

epistemology, attempts have been made to characterize design research as, at

[5] Victor Margolin, "Doctoral Education in Design: Problems and Prospects," *Design Issues* 26:3 (2010): 70.

[6] Owain Pedgley and Paul Wormald "Integration of Design Projects within a Ph.D.," *Design Issues* 23:3 (2007): 70-85.

[7] See, for example, Richard Buchanan, Dennis Doordan, Lorraine Justice, and Victor Margolin, eds. *Doctoral Education in Design 1998: Proceedings of the Ohio Conference, October 8–11, 1998* (Pittsburgh: The School of Design, Carnegie Mellon University, 1999); Nigel Cross, "Design Research: A Disciplined Conversation," *Design Issues* 15:2 (1999): 5-10; and Ken Friedman "Theory Construction in Design Research: Criteria, Approaches and Methods," *Design Studies* 24:6 (2003): 507-522.

[8] See, for example, Bruce Archer, 'The Nature of Research," *Co-Design Journal* 2:11 (1995): 6-13; Michael Biggs, "The Role of the Artefact in Art and Design Research" *International Journal of Design Sciences and Technology* 10:2 (2002): 19–24; and Stephen Scrivener, "Characterising Creative-Production Doctoral Projects in Art and Design," *International Journal of Design Sciences and Technology* 10:2 (2002): 25–44.

[9] For a brief overview of the confusion surrounding understandings of practice-based design research arising in relation to the UK's 1996 Research Assessment Exercise, see Carole Gray and Julian Malins, *Visualizing Research: A Guide to the Research Process in Art and Design* (London: Routledge, 2016): 3-4. Further discussion, relating to practice-based PhDs in particular can be found in Owain Pedgley and Paul Wormald "Integration of Design Projects within a Ph.D."

[10] See, for example, Michael Biggs, "Learning from Experience: Approaches to the Experiential Component of Practice-Based Research," in *Forskning- Reflektion-Utveckling* [Research-Reflection-Development], Henrik Karlsson ed. (Stockholm: Swedish Research Council, 2004): 6–21; Maarit Mäkelä "Knowing Through Making: The Role of the Artefact in Practice-Led Research," *Knowledge, Technology & Policy* 20:3 (2007): 157-163; and Kristina Niedderer, "Explorative Materiality and Knowledge. The Role of Creative Exploration and Artefacts in Design Research," *Form Akademisk- Research Journal of Design and Design Education* 6:2 (2013): 1-20.

[11] See, for example, Eva Brandt and Thomas Binder, "Experimental Design Research: Genealogy, Intervention, Argument," (paper presented at the conference of the *International Association of Societies of Design Research*, Hong Kong, 12-15, 2007); John Zimmerman and Jodi Forlizzi, "The Role of Design Artifacts in Design Theory Construction," *Artifact* 2:1 (2008): 41-45; Ilpo Koskinen, John Zimmerman, Thomas Binder, Johan Redström, and Stephan Wensveen, *Design Research through Practice – From the Lab, Field, and Showroom (*Burlington MA: Morgan Kaufmann, 2011); and Anne Louise Bang and Mette Agger Eriksen, "Experiments All the Way in Programmatic Design Research," *Artifact* 3:2 (2014): 4-1-4.14.

times, necessarily tacit.[12] Beyond this, another manoeuvre positions the design research program as the 'frame and foundation' of research that incorporates design practice;[13] furnishing activities with a core belief system, as well as a set of theoretical commitments that link the work to deeper strands within philosophy.[14]

While such proposals undoubtedly hold appeal, the general absence of an explicit, widely shared epistemological narrative dedicated to the incorporation of design practice within research is problematic. It points to evasion, suggesting that such an approach is not seen to require justification. At the same time, it also limits the potential for development and is, ultimately, regrettable.

In seeking to address this gap, a number of epistemological pairings might be advanced. For example, plausible alignment could be drawn with Nigel Cross's theory of 'designerly ways of knowing'[15] or, equally, with more general perspectives on design thinking.[16] However, given the popular focus on notions of the experimental, Donald Schön's concept of knowledge-in-practice[17] can arguably be seen to provide one of the clearest articulations of an epistemology of design inquiry yet published. Above all, his positioning of reflection in and on action as a form of inquiry lends ready support to the view that design practice can be central to the conduct of research.[18] Indeed, Schön is already widely

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[12] See Claudia Mareis, "The Epistemology of the Unspoken: On the Concept of Tacit Knowledge in Contemporary Design Research," *Design Issues* 28:2 (2012): 61-71.

[13] Thomas Binder and Johan Redsröm, "Exemplary Design Research," (paper presented at the DRS Wonderground Conference, November, 1-4, 2006); also see Brandt and Binder, "Experimental Design Research: Genealogy, Intervention, Argument"; and Koskinen et al., *Design Research through Practice – From the Lab, Field, and Showroom.*

[14] Koskenin et al., *Design Research through Practice – From the Lab, Field, and Showroom*, 39

[15] According to this view design practice constitutes a complex, unique mode of knowledge production distinct from the arts and sciences. See Nigel Cross, *Designerly Ways of Knowing* (Basel: Birkhäuser-Verlag, 2007).

[16] See, for example, Kees Dorst, "Design Research: A Revolution-Waiting-to-Happen," *Design Studies* 29:1 (2008): 4-11; Richard Buchanan, "Wicked Problems in Design Thinking," *Design Issues* 8:2 (1992): 5-21; and Bryan Lawson, *How Designers Think: The Design Process Demystified* (London: Routledge, 2006).

[17] Donald Schön, *The Reflective Practitioner* (New York: Basic Books, 1983): 69.

[18] According to Schön, in order resolve problematic situations professional practitioners will conduct live, practical experiments with a view to understanding and changing the situation. Underpinning this experimental process is the professional's ability to reflect in and on action. Amongst other functions, reflection is seen to allow for the formulation of

referenced in design research literature concerned with exploring practice-research relationships.[19]

This apparent alignment points, in turn, to another, deeper alignment. Namely, to the connection between Schön and the Pragmatist philosopher John Dewey, whose theory of inquiry inspired the underlying structure of Schön's approach.[20] Though design scholars tend to pay comparatively less attention to Dewey's work, his aesthetics and pedagogy can be seen to have had a direct and profound influence on the broader field of design. This is perhaps most immediately evident in the context of design education. Here, Dewey's connections with László Moholy-Nagy[21] and John Andrew Rice led to an involvement in the establishment of both the New Bauhaus[22] in Chicago and North Carolina's Black Mountain College.[23] By the time the New Bauhaus became the Institute of Design, *Art as Experience* (1934) was required reading in the product design workshop.[24][25] Latterly, the book's chapter "Having an Experience" informed the incorporation of design thinking within HCI work at the Palo Alto Research Centre and, subsequently, went on to become a foundational text within the discipline.[26] This influence has continued up to the

hypotheses, as well as the evaluation of the result. Over time, the accumulative application of reflection is seen to take the form of an extended 'reflective inquiry', thus redefining practice as an active research process.

[19] See, for example, his extensive citation throughout Michel ed., *Design Research Now*.

[20] Schön, *The Reflective Practitioner*, 357. Also see Donald Schön, "The Theory of Inquiry: Dewey's Legacy to Education," *Curriculum Inquiry,* 22:2 (1992): 119-139.

[21] See, Mary Jane Jacob and Jacquelynn Baas, eds. *Chicago Makes Modern: How Creative Minds Changed Society* (Chicago: School of the Art Institute of Chicago, 2012); and Alain Findeli, "Design Education and Industry: The Laborious Beginnings of Institute of Design in Chicago," *Journal of Design History* 4:2 (1991): 97-113.

[22] See, Findeli, "Moholy-Nagy's Design Pedagogy in Chicago (1937-46)," *Design Issues* 7:1 (1990): 4-19.

[23] Katherine Reynolds, "The Influence of John Dewey on Experimental Colleges: The Black Mountain Example," (paper presented at the American Educational Research Association Conference, April 22, 1995).

[24] Findeli, "Moholy-Nagy's Design Pedagogy in Chicago (1937-46)."

[25] It has also been claimed that Dewey's work partially informed the development of Tomás Maldonado's semiotics at the Ulm School in Germany in the 1950s. See, Klaus Krippendorff, *The Semantic Turn: A New Foundation for Design* (Boca Raton: CRC Press, 2006): 306.

[26] See, Buchanan, "Thinking About Design: An Historical Perspective", 418.

present, with Dewey's theories of experience still inspiring much discussion among the interaction design community.[27]

Given the depth of Dewey's impact on design in general, it is surprising how few authors have directly explored the implications of his broader philosophy for design research.[28] Most strikingly, there has been little investigation of his epistemological approach—especially when considered against the wide referencing of Schön.

It is my belief that the field has much yet to gain from a coherent overview of Dewey's extensive body of work. In particular, I wish to put forward the argument that Dewey offers a more expansive approach to knowledge than can be found in Schön; one which, if carefully examined and appropriated, has much to offer design research. Accordingly, through the remainder of this article I aim to do two things. Firstly, to provide an outline of Dewey's approach to knowledge and, secondly, to highlight a number of its features, which, I believe, hold the potential to enrich the epistemological basis of design inquiry.

Before proceeding, to avoid confusion, a distinction must be drawn between the concept of knowledge as it pertains to design research and knowledge in the context of individual acts of learning, i.e., the difference between 'it is known' versus 'I know'. The latter points to personal endeavour; while the former implies that a particular set of techniques and procedures—recognized by a specific knowledge community—have been applied, leading to outcomes, which

27 See, for example, Peter Wright and John McCarthy, *Technology as Experience* (Cambridge MA: MIT Press, 2004); Erik Stolterman, "The Nature of Design Practice and Implications for Interaction Design Research," *International Journal of Design* 2:1 (2008): 55-65; and Peter Dalsgaard and Christian Dindler "Between Theory and Practice: Bridging concepts in HCI research," in *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (New York: ACM, 2014): 1635-1644.
28 For some strong examples of those who have see Buchanan, "Wicked Problems in Design Thinking"; Peter Dalsgaard, "Pragmatism and Design Thinking," *International Journal of Design* 8:1 (2014): 143-153; Melles, "An Enlarged Pragmatist Inquiry Paradigm for Methodological Pluralism in Academic Design Research"; Gavin Melles, "New Pragmatism and the Vocabulary and Metaphors of Scholarly Design Research," *Design Issues* 24:4 (2008): 88-101; and Leif E. Östman, "A Pragmatist Theory of Design," (PhD diss., Royal Institute of Technology, Stockholm, 2005).

advance the investigations of that community. In highlighting Dewey's

epistemological approach, then, I am examining its applicability to the formal

process of knowledge production in design research, as opposed to the work of

professionals operating solely within the domain of design practice.

John Dewey's Pragmatism

Alongside Charles Sanders Peirce (1839-1914), William James (1842-1910) and

George Herbert Mead (1863-1931), John Dewey's (1859-1952) work sits within

the classical Pragmatist tradition; a movement that coalesces around a series of

core concerns relating to knowledge, meaning, truth and value. Though gradually

usurped by logical positivism in the late 1930s,[29] numerous followers continued

to pursue key Pragmatist themes through the following decades of twentieth

century. This includes Richard McKeon, whose important investigations of

rhetoric have been related to the study of design.[30] More recently, the Neo-

Pragmatism of Richard Rorty[31] and others has led to a resurgence of interest in

classical Pragmatist philosophy.

In broad terms, Dewey's own unique Pragmatism can be seen to bridge

Peirce's critical and scientific interests with James's concern for moral

implications. Throughout his work, an almost constant focus is directed towards

the relation between science and human value.[32] Equally, underpinned by what

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[29] Richard Bernstein, *The Pragmatic Turn* (Malden MA: Polity, 2010): 11-12.

[30] McKeon was a student of Dewey's at Columbia and eventually a professor at the University of Chicago. Examining McKeon's investigations of rhetoric from the perspective of design, Richard Buchanan has identified a wealth of connections between the two. See, Richard Buchanan, "Design and the New Rhetoric: Productive Arts and the Philosophy of Culture," *Philosophy and Rhetoric* 34:3 (2001): 183-206

[31] Horace Standish Thayer, *Meaning and Action: A Critical History of Pragmatism (*Indianapolis: Bobbs Merrill Co., 1968): 165.

[32] See, Richard Rorty, *Philosophy and the Mirror of Nature* (Princeton: Princeton University Press, 1979). It is important to note that though Rorty champions Dewey as one of the greatest philosophers of the twentieth century, he has been accused of misreading the work. It particular, a number of critics find his rejection of Dewey's belief in the possibility of social reconstruction objectionable. See, for example, James Campbell "Rorty's Use of Dewey," *The Southern Journal of*

has been interpreted as a melioristic spirit,[33] we find a long-term commitment to the possibility of enabling a democratic reconstruction of the social world.[34] Through this broad thematic reach, it is perhaps unsurprising that his contributions extend across many fields, including education, psychology, sociology, aesthetics and politics.[35]

While the readings of Dewey which follow are my own, I have been guided by the work of two leading scholars, Ralph Sleeper and Larry Hickman. Both offer keenly insightful perspectives on Dewey's work, perceptively describing its core features, as well as highlighting its contemporary implications. Of the two, however, it is Sleeper who develops the most compelling presentation. On his account, if we are to understand Dewey in holistic terms, we must understand how his theory of inquiry relates to his metaphysics through a theory of communication.[36] This basic thesis guides the structure of following sections, where my primary focus will be directed towards two texts in particular: *Logic: A Theory of Inquiry* (1938) and *Experience and Nature* (1925). The former presents what is perhaps Dewey's clearest statement on the subjects of inquiry and logic, while the latter may be understood as a background to this, setting out Dewey's metaphysics.

At the outset, it is important to highlight that Dewey's philosophy has not avoided criticism. In fact, there is an entire volume compiling various, sometimes

Philosophy 22:2 (1984): 175-187; Ralph W. Sleeper, *The Necessity of Pragmatism* (New Haven: Yale University Press, 1986); and Bernstein, *The Pragmatic Turn*.

[33] Sleeper, *The Necessity of Pragmatism.*

[34] James Campbell, "A History of Pragmatism," in *The Bloomsbury Companion to Pragmatism*, Sami Pihlström ed. (London: Bloomsbury, 2015).

[35] Larry Hickman, Foreward to *Unmodern Philosophy and Modern Philosophy*, by John Dewey, Philip Deen ed. (Carbondale: Southern Illinois University Press, 2012): xiii-xi.

[36] Sleeper, *The Necessity of Pragmatism*, 6-7.

high-profile attacks and critiques mounted by his contemporaries.[37] For the most part, these focus on aspects of Dewey's metaphysics, often questioning the extent to which it can be seen as a metaphysics at all or the particular version of reality it presents.[38] Another area of contention concerns his theory of inquiry and its relationship to formal logic.[39] More recently, Rorty—a champion of Dewey in general—has dismissed his metaphysics as a mistake.[40]

Given the radical nature of many of Dewey's proposals, such criticisms are understandable. Approaching the work without prior orientation, some pronouncements can appear ill-conceived or misguided, leading to much confusion in the literature. However, as is the frequent plea of Dewey's admirers, slow, careful and systematic readings of the works, combined with reference to the full breath of available sources, can yield a rich and rewarding insight into human action and its potential.

Dewey's Theory of Inquiry

Though unique in itself, Dewey's theory of inquiry can be seen to directly appropriate a number of core concepts drawn from Charles Sanders Peirce's 'doubt-belief' theory.[41] In this work, Peirce explored the role of human psychology within the evolutionary process. On his view, in order to survive, the human organism must continually engage in cycles of moving from a state of doubt to a state of belief. When in doubt we are 'uneasy and dissatisfied' and, as a

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[37] Sidney Morgenbesser, ed. *Dewey and his Critics: Essays from the Journal of Philosophy* (Lancaster PA: Lancaster Press, 1977).

[38] See, for example, George Santayana, "Dewey's Naturalistic Metaphysics", in *Dewey and his Critics: Essays from the Journal of Philosophy*, Sidney Morgenbesser ed. (Lancaster PA: Lancaster Press, 1977): 343-358.

[39] See, for example, Bertrand Russell, "Professor Dewey's "Essay's in Experimental Logic,"" in *Dewey and his Critics: Essays from the Journal of Philosophy*, Sidney Morgenbesser ed. (Lancaster PA: Lancaster Press, 1977): 231-252.

[40] Richard Rorty, *Consequences of Pragmatism: Essays, 1972-1980* (Minneapolis: University of Minnesota Press, 1982).

[41] Thayer, *Meaning and Action: A Critical History of Pragmatism*, 171; Sleeper, *The Necessity of Pragmatism*, 49.

result, are required to initiate 'a struggle to attain a state of belief'—a process that Peirce refers to as 'inquiry'.[42]

Through his appropriation, Dewey refashioned Peirce's original theory into an organic, naturalistic presentation of inquiry, allowing it to account for both the emergence of the scientific method, as well as formal logic.[43] On this reframing, instead of being understood as 'unobservable, transcendental and "intuitional,"' logic would become empirical and observable.[44] Though both doubt and belief were retained as the theory's start and end points, knowledge was now positioned as inquiry's 'product'.[45] By way of definition, Dewey sets forth the following statement:

'Inquiry is the controlled or directed transformation of an indeterminate situation into one which is so determinate in its constitute distinctions and relations as to convert the elements of the original situation into a unified whole.'[46]

Dewey proposed that, in all cases, the process could be observed to follow a more or less coherent sequence, referred to as the 'pattern of inquiry'. For Dewey, this is seen to begin when we alight upon a questionable situation. Such a situation may be 'troubled, ambiguous, confused, full of conflicting tendencies,

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[42] Charles Sanders Peirce, *The Essential Peirce, Selected Philosophical Writings, Volume 1, 1867-1893*, Nathan Houser and Christian Kloesel eds. (Bloomington: Indiana University Press, 1992). See in particular "The Fixation of Belief" and "How to Make Our Ideas Clear".
[43] Sleeper, *The Necessity of Pragmatism*, 50
[44] John Dewey, *The Later Works, 1925-1953, Vol. 12: 1938*, Jo Ann Boydston ed. (Carbondale: Southern Illinois University Press, 1987): 107. For Dewey, logic is best understood as emerging through our real world interactions; the successes and failures of approaches to action as we seek to respond to the situations we encounter. Accordingly, an appropriate theory of logic would, on his view, position structured logical understanding as the outcome of competent inquiry, which may inform future inquiries. In this way, logic becomes a *theory of inquiry*.
[45] Ibid., 15-16.
[46] Ibid., 108.

obscure' and so on. Dewey is keen to stress that these traits belong to the situation and not to the individual or group who are initiating the inquiry.[47]

Questioning directs us toward a wider set of considerations. Perhaps most significant among these is the need to set or, as Dewey has it, 'institute' a clearly defined problem. This frames the inquiry and becomes, according to Dewey, 'the criterion' from which the 'relevancy and irrelevancy of hypotheses and conceptual structures' are to be judged. From here, solutions may be conceived and evaluated. However, progress towards a solution presents a number of challenges.

In outlining the process, Dewey binds together a series of interrelated intellectual and practical activities that are seen to lead eventually to the close of inquiry. As an initial step, in order to identify a valid problem, we must first attend to the immediate existential facts of the situation.[48] Against these, solutions may 'flash upon us, occur to us' in the form of suggestions or possibilities. Suggestions and possibilities will evolve into ideas as we examine their 'functional fitness' and their 'capacity as a means of resolving the given situation'.[49] Here, they become 'anticipated consequences (forecasts) of what will happen when certain operations are executed under and with respect to observed conditions'.[50] Following on from this, once an idea is formed, its 'meaning contents' must be considered in relation to the inquiry as a whole. According to Dewey, this occurs through a process of reasoning wherein the consequences of selecting a given meaning are checked against its impact on the

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[47] Ibid., 109.
[48] Ibid., 112-113. By way of example, Dewey considers the sounding of a fire alarm. There is much that we will be able to identify as fact, such as the likely presence of a fire, the position of the exits, and the behaviour of others. Such material is said to 'constitute the terms of the problem', which must be taken into account if we are to arrive at a relevant solution.
[49] Ibid., 113-114.
[50] Ibid., 113.

system of meanings that have been developed within the course of the inquiry. This is likely to result in an idea's modification as it is transformed through gradual iteration, becoming 'more clearly relevant to the problem at hand'.[51]

Underpinning the above stages is Dewey's belief that inquiry is carried forward and ultimately brought to a close through the constant operational interaction of facts (i.e., existential material) with ideas (i.e., non-existential material). Facts lead to ideas; ideas lead to experiments or other 'operations of observation' wherein further facts may be gathered.[52] The overall cycle relies on the productive application of both.

Interestingly, apart from the stipulation that indeterminate situations must become increasingly determinate, we are not offered a clear insight into the endpoint or closure of inquiry. This may be due to Dewey's insistence that no inquiry is final in and of itself. Indeed, no set of conclusions, he argues, can avoid the possibility of future revision or adaption.[53] Thus, rather than define the process of closure, Dewey invokes the concept of attaining knowledge as the means by which inquiry is settled. Here, we are told:

'That which satisfactorily terminates inquiry is, by definition, knowledge; it is knowledge because it is the appropriate close of inquiry.'[54]

Use of the words 'satisfactorily' and 'appropriate' here imply that, at the end of an inquiry, a pre-existing set of aims or objectives will have been fulfilled or at

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[51] Ibid., 115.
[52] Ibid., 116.
[53] Ibid., 16. Dewey presents this as follows: '[...] inquiry is a continuing process in every field with which it is engaged. The "settlement" of a particular situation by a particular inquiry is no guarantee that *that* settled conclusion will always remain settled. The attainment of beliefs is a progressive matter; there is no belief so settled as to not be exposed to further inquiry.'
[54] Ibid., 15.

least approached. What we are left with is 'an object of knowledge'; that is, a known object, which may guide and inform further inquiry.

Sensibly, against this latter stance, Dewey avoids of any discussion of 'truth' as a strictly defined concept relating to a correspondence with reality. Indeed, the possibility of final and absolute access to truth would inevitably conflict with an understanding of inquiry as a 'continuing process.' By way of alternative, the notion of 'warranted assertibility' is introduced. Though less crisp a term than truth,[55] warranted assertibility offers a flexible approach to the concept of validity within the conduct of inquiry. Specifically, it refers to the presentation of a set of reasonable conclusions, which are seen to arise out of competent practice[56] and hold clear applicability to the conduct of future inquiries.[57] As such, value is recognized at the same time as allowing for future revision.

From the above outline, it will be apparent that the pattern focuses on the activities that direct inquiry rather than its abstract underpinnings. As Morgenbesser puts it, Dewey very much saw inquiry as a 'species of action'[58] and not a purely intellectual pursuit. To be sure, on the Deweyan understanding, it is a species of action that is firmly located in ordinary life. Indeed, Dewey went so far as to claim that his pattern of inquiry was as applicable to everyday 'common sense' inquiries as to scientific endeavour. In fact, the two are seen as linked, with common sense inquiry attending to issues of 'use and enjoyment' in holistic real-world situations and science aiming to abstract from this, resulting in contingent knowledge. Returned to everyday experience, such knowledge is said to refine, expand and liberate the 'contents of and the agencies at the disposal of

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[55] Sleeper, *The Necessity of Pragmatism*, 134.
[56] Dewey, *The Later Works, 1925-1953, Vol. 12: 1938*, 108.
[57] Ibid., 120.
[58] Morgenbesser, *Dewey and his Critics: Essays from the Journal of Philosophy,* xxiv.

common sense'.[59] Consequently, though common sense and science differ in the *types* of problems they examine, they are not viewed as metaphysically or ontological different.[60]

To a large degree, this linking of common sense and science relies on Dewey's proposal that two broad 'existential' matrices, one biological and the other cultural, necessarily frame and advance inquiry. Biologically, the human organism is considered in strictly functional terms, relating to our sensory, motor, and nervous systems.[61] Culturally, however, the relevant social factors are drawn into focus, with a particular emphasis being placed on language and its consequences.[62] Here, we encounter Dewey's theory of communication.

Dewey's Theory of Communication

For Dewey, human communication is manifest not only in speech and writing but also, more expansively, in all modes of art and music.[63] Accounts detailing the process of communication and its consequences appear throughout his works.[64] Among these, perhaps the sharpest outline may be seen to form the central pivot of *Experience and Nature.* In this text Dewey sets out to challenge traditional conceptions of the relationship between the 'external' world and the human mind. On his reconfiguration, communication, or more specifically language, is presented as a 'naturalistic link' between the physical world and what is generally thought of as the ideal.[65] Indeed, for Dewey, it is the material-

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[59] Dewey, *The Later Works, 1925-1953, Vol. 12: 1938*, 71-72.
[60] Larry Hickman, *Pragmatism as Post-Postmodernism: Lessons from John Dewey* (New York: Fordham University Press, 2007): 212.
[61] Dewey, *The Later Works, 1925-1953, Vol. 12: 1938*, 30.
[62] Ibid., 48-49.
[63] Larry Hickman, *Philosophical Tools for Technological Culture: Putting Pragmatism to Work (*Bloomington, IN: Indiana University Press, 2001): 46-47.
[64] The particular titles I have in mind include *Experience and Nature, Art as Experience* and *Logic: The Theory of Inquiry.*
[65] John Dewey, *Experience and Nature* (1929; rpt. New York: Dover Publications Inc., 1958): xiii.

intellectual interactions that occur in language, which have led to there being any concept of the ideal or spiritual to begin with.[66]

His argument advances from the view that communication may be understood to be both 'consummatory as well as instrumental'.[67] Consummatory because our immediate experiences are enhanced as we enjoy the consequences of exchange and understanding. Instrumental because, through communication and language, we are able to establish cooperation within a joint activity.[68] Following on from this, we are said to gradually develop shared meanings concerning the foreseen consequences of the activities we undertake in partnership. The development of such shared meanings amounts to a gradual consolidation of the relationships between persons, things and consequences. Over time, 'pronounced instances of meaning' may be formed, which, in turn, are said to constitute the 'essence' of particular relationships within given cultures.[69]

While this process of consolidating meaning is seen as one of the primary long-term outcomes of communication, Dewey goes on to say that such meanings are not applied restrictively. Rather, he claims, meanings are continually being experimented with. In communication we often stretch them, testing whether or not they may be profitably transferred to any novel cases we might encounter.[70] Such testing is seen to form the basis of new thinking.

'Meaning, fixed as essence in a term of discourse, may be imaginatively administered and manipulated, experimented with. Just as we overtly

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[66] Ibid., 171.
[67] Ibid., 202.
[68] Ibid., 179.
[69] Ibid., 182.
[70] Ibid., 188.

manipulate things, making new separations and combinations, thereby

introducing things into new contexts and environments [...]'[71]

For Ralph Sleeper, such statements indicate an understanding of

communication as transformational.[72] In other words, following Dewey's

argument, communication may be seen as a process through which our

conceptualizations of the relationships between of persons, things and

consequences may be redirected and altered. Sleeper goes on to suggest that, in

the Deweyan approach, the way we view existence itself may be seen as

undergoing continual transformation through communication. This links us at

last to Dewey's own particular brand of metaphysics.

Dewey's Metaphysics

Metaphysics has traditionally been presented as the study of what exists,

examining in particular the properties of existent things, their relationships, as

well as the structure of reality as a whole. While many metaphysical conclusions

are at least partly based on direct empirical evidence, 'hunches and intuitions of

truth' are also permissible when 'secure knowledge is unavailable'.[73] From the

beginning of the twentieth century, Dewey had been questioning the extent to

which this classical framing could be sustained.[74] In *Experience and Nature*

(1925) he proposed a full-scale reconstruction of the discipline.

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[71] Ibid., 194.
[72] Sleeper, *The Necessity of* Pragmatism, 120.
[73] Robert C. Koons and Timothy Pickavance, *Metaphysics: The Fundamentals* (London: John Wiley & Sons, 2015): 2.
[74] John Dewey, "The Subject Matter of Metaphysical Inquiry", in *Dewey and his Critics: Essays from the Journal of Philosophy*, Sidney Morgenbesser ed. (Lancaster PA: Lancaster Press, 1977): 317. In 'The Subject-Matter of Metaphysical Inquiry' Dewey presented an initial proposal outlining a revised role for the discipline. Through reformation, he argued, metaphysics could become a science focused on the identification and articulation of 'the ultimate traits of the world' It would be concerned not with specifics, as is the case in the natural sciences for example, but instead with the generalities of existence.

The text opens with the argument that experience and nature should not be seen as separate. Experience, we are told, is '*of* nature as well as *in* nature'.[75] It is through experience that we encounter a world, which is anything but 'sure, regular and finished'. Rather, the world we come to know in daily life is a blend of 'sufficiencies, tight completeness, order' and 'recurrences', as well as 'singularities, ambiguities,' and 'uncertain processes'.[76]

Against this complexity, existence is said to be comprised of events.[77] On Dewey's account, events draw together human life in an unbounded completeness, weaving the personal, the social and the material into one complex interaction. As was highlighted in the previous section, Dewey believes that it is through social discourse that we are able to identify and articulate the meaning of things, to draw them into focus, as well as to expand upon them. Further to this, in events, language is said to allow us to convert felt qualities into the 'objective differences' between things. Feelings come to make sense. We can identify and discriminate between 'pains, pleasures, odors, colors, noises, tones'.[78] As such qualities are seen to arise through 'the complex and extensive interaction of events', Dewey insists that they must be understood as holding a 'natural existential status'.[79] In other words, he believes that they belong as much to the situation as to the individual. In holding a natural existential status, qualities are presented as the 'ends, terminals, arrests, enclosures' of nature. On this view, nature may be seen as 'an affair *of* affairs'; a linked up set of ends and beginnings which each hold qualities.[80]

[75] Dewey, *Experience and* Nature, 4a.
[76] Ibid., 47.
[77] Ibid., 71
[78] Ibid., 258-259
[79] Ibid., 265.
[80] Ibid., 96.

The text concludes with an exploration of the relationship between existence, values and philosophy. We are told that 'natural ends' necessarily present intrinsic, immediately recognizable values.[81] In light of this, Dewey believes that, were it appropriately contextualized, philosophy would become 'a method of discriminating among goods on the basis of the conditions of their appearance and of their consequences';[82] that is, a method of criticism or 'a criticism of criticisms'. This method, when properly pursued as a means of inquiry, would result in the institution and perpetuation of 'more enduring and extensive values'.[83]

Following on from this proposed redirection of philosophy and the preceding theory of existence, a reconstructed metaphysics would aim, we are told, towards 'a statement of the generic traits manifested by existences of all kinds without regard to their differentiation between the physical and the mental'. These would likely include: 'qualitative individuality and constant relations, contingency and need, movement and arrest'. While the identification of such traits would never be final, they would begin to provide philosophy with a 'ground map', guiding criticism towards 'more intricate triangulations' in its investigation of values.[84]

A Deweyan Framework for Knowledge

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[81] Ibid., 396. To trace some of Dewey's examples, in our natural experience qualities such as poignancy, humour, zest, tragedy and beauty are all implicitly approached in terms their being 'fugitive and precarious, positive and negative' and 'indefinitely diversified'.
[82] Ibid., 396.
[83] Ibid., 403.
[84] Ibid., 412-413.

It is often noted that Dewey never developed a formal epistemological theory, at least not in the traditional sense.[85] By way of alternative, some suggest that his theory of inquiry may be seen to function as a stand-in, i.e., fulfilling a similar role.[86] To a degree, this is true, however, as was alluded to earlier, Ralph Sleeper presents a compelling argument in favour of seeing Dewey's approach to knowledge as being distributed across the three theories outlined above.

At the outset, Sleeper centralizes the theory of inquiry and highlights how, as an approach to understanding logic, it should be seen as taking *experience* as it subject matter. Following on from John McDermot, he argues that, from Dewey's perspective, experience is to be understood as 'pedagogical'; it teaches and, through reflection, we learn.[87] By reflecting on our experiences in the experimental settings of both common sense and scientific inquiry we are able to arrive at objects of knowledge or, to put it in clearer terms, *known* objects. This is key; for when *unknown* objects are transformed into *known* objects we inevitably transform our understanding of their placement in the world, which, consequently, is itself transformed. As Sleeper states:

'The thing is not merely seen differently as a result of inquiry, nor is the difference merely the effect of causal factors present in the operations of inquiry, which intervene between the non-cognitive object and the object as known. For the object, by being placed in wholly new relationships becomes a

[85] Hickman, *Philosophical Tools for Technological Culture: Putting Pragmatism to Work*; John R. Shook, *Dewey's Empirical Theory of Knowledge and Reality* (Nashville: Vanderbilt University Press, 2000); Sleeper, *The Necessity of* Pragmatism; George Dykhuizen, *The Life and Mind of John Dewey* (Carbondale: Southern Illinois University Press, 1973).
[86] Hickman, *Pragmatism as Post-Postmodernism: Lessons from John Dewey*, 206
[87] Sleeper, *The Necessity of* Pragmatism, 6.

different object. The transaction that takes place in inquiry reconstructs the object by reconstructing its relations.'[88]

From the above, we connect to Dewey's metaphysics. For Sleeper, this functions as a background theory to the whole. Through it, experience is connected to nature, mind to body, thought to action, communication to the things of the world and consequences to value. There is no longer any awkward, imposed disjunctions or arbitrary separations between the world and our full physical and intellectual participation within it. In the simplest terms, inquiry as a natural process gives us access to nature. To restate this more fully, we apply intelligence and reflection—which are seen as natural—as we inquire and, broadly, through inquiry, we gradually come to understand the structures of existence such that we can offer adequate criticism on subjects of belief, conduct and appreciation.

The wholeness of this arrangement, Sleeper believes, relies on Dewey's theory of communication, which he argues connects the theory of inquiry to the theory of existence. On this view, language allows us to establish a relationship between things in experience and things in existence.[89] In other words, by bundling the people, things, and consequences of inquiry together as meanings, language also carries our ontological understandings forward. It is the tool that allows us to project from experience to an understanding of existence.

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[88] Ibid., 121.
[89] Ibid., 116.

An Enrichment of Design Research

In recent years, Richard Buchanan and others[90] have drawn links between Dewey's theory of inquiry and design research. Through Sleeper's investigation, the possible relevancy of the theory is extended further. Specifically, the Deweyan framework he reveals—linking, as it does, people, things and consequences in relation to knowledge— points to the possibility of a strengthened epistemological narrative for research which incorporates design practice. Examining this framework in detail, it is possible to identify a number of features, which, taken collectively, begin to scaffold such a narrative.

The first feature is Dewey's explicit naturalization of thought, ideas, meanings and imagination, as supported by his theorization of a 'biosociocultural continuity'[91] within the metaphysics. On this view, thought, ideas and meanings are not understood in opposition to nature but, rather, are *of* nature, arising in action. As such, the creativity of designers and other professionals is no longer an anomalous, extra-natural occurrence but rather a finely honed ability to move between problems and solutions, solutions and problems in the real world; an outcome of an experimentation with meanings in discourse and, equally, a necessary process at play within inquiry.

The second feature concerns Dewey's identification of two types of inquiry—common sense and scientific. The two are distinguished in terms of their subject matter and priorities but not their basic logic or metaphysical standing and, as such, are seen as related along a continuum. A parallel can be

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[90] See, for example, Buchanan, "Thinking About Design: An Historical Perspective"; Buchanan, "Strategies of Design Research: Productive Science and Rhetorical Inquiry"; Leif E. Östman, "A Pragmatist Theory of Design"; and Peter Dalsgaard "Designing Engaging Interactive Environments: A Pragmatist Perspective." (Aarhus, Denmark: Aarhus University, 2009).

[91] Raymond Boisvert, *John Dewey: Rethinking our Time* (Albany: State University of New York Press, 1998): 127.

drawn here between design practice and design research.[92] Both have specific

aims and priorities (e.g., the development and delivery of products, services and

experiences, versus the production of knowledge) but they are not logically

different. In each case the inquirers—one a designer, the other a design-

researcher—move from indeterminacy to situations that are increasingly

determined. From this perspective, the incorporation of design within a research

project is unproblematic. Indeed, it may even be necessary or desirable.[93]

The third feature of note is Dewey's concept of warranted assertibility. Here,

workable, viable (objects of) knowledge are valued for their applicability to

future inquiries, as opposed to any supposed correspondence to an ultimate

reality.[94] The relevance of this feature for design research has been highlighted

by a number of authors.[95] It is found to be a particularly compelling concept as it

suggests that competency, contextual appropriateness and transferability[96] can

legitimately underscore an inquiry's conclusions.

This links to the final and perhaps most significant feature of the framework

relating to the claim put forward by Sleeper that Dewey sees inquiry as a process

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[92] Richard Buchanan has related Schön's approach to Dewey's concept of common sense inquiry. See Buchanan, "Strategies of Design Research: Productive Rhetorical Inquiry", 63.

[93] Dewey believed that the findings of science should, as a matter of course, be returned to the world of common sense. However, he was not convinced that this was routinely achieved. Though much has changed since Dewey's time, design research can, arguably, be said to present a means by which links may be forged between the two domains. Indeed, in the late 1990s Buchanan proposed that doctoral education in design might be based on a 'neoteric' approach to education that 'gather[s] resources from any area of previous learning in order to find new ways of addressing the new problems, thereby creating a new body of learning and knowledge.' See, Richard Buchanan, "The Study of Design: Doctoral Education and Research in a New Field of Inquiry," in *Doctoral Education in Design 1998: Proceedings of the Ohio Conference, October 8–11*, 1998; and Richard Buchanan, "Design research and the new learning," *Design Issues* 17:4 (2001): 3-23.

[94] For philosopher Larry Hickman, the fallibilism inherent in this concept contributes to what he terms a 'post-postmodern' character in Dewey's work. According to Hickman, this emerges in Dewey's effective rejection of the central claims of modernist thought (e.g., dualism of mind and body; that certain knowledge is attainable) but also his avoidance of the subsequent excesses of post-modernism (e.g., that no one viewpoint can be privileged over any other). As such, Dewey is seen to have anticipated postmodernist arguments at the same time as avoided some of the movement's more negative conclusions. See Hickman, *Postmodernism: Lessons from John Dewey*.

[95] See, for example, Stolterman, "The nature of Design Practice and Implications for Interaction Design Research"; and Wolfgang Jonas, "Design Research and its Meaning to the Methodological Development of the Discipline," in *Design Research Now*, 187-206.

[96] There is a parallel here with the constructionist evaluation criteria of credibility, transferability, dependability and conformability first proposed by Lincoln and Guba. See Yvonna S. Lincoln and Egon G. Guba, Naturalistic Inquiry (Newbury Park, CA: Sage Publications, 1986). For a discussion of possible evaluation criteria for research through design in the context of HCI see John Zimmerman, Jodi Forlizzi, and Shelley Evenson, "Research Through Design as a Method for Interaction Design Research in HCI," in *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (New York: ACM, 2007): 493-502.

of ontological transformation. On this account, the inquirer works to convert

unknown objects into known objects and, so, reconstructs these entities along

with the wider network of relations they sustain. Arguably, design inquiries can

be seen to go further in that novel things may be developed and deployed in

social situations, leading to novel consequences. People, things and

consequences are then drawn together in new ways, resulting in new meanings

and wholly new sets of relations. From this perspective, design inquiries not only

transform things encountered, but also the range of things, consequences and

meanings available to encounter.

This strategy has been widely explored in design research. For example,

Dunne and Raby's critical design[97] and Walker's development of propositional

objects[98] can be seen to include the active interrogation of ontological themes as

a function of inquiry. In both cases, scenarios and artefacts are designed with the

explicit aim of questioning assumptions and expanding possibilities. Further

parallels can be found in the work of Krippendorff and Verganti, who both

investigate design's relationship with meaning. For Krippendorff, design is a

process which disrupts present stabilities;[99] 'meaning', he claims, is constituted

in the use of its outcomes.[100] Similarly, Verganti argues that, through 'in-depth

explorations of the evolution of society, culture and technology', designers are

capable of radically innovating product meanings.[101]

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[97] Antony Dunne and Fiona Raby. *Design Noir: The Secret Life of Electronic Objects* (Basel: Birkhser, 2001); Antony Dunne and Fiona Raby. *Speculative Everything: Design, Fiction, and Social Dreaming* (Cambridge MA: MIT Press, 2013).
[98] Stuart Walker, *Designing for Sustainability: Making Radical Changes in a Material World* (Oxon: Routledge, 2014).
[99] Krippendorff, *The Semantic Turn: A New Foundation for Design*, 210.
[100] In formulating his semantic theory of design, Krippendorff draws heavily on the work of Wittgenstein. In particular, he focuses on Wittgenstein's 'meaning in use' concept. Though this is not a Deweyan perspective, the two views are not necessarily incompatible. See Stephen Toulmin, Introduction to *The Quest for Certainty, The Later Works, 1925-1953: 1929, Vol. 4*, by John Dewey, Jo Ann Boydston ed. (Carbondale: Southern Illinois University Press, 1984): vii-xxii.
[101] Verganti, *Design Driven Innovation* (Boston: Harvard Business School Publishing, 2009): xi.

Lining up the features in sequence, then, naturalized creative thought is linked to the conduct of design inquiry—in both its practical and academic forms—which, in turn, is linked to an understanding of knowledge as contingent and ontologically transformative. Taken as a whole, this arrangement begins to trace an outline of an epistemological narrative for design research that draws it into an explicit relationship with design practice. Set next to one another, both are seen to share a basic logic and, yet, at the same time, both retain a particular, specific set of aims and priorities—with design research focusing exclusively on knowledge production. Following Dewey's lead, we can now come to recognize that as unknown becomes known (and the unmade is made), there emerges the potential to bring about a deep and profound reorientation of our ontological parameters. Further, it becomes the broader task of the design research community to begin to critically articulate the extent to which particular appearances and consequences—as represented in its discourse relating people to things—contribute to the institution and perpetuation of 'more enduring and extensive' values.