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Values as Hypotheses: Design, Inquiry, and the Service of Values

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Values: A Problem of Practice

The question of the relationship of design and values has sparked much scholarship during the past 30 years. These investigations have led to the growing consensus that design is not a neutral activity; rather, it is value-laden: design is laden with, or bears, values. Despite substantial agreement that design is value-laden, significant variation arises in understanding how and why design bears values.[1] Some scholars argue that artifacts act to determine what is possible and impossible in human engagements with the world—that is, products bear consequences that affect what we value in human life and living.[2] Others note that products, broadly conceived, bear the conscious and unconscious intentions, values, and politics of the individuals and corporations that designed them.[3] Some scholars propose that designed products bear the preferences and values of those who use them,[4] while others view values as ideals, and design bears the burden of approximating an ideal.[5] Others speak of products as embodying values, as value-bearing material expression.[6] Others emphasize the capacity of designers and publics to give voice to values, to contest and argue for what should be valued; here, values are born and borne in argument.[7] None of these positions offers a definitive, settled, or uncontested account of the relation of design and values. This scholarship, however, has led to calls for practitioners to explicitly address values in their everyday design practice.

Values-oriented practitioners not only are faced with a variety of theoretical understandings; they also regularly encounter the empirical fact that a given value (e.g., autonomy) can be both valuable and not valuable in its participation in design products and practices. Batya Friedman provides a useful example that illustrates this problem. She describes a situation in which a new computer workstation, designed to support speech input and multimedia, includes a built-in, always-on microphone. When a user of this workstation wishes to have a conversation that is not recorded, she must go through multiple steps to turn off the microphone—a cumbersome solution. Out of this case, Friedman explores the concept of autonomy, she asks:

1 For a thorough scholarly explication of the history of ethics and design from a European perspective see, Anna Valtonen, "Back and Forth with Ethics in Product Development—A History of Ethical Responsibility as a Design Driver in Europe" (presentation, Conference of the European Institute for Advanced Studies in Management (EIASM), Cergy-Pontoise, France, October 13, 2006).

2 Bruno Latour, "Where are the Missing Masses? The Sociology of a Few Mundane Artifacts," in *Shaping Technology/Building Society: Studies in Sociotechnical Change*, ed. Wiebe E. Bijker and John Law (Cambridge, MA: The MIT Press, 1994), 225–58.

3 Langdon Winner, "Do Artifacts Have Politics?," in *The Whale and the Reactor: A Search for the Limits in an Age of High Technology* (Chicago: University of Chicago Press, 1986), 19–39.

4 Roland Barthes, *Mythologies*, 1st edition, Annette Lavers, trans. (New York: Hill and Wang, 1972); cf. (Paris: Editions du Seuil, 1957).

5 Victor J. Papanek, *Design for the Real World: Human Ecology and Social Change*, 1st ed. (New York: Pantheon Books, 1972).

6 Anthony Dunne and Fiona Raby, *Design Noir: The Secret Life of Electronic Objects* (Boston: August Media, 2001).

7 Carl DiSalvo, *Adversarial Design* (Cambridge, MA: The MIT Press, 2012).

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> How can designs promote user autonomy? From the previous example, there might seem to be a simple answer: If autonomous individuals need to have freedom to choose means and ends, then it could be said that whenever possible and at all levels, designers should provide users the greatest possible control over computing power.

Friedman recognizes, however, that the issue of autonomy is more complicated. She notes, for instance, that many users of word processing software have little interest in controlling the technical aspects of how the program executes a search-and-replace operation, but they have significant interest in controlling the layout options of the document.

> In this case, achieving the higher order desires and goals, such as efficiently producing a good-looking document, will enhance autonomy, whereas excessive control over all levels of operation of the editor may actually interfere with user autonomy by obstructing users' ability to achieve desired goals. In other words, autonomy is protected when users are given control over the right things at the right time. Of course, the hard work of design is to decide these whats and whens.[8]

Friedman's reflection reveals the practical problem facing designers who wish to support values such as autonomy. On the one hand, autonomy demands that users have or be given control; on the other hand, giving users control might impair their autonomy. In one circumstance, autonomy requires that users are in control of the machine's operations; in another circumstance, removing the complexity of operations from the user's control advances autonomy. These autonomies are not interchangeable in a successful product. An *autonomy* that is highly appropriate in one circumstance may be highly problematic in another. The bearing of values such as *autonomy* is a highly practical issue for designers. It is a problem in practice. Despite the rich body of values-oriented scholarship, design practitioners have little guidance in addressing this fundamental problem: *How do values adequately inform design practice if they are sometimes appropriate and sometimes problematic?*

Identify/Apply Logic

A common response to variability in the bearing of values is to take the position that the problem arises because current knowledge of values is incomplete. This response is exemplified in the field of human–computer interaction (HCI), where inquiries into values (e.g., value-sensitive design [VSD[9]]) have flourished. Here,

8 Batya Friedman, "Value-Sensitive Design," *Interactions* 3, no. 6 (1996): 17–18. For the last paragraph of the scenario, see also, Batya Friedman and Helen Nissenbaum, "Software Agents and User Autonomy," in *Proceedings of the First International Conference on Autonomous Agents* (New York: The ACM Press, 1997), 467.

9 Friedman and her colleagues describe VSD as a theory, a methodology, and an approach for addressing values during the design process. See Batya Friedman, Peter H. Kahn, and Alan Borning, "Value Sensitive Design and Information Systems," in *Human–Computer Interaction and Management Information Systems: Foundations:* Ping Zhang and Dennis Galletta, ed. (Armonk, NY: M.E. Sharpe, 2006), 348–72.

scholars argue that we need first to understand values better (i.e., identify them more precisely; define them more accurately; or discover a wider range of them). Once this step is complete, we can apply our more complete knowledge of values to design situations and design products with greater certainty. This approach follows a two-step logic: 1) the need to identify and understand values so that 2) they can be better applied to design practice. We call this response the *identify/apply logic.*

A significant body of scholarship has been developed to formally identify, define, and list values in HCI, addressing the first step through a broad range of philosophical and methodological approaches. For example, Friedman et al. explicitly identify and list foundational values of ethical import.[10] However, recognizing that there may be other contextually relevant values, Friedman et al. put forward a tripartite methodology consisting of conceptual (i.e., philosophically informed), technical, and empirical investigations to identify, define, and analyze appropriate values for application during the design process. Similarly, Flanagan et al. propose a methodology comprising three distinct activities, including a *discovery* mode in which values that are relevant to, inspire, or inform a given design project are identified and defined. They recommend drawing upon philosophic discourse and inquiry to develop specific definitions of values.[11] Fleischman et al. focus their research on listing values (i.e., value terminology) drawn from professional and popular discourse.[12] The resulting "meta-inventory" is used to detect value expressions in social media channels, with the goal of creating a comprehensive list of values.[13] Alan Borning and Michael Muller also advance the creation of value lists. They suggest that the broad community of VSD researchers should create and share an online list of values as a resource for doing values-oriented work.[14]

Applying the identified values in the design of products and activities marks the second step of the dominant logic in values scholarship. In other words, once the values are known, the second question to address is how designers can account for, embody, convey, or incorporate these values in products. For example, how can a social media app convey the value of privacy? Friedman et al. put forward a procedural approach to be carried out by designers: start with a value, technology, or context; identify direct and indirect stakeholders; identify benefits and harms for each stakeholder group; map benefits and harms onto corresponding values; conduct a conceptual investigation of key values; identify potential value conflicts; and so forth.[15] Flanagan et al. refer to the act of translation: "Where discovery consists of the activity of identifying the values pertinent to a given design project, translation is the activity of embodying or expressing these values in system design. Translation is further divided into operationalization,

10 The original set of values put forward by Friedman et al. includes: human welfare, ownership and property, privacy, freedom from bias, universal usability, trust, autonomy, informed consent, accountability, courtesy, identity, calmness, and environmental sustainability. See Friedman, Kahn, and Borning, "Value Sensitive Design and Information Systems," 364–65.

11 The resulting list of values is compiled from multiple sources, including values in the definition of a project; values that emerge in specifying design features; designers' values; and user values. See Mary Flanagan, Daniel C. Howe, and Helen Nissenbaum, "Embodying Values in Technology: Theory and Practice," in *Information Technology and Moral Philosophy,* Jeroen van den Hoven and John Weckert, ed. (Cambridge, UK: Cambridge University Press, 2008), 334–38.

12 An-Shou Cheng and Kenneth R. Fleischmann, "Developing a Meta-Inventory of Human Values," *Proceedings of the American Society for Information Science and Technology* 47, no. 1 (2010), 1–10.

13 This approach is similar to research that uses survey methodology and content analysis—for example, in Jes A. Koepfler and Kenneth R. Fleischmann, "Studying the Value of Hard-to-Reach Populations: Content Analysis of Tweets by the 21st Century Homeless," in *Proceedings of the iConference 2012* (New York: The ACM Press, 2012), 48–55.

14 Alan Borning and Michael J. Muller, "Next Steps for Value Sensitive Design," in *Human Factors in Computing* (New York: The ACM Press, 2012), 1125–84.

15 For details, see Friedman, Kahn, and Borning, "Value Sensitive Design and Information Systems," 348–72.

16 Flanagan, Howe, and Nissenbaum, "Embodying Values in Technology," 338–47.

17 Christopher A. Le Dantec, Erika Shehan Poole, and Susan P. Wyche, "Values as Lived Experience: Evolving Value Sensitive Design in Support of Value Discovery," in *Proceedings of the 27th International Conference on Human Factors in Computing CHI 2009* (New York: The ACM Press, 2009), 1141–50.

which involves defining or articulating values in concrete terms, and implementation, which involves specifying corresponding design features."[16]

Again, note that the manner of application suggested by these scholars differs, but they share the implicit assumption that once the values have been accurately identified, they can be applied to the design of a technology that will in turn embody, bear, or advance those values. Indeed, even the scholars offering alternative approaches follow the identify/apply logic. For example, in a direct critique of VSD, Le Dantec et al. argue that encounters with values in project work should always begin empirically (grounded in local settings), rather than discursively (grounded in discourse).[17] They work to demonstrate that qualitative research within particular design contexts should start with the *discovery of diverse values* present in particular local contexts, rather than starting from a predefined or *discursive* analysis.[18]

We are broadly sympathetic to this call to treat values as local phenomena expressed in a local vocabulary.[19] We, too, support the development of methods that focus on discovery of the values in context. However, we are concerned that even a focus on identifying and applying local values fails to engage the issue fully. Le Dantec et al. make a strong case that some values understood discursively are inadequate and therefore values should be sought locally. We argue that not all local values are valuable, either. After all, self-interest is a value likely present in local situations—that may lead to or be expressed as intolerance and bigotry. In addition, the commonplace understanding of values in VSD as *what a person or group considers important in life* is not serving the values and design community because it emphasizes the identification of values rather than their service in design situations. Understanding values in this manner suggests that values are what we find in a survey (local or discursive) of people, rather than an active, enduring, and coordinating element serving in the situations of human life and living. The issue for practice is not simply defining what a person or group considers important in life, locally or discursively.[20] Rather, the fuller issue is how values serve to honor, participate in, and advance the situation.[21] In this light, the prominent identify/apply logic shows its greatest weaknesses when put into practice.

In summary, the two-step logic rests on a core assumption: Values can, in theory and scholarship, be adequately addressed separately from action.[22] In this assumption the work of understanding a value and the work of applying a value to design are separate. This assumed separation of design and values demands a logic or method for *sensitively* identifying values and applying them to design. Practicing designers, however, make sense of values not at remove, as in scholarship, but in the often-confused design situations in which a value has value. For practitioners, the

18 Ibid., 1144.

19 Le Dantec et al. cast the issue of values application as *accounting for* human values in the design of computer systems. However, their emphasis remains on the discovery of values so that "we can derive system designs that reflect the values of the people they are meant to serve rather than the values of the system designers." Ibid., 1147.

20 Further, defining a value as what a person or group considers important in life collapses a useful distinction between values and preferences. Caroline Whitbeck helpfully distinguishes preferences and values. She explains that statements of preference are statements about the person uttering the statement. Statements of value are claims about the subject, or situation, under discussion. See Caroline Whitbeck, "The Trouble with Dilemmas: Rethinking Applied Ethics," *Professional Ethics* 1, no. 1–2 (1992): 119–42.

21 Shades of this fuller issue are present in Le Dantec, Poole, and Wyche's work. When they argue that "the classifications of values derived from empirical work are more effective and relevant for informing the design of computational systems for those contexts than are conceptions of values in the abstract," they are not suggesting that all values empirically present serve the situation; rather, they mean that some values discovered locally are *relevant and effective* (i.e., they serve). Le Dantec, Shehan Poole, and Wyche, "Values as Lived Experience," 1147.

22 In collating this research, we are not suggesting that these works are the same or even similar in their philosophic grounding. VSD scholarship encompasses a broad range of philosophical and methodological approaches. Nonetheless, all of the perspectives described here share the two-step logic that begins with *identifying* the values to be subsequently *applied* to products or incorporated in design processes.

problem of the bearing of values (of which Friedman's *autonomy* is an instance) is not a definitional issue solvable at a distance in a formal account. It is a problem in the situation of action—a condition in which it is often unclear both what the situation is, and what is to be done. Values are appropriate or problematic in their service to the developing design situation, not in scholarship.[23]

Values in Service as Hypotheses

Values and design are more intertwined than the identify/apply logic suggests. Signs of this closer link are apparent in design practice and in values scholarship. In Friedman's example, an understanding of the value of *autonomy* and the substantive work of design develops together. At first she posits that autonomy simply involves giving users control over the machine, while design is a matter of specifying and incorporating functions that provide control. Friedman then exposes how these characterizations of *autonomy* and the work of design are inadequate. She develops a fuller understanding of autonomy by questioning how it is served by particular designs in particular situations.

Through this telling, understanding of autonomy develops alongside an appreciation of what it is to substantively design to protect autonomy. This dual development occurs more widely too, when we examine how a value and the products and practices of design *serve* in concrete situations. Issues of values and design arise together when we encounter these problems:

1. *How products serve human life and living.* In public, academic, and professional discourse, issues of values and design arise together when products do not adequately serve human life and living. We recognize this problem in Langdon Winner's iconic (and contested) example of low highway overpasses connecting New York City to Long Island beaches.[24] The issue of values arose when it was recognized that highway overpasses that prevent public buses from passing under them do not adequately serve the free and inclusive movement of diverse communities. The values and design literature often begins with examples that highlight the inadequate service of a product to a community or circumstance.
2. *How the activities by which we change current circumstances serve to honor, advance, and participate in human life and living.* Design, as deliberative action, serves in the shaping and reshaping of human life and living. Inadequacies in the service of design activity also bring the issue of values to the fore. For example, participatory design arose and advanced the value of democracy in response to the inadequate service of paternalistic practices that designed at people rather than for and with people.[25]

23 The separation of understanding values from the conduct of design, which is inherent in the two-step logic, is in part driving the disquiet that scholars have voiced with the conception and application of VSD in practical design situations. Le Dantec et al. are among the recent critics of this approach. Other critiques can be seen in Noëmi Manders-Huits, "What Values in Design? The Challenge of Incorporating Moral Values Into Design," *Science and Engineering Ethics* 17, no. 2 (2010): 271–87; and Alan Borning and Michael J. Muller, "Next Steps for Value Sensitive Design," in *Proceedings of the SIGCHI Conference on Human Factors in Computing* (New York: The ACM Press, 2012), 1125.

24 Langdon Winner, "Do Artifacts Have Politics?," in *The Whale and the Reactor: A Search for the Limits in an Age of High Technology* (Chicago: University of Chicago Press, 1986), 19–39.

25 Michael J. Muller, "Participatory Design: The Third Space in HCI," in *Human–Computer Interaction Handbook*, Andrew Sears and Julie A. Jacko, ed. (Mahwah, NJ: Lawrence Erlbaum Associates, 2003), 1061–82.

Figure 1
The Two Interrelated Sides of the Question of Action.

3. *How values serve in the conduct and development of individual and collective human life and living.* Design products and activity serve, or fail to serve, in concrete and particular situations. Values of freedom and equity matter in the context of people moving through the city. Autonomy matters in the day-to-day social context of technologies like the ones considered by Friedman. Values of paternalism and democracy matter in the context of what and who is brought within design decision-making activities. It is also within concrete situations that we experience the *service of values.* Values such as freedom are widely held with few people objecting to freedom as a generality. The many controversies of freedom arise when the value plays out, or serves, in particular circumstances.[26]

Design and values are linked in that we know the adequacy, substance, and significance of both design and values through their service in human life and living. Issues of design and values arise together when we encounter problems of how to serve the many demands of human life and living in particular and changing circumstance.

Attending to the pragmatic service of values aligns well with the work of American philosopher John Dewey. Dewey argues that problems arising in action lead to the formalization of values, and new problems require the active inquiry into (and rethinking of) values.[27] Moral values are neither unchangeable truths, nor are they local expressions of individual and group preferences. Rather, ethics is a practical matter concerned with *the question of action:* "What are the conditions which require action, and what is the action which they demand?"[28] (see Figure 1). In many circumstances our grasp of conditions and required action is straightforward—a broken window demands repair, for instance. (Here, settled values such as safety and comfort serve well.) At other times there is significant uncertainty and doubt as to what the situation is and what should be done.[29] In such situations Dewey's *question of action* is not trivial but marks a significant existential problem. Dewey characterizes these situations as *problematic situations.*[30]

26 For example, the recent controversies around the U.S. National Security Agency's PRISM program challenges—in the particular—the service of the value of security, the technologies it produces, and the practices it animates. Interrogating the service of values in concrete situations exposes the issue of design in those situations.

27 John Dewey, "Moral Theory and Practice," *International Journal of Ethics* 1, no. 2 (1891): 186–203.

28 Ibid., 193.

29 That for Dewey the two parts or sides of the question of action are not independent or sequential in the problematic situation is important to recognize. They are conjoined; they function together. We might paraphrase for design practice by saying that what the problem/situation is depends on what you're doing about it, and, what you're doing depends on what the problem/situation is. The service of design and values concerns resolving the two sides of the question of action so that they function together.

30 *Indeterminate* and *problematic* situations are subtly different but closely related as Dewey describes them in his theory of inquiry. The indeterminate situation is *the antecedent conditions of inquiry,* in that it is a questionable situation that evokes inquiry because it is inherently doubtful and uncertain. The indeterminate situation becomes problematic in the process of being subjected to inquiry. In other words, when we see that the situation requires inquiry, then the indeterminate situation is transformed into a problematic one. For more on this distinction and the process of inquiry, see John Dewey, "The Pattern of Inquiry," in *Logic: The Theory of Inquiry* (New York: H. Holt and Company, 1938), 101–19.

In problematic situations, values cannot be used as preestablished formulas that yield proper courses of action. Rather, values serve as *hypotheses* by which to examine what the situation is, what the possible courses of action are, and how they might transform the situation. Judgments, including design judgments, are the outcome of practical, intellectual, and emotional interaction with situations that are indeterminate or puzzling. Values are not *applied to* situations; rather, values *serve* situations as hypotheses. They serve both to bring forward the means that are available to advance valued ends and to advance understanding of the value of ends achievable through conceivable or available means. The dialectic of means and ends in the situation is recognizable as design.

Dewey illustrates the service of values in problematic situations using an analogy to the practical work of making a tunnel—a skillful but largely mechanical task when current tunneling conditions closely mirror previous experience.[31] In such cases, extant engineering theory is appropriate to the particulars of the task, and it may simply be applied. However, when faced with new situations (e.g., extreme weather conditions or unusual soil quality), these theories function as hypotheses. As hypotheses they cannot be applied fully; rather, they serve in that they help us make sense of new conditions. At the same time, we use the learning from experimenting with these theories in these new conditions to adapt the old theories or to form entirely new ones.[32] The same idea applies to ethics. In everyday practice we may follow established norms and values. But there are times when we are faced with uncertainty about how to act. In these situations ethical theories function as working hypotheses that help us understand and develop the situation.

In the following sections we describe an empirical study that demonstrates how understanding values in service as hypotheses is well-aligned with the daily practice of designers. We then describe key characteristics of this new understanding through a real-life example. Finally, we discuss the direction that this understanding suggests for design practice and scholarship.

Applying Values or Employing Values?

To gain insight into how designers engage values in their design and professional practice, we conducted a small exploratory study. We used *Envisioning Cards* as probes to prompt reflections from practicing designers on the place of values in their work (see Figure 2). Based on the scholarship of VSD, the envisioning cards are tools to help designers explicitly incorporate longer term thinking and values into their work.[33] Each set is made up of 35 double-sided cards. Each card invites an exploration of a theme associated with one of four envisioning principles: stakeholders,

31 John Dewey, *The Early Works of John Dewey, 1882–1898, Volume 3, 1889–1892: Essays and Outlines of a Critical Theory of Ethics*, Jo Ann Boydston, ed. (Carbondale, IL: Southern Illinois University Press, 2008), 156–57.

32 Ibid., 156–67.

33 For an overview of envisioning cards see, Batya Friedman and David G. Hendry, "The Envisioning Cards: A Toolkit for Catalyzing Humanistic and Technical Imaginations," in *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (New York: The ACM Press, 2012), 1145–48. See also Lisa P. Nathan, Batya Friedman, Predrag Klasjna, Shaun K. Kane, and Jessica K. Miller, "Envisioning Systemic Effects on Persons and Society Throughout Interactive System Design," in *Proceedings of the 7th ACM Conference on Designing Interactive Systems DIS 2008* (New York: The ACM Press, 2008), 1–10.

Figure 2
Envisioning Card Example.

time, values, and pervasiveness. Each card displays an evocative image on one side and a textual description of a theme (e.g., "political realities" or "crossing boundaries") on the other side.

We invited design practitioners to take a set of envisioning cards and incorporate them into their practice.[34] A month later we asked the designers to reflect on the cards and the work of values in their practice. A thematic analysis of our interview transcripts confirms the centrality of values to design practice. Most interviewees expressed a variation of the remarks made by Participant #12, a software designer, who stated:

> Value is inherent; regardless of work you are already doing, values are already there. I think the question is self-awareness of what those values are, and if you want to stretch those values then that's a different issue.

While others reinforced the critical place values hold within design, participant #3 extended this thought to infer the importance of a values approach to business:

> Without values—socially, or otherwise—you're nowhere as an enterprise, to our thinking.

On the whole, the interviewees received the envisioning cards positively and saw them as a helpful aid for engaging values. Participant #2 captured this spirit with the comment:

> I think that having the cards is like someone in the room asking me questions and challenging me, and I think the best thing in a design process is to be challenged by unfamiliar contexts, questions, scenarios.

34 We distributed card sets to 30 design professionals during the *Design Thinking unConference* in Vancouver, Canada in 2011. During the following month, we contacted the designers to schedule interviews, and 15 individuals were interested in providing extensive feedback via interviews. The majority of those who declined a full interview stated that, despite initial enthusiasm, they never engaged the card set.

scholars argue that we need first to understand values better (i.e., identify them more precisely; define them more accurately; or discover a wider range of them). Once this step is complete, we can apply our more complete knowledge of values to design situations and design products with greater certainty. This approach follows a two-step logic: 1) the need to identify and understand values so that 2) they can be better applied to design practice. We call this response the *identify/apply logic.*

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12 An-Shou Cheng and Kenneth R. Fleischmann, "Developing a Meta-Inventory of Human Values," *Proceedings of the American Society for Information Science and Technology* 47, no. 1 (2010), 1–10.

13 This approach is similar to research that uses survey methodology and content analysis—for example, in Jes A. Koepfler and Kenneth R. Fleischmann, "Studying the Value of Hard-to-Reach Populations: Content Analysis of Tweets by the 21st Century Homeless," in *Proceedings of the iConference 2012* (New York: The ACM Press, 2012), 48–55.

14 Alan Borning and Michael J. Muller, "Next Steps for Value Sensitive Design," in *Human Factors in Computing* (New York: The ACM Press, 2012), 1125–84.

15 For details, see Friedman, Kahn, and Borning, "Value Sensitive Design and Information Systems," 348–72.

16 Flanagan, Howe, and Nissenbaum, "Embodying Values in Technology," 338–47.

17 Christopher A. Le Dantec, Erika Shehan Poole, and Susan P. Wyche, "Values as Lived Experience: Evolving Value Sensitive Design in Support of Value Discovery," in *Proceedings of the 27th International Conference on Human Factors in Computing CHI 2009* (New York: The ACM Press, 2009), 1141–50.

them from precise definitions or following procedural steps. This finding suggests that prompts, checklists, and step-by-step procedures fail to capture the link of values and design and certainly cannot replace the hard work of design—that is, *to decide the whats and whens.*[35]

Problematic Situations: Inquiry and Action

Key characteristics of understanding values as hypotheses are illustrated in the following example.[36] Luke, a custodian in a hospital, had just cleaned the room of a young patient who was in a coma. When the father returned, unaware of Luke's actions, he confronted Luke and demanded that he clean his son's room.

> **LUKE:** I kind of knew the situation about his son. His son had been here for a long time and ... from what I hear, his son had got into a fight and he was paralyzed. That's why he got there, and he was in a coma, and he wasn't coming out of the coma.... Well,... I went and cleaned his room. His father would stay here every day, all day, but he smoked cigarettes. So, he went out to smoke a cigarette and after I cleaned the room, he came back up to the room. I ran into him in the hall, and he just freaked out—telling me I didn't do it. I didn't clean the room and all this stuff. And at first, I got on the defensive, and I was going to argue with him. But I don't know. Something caught me and I said, "I'm sorry. I'll go clean the room."
> **INTERVIEWER:** And you cleaned it again?
> **LUKE:** Yeah, I cleaned it so that he could see me clean it.... I can understand how he could be. It was like six months that his son was here. He'd be a little frustrated, and so I cleaned it again. But I wasn't angry with him. I guess I could understand.[37]

Luke, in this confrontation, faces a dual uncertainty: *What is the situation? And what needs to be done?* These two questions are not independent of one another; they develop together as the story unfolds. In this development, we observe the following: First, the situation is encountered as indeterminate and is treated as a problem of action. Luke begins by telling the interviewer that he found himself in the midst of a puzzling situation. He paints the picture of what he confronted and shares his puzzlement about how to act. Part of the puzzlement is that values are indeterminate in the situation. No value or set of values simply settles the situation that Luke faces or what should be done to resolve it.

Second, the problematic situation is developing in inquiry. Luke tells his story after the fact, after the problem is resolved. In the throes of the situation, it is uncertain what Luke is confronting and what is to be done. The work of resolving the situation is an

35 Batya Friedman, "Value-Sensitive Design," *Interactions* 3, no. 6 (1996): 17–18. For the last paragraph of the scenario, see also, Batya Friedman and Helen Nissenbaum, "Software Agents and User Autonomy," in *Proceedings of the First International Conference on Autonomous Agents AGENTS 1997* (New York: The ACM Press, 1997), 467.

36 The example is drawn from Barry Schwartz and Kenneth Sharpe, *Practical Wisdom: The Right Way to Do the Right Thing* (New York: Riverhead Books, 2010).

37 Ibid., 13–14.

inquiry. The issue of inquiry in problematic situations is how to make the two parts of the question of action function productively together. Resolving the issue involves an exploration of what in our conception of the situation matters for action, and what in action matters for our conception of the situation. For instance, say we bring a hypothesis of "privacy" to Luke's story. As we draw privacy into the situation, we might ask whether privacy does anything to make the problem more productive. It does not. Privacy as a hypothesis does not show potential to functionally relate what the situation is and what is to be done. However, drawing in "justice" as a hypothesis begins to draw out the situation in a way that is more fruitful. Justice brings forward a range of inequities. The father is treating Luke unfairly, but what catches Luke and leads him toward deliberation is his perception of how unfairly life has treated this father and son. The idea of justice helps make sense of the situation and its practical, emotional, and intellectual characteristics.

Third, value hypotheses test and clarify conditions and action. Luke could have responded to the patient's father in many ways and justified his response through a range of values. He could have been courageous, claiming his own right to fair treatment. He could have been honest, restating firmly that he had cleaned the room. Instead, Luke cleans the room again, putting into action an understanding of justice that considers how unjustly this father has been treated by life circumstances.

Two things happen when justice is brought to Luke's story. The hypothesis of justice helps us to make sense of what matters in this situation, and the situation itself allows us to expand our appreciation of the substance of justice through its service in this situation. We move our understanding of both Luke's situation and the idea of justice away from being solely about individual rights and shape actions that may better serve the situation. In short, we develop the value *justice* by testing and observing the work that the justice hypothesis does in various situations, and we recognize situations as just or unjust through reference to this learning.

This example highlights three points. First, ethics goes beyond the *application* of known values. In a problematic situation, it is uncertain which values serve and how they serve. Second, in such cases values function as working hypotheses that might or might not serve. Third, both values and problematic situations develop in inquiry.

Focusing on the problems of situations, working hypotheses, and inquiry underscores that values such as justice are not applied from a clear definition or precise identification. In this case justice is one possible way of approaching a confusing situation so

38 Dewey, "Moral Theory and Practice," 193.

that the situation may be made more productive. As a hypothesis, justice is provisional. Justice holds what we believe from prior experience to be significant and tests it in a new situation. When we test the hypothesis of justice in a situation such as Luke's, we might observe how justice usefully serves to order the confusion of the situation. In so doing, we might ask: Does the hypothesis of justice bring an intellectual, emotional, and practical coherence to the situation? Does justice help resolve the question, *"What is the situation that demands action, and what is the action that the situation demands?"*[38] If the hypothesis does not serve in the positive development of the situation, we can look for another hypothesis. If, as in Luke's story, the hypothesis serves in an unexpected manner, the hypothesis of justice is itself developed further, as to better inform and serve future situations.

Luke's story provides an example of values serving as hypotheses in the transformation of a problematic situation. As hypotheses, values test conceptions of situations and the action that they demand. Luke does not *apply* justice to the situation from a rulebook. Rather, he *employs* his experiential understanding of justice to test what the situation is, and the action that it demands. Deliberation, design, and values are in the interaction of people and problematic situations.

Storied Inquiry

Throughout this article we have used examples to articulate and illustrate the qualities and characteristics of values scholarship. Although the use of examples in values work is commonplace, they typically are used simply to set the stage of the authors' argument (e.g., Friedman's workstation scenario to explore autonomy). Once the stage is set, the examples are left behind in favor of more abstract and theoretic argument. In our work, we see examples as an integral and constitutive part of the argument: The understanding of values is at one with understanding their service in concrete situations, and vice versa. We propose not only that the practice of design is at one with values inquiry, but also, that a scholarship of values needs to integrate stories from concrete situations of design practice. The reliance on cases and examples is arguably a key feature of such scholarship because without them scholarship is separate and distant from practice. Approaching values as hypotheses marks a reorientation for design and values scholarship—from seeking an ever clearer, more precise, or more comprehensive list of values to cultivating stories that develop, form, and re-form the question of action in concrete situations of practice.

39 Schwartz and Sharpe, *Practical Wisdom*, 13–14.

Design and values are storied. In story values function as hypotheses to draw out what the situation is, and what action it demands. The centrality of the question of action in design practice helps us understand why the cultivation of stories is at the forefront of design and values scholarship.

We recognize the storied nature of design practice in at least four ways: *First, the development of situations as problematic is storied in practice.* Luke is confronted with an uncertain and confusing situation. It is through finding and developing (and later recounting) the story of the situation that the quality of the uncertainty is drawn out: "I ran into him in the hall, and he just freaked out... telling me I didn't do it."[39] In the development of the problematic situation, the uncertainty of the situation becomes part of the story. Other matters also gain significance when they function as part of the story. For instance, Luke's story emphasizes that the man confronting him is a father; a father who has been in the hospital for some time; who does not leave his son's bedside except for short cigarette breaks; and so on. These storied matters warrant Luke's action and make it understandable.

Second, design practice obtains its coherence in stories. Design and values become substantive in story. Friedman's story of the design of a workstation is one instance in which we appreciate and question the situation, along with its resolution in action. Here, autonomy serves in the understanding and development of the situations that Friedman contemplates while the development of these situations presents autonomy in its substance. In stories of practice we see design and values function as one. Together, values and design present the emotional, practical, and intellectual coherence of design practice—formal coherences that have long been its hallmark.

Third, values vary, retire, endure, and develop in stories. We cannot fully grasp from one story what a value such as autonomy is. Friedman's multiple, brief scenarios present ways that autonomy, as a value, might develop. The service of autonomy is brought forth and explored through multiple stories, as the two sides of the question of action develop together. Values tested and presented in the stories of human life and living allow us to grasp values in their constancy and change, sameness and difference, propriety and impropriety.

Fourth, stories of design and of values ultimately must serve human life and living. Stories both advance and hinder our grasp of situations and design of human interventions. With this pluralism in mind, the formal coherences of particular stories remain open for revisiting as the circumstances of human life and living change.

Conclusion

Embracing the idea that the same values are at times appropriate and productive and at other times problematic is at the heart of pluralism. By pluralism we do not mean that many values must be addressed in the design of new products—although certainly there is a growing diversity of values considerations. Neither do we mean that a pluralistic stance offers many lenses and perspectives through which to critique and advance design practice and products—although the inclusion of many points of view adds a welcome richness, as well as conflict, to the discussion of design and values. Rather, pluralism entails a simultaneous appreciation for and skepticism of values, affirming that no single correct interpretation of values serves all situations. Philosopher Richard McKeon says of pluralism that it speaks to "...a sense in which truth, though one, has no single expression, and a sense in which truth, though changeless, is rendered false in the uses to which it is put...."[40] In pluralism we expect to find *no single expression* of values. We also expect to find occasions in which an expression of values and design is *rendered false in the uses to which it is put.*

Design has a role in cultivating values as both old and new, same and different, appropriate and inappropriate. Values such as well-being, justice, sustainability, or community, which may appear new as terms of discourse in design, connect to ideas that have a long history. These values endure not through fixed definition but through their development as they serve the changing problems of current circumstance. Service to the situations of human life and living is the value of values.

40 See Richard McKeon, "A Philosopher Mediates on Discovery," in *Selected Writings of Richard McKeon: Volume One: Philosophy, Science, and Culture,* Richard McKeon ed. (University of Chicago Press, 1998), 49.