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Dealing with Wicked Problems: Normative Paradigms for Design Thinking

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Abstract
Wicked problems, such as climate change, poverty, and antibiotic resistance, are ethical problems, as moral plurality about the social good is one of their constituting factors. Although wicked problems cannot be fully solved, they are urgent and demand intervention. While design thinking was suggested in the 1990s to deal with wicked problems, it is still an open question how it can address moral plurality. In this article, we consider how design thinking can address moral plurality in wicked problems. We propose that designers using design thinking can adopt four normative paradigms toward moral plurality, namely moral agnosticism (design for solutions), moral pragmatism (design for aggregated preferences), moral unificationism (design for community-created values), and transcendental moralism (design for The Good). Then, we argue that designers can address moral pluralism and deal with wicked problems within the first three approaches to normativity, provided that designers acknowledge that their responses to wicked problems may fail over time and require new design responses. Ignoring that possibility fits within the paradigm of transcendental moralism, which does not give designers the means to deal with wicked problems.

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Introduction

What climate change, poverty, and antibiotic resistance have in common is that they are all problems that cannot be fully defined or solved. To understand such issues, we can refer to the features of "wicked problems," a concept coined by Horst Rittel and Melvin Webber.[1] Their essay argued that wicked problems are difficult to define, have no stopping rule, and have no final solution. Moreover, Rittel and Webber identified three dilemmas within wicked problems, and the first is that there is no (consensus on a) conception of the social good.[2] Rittel and Webber pointed out that solutions to wicked problems "are not true-or-false, but good or bad."[3] Hence, wicked problems are always also ethical problems, as they have irreducible normative dimensions.[4] Due to the lack of a shared conception of The Good, or moral pluralism, in current societies, wicked problems cannot be straightforwardly solved by using planning or engineering methods.

Still, some wicked problems are urgent and demand intervention. If we characterize what these interventions can amount to, we can distinguish between "solving" wicked problems, which is, by definition, impossible, and "dealing with" wicked problems. In the latter case, a problem is not solved, but specific (urgent) aspects of the problem are temporarily overcome or taken away. Much literature on wicked problems focuses on leveraging inter- and transdisciplinary research in this context. In the 1990s, design thinking was suggested as an approach to solving wicked problems.[5] At that time, design thinking represented a new and promising approach for taking up challenges in product development and society, by considering multiple perspectives and disciplines, allowing ongoingly formulating problem definitions, and adopting solutions that are constantly being iterated.

Although much has been written about how using design thinking can lead to new artifacts, services, and environments that help solve wicked problems,[6] less scholarly attention has been paid to how design thinking can be used to deal with the normative aspects of wicked problems. Pieter Vermaas and Udo Pesch explored to what extent design thinking is apt to deal with wicked problems. They concluded that, although the approach is promising, design thinking does not offer a way to address the moral pluralism about the social good part of wicked problems.[7] As such, it is still an open question whether and how to use design thinking to deal with wicked problems.

This article poses the following research question: How can design thinking be used to address moral plurality in wicked problems? To answer this question, we first summarize previous work on design thinking in relation to wicked problems. Next, we distinguish four normative paradigms in design that represent different ways for designers to address moral pluralism, or Rittel and Webber's dilemmas 1 and 3. The overall advantage of articulating these paradigms is that they make explicit the normativity of wicked problems and design approaches. Then, we discuss to what extent the four normative paradigms deal with different properties of wicked problems, namely their abilities and pitfalls, when faced with evaluations of good and bad and with unintended consequences. In the final section, we conclude that designers can address moral pluralism and deal with wicked problems within the first three approaches to normativity, provided that designers

1 Horst W. J. Rittel and Melvin M. Webber, "Dilemmas in a General Theory of Planning," *Policy Sciences* 4 (1973): 155, https://www.jstor.org/stable/4531523.
2 Udo Pesch and Pieter E. Vermaas, "The Wickedness of Rittel and Webber's Dilemmas," *Administration and Society* 52, no. 6 (2020): 960–79, https://doi.org/10.1177/0095399720934010.
3 Rittel and Webber, "Dilemmas in a General Theory," 162.
4 Jeffrey K. H. Chan, "The Ethics of Wicked Problems: An Exegesis," *Socio-Ecological Practice Research* 5, no. 1 (2023): 35–47, https://doi.org/10.1007/s42532-022-00137-3.
5 James Woudhuysen, "The Craze for Design Thinking: Roots, a Critique, and toward an Alternative," *Design Principles and Practices* 5, no. 6 (2011): 235–48, https://doi.org/10.18848/1833-1874/CGP/v05i06/38216; Brian Baldassarre et al., "Responsible Design Thinking for Sustainable Development: Critical Literature Review, New Conceptual Framework, and Research Agenda," *Journal of Business Ethics* 195 (2024): 25–46, https://doi.org/10.1007/s10551-023-05600-z.
6 Baldassarre et al., "Responsible Design Thinking."
7 Pieter E. Vermaas and Udo Pesch, "Revisiting Rittel and Webber's Dilemmas: Designerly Thinking Against the Background of New Societal Distrust," *She Ji: The Journal of Design, Economics, and Innovation* 6, no. 4 (2020): 530–45, https://doi.org/10.1016/j.sheji.2020.11.001.

acknowledge that their responses to wicked problems may fail over time and require new design responses. Ignoring that possibility fits within the paradigm of transcendental moralism, which does not give designers the means to deal with wicked problems.

Background

Design Thinking

In the 1960s, researchers studied what designers do, how they proceed, and how they think as part of the Design Methods Movement.[8] Herbert Simon's *The Sciences of the Artificial* famously defined design as concerning the *ought*, or the world as it *should be*, by bringing about desired states of affairs, as opposed to the sciences that study what *is*.[9] After Rittel and Webber's article on wicked problems came out in 1973, the idea emerged that design as an approach may be apt to solve complex societal problems.[10] The term *design thinking* emerged in the 1990s. At that time, Richard Buchanan, in his exploration of how to position design within the disciplinary landscape of the academy, embraced wicked problems as a central type of problem with which design thinking is concerned.[11] Design thinking was increasingly defined as "an experimental, user-centered, and collaborative approach to solving wicked problems,"[12] leading to great optimism about design thinking as an approach to solve social issues. In 2009, Tim Brown published *Change by Design* arguing that good design outcomes involve technical feasibility, commercial viability, and user desirability.[13] In the same year, Roger Martin published *The Design of Business*, advertising design thinking as an approach that could be used to benefit economic performance.[14] These two books represent more recent strands in design thinking,[15] or the "gospel of [design thinking] today,"[16] sparking new academic debate.[17]

There is still much unclarity about what design thinking is, to the extent that Jason Tham argued that the term has become a "common catchphrase" or a "magical recipe for new inventions … to address both technical and social needs."[18] Lucy Kimbell argued that design is a fragmented discipline "decoupled from any one field or discipline of design, design thinking is meant to encompass everything good about designerly practices."[19] In general, a distinction can be made between design thinking as a mindset and design thinking as a methodology.[20]

Design thinking as a mindset denotes a state of mind that engages a more profound philosophy.[21] This mindset entails design principles such as "reflective practice, communication through visualization, empathy, fail quickly and cheaply, and structuring the problem-solving process"[22] or "creative thinking and collaboration across disciplines that propel inventive analysis of problems and ideation for solutions."[23]

Design thinking as a methodology embodies a resistance against rational and economic approaches to problem-solving, as it involves "understanding the human needs related to a problem, reframing the problem in human-centric ways, creating many ideas in brainstorming sessions, and adopting a hands-on approach to prototyping and testing."[24] Although often simplified as a linear instruction manual, design thinking as a methodology entails a set

8 Lucy Kimbell, "Rethinking Design Thinking: Part I," *Design and Culture* 3, no. 3 (2011): 289, https://doi.org/10.2752/175470811x13071166525216.
9 Herbert A. Simon, *The Sciences of the Artificial* (Cambridge, MA: MIT Press, 1969).
10 Woudhuysen, "Craze for Design Thinking."
11 Richard Buchanan, "Wicked Problems in Design Thinking," *Design Issues* 8, no. 2 (1992): 5–21, https://doi.org/10.2307/1511637.
12 Baldassarre et al., "Responsible Design Thinking," 26.
13 Tim Brown, *Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation* (New York: Harper Business, 2009).
14 Roger Martin, *The Design of Business: Why Design Thinking Is the Next Competitive Advantage* (Boston: Harvard Business Press, 2009).
15 Lucy Kimbell, "Design Practices in Design Thinking," *European Academy of Management* (2009): 1–24, available at http://www.lucykimbell.com/stuff/DesignPractices_Kimbell.pdf.
16 Woudhuysen, "Craze for Design Thinking," 245.
17 Xinya You, "Applying Design Thinking for Business Model Innovation," *Journal of Innovation and Entrepreneurship* 11, no. 1 (2022): article no. 59, https://doi.org/10.1186/s13731-022-00251-2.
18 Jason Tham, "Pasts and Futures of Design Thinking: Implications for Technical Communication," *IEEE Transactions on Professional Communication* 65, no. 2 (2022): 261, https://doi.org/10.1109/TPC.2022.3156226.
19 Kimbell, "Rethinking Design Thinking," 289.
20 You, "Applying Design Thinking."
21 Alladi Venkatesh et al., "Design Orientation: A Grounded Theory Analysis of Design Thinking and Action," *Marketing Theory* 12, no. 3 (2012): 289–309, https://doi.org/10.1177/1470593112451388.
22 You, "Applying Design Thinking," 16.
23 Tham, "Pasts and Futures of Design Thinking," 265.
24 Mary K. Foster, "Design Thinking: A Creative Approach to Problem Solving," abstract, *Management Teaching Review* 6, no. 2 (2021): 123, https://doi.org/10.1177/2379298119871468.

of emblematic practices, including sketching and drawing, prototyping, brainstorming, and destroying as an iterative process.[25]

Although enthusiasm about using design thinking to tackle wicked problems has not waned, scholars have raised several issues questioning its value for use in solving societal problems. One issue is that design thinking lacks practical feasibility due to its time and resource requirements.[26] Design thinking is also critiqued for its lack of attention to sustainability,[27] its entanglement with ideologies such as techno-optimism,[28] and its "disembodied and ahistorical cognitive style,"[29] which might lead to morally undesirable solutions. Lastly, design thinking is said to offer limited scope for designers to address the moral pluralism that is part of wicked problems.[30] This critique goes to the heart of the ambitions of design thinking. As such, it is crucial to study the normative paradigms that lead to design solutions for social problems in the face of moral plurality.

Since there is no consensus on a definition of design thinking, it is a challenge to arrive at an equally general conclusion about design thinking by means of a general analysis. To still be able to advance, we adopt the approach by Vermaas and Pesch of laying down six general characteristics of design thinking and defining with these characteristics what these authors call *designerly thinking.*[31] Our argument uses these six characteristics and is, in that way, applicable to any design thinking approach that shares them. The six characteristics are:

- Investigating the broader contexts and backgrounds of problems;
- Interdisciplinary teams and knowledge;
- Active participation of multiple stakeholders;
- Designers add their own values, interpretations, frames, and problem definitions;
- Ongoing and iterative problem definitions;
- Ongoing and iterative experimentation.

Rittel and Webber's Analysis of Wicked Problems: Three Dilemmas

Rittel and Webber's article on wicked problems incited a large body of literature that pointed out the concept's advantages and limitations. The concept is considered useful, as it offers an approach that helps us understand why public programs and policies are met with resistance and may have unintended consequences.[32] For example, Kelly Levin et al. argued that climate change is a "super wicked" problem, posing major challenges for policymakers.[33] In a similar vein, John Alford and Brian Head proposed a typology of wicked problems based on varying levels of complexity and conflicting stakeholder perspectives.[34] However, there have also been critiques on Rittel and Webber's underlying assertions, such as the viability of their distinction between tame and wicked problems (in relation to different scientific disciplines), the analytically imprecise and rhetorical nature of the theory, and the danger that the language of wicked problems may lead to decision paralysis.[35] Moreover, conceptual critiques often focus on reformulating the ten properties of wicked problems.[36] Still, among the publications on wicked problems, Rittel and Webber's 1973 article is the single most cited, making it a foundational paper in the field.[37]

25 See Kimbell, "Design Practices in Design Thinking"; Kimbell, "Rethinking Design Thinking."
26 Tammy McCausland, "Design Thinking Revisited," *Research Technology Management* 63, no. 4 (2020): 59–63, https://doi.org/10.1080/08956308.2020.1762449.
27 Baldassarre et al., "Responsible Design Thinking."
28 Woudhuysen, "Craze for Design Thinking," 235–48.
29 Kimbell, "Rethinking Design Thinking: Part I," 287.
30 Vermaas and Pesch, "Revisiting Rittel and Webber's Dilemmas."
31 Ibid.
32 Brian W. Head, *Wicked Problems in Public Policy: Understanding and Responding to Complex Challenges* (Cham: Palgrave Macmillan, 2022).
33 Kelly Levin et al., "Playing It Forward: Path Dependency, Progressive Incrementalism, and the 'Super Wicked' Problem of Global Climate Change," *IOP Conference Series: Earth and Environmental Science* 6, no. 50 (2009): article no. 502002, https://doi.org/10.1088/1755-1307/6/0/502002.
34 John Alford and Brian W. Head, "Wicked and Less Wicked Problems: A Typology and a Contingency Framework," *Policy and Society* 36, no. 3 (2017): 397–413, https://doi.org/10.1080/14494035.2017.1361634.
35 Johanna Lönngren and Katrien van Poeck, "Wicked Problems: A Mapping Review of the Literature," *International Journal of Sustainable Development and World Ecology* 28, no. 6 (2021): 481–502, https://doi.org/10.1080/13504509.2020.1859415.
36 Raymond McCall and Janet Burge, "Untangling Wicked Problems," *Artificial Intelligence for Engineering Design, Analysis and Manufacturing: AIEDAM* 30, no. 2 (2016): 200–210, https://doi.org/10.1017/S089006041600007X.
37 Lönngren and Van Poeck, "Wicked Problems."

Though Rittel and Webber are mostly known for the ten properties of wicked problems, this is only part of their original argument. In fact, these ten properties make up only one of the three dilemmas planners or designers face when dealing with wicked problems. As can be read at the end of the original article in which Rittel and Webber summarized the three dilemmas:

> "We have neither a theory that [1] can locate societal goodness, nor one that [2] might dispel wickedness, nor one that [3] might resolve the problems of equity that rising pluralism is provoking."[38]

Rittel and Webber spell out the second dilemma by means of the ten properties, while the other two dilemmas directly pertain to the impossibility of choosing rightly in the presence of moral pluralism. Vermaas and Pesch argue that design thinking offers limited scope to designers to resolve these three dilemmas.[39] However, in this argument, they focus mainly on the well-known ten properties related to the second dilemma and do not make explicit how designers can approach the moral pluralism captured by the first and third dilemmas. Here, we will revisit the argument and argue that there are four approaches or normative paradigms for designers to take up this pluralism. We will first present dilemmas 1 and 3, which address the fundamental normative uncertainty evolving from moral pluralism, and subsequently discuss dilemma 2.

Dilemmas 1 and 3: Normative Uncertainty

As can be read in the quotation above, the first dilemma of wicked problems is that there is no undisputed theory of societal goodness. In other words, what is "good" is subject to societal disagreement. The third dilemma is somewhat similar and states that there is no undisputed theory of social equity, meaning that there is uncertainty about what can be considered fair. As such, it is uncertain what the best course of action is, as there might be disagreement about the righteousness of a distribution of burdens and benefits.[40] As such, planning and design involve normative uncertainties, which are "situations where there are different partially morally defensible—but incompatible—options or courses of action, or ones in which there is no fully morally defensible option."[41]

Vermaas and Pesch suggest that design thinking addresses normative uncertainty by proposing "new goals and values as a way out of the conflict and produce responses to the problems that are acceptable for all groups," even though such solutions are impossible, nonexistent, or partial.[42] How and on what grounds the new goals or values are proposed remains unclear. In other words, when proposing "solutions" to societal problems, design thinkers seem to have specific approaches to normativity that remain implicit. Although design thinking implies making normative decisions per definition, it contains no explicit approach to handling normative uncertainty.

Dilemma 2: Dispelling Wickedness

The second dilemma states that there is no way to dispel the wickedness produced by the ten properties of wicked problems. The ten properties of wicked problems are:

38 Rittel and Webber, "Dilemmas in a General Theory of Planning," 169, numbering added by us.
39 Vermaas and Pesch, "Revisiting Rittel and Webber's Dilemmas."
40 Nynke van Uffelen, Behnam Taebi, and Udo Pesch, "Revisiting the Energy Justice Framework: Doing Justice to Normative Uncertainties," *Renewable and Sustainable Energy Reviews* 189, part A (2024): article no. 113974, https://doi.org/10.1016/j.rser.2023.113974.
41 Behnam Taebi, Jan H. Kwakkel, and Céline Kermisch, "Governing Climate Risks in the Face of Normative Uncertainties," abstract, *Wiley Interdisciplinary Reviews: Climate Change* 11, no. 5 (2020): article no. e666, https://doi.org/10.1002/wcc.666.
42 Vermaas and Pesch, "Revisiting Rittel and Webber's Dilemmas," 535.

1 The absence of a definite problem definition;
2 The absence of a stopping rule;
3 Solutions are good-or-bad, not true-or-false;
4 The absence of an immediate or ultimate test of solutions;
5 Every solution is a one-shot operation that will have irreversible societal consequences;
6 The absence of an exhaustive set of potential solutions;
7 Its uniqueness, particularity, and contextuality;
8 Each problem can be seen as a symptom of another problem;
9 Different problem definitions lead to different responses, all of which are dependent on the designer;
10 Designers have moral responsibility because their responses to wicked problems have societal consequences.

Vermaas and Pesch argued that design thinking can deal with six of these ten properties, namely 1, 2, 6, 7, 8, and 9.[43] That leaves four properties with which design thinking is unable to deal.

Design thinking usually deals with property 3 (solutions to wicked problems are not true-or-false, but good-or-bad) through stakeholder inclusion. However, "designers cannot always establish the values and goals that every stakeholder group will agree on. Designers even typically ignore specific groups," and as such, design thinking has limited ability to deal with the inherent normativity in design.[44]

Properties 4 (there is no immediate and no ultimate test of a solution to a wicked problem), 5 (every solution to a wicked problem is a "one-shot operation"), and 10 (the planner has no right to be wrong) are all related to the long-term material, social, and ethical consequences of design. It remains hard to predict the consequences of new designs, so there is no ultimate test for the quality of solutions. Moreover, solutions are often irreversible, to which design thinking does not provide a way out. Also, solutions may have a pervasive impact on society, yet there is a responsibility gap.

In sum, Vermaas and Pesch conclude that design thinking methods offer limited scope to designers to handle the normativity in wicked problems and the (unintended) long-term consequences of possible solutions.[45] In the remainder of this article, we explore if design thinking becomes more successful when it adopts a specific approach to this normativity.

Addressing Normative Uncertainty: Four Normative Paradigms, Four Ways to Do Design

Wicked problems are characterized by the presence of moral plurality and the absence of an undisputed theory of The Good. Therefore, any practitioner involved in decisions about these problems inevitably turns to normative convictions about what can be considered good. This also holds for designers.[46] To make explicit how designers address normativity in wicked problems and specifically deal with dilemmas 1 and 3, we distinguish four normative paradigms (see Table 1). These paradigms can be seen as templates for how people approach questions about what is "good." These four paradigms

43 Ibid.
44 Ibid., 539.
45 Ibid.
46 In this article, we focus on the normative paradigms of *designers* in dealing with wicked problems. This leaves the question of whether the process is led by designers open. Moreover, it may be that some normative disciplines are more or less paradigmatic in different academic disciplines, which is relevant because designerly thinking is inherently interdisciplinary. See Udo Pesch and Nynke van Uffelen, "Normative Paradigms and Interdisciplinary Research," *Social Epistemology* (2024): 1–15, https://doi.org.10.1080/02691728.2024.2403635.

Table 1 **Normative paradigms for design thinking.**

Moral paradigm	Designers	Design approach	Sources of the social good	Addressing moral pluralism
Moral agnosticism	The agnostic designer	Design for solutions	Not relevant	Bypassing by ignoring moral issues
Moral pragmatism	The pragmatist designer	Design for the values of clients or for aggregated preferences	Clients/stakeholders	Accepting and focusing on specific (aggregated) values
Moral unificationism	The unifying designer	Design for (emerging) community-created values	Communities / social groups	Accepting and eliciting values shared by groups
Transcendental moralism	The moralist designer	Design for The Good	The moral Truth	Rejecting pluralism and persuading clients and the public of the designer's conception of The Good

follow from two choices. The first is about whether one makes The Good explicit in one's approach. If one does not, the approach is *agnostic*. If one does one, the second choice defines three more approaches:

- one takes The Good as fixed by each person personally, leading to a *pragmatic* approach;
- one takes The Good as determined by groups, leading to *unificationism*; or
- one assumes that The Good is an objective truth, creating *transcendentalism*.[47]

47 Ibid.

Let us directly acknowledge that in real life, it can be hard to find designers that seamlessly fit into these paradigms. Our aim is not empirical adequacy but to illustrate approaches designers may take for coping with wicked problems and normative uncertainties.

The Agnostic Designer: Design for Solutions

The first normative paradigm is "moral agnosticism," which pertains to the disposition that normative issues are either irrelevant or can be circumvented. This means that moral pluralism (and, in fact, any question about The Good) is not seen as a problem for design because design can provide solutions that bypass moral pluralism. Moral agnosticism is a disposition that can most straightforwardly be recognized in technocratic accounts, which portray technologies or design solutions as merely instrumental or value-neutral. Although this paradigm has been dominant midway through the twentieth century, it is now widely recognized that any solution has moral repercussions—the work of Rittel and Webber has been one of the key texts that increased the awareness of the normativity of design. Nevertheless, there are still designers who perceive design as providing the opportunity to accommodate normative plurality, making the question about the theory of The Good irrelevant. Designers that fit this paradigm entertain practices that step over moral pluralism, aiming at artifacts or systems that can bypass differences in value orientation and provide a "technofix" to societal problems.

Although design thinking is more oriented to encourage understanding the lifeworld and motives of people, the black-boxing of people's values can

be recognized in the earlier mentioned *fail quickly and cheaply* recommendation in design thinking when it is used to scan options for design solutions to swiftly arrive at ones that people find attractive without first exploring what those people value as important. Moreover, design tools that approach people as (only) customers with desires and preferences, such as *Quality Function Deployment*, fit the moral agnosticism paradigm.[48]

48 Yoji Akao, ed., *Quality Function Deployment: Integrating Customer Requirements into Product Design* (Cambridge, MA: Productivity Press, 2004).

The Pragmatist Designer: Design for Aggregated Preferences

The second normative paradigm of "moral pragmatism" advances the idea that design should serve the preferences and values of the client. In this paradigm, normative pluralism is taken as a given, as each individual may have her own theory of The Good. Designers take the clients' values as driving designs and do not insert their personal moral convictions. In cases where design serves public goals, this paradigm maintains that in a well-functioning pluralistic society, there are institutional arrangements that allow collective decisions to be made. For instance, there is a parliamentary democracy in which procedures like the majority vote make it possible to have collective decisions that are legitimate while respecting the autonomy of individual normative positions.

According to this paradigm, all stakeholders have their own values, preferences, or interests. Upon these subjectivist starting points, design thinking becomes focused on identifying the needs and preferences of individuals and following up on these. In this context, design thinking often stresses human-centered design and the deployment of various creative methods to discover what users need, such as need-finding interviews or user observations.

Designs, especially in the context of wicked problems, are often collective or placed in public spaces, like infrastructures, systems, or services. In such cases, there are regularly competing interests and values instead of a single, unequivocal preference. To deal with this moral pluralism, the pragmatist designer determines the social good by aggregating individual voices. In other words, what is valuable is the sum of what individuals find valuable. This aggregation can be achieved through several procedures, such as voting, making a qualitative or quantitative inventory of users' desires, or measuring consumers' willingness to pay. Designers who hold this normative paradigm typically aim to serve the client's preferences; they provide options that may or may not be chosen given these preferences. As such, this approach is very much in line with market-based practices: designers serve customers from all walks of life by designing (different products) that fit all possible values.

With the dominance of neoliberal thinking in policy and society, subjectivist thinking connected to this paradigm has become almost omnipresent. Although it is hard to find designers who explicitly promote this approach, everyday architecture and consumer products are designed to serve individual tastes and preferences.

The Unifying Designer: Design for (Emerging) Community-Created Values

In the third paradigm, "moral unificationism," the reality of normative pluralism is somewhat qualified. The precedence of The Good is placed at the

level of communities in which certain norms and values are reproduced. Communities represent an undivided moral identity. The presence of normative pluralism is not denied, but it is taken as the result of poorly organized communal structures. The role of design is to repair this problem, for which two approaches may be recognized. First, there is a deliberative approach that enables communities to collectively articulate their shared norms or values. Second, there is the "organic" approach, in which shared norms and values are believed to form independently from any institutional structure. In the latter approach, it is a task for the designer to identify or discover these norms and values.

The unifying designer assumes that values are developed at the level of cultural communities. As said above, two approaches can be distinguished when designing for these values. First, the *unifying* designer constructs the social good through organizing deliberation with groups of stakeholders. The assumption is that, through an ideal and perfect deliberation, moral plurality can be transformed into consensus—the outcomes of such a deliberation steer design. Design tools within this paradigm include focus groups and participatory design: "[D]esign has become a social process, whether we like it or not. Designers need to interact with groups of people that have different ways of looking at the design problem and the design solution.… There is no single overriding perspective that encompasses all aspects of the design problem and solution. Because of this, designing becomes a process of negotiating a consensus among all the participants who have differing interests in the design."[49]

Second, the *organically* inclined designer finds The Good by focusing on community values that emerge organically. In this paradigm, moral plurality is understood as a conflict between community values and values that are institutionalized in policy, the economy, and design. In this, community values should take precedence. An example of organically inclined design can be found in the work of Sasha Constanza-Chock, who writes about "design justice," which can be defined as "a growing community of practice that aims to ensure a more equitable distribution of design's benefits and burdens; meaningful participation in design decisions; and recognition of community-based, Indigenous, and diasporic design traditions, knowledge, and practices."[50] This quotation implies that Constanza-Chock equates justice with the norms and beliefs that are developed bottom-up within existing communities. As such, community values are taken as the starting point for design, and it is unjust for design to impose any top-down structures on these communities, which deliberative unifiers would endorse. Design tools that fit this paradigm are design ethnography, explicitly constructing user personas in relation to specific underrepresented communities, and community-led design.

The Moralist Designer: Design for The Good

Finally, there is the paradigm of "transcendental moralism." Agents who adhere to this position believe that there is a theory of The Good that transcends the empirical presence of normative plurality. The big question is whether one knows which theory of The Good is correct. Many people, including designers, have been convinced that they were right, so their task was

49 Kees Dorst, *Understanding Design* (Amsterdam: BIS Publishers, 2003), 18.

50 Sasha Costanza-Chock, *Design Justice: Community-Led Practices to Build the Worlds We Need* (Cambridge, MA: MIT Press, 2020), 23.

51 Brown, *Change by Design*.

to persuade others of the rightness of their convictions. Others might be more humble in claiming to know the moral "truth" but see their design decisions as attempts to come closer to this truth in an experimental fashion.

In this fourth normative paradigm, the social good is an idea that we might or might not know, and we can be mistaken; yet it is a single idea, not a plural one. For the moralist designer, value pluralism only exists on an empirical level. People can have different interpretations of social good because there is a lack of knowledge about The Good and about how to understand values in a specific context. As such, the moralist designer designs for the social good, sometimes despite what users and consumers perceive as good. The designer, convinced that they have the knowledge of these objective values, thinks themselves are allowed to impose these values upon society. This "imposing" may take the form of manipulation, nudging, or convincing the public. As such, this is a top-down approach to design and it involves, to a certain extent, ignoring societal value articulation.

"Star designers" like Steve Jobs seem to adhere to this paradigm, which can be inferred from quotes that are widespread on the Internet, such as, "the noise of others' opinions [should not] drown out your own inner voice," because "A lot of times, people don't know what they want until you show it to them." Jobs can probably not be taken as the typical designer occupied with wicked problems, yet he represents the mindset of moralist designers, who lead the way to a better world because they believe to be more knowledgeable about what the world should look like, or even believe they can create that world on their own, by being a star or genius. Design thinking tools that fit this paradigm include, for instance, looking at future-directed users. The idea behind such tools is that consulting an average user leads to collecting information about usage and values in current and equally average practices. By looking at expert, excentric, and niche users, designers can reveal future usage and related values and translate those practices back from future-directed users to average users.[51]

Dealing with Wicked Problems: Opportunities and Limits of the Four Design Approaches

Each of the four normative approaches gives a specific way by which designers can address the normative uncertainty of wicked problems, giving an answer to how designers can resolve dilemmas 1 and 3. Let us now return to dilemma 2 and see if each approach also provides designers with a method to deal with the ten properties of wicked problems. As said previously, design thinking can deal with six of them; the ones that remain are the normativity of responses to wicked problems (property 3) and the (unintended) long-term material and social consequences of responses (properties 4, 5, and 10).

The Evaluation of Responses as Good or Bad?

Property 3 of wicked problems is that responses to them are not true or false but good or bad. Moreover, stakeholders may disagree on this normative evaluation of responses depending on their values, preferences, goals, and interests. Each of the four paradigms described in the previous section offers

opportunities for designers to deal with this property, and each has its pitfalls.

Agnostic designers generally ignore the fact that responses to wicked problems are good or bad. The design solutions they propose are considered "value neutral." With that, these designers tend to ignore stakeholders' values, which is both a strength and a pitfall. On the one hand, the designer can arrive at responses without addressing clients' values. On the other hand, by not studying stakeholder values, stakeholders may feel they are not fully understood, and designers miss opportunities to understand the problem and, thus, to arrive at better responses.

Alternatively, *pragmatist* designers can conceive of responses to wicked problems as good and bad by equating "the social good" with the wants of the aggregate. As such, they assume that moral authority lies in the hands of the design's client, purchaser, or user. Appropriate aggregation procedures, such as the majority vote, should be in place in designs that serve the collective good. However, when no aggregation procedures are available[52] or the aggregation procedure becomes contested, the pragmatist designer cannot deal with normativity in wicked problems.

Although *unifying designer*s take value pluralism in society as a given, they can deal with good or bad evaluations to a certain extent. They do so by constructing a deliberation that should lead to consensus (deliberative unifiers) or starting from organically articulated values in communities (organically inclined unifiers). However, these designers have limited capacity to deal with evaluations regarding good or bad because they have no way of resolving moral plurality *between* or *within* communities. After all, communities are often fluid and heterogeneous.[53]

Moralist designers can evaluate responses to wicked problems in terms of good and bad. However, the pitfall here is that the designer's assessment may differ from that of clients or other stakeholders, leading to unresolvable disagreements. The imposition of the values the designer holds through their nudging and talking is seen by others as morally wrong, but the moralist designer may cling to it as ethically justified.

Anticipating Long-Term Unintended Consequences of Responses

Properties 4, 5, and 10 of wicked problems are about the long-term consequences of responses, ranging from environmental to societal ones, and the inability to upfront test responses for these consequences. None of the four normative approaches enable designers to avoid these consequences. Still, the first three allow designers to come up with adjustments to the responses to wicked problems or new responses.

For *agnostic designers*, unintended consequences of design responses and technologies are reasons to start the design process anew. According to this paradigm, design solutions are neutral, and unintended consequences originate from the used phase because societal actors may use technologies differently. If users, clients, or society want countermeasures to those consequences, there are new (wicked) problems on which to act. Agnostic designers deal with wicked problems through a series of responses spread

52 Rittel and Webber, "Dilemmas in a General Theory of Planning."
53 Ibid.

throughout time, resulting in a sequence of responses that are temporarily accepted. A course-grained illustration of the approach of "designing for solutions" may be found in responses to the wicked problem of plastic soups: the problem that rivers, seas, and oceans are increasingly polluted by plastic debris, from bottles to microplastics. The agnostic designer could focus on creating technological solutions to clean out as much plastic from water as efficiently as possible. However, such solutions may eventually facilitate the continuation or even the increase of plastic production, which the agnostic designer interprets as an unintended consequence due to the actions of societal actors, leading to even more pollution in the rivers and, thus, the need for more efficient technological solutions.

Pragmatist designers and *unifying designers* can deal with unintended consequences in a similar way. They both design responses that clients or groups find good, and if these clients or groups revoke their assessment after consequences emerge, pragmatist and unifying designers can start designing again. Emerging contestation to products or systems incites the development of new products and systems. In this, pragmatist designers generally repeat aggregation procedures while unifying designers rethink the methods used to deduce the communal conception of The Good. For the unifying designers, societal disagreement implies that better approaches to achieving consensus must be developed. However, deliberations will never be perfect, so the process is ongoing.

To a certain extent, these three paradigms deal with unintended consequences similarly. Disagreements in society do not show that designers have made the wrong design choices but that solutions may become contested, demanding reconsidering design criteria or methods. The pitfall is that societal risks are reasoned away within each paradigm as "our solution is good now, and it may become contested, but we will deal with this later." In other words, anticipating unintended consequences and social risks may be avoided and pushed forward in time.[54]

Moralist designers, however, face a different pitfall in the face of unintended consequences. Responses, as developed by those designers, are evaluated as good by some transcendental truth. If society disapproves of the designs introduced by moral transcendentalists, it either proves society or the designer wrong. Recognizing that a response is flawed due to unintended consequences undermines the moralist designer's foundational assumptions. This creates a deadlock: designers must either accept that they were wrong or wait until society realizes its mistake. As a result, moralist designers have very limited capacity to deal with unintended consequences beyond manipulation and nudging techniques.

Conclusion

In this article, we considered whether design thinking can address moral plurality in wicked problems. Rittel and Webber coined the notion of wicked problems and argued that responses to them face three dilemmas. First, there is no shared theory of societal goodness; second, wicked problems have ten properties of wickedness; third, there is no shared theory of social

54 Benjamin Hofbauer, "Normative Uncertainty in Solar Climate Engineering Research Governance," *Ethics, Policy and Environment* 27, no. 3 (2024): 451–70, https://doi.org/10.1080/21550085.2023.2216148.

equity. Vermaas and Pesch argued that design thinking does not provide a method to resolve the second dilemma because it does not deal with all ten properties of wickedness.[55] In this article, we revisited and extended this argument by considering whether design thinking can address the moral pluralism that creates these dilemmas, as stressed in the first and third dilemmas.

To answer the research question, we presented four normative paradigms in design that address moral plurality in different ways, namely moral agnosticism (design for solutions), moral pragmatism (design for aggregated preferences), moral unificationism (design for community values), and transcendental moralism (design for The Good).

Next, we assessed the capacities of each normative paradigm to provide a way to deal with properties 3, 4, 5, and 10 of wicked problems. On the one hand, all four paradigms provide designers with ways to deal with solutions in terms of good or bad (property 3). However, each paradigm has its pitfalls when doing so: the agonistic designer fails to take stakeholder values into account; the pragmatic designer becomes powerless when aggregation procedures are contested; the unifying designer cannot deal with heterogeneity between or within communities; and the moralist designer quickly faces disagreements with stakeholders. On the other hand, only three paradigms can "deal with" the unintended consequences of solutions to wicked problems (properties 4, 5, and 10). Although unintended consequences cannot be avoided, the paradigms of moral agnosticism, moral pragmatism, and moral unificationism enable designers to keep proposing new responses to wicked problems. In contrast, the moralist designer risks a deadlock in the face of unintended consequences.

From this, we conclude that design thinking has useful resources for dealing with wicked problems. Three normative paradigms — moral agnosticism, moral pragmatism, and moral unificationism — enable designers to effectively address the three dilemmas for wicked problems. These paradigms allow designers to deal with wicked problems by proposing designs, interventions, and technologies. This is crucial because wicked problems are often urgent societal issues that require intervention.

However, although designers, according to our argument, have three different normative paradigms available to address wicked problems, designers should remain aware of the shortcomings of these paradigms. Design thinking in either of these three approaches still does not solve wicked problems; design thinking may deal with wicked problems by temporarily overcoming, taking away, or solving (urgent) aspects of the wicked problems. Normative disagreement about these wicked problems may at any time resurface, and unintended consequences of responses may present themselves. When that happens, designers have to get back to work to come up with a new response. Designers working within the moral paradigms of agnosticism, pragmatism, or unificationism can deal with wicked problems if they continuously monitor whether their design responses are still good. If they stop monitoring and take their initial responses as good, they shift to the normative paradigm of transcendental moralism. This paradigm does not give designers an approach to deal with wicked problems.[56]

55 Vermaas and Pesch, "Revisiting Rittel and Webber's Dilemmas."
56 Hofbauer, "Normative Uncertainty."

Ultimately, design in the face of wicked problems is a permanent experiment, requiring flexibility, constant monitoring, and re-imagining of solutions. In other words, design for wicked problems is "muddling through"[57] or a continuous process that revisits wicked problems when long-term consequences emerge.[58] Three normative paradigms allow designers to deal with—as in, muddle through, not solve—wicked problems and thus demonstrate what design thinking can do to address our urgent societal problems.

57 Charles E. Lindblom, "The Science of 'Muddling Through,'" *Public Administration Review* 19, no. 2 (1959): 79–88, https://doi.org/10.2307/973677; Charles E. Lindblom and David K. Cohen, *Usable Knowledge: Social Science and Social Problem Solving* (London: Yale University Press, 1979).

58 Kees Dorst, "Design beyond Design," *She Ji: The Journal of Design, Economics, and Innovation* 5, no. 2 (2019): 117–27, https://doi.org/10.1016/j.sheji.2019.05.001.

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