

The Logic of the Design Problem: A Dialectical Approach

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The Logic of the Design Problem

Across the literature of design thinking, the “design problem” represents a fundamental object of concern, and its complex character frequently plays a key role in marking design’s difference from art or science, on the basis that the design problem is of a different nature to problems confronted in those fields. This argument is not made on the basis of the content of the design problem (a design problem is not defined as such because it deals with graphics, fashion, etc.) but on the basis of its logical structure—that is, the relation between problem and solution, and the means by which this solution is obtained. But what is the nature of this logical structure?

Arguments regarding structure make up some of the earliest texts in the design-thinking canon.¹ Herbert Simon’s *The Sciences of the Artificial*, which takes a broad view of design as that which is “concerned with how things *ought* to be,”² presents design problems as fundamentally rational in nature but whose rationality can be obscured by their framing. For Simon, design problems are essentially well defined; their intractability derives from the difficulty the problem solver may have in properly identifying the problem. The key to solving such problems is “focusing on the particular features of the situation that are relevant to the problem, then building a problem space containing these features but omitting the irrelevant ones.”³

Richard Buchanan has argued that design problems are not well defined but indeterminable or “wicked.” He draws on a 1973 paper by Horst Rittel and Melvin Webber that classifies as “wicked” any problem whose complexity prevents its formulation in simple terms and its solution by propositional or programmatic means.⁴ He argues that design problems meet this designation because the content of design is unlimited: “The subject matter of design is potentially universal in scope, because design thinking may be applied to any area of human experience.” In proposing a solution to a problem, a designer must “discover or invent a particular subject out of the problems and issues of specific circumstances,”⁵ and therefore any solution proposed is as much an argument for its own applicability as it is a logical solution to the problem, implying a rhetorical rather than a logical relation.

- 1 For a recent survey of the canon, see Lucy Kimbell, “Rethinking Design Thinking: Part I,” *Design and Culture* 3, no. 3 (2015): 285–306, and Lucy Kimbell, “Rethinking Design Thinking: Part II,” *Design and Culture* 4, no. 2 (2016): 129–48.
- 2 Herbert A. Simon, *The Sciences of the Artificial* (Cambridge, MA: MIT Press, 1996), 4.
- 3 Simon, *Sciences of the Artificial*, 109. Simon later conceded that some problems were “ill-structured,” but maintained that such problems were essentially rational at the core. See Herbert A. Simon, “The Structure of Ill-Structured Problems,” *Artificial Intelligence* 4 (1973): 181–201.
- 4 Horst Rittel and Melvin Webber, “Dilemmas of a General Theory of Planning,” *Policy Sciences* 4 (1973): 155–69.
- 5 Richard Buchanan, “Wicked Problems in Design Thinking,” *Design Issues* 8, no. 2 (Spring 1992): 16.

More recent theories of problem solving in design have abandoned the notion of problem and solution as discrete phases of a linear process and instead posit a model of design which is “an iterative interplay to ‘fix’ a problem from the problem space and to ‘search’ plausible solutions from the corresponding solution space.”⁶ Accordingly, there is no single linear movement from problem and solution but the simultaneous co-development of both:

As the design progresses the designer learns more about possible problem and solution structures as new aspects of the situation become apparent and the inconsistencies inherent in the formulation of the problem are revealed.

As a result, designers gain new insights into the problem (and the solution) which ultimately result in the formation of a new view; the problem and the solution are redefined.⁷

Kees Dorst pursues this angle further, suggesting that if the design problem and design solution co-evolve during the design process, then the problem as such never truly exists in any objective sense and instead ought to be considered an “amalgamation of different problems centered on the basic challenge described in the design brief.”⁸ Dorst suggests that we think instead of the design scenario as a paradox: a description of the problem situation in which “all the statements...are true or valid, but they cannot be combined.”⁹ By this account, the design problem consists not of the statements of the design paradox but the logical aporia around which the paradox is structured. The paradox is the essence of the “stuckness” of the situation—a formal inconsistency that must be evinced through the exploration of its content. However, this reformulation of the problem can serve as the basis for its resolution: “The creation of solutions to a paradoxical design situation often requires the development and creative redefinition of that situation.”¹⁰ In other words, the pursuit of the design problem coincides with the discovery of its solution. Precisely how this discovery is achieved is not made clear.

Other approaches have stressed the conversational nature of the design process—not a linear logical progression but a circular process of discursive exchange, “usually held via a medium such [as] a paper and pencil, with an other (either an ‘actual’ other or oneself acting as an other) as the conversational partner.”¹¹ Nigel Cross has observed that this conversational process proceeds “by oscillating between subsolution and subproblem areas, as well as by decomposing the problem and combining subsolutions.” This process aims at “the articulation of an opposite concept [...] which enables the models to be mapped onto each other.”¹²

6 Mary Lou Maher, Josiah Poon, and Sylvie Boulanger, “Formalising Design Exploration as Co-Evolution,” in *Advances in Formal Design Methods for CAD*, ed. John S. Gero (Dordrecht: Springer, 1996), 3.

7 Brian Logan and Tim Smithers, “Creativity and Design as Exploration,” in *Modelling Creativity and Knowledge-Based Creative Design*, ed. John S. Gero and Mary Lou Maher (Hillsdale, NJ: Lawrence Erlbaum, 1993): 145.

8 Kees Dorst, “Design Problems and Design Paradoxes,” *Design Issues* 22, no. 3 (Summer 2006): 11.

9 *Ibid.*, 14.

10 *Ibid.*

11 Ranulph Glanville, “Researching Design and Designing Research,” *Design Issues* 15, no. 2 (Summer 1999): 88.

12 Nigel Cross, “Descriptive Models of Creative Design: Application to an Example,” *Design Studies* 18 (1997): 439.

Elsewhere, Dorst and Cross have argued that the relation between design problem and solution relies on a speculative form of reasoning called *abduction*,¹³ whereby undetermined data can be temporarily filled out with reasonable assumptions to advance a line of inquiry or form a hypothesis. Designers must rely on abductive reasoning because “design initiates novel forms,”¹⁴ and thus what is inferred in a proposed solution cannot be tested until that form exists. Once a successful solution has taken form, it will prove that those assumptions were correct and the solution has therefore been reasonably inferred from its problem. As attractive as this line of argument is, it is problematic in that it suggests that some degree of logical necessity exists in the relationship of a “good” solution to a design problem. But because this necessity can only be determined retroactively, this conclusion is unsound, for if there were a necessary relation between problem and solution, no abductive inference would have been needed to uncover it. In effect, the abductive explanation offers a means of side-stepping the paradox to avoid having to untangle it. It is thus descriptive of the process rather than analytic, as the paradox still remains.

A difficulty for theorizing the design process appears to lie in discerning the logic of the relation of the design problem to the design solution. Descriptive models may bear a much closer resemblance to the way designers actually work, but fail to abstract the logic of the process, while Simon’s positivist model abstracts beyond actual practice. The co-evolutionary model moves closer to experience, but the logical relation of problem and solution within it remains problematic—hence Dorst resorts to a phenomenological “bracketing” of the design problem as a concept, so that it can be discussed while temporarily disavowing its paradoxical nature.¹⁵

The cause of the paradox is both temporal and formal. It is temporal because common sense tells us that a problem must precede its solution, just as a cause must precede its effect. However, practice repeatedly shows us that a design problem does not appear to be properly determined until the determination of its solution. It is formal because common sense tells us that a solution must be deduced from its problem, just as a conclusion must be deduced from its premises. However, the design solution appears to determine the premises from which it is deduced, suggesting that it is logically invalid. Nevertheless, the teleological nature of the design scenario necessitates the problem–solution structure.

13 Kees Dorst, “The Nature of Design Thinking,” *Proceedings of the 8th Design Thinking Research Symposium (DTRS8)*, Sydney, October 19–20, 2010: 131–39.

14 Nigel Cross, *Designerly Ways of Knowing* (London: Springer, 2006), 17.

15 See Kees Dorst, “Design Problems and Design Paradoxes,” *Design Issues* 22, no. 3 (Summer 2006): 4–17.

How are we to conceive the logic of the design scenario in a way that resolves these temporal and formal paradoxes without recourse to either a reductive rational model or the bracketing of the design problem? Because these paradoxes are the result of trying to perceive the design problem and its solution as independent entities whose logical relation must be deduced, perhaps we should think instead of problem and solution as aspects of a single concept. To achieve this, it is my suggestion is that we turn to the work of Georg Wilhelm Friedrich Hegel, specifically his dialectical system of logic.

I argue that the best way to approach the logic of the design problem is dialectically; that is, by viewing the design problem and its solution as moments of a concept undergoing a dialectical process. As I attempt to demonstrate, the logic of the dialectic as Hegel presents it not only disarms the temporal and formal paradoxes of the design problem as we currently understand it but also helps us more fully perceive the nature and extent of the designer's subjective intervention into the design scenario—how the designer, in working through a design problem, is effecting a formal reconfiguration of its content. I will proceed first by discussing the dialectic itself, and then by examining in what sense the design process is dialectical, and finally by looking at what it is that makes the designer a dialectical thinker.

Why Dialectical?

Although the term *dialectic* has been used in philosophy since Plato (generally to mean a process of rationally debating opposing positions), it was not until Hegel developed his philosophical system (primarily in *Phenomenology of Spirit*, first published in 1807, and *Science of Logic*,¹⁶ published between 1812 and 1816), that the term has applied to some fundamental quality of the movement of thought and knowledge and the interaction of their form and content. A common misunderstanding of the dialectic involves the triadic structure of thesis-antithesis-synthesis, according to which the progress of ideas and the progress of history proceed through the opposition of one concept—the thesis—to its logical counterpart—the antithesis—which eventually resolve into some compromise position—the synthesis. This may be a neat model for the representation of progress through rational reduction but as a system that unites two positive but contradictory entities, it finds no like in Hegel's work. Though the form of the dialectic as Hegel deploys it is typically (though not exclusively) triadic, it does not comprise three discrete concepts. Instead, Hegel describes these dialectical forms as moments or stages (*Momente*¹⁷) through which a single concept (*Begriff*) passes—partial aspects of a conceptual whole. Because each moment of the dialectic is immanent to its

16 G.W.F. Hegel, *Phenomenology of Spirit*, trans. A. V. Miller (Oxford: Oxford University Press, 1977); G.W.F. Hegel, *Hegel's Science of Logic*, trans. A. V. Miller (New York: Humanity Books, 1969).

17 Where I intend a term to be understood in a specifically Hegelian sense, I have included Hegel's original terminology. This will also help avoid any confusion where one term has been rendered in a number of different ways in published translations, for example, *notion* and *concept* for *Begriff*.

concept—the antithesis, for example being the inevitable negative result of the determination of the thesis—it is inaccurate to conceive the dialectic as a model whereby two externally opposed ideas meet and do battle. The antithesis has to emerge from the thesis; more accurately, both thesis and antithesis emerge simultaneously—determining the thesis, positing its positive content, necessarily requires the positing of its antithesis as its negation, against which it is determined. Positing “being,” for example, necessarily requires positing “nothingness” as its negation, against which being can be defined: both being and nothingness are therefore aspects—or “moments”—of the same concept.

The dialectical movement, then, is a movement of contradiction through negation. When the positive content of the concept is determined (i.e., it is abstracted as a distinct object of thought), its negation is posited as that against which it is defined. This is a formal condition of its determination as a concept: it cannot be determined without also being negated. But this negation remains part of the concept. It does not create another concept that is the negation of the first; rather, its negation is a condition of its becoming a concept, and cannot be separated from it. It is this part of the process that can properly be called *dialectical*, in the sense that the term denotes a logical process of reasoning through contradiction. But this splitting that is caused by the concept’s determination faces a countermovement through which the negation is realized. The movement that reconnects these contradictory terms is *speculative*, and in this moment this formal division is reinternalized and overcome.

Hegel describes the speculative movement using the German verb *aufheben*, which conveys a range of meanings: to raise up, to preserve, to overcome, and also to cancel and to abolish. The word is usually translated into English as the obscure verb *sublate*, and although this term lacks the breadth of meaning of its German counterpart, it diffuses the reductive simplicity of the term *synthesis*, which suggests a contradiction resolved and an antagonism undone. At the third moment of the triad, the synthesis does not unify the thesis and antithesis into a new and stable concept that has been shorn of its internal contradictions but designates the concept such that it is reconceived in light of the recognition of this constitutive contradiction. In other words, the synthesis is purely a formal movement that reconfigures preexisting content. Nothing is added in this moment of synthesis, and nothing is taken away. Each moment is immanent to the concept, and the movement from moment to moment ought not be considered a temporal succession, but the recognition of aspects of the concept itself.

The movement of the dialectic is not self-propelled (concepts do not think themselves) but the result of the active involvement of a thinking subject. In determining the concept—that is, abstracting a concept from the content of the understanding—the subject inevitably impels the concept’s formal movement (indeed, in Hegel’s use of it, the term *concept* more closely describes the subjective experience of thinking than an independent, objective idea), and this subjective quality of the dialectic is what helps us recognize its presence in the design process. In the design scenario (the situation wherein a designer is required to offer a solution to a design problem), the designer’s intervention is formal: she reconfigures the “stuck” content of the scenario without adding content of her own, and through her active intervention into the situation, this formal reconfiguration of the content is achieved. Conceiving the design scenario dialectically allows us to understand more clearly how this formal reconfiguration is achieved and the part the designer plays in achieving it.

More importantly, a dialectical reading of the design scenario diffuses its formal and temporal paradox, taking with it the need to call on the problematic concept of abductive reasoning,¹⁸ which was only ever summoned to bridge the gap opened up by the paradox. Although abduction may remain effective insofar as it is descriptive of the subjective experience of the design process, the dialectical reading helps explain the underlying logical passage from problem to solution by presenting both as moments of the same concept that are revealed as the concept is thought through (*nachgedacht*)¹⁹ by the designer.

Perhaps the greatest difficulty in achieving a dialectical reading of the design scenario comes from the logic of the dialectic itself—specifically, the difficulty in grasping this logic and recognizing its distance from conventional reasoning, which tends to frustrate simple exegesis. I have endeavored to avoid as much Hegelese as is reasonable, but must concede some fallibility to the tortuousness that inevitably infects any attempt to consider a concept dialectically. But just as a design problem might fail to yield a rational solution at first pass, so does the dialectic ask for a patient, open-minded, and reflective consideration.

The Design Problem and Its Negation

The first step a designer must take when intervening in a design scenario is to reduce the situation in all its complexity to a simpler, thinkable form. This begins the process of determining the design problem.²⁰ However, the design problem (as opposed to the design scenario) lacks any objective existence; establishing knowledge of the problem means establishing the problem *as* an object of thought, or in other words, as a concept (*Begriff*).

18 For a summary of the logical arguments surrounding abductive reasoning, see Douglas N. Walton, “Abductive, Presumptive and Plausible Arguments,” *Informal Logic* 21, no. 2 (2001): 131–69.

19 Hegel uses the German prepositional verb *nachdenken* (think through, consider) to refer to the subject’s act of cognitive engagement with the concept, which is also the act of determining the concept.

20 “To determine” (*bestimmen*) in the dialectical sense means “to add features or qualities to a concept, to distinguish it.”

The move from the concept as an abstraction of the situation to the concept specifically as a design problem involves the introduction of the teleological form. The concept of the situation already contains its paradox; but the paradox does not constitute a problem until the teleological inflection is introduced, because that requires the paradox to be resolved. It is the designer that introduces the teleological form, and it is the designer whose task it is to seek a solution. The designer therefore opens up a contradiction: between the problem (the situation as it presently is) and the goal (the situation as it *ought to be*)—that is, the situation hulled of its stuckness. Any determination of one term therefore posits a contradictory determination in the other. Any quality attributed to the problem (insofar as it is specifically recognized as a property of the problem and not merely an incidental detail of the situation) necessarily posits that same quality negated in the solution. In addition, as the *ought* of the goal situation necessarily designates a scenario in a possible future (as opposed to the situation as it is in the present), it also introduces the quality of temporality as a determination of the problem. Further determinations of the content of the problem will be conditioned by this temporality. It is important, however, that the temporality necessary to the teleological form not be confused with the actual passage of time. Speaking of the future is not the same as being in the future, even if the goal scenario appears only to exist in some time yet to come.

The task before the designer now consists in *determining* the problem—that is, attributing content to the problem to reveal its nature. That content may be discovered by speaking to those affected by the problem, researching similar scenarios, or even from the designer's own experience of problems of a similar nature. From wherever the content may come, however, what is important to note is that the teleological relation between the problem and its posited solution (the situation as it ought to be) requires that any determination made of the problem is negated in the solution.

The further the problem is determined, the further the solution is determined. However, this is not a co-evolutionary process; the problem and solution are not separate entities evolving together. Rather, they are aspects (or *moments*) of a single concept. The work of determining the problem is actually a process of separating the problem and solution by becoming conscious of the contradiction between an aspect of the situation as it is and the same aspect reflected in the situation as it ought to be. By the same token, determining the situation as it ought to be necessarily determines the situation as it is, as no *ought* can be determined without positing a difference in the *is*. Furthermore, the very concept of the

situation as problematic could not exist if it were not placed in contradiction to another situation deemed preferable. The problem cannot therefore be said to preexist its solution; it is only by opening a formal space for a solution that the problem comes into (formal) existence.

In traditional dialectical terms, the problem and the solution represent the thesis and its antithesis, that is, the abstraction of the concept and its negation. The negation of the concept is an aspect of the concept itself and not a separate entity. Determining the concept of being, for example, necessarily posits the determination of “not nothingness,” and thus nothingness is contained within the concept of being as its negation and cannot be separated from it. The design process therefore concerns the simultaneous determination of problem and solution. This work of determination is entirely cognitive; any determination of the problem is only a determination of the concept of the problem. It is also therefore a subjective process, in that it only occurs as the result of the designer thinking through the problem.

If the problem and solution are the thesis and antithesis of the problem-as-concept and emerge through the work of determining the problem—“filling” its form with content, the question remains of how their contradiction is resolved and the opposing terms reunited in a synthesis. The synthesis is not a new concept, separate from the thesis and antithesis, but a third moment of the problem-concept, in which the opposition between thesis and antithesis is sublated (*aufgehoben*). This moment concerns the *negation of the negation*—the negation of the determinations that were negated through the determination of the thesis. This does not involve the addition of any further content but the formal reconfiguration of the content of the thesis. Philosopher Slavoj Žižek explains, the synthesis “implies the *recognition* of a pre-existing state of affairs. The reversal is reduced to the realization that ‘it’s already like this’—*we already have* the thing we were looking for; what we aspire to is *already the case*.”²¹ The synthesis of thesis and antithesis therefore represents a simple change of perspective through which the solution as antithesis (i.e., as the negation of the problem-as-concept) is recognized as the solution as such—that is, the moment at which the designer becomes conscious of the solution *qua* solution. Although this moment—which somewhat coincides with what Omer and Cem Akin call the “Aha!” response²²—may appear to involve the sudden arrival *ex nihilo* of some new concept, the change is only a formal shift on content already present which then comes to consciousness, for no epiphany arrives without a prior thinking through (*nachdenken*) of the concept.

21 Slavoj Žižek, *The Most Sublime Hysteric: Hegel with Lacan* (Cambridge: Polity Press, 2014), 23 (emphasis in original).

22 See Ömer Akin and Cem Akin, “Frames of Reference in Architectural Design: Analysing the Hyperacclamation (A-h-a-!),” *Design Studies* 17, no. 4 (1996): 341–61.

In the synthesis, then, the problem and solution remain part of a single concept because the solution, as such, is a solution to the problem posited in the concept. The synthesis does not mark some closure or completion of the contradiction; further determinations of the problem will be reflected in the solution, and vice versa. Nor does the synthesis designate the coming-into-being of the solution in some material form—it is a concept only, and may remain so. The solution only becomes a concept itself once it exists outside of the teleological form of the design scenario. Until then, the problem and solution remain aspects of a single concept.

It is important to recognize that what is being described is the logic of the design process insofar as design is a cognitive activity. On a purely physical level, that a design solution could precede a design problem, or that the two could develop simultaneously, is nonsensical. But design cannot be purely physical; it is by definition a conscious, human, goal-directed activity. By abstracting the logic of the process and putting aside any notion of the necessity of a physical result, its dialectical structure is revealed and consequently, the paradox of the design problem is illuminated as an effect of perspective. The temporal paradox is the result of perceiving problem and solution as separate and independent entities (which, in a physical sense, they may well be). However, by recognizing problem and solution as moments of a single concept, we can see that the supposed temporal distance between them is an effect only of the teleological form, which temporalizes the solution as a situation-yet-to-come. The formal paradox is the result of perceiving the solution as the necessary logical deduction of the premises uncovered in the problem. However, the solution is not the conclusion of a ratiocinative process, nor is the process rational or objective, and any necessity perceived in the relation of solution to problem is the effect of a formal distortion that “rereads” the design process post factum as a syllogistic deduction of a solution from a problem.

Owing to its dialectical structure, the design process is a subjective activity that can only unfold when the designer actively commits to thinking through the stuckness of a design scenario. It is to the nature of this subjective activity that I now turn.

The Designer as Speculative Reader

If the logic of the design process is dialectical, how best are we to construe the designer’s role within it? If the solution to the problem emerges as the negation of the problem, it would suggest that there is some inevitability to the process that renders the designer’s part in the process incidental. However, this mischaracterizes

the problem-as-concept as preexisting the design scenario and the designer's engagement with it. While the problem and solution may determine one another, the attribution of determinations to the problem-as-concept remains the province of the designer, and it is the means by which the designer achieves this determination—the way she approaches, reads, and understands the situation and its stuckness—that distinguishes the designer from the nondesigner.

A passage from Hegel's preface to *Phenomenology of Spirit* helps illustrate the nature of this distinction. He addresses the complaint that philosophy is difficult to read—specifically, that “so much has to be read over and over before it can be understood—a complaint whose burden is presumed to be quite outrageous, and, if justified, to admit of no defense.”²³ He attributes this difficulty to the nature of the propositions involved, which he argues are speculative, as opposed to the ratiocinative propositions of common sense. The latter species of proposition is easy to grasp because it involves the simple attribution of determinations to a subject:²⁴ “Usually, the Subject is first made the basis, as the *objective* fixed self; thence the necessary movement to the multiplicity of determinations or Predicates proceeds.”²⁵ Thus, in a ratiocinative proposition, the subject is taken to be a stable, delineated entity to which qualities can be attributed in an independent, nondialectical manner: a dog has four legs, a tail, and so on.

The speculative proposition, however, offers no such stability: “The general nature of the judgement or proposition, which involves the distinction of Subject and Predicate, is destroyed by the speculative proposition, and the proposition of identity which the former becomes contains the counter-thrust against that subject-predicate relationship.”²⁶ In other words, a speculative proposition is one in which the predicate immediately turns back on the subject by positing the essence of the subject instead of a determination of it. Rather than unfolding in linear fashion, like the ratiocinative proposition, the logic of the speculative proposition reflects back on itself, requiring the thinker to think both terms together: “Thinking therefore loses the firm objective basis it had in the subject when, in the predicate, it is thrown back on to the subject, and when, in the predicate, it does not return into itself but into the subject of the content.”²⁷

The speculative proposition frustrates common sense because it appears to posit a contradiction, the understanding of which requires the reader to step back and think the two terms as one concept. Hegel offers the proposition “God is being” as an example, though for the present task, I suggest the following alternative: “the problem is the solution.”

23 Hegel, *Phenomenology of Spirit*, 39.

24 *Subject* here should be primarily understood in the grammatical sense of the term.

25 Hegel, *Phenomenology of Spirit*, 37.

26 *Ibid.*, 38.

27 *Ibid.*, 39.

Common sense might balk at such a proposition as nonsensical, and if the proposition were read ratiocinatively, common sense would have a point: the solution cannot be an attribution of the problem because problem and solution are separate entities—each with their own set of characteristics. A speculative reading of the proposition, on the other hand, requires the reader to think through the contradiction of problem and solution in its dialectical-speculative fullness so that the path through it becomes clear. Philosopher Catherine Malabou suggests that this moment arrives “when the reader enters into the speculative ordeal constituted by the relationship between the difference of the reader and the identity of the text.”²⁸ The reader must be willing, in other words, to forgo the immediate understanding of the proposition and instead construct a set of propositions through which it can be understood. It is an ordeal, a cognitive labor, through which the reader creates an understanding that transforms both the reader and the proposition. In the case of the example given (“the problem is the solution”), this process was unfolded in the previous section.

The difference between speculative and ratiocinative propositions marks the difference between philosophy and ordinary reading, for where ordinary reading sees only a senseless and irretrievable contradiction, the philosophical reading sees an invitation to engage—to undertake what philosopher Bernard Bourgeois describes as “literally an adventure calling on the reader’s own self.”²⁹ This difference finds a parallel in the design scenario. While the ordinary, ratiocinative reading of the situation conveys only stuckness and contradiction, the designer discovers something else: an invitation to venture into the knotted logic of the situation and construct a different understanding. The designer must take the decision to think past the initial confusion of the design scenario and commit to putting its content into a new form, and thus read the situation speculatively. It is an ordeal, a mental labor, in which the designer must determine the problem and thus its negation and the synthesis of the two. Finally, she will arrive back where she started, but now the design scenario will lend itself to a ratiocinative reading: in the final analysis, problem and solution lie in linear relation, and the contingency inherent in the subjective transformation of the scenario appears now to be objective logical necessity—the solution determined by its premises.

This simple ratiocinative reading of the problem and solution is only possible because the designer has committed her own self—her subjective engagement—to a speculative reading of the design scenario. Once effected, however, no evidence of her cognitive labor remains. From this position of hindsight, it appears that the logical, rational relation of solution to problem was always

28 Catherine Malabou, *The Future of Hegel* (London: Routledge, 2005), 184.

29 Quoted in Malabou, *The Future of Hegel*, 185.

extant, and her achievement was simply to reveal it. But this is a fault of perspective that sees only the content of the scenario and ignores its form. The designer's labor consisted in taking this content in its speculative, contradictory form and reconfiguring it into its ratiocinative form by constructing a means by which to understand it: this is the cognitive work of design.

This allows us to propose a definition of the design problem by reuniting its speculative form with particular content. Although I began this article by refusing content a defining role in the determination of a design problem in preference to a particular logical form; now that that form has been proposed, content can once again be admitted. This content will not simply be the traditional content of design (graphics, fashion, etc.) but that which marks the difference between a problem for philosophy and a problem for design. The content of the speculative judgment in philosophy is the abstract and universal: questions of being, truth, freedom, and so on—what Kant called “transcendental ideas.” By contrast, the content of the speculative judgment in design concerns the concrete and particular: actual situations of contingent reality whose speculative reformulation will only ever have a local effect. It can be proposed therefore that a design problem (and thus a design solution) is a scenario in which a designer brings a speculative judgment to bear on the particular. However, this determination is merely an abstraction. A great deal of “thinking through” will be required if the speculative design problem is to become a more concrete concept and the potential value of the consequent theoretical reorientation is to be realized.

Conclusion

A dialectical reading of the design process does not contradict a rhetorical, abductive, or paradoxical interpretation so much as it brings to our attention something that was already present in all of these approaches. The value of the dialectical approach lies in helping us recognize the distinction between the form of the design scenario and its content and the subjective nature of the designer's intervention therein. It offers us a means to further analyze (and not simply describe) what we do when we design and define more precisely what we mean when we talk about design thinking.