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# Antinomies in systemic design

## Dilemmas, paradoxical tensions, and Werner Ulrich

Desmond Wong and Shan Shan Tan

This short paper explores the relevance of Ulrich's (2021) boundary critique to the practice of systemic design (SD) today. The concept of '*critique*' (*disclosure*) lies at the heart of dilemmas and paradoxical tensions intrinsic to SD foundations, and is complementary to maps (*correspondence*) and design (*coherence*) as ways of knowing and acting in the world. In turn, boundary critique provides a unique account of unfolding paradoxical tensions and dilemmas: Its historical, conceptual, and pragmatic fit with SD's context and concepts could also help create, modify, and extend its learning competences and knowledge routines. On the flip side, a systematic approach may incidentally preclude the nuanced, boundary-crossing understandings that characterize SD. We suggest that scholar-practitioners consider theory synthesis approaches to embrace the diversity of perspectives and methods.

Keywords: boundary critique; reflective and reflexive practice; systemic design; social policy.

### I. Old dilemmas

"This is precisely the definition offered by Guardini of polar opposition. It is not, he said, 'a 'synthesis' of two moments into a third. Nor is it a whole, of which the two moments constitute 'parts'. Still less is it a mixture, in some sort of compromise. It is, rather an entirely distinct, original relationship of an original phenomenon. Neither pole can be deduced from the other, nor rediscovered starting from the other ... Rather, both parts are contemporaneous, thinkable, and possible only thanks to each other. This is opposition: two moments are each in themselves without being able to be deduced, transposed, confused, and yet are inextricably linked to each other; ... they can be thought of only one in the other ... thanks to the other." (Borghesi, 2017)

According to the Systemic Design Association (2021), *systemic design (SD)* is "an integrated discipline of systems thinking and systems-oriented design" (para.1) that continues from the *Design Methods Movement/Group (DMG)* of 1962 to 1972, in Berkeley, United States. "Members advocated a *systems* view of *design* projects" (Rith & Dubberly, 2007, p.1), with much of the DMG pivoting on Rittel's (1972) problem structuring methods (*PSM*), then termed '*second generation design*'. Yet underlying this were Rittel and Webber's (1973) *three dilemmas* intrinsic to social policy: *Equity*, *public good*, and *wickedness*. (It is the *wickedness* dilemma that has since become canon: How to solution, when/if we cannot know the '*problem*'?)

However, a precise definition of SD is elusive and by extension, the ability to create, modify, and extend its learning competences. For a purposeful discussion, we must address the varying definitions of systems thinking (*ST*) and design thinking (*DT*) that make up SD. In this short paper, we define ST as both *PSM* and *appreciative inquiry methodologies* arising from the trajectory of operational research (*OR*) (Jackson, 2019; Checkland, 2018) – thereby excluding the '*Sengian*' alternative of ST as organizational development (*OD*) (Lane, 2016). Likewise, we define design thinking (*DT*) as the DMG's *designerly* offshoot from '*soft*' OR (Baker & Moukhiss, 2020) – thus excluding the other '*Brownian*' alternative of DT as *IDEO*.

One interesting observation at this point, is DT's implicit grounding in the *cybernetic* stream of ST (Jonas, 2020; 2019; Rith & Dubberly, 2007), and its move upstream from *technical (artefact)* to *social complexity (context)* (Ryan, 2014). It mirrors ST's own move from technical (*complex adaptive systems*) to social complexity (*soft systems*) and a *critical* lens. According to Jackson (2020), this is a foregrounding of ontological and cognitive

complexity involving conflict, “when power comes into play on the stakeholder dimension ... in the ... different ways individuals and groups see and respond to the world ... [And it is in this light, that] Ulrich’s ‘*critical systems heuristics*’ ... take[s] seriously the existence of ‘*coercive complexity*’” (pp.5-6).

Regardless, ST and DT share two basic understandings. First, both recognize ‘*needs*’ as “an imposed ... faux desire, which originates outside the individual’s own generative nature .... [implicitly assuming that] the desired situation is clearly understood ... [,] that there is no difficulty in determining the needs ... [, and that the] outcome is known from the start” (Nelson & Stolterman, 2012, p.190). Second, *dilemmas* are necessarily intrinsic to SD (*process*) as they are to social policy (*content*): Breadth and depth, intent and action, systematic and generative (Ryan, 2014; Nelson & Stolterman, 2012), so on and so forth. Like the boundary critique discussed below, it helps to be explicit about these understandings in SD practice.

Vermaas and Pesch (2020) stand out for their direct return to Rittel and Webber’s (1973) three dilemmas at the intersection of the ST and (heart of) DT that make up SD. They argue and conclude that DT cannot address these dilemmas, yet provide practical recommendations that include an outline of what in ST parlance, is termed ‘*ongoing boundary critique*’ (Gregory et al., 2020). Jonas (2020) is more historically-informed in tracing Rittel (1972) back to the *Studiegruppe für Systemforschung (SfS)* of 1958 to 1975 in Heidelberg, Germany. Here, ST methodologies have entrenched, extended, and stretched DT, and vice versa. In turn, the knowledge routines have allowed for a distinctly German approach to SD theory and practice.

Yet underlying Jona’s (2020) framework is Churchman’s (1971) initial introduction of two pivotal concepts: *Boundary critique*, and the inherent tension between appreciative inquiry (*methodologies*) and authority (*PSM*), prefiguring Checkland’s (2018) 40-year reflections. Within *methodologies*, Jonas (2020) then references an inherent tension between *facts* and *values*. This is described as an “ongoing reflection of facts and values within a wider context of relevance .... [through] a design/inquiring system .... which creates the driving force for the transformation” (p.103). While implicit, Jonas (2020) sets out this way, Ulrich’s (2021) triadic tension of *facts*, *values*, and *reference systems* – in other words, the eponymous ‘*systems*’ of ST.

The SD community has yet to explore Ulrich and Reynolds’s (2020) boundary critique methodology (*critical systems heuristics*), despite its unique fit: Historically, it has a direct line to Rittel (1972) through Churchman (1967), who interfaced with *wickedness* before teaching Ulrich (1983) at Berkeley (8 years after the DMG had dissolved into *Design Issues*). Conceptually, boundary critique aligns with Rittel and Webber’s (1973) starting point in social policy and the three dilemmas (Ulrich, 1988; 1987; 1983). Pragmatically, it is a sophisticated account of working with dilemmas and paradoxical tensions best maintained as a ‘*question mark*’. Lastly, it provides a unique take on value conflicts and breaks in scale with(in) identity.

This short paper sets out the principles and relevance of boundary critique, as opposed to its methodology and method. This fills a longstanding gap in SD. On the one hand, leading scholars like Nelson and Stolterman (2012) cogently identify a wide range of dilemmas and tensions, but are not always specific on the process of working with these dilemmas and tensions beyond analogy; and the same may be said for Rittel and Webber (1973). On the other, those like Gregory et al. (2020) are still finding ways to ‘*pull*’ boundary critique back from an overt *interpretivism*, so that practitioners engage with real issues of power and marginalization that affect design. Both positions are inherently paradoxical, but also *antimonious*.

While originating from Churchman (1971) and the critical lens, Midgley (2011; 2000) provides an alternate stream on boundary critique to Ulrich (2021; 1987; 1983; & Reynolds, 2020). Yet for the purposes of this paper, only a key insight is discussed: One where a system is “*held in place*” ... by virtue of the fact that it expresses ... struggles between competing discourses ... and [so] a boundary judgment needs to be made about which level(s) of analysis will be most appropriate for the purposes ... [and] how some stakeholders and issues may be stigmatised by systemic processes, resulting in ... marginalization” (pp.145-158). Interested readers are pointed to Ivanova and Elsawah’s (2021) for updated discussion on boundary critique in general.

Nevertheless, there are limitations to our approach of defining SD according to the SDA, situating ST and DT, then boundary critique through the lens *historical*, *conceptual*, and *pragmatic* fit. To some degree, systematicity and precision are needed for new knowledge routines. However, this can also impose a referential enclosure that precludes nuanced, boundary-crossing understandings that have characterized SD (E.g., Jones, 2020). With this in mind, we suggest *theory synthesis* approaches for future research, where “a concept or phenomenon ... [is used in] transforming previous findings and theory into a novel higher-order synthesis ... and [unlike reviews, facilitate] new theoretical view[s]” (Jaakola, 2020, pp.21-23).

## II. New dilemmas

White and Taket (1997) were tacit on the dangers of de-emphasizing identities in their multistakeholder approach to 'needs' and dilemmas. Yet, Ulrich (2021) adds that the objective of boundary critique is not to resolve dilemmas, but enable *antinomy*. This is a central feature of its Kantian foundation, which recognizes that *meaning* and *process* transcend *content* (*a priori*), even where two or more sets of facts may be equally valid, yet contradictory (*a posteriori*). The three dilemmas offer examples, but a practical summary is quite simply, '*one man's freedom fighting is another man's terrorism*' (Checkland & Poulter, 2020): Where reference systems change, so do facts and values; and *purposeful* action has to account for this.

Boundary critique starts with identity through *critique*, or a reflective practice on the *claims*, *ends*, and *means* of actors (Jackson, 2019). In turn, this ensures that action is *legitimate*, *effective*, and *meaningful* to the people involved and affected in high-conflict, social complexity. In early iterations, Ulrich (1987; 1983) was more explicit on how this would operationalize the Kantian '*analytic-synthetic distinction*', which is simply a distinction between *analysis* (involving facts and observation) and *synthesis* (as they are *relative* to values or *relevant* to reference systems). However, the gem lies in how critique is an alternative to *maps* and *design* ubiquitous in ST and DT (Ulrich & Reynolds, 2020). This is discussed next.

First, there is the historical dilemma of "*the fundamental divide between systems and reality*" (Ulrich & Reynolds, 2020, p.263). This can be broken down into a triadic tension of *maps*, *designs* and *critique* that differentiated by their *ontological* proximity. Maps are close to reality; design has a "critical distance ... for developing alternative futures ... [in] implicit critique of the present" (p.264); while critique is furthest away. Indeed, a critique is an affective and embodied abstraction behind maps and design (Figure 1). In philosophical terms, this is to explore meaning as *correspondence* (*maps*), *coherence* (*design*), and as '*dis*'-closure (*critique*): It is a singular point that should enable SD to create, modify, and extend its own competences.

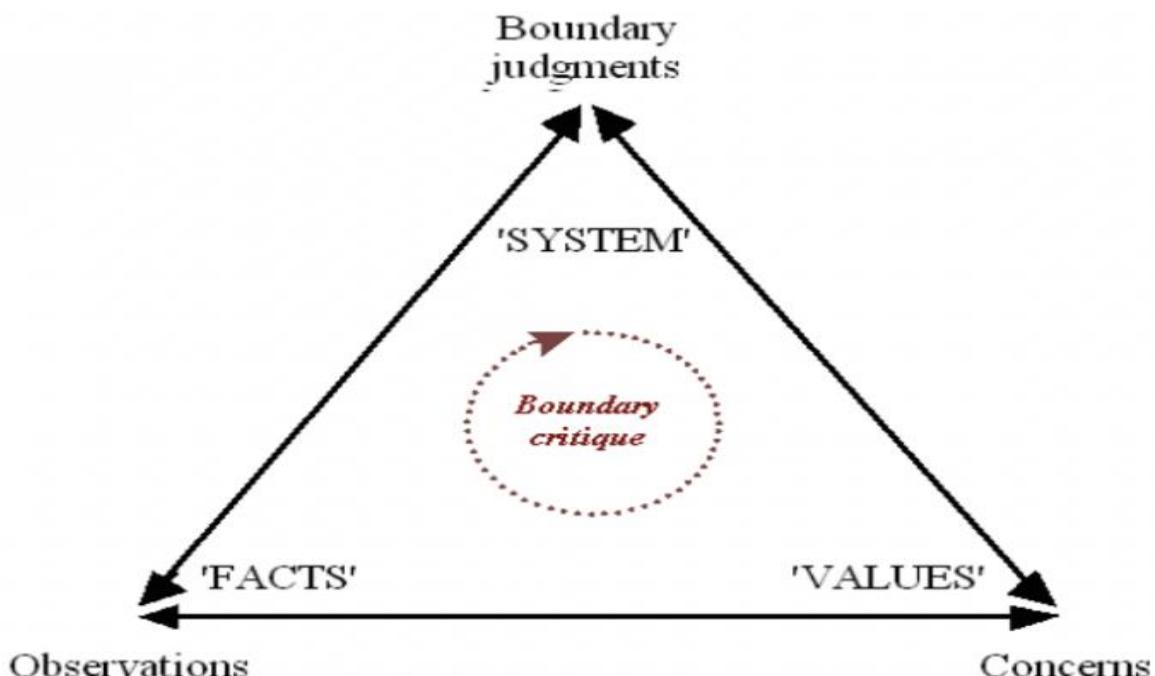


Figure 1. Boundary critique, from Ulrich (2021).

To those familiar, this may well be the answer to Archer et al.'s (2005) claim in DT for a third area in general education (*design*), contra science (*facts*) and humanities (*values*). "The simple answer must be that we do not know what literacy in design might mean because we have not yet experienced it in ... society" (p.49). We suggest that boundary critique may be the answer today.

Second, there is the deeper, conceptual dilemma and paradoxical tension between *positive* and *negative* heuristics of sorts. This is native to theology, as an appropriated quote from von Balthasar (1991) would suggest:

"Knowledge ... can only come to itself in reflexive concepts that, as indeed valid but never sufficient, must always be criticized, relativized, submitted to the principle of analogy ... to carry through ... ever beyond the concept, ... [and mere] positivism ... (1) the strict reduction of all reduction ... to logical categories ... (2) the assignment of all negative [exploration] ... to its proper place ... via negationis can only be entered upon because an 'eminentia' is already present within the 'positio'" (para.3).

Again, *negative critique* is Kantian antinomy in complexity than polar opposition. Ulrich and Reynolds (2020) explain that "whatever we can think and say about a situation, it already contains some mapping and/or design elements ... different degrees of abstraction and conceptualization ... our notion of the situation is itself a map [and design] and likely to be conditioned by the same sort of selectivity ... we can, however, use differences ... to drive our thinking about the underlying judgments ... [and the] ways we use them" (p.264). The act of defining and structuring is itself, the *reference system* of the real "context that matters" (p.265).

Third, there is the pragmatic dilemma of the '*why*' against the '*who*' (*Figure 2*). The first set of '*why*' boundaries is broken down into a tetradic tension of purpose and value (*motivation*), resource bases and decision-making (*control*), expertise and experience (*knowledge*), and approval (*legitimacy*). In comparison, the second set of '*who*' boundaries are broken down into a triadic tension of social identities (*stakeholders*), concerns (*stakes*), and issues influencing conflict or collaboration (*stakeholdering issues*). This is a dialectical unfolding that prizes "contexts of application" (Ulrich, 1987, p.276) in using tension to remain sensitive to facts (*analytical-*), values (*process-*), and reference systems (*context- competences*).

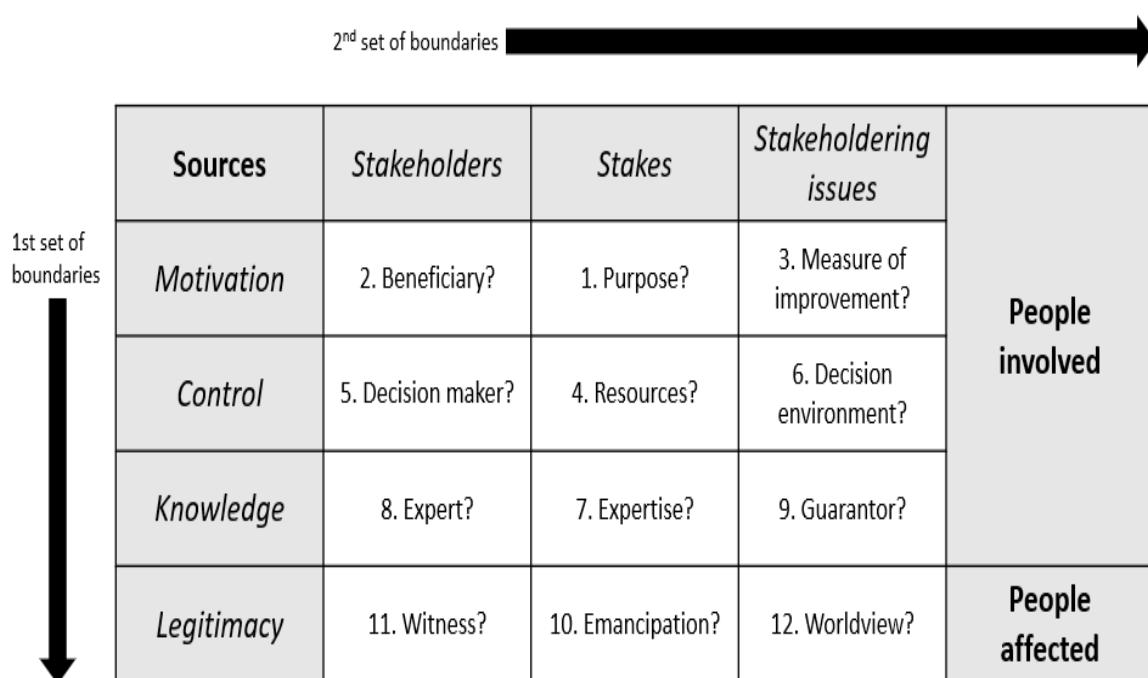


Figure 2. Boundary judgments, adapted from Ulrich and Reynolds (2020).

The numberings have been changed from the original to reflect the recommended order for dialectical unfolding for beginners. For advanced practitioners, Ulrich and Reynolds (2020) provide facilitation prompts (p.290) to enable a *future state critique*. An ongoing critique can be presented in 3 points per row, if at all. We suggest that as a heuristic, this could be distilled even further.

What boundary critique offers is to make tacit identities and the unfolding process. Often, this is done at the back of the head, which Checkland and Poulter's (2020) term a '*Mode 2*' application of ST. The idea of working with dilemmas and paradoxical tensions maintained as a '*question mark*' is recursive dialectic across the three major dilemmas, above. They also undergird Rittel and Weber's (1973) original dilemmas at the intersection of SD, as operationalized into triadic and tetradic tensions. Finally, a silent dilemma in the backdrop is that of *flexibility* (*systemic iteration*) and *structure* (*systematic triangulation*) of facts, values, and systems. This is necessarily ongoing, as actors and identities evolve (Gregory et al., 2020).

Our design case ran from February to July 2021, where we used boundary critique to set up a place-based intervention for a resident population in Singapore. Its key advantage was in providing a systematic and practical guide for conversations and iteration with over 10 organizations and groups of residents: This was then ‘coded upwards’ to the multistakeholder level for further iteration, and a theory of action. Conversely, a key disadvantage were the nuances of application, not covered by Ulrich and Reynolds (2020). In practice, we found that *legitimacy* was less a sub-set of boundaries, than a prerequisite to those before (*Figure 2*). Guarantors under *knowledge* were also stakeholders to be aware of, and at various levels (E.g., ‘*project sponsors*’).

Yet, our real challenge came through new alliances. Despite our ground rules for engaging only through facilitation as project leads, we found out that two of our team members had been covertly approaching stakeholders with new funding deals. One (X) would come to challenge the intervention from this: On the one hand, X refused to submit agreed-upon details for 3 months, and privately insisted that their 5 partners rescope around their choices. On the other, X also sought to impose its worldview against the interests of those involved and affected (E.g., a recurring narrative was that X was ‘*beyond*’ services and ‘*knew best*’, even as this went against what we had known over fieldwork with their own beneficiaries and facilitation with partners).

An important reflection from this was that pragmatic use of boundary critique must draw back to *purposefulness*; and in the real world, a purpose-based nudge and even exclusion, may be necessary. First, ‘*ongoing boundary critique*’ must be tacit about finding congruence between the people involved and affected (whether or not *legitimacy* is seen as a sub-set of boundaries or a prerequisite, above). Second, between what stakeholders say and actually do. Closer to the alternate stream of boundary critique, our team members’ and X’s behaviors were constantly “expressed in ‘*asides*’ ... defending their own boundaries of interest whilst disregarding the views of others ... [while] unsure about ... commitment to the Project” (Midgley, 2000, p.342).

### III. Conclusion

Boundary critique is complementary to SD, and has much to offer even to composite ST and DT. As Nelson and Stolterman (2012) explain, “the process of design is always the most effective and efficient means of getting ... to new places ... it calls for *good* compositions – not *true* solutions ... based on notions of *reflections* and *substance* ... [and to take away from] the focus on *problems*, whether wicked or tame, as the ... trigger [that] ... has limited our ability to frame change as an outcome of intention and purpose ... [to] focusing on intentional actions that lead to states of reality ... desirable and appropriate ... the reconstitution of *sophia* ... [and] reflective practice, intellectual apperception and intentional choice” (pp.5-20).

In turn, “institutionalizing systematic processes of reflection and discourse on the boundary judgments that condition people’s facts and values, [maps and design] ... [will help us] talk about and question the same facts at a time; rather than being at cross-purposes” (Ulrich, 2021, p.7). Over time, boundary critique has deepened its focus on *process*, which adds to its universal complementarity. It has also extended beyond its Kantian foundation (Ulrich and Reynolds, 2020; Ulrich, 1988), acknowledging the equal influence of *pragmatism* drawn on by German SD (Jonas, 2020) and Churchman (1971) through dialogue with scholars like Ormerod (2020; 2007). It is a unique alternative to expert-led maps and design, and the original dilemmas.

Notably, disclosure from critique is not mutually exclusive to maps and design, and Ulrich (1987) himself advocated for analytical competences, alongside context and process ones. The different ontological proximities in critique, maps, and design imply different degrees of reflexive/reflective and instrumental thought that cannot be contained within the other. As such, the proper place of boundary critique is to help SD practitioners become more tacit about different dimensions of purpose and reference systems. It may also have an adjacent contribution to boundary specification problems that remain in ‘*hard systems*’ modelling today (Laumann et al., 1983). Interested readers are pointed to Wong and Tan (2021) for a preliminary synthesis of the two.

Aside from the issues with referential enclosure (para.10), we would point out to scholar-practitioners a fourth, unspoken dilemma that surfaced through our design case: When is a purpose-based nudge, and even exclusion, necessary and legitimate? To take this question a step further, how does this change when the people affected are wholly irrational actors (E.g., lung cancer patients who insist on smoking, traders who choose to invest via ‘*dark pools*’)? And then, what should governance look like, and how can we realistically track ‘*ongoing boundary critique*’? These are questions that have not been answered in the literature, other than ‘*matrices*’ for multi-methodology (Jackson, 2019). In turn, Wong (2022) is a preliminary response.

Thinking again on fit and new dilemmas through *historical, conceptual, pragmatic* fit is rarely explored in SD literature, but can be useful to future scholars if appropriated carefully. Conversely, a more precise definition of SD could preclude new knowledge routines, or confines ST and DT to the ‘*Sengian*’ and ‘*Brownian*’ – which have limited application, and as is the unfortunate case in Singapore. While Ulrich’s (2021) boundary critique is one of two streams, it is a means to antinomy in SD and new learning competences for a transdisciplinary community. In short, “it is becoming more obvious that we need to think more carefully about what we choose to create or change ... in guiding the evolution of human systems – the *praxis* of a wise hand” (Nelson, 2021, p.5).

*“To return to the things themselves is to return to this world prior to knowledge, ... of which knowledge ... speaks, and ... with regard to which every scientific determination is abstract, signitive, and dependent, just like geography with regard to the landscape where we first learned what a forest, a meadow, or a river is. This movement is ... distinct from the idealist return to consciousness, and the demand for a pure description excludes the process of reflective analysis just as much as it excludes the process of scientific explanation ... The world is there prior to every analysis ... it does not wait for our judgments ... or deliberate taking of a stand ... [Rather,] it is the natural milieu and the field of all my thoughts and ... explicit perceptions.”* (Merleau-Ponty, 2012, pp.xxii-xxiv)

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