

# Designing and sciencing: Response to Galle and Kroes



Robert Farrell and Cliff Hooker, School of Humanities and Social Sciences,  
University of Newcastle, Callaghan, NSW 2305, Australia

*Galle and Kroes (this journal 2014) have critiqued a recent paper by Farrell and Hooker (this journal 2012) that argued that design and science shared a common core problem-solving (cognitive) process. Contrarily, Galle and Kroes argued for distinct purposive identities to design and science and on that and further grounds argued for their having distinct core cognitive processes. In turn, this paper argues, first, that the distinct purposive identities provided by Galle and Kroes are appropriate, but quite compatible with design and science sharing a common core cognitive process. Second, this paper argues that the further arguments for cognitive distinctness proffered by Galle and Kroes founder on illogicality and/or too shallow an understanding of scientific process.*

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Championed by Simon (1996 [1969]), the now common view within design is that design and science are, through and through, different kinds of pursuits. Call this position Universal Separatism [US]. One traditional Simonian strand, elaborated by Kroes (2002), argues that (I) the objects produced by design and science (respectively, artificial artefacts, descriptions of nature) are fundamentally different, so (II) their problem-solving (cognitive) processes must also correspondingly differ. We have recently argued (Farrell & Hooker, 2012) that claim (I) is wrong when scientific research (hereafter: science) is properly viewed as strategic pursuit rather than as logical inference.<sup>1</sup> Rejecting claim I leaves it open to drop claim (II). More than that, viewing both pursuits as strategic invites recognising the clear similarities between the problem-solving methods/processes each use, directly undermining claim (II).<sup>2</sup> We considered that, given the similarities in their general problem situation and problem-solving process, it is reasonable to view the two as sharing a common core cognitive process. Call this last position Core Cognitive Commonality [CCC].

**Corresponding author:**  
Cliff Hooker  
[Cliff.Hooker@  
newcastle.edu.au](mailto:Cliff.Hooker@newcastle.edu.au)

Elsewhere we have argued similarly against other strands of US. Specifically, we argued that (a) science is not distinguished from design by lacking the kinds of wicked problems design has, a new analysis of wickedness plus the strategic view of science shows otherwise (Farrell & Hooker, 2013), and (b) design and



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science are not distinguished by differing roles that values/norms play in their activities (Farrell & Hooker, 2014). We take these outcomes to similarly support CCC and consider that, taken together, these three results shift the onus on to supporters of US to justify their position. Hence our challenge to come up with better arguments in favour of the distinctness of cognitive method/process between design and science, or concede to CCC.

Let us be clear about what is being claimed here. US and CCC are logical contraries: both cannot be wholly true together. But that is because US requires difference everywhere. There may be many ways that design and science differ compatibly with CCC holding. That possibility is the key to what follows. We accept that there are important differences between design and science: differences in purpose (producing client approved entities versus public knowledge), norms (e.g. aesthetics versus knowledge, client-based versus objective), working conditions (e.g. private firms versus government research laboratory), and so on. What we claim is that none of this provides any reason to think that their basic problem-solving (i.e. cognitive) processes are different. It is like the relationship between dogs and cats: they differ in so many particulars so strongly as to appear to the superficial glance to be thoroughly different kinds of creatures, yet they share in common an underlying mammalian nature, including basic skeletal 'bau-plan', organ types, sensory structures, etc. Since design is noted for its creative solutions to novel problems, including ill-defined and 'wicked' problems, while science is noted for its capacity to also solve deep, difficult problems and to deliver once-unfathomable understanding of new domains, we are interested in the problem-solving methods/processes involved and suspect they are the same general kind when abstracted from their immediate detail, however beguiling may be the differing particularities of their applications in each domain. This is what CCC asserts. It is not a new thought. But we trust that our defenses of it are successful against the still-dominant opposing arguments for cognitive distinctness and we aim to later make a modest new contribution to what that common process might be like.

Galle and Kroes (2014) have recently responded to our treatment of the Simon-Kroes position above. First they provided an analysis of our argument forms, concluding that we had no proof of US's falsity. Then, through a careful elaboration, they responded to our challenge by developing purposive characterisations of design and science that they argue leave them quite different activities while sustaining traditional design distinctions in support of that view. Here we respond briefly to their paper.<sup>3</sup>

### *1 Setting lesser matters aside*

Galle and Kroes begin by essentially accepting our views in critique of the Simon-Kroes position, conceding that design and science both produce artefacts as their products and by implication also accepting the strategic

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