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# The central role of the designer's 'appreciative system' in socially situated design activity

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## ABSTRACT

According to Dorst and Dijkhuis (1995) the two main paradigms governing design discourse are Simon's rational problem solving and Schön's theory of design as a 'reflective conversation with the situation'. Rational problem solving has dominated design theory, and focused on design activity determined by a fixed problem space, reducing the designer to a 'missing person' within design research (Dorst & Reymen 2004). The aim of this paper is to locate the 'missing' designer within socially situated design activity.

Dorst's (2006) framework of 'design paradoxes' questions the dominance of the design problem in determining design activity suggesting design problems are unknowable, and determined by the designer's re-interpretation of the accepted discourses underpinning the design situation. Dorst's concept of design, as socially situated activity, corresponds with Schön's 'problem setting' which is 'bounded' by the appreciative system (personal knowledge, values and beliefs) (Schön 1983).

This paper identifies the correspondence between Schön's theory and contemporary frameworks including 'design paradoxes'. It investigates the agency of the designer as evidenced in the use of the 'appreciative system' in the genesis and evaluation of 'frames' within problem setting. This is elucidated using case study analysis of novice designers within an Australian tertiary design degree. The case reveals the structured and motivated use of the designer's appreciative system to commence designing in the absence of 'repertoire' or domain knowledge (Schön 1983), and to structure the acquisition of new repertoire knowledge.

These findings offer new pedagogical perspectives both in terms of design expertise, and educating domain independent, multi-disciplinary designers. Frames or similar organising principles operate in most design fields, and create a 'principle of relevance' for knowledge from multiple domains and disciplines (Buchanan 1992). Educating designers requires the acknowledgement and understanding of the objective function of subjective and social knowledge within design thinking, thereby locating the 'missing' designer within innovative design activity

## INTRODUCTION

Design activity involves negotiating ill-defined and information rich design situations to produce meaningful and appropriate outcomes. Traditionally understood as a problem solving process, Schön (1983) described design as a 'reflective conversation with the situation' orchestrated by the agency of the designer. Since the 1960's rational problem solving has dominated design theory focusing on the design problem and formal domain knowledge, effectively reducing the designer to a 'missing person' within design research (Dorst & Reymen 2004).

Although Schön's concept of 'professional artistry' (Schön 1983:VII) represents a significant challenge to normative definitions of design knowledge and design activity, it remains poorly understood. Professional artistry combines the designer's repertoire (domain knowledge), appreciative system (personal experience, values and beliefs) and their stance (attitude). Because repertoire knowledge governs problem solving, and appreciative knowledge governs problem setting, the role of the appreciative system is seldom discussed within design discourse. While rarely acknowledged, Schön's 'true legacy' was that he 'legitimised informal knowledge', by foregrounding the agency of the designer within the design conversation (Sanyal 1997).

While Schön's theory of reflective practice has been described as 'weak and fuzzy' (Roozenburg & Dorst 1998) this paper demonstrates that a contemporary re-reading of Schön's theory of 'reflection-in-action' offers a relevant descriptive model of domain independent design activity. This paper identifies contemporary frameworks which significantly augment Schön's theory including 'design paradoxes' (Dorst 2006), 'organising principles' (Rowe 1987), and 'creative problem structuring' (Mumford et al 2004). This re-reading of Schön's work is elucidated by using emergent findings from qualitative research exploring the design activity of a novice designer within a tertiary design degree. These preliminary findings indicate that novice designers employ their appreciative systems in order to commence designing in the absence of repertoire knowledge and to direct and structure the acquisition of new repertoire knowledge. This analysis reveals the contemporary relevance of problem setting as domain independent design

knowledge and the central role of appreciative goals in the design activity and education of multi-disciplinary designers.

## I. PROFESSIONAL ARTISTRY AND AMBIGUOUS SITUATIONS

Schön perceived problem setting as a form of ‘hypothesis testing bounded by the appreciations’ (Schön 1983:151). Problem setting depends on ‘professional artistry’ as the basis for the qualitative judgements which direct design activity (Schön & Wiggins 1992:137). Schön suggested ‘professional artistry’ is an ‘exercise of intelligence’ or a ‘kind of knowing’ (Schön 1986:13) that *mediates* the use of theory in practice, (Schön 1985:92). Professional artistry reflects the central role of the designer’s appreciative system in design activity. Problem setting generates successful ‘frames’ when the designer moves beyond ‘usual range of descriptive [situational] categories’ (Schön 1985:27). This altered perception depends on the use of informal knowledge within ambiguous design situations.

While ill-defined design problems are frequently described as vague they are actually ambiguous. Vague situations ‘lack precision’ and are resolved with information, whereas ambiguous problems ‘can be understood in more than one way’ (Maykut & Morehouse 1994:31). By definition, designers cannot hold all the ‘necessary’ domain information needed to resolve ill-defined situations (Cross 1982 224). Although ‘the ability to tolerate uncertainty’ is identified with design expertise (Cross 1994:41) there is little understanding of how it is developed. Recent studies have found that *knowledge organisation* is more important in problem setting than *knowledge acquisition* (Mumford et al 2004, Restrepo & Christiaans 2004). This corresponds with Schön’s belief that problem setting involves the ‘selectivity and organisation’ of the phenomena of the situation (Schön & Rein 1994:30).

Within qualitative methods, a tolerance of ambiguity is recognised as the ability to maintain ‘multiple perspectives’ (Stake 2000: 443) of a situation while assessing which is ‘merited’ (Maykut & Morehouse 1994:31). Expert designers similarly hold ‘parallel lines of thought’ (Lawson 1994) or ‘double vision’ (Schön 1983:28) while waiting to see which is most *viable*. Designers *re-define* even well defined design situations, rendering them temporarily ambiguous, because of the generative potential of maintaining ‘double vision’. In effect, a tolerance of ambiguity within design activity is the ability to make appreciative judgments, within a dynamic structure that allows for multiple interpretations, in order to stimulate the altered perspective necessary for innovative design activity.

## II. ORGANISING PRINCIPLES AS DOMAIN INDEPENDENT KNOWLEDGE

Problem setting represents the ability to maintain multiple perspectives within motivated and structured design activity

in order to frame the design situation. Similar concepts to frames exist in all design domains under a variety of names including ‘organising principles’ (Rowe 1987), ‘primary generators’ (Darke 1979), ‘interpretations’ (Goldschmidt 1988), and ‘representations’ (Restrepo & Christiaans 2004, Mumford et al 2004). These concepts are all developed in action, based on personal knowledge, enabling design activity to commence in the absence of relevant domain knowledge.

Organising principles create a ‘principle of relevance’ for knowledge, allowing the designer to ‘filter’ knowledge from multiple domains or disciplines. This enables the ‘conceptual repositioning’, that is fundamental for innovative design thinking (Buchanan 1992:13). Rather than being the product of intuition this altered perspective is based on the ‘adaptability’ of organising principles which results from personal and situational knowledge being enculturated and therefore, ‘negotiable’ (Restrepo & Christiaans 2004).

## III. SOCIALLY SITUATED DESIGN ACTIVITY

Dorst’s (2006) framework of design paradoxes highlights the central role of enculturated knowledge in design activity. Dorst holds that design problems are ‘design paradoxes’ because they are constantly evolving and unknowable. Paradoxical situations are understood through their underlying social ‘discourses’, including embedded terms and relationships. The paradox is resolved when the designer ‘transcends or connects’ *different* discourses by ‘stepping out’ of normative understandings, using their ‘personal experience’ and ‘intuition’ (Dorst 2006:14).

While Schön substituted professional artistry for ‘intuition’, the socially situated nature of ‘paradoxical situations’ parallels the ‘reflective conversation’. Both involve a redefinition of the design situation using interpretations or qualitative judgements, based on personal and social knowledge, within ambiguous situations. Additionally, Dorst’s concept of the local ‘linking behaviour of designers’, within a ‘local network of links’ corresponds with Schön’s concept of local design moves within a ‘web-of-moves’. Links or webs play a vital but understated role in reflective practice.

## IV. STRUCTURED AND MOTIVATED USE OF THE APPRECIATIVE SYSTEM

Schön’s web-of-moves structures the design activity determined by appreciative judgments (Schön & Wiggins 1992:168). The web is maintained through ‘fidelity’ to both previous and future moves, and to the designer’s appreciative system. The ‘constancy of the appreciative system’ allows frames to change within a design episode, allowing the designer to maintain ‘double vision’ without ‘reducing design activity to disconnected episodes’ (Schön 1983:130). The appreciative system is intrinsic within the *genesis and*

*evaluation* of moves and frames. The constant evaluation within the web-of-moves structures design activity and enables a ‘kind of objectivity’ (Schön & Wiggins 1992:138).

Significantly reflection only begins when a sense of similarity between two *dissimilar* concepts or situations is ‘treated as information’ (Schön 1985:26). Similarity is stimulated by ‘immersion triggers’ resulting from the ‘initial descriptions’ of the design situation generated by the designer’s initial frame. Possibly the most critical yet least recognised aspect of problem setting, this process of ‘seeing-as’ (Schön 1967), accounts for the identification of patterns or similarities and the generation of meaning above and beyond the meaning of individual elements or concepts. New concept generation occurs through a *shift in perception* in which both of the original concepts are transformed (Schön & Wiggins 1992:135). What has been called ‘intuition’ within design activity is in fact the ‘judgments embodied in acts of seeing’ which alter perception (Schön & Wiggins 1992:137).

#### V. APPRECIATIVE GOALS AND MOTIVATION

Designers begin seeing-as by responding to ‘personally meaningful’ triggers and forming frames based on personal ‘self-set’ goals (Mumford et al 2004:24). An *appreciative* goal is the coalescence of preferences into a meta-interest which informs qualitative judgments. In much the same way that a designer’s application of domain knowledge is governed by their ‘overarching’ theoretical position (Schön 1983:164), appreciative goals, as expressions of the designer’s appreciative system, govern their qualitative judgments. The concept of appreciative goals enhance our understanding of the ‘principle of relevance’ and altered perspective because they motivate the designer to ‘seek out and attend to cues that they would not normally view as being relevant to the problem situation’ (Mumford et al 2004:33).

#### VI. NEW PERSPECTIVES ON DESIGN EDUCATION

Schön (1987) noted that skilled tutors ‘particularise’ design situations for individual students, while simultaneously defeating the defensiveness that arises because ambiguous design situations necessitate the student begins designing before they know what they need to know. The assumption that ambiguity is ameliorated by ‘hard’ knowledge is incorrect. Schön and Dorst’s theories suggest that local subjective moves result in objective global frames. Qualitative judgments based on appreciative goals are the basis of the linking behavior of designers that enables a tolerance of ambiguity. Because problem setting is based on the appreciative system not domain specific repertoire knowledge the linking behaviours involved are domain independent activity.

Multi-disciplinary designers must tolerate ambiguity and organise knowledge beyond their domain knowledge. Multi-disciplinary design education should involve the demonstration of particularised design moves which employ appreciative goals to motivate and structure knowledge organisation within an evaluative, structured framework. Schön held that ‘professional artistry’ was ‘learnable’. The emergent findings of the small qualitative study suggest that focusing the designers ‘linking behaviour’ offers a significant means by which to facilitate the development of ‘professional artistry’ or a ‘designerly way of knowing’ (Cross 1982).

#### VII. NOVICE DESIGN ACTIVITY

While protocol analysis has dominated design activity research there is an emerging need to examine design activity as experienced by the designer in situ. The excerpts used in this paper to support the contemporary re-reading of Schön’s theory are based on an emergent ‘instrumental’ case study (Stake 2000) involving analysis by ‘constant comparative method’ (Maykut & Morehouse 1994:151). Halle, the novice designer, quoted within this paper, was a second year student within a cross-disciplinary tertiary design degree. For the purposes of this paper, Halle was selected from the sample as she was reflective of the demographic within the course. Her selection anticipated the idea that qualitative research should focus on ‘those cases that seem to offer opportunity to learn’ (Stake 2000). The case study employed in-depth unstructured interviews, based on interview guidelines and artefact analysis, approved by a university ethics committee. The study was designed to mitigate against ‘post-hoc rationalisation’ by focusing on ‘general concepts and issues’ which emerge across a number of projects within three different studios, over a semester, rather than examining a single project in detail (Lawson 2001:10).

The research focused on Halle’s experience of design activity, over a semester, not her design outcomes. Halle comes from a creative artistic family and is motivated by differentiating her ideas from her peers admitting, ‘I don’t like the idea of making something that I am not going to like and really sort of feel, that’s not mine’. She resists doing things that she ‘has to do’ or in the way ‘they’ want her to, and prefers choices based on her personal interests. Halle wants ideas to ‘have quiet a lot of information’ embedded in them so that they are not ‘obvious’. Halle strongly believes that her ideas are randomly generated. Her random ideas are in fact evidence of seeing-as and the central role of her appreciative system, the strongest expression of which, is her relationship with origami. Halle’s relationship with origami offers insight into particularising design education using appreciative goals.

##### A. Relationship with Origami

Halle believes her ‘obsession’ with modular origami is a *personal* interest because it was stimulated by her father, and is self taught and directed. It represents a *meta-interest*

associated with a 'childhood' fascination with mechanisms, and strong interests in mathematics, geometry, modular systems and making things. Halle has cultivated this meta-interest through open goals she describes as 'trying to find new paths', and applied it (despite protests by teachers) to numerous art and design projects. This meta-interest has a profound effect on Halle's design activity as the foundation for many of her 'random ideas'. The depth and duration of this personal knowledge corresponds with Schön's concept of 'constancy of appreciation'.

A comprehensive understanding of a student's personal history is neither necessary nor productive in particularising design demonstrations. Identifying and facilitating their linking behaviour is, however, vital. This is evident in an episode Halle describes as *the* most significant event in her design education. Prior to this event, Halle was finding it hard to 'connect' to her briefs. In a critique Halle showed her tutor some sketch models based on modular origami, analysing the design of a coffee pot. Halle believed it 'would have looked like it had nothing to do with it, but I found some sort of little way that it related' and that the tutor 'understood', and explained that she believed origami was Halle's 'visual language' or 'way of visually communicating'. Halle's tutor responded to the initial descriptions Halle had made *using* origami not origami per se. Not only did Halle's tutor legitimise the use of her appreciative system, she offered her the *language* to articulate the design activity she couldn't describe or justify. These 'moves' represent 'reciprocal reflection' (Schön 1985:67) and enabled Halle to begin to tolerate ambiguity and connect *personally* with her design briefs.

In an inverse situation Halle's use of her appreciative goals is misunderstood by both herself, and her tutor. When conducting a 'random' search for stimuli for a shelter design Halle discovered the 'next level up' to modular origami in Santiago Calatrava's 'flexible geometry'. Halle identified this with her appreciative goals because 'it just summed up everything that I was interested in'. Halle considered Calatrava's 'foldable cube' as a potential form for her shelter which she made and she presented in class. Her tutor's reaction marks a significant event for Halle:

I was still really buzzing and I said 'I have something I have to show you' and I showed her this little model that I had made, of what I wanted to make, and she said "that's really cool but you have gone a step too far and I don't want you to do that..."

Halle and her tutor interpreted the model as a design prototype rather than an extension of the experimental process involving modular origami. Halle responded to the 'foldable cube' due to her personal interests and the initial frame she had established for her project of a 'portable' shelter based on previous research. The model could have functioned as a 'move experiment' used to test her 'initial frame' leading to a stable final frame. Because Halle's tutor didn't demonstrate a design 'move' for Halle's 'reflective imitation' (Schön 1987:73), Halle was unable to generatively

connect her personal and domain knowledge through seeing-as and alter her perception of the cube. Without support Halle was unable to manage the complex web-of-moves necessary to develop a final stable frame.

Interestingly, because this discovery was motivated by an appreciative goal not the design problem, Halle remained committed to flexible geometry as an extension of her meta-interest. Although Halle's project remained unresolved for the first time Halle identified her personal interest with *knowledge* stating, 'I mean now it's good because ... I still have that knowledge in my mind'.

This knowledge functioned as a frame 'exemplar' within later projects (Schön & Wiggins 1992). Halle continued to explore flexible geometry and successfully applied it in the design for a portable theatre made from sustainable materials in East Timor. In this way Halle's appreciative system 'seeded' multi-disciplinary knowledge including philosophy, human geography, politics, performance, and sustainability and domain knowledge relating to materials and structure.

### B. Random ideas

Halle profoundly believes that her design concepts are based on 'random ideas' which she defines as 'things that seem unrelated or out of place'. Random ideas are a *spontaneous* response to a brief, often based on visual or verbal triggers within her immediate vicinity which stimulate her personal interests and memories. When given a brief to design a box to hold 'memories', Halle's initial response was based on an aversion to one of the design criteria which called for an examination of 'surface and texture':

You know, texture, surface, and all that kind of stuff, and I thought "it's really crafty kind of stuff" and I can't stand that kind of stuff.

Halle's appreciative system stimulated a sense of similarity between a container and a mechanical 'mousetrap' that 'snaps' on memories. This 'seeing-as' was based on preferences derived from her meta interest in modular origami that include a preference for making over drawing, for kinetic over static objects, and for form over colour, texture, and surface. Halle's 'random' ideas are very consistent but appear random because they are not based on formal domain knowledge.

Halle is motivated to select random ideas that are *not* logically connected to the brief based on her appreciative goal to differentiate her projects. Halle ensures differentiation by developing random ideas through an activity she calls 'branching'. Random ideas, as initial frames, structure 'branching' by forming a principle of relevance which directs her response to information. In the 'memory box' example, Halle connected memory, with cognitive maps, through the mousetrap metaphor to puzzles and mechanical toys. She framed the memory box as a promotional toy for McDonalds, connecting toys with manipulation based on and understanding of branding and consumption stimulated by her father. Halle thereby connected extant personal

knowledge (of mechanisms, and consumerism) with new multi-disciplinary design knowledge (cognition, packaging, manufacturing). This example illuminates how the appreciative system both motivates and structures design activity and connects formal and informal knowledge.

## CONCLUSION

Traditionally design expertise is associated with domain knowledge (Goldschmidt 2003) and ill-defined problems are perceived as the clearest expression of domain independent knowledge (Reymen 2001, Buchanan 1992). Both assumptions are derived from the dominant rational problem solving paradigm and limit normative understandings of design knowledge and design activity.

This contemporary re-reading of Schön's theory of design as a 'reflective conversation with the situation' offers an insightful model of design activity, which accommodates ambiguity and the objective use of personal and social knowledge. Augmented by contemporary theory of 'design paradoxes', 'organising principles' and 'creative problem construction', this re-reading identifies problem setting based on appreciative goals as domain independent design activity which suggests new approaches to educating multi-disciplinary designers.

The emergent findings within the case study support the central role of the appreciative system in determining a 'principle of relevance' within domain independent design activity. This paper illustrates the vital role of the tutor in demonstrating 'linking' moves, particularised around the designers appreciative goals, to the ameliorate the anxiety associated with ambiguous design situations. These linking moves, as the basis of the objective use of subjective knowledge in 'problem setting', offer a new perspective of domain independent knowledge, established through the agency of the designer, not the limitations of the problem space.

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