

Pedagogical Ways-of-Knowing in the Design Studio

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Abstract

This research addresses the effect of pedagogical ways-of-knowing in higher education design programmes such as Graphic Design, Interior Design, Fashion, and Industrial Design.

One problematic aspect of design studio pedagogy is communication between teachers and students about the aesthetic visual meaning of the students' designed objects. This problematic issue involves ambiguous and divergent *ways-of-knowing* the design meaning of these objects. The research focus is on the design teacher role in design studio interactions, and regards pedagogical ways-of-knowing as the ways in which teachers expect students to know visual design meaning. This pedagogical issue is complicated by the fact that there is no agreed-upon corpus of domain knowledge in design, so visual meaning depends greatly on the social knowledge retained by students and teachers.

The thesis pursues an explanation of pedagogical ways-of-knowing that is approached through the philosophy of critical realism. How it is that particular events and experiences come to occur in a particular way is the general focus of critical realist philosophy. A critical realist approach to explanation is the use of abductive inference, or inference as to how it is that puzzling empirical circumstances emerge.

An abductive strategy aims to explain how such circumstances emerge by considering them in a new light. This is done in this study by applying Luhmann's theory of the emergence of cognition in communication to teacher ways-of-knowing in the design studio. Through the substantive use of Luhmann's theory, an abductive conjecture of pedagogical ways-of-knowing is mounted. This conjecture is brought to bear on an examination of research data, in order to explain how pedagogical ways-of-knowing constrain or enable the emergence of shared visual design meaning in the design studio.

The abductive analysis explains three design pedagogical ways-of-knowing: design inquiry, design representation and design intent. These operate as macro relational mechanisms that either enable or constrain the emergence of shared visual design

meaning in the design studio. The mechanism of relation is between design inquiry, design representation and design intent as historical knowing structures, and ways-of-knowing in respect of each of these knowing structures. For example, design inquiry as an historical knowing structure has over time moved from ways-of-knowing such as rationalistic problem solving to direct social observation and later to interpretive cultural analysis. The antecedence of these ways-of-knowing is important because communication about visual meaning depends upon prior knowledge, and teachers may then reproduce past ways-of-knowing.

The many ways-of-knowing that respectively relate to design inquiry, design representation and design intent are shown to be communicatively formed and recursive over time. From a Luhmannian perspective, these ways-of-knowing operate as variational *distinctions that indicate or relate to* the knowing structures of design inquiry, design representation and design intent. This is the micro-level operation of pedagogical ways-of-knowing as relational mechanisms in design studio communication. Design teachers' own ways-of-knowing may then embrace implicit way-of-knowing distinctions that indicate the knowledge structures of design inquiry, design representation and design intent. This implicit indication by distinction is the relational mechanism that may bring design teachers' expectation that *this* and not *that* visual design meaning should apply in communication about any student's designed object. Such an expectation influences communication between teachers and students about the potential future meaning of students' designs. Consequently, shared visual design meaning may or may not emerge.

The research explanation brings the opportunity for design teachers to make explicit the often implicit way-of-knowing distinctions they use, and to relate these distinctions to the knowing structures thus indicated. The study then offers a new perspective on the old design pedagogical problem of design studio conflict over the meaning of students' designs. Options for applying this research explanation in design studio interactions between students and teachers are therefore suggested.

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Chapter One

Introduction

This study's concerns are probably best introduced by an overview of the general idea of design. So I begin this thesis with a brief tour of the wider and lesser known reaches of design in the social world. Then I move on to the specific context of this study, the design studio in higher education, where the teaching of design involves students in the actual designing of objects.

1.1 The Idea of Design

Writing about the idea of design, Guffey (2009) wryly quotes the view that design has entered a golden age – and then says this was a view expressed in the 1950s. To use some intentionally disparate points of reference, the idea of design as a media phenomenon, as a museum and exhibition draw-card, and as a profession have grown exponentially since the 1950s.

Design is situated in what are called the 'creative industries' (Department of Culture, Media and Sport, 2001) – a field that has included craft, art and design products and their vendors; the performing arts; various creative media such as film, video, DVD, television and radio; collectable design such as antiques and memorabilia; and design exhibitions. The inclusiveness of the creative industries continues to widen now that there are so many forms of electronic dissemination for created artefacts. One already huge and fast-growing form of this is the leisure pursuit of interactive gaming, which is designed aesthetically and technologically by multimedia-trained design graduates. Understandably, this blurring of the boundaries of design-based creative industries means that it is difficult to pin down the idea of design.

Heller's 'Design Literacy: Understanding Graphic Design' (2004, 2nd ed.) is a very eclectic collection of essays on the graphic design meanings of historical and contemporary 'objects'. Designed 'objects' are artefacts, but artefacts as human-made objects can be visual images or even the ideas and practices associated with

visual images (Smith, 2007; Friedman, 2007; Hagan, 2007). One might well describe designed artefacts as knowledge artefacts. Heller's 'Design Literacy' collection (2004) examines such knowledge artefacts as the graphic rendition of identity in 'Dylan' (Glaser, 2004); of style in 'Japanese Movie Tickets' (Anonymous, 2004); and of persuasion in 'End Bad Breath' (Chwast, 2004). Buchanan (1996) has famously called this kind of design meaning 'design rhetoric', as an area of formal design scholarship. Informally, television and magazine journalism pursues design rhetoric or design argument (Buchanan, *ibid*) about interior decor, cars, garden design, and fashion, as a minimal listing.

In the wake of this rhetorical focus on design, Krippendorff (2006, p. 47) has said, "Humans do not see and act on the physical qualities of things, but on what they mean to them". Since the 1980s, the meaning of designed products has been theorised in a disciplinary field called 'product semantics'. Krippendorff's book 'The Semantic Turn' (2006) established this semantic inquiry into design meaning. In Krippendorff's view, designed object forms are endowed with symbolic qualities through social practices, over time. Well-known examples are the Mini motor car and the miniskirt of the 1960s, which were strongly associated with the rise of youth culture (Tambini, 1996).

The semantic turn of social meaning in design expression seems, however, to have been overtaken by the 'social responsibility' turn. Socially responsible design has wide concerns relating to environmental issues and the redress of a compromised quality of life. A fine example of the latter is Tracy Gromek's FiiWA (Freedom in Interactive Wearable Art) sports equipment for the visually impaired. Sensors implanted in Gromek's sportswear and sports equipment enable groups of visually impaired people to play sports together (Marshall, 2009).

Designers have increasingly been tasked with addressing social issues, whether through the design of physical objects or through the design of systems or services. Sustainable design is another form of socially responsible design that reduces the attrition of natural resources through human needs. Burns, Cottam, Vanstone, and Winhall (2006) promote 'transformation design' which addresses problems such as the design of environments for learning, health care and transport. These are issues

of social responsibility that often require design services providing an efficiently functioning system, as well as an aesthetically positive human experience. Burns et al. (2006) say that since the post-war movement of design toward a customer or market-led approach, the participation of those who use and receive designed services or amenities has become part of the design process. Lupton (2004) has also made the point that from the 1990s onward, the 'user' is a central idea in design. The 'user' was first referred to as one who used a computer in the field of human computer interaction (HCI) design – the person or group who might experience the use of a designed object as meaningful in cognitive, emotional and physical ways. The more acceptable and more accurate term for 'user' is 'human', and Hanington, (2006, p. 1) advocates a human interactional or interface approach to other design domains, such as graphic design. Of this, though, Lupton (2004) says that while a designed artefact might meaningfully address a human user, the designed artefact also talks back through human use of it.

Socially responsible design that puts ethical values first is the current rallying cry. But objects with culturally expressive associative appeal are still in very high demand, and these associations need not hark to grubby capitalist excess. For Palmer, (1996, citing Haug, p. 11):

People convert their sensual self-expression into the commodity form of buying things which become expressions of themselves, which changes the possibilities of expressing the human instinctual structure ... features of design – function, preference and aesthetic judgement – complicate the issue of aesthetic judgement of design, because aesthetic judgement has traditionally been analysed in terms of a very different conception of objects, one that does not necessarily include consumption. This means that in design we have to take into account the relationship between human beings and objects.

Fairs (2004, unpagged) says that when people say that they are interested in design or remark on the beauty of a design they are usually referring to 'stuff' – the artefact outcomes of design. But for Fairs, one of the things that makes design unique is that it is the *process* of design that design more precisely refers to, because of the practical origins of design in craft as a trade vocation. Fairs' perceptive comment is that art, literature and music mean the results of the creative process, whereas design properly refers to *designing*. The significance of this is that people want

things that have been designed, often by 'star' designers, who adopt a particular representational position, such as that of deconstructivism, or postmodernist retro references, or modernist purity of form. Such designers attract a cognoscenti following, where the famed designer's approach rubs off in proclaiming a person's discerning social identity.

The idea of design thus has multiple trajectories.

The meaning of designed objects is visual meaning that is non-verbally communicated. Sharing in this meaning is common in everyday life, where we use a great many visual cues as information, and a great many visual forms have cultural and social meaning. In social life, design meanings are not only known, but are actively incorporated in activities and practices. Every item of personal use is designed with meaning value in mind. We furnish our everyday lives with French garden furniture, retro-modern toasters and kettles, fashion garments that portray the wearer as wanton, ascetic or alien; we drive motor cars that bespeak glamour, youth or power. In our designed environment, themed visual narratives bring an imaginative dimension to everyday life, in the form, for instance, of a series of oriental pavilions that house a shopping mall.

In one view, the 'narrativising' of our environment and ourselves with designed meaning can be regarded as frivolous and superficial, causing rampant spending and waste of resources. From the early 20th century, the meaning associations that have come with 'lifestyle' products have been a social preoccupation. The resulting tidal wave of 'lifestyle' consumerism has been under sustained critique since the 1980s, because of the social and natural environment damage it has caused (Thomas & Southwell, 2003).

But from an opposing viewpoint, designed artefacts provide ways of negotiating cultural transitions (Attfield, 2000; Ebbesen & Vihma, 2006; Atzmon, 2007). The Bauhaus movement in design is probably the best example of this. The Bauhaus was an intensely ideological movement in design during the 1920s and 1930s that championed a progressive industrial aesthetic of clean lines and purity of form (Kim, 2006).

Designed artefacts that challenge or advance social and cultural norms (Buchanan, 1996) are not simply about consumerism. The general public's involvement in design need not involve actually living in a home, or actually wearing a necklace. Neither does it necessarily involve the purchase thereof, in the popular understanding of the word 'consumer', which is generally thought to involve the purchase of an artefact. In the lingo of material cultural studies, consumption designates the consumption of meaning through social involvement with material things (Miller, 1987). We 'consume' design meaning simply by living in a designed world.

Professional designers, whether they be stars or not, address design meaning as human involvement with material things. The process of design in a professional context has been the object of Schön's groundbreaking insights into the design process. In Schön's (1983, p. 165) research into professional design practice, professional design practitioners

frame the problem of the situation, they determine the features to which they will attend, the order they will attempt to impose on the situation, the directions in which they will try to change it. In this process, *they identify both the ends to be sought and the means to be employed* [My emphasis].

Schön's reference to both ends and means in design exemplifies design endeavour. Designers not only solve problems or meet needs; they identify what constitutes a problem or issue. Then they execute design as the artefactual expression of a solution, a response, or a proposition. This is fully the sense in which the practice of design is quintessentially *intentional* (Prentice, 1996; McCullagh, 2000; Tregay, 2000; Russell, 2008). But in the design professions this is just the beginning, because the designer is often not the maker. The professional designer, briefed by a commissioning client, provides a blueprint or model for manufacture of the design in multiple product runs.

Marshall (2009, unpagged) observes that design is a human capacity that is defined by, but not limited to, professional design. Marshall's comment brings up the uncomfortable fact that design education and design pedagogy neither necessarily provide for professional design competence, nor bring the ability to convey significant meaning to design. There are, as Marshall says, completely untrained but

much celebrated professional designers. In the next section I explore what this and other anomalies might mean for design education and design pedagogy.

1.2 Design Education and Design Pedagogy

Design education has made a transition from vocational training to higher education in tandem with the rise of the knowledge economy (Friedman, 2003). The historical development of design through vocational training came from the days of the craft guilds, when apprentices learned from master craftspersons (Friedman, *ibid*). Cross (2007) regrets the continuing vocational or ‘trade’ association that design education carries, especially since design teachers are often designers themselves – and designers first, teachers second. If the teaching is done by practising designers, this does not necessarily represent an advantage for the students, because there is no agreed content knowledge or formal subject knowledge domain in the design professions or in design education. By contrast with the lack of a content domain in design, without a good content knowledge of anatomy, one cannot hope to progress in the study of medicine. As Press (1994, cited by McCullagh 2000, p. 44) has bluntly put this, “There are few subject areas where less is known about itself than design”. Knowledge about design can then derive from the individual person of the teacher, and from that person’s perspective (Dutton, 1991; Prentice, 1995; Salmon, 1995; Oxman, 2003; Blair, Blythman & Orr, 2007; Shreeve, 2011; Ng, 2011).

Instead of domain content knowledge, different kinds of expertise are pursued in particular design programmes. McCullagh (2000, p. 49) has provided an illustrative scheme of knowledge applications (rather than subject domains) in design ‘disciplines’:

Graphic Design – communication, product differentiation, semiotics

Industrial Design – product language/semantics, human technology interface, economics and technologies of mass production, product differentiation

Craft Design – intimate knowledge of materials, tools, processes

Interior Design – manipulation of space, light, materials and finish, building technology, ergonomics

Fashion Design – social aspiration, sexuality, gender, fabric technology.

Next, McCullagh (2000, p. 49) shows instances of knowledge crossover that are due to the digitisation of design, and to the ad hoc nature of problems faced by a designer in design fields that have blossomed over the last half-century:

Interaction Design – industrial design, graphic design, anthropology, computer science and cognitive psychology

Information Design – graphic design and cognitive psychology

Transport – industrial design, interior design, textile design, mechanical engineering design and interaction design

Sportswear, sports equipment and luggage design – industrial design, fashion design, mechanical engineering design and materials science.

Though there are separations and cross-pollinations among design education programmes, there are still long-established traditions of design pedagogy. These forms of teaching are 'signature pedagogies' of design. Shulman's signature pedagogy model (2005) describes the traditional forms of teaching in particular academic and professional disciplines. The three signature pedagogies of design education are theory teaching, practical studio teaching and subsequent summative 'crits' (critiques of the finished design product).

Theory study is usually meant to support practical design understanding in the studio and the crit. Theoretical study is generally of critical rather than subject knowledge nature, unless a programme curriculum includes the relatively structured field of design history.

This study is concerned with the other two signature pedagogies, practical studio teaching and studio critique of students' finished designs.

In the practical design study or 'studio' component of design education, students are typically given design briefs which they execute in a studio environment. Designing, in the context of this signature pedagogy, is something students do in response to their teachers' more or less authentic¹ design briefs. These are design briefs with requirements that simulate real-world scenarios (Wiggins, 1989) of professional design as closely as possible. However closely design educational project briefs might resemble real-world professional design commissions though, these briefs can be satisfied in multiple ways. Design briefs typically simulate real-world design challenges, but do not map out requirements in such a way as to limit possible design solutions. This makes knowing the visual meaning of students' objects a most complex and ambiguous issue.

Subsequent to the practical studio development, students' designed objects undergo a summative critique or 'crit' led by a design teacher or teachers, and involving the individual students or groups of students.

Studio and crit events involve a kind of pedagogical engagement with students that is unusually intensive and demanding for both the teachers and the students. In the first instance, communicating about the visual meaning of new student designs is far from easy. There are a variety of assumptions as to how it is that the meaning of students' designs might be known to others in the social world, beyond the design studio, and beyond design education. The teachers may need to handle advice and critique along the lines of the title of Oak's (2000) paper, "It's a Nice Idea, But It's Not Actually Real". The students may sometimes feel thwarted and diminished by teacher comment, but at other times students appreciate their learning about nuances of visual design meaning (Blair, Blythman & Orr, 2007).² There are a growing number of studies that deal with these pedagogical issues in the design studio, especially regarding the challenges of verbal communication about visual

¹ Authentic learning tasks in Wiggins's (1989) view are meant to simulate real world professional challenges. But simulated challenges can only be authentic to a degree. Other views on authentic learning prioritise reflection and collaboration between learners. These views follow upon Boud, Keogh and Walker's (1985) views about reflection on experience as authentic learning.

² Blair, Blythman and Orr's (2007) research concerns a large inter-institutional study of the design studio 'crit' or critique.

design meaning (for instance, Fleming, 1998; Oak, 2000; Logan, 2007). This research is investigated in more detail in Chapter Two.

In the next section I introduce this study's concern with student design meaning, and in the section that then follows, I show why the knowing of these meanings is a central problem for design pedagogy.

1.3 The Study's Concern with Knowing Design Meaning

Some while ago in the 1970s the term 'affordance', coined by Gibson (1977), began to be applied to designed objects in everyday use. A door knob affordance is the opening of a door. Why then are there serried ranks of differently designed doorknobs and handles in specialist shops? This is because the value of designed objects involves more than utilitarian meaning, and something other than skilled crafting.

In a word, the meaning concerns of this study centre upon design meaning as *relevant*. But what counts as relevant? In ordinary life, design meaning *engages* people (Poynor, 2008), though they cannot necessarily say how or why. Buchanan (1996, p. 94) says that:

[d]esign is an art of thought directed to practical action through the persuasiveness of objects, and, therefore, design involves the vivid expression of competing ideas about social life.

Design teachers and students discuss why a student's designed object should engage anyone, and in what way that object might have vivid and persuasive relevance in the social world. However a tricky issue arises from this: is it only the shared social meaning of designed objects that is important? What about personal meaning, the meaning individual students intend when they design, or the meaning individuals in society make of designed objects? I would argue that it is not possible for any individual (within or outside of design pedagogy) to make entirely personal meaning of a designed object. Individual knowledge is socially formed in the case of non-verbally communicated object meaning (Bandura, 1986; Barnard, 1998). As I explain in more detail in Chapter Two, individual self-expression is celebrated by

some design teachers, and lamented by others. In any event though, if individual members of the public engage with design meaning through their socially formed knowledge, then individual design students do so too.

Poynor points to one way of construing the individual-versus-social-expression difference. Poynor (2008, unpagged) quotes Merholz's view that design novelty for its own sake satisfies only the individual designer. This comes at the cost of a kind of engagement in which it is possible for people "[t]o be moved. To grow. Laugh. Cry. Discover. Move beyond their basic needs ..." (Poynor, 2008, unpagged, quoting Ziba). Such a lack of engagement for Poynor (2008) ignores cultural and social expression in design. He asks:

Are the great cathedrals of Europe – Rheims, Lincoln, Chartres – merely pretty? Are the gardens of Kyoto? Is Alvar Alto's Paimio armchair? Was Alexey Brodovitch's Portfolio magazine? How about Leica cameras? The patterns on Moorish ceramic tiles? Or the PowerBook and the iPod?

A related question about design meaning arises from Poynor's mention of the Powerbook and the iPod. These may be regarded as exclusively utilitarian but are designed with a concern for stimulating visual appeal. A similar example of the need for aesthetic qualities in utilitarian design is given by Buchanan, who comments on the aesthetic appeal of a pair of geometry dividers. He says these dividers "do not possess beauty, but show a concern for beauty" (1996, p. 102).

The design meaning concerns of this study are not confined to non-utilitarian artefacts that are merely aesthetically engaging. Rather, the study considers all material artefacts that, like Buchanan's dividers, are concerned with both functionality and aesthetic appeal.

The following two examples may illustrate what is signified by 'engaging relevance': Figures 1.1 and 1.2 overleaf show two more or less equally functional toothbrushes.

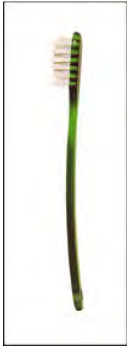


Figure 1.1 1940's toothbrush



**Figure 1.2 Philippe Starck toothbrush
1989**

Source: Tambini (1996, pp. 100–101).

The toothbrush in Figure 1.1, though it emerged in the 1940s, is still a popular design. The toothbrush in Figure 1.2 is the work of the celebrated designer Philippe Starck, and it departs significantly from the 1940's design. The relevance of the Philippe Starck toothbrush might lie in its modernist, technological, streamlined, futurist or even aero-dynamic qualities. This relevance may not be precisely articulated by the general public, even as they are engaged by it, but design teachers and design students are required to articulate the reasons why a design might be found relevant and engaging.

As a brief illustrative vignette, Dannels, Gaffney and Martin (2008, p. 1) quote from their observation of a design studio and teacher–student interaction:

What is this black thing? That's the handle for the crane? Ok well, when I look at it like this, it looks like I might stab myself with it or something. Designers have to explain things all the time.

Archer (2005, p. 11) says that design concerns the human experience of material and spiritual needs and design education concerns the ability to understand, handle and express these through the medium of design. How then do students and teachers know and communicate within the very wide scope of these meaning matters?

Design 'ways-of-knowing' have become a focus of design education scholarship; the most recent example is the third edition of 'Designerly Ways of Knowing' by Cross

(2007). In 1982 Cross published his seminal article on design ways-of-knowing. In this article, Cross (1982, p. 223) refers to a Royal College of Art Report stating that design has its own distinct “things to know, ways of knowing them, and ways of finding out about them”.

Though Cross found this formulation vague, he did say that design knowing should enable the designer to translate social needs into physical artefacts. Cross’s view was that knowledge resides in objects themselves, a knowledge that is available to all. This knowledge is of material culture³ and designers are literate in the reading and writing of material culture. Citing Douglas and Isherwood, Cross (1982, p. 225) has explained that goods are “a nonverbal medium for the human relative faculty”, and that designers are particularly skilled in reading the world of goods.

The meaning of designed objects becomes well known in social life, even if not every person can articulate this meaning. But what of students’ newly hatched designs? These objects have not yet been framed within social life. However new student designs are often aimed at revising the meaning of existing design objects, a meaning that *has* been framed in social life.

Mostly, design is re-design (Michl, 2002). In design as re-design, part of the design meaning comes from the past, and part of the meaning comes from some alteration that challenges or transforms past meaning. Streamlined modern design is perhaps the epitome of this challenging and transforming impetus. Modernity has brought to design a principled forward-looking revision of a decoratively cluttered past; postmodernity has since challenged this revision. As Casakin (2008, p. 46) has put this:

Design problems are unique, complex, and ambiguous. They are considered to be non-routine and ill-structured. Since these kinds of problems require the production of innovative solutions, design problem-solving involves creative thinking. Creativity is concerned with the capacity to restructure old ideas to produce novel solutions, and the ability to search for unusual design alternatives that transcend the known and familiar.

³ ‘Material Culture’ is a disciplinary area deriving from Miller’s (1987) inquiry into relationships between people and objects.

Casakin shows that the creative revision or restructuring of old ideas involves ambiguity in the design problem itself.

So it is that Stephenson and Bromly (1992) feel that student capability in art and design is an individual, practical capability informed by historical and cultural awareness. They emphasise that art and design have a reciprocal relationship with other social and cultural practices.

This is the sense in which knowing in design is qualitatively different to other forms of knowledge in higher education. 'Knowing that' or declarative knowledge (Anderson, 1983) is not limited to a subject domain – in order to design, one might just as well draw on knowledge of Mongolian weaponry to design a new set of cutlery, as use the New York City skyline in a woven textile. As far as 'knowing how' or processual knowledge is concerned, the history of art and design education is marked by Kuhnian⁴ turns of accepted design process: early craft emphasis on design execution (Friedman, 2001), the industrial-artisanal approach of the Bauhaus in the 1920s (Boradkar, 2009), the goal-directed, problem-solving approach of Herbert Simon (1996), the design principles that emerged in the 1940s (Grow, 2010), the design methods movement of the 1970s (Jones, 1970/1981), and Schön's (1983) reflective practice are a sampling of these.

'Knowing that' has, not without consequence been held to emerge from 'knowing how' in design education (Prentice, 1995). Stephenson and Bromly (1992, p. 22) explain about art and design learning that:

[c]ontent and process have to occur simultaneously for ideas to be expressed visually and materially. This duality is so central to the subject that initially much study is taken up in enabling students to develop this facility.

The difficulty with content (knowing that) is that the student's developing visualisation of the meaning of their design happens during the practical design-making process (knowing how). Students must then 'see in the mind's eye' (Archer, Baynes & Roberts, 2005, p. 3) what their process means as content. But this advanced kind of

⁴ Kuhn (1970) showed change in scientific knowledge paradigms to follow a pattern of reaction to or turning away from established scientific traditions.

visualisation thinking often draws upon tacit knowledge (Schön, 1983; Chen & Heylighen, 2006; Cross, 2007; Shreeve, 2008; Kolko, 2010). Nevertheless, design studio pedagogy entails communication between the student and teacher about how the making process is developing significant meaning.

Herein lies the central concern of this study. Engagements between students and teacher often involve *different ways-of-knowing* – the ‘*knowing that*’ or *content aspect of design meaning*. When it comes to studio and crit interactions, students and teachers attempt to articulate how students’ designed objects engage visual meaning. Inevitably, how it is that students’ designed objects might engage others becomes a matter of knowing. This is the case whether it is students’ drawings or models of their designs that are under consideration. Lockard (2000) in his discussion of drawing for design says:

We must recognize that practising designers spend much more time communicating verbally than graphically and that only a fool would ever let the drawings “speak for themselves”.

Lockard’s point highlights the fact that pedagogical interactions are communicative interactions. But they are communicative interactions *about* visual design meaning, and projected future visual design meaning, at that. The pedagogical problems that arise from this are the central concern of this study.

1.4 The Motivation for the Study

As a design educator, I have dealt with teaching challenges in the (fashion) design studio, and also in theoretical or Contextual Studies for design, across design programmes. In my student years, I very much enjoyed the fashion vignettes that my own teacher, Robert Pollexfen, described (and even mimed), so I tried to stimulate my own students in the same way. In theoretical or Contextual Studies teaching, I spent a lot of time on developing my ability to build students’ visual conceptualisation. On one occasion I was greatly rewarded when a group of arriving students said to those who were ending their session with me, “Clear out, it’s our turn”. It seemed I had got rapport with my students right in at least some ways. Further encouragement came from the discussions I held with student groups to help

with their reflective journals (part of Contextual Studies requirements). Reflective journals⁵ are a learning tool for drawing insights from practical experience. Generally speaking, reflective journals commit to writing a retrospective view of how a practical process has been planned, implemented and evaluated, so that the benefit of such an experience can be retained.

These discussions with students about what they might say in their reflective journals became a surprisingly successful forum of mutual support that generated useful insights.

These happy circumstances were, however, far less evident in my studio design development and studio critique teaching. I had constant doubts about critique in particular, and my efforts to create the same kind of discussion forum as for the reflective journals did not work nearly as well. It seemed that the gap between understandings of design meaning relevance amongst students, and between me and students was too wide to bridge. It was even worse when I found that some students would unquestioningly accept my view of their work, without understanding it. Tovey (2011) has in this regard identified the learning vulnerability that students must face in design education. Students must deal with ill-defined design problems, so they are uncertain and may remain so until tolerance of uncertainty is recognised as an essential part of the design process.

To me, it is extremely important for design teachers to be sensitive to this uncertainty, in all interactions with students. As Dannels, Gaffney and Martin (2008, p. 12) ask:

[H]ow often do we consider, within the complex social context of our classrooms, that our feedback could potentially shape our students' understanding of who they are as disciplinary members and educational participants?

Dannels et al.'s trenchant observation echoes the upshot of my Master's research investigation into assessors' approaches to assessment in design (Kethro, 2007).

⁵ The educational use reflective writing in a journal arises from the experiential learning theories of Dewey (1933), Schön (1983) and Kolb (1984), and has since been extensively theorised.

Different teacher ways-of-knowing about design meaning were pivotal in the analysis of my research data. I concluded that there was a pervasive disconnect between teacher feedback and student autonomy. Teacher feedback might with the best of teacher intentions be directed toward enhancing the meaning relevance of students' designs; but feedback often did not gel with the student's developing understanding. The student was then put in the position of giving up autonomy of thought and understanding, *in order to learn*. In an unstructured knowledge domain such as design, where student designers must learn to make independent decisions about the future meaning of their designs in social life, this obstacle to learning autonomy is cause for deep concern.

My further thinking about this schism has brought the realisation that different teacher expectations about not just what students might know about the meaning of their designs but how they might know it are, as Oxman (2003) has pointed out, hazy, if they are ever even made explicit.

Teacher views on student knowing amount to 'pedagogical ways-of-knowing'. Pedagogical ways-of-knowing have been theorised by Shulman as a core aspect of the teaching profession. Because pedagogy is teacher interaction with students, pedagogical ways-of-knowing very much refer to how the teachers think that students might come to know (Shulman, 1991). Shulman is a leading proponent of the Scholarship of Teaching and Learning or SoTL movement and says "an educator can teach with integrity only if an effort is made to examine the impact of his or her work on the students" (Shulman, 1991, p. vii).

Austerlitz, Blythman, and Grove-White et al. (2008, p. 127) have drily referred to the tendency in higher education to try to 'manage' student expectations, so that they will "no longer be disappointed or expect the impossible". Their comment is that pedagogic approaches need to be examined instead. In line with this view, Blair (2003, p. 80) has this to say about design pedagogy:

If the students' cognitive resources are interfered with in one or more of the crit activities, through either a negative experience or a misunderstanding of the formative feedback, or by being so apprehensive that they cannot listen to or absorb the feedback comments on either their

own work or the work of others, then this can impair the student's performance and learning experience.

The reason for doing this research was thus to address my own and other design educators' discomfort about not always helpful engagements with students regarding the meaning value of their designs.

Oak (2000) advocates reflexive examination of what design learning means to students and teachers. Although teachers and students share the difficulty of divergent meaning interpretation, I put the responsibility for this situation on the shoulders of the teachers who deliver design courses and curricula design qualifications. As curriculum designers, teachers need to be aware of the ways-of-knowing assumptions of their pedagogy. The enquiry into ways-of-knowing in this study is then pedagogically motivated.

Teachers and students together develop design products that might potentially find a place in social life beyond higher education. Although teachers and students share the knowing difficulty of design object meaning interpretation, Oxman (2003, p. 4) remarks on the individuality of teachers' design pedagogical practice. Design teachers' individual approaches to design meaning find room for expression in the "endemic unstructured quality of both [design] domain problems and domain knowledge" (Oxman, 2003, p. 8).

This is one reason why this research concentrates on design pedagogy; further reasons lie in my personal experience of design studio and design crit teaching, as elucidated in this section. A pedagogical interest in knowing about design object meaning, as well as how that knowledge comes about, thus forms the motivation for this study.

1.5 Overview of the Research Design

Reading for this study, I noticed that the design teacher scholarship that I found relevant to the knowing of visual design meaning came from design educators who are geographically spread across the world. My tentative research focus then began to move away from the confines of a contextualised case study and toward a broader

view on knowing design meaning. The research design I describe here is then focussed upon the widespread issue of ways-of-knowing in design studio pedagogy, rather than any particular design studio or studios, or any particular time frame.

Knowing design meaning is something of a wild card, as I discovered from reading across design educational specialisations where designed *objects* are produced – whether as fully fledged products, or as blueprints or prototypes in the form of sketches or models. There are many factors that might potentially affect teachers' studio communication with students – for instance, language and cultural differences can mask the knowing of design meaning.

Therefore I was doubtful about separately investigating students' ways-of-knowing and teachers' ways-of-knowing design meaning. I doubted, too, that I could generate sufficient research data about ways-of-knowing design object meaning through observing studio tutoring in design studios, or studio critique events. This was because I could see no relevant criteria on which to base the selection of such events for observation, though select I must, otherwise the study would be impracticable. Also, very competent observational studies of studio interactions in design education, and very competent interview-based studies of design studio pedagogy are available. These inspiring studies helped me to focus on what could be done in research, and what, by way of research, could help with the problem of knowing the meaning of student designs in design pedagogy. Ultimately this led me to focus this study on the time and place transcending issue pedagogical ways-of-knowing, or how the teachers think the students might know design meaning.

Further study limitations came from the focus on *visual* design meaning focus. In this study only ways-of-knowing about visual design artefacts are considered, because they can be looked upon (perhaps in the form of a model or a sketch) in a teaching situation, whereas the design of a health care service, for example, cannot. Utility aspects of designed products, and designs as inventions that are confined to specialised technological applications are likewise excluded from the focus on design meaning.

Meanings that do not come from any formal knowledge domain *are* ascribed to student designs in design pedagogy. Though design briefs in design education do set a challenge, multiple ways of satisfying that challenge emerge as various visual meanings in students' newly designed objects.

Therefore I adopted an emergence approach to the study. Emergence was tackled from the point of view of Critical Realism (CR), a philosophy emanating from the work of Bhaskar (2008). The core idea that I have used from Critical Realism is that any empirical social phenomenon, (in this case, knowing design meaning in design pedagogy) is a historically emergent phenomenon. In CR, which I discuss in much more depth in Chapter Three, for such an empirical knowing phenomenon to occur, there must be pre-formed conditions or pre-suppositions that affect the emergence of the phenomenon in question (Sayer, 1992; Collier, 1994; Danermark, Ekström, Jacobsen & Karlsson, 2002; Lawson, 2004; Bhaskar, 2008).

I focused on a particular aspect of these pre-formed conditions or suppositions: that of pedagogical ways-of-knowing. I mounted a conjecture about how pedagogical ways-of-knowing in design might be constituted, and how they would consequently influence communication about visual design meaning between students and teachers.

Explaining design pedagogical ways-of-knowing was though still a very broad research goal. Initially, a methodologically collectivist approach seemed to be indicated. In this 'macro' approach, social collectives are regarded as the better bet for sociological evidence; the contrary view is that data from individuals, or the 'micro' level, is more authentic (Felin & Foss, 2006, p. 1). But while I wanted to deal with the general problem of design pedagogical ways-of-knowing in the design studio, I felt that an explanation of pedagogical ways-of-knowing should be locally and contextually applicable.

Resolving this methodological-collectivist versus methodological-individualist issue was pivotal in my research design. The CR philosophy is one that specifically rejects the opposition of collective to individual knowing, instead advocating an explanatory approach to showing how macro, abstract phenomena (like pedagogical ways-of-

knowing) might play out on a micro concrete level (like the emergence of design meaning, in any given design studio pedagogical event). The CR philosophy was then an attractive option for explaining how macro pedagogical ways-of-knowing might apply in any particular micro design studio event.

CR seeks to explain what is puzzling about events and experiences (Bhaskar, 2008; Carter & New, 2004; Danermark et al., 2002). An analytical strategy for this kind of explanation is abductive inference. In CR philosophy, abductive inference is theoretical inference of what it is that predisposes to the emergence of an anomalous phenomenon, in a particular context (Wad, 2001; Danermark et al., 2002; Maxwell, 2004). That anomalous phenomenon, in this study, is knowing the meaning of students' designed objects in design pedagogy. To put this another way, taking a CR approach in this study means looking beyond meaning-making in design pedagogy to try to find what it is that might predispose toward the emergence of *this* or *that* visual meaning in any one instance of discussion about a student's designed object.

The abductive methodology I have developed requires that one places the anomalous research phenomenon within a new theoretical context of ideas (Wad, 2001). This new context of ideas then allows a theoretical conjecture to be made. But as Wad also says, for this conjecture to have validity, the relevance of theoretical ideas to the empirical context under scrutiny must be established. Mounting a theoretical abductive conjecture requires showing how the theory applies substantively to the research situation, such that inference from such a conjecture is warranted.

Luhmann's (1995, 2000, 2002, 2006) theory of the emergence of knowing and meaning in communication enabled a contextually relevant research conjecture. In Chapter Four I embark upon a detailed discussion of Luhmann's theorisation, in order to show the substantive relevance of this theory to pedagogical ways-of-knowing. In particular, it was important to conjecture why teachers might favour certain and not other visual meanings of student designs.

The next step was to submit my theoretically framed conjecture about design pedagogical ways-of-knowing to examination in an analysis of design educator data. In this analysis, I use Luhmann's (1995, 2000, 2002) abstract social systems of communicable knowing to explain macro effects on micro communication interactions where visual design meaning is at issue.

CR requires that a research explanation 'outperforms' rival explanations (Peacock, 2000). While CR holds that there are real historical and social conditions that come to bear on empirical phenomena, there is a caveat to this realism: the 'real' conditions affecting an empirical context cannot be fully known; so research explanations are revisable and fallible (Bhaskar, 2008).

In saying this, Bhaskar distances CR from postmodernism, where research accounts cannot but be endlessly relative. Bhaskar says instead that explanation of real effects must be attempted, even if 'the real' can never be fully known. Seeking to provide an explanation of a deeper reality takes into account that our knowing resources are limited. Nevertheless, critical realists say that not all explanations are equally 'practically adequate' (Sayer, 1992, p. 70). So the research must show why a tendered explanation is more 'practically adequate' to the research context of inquiry than other explanations might be.

To conclude this chapter, I show how the study research design I have briefly outlined above has been structured over eight chapters.

1.6 The Structure of the Study

In this chapter, Chapter One, I have attempted to give an overall orientation to the concerns of this study.

In Chapter Two, I elaborate my research focus on pedagogical ways-of-knowing. The design pedagogical impact on meaning-making in the design studio is established.

Chapter Three focuses on how pedagogical ways-of-knowing might condition the emergence of design meaning in the design studio. I explain how Bhaskar's (2008) Critical Realism (CR) can be applied to knowing design meaning as the pedagogical concern of this study. I take the ontologically realist position that pedagogical ways-of-knowing form some of the conditions for the emergence of meaning in students' designs, and propose abductive inference as the way to explain what these pedagogical ways-of-knowing are.

In Chapter Four, because CR is a philosophy and not a substantive theory, I move to the substantive abductive potential of Luhmann's theorisation of knowing and meaning in communication. Luhmann's theory is used to re-contextualise the problematic empirical research context of design studio pedagogy. This theoretical re-contextualisation allows me to make an explanatory abductive conjecture about pedagogical ways-of-knowing as cognitively selective and communicatively organised, (Luhmann, 1995, 2000, 2002).

Chapter Five sets out the methodology for examining this abductive conjecture in the light of the research data.

In Chapter Six, the abductive conjecture is brought to bear on the analysis of data from an online discussion forum. I implement and show my analysis of the conjectured macro and micro, abstract and concrete aspects of pedagogical ways-of-knowing that might lead to the emergence of design meaning.

In Chapter Seven, the abductive conjecture is further considered in the light of data from discussion groups with design educators.

In Chapter Eight, I examine traditional research criteria of validity and reliability in light of the abductive methodology of the study.

In Chapter Nine, I tender my research explanation of pedagogical ways-of-knowing as relational mechanisms that entail recursive distinctions. Then I suggest how my explanation might be applied in design studio pedagogy. Finally I explore ways in

which my research explanation might extend to other important design pedagogical issues..

Chapter Two

Knowing Design Meaning in Design Pedagogy

Objects express meaning. This is clear to anyone involved in the study of design, architecture, art, archaeology or any of the related fields dealing with the production, reception, transmission and survival of artefacts over time and place. Just how they do so is one of the great questions, perhaps the great question, faced by the different types of scholars, experts and enthusiasts who choose to work with object-based research. What is it about certain artefacts that make them more expressive of a given culture than others of similar origin? Why do some objects retain the power to dazzle, to thrill, to awe – in a word, to communicate – while others lose their eloquence and fall silent, becoming inscrutable or simply dull and uninteresting? The exact nature of the relationship between verbal meaning and visual/material expression is certainly complex, and perhaps never fully knowable; but the very real difficulty of the task should not deter us from engaging in it.

Cardoso (2004, p. 1)

The relevance of the visual meaning of students' designs is at issue in communication between students and teachers in design pedagogical interactions. But as Cardoso intimates above, the relationship between visual meaning and what is said about it is a complex one. Communication about visual meanings happens during students' design development processes, and the evaluation of these designs, as a series of events occurring in the pedagogical space of the design studio.

This chapter draws on the scholarship of design pedagogy to show pedagogical effects on what happens in teachers' design studio interactions with students. The point of departure was design teachers' expectations of students regarding a particular kind of knowing: knowing about the meaning of students' designed objects. This is the kind of knowing that Cardoso describes above.

In Section 2.1 of this chapter I clarify the visual design meaning dimension of pedagogical ways-of-knowing in this study. Then in Section 2.2, I trace the broad historical emergence of design pedagogical approaches and the ways-of-knowing

they have embraced.. The following Section 2.3 takes a closer look at what happens in the design studio and Section 2.4, highlighting how pedagogical ways-of-knowing design meaning may become problematic. Finally, in Section 2.5, I report on both positive and negative views of design pedagogy, showing that visual design meaning may be disputed or shared. In this last section I identify the aims of the study in terms of the overall design pedagogical focus on ways-of-knowing.

2.1 Design Pedagogy and Visual Meaning

Deep-rooted differences in the understanding of ‘what design is’ (Roberts, 1990; Jackson, 1995; Davies, 2002; Archer, 2005; Smith, Hedley & Molloy, 2009) are connected to the issue of design meaning. Visual meaning that is non-verbally communicated by designed objects is included in the general sweep of most design definitions, but that sweep tends to be so inclusive as to mean very little.

Jonas (2000, p. 1) elaborates design as a ‘groundless field’:

a hybrid swampy region of artefacts and social phenomena ... No stable disciplinary core but a fluid network of ‘chunks of ideas’, re-established in communicative feedback at the interface between the contextual and the artefactual. Design is permanently re-creating its own ground ... [not] eternal basics but rather arbitrary entry-points. Therefore ‘fundamental’ issues comprise such meta-subjects as: analytical and systemic thinking, associative power, synthetic, generative and evaluative competencies, and communicative skills.

Jonas’s paradoxically fundamental meta-subjects are a telling indication of the lie of the land in design pedagogical knowing. The terms used to describe design knowing in design pedagogical literature, such as ‘cognitive’, ‘creative’, ‘interpretive’, and ‘conceptual’ are often rather arbitrarily relativised to each other, sometimes as basic and taken for granted, and sometimes as all embracing. Jonas’s mention of the multiple and arbitrary entry points to design also captures the confusing situation of disparate understandings of knowing design meaning.

Perhaps the deepest vein of ambiguity in knowing the meaning of student designs lies in historical differences between design and art.

Design is a phenomenon that has grown out of the social division of labour of the industrial revolution (McCullagh, 2000) and has been grounded in cultural contexts of production and consumption. Design movements (like the art and craft movement, art deco and art nouveau) have, as Palmer (1996) points out, been notably *specific* to a particular time and place. The design object obtains its meaning value by means of association with a specific context of interpretation. Historically⁶ the absolutist fine art canon of “*beauty*” as a universal aesthetic then opposes the relativist orientation of design to contextual “*meaning*” (Palmer 1996, pp. 5–6, emphasis added).

These opposing historical conceptions of art and design aesthetics have long played out in both art and design higher education. The art school tradition has given students “license to constructively externalize their own ideas and emotions” (Boyd-Davis, 2000, p. 67). But this individualistic view of creativity has also been supported in design education (Dineen, Samuel & Livesey, 2005). There has, equally, been a push for design students to work from a knowledge of cultural issues (see for instance, Strickfaden, Heylighen, Rodgers & Neuckermans, 2005). As a result, art and design values may be ambiguously merged in the aesthetic understandings of design teachers.

Thus the literature suggests that the historical relationship between art and design is divided along creativity fault lines as shown in Figure 2.1. There is an ‘art’ view of design, and there is a view of design as distinguished from art.

⁶Here I only refer to historical divisions between art and design.

Art in Design	Design, not Art
self-expression	cultural expression
universality	contextualization
imagination	interpretation

Figure 2.1 Art in design, design versus art

Teachers work with students to develop their designs according to a design project brief, and the teachers also give feedback on how student designs might meaningfully engage others. The aspect of feedback that is under focus in this study, that of knowing design meaning, can be loosely described as the ‘aesthetic’ meaning value of the students’ designs.

Before going any further, I must qualify the meaning of the word ‘aesthetic’. In the classical philosophical sense, aesthetics refers to the sensory qualities of an object: elements such as shape, colour, line and texture (Dikovitskaya, 2005). These sensory qualities are called ‘formal’ qualities, because together they constitute the object as a physical form. However the word aesthetic has also come to be associated with style (Ewenstein & Whyte, 2007), as in a ‘Grecian’ urn – the style of the urn is Grecian, whether or not it is of Grecian origin. For Ewenstein and Whyte (2007), aesthetics refers also to an informed interpretive faculty, where being informed will allow one to discern, for instance, a pop culture graphic aesthetic. Being informed about design history allows an attribution to pop culture of the 1950s and 1960s attribution to be made, and to be shared. Here, social knowing is involved. As aesthetic apprehension, the stylistic and the interpretively informed faculties are confined to social rather than natural objects. Vitta (1996, p. 32) finds a ‘social logic’ in designed objects which is “not that of the individual appropriation of

the use-value of objects, but, on the contrary, that of the production and manipulation of social meanings”.

Designed objects are referred to as artefacts because they are the result of intentional human agency. As purposively planned and human-made objects, they bring qualities to social life which would not otherwise be there (Smith, 2007). Barnard (1998) has described these qualities as historically falling into an object-based meaning camp and a structure-based meaning camp. Object-based meaning is based in the tradition of philosophical aesthetics, where such features as the colour, line, shape, and texture of an object could universally inspire a sense of truth and beauty, and aesthetic purity (Bell, cited by Barnard, 1998, p. 34). Structure-based ideas, by contrast, have to do with context-bound normative associations such as what is seen as feminine, or exotic, or technological.

So prevalent is the visual in social life, says Barnard⁷ (1998, p. 3) that:

Western philosophical and religious traditions which underlie our everyday habits of thought and much unexamined everyday behaviour are almost completely dependent on visual metaphors, allegories and ‘images’ to describe and explain subjects such as life’s meaning. The ways in which Western cultures understand and experience human knowledge and good and evil, for example, are highly dependent upon visual imagery. Philosophy is full of examples of light, dark, sight, blindness, reflections, shadows, mirrors and other visual phenomena being used to get to grips with the intricacies of such momentous subjects.

Visual meaning is not just a phenomenon of social life; it amounts to relevant cultural expression, as the examples of ‘Grecian’ and ‘pop culture’ indicate. For this reason, art and design education have adopted the term ‘visual culture’ as a theoretically accommodating description of the cultural meanings of visual objects (Verstegen, 2006). The theoretical thrust of the visual culture ambit corresponds with Barnard’s structure-based ideas, embracing the study of meaning engagement between people and visual objects.

⁷ Barnard refers only to Western visual culture here. Presumably the iconology of visual imagery in other cultures may function differently.

Significantly, as Barnard (1998, p. 34) puts it, “The way a piece of visual culture looks cannot simply be explained by referring to the way that piece of visual culture looks”. Rather, it is the structures of thinking and knowing that we invest in objects that explain how we see them. As far back as 1958, Dewey (cited by Moore, 2010, p. 155) argued that mental conception and sensory perception join in our experience of objects, and that our experience of objects is how we know them. In other words, speaking of visual meaning is speaking of visual knowing: ‘seeing’ as opposed to ‘looking at’ is a cognitive activity in which experience of the object becomes classified (Friedman, 2001, p. 13). The design educator Katherine Moore firmly states that “what we see cannot be separated in any way from what we know” (2010, p. 13). Taking this assertion further, Büchler and Biggs (2006, p. 10) say, “What this means in the material culture context is that the physical design of a product may have less impact on our visual perception than the knowledge that we attach to it”.

Artefacts are typically intentionally designed to echo past social meaning attributions, using well-known visual allusions – like already cognitively framed geometric forms of the art deco movement, or the spare plainness of Shaker furniture. So a designer may design ‘new’ art deco jewellery, or ‘new’ Shaker furniture, updating traditional object forms by juxtaposing the new with the old. The meaning relevance in this case is the design precedent or forerunner that has become able to engage people over time and across locations. If, then, a student’s designed object can engage with established visual meaning, that design has a good chance of being found relevant in social life.

Cognitive framing can nevertheless also involve a stretching of credibility. In 1975 Tom Wolfe lampooned the art critic tendency to ‘read’ social meaning off abstract art splatters and splotches in his book ‘The Painted Word’. This rather suspect capacity for the detection of hidden visual meaning is still alive. As an example of the stretching of cognitive framing, I venture the prize-winning photograph of a cow (Figure 2.2). I purposely footnote the competition judges’ cognitive rationale for awarding first prize to this photograph and I ask my reader to first ‘cognitively frame’ their meaning of the prize-winning photograph depicted in Figure 2.2 overleaf, and to compare their interpretation of the photograph with the footnoted cognitive frame rationale for the first prize award that was agreed by the competition judges.



Figure 2.2 Wendy Erlandson's prize-winning photograph of a cow⁸

Source: National Geographic Magazine, May 2009, p.114

The cognitive framing of visual objects is sometimes referred to as 'visual literacy' (Smith, 2007). Visual literacy⁹ has historically been thought to be a sensory rather than a cognitive function, because of the notion that great art can be universally visually sensed as great (Bryson, cited by Moore, 2010, p. 37). By contrast, the art criticism perspective of the 1960s and 1970s took a very literate semiotic approach to visual meaning. The tendency was to superimpose politicised viewpoints on paintings. A hypothetical example of such a viewpoint might be along the lines of 'these splatters are about the alienation experienced in the city'. Here the intellectually high-brow conception of design pursues the "grail-like lure of the invisible" (Moore, 2010, p. 54). Moore thinks this approach is of no help to students learning visual literacy. In her view the sensory perception of what is seen and the knowledge-based cognitive conception of what is seen must be brought together in order for visual meaning to be known.

What Moore seems to refer to is a kind of visual literacy that allows existing knowledge to be selectively applied to design artefacts. Design literacy or cultural literacy (Kolko, 2005; Russell, 2008) are alternative terms that apply to visual

⁸ The judges awarded the prize to Erlandson's cow photograph because they were captivated by the cow's "sense of dignity". Is this what my reader also discerned?

⁹ Visual Literacy is a widely interpreted concept. It is either referred to in very general terms, or explained in a number of overlapping ways (Messaris, 1994).

literacy. Nevertheless, this is a kind of literacy that involves highly specialised knowledge. Mermoz's (2006, p. 80) elaborate definition of design literacy is as follows:

Beyond fads and fashions, design literacy, in my mind, refers to the capacity of the designer to infer the mental processes and the theoretical basis of the design choices which led to a given design, as well as the capacity to consider their implications in terms of how they might implement a reference, and how it might be interpreted in the viewing/reading process.

Mermoz's explanation of design literacy refers to nothing less than inferring the processes of design from the designed artefact. Though Rust, Hawkins, Roddis and Whitely (2000) and Bowen (2009) have actually used the inference of process and ideas from artefacts in their design research, there is an undeniable variety of cognitive processes and resources used for this explicit inference of knowledge tacitly held in the artefact inference. Mermoz's account at the very least involves information, theory, interpretation and analysis for design literacy as relevant to the knowing of visual design meaning.

Design literacy also surfaces in a somewhat different way in the growing field of design journalism and television coverage. In a newspaper article, design critic Steven Bayley (2010) wrote of the world's tallest skyscraper (170 floors), the Burj Khalifa building in Dubai:

Corporations want, or wanted, supertalls to exploit what Tom Wolfe called "kerbflash", that liminal effect which a dramatic architectural profile achieves. Paradoxically, Burj Khalifa is not a truly modern building. It is a hangover of a demented spending binge. It is a subprime Great Pyramid. It is queasy nostalgia for a version of the future that looked old-fashioned a generation ago. It is kitsch retro fantasia, a glassy memorial to something not so much forgotten as never known ... Sublime to the point of being frightening, Burj Khalifa is archaically greedy with energy and resources ... it was built for vainglory rather than for purpose. Vast in size but small in meaning, Burj is a lot more stuff, but less idea.

Whether or not one agrees with Bayley, his descriptive terms in this piece are significant. He invokes the historical past (the pyramids, 'kitsch retro', a glassy memorial, old-fashioned); he refers to cultural attitudes and values (hubris, greed, vanity, queasy nostalgia) and he makes some very pointed remarks about capitalist

power relations (vainglory, demented spending binge, more stuff but less idea). Bayley's newspaper piece is written with persuasive intent – rhetoric, to be precise, and rhetoric that assumes particular understandings and sets out to convince. Bayley refers to a building, but his terms of reference expose the scope of meanings and ideas that a designed object might carry.

More than simply conveying ideas, designed artefacts and products are communication instruments (Vitta 1996, p. 32). It has also been Baudrillard's (1996) argument that through advertising and other media influences, objects lose their original meaning. They become simulacra of themselves, mere informative instruments that transfer the image of themselves onto the individuals who consume them, becoming completely identified with the manner in which they are consumed. This results in a process of meaning classifications and social differentiations that overrides attention to the objects themselves.

Design educators are comfortable with the assumption that designs are about ideas. But what is further often assumed in design pedagogy is that students are aware, in their practical design processes, that designed objects are intended to produce a meaning interpretation response in at least one other person.

2.2 A Current History of Design Pedagogical Approaches

Some historical background to present-day design studio pedagogy can begin to expose the divergent origins and paths of development of design pedagogical ways-of-knowing.

What is now called design education has its origins in the apprentice tradition of the 14th century craft guilds (Friedman, 2002). Craft guilds established standards for carpenters, tailors, engravers, builders and cabinetmakers (Barnard, 1998). These standards were to be conveyed to apprentices through a pedagogy of tacit knowledge transmission (Gamble, 2002). Apprentices were expected to learn how to execute the tacit principles of the craft by observing the techniques of master craftsmen.

When the 18th century Royal Academy of the Arts in Britain was established, it distanced itself from some of the more manual or mechanical activities of the craft guilds, seeking to provide a liberal arts education (Barnard, 1998). The academy was concerned with the European *beaux arts* (fine art) ideal of abstracting the universal 'real' of essential form through imagination (Dodson, 1996). Hall Jones (1996 p. 132) has described how, in the Beaux Art system, the student was regarded as a 'vessel' for the tutor's insight.

After the applied arts and fine art were separated as knowledge fields, the idea of design as a field of education gained prominence. Design was an art-based development on hitherto purely craft-based training. In the United Kingdom the Government Schools of Design grew to some twenty-one institutions by 1849 (Schmeichen, 1995). These institutions were however forced to tread a somewhat difficult path between art, design and technology in that they were divided between the manufacturer requirement for specialised artisanal expertise, and a more holistic art and design education (Schmeichen, 1995, p. 176).

The late 19th century Arts and Craft Movement in Britain resolved this dichotomy by adopting a socialist applied arts perspective, distanced from the elite fine arts aesthetic. With the establishment of the post-World War 1 Bauhaus movement, design became an *applied art* which adopted the art academy or 'atelier' (studio) approach. The Bauhaus and Ulm design schools followed the atelier apprenticeship model where leading avant-garde artists such as Paul Klee and Wassily Kandinsky imparted their mastery to student apprentices (Kim, 2006).

It is interesting that both the older tradition of fine art and the modernist Bauhaus movement held to a context-free, universalistic notion of visual aesthetic value. Achieving the Bauhaus aesthetic ideals required adherence to "pure, abstract and reasonable" (Grow, 2010, unpagged) design principles. These principles attempted to establish rules for a visual language of design: visual elements of shape, colour and line could convey meaning. These principles were later rejected because they assume a universal response to visual elements, and ignore cultural influences on visual meaning (Lupton, 1988, pp. 3–4).

However, the Bauhaus design school developed a basic or foundation course for learning these design principles as a visual language which was widely adopted in art and design education after World War I (Lupton, 1988). The Bauhaus apprenticeship pedagogy embraced the idea of visual design attributes that could be imbued in a designed object under the tutelage of master practitioners. This has been called the 'master/mystery model' of design pedagogy (Jacks, 2002 ; Salama, 2006). Only under a master's tutelage could an apprentice hope to penetrate the mysteries involved in inscribing visual meaning in an object. The idea of creativity as a mysterious gift survives to this day, as Polaine (2011, p. 44) explains:

Designers have for too long been complicit in perpetuating the myth of design ability stemming from talent and inspiration. Both of those may play a part in successful design activities, but they do in any discipline. To accept that creative thinking is just the result of a special gift is to deny the effort that goes into practice and experience. This is perhaps not surprising. Relegated to being non-academic in school early on, designers can fall back on the magic of how they come up with great ideas to restore their sense of self-worth. Later, in agency form, this mystery is sold to clients, perpetuating the mythology.

The survival of the studio apprenticeship teaching method and its subsequent disrepute has been famously evoked in Swann's 'Sitting by Nellie' pedagogical scenario (Davies, 2002, p. 168). Writing in the 1980's, Swann described how a 19th century apprentice would be inducted into the weaving industry by 'sitting by Nellie', an adept weaver, and watching her work. In this apprenticeship scenario, skills would be absorbed through a tacit 'osmosis' process of seeing and then doing.

Teaching in the design studio has since undergone a series of transformations. Salama (2006) has made a distinction between three studio teaching models in architecture: the traditional apprentice model of tacit learning, the revolutionary model where conceptualisation is informed by such learning theories as Piaget's (1963, 1977) assimilation and accommodation and Kolb's (1984) theory of experiential learning, and the virtual model. The virtual model brings digital visualisation and simulation tools for developing and rendering design ideas. What is interesting, as Salama points out, is that none of these studio-teaching models has replaced another. Schools of Architecture may individually adopt any of the three models, and some schools have integrated all three.

Schön's (1983; 1987) 'reflection in action' is the best known revision of apprenticeship design pedagogy. Reflection in action entails a *reciprocal* framing of design problems and solutions between teacher and student, developing through experimental design stages. The 'frame experimentation' process involves the teacher's suggestion of design moves to the student that manipulate the materials and techniques being used to explore visual meaning alternatives. In this experimentation process, the student responds to the physical materials of the design, which may indicate meaning framing revisions, improvements, or even outright rejection of a frame or of a material/technique (Schön, 1987). In this way, the student's understanding is transformed in a process of learning by doing.

A later still view of design apprenticeship pedagogy is styled on the community of practice model of Lave and Wenger (1991). This style of pedagogy still involves the teachers' skilled experience and approach to design as a *practice*. However, instead of universal notions of aesthetic worth, in a community of practice students increasingly participate in a 'situated' or shared practice. Here the 'legitimate peripheral participation' of the novice design student allows inculcation of a visual design culture that reflects professional design values (Drew & Shreeve, 2005; Logan, 2007)¹⁰, or, as Coe describes situated learning (2001, p. 394), it is participation in "the complex structure of people acting in a [particular] context". Essentially, this pedagogical approach regards visual knowledge as not somewhere 'out there', as something that can be tracked down if one looks hard enough. Instead, there is participation in learning the partly tacit and partly explicit practice discourse of a professional field of knowledge (Lave & Wenger, 1991).

The whole question of repertoire, as Smith (2001, 2011) remarks, is at the centre of Schön's frame experimentation. I think the same applies to the situated community of practice model of Lave and Wenger (1991). The ways-of-framing or ways-of-knowing repertoire that a design teacher draws upon is not necessarily shared by the novice student, and the inculcation of such a shared repertoire presents some

¹⁰ Situated learning seems to mean different things to different design educators. One understanding is that of the situated learning of professional knowledge cultures where the learning environment and the understandings fostered in it are "inseparable and co-constitutive" (Logan, 2007, p. 6). In another understanding, situated learning means embodied learning "in a durational framework ... [which is] not halted or gestalted" (Thomsen, 2005, p. 5).

problems. Precedent in the form of visual images, ideas, exemplars, and techniques comes from experience, but this experience is not necessarily shared. Problematically, this experience is so much taken for granted that it need not be mentioned (Smith, 2001, 2011). Visual design meanings depend on their connection to design actions (Schön, cited by Waks 2001, p. 48), but design actions also require words to explain their purpose, and any repertoire of design practice must face the difficulty of articulating what is 'in' that repertoire.

At least two characteristics of the apprenticeship model of design teaching survive in contemporary design education. Firstly, tacit teaching and learning practices are still endemic to design education (Oxman, 2003). The old apprenticeship model, and newer forms of it like Schön's reflection in and on action, as well as the community of practice model all endorse *learning through practice*.

Secondly, there is a vocational connotation to design education (Cross 2007), inherited from the previously mentioned craft industry origins of design education. Design is now seen in a more professional light, but if design professionals become design teachers, this does not necessarily mean that they receive training in teaching (Chen & Heylighen, 2006). Professionals are also not necessarily better teachers (Chen & Heylighen 2006), and Wenger (2006), one of the original community of practice theorists, has commented on the difficulty of enacting professional ways-of-knowing in educational contexts.

A currently favoured view is that designers should collaborate, a view in some ways seated in the community of practice ideal of Lave and Wenger (1991). The collaboration drive is often voiced within a social ethics approach that is critical of the 'acquire more things' syndrome of consumerist excess (Naish, 2009). Faced with the consequences of inflation and enormous waste of resources, designers – this approach argues – should collaboratively address sustainable design issues. For Marshall (2009, p. 3) engaging with this meta-issue has the effect of bringing design disciplines together:

Design expertise in this context becomes the ability to edit, organise, and integrate various expert perspectives and their respective data sources. The design process repeatedly visualises and prototypes collaboratively

proposed actions and these are taken back to the multi-disciplinary teams in the hope of determining an effective intervention.

Marshall's view seems to entail a social 'learning together' approach (Brown, Collins, & Duguid, 1989, p. 32) through student group collaboration on studio projects, now widely pursued in design education (du Preez, 2010).

Design collaboration does, however, meet with resistance from some students (du Preez, 2010). The individualistic, personal self-expression view of visual design survives, (Danvers, 2003; Fernando, 2006; Hadjiyanni, 2008; Orr, 2010) perhaps as a heritage of the master-apprentice tradition. Simplistically, the old master-apprentice pedagogy seems to pursue the ideal of the master as 'one who knows all', and the community of practice apprenticeship pedagogy seems to pursue the ideal of students and teachers as 'all who know, as one'. This is admittedly a reductive polarising of visual knowing ideals but it does illustrate the deep chasms that can exist between design pedagogical ways-of-knowing.

2.3 Design Studio Interactions

In this section I call on the literature to try to give a sense of what it is like to be a teacher or a student in a design studio. What I particularly want to show is the inquiry nature of design study, and the ambiguities that are endemic to such inquiry, that 'come with the territory' of design pedagogy.

Oak (2000) has given a detailed description of the method of practical design teaching in the design studio. At the core of this method are design briefs given to students which require solutions in the material form of objects – whether graphic imagery, jewellery, textiles, garments, interiors and furnishings, household and other goods, photography, multimedia or interaction design¹¹. Briefs loosely outline a design requirement in a context, but cannot be too closely defined, as there is no 'correct' solution; multiple solutions can be successful, and each student (or student group) will come up with their own solution as an interpretation of the given brief.

¹¹ Interaction design initially focused on human-computer interaction as a matter of the functionality afforded to human 'users' by the design of computers. This focus now embraces a more interpretive leaning toward social artefact meanings (Hanington, 2006).

Importantly, the design brief does not specify the visual design requirement in exact terms. For instance, if an informational HIV/Aids poster were required in graphic design, there might be a project brief directive that requires the poster's visual design to accommodate low literacy levels. But students will still have to further specify the problem: do they need to deal with how HIV/Aids is transmitted, or do they need to deal with HIV/Aids denialism, or do they need to deal with folk cures for HIV/Aids? Similarly, if fashion students are asked to design for a theme such as 'Fusion', the options for fusion are almost limitless – national and historical costume elements may be (and have been) successfully combined; so have industrial and hand-crafted fabrics.

Design problems are, in Rittel and Weber's (1973) terms, 'wicked'. The term 'wicked' has been accepted into design academic parlance because of the centrality of the 'wicked' concept and the scope of its consequences. Wicked design briefs are wicked because the field of design needs is indeterminate and changing; design briefs are therefore ill-defined, and concerned with emerging social issues that can be satisfied in multiple ways. Design briefs typically simulate real world design challenges, but they state requirements in such a way as to only loosely limit possible design solutions. Students learn about design problems by trying out solutions. This is an inverse process to that of problem-based science, where the emphasis is on the 'rule presented by the problem', rather than the solution (Russell, 2008).

What is inescapable though is that, according to Austerlitz et al.'s (2008) view, however wicked a design brief may be, student designs should non-verbally express a *visual meaning position* through their designed objects.

As Oak (2000) describes, usually students will do some kind of information gathering about the context in which the design solution should be visually meaningful: they may use reference books, may visit physical locations, and may find out about materials and processes. The main effort though will be put into planning the design as a prototype, drawing, model or process. As Gedenryd (1998) has described, this is where the design inquiry spade-work is done. Drawing iterations try out ideas, revise ideas, suggest ideas, just as prototype models or blueprints do; in these ways

a designer creates a visually relevant design. Prototyping, as a blanket term, is – as Gedenryd (1998, p. 174) points out – a future situating strategy for design ideas. Most of students' time and attention is directed to this planning and making of the object which will be their solution to the problem. Students need to make informed assumptions as to how to proceed, and their assumptions are refined and translated into material form in conjunction with the advice or comment of tutors (Oak, 2000, p. 87). In this process students must 'see in the mind's eye' what their process means as content. 'Seeing in the mind's eye' is what Archer, Baynes and Roberts (2005, p. 3) refer to as 'cognitive modelling'. Students' cognitive modelling happens in consultation with teachers even though what is seen in the mind's eye, is, at least to begin with, tacit knowledge (Schön, 1983; Chen & Heylighen, 2006; Cross, 2007; Shreeve, 2008; Kolko, 2010).

After the students' designs have been completed, there is a feedback 'critique' (known as a 'crit') which may or may not also constitute a summative assessment. Crit interactions take place in a number of scenarios: one-on-one teacher–student interaction, small groups, whole class and crits that are formally or informally structured. Oak says that in most of her research into crit interactions, there were at least two teacher critics, and there was debate with the student and/or other students. As Oak (2000, p. 89) says of the student reaction to crits:

Although they may not always vigorously dispute the critic's comments, the students usually pay close attention to what is being said, as the critic's words indicate whether the objects under discussion are considered 'good' or 'bad'. If the explicit content of the critic's remarks is not understood, then the students attend to cues of form, as Donald Schön notes when he quotes an architecture student who says "You hang on the inflection of the tone of voice in your crit to discover if something is really wrong.

This last remark quoted from Schön intimates that there might be designerly ways-of-knowing that are less than explicit in teacher interactions with students around visual meaning-making (Cross, 2007). There are also warring expectations at work, at least initially.

Austerlitz et al. (2008) show how design pedagogy confounds expectations: they describe how a student's parent, himself an educator, appealed to reason in his

complaint about the teaching of his son's chosen design course. Then they describe the design teacher's response to the concerned parent. Four weeks into the course, the father found that:

The openness of briefs leads to little or no direction. When students ask if they are on track they get no direct answer, therefore students are constantly unsure whether they are performing to standard i.e., no ongoing evaluation or critiquing of student work. There appears to be no planning of tutorials, so a lot of time is wasted.

This very reasonable parent complaint acknowledged that tutors on this course had, in one of the course modules, demonstrated design techniques along with clear explanations as to how performance might progress. This is what the father had expected of the institution.

The tutor's response to the parent's charge was just as reasonable. In Austerlitz et al.'s (2008, pp. 7-9) quote from the tutor's response, the tutor offers her understanding of the differences between a more traditional transmission-type pedagogy and the ill-defined problems of design pedagogy:

Because of the open nature of the brief and the desire of students to be directed, students will often ask if what they are doing is 'right' and our response will be to explain that rather than 'right' or 'wrong,' we are expecting students to engage with the themes of the brief and develop a position in response to that engagement.

In this teacher's testimony, design problems require that students take a position in response to the design brief or problem. Here there is a clear illustration of the nature of design 'problems'. They are not just problems that require a solution; they are problems that required a positioned solution that is visually expressed.

For Gedenryd (1998, p. 15), design is an endeavour of inquiry, and this is the more so because although there is a brief, the design task parameters only emerge *after* design begins. Design problems do not come ready-made; students must identify the issues that impact upon the problem before they can start to shape a solution, and that solution comes from taking a position in relation to the design problem. The word problem is somewhat anomalous in design education, as it suggests an identified set of parameters and a solution that corresponds with these. Design briefs

present unstructured visual problems. Also, design knowledge is unstructured (Oxman, 2004), so it is unavoidable that design learning involves multiple visual ways-of-knowing.

2.4 Tensions in Design Ways-of-Knowing

There are many variants of the visual referential context used by designers; among them are design precedent, memory, personal experience and history. However vivid a student designer or teacher's conception of a referential context might be, such a conception cannot always be shared between design students and design teachers. This is due to the highly varied ways in which visual referential contexts may form the basis of inquiry. Information from reference resources, design precedents (Lawson, 2004; Oxman, 2003), reflective inquiry into personal experiences of social phenomena, and observation of social phenomena are just a few of these.

Dilnot (2006, p. 5) sidesteps the attempt of a definition of design by astutely observing that "An adequate 'theory' of design is a theory of design as a capacity or a potentiality." This is potential meaning in a life-world context of the immediate future. Designing a design product within the confines of a design studio, designers envisage a design's future visual meaning potential from the perspective of present or past life world contexts (Gedenryd, 1998). Though designers may research these contexts, they are contexts in which the designer is generally not physically present (Gedenryd, 1998, p. 156). There is then a widely acknowledged view that design is above all an inquiry-based discipline (Gedenryd, 1998; Waks, 2001; Danvers, 2003; Lawson, 2004; Cross, 2007; Logan, 2007), that deals with ambiguities (Strickfaden et al., 2005; Fleming, 1998; Friedman, 2007; Smith, Hedley & Molloy 2009; Moore, 2010).

Design pedagogy has been called a pedagogy of ambiguity (Austerlitz et al 2008), because in design the boundaries between knowing structures, technical processes and visual artefacts are blurred. My research focus is on this meaning ambiguity as the pedagogical concern of design teachers; a concern which is about ambiguous and multifarious ways-of-knowing about visual design meaning.

Ambiguity in the knowledge frames used in studio teaching persist (Oxman, 2004). What these knowledge frames might include and exclude is far from clear. Fleming (1998, p. 41) contrasts the primarily cognitive view of knowing design meaning with the primarily romantic view of knowing design meaning. The latter is described by Fleming as “the creative emanations of a gifted soul”. Here ‘cognitive’ seems to refer to knowledge, and creativity to self-expression. But creativity certainly requires cognition. In design pedagogical scholarship, a slew of different terms interchangeably characterise the cognitive and the conceptual, and these terms tend to represent inimical design way-of-knowing interests. A strong view prevails that it is conceptual understanding that is needed to solve visual design ‘problems’, after technicalities of making have been addressed. In Moore’s (2010) view the conceptual rationale for a designed object cannot be replaced by arbitrary subjective responses to sensory qualities; here Moore casts ‘the conceptual’ as something more than personal knowing, and something more than a sense perceptual response. How conceptual understanding is to be achieved in design pedagogy remains a topic of contention. The reason for this, as Oxman (2003, p. 3) explains, is that:

The actual practice of design in the problem-related studio situation of most design schools rarely, if ever, *treats the cognitive processes of design thinking as a form of explicit teaching content*. [Author’s emphasis]

Tensions occur where ‘conceptual’ ways-of-knowing visual meaning are differently understood. For instance, Teymur (2008) complains that professional knowing is preferred over academic knowing. But both academic and professional knowing involve conceptual skills. Professional design practice is often held up as the ‘right’ example to follow. In Teymur’s view, however, the practice of professional architecture does not much help with the broad understanding of architecture as an historical discourse.

As another example of mixed perspectives on the conceptual, Webster’s (2005) study shows that students were required to produce drawings that could equally be read by the student and the tutor. This happy circumstance did not always eventuate, because some students could not penetrate the reigning architecture-pedagogical discourse in their school of architecture. As Webster says, this meant

that the dominant teacher paradigm of architectural discourse remained unassailable. Regarding this particular architectural discourse, students noted that there were particular words and phrases that were “cool to drop in” during studio critique (Webster, 2005, p. 277).

At the third year level however, as Webster (2005) reports, students began to understand that notions of value in architecture were contested not only within the discipline but also in the cultural milieu beyond the architectural community of academics and professionals. Nonetheless, students were not able to understand the differences between these values.

Webster cites one student’s telling observation that “There must be universal notions of quality. I guess they stem from what we find beautiful going back to geometry in Greek architecture or something” (Webster, 2005, p. 275). A critical valuing of contested architectural mores contradicts the idea of a universal architectural discourse. Such a critical conceptual stance also does damage to the myth of the architectural review as “a collective and liberal celebration of individual student creativity” (Webster, 2005, p. 280).

Dannels, Gaffney & Martin (2008) go so far as to describe feedback in design teaching as shaping the entire pedagogical field of design. But in their study there is evidence of conflicting expectations of students: teachers tried to make students more aware of the need to explain their work by urging them to persuasively articulate formal visual design choices (what the design looks like) with what the design is ‘saying’ (what the design means). The pedagogical stance was that students must supplement the nonverbal meaning communication of their designs with verbal communication about this meaning. But teachers also wanted the students to benefit from their feedback, and wondered why the students didn’t “get it” (Dannels et al., 2008, p. 2). For example, a teacher comment in a studio crit was:

The box for me is just ... terrible. I mean I expect Count Dracula to come out. You know, think about those things. These compositions are so beautiful. You want to think about your typography the same way you think about the composition on the page. You wouldn’t draw a boomerang that looked like that ‘D’ there for instance. Make everything as beautiful as you did up here.

One outcome of that study was the thought that a set of blueprints for communication within the discipline might help. With this thought came the understanding that communicating about the discipline is knowing what the discipline values – which students were however still learning. Dannels et al. therefore explored what it was that teachers were intentionally or unintentionally saying about design expertise – as in the teacher comment “You understand? It’s about graphically how we read things” (Dannels et al., 2008, p. 7). However, this study reports that teachers gave students very different messages about knowing visual design meaning as design expertise. Students were at various times urged to articulate quite divergent conceptual stances: a teacher wanted to see the “linear” process by which a student developed a design students should provide a “persuasive rationale” (Dannels et al. p. 7) and then they should “see their own work from a different perspective ” (Dannels et al. p. 10).

In Oak’s (2000) study, personal conceptions versus social conceptions of visual design meaning had resonating effects on studio interactions between students and teachers. Oak (2000, p. 87) says that “designed objects result from compromises, not from the unconstrained individual personality”. In her analysis of design critiques as a form of assessment, she highlights the tension between the vocational imperatives of design, and those that are more personal (Oak, 2000, p. 89). Students were made aware in these design critiques that they must bridge these polarities, that “they must speak both their own and another’s language” (Oak, 2000, p. 90).

The polarities Oak speaks of were enmeshed in a network of commercial needs for socially expressive and innovative products, and the personal creativity of designers (Oak, 2000, p. 87). There were concurrent tensions between the immediate educational setting and the projected professional design field in which any design problem has relevance. Assumptions on either count might equally be tacit or explicit in talk about a student’s designed objects (Oak, 2000, p. 89).

Fleming (1998) brings some insight to the tacit/explicit divide in design pedagogy. He suggests that design might be seen as situated action that draws upon two different visual meaning resources. First, visual meaning refers to ‘language-laden objects’ that are ‘out there’ in the world – for instance, the circus, climate change or Doric

columns. Second, there is 'object-laden language' which refers to the student's actual designed object. Object-laden language is completed by the student's actual designed object or sketch that is being discussed by the teacher and student. Comments such as "It needs softening on the edges" refer directly to the designed object that is viewed by the teacher and student. Such a comment would not make sense outside of the actual student-teacher interaction about the object. So on one hand object-laden language tacitly 'stands in' for explicit visual knowledge. On the other hand, language-laden objects require explicit knowledge of the past or present existence of such visual objects in the world beyond the design studio. This 'in here/out there' tacit/explicit divide may be seen as a typifying and almost definitive feature of design studio pedagogy.

There are underlying tacit/explicit fault lines in much of what is advocated in design knowing. For Reid and Petocz (2004, p. 50) there should be a conceptual interplay between students' own experiences and intentions, professional knowledge, and social/cultural expectations. Ironically they then ask how it might be possible to set up a 'total learning environment' where this variegated conceptual learning might be evident in the products of learning, i.e. students' designs. Here Reid and Petocz expose the difficulty of design ways-of-knowing: they speak of divergent conceptual trajectories, and then wonder how these might be visually discerned in students' finished designs.

It is easy to advocate conceptual flexibility in design, but not so easy to conduct formative and summative assessment of students' designs in a conceptually flexible way. In this regard, James (2000, p. 157) mentions how Heron has shown a mismatch between the level of rationality we assume students can bring to learning, and that which we give them credit for in assessment and other processes. In the assessment of design learning, it seems that various ways-of-knowing jostle for position in the knowing of visual design meaning.

At the crux of these tangled ways-of-knowing is the implicit 'pedagogy of ambiguity' (Shreeve, 2011) of design education. It is perhaps due to this ambiguity that there has been a focus of attention on the norms of studio pedagogy in art and design (for instance Dannels, Gaffney, & Martin, 2008; Fleming, 1998; Logan, 2007; Oak, 2008).

2.4.1 Pedagogical Views on Design Teaching

There is a view that the design curriculum “can only come mediated through the person of the teacher; the tasks, materials, goals of the lesson come infused with the teacher’s personal identity” (Salmon, 1995, pp. 23-24). Prentice (1995, p. 4) sums up this thought:

Of particular significance for teachers of art and design – given the diverse specialisms included in the subject-field along with the problematic nature of art – is the claim that teachers represent more than their subject: they represent their personal stance towards it.

Prentice’s statement is precisely mirrored in Oxman’s reference to the individuality of design pedagogical practice, an individuality that finds room for expression in the “endemic unstructured quality of both [design] domain problems and domain knowledge” (Oxman, 2003, p. 4). Again the lack of structured knowledge puts emphasis on the way in which the teacher communicates with students.

Oxman’s observation echoes the old master/apprentice pedagogy, which also came in the person of the individual teacher. While Schön regards conjoint reflection between the student and the teacher as essential to developing design knowing, he admits that there are difficulties in making expert knowledge accessible to students. This is a pervasive difficulty of design education, where the ‘tacit theories’ of design teachers (Schön, 1983, p. 321) hold sway. Ng (2011), too, says of his study of art and design education that students found some teacher facilitation styles meaningful in critique, and not others.

Blair, Blythman and Orr (2007), in their substantial study of crit interactions in six UK universities, provide a glossary of design-specific terms with, however, a disclaimer that these terms might hold different meanings in different specialisations, and that these meanings would have to be explained per the design specialisation and the individual tutor’s intention

A number of studies show that design studio pedagogy is not always regarded as beneficial by students: Shreeve (2011, p. 116) says some students experience a

design studio transmission-like style of teaching where tutors dispense advice while 'studio-cruising'.

In Logan's (2007) view, teachers who are themselves experienced design practitioners are better able to articulate design meaning scenarios. However, professional design practitioners and academics can subscribe to different values, and as Logan says, these differences tend to become evident when student designs are evaluated. This point echoes Chen and Heylighen's (2006) view that professionals are not necessarily the best teachers.

Klassen's (2002) contrasting emphasis is on cultural inquiry through discussion between students and teachers, because design projects do not exist in and of themselves, separated from culture and social life. Dutton's (1991) study of the hidden curriculum in the design studio also maintains that the production and distribution of knowledge in design studios is affected by the same political, economic and social tensions that operate in the world outside of design education.

2.4.2 Teacher–student contention about design studio critique

Doman, Laurie & Duvenage (2009, p. 76) have written about reflective journalling in design. In the following example Doman et al show a student's written journal reflections on the reasons behind teacher assessment and feedback on her work. The student first quotes teacher crit feedback on her photographs:

There are very strong images (these two depict deep emotions). That the other three which do not have the same emotional strength bring (sic) the entire body of work down to an average and therefore does not get a distinction.

The student responds to this teacher comment in her journal:

I did not intend to pose/fake expressions and captured it as natural as possible. Three of the women I photographed did obviously not want to expose a certain personal emotion.

The student then quotes her teacher's response to her reply above:

Maybe you don't have the ability to evoke the emotion required ...

The student's final journal entry responds to this teacher remark:

I am a white/European female – maybe this was partly why they didn't want to express a very sensitive emotion and maybe they wouldn't have to any person anyway.

In Figure 2.3 below I show the student's actual reflective journal entry, with her underlined emphasis on her reaction to teacher feedback.

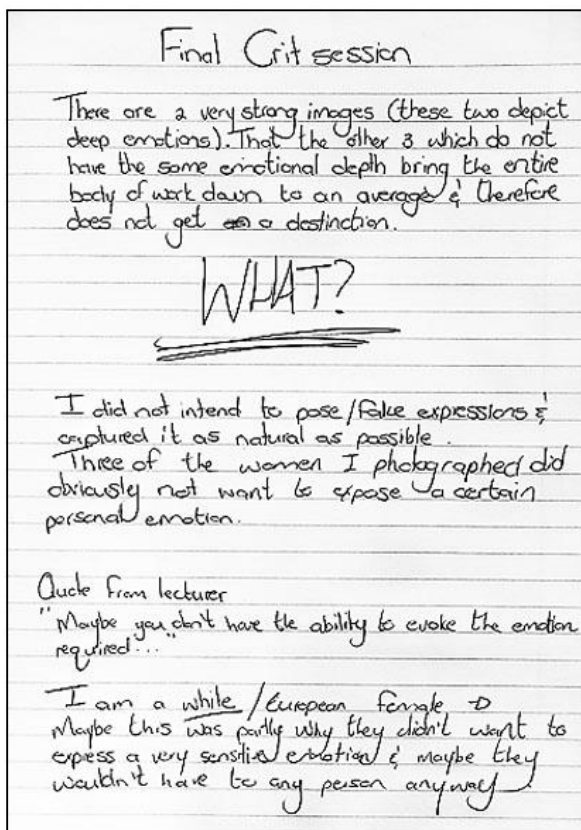


Figure 2.3 A student's reflective journal entry after studio critique

Source: Doman, Laurie and Duvenage (2009, p. 76)

Reproduced by kind permission of the Design Education Forum of South Africa

From my second-hand perspective on this reflective journal example, it seems that the teacher was looking for a photographic portrayal of emotion, which would evidence a sophisticated representational design way-of-knowing. The student did sense an emotion in her subjects, but denies that capturing it was either necessary or desirable: her whiteness would preclude the showing of emotion by the photographic subjects. In this situation, the teacher way-of-knowing design meaning rests on the idea that an emotion, as the design meaning, can be purposively and intentionally evoked in the photograph, as a design learning exercise.

On one hand, the student seems to feel that her photographs should stand on merits only she understands. She resents being tied down to capturing a pre-specified meaning, and possibly expects the teacher to appreciate her personal way-of-knowing.

On the other hand, the teacher seems to take it for granted that the student should understand the need to represent recognisable emotion in a photograph. How, however, the recognisable emotion might be knowable is far from clear. Teachers routinely expect students to appreciate their personal ways-of-knowing. As Moore (2010, p. 149) says: “for too long criticising [design work] as merely visual or subjective has been used as a smokescreen for personal preference and bias”.

More acrimonious comment comes from Till’s debunking of the default design pedagogical defence of studio crits as authentic professional learning (cited by Blair, 2003, p. 92):

“It [the design crit] prepares for the real world” (come on, a tutor hardly shares the same priorities as a client). “I did it and survived.” (Yes, and people fought in the Iraq war and survived; that doesn’t make the war right). “It is part of our history, right from the nineteenth century”.

Criticism of the design studio crit has been published since the 1990s (for instance, see Dutton 1991; Jackson 1995; Davies, 1997; Atkinson, 2001; Oxman, 2003; Ehmann, 2005; Dannels, 2005; Beuchel et al., 2010; Moore, 2010). However such criticism of design teachers must be put against Waks’s (2001) observation that design teachers, unlike other teachers, do not have the opportunity of rehearsing a

teaching event that has a topic and frame of reference. Most importantly, most other forms of teaching do not entail a search for meaning innovation.

2.5 Pedagogical Ways-of-Knowing and Shared or Unshared Visual Design Meaning

The censure of design studio pedagogy reported in the previous section is balanced by positive student experiences. In Logan's (2007) study, students enjoyed their participation in a studio community of practice, where they felt a strong sense of belonging. Other positive effects of the crit have also been noted. For instance, in Blair, Blythman and Orr's (2007) study, students identified the benefits they derived from studio critique. As a way of learning, crits provided relief from a purely 'marks' perspective, opportunities to engage with other students' work, opportunities to tackle deeper issues, and access a variety of perspectives. Crits further provided individual attention, experience in articulating design meaning and thinking critically and "getting to know yourself better" (Blair et al., 2007, pp. 6-7). By this account, the crit can be a transformative, collaborative experience that also accommodates individual attention to students and brings about their personal growth.

This account, and those following below suggest that design studio pedagogy may also lead the sharing of visual design meaning between students and teachers.

Shreeve (2011, p. 116) cites a design teacher interview from a large design pedagogy research study¹² over several subject areas and institutions which shows very positive teacher attitudes toward students:

...your relationship to students is different from student to student. There are some students that come to an idea which I just can't get my head around. But I trust them and I'll say go with your instinct because they're a strong student.

Shreeve (2011) explains too that design studio interaction with tutors helps students to organise their own learning in the 'home base' of the studio, in the absence of formal lectures that might structure knowledge. Design students cannot be given a

¹² Shreeve refers to the CLIP CETL Funded UAL Research Project Report titled 'Teaching Landscapes in Creative Arts Subjects' (Sims, 2008).

demonstration on 'how to design', but they do enjoy the advantage of direct contact with teachers and other students in the practical learning experience of the design studio. Student contact with teachers is often on a one-to-one basis, so there is the opportunity for deep engagement with the teacher about design development issues.

But conflict between teachers and students concerning visual design meaning may equally occur.

Regarding the divergent ambiguity of student and teacher ways-of-knowing, Fleming (1998, p. 43) cites Forester on design conversations:

When form-giving is understood more as an activity of making sense together, it can then be situated in a world where social meaning is a perpetual practical accomplishment. Designing takes place in institutional settings where rationality is precarious at best, conflict abounds, and relations of power shape what is feasible, desirable and, at times, even imaginable.

Sharing design meaning is then at least partially dependent on variable pedagogical ways-of-knowing in the design studio. There might be ambiguity and inconsistency in the ways in which the teacher expects students to know, and the ways in which the teacher him- or herself knows, on any one occasion. As the studies I have reviewed in this chapter suggest, ambiguity is endemic to both the conception and the articulation of relevant design meaning in design pedagogy.

How talk and artefacts combine in design education is key to design as a practice in which the object mediates between the designer and others (Oak, 2008, p. 1). For this study, the entwining of knowing with communication then seemed to lie at the heart of conceptual ambiguity and divergence in design studio pedagogy. I depict this in Figure 2.4 as a triangular relationship where pedagogical ways-of-knowing and communication in the design studio converge on the possibility of sharing an understanding of design meaning.

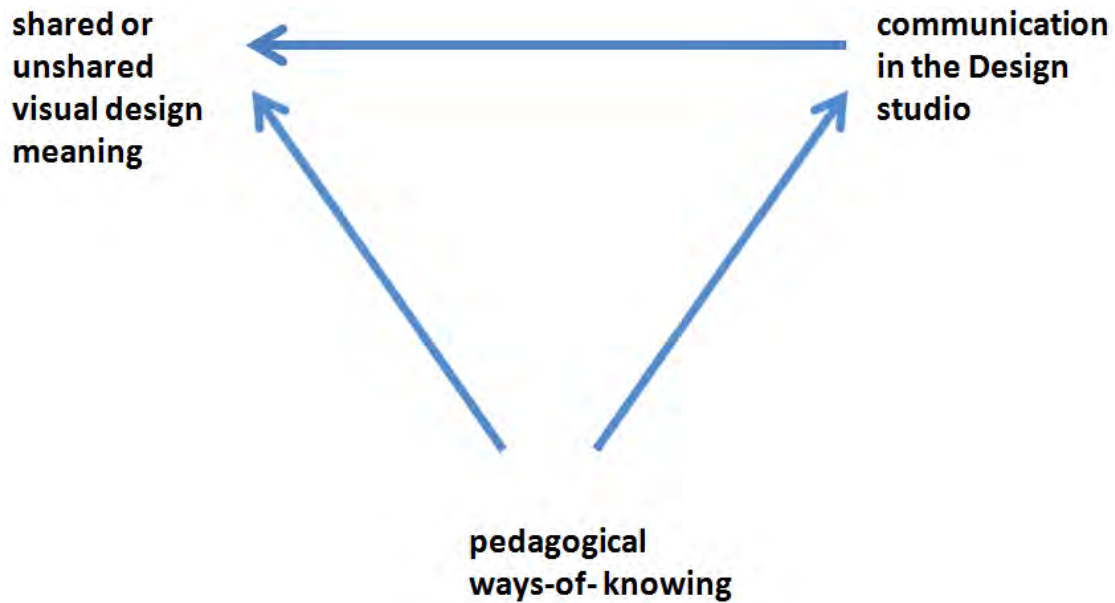


Figure 2. 4 The convergence of pedagogical ways-of-knowing and communication on shared or unshared visual design meaning.

As I have briefly explained in Chapter One, my research approach is one that uses abductive explanation of an anomalous situation. The divergences and ambiguities of design studio pedagogy elaborated in this chapter constitute this anomalous situation.

In the next chapter I target this abductive explanation through the formulation of research questions about knowing and articulating design meaning. In doing so I also grapple with the ontological possibilities for articulating such knowledge in the design studio, by drawing on Critical Realist philosophy.

Chapter Three

Critical Realism and Pedagogical Ways-of-Knowing Design Meaning

This chapter gives an account of Critical Realism (CR) as the overall philosophy that guides the research explanation in this study. As I mentioned in Chapter One, CR moves from observations about a research phenomenon to explanation of the conditions of possibility for this phenomenon to occur (Collier, 1994; Danermark et al, 2002; Lawson, 2004; Bhaskar, 2008). In other words, the CR ontology concerns what makes the occurrence of a particular social phenomenon possible.

This means that CR is a philosophy of social emergence. Bhaskar's (2008) CR approach regards social aspects of empirical situations and events as emerging through the influence of historically formed social structures. To put this very simply, the CR view is that whatever happens (in the social world) happens because of something else, or a combination of some other things.

In Chapter One I also referred to abductive inference as an analytical strategy for research explanation. The abductive approach is a form of inference that is closely aligned with the CR project of accounting for emergence. Abduction generally proceeds by means of a theoretical re-contextualisation of research circumstances to explanation of what makes these circumstances emerge.

Over the course of this chapter I position my research concern with design pedagogy within a critical realist explanation, moving toward a fuller account of my choice of the abductive research method.

3.1 Targeting the Research: Emergence and Design Meaning

In Chapter Two, design education scholarship showed that there is a variety of teacher expectations about knowing and articulating the visual meaning of students' designed objects. Across the studies I reviewed in Chapter Two, divergent

pedagogical ways-of-knowing were evident in communication between teachers and students in the design studio.

Unlike academic disciplines with a more defined knowledge base, knowing the visual meaning of student designs is not a matter of drawing upon formal knowledge content. For instance, knowing in Geology proceeds from knowledge of solid earth – from physical matter. Such knowing might come to revise existing knowledge of solid earth or rock formations, but such revisions refer to a defined knowledge base.

To exacerbate the lack of defined knowledge base, design briefs tend to have unfamiliar and ill-defined parameters (Lawson, 2004, p. 18) that require some form of inquiry. It was for this reason, initially, that I began to regard the matter of knowing visual design meaning as a matter of emergence.

Students generally respond to design briefs by producing ‘new’ designs. These designs are innovations or re-interpretations of preceding designs, rather than totally original inventions. These student designs emerge with reference to some sort of predecessor artefact (Michl, 2002) so new design meanings emerge more as transformations.

Then there is the matter of communicating about this visual meaning. For communication about nonverbal, visual meaning to proceed, *relevant* previous meaning must emerge in communication. Often this is tacit knowledge about visual meaning, that must somehow be made explicit. A student may explain what information has been collected in order to design their designed object. However, this information used in the process of design must still be related to the student’s newly designed object.

The visual meaning of designed objects is in any case emergent in social life, as Bayley’s (2010) critique of a skyscraper building showed in Chapter Two. So yet another emergence trajectory is involved in inferring the potential meaning emergence of a student’s design in the social world beyond the design studio. As I mentioned in Chapter Two, this future visual meaning is part of the design conceptual process (Gedenryd, 1998).

The visual meanings of student's designs are, then, emergent in studio communicative interactions between students and teachers. What is of primary importance to this study is shared visual meaning emergence between teachers and students, because without this, there is little chance that students can learn from design studio interactions. In studio communication between teachers and students, it may happen that there is no divergence in the understanding of visual design meaning, and it may happen that there is.

In Chapter Two, the design pedagogy literature placed a strong emphasis on the design teacher's role in visual meaning-making in the design studio. Pedagogical ways-of-knowing are hugely important to studio communicative interactions, because they are both tacit and equivocal (Austerlitz et al., 2008, p. 9).

Therefore, I targeted pedagogical ways-of-knowing as a highly significant factor in the sharing of visual design meaning. What seemed most important to find out was: *how do design teachers consider knowing visual design meaning to be possible for students?* This is not a matter of possibility in the sense of serendipity, but a matter of what makes for the *emergence* (or not) of shared visual design meaning in studio communication interactions.

In my view, pedagogical ways-of-knowing may operate, even where design educators consider design visual meaning to be essentially 'undecidable' as in a post-structural or postmodern approach to design meaning. Even undecidability¹³ needs references which may not decide, but instead, open meaning in particular ways, and even the "endless ironic regress" of postmodernism (Eschelmann, 2008, p. 3) is ironic about something.

However, I wish to be clear that I do not *privilege* pedagogical way-of-knowing, but investigate them because of their undeniable effect (as demonstrated in Chapter Two) as conditions of possibility for the emergence of shared visual design meaning.

¹³ Undecidability (Derrida, 1978), is a cornerstone of postmodern or post-structural meaning and knowing.

As core research questions about how design pedagogical ways-of-knowing might affect the sharing of design meaning, I asked:

- In what different ways do teachers think the visual meaning of students' designs can be known? In other words, what are the different pedagogical ways-of-knowing that operate in the design studio?
- How does verbal communication affect pedagogical ways-of-knowing visual design object meaning?
- Why might particular, non-arbitrary visual design object meanings be articulated by design teachers?

I felt that design educators might share an uneasiness about the validity of visual meaning attributions that might emerge in any studio interaction – either their own or those of students. In this I intend no disrespect to my colleagues (or myself). Argyris and Schön's (1974) premise that teachers' espoused theory might differ from theory they actually use in practice would, in my view, be unfairly applied to the extraordinary difficulties entailed in articulating the visual meaning of students' designed objects. Communication in the design studio is not just about the visual meanings of students' designs; it is about how that visual meaning might emerge for others in some other place at some other time.¹⁴

There are, as I have shown in Chapter Two, disparate views on how visual design meaning might be articulated as knowledge. Since this knowing of visual design meaning also comes through the filter of verbal articulation, I decided to take an emergence research approach to knowing design meaning. I turned to CR emergence philosophy, pioneered by Bhaskar in the 1970s but now widely and authoritatively theorised beyond Bhaskar's work. CR asks what makes things possible, and it looks to underlying factors that condition possibility (Bhaskar, 2008). The CR approach is a social approach to reality, in which social conditions are held to enable or constrain (and to enable *and* constrain) the emergence of a particular

¹⁴ I discussed this issue in Chapter Two, calling on Gedenryd (1998) and Fleming (1998) with regard to the nature of design meaning

phenomenon. Most often such underlying conditions are historically formed (Bhaskar, 2008), and affect the possibilities for what might be experienced in any situation – the studio in design pedagogy, in this instance.

The benefits of taking a CR approach in this particular study rest on differences between CR and other paradigmatic approaches. I sought to *explain* the effect of pedagogical ways-of-knowing on the sharing of visual design meaning between students and teachers in the design studio.

Such an explanation aspires to reach beyond the undecidable and endlessly relative multi-voiced approach of postmodernist and post-structuralist research. The CR approach *is* a relational approach, but one that prioritises historical relationality and seeks through historical relationality a provisional but ‘practically adequate’ explanation for local and particular circumstances (Sayer, 1992).

The provisional aspect concerns the CR admission that knowledge is revisable and fallible (Moore, 2007). Then, some explanations are more practically adequate than others (Sayer, 1992, p. 70). So CR is a philosophy that works toward useful and emancipatory relational explanations that should demonstrate something more than a standpoint, but are still revisable (Moore, 2007).

This is not to say that ideological standpoints can be dismissed in the CR approach. But for this study, it seemed that ideological domination was too hefty an assumption to bring to the attempt to explain pedagogical ways-of-knowing visual *design object meaning*.

A further an most important ontological consideration was my own belief that when triggered, social history and social events influence concrete situations. I realised that this belief had been implicit in my own thinking as a professional fashion designer, before I became an educator. Though I did not realise it at the time, my design thinking rejected the notion of individually subjective reality as the only reality. But at the same time I also implicitly understood that larger influences tended to occur in particular contexts, so the collective subjectivity of social constructionist thinking (Cohen, Manion & Morrison) did not fit my thinking either.

It was clear that the issue of divergent and ambiguous pedagogical ways-of-knowing in the design studio is not confined to time or place, as I have said in Chapter One. Because CR is a philosophy that supports the linking of macro forces with micro effects, (as I explain further in Section 3.3 of this chapter). I recognised the opportunity CR provided for the particular kind of contextual but not localised explanation that I have found it important to pursue.

3.1.1 Explaining Teacher Ways-of-Knowing Visual Design Meaning

My research strategy was to see pedagogical ways-of-knowing, (the ways in which teachers think students might know) as conditions that influence the design object sense-making that happens in design studio communicative interactions.

To re-iterate, there is always some kind of preceding or anterior knowing going on in the making of design meaning, but why do certain and not other ways-of-knowing operate on any given occasion?

To ask this question, and to ask it in this way, means that one is dealing with the concept of emergence. Emergence in the CR philosophical tradition embraces the above-mentioned 'conditions of possibility', that is, what it may be that conditions the emergence of a phenomenon in a particular context (Bhaskar, 2008). As I mentioned in Chapter One, Bhaskar's realist approach seeks to explain how it is that particular circumstances come to obtain; any occurrence or experience assumes some prior categorical necessity, which predisposes things to be how they are. In this approach then, there are social reasons why poverty occurs, just as there are natural reasons why the weather changes.

3.2 Critical Realist Explanation

According to Bhaskar (2008), social reality is manifest on different levels, so any straightforward claim about what is real on one level is still subject to different forms of manifestation on other levels. Reality is stratified on levels of the real, the actual and the empirical (Bhaskar, 1997, 2008). As shown in Figure 3.1 overleaf,

- the *real* consists of relatively enduring structures and mechanisms that exist apart from our knowledge of them;
- the *actual* consists of events, whether or not they are observed, and
- the *empirical* consists of experience.

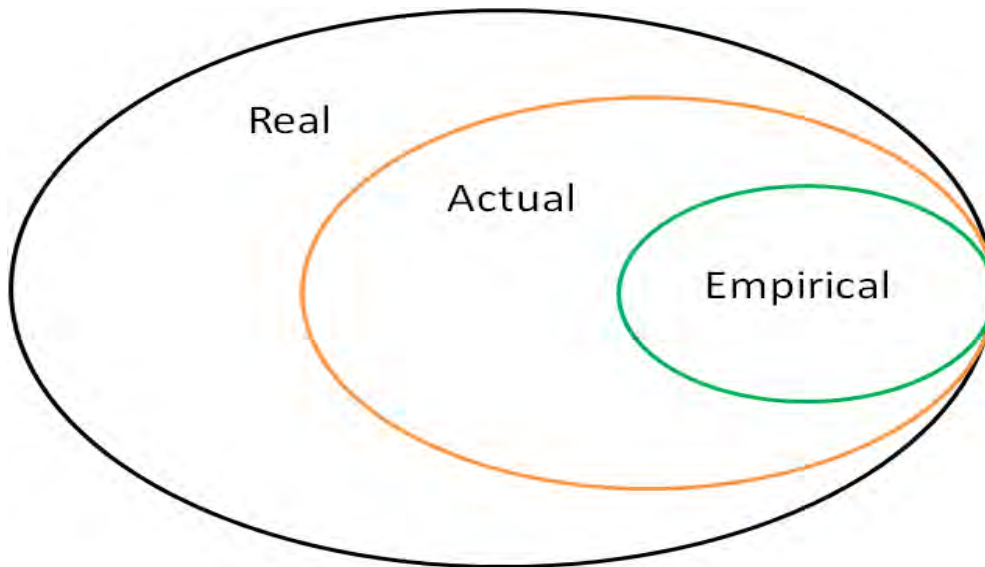


Figure 3.1 Bhaskar's (2008) realist ontology

Taking Bhaskar's stratified levels of reality in reverse order, the empirical as experience may mean experience of real but abstract phenomena, like 'the economy' through a sudden drop in the value of a currency. 'The empirical' is, as Scheuer (2001, p. 21) puts it, "where what goes on does meet the eye", rather than *how* something is personally experienced. Empirical experience is nonetheless still concept-dependent; people do not apprehend phenomena of any kind without prior conceptualisations that they bring to this apprehension (Sayer, 1992). An empirical experience might conceptually refer to the abstract real or to an actual event (witnessed or not), but it may also simply (but still concept-dependently) fasten upon a material object (Sayer, 1992).

The actual level includes what we observe at first hand and also what occurs outside of our experience, or has occurred in the past, as the manifestation of real structures. The 'actual' is then what is taken to have occurred, whether observed at first hand or not. Again the example of currency devaluation may serve as the actual,

event manifestation of the structure called 'the economy'. We trust in the report of such an event whether or not we observe or experience it, and people who were born in the 1960s take it for granted that the Great Depression as an actual event happened in the 1930s.

Lawson (2004, p. 2) thinks that the real level of 'enduring structures' should rather be described as 'relatively enduring' structures, and gives the example of Cambridge University as a relatively enduring structure. Lawson's qualification is important to understanding the sense in which Bhaskar's ontology applies in the social world. Enduring structures are not monolithic edifices that have endured from time immemorial. However, the enduring structures on the level of the real are termed 'intransitive' (unchanging) by comparison with the transitive (changing) actuality of events and experiences (Baehr, 1990, pp. 769-770).

But, as Baehr asks, how can *social* reality be unchanging? Bhaskar's answer, quoted by Baehr (1990, p. 769), is that real social structures are "activity-, concept-, and space-time dependent", but once they have formed as, for instance, social institutions, real social structures have real enabling and constraining effects. Bhaskar's "transformational model of social activity" (1989, pp. 34–54) expresses the activity, concept, and space–time dependency of social structures on human agency: "Society is both the ever present condition (material cause) and the continually reproduced outcome of human agency".

The stratified CR ontology is, as I have shown, nested, so that experience and events are to be considered part of the real. Causes and effects are embedded in the superimposed and layered domains of the social realm. This is a key feature of the CR ontology, which should not be taken to represent a hierarchy. The domain of experience is a subset of the domain of the actual, and the domains of the actual and the experiential are both subsets of the real (Carter & New, 2004, p. 16). The

CR idea is that social processes represent the relational dynamics between these domains.¹⁵

I regard it as extremely important that the CR ontology not be taken too literally. The real, the actual and the empirical are very broad terms for very ordinary aspects of social life: abstract structures, events whether witnessed or not, and the direct experiences of human beings. There is no reason to doubt that there are abstract structures that form part of social life (we take it for granted that politics, marriage and geology exist, without our direct experience of them), that actual events take place (we take note of news reports, though we do not witness the events that are reported), and we have first-hand experiences (of child-raising, of world travel, or of illness). What Bhaskar maintains is that first-hand experiences do not simply arrive on our doorsteps, and neither are they understood in a *tabula rasa* or blank slate kind of way. Abstract structures of knowledge and awareness of events are brought to the understanding of direct experience (Bhaskar, 2008).

That social reality might then be constituted by these abstract, semi-abstract and concrete components – structures, events and experiences – is not a particularly surprising claim. A too technical view of structures, events and experiences is then inappropriate to what are really aspects of everyday life as it is *known*. Such a view would mitigate against the common sense usefulness of Bhaskar's realist ontology. As Pratt (2007, pp. 27-28) has put it:

Critical realism is not an Enlightenment-type rationality, or a return to a one-dimensional positivism based on an accumulation of observable data, but a highly flexible meta-view which can accommodate inquiry in both the natural and social sciences ... From a critical realist viewpoint, broad social conditions are as much 'givens' of the human condition as the landscape, and, once set in place, are not amenable to attempts at human control. While the term "under-labourer" (Locke 1690:3) for the natural and human sciences frequently recurs in accounts of critical realism, it should possibly more properly be treated as an *overview* or meta-perspective, or perhaps even something of an interface stretching beyond socially constructed views of reality towards reality itself, which is not necessarily a realm of solid objects (Norris 1999:6) but a state of being we all tacitly acknowledge to exist by virtue of our everyday functioning.

¹⁵ Bhaskar's early work on Critical Realism has been elaborated and extended in his books on dialectical Critical Realism. This study follows the early form of CR as a matter of epistemological and ontological orientation.

Pratt describes the value of CR as a philosophical rather than a theoretical approach, a view that is echoed by Archer, Bhaskar, Collier, Lawson and Norrie (1998) as key CR proponents. I recognised that it is on this philosophical level that the emergence ontology of CR might guide my inquiry into what sorts of teacher ways-of-knowing might allow visual design meaning to emerge in design pedagogical interactions. CR does not provide the researcher with the means to connect an explanation to an empirical situation, but it does espouse a socially relational and processual ontology of emergence, where experiences and events are inescapably influenced by real abstract structures. Kaboub (2001, p. 1, author emphasis) defines the 'real' in CR:

The critical realist philosophical ontology states that something is *real if it can bring about visible/material consequences*. In other words, in critical realism something is *real* if it is *relationally efficacious* (e.g., a magnetic field, unemployment, poverty).

Abstract phenomena like those Kaboub mentions have discernable social effects, and these phenomena translate into the processes of emergence that result in our experience of the world (Carter & New, 2004). CR then embraces a non-positivist emergence relationality that is concerned with the effects of social processes.

The CR ontology holds that 'conditions of possibility' are underlying structural mechanisms of a kind that generate the emergence of the phenomena experienced in social life (Bhaskar, 2008). In this study, the experiential phenomenon is the visual meaning of students' designed objects which emerges within the confines of the design studio in design education.

Another way of putting the idea of these conditions of possibility is to think of them as mechanisms that make it possible for things to be related – relational mechanisms. The term 'mechanism' here does not refer to anything mechanical. Instead, as Sawyer (2004) has explained, in sociology mechanisms are associated with the unobvious reasons for the emergence of social phenomena.

Relational mechanisms entail the simultaneous emergence of antecedent and either similar or different present phenomena at a particular moment or in an event (Elder-Vass, 2007a, p. 230). This is not the kind of relational emergence where historical

social structures emerge *over time*, but the mechanism of emergence that brings an abstract historical structure to bear in an empirical context, as Elder-Vass (2007a) explains. Relational emergence therefore refers to the nesting of Bhaskar's stratified levels of real structures, actual events and empirical experience; the real structures come to bear on actual events or empirical experiences (Archer, 1995; Bhaskar, 2008). For instance, one may say that relational emergence occurs when historical traditions influence a particular event, like a wedding, a carnival or the winning of a trophy.

The CR ontology holds that 'conditions of possibility' are underlying relational mechanisms of a kind that generate the emergence of the phenomena experienced in social life. CR explains how mechanisms may be relationally efficacious, bringing structures into relation with our experiences and interactions, in unobservable ways (Archer, 1995; Sawyer, 2004; Elder-Vass, 2007a; Bhaskar 2008). Our experiences are of a reality that is never 'simply present'; processes and events have come into relation or linked up and the conditions we experience have emerged from these linkages.

This is the philosophical position I take in this study regarding the emergence of the visual meaning of students' designs. I regard this emergence as being influenced by pedagogical ways-of-knowing as relational mechanisms. Clearly, and very importantly, this is not the *only* influence on the emergence of visual design meaning in design pedagogy, but it is the influence that I focus upon.

The CR stratified ontology and relational mechanisms explain each other, as Vincent (2005, p. 9), points out:

Subjective positions and agency groups, material products, businesses and market structures, institutions and other national governance mechanisms *all* have relational powers that interact and, depending on their combination, they simultaneously and selectively influence social action and agency in specific organizational contexts. This suggests a "stratified and transformational ontology" (Ackroyd & Fleetwood, 2000), in which various levels and types of force are considered for how they affect social action in particular locations.

It would, however, be a mistake to take it that relational mechanisms are always seated in macro social institutions. Vincent's (2005) portrayal of how relational mechanisms operate shows their appearance at different social levels. For instance, students' experience of design pedagogy might be affected by the appointment of ex-professional designers as teachers, who have no knowledge of how learning might happen. This could be the structural effect caused by an institutional view of design education as vocational education.

As another example, stratified levels of emergence could also mean that an anti-consumerist design philosophy might underlie the way in which critique is handled in studio interactions, with the result that students graduating from such a design programme are preferred by socially responsible design consultancies.

Relational mechanisms are also generative mechanisms of emergence, as the previous examples may show. CR relational mechanisms can account for the emergence of abstract and concrete aspects of contextually confined, direct experiences (Archer, 1995; Sawyer, 2004). The mechanisms that might operate in design pedagogy, specifically mechanisms of pedagogical knowing, would not be obviously discernable in crit and studio interactions. Teachers' notions about knowing visual design meaning might be generated over time, through processual relations (not necessarily linear) between social structures, social events and social experiences.

3.3 Critical Realist Explanation: Research Challenges

The challenge one faces when adopting a critical realist theoretical approach is to explain the deeper, abstract layers beneath the concrete surfaces of experience.

A good example of the background operation of relational mechanisms is Marsh, Rosser and Harre's (1980) study of football hooliganism (cited in Carter & New, 2004, p. 6). This study found that there are social benefits and a moral rationale to hooligan mob membership that operate behind the scenes of the actual football match events. In this case there is no obvious link between the first-hand observation or experience of football hooliganism and its relational emergence. Also,

observing football matches where hooliganism might occur will not reveal these relational mechanisms. The lack of explanatory information at the empirical level (as in this example of hooliganism at football matches) is a challenge to be faced in a CR-based research study.

The processual, social kind of relational mechanism may or may not pertain in particular contexts and circumstances, and it is the researcher's task to explain why a relational mechanism might partially account for the circumstances experienced in a particular context. The activation (or not) of the relational mechanism depends on the context in which it occurs (Maxwell, 2004, p. 6). So relational explanation of mechanisms of emergence includes, as part of the explanation, the concrete context in which the relational mechanism operates. Here lies the difficulty: CR rejects the idea that one could, in the empirical sense-data tradition, observe reality. Bhaskar's position, in my understanding, is that whatever occurs is made possible on some other level. To reiterate, Bhaskar's levels are:

- the empirical (but the empirical as experience, which is someone's experience, or some collective experience)
- events, or the 'actual'; events that take place whether they are experienced or not, and
- the real, which engenders each and both of the above.

The upshot of this is that there are emergence mechanisms at the level of the real that are responsible for what occurs, or what is experienced. But the further upshot of this is that if experience is influenced by events and mechanisms, researcher accounts of what is experienced in any given context are the most intractably difficult to account for with any methodological validity.

Neither micro social explanation in the tradition of methodological individualism, nor macro social explanation in the tradition of methodological collectivism is accepted in the CR project. This is because social reality is neither held to be the result of individual agency nor the result of the collective properties of social structures.

Furthermore, critical realists dismiss as ‘central conflation’ the idea of agency and structure as mutually constitutive (Archer, 1995). Abstract structures, at the level of the real, and concrete agency at the level of the empirical, function interdependently and independently (Archer, 1995; Bhaskar, 1993). Individuals are born into social structures that shape their lives. But individuals can also be agents of change in social structures.

This macro-micro issue maps respectively onto abstract and concrete relationships. The significance of this for this study is that there is little point in researching a number of cases of design pedagogy on a micro level, in order to find out what makes visual design meaning possible, because that is a macro matter and it is likely to be hidden though effectual in any one design studio session or event. However, pedagogical ways-of-knowing are here conceived as macro relational mechanisms that might have effects on design studio events, while acknowledging that they are not the only relational mechanisms that might do so.

This study concentrates on pedagogical ways-of-knowing as significantly enabling and constraining the emergence of shared visual design object meaning, but other relational mechanisms are also sure to be at play. Together with this awareness, the CR position for Carter & New (2004, p. 5) is that:

[t]he world to which our concepts and theories more or less adequately refer ... is neither a product of, nor constituted by, our theories about it. It is fashionable to attribute the properties of knowledge (its partial, provisional nature) to the objects of knowledge, a mistake which Bhaskar terms the ‘epistemic fallacy’ (Bhaskar 1989a, p. 133).

In this light, relational mechanisms must be considered to be *tendencies* (Bhaskar, 2008) and not certainties. Explaining the activation of an abstract mechanism in a concrete context is then no easy task. While the CR ontological claims of a social reality might be pursued, they are not held to be fully attainable. In the next section I examine the analytical challenges that attend a partial but ‘practically adequate’ (Sayer, 1992, p. 70) explanation of the fully real.

3.3.1. A Discourse Analytical Approach to CR Explanation

Because the discourse- analytical approach of Fairclough (1992, 2005, 2010) is widely used in CR-orientated research analyses, I explore this approach here, and give reasons why I have elected not to use it.

To start with, discourses and discursive formations have long been a favoured analytical strategy for finding linkages between abstract and concrete phenomena. Broadly, there is discourse analysis that sees social practices and activities as the expression of consolidated thinking patterns that enter every crevice of human experience. Then there is discourse analysis that works the opposite way. This is discourse that *arises* from material practices, in the Marxist tradition (Banfield, 2003).¹⁶ Such discourses can account for relational mechanisms in CR research (Fairclough, 2005).

CR prioritises material practices over language, and requires that extra-discursive referents be identified (Laclau & Bhaskar, 1998, Fleetwood, 2005; Curtis, 2007; Riley, Sims-Schouten, & Willig, 2007) Extra-discursive referents are non-textual, material referents. Bhaskar's (1998, p. 14) separation of the extra-discursive and material referent 'water' from the referenced 'desire to drink water' is illustrative: "If I desire water, I must detach the water from the desiring subject; this is the referent of my act of desire".

Fairclough takes the latter view I have described, that of discourse as arising from human material activities and practices. Since there is no easy path to establishing an abstract knowing link to material phenomena, I first looked at what Fairclough's discourse analytic approach might afford this study.

Fairclough's approach looks at how particular individuals or groups select and combine elements of micro discourses within macro discourse perspectives (Ruiz, 2009). Macro orders of discourse, might, for instance, be 'mental illness', 'citizenship' or 'literacy'. These are macro layers of discourse that comprise of a multitude of

¹⁶ The philosophy of emergent materialism is roughly in line with this view. It is through material practices that knowing emerges (Banfield, 2003).

linked social elements. Such macro discourses have the micro effect of discursively positioning people (for instance, patients within the macro mental illness order of discourse) and their interests (Fairclough, 1993, pp. 3-4).

Initially, this macro-micro relation looked promising for investigating how macro abstract structures might bring the emergence of empirical circumstances at a micro, research context level.

Macro discourses, for Fairclough, need to be considered in the light of historical change. For example, 'Aids' is a macro order of discourse that might call upon historically formed attitudes to venereal disease or illicit sexual practices (Fairclough, 1993, pp. 3-4). Then, to extend this example, micro material practices such as contraception or promiscuity will mesh with the macro orders of discourse, and the circumstances in which language and practices combine ("text and interaction") will form another layer of meaning (Fairclough, 1993, p. 134).

In Fairclough's overall view, the layered effects of orders of discourse, historically merging and emergent discourses, and social interactions represented in textual forms¹⁷ must be considered in terms of their separate and combined effects.

However, Curtis (2007) mounts a critique of Fairclough's discourse-analytical process.¹⁸ The gist of Curtis's criticism, based on examples of Fairclough's discourse analyses, is that interpretive construction is required to progress from one layer of discourse to the next. This is for Curtis particularly true of the discourse 'genres' Fairclough identifies in the different layers. Curtis cannot 'find' the genres Fairclough identifies in these examples, and suggests instead that they are interpretations, even narrative productions of layers that can then be used to analyse another layer.¹⁹ Perhaps though, what Fairclough does is to infer, rather than 'find' genres; CR has after all always denied that we can unproblematically discover the realities of any empirical phenomenon, in a positivist way.

¹⁷ My understanding of 'textual' is anything that can be interpretively read off an object, including a visual object.

¹⁸ Uldam (2010) takes a similar view on Fairclough's ontological discourse analysis approach.

¹⁹ I do not presume that Fairclough advocates a progression from micro to macro, or the other way around.

To attempt relational explanation by means of a series of interdependent inferences might be credible if these inferences pertain to dominant and ideologically recognisable discourses. But as I mentioned earlier I was afraid that the idea of dominant discourses as pedagogical ways-of-knowing very different student designs was a somewhat pre-emptive framing.

My sense was that conditions of possibility that translate into relational mechanisms needed to prioritise relations over structures. Put differently, I favoured the abductive inference of structures through evidence of relations, rather than the abductive inference of relations from evidence of structures. The explanatory goal of the study is a one of accounting for a process; for how pedagogical ways-of-knowing might lead to the emergence of visual designed object meaning, rather than the meanings themselves.

Because of the scope of visual design meaning, it was necessary to maintain a very open approach to the idea of relation mechanisms that might account for different ways-of-knowing, for how they might affect communicative interactions in the design studio, and why certain and not other visual design meanings might emerge.

The pursuit of such openness as the CR philosophy espouses did, however, still need to deal with mechanisms as macro-micro and abstract-concrete relations that lead to visual design meaning emergence on any given occasion. Since, as I have earlier said, the research context itself is an important component of the explanation of what is going on in that context, theoretical abduction from the research context looked like a viable strategy.

In the next section I explain how theoretical abduction provided an opportunity to address the empirical research context of design studio pedagogy within the overall CR approach of the study.

3.4 Critical Realist Explanation: Research Opportunities

CR studies often use 'retroduction' or 'abduction' as the methodological thrust behind explanation (Sanghera, 2000; Wad, 2001; Danermark et al, 2002; Lawson, 2004;

Breese, 2008). In the case of retroduction, the strategy is to look for what is presupposed, or what pre-conditions may be invoked by research phenomena that define them as substantially different from other phenomena (Dick, 2005; Quinn, 2006). In the similar case of abduction, conditions of possibility are inferred using the lens of a theoretical or conceptual framework (Roberts, 2001; Wad, 2001; Kelle, 2005; Quinn, 2006; Breese, 2008).

To avoid confusion, 'retroduction' is often used as the general term for both retroductive and abductive strategies. The retroductive search for conditions of possibility has been criticised as a "linear movement of concrete *to* abstract and then *from* abstract back *to* concrete" (Roberts 2001, p. 557). Roberts allows, though, that if relevant theory can be applied in a methodologically compatible way, both tendentiousness and reductive inference might be avoided. This use of relevant theory is the mode of inference properly known as abduction. In CR-oriented research, this requires substantive conceptualisation of conditions of possibility or, synonymously, the mechanisms that make a situation what it is (Wad, 2001).

The abductive method finds the relational processes or mechanisms of emergence that account for an anomalous empirical situation. In this study these are relational mechanisms. The empirical situation is the situation of ambiguous and divergent ways-of-knowing of design studio pedagogy described by design education researchers in Chapter Two. From an abductive CR perspective, the reasons why the empirical situation might obtain do not 'come from' the empirical situation, but do come to bear on it. If certain deeper structures or prior events come to bear on events and experiences at certain times and in certain places; it is the researcher's task to explain what, when, where and how. In the depth ontology of CR, the layers of reality are nested, so if the anomalous research situation to be explained manifests at the level of actual events or experiences, that anomalous situation as the research context quite naturally forms part of the explanation of what goes on in it.

In this case, the research context is layered on CR ontological levels. On the level of real structures are differentiated pedagogical ways-of-knowing. These real structures either constrain or enable communication around visual design meaning in the

design studio, on the level of actual events. Because pedagogical ways-of-knowing are opaque to students and teachers in design studio communicative interactions, shared visual design meaning may or may not emerge at the empirical level. As a point of departure, relational mechanisms are considered to somehow involve differentiated design teacher ways-of-knowing as real structures that come to bear on design studio communication, bringing teachers' attribution of particular, non-arbitrary attribution of visual design meaning to students' designs. The whole of this initial relational mechanism construal conditions the emergence of shared or unshared visual design meaning between teachers and students, as shown in Figure 3.2 below.

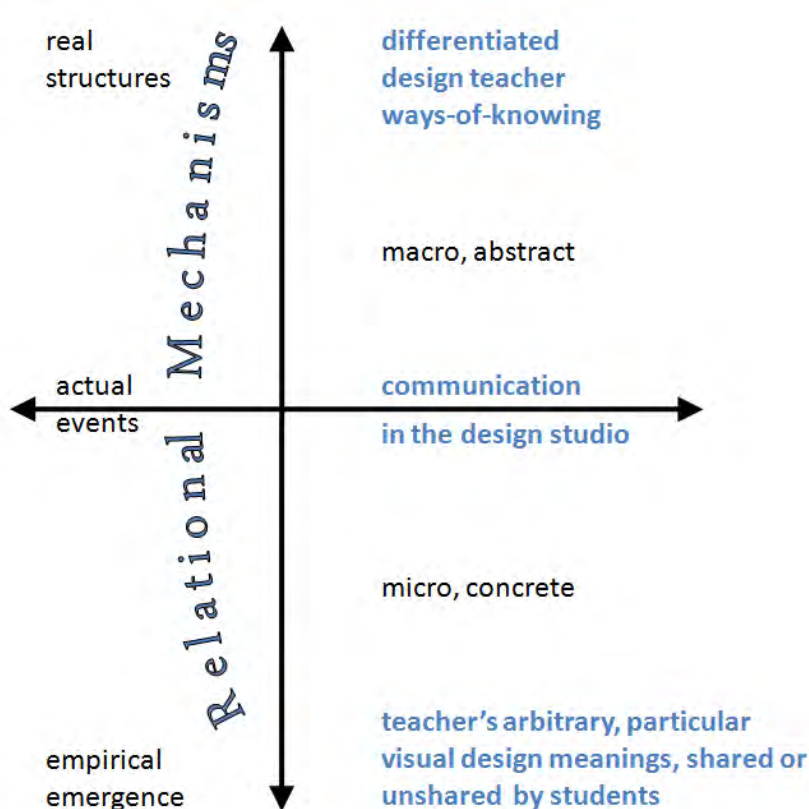


Figure 3.2 Initial Design Studio Construal of Relational Mechanism Emergence

The term 'abduction' was coined by Peirce (cited by Kelle, 2005, unpagged). I follow here Kelle's explanation of Peircean abduction: abductive inference starts with the research situation or context needing explanation. This situation is then conceptualised in terms of what might account for the anomalous circumstances of

the situation under research scrutiny. Abductive conceptualisation draws upon previously formed theories that must, however, fit the circumstances of the research context. The process of abductive inference does not invent new knowledge, but rather construes the situation under scrutiny in a new light. It is worth quoting Kelle (2005, unpagged) on abductive knowledge claims:

Many of the theoretical insights and developments in sociology which led to new and convincing explanations of social phenomena may be reconstructed as arising from abductive inferences. This especially relates to so called 'middle range theories', as for instance Durkheim's idea that differences between suicide rates result from differing levels of 'anomia', or Weber's explanation of the economic success of protestant merchants as a consequence of their religious orientations. The 'labelling approach' which attempted to understand 'mental illness' or deviance not as an inherent personal quality or attribute of individual actors but as a result of processes of social interaction may serve as another good example.

To sum up, abductive inference is a theoretically informed mode of inference that can be shown to be relevant to the research context of enquiry. The abductive route entails a re-describing of the research phenomenon in new terms of structural and relational possibility (Breese, 2008). Understandings about the object of study are developed by being placed in new 'contexts of ideas' (Breese, 2008). The discussion of substantive theory that follows in Chapter Four is thus more than a summarising of what Luhmann offers this study and includes the argument for Luhmannian theory as a relevant if partial account of pedagogical ways-of-knowing. Abductive inference must heed the provisional validity and the fallibility of explanation that are enshrined in CR philosophy. But equally, CR asks for explanatory power that can be put to work, rather than discovery or interpretive 'thick description'.²⁰

The goal of abductive inference in this study is to identify relational mechanisms that bring macro ways-of-knowing into the micro context of design pedagogy. The micro level is the level of visual design meaning emergence in pedagogical interactions in the design studio, and the macro level is the pedagogical ways-of-knowing that may apply and continue to apply across design pedagogical interactions, irrespective of time and place.

²⁰ 'Thick description' is Geertz' (1973) anthropological term for the interpretive validity of a descriptive research account.

I regarded pedagogical ways-of-knowing as macro structures or mechanisms that may lead to the emergence of particular student visual design object meanings in design studio pedagogical events. In the next chapter, I place pedagogical ways-of-knowing in the new context of ideas offered by Luhmann's theory of cognition in communication, as a theory of meaning emergence.

Chapter Four

Re-contextualising Design Studio Pedagogy

The re-contextualising move made in this chapter is the application of substantive theory to the research context of design studio pedagogy. Theoretical re-contextualisation of design studio pedagogy is the first step toward abductive inference through new but compatible ideas. The theory that is substantively applied is also one of emergence, as a first element of alignment with CR emergence ontology that drives abductive research explanation. This theoretical approach is Luhmann's (2000, 2002, 2006) emergence theory of cognition in communication, also known (in a less accessible way) as his theory of 'observation', as I go on to explain in Section 4.1

In Chapter Three I took an emergence view on how teachers think it possible to know the visual meaning of students' visual design objects. I regarded these pedagogical ways-of-knowing²¹ as ontological conditions of possibility for teachers and students to share a view on the visual meaning relevance of students' designs.

If there is accord between a student's and a teacher's view of visual design meaning, then the relevance of design meaning can emerge as shared meaning. If there is no accord between teachers and students about design meaning relevance, then visual design meaning does not emerge.

I have approached the possibility of visual design meaning emergence from the perspective of how teachers think design meaning may be known. In Chapter Two, I showed that design teachers undoubtedly affect the pedagogical sharing of visual design meaning, through their ways-of-knowing design meaning.

Certainly pedagogical ways-of-knowing do not exhaust the possibilities for student knowing, and student ways-of-knowing the meaning of designed objects also condition the emergence of shared design meaning. However, as I have argued in

²¹ Here I remind my reader that I have defined pedagogical ways-of-knowing as the ways teachers think the students might know.

Chapter Two there is evidence of teachers' strong influence on communication with students about visual design meaning, and therefore on the emergence of shared design meaning. In view of the multiplicity of assumptions that underpin teachers' expectations of student knowing (see for instance Fleming, 1998; Oxman, 2003; Baynes & Roberts, 2005; Logan, 2007; Austerlitz et al., 2008; Smith, Hedley, & Molloy, 2009) my research focus was limited to the pedagogical role in student learning about design meaning.

The emergence concerns here led to my positioning this study within the philosophy of Critical Realism (CR). To recapitulate, in CR a relational mechanism brings an abstract structure into relation with a concrete event or experience (Archer, 1995; Elder-Vass, 2007a; Bhaskar, 2008). I have then regarded pedagogical ways-of-knowing as historically and socially structured, and brought into relation with design meaning in studio events. I have regarded pedagogical ways-of-knowing as relational mechanisms that condition the emergence of shared visual design meaning in the design studio. 'Condition' here means to enable, or to constrain shared design meaning.

This emergence positioning of the study led to my adoption of an abductive strategy of inference, which uses a theoretical conjecture. Abductive inference works within the CR project of explaining emergence conditions of possibility by theoretically conjecturing these conditions (Wad, 2001; Kelle, 2005; Breese, 2008).

CR can suggest only that relational mechanisms might operate in design pedagogy. It needs a more substantive theory of pedagogical ways-of-knowing as mechanisms to abductively infer their nature, and so provide an explanatory re-description of these mechanisms. In the abductive method, such a theory is used to re-contextualise the research situation, with the proviso that substantive and empirical relevance of the theory to the research situation can be demonstrated (Roberts, 2001; Dey, 2004; Kelle, 2005).

The emergence positioning in Chapter Three regarded particular empirical factors in design pedagogy as contextualising the research phenomenon of visual design

meaning emergence. These contextualising factors were established in the core research questions of the study, to which I now give contextual emphasis:

- In what different ways do teachers think the visual meaning of students' designs can be known? In other words, what are the *different pedagogical ways-of-knowing* that operate *in the design studio*?
- How does verbal communication affect pedagogical ways-of-knowing visual design object meaning?
- Why might particular, non-arbitrary visual design object meanings be articulated by design teachers?

It is in respect of these contextual factors that Luhmann's theorisation²² is, I will argue, substantively relevant to this study. Luhmann sees knowing and meaning as embodied in communication processes (Luhmann, 1995, 2002, 2006). Communication about visual design meaning can only proceed on the basis of different ways-of-knowing. This was the starting perspective of Luhmann's theorisation.

4.1 Luhmann's Theorisation and Design Pedagogy

I begin with an overview of Luhmann's theorisation, and then move to my Luhmannian re-contextualisation of design pedagogy in the design studio.

Luhmann's work is usually known as systems theory, but in his later work he developed the focus on systems theory in terms of the observation of distinctions that are organised within systems. This has culminated in what is regarded as Luhmann's (1997) master work, *Die Gesellschaft der Gesellschaft*. The first of two

²² Kadirov and Varey (2008, p. 2) say that Luhmann is held in the same regard as Kant, Weber, Heidegger, Gadamer, Foucault, Parsons, and Habermas. Baecker (2008), Mingers, (2002) Elder-Vass (2007), Farias and Ossandón (2009), and Lee and Brosciewski (2009) are among others who also regard Luhmann as a sociologist of great eminence. These authors attribute the lack of wider recognition of Luhmann to delay in English translation of his work, which has mostly been written in German.

volumes of this work has been translated into English under the title 'The Theory of Society: Cultural Memory in the Present', (Vol I, 2012).

Luhmann (2002) terms persons who use ways-of-knowing 'observers'. This is not observation in the ocular sense; it is observation as cognition. For Luhmann, cognition requires an indication or a 'pointing to' that at the same time leaves other things aside. This is the same as to say, if I point to something, I can only do so by leaving aside everything I do not point to. Only on the condition that there is this separation can anything be pointed to or indicated. So what is not indicated is necessary to what is indicated, and vice versa; an indication also entails a distinction (Schiltz, 2007, citing Spencer Brown).

The term 'observation' for Luhmann refers not to the object that is indicated, but to the cognitive act of indicating, that always requires that other things be left aside. Indication by distinction is then very much about how something is observed, rather than what is observed. An observation is an act; it is 'doing' cognition, rather than what is cognised. In this sense, observation is an act of cognition and an event of cognition. The act of cognition becomes an event when it occurs within the communicative recursion of linked distinctions.

Above all, indication by distinction happens in concrete communication events (Luhmann, 1995, 2000, 2002). Though the distinction is usually implicit, it enables a concrete indication. An act of observation in a communication event is not limited to writing, speaking, or visual images or objects but extends to the communicative realms of body language, dance, and team sports tactics (Knudsen, 2010). Knudsen (2010, unpagged) also explains indication by distinction:

It is not possible to indicate something without distinguishing. Observation is not bound to visual perceptions; the concept of observation covers any praxis of distinguishing indications, including actions. If you make an indication you also draw a distinction. Communication is for instance also distinguishing indications.

My summation so far relates to cognitive indication by distinction in micro communication events. But on a macro level, over many communication events taking place over time, distinctions begin to categorise particular indications

(Luhmann, 1995; 2002). This means that a range of distinctions might accrue to knowing and communicating about gardening, or astrology, or contract law, for instance. Luhmann theorises such particular categorising, or observing by distinction, as social system processes of knowing and communication. It is ultimately the recursion of implicit distinctions made in concrete communication events that builds these abstract systems (Luhmann, 1995, 2000, 2002). Luhmann's social systems are categories of cognitive observation (Grant, 2004, p. 219) that continually build through communication over time.

Luhmann's theory then holds that observers' micro ways of indicating by distinction draw from macro systems of knowing and communication. These macro social systems are communicative networks that allow some and not other cognitive distinctions to be made in any communication event. They are first abstract *systems* that allow knowing on the fly in communication events, and are systems only in as far as they allow variational distinctions of meaning to be connected in communication events (Luhmann, 1995, 2000, 2002). So communicators are constantly drawing from these abstract macro systems to make micro indications by distinction, and they often do so without conscious awareness of the macro system conditioning the communication.

These macro systems are historically formed abstract structures that co-ordinate the selection of cognitive distinctions in concrete communication events (Luhmann, 1995). In this regard, macro system structures correspond with the CR idea of real, abstract social structures that are activated by agents in concrete events (Mingers, 2002; Elder-Vass, 2007; Montiel, 2007; Brier, 2009; Fuchs & Hofkirchner, 2009; Wan, 2010). In both Luhmann's (1995) systems theory and Bhaskar's (2008) CR theory, systems of knowing and communication and real structures are in one way or another *reproduced* in concrete events. In Luhmann's later theory, this reproduction of systems is called 'observation', and the systems are 'observed' systems. There is thus from the start, the intimation of relational processes or mechanisms in both CR structures and Luhmann's social systems of knowing and communication.

Returning to the above-mentioned cognitive distinctions that indicate, it is meaning that is indicated by a variational distinction, though a meaning, and the indication of

this meaning by distinction, are all tied together. None of these elements can stand alone. Luhmann does not support the idea of unitary meanings as encapsulated in any one term (Gibson, Gregory & Robinson, 2005, p. 8). Meaning in the Luhmannian scheme is about sense-making²³ through related distinctions of meaning in communication. Social systems of knowing and communication organise sense-making, as Martens (2006, p. 86) describes:

Social systems consist of recursively related communications [and] communications process meanings. Meaning processing involves the use or incorporation of what he calls distinctions. The best way to understand communications and distinctions in Luhmann's theory is, therefore, probably to consider them against the background of the notions of meaning and meaning processing. The word meaning is used in a specific way in Luhmann's language. It refers to a general form of thinking and communication. The form of meaning is characteristic of each thought and every communication, as it has something as its focus and refers marginally to a horizon for further thought and communication.

If, for instance, a communication and knowing system were structured around 'medical science', the observers who indicate medical science might be medical doctors and nurses who make implicit distinctions that allow medical science to mean medical science, rather than folk remedies or other health care options. The system perhaps called medical science would not then be a repository of everything there is to know about medical science, but rather a developing network of various communicative (or associative) distinctions of medical science meanings, that are always founded upon the distinction of medical science from whatever, at the time, is not considered to be part of medical science (but may come to be). Medical science has a long history of scientific experiments as distinctive evidence that 'indicates' medical science. The network of communicative distinctions of medical science knowledge, like all such knowing and communication systems, can shift and change over time. At one time, it would have been unthinkable to include nutrition in medical treatment, but this is now standard. By the same token, it is now unthinkable to bore into the skull of an epilepsy sufferer, in the procedure known as 'trepanning'.

²³ Farias and Ossandón (2009) report that the English translation of Luhmann's 'Social Systems' (1995) incorrectly associates Luhmann's theory with meaning. Luhmann theorises sense and sense-making, rather than meaning.

While there are macro knowledge structures that have developed over time, knowing is immediate and specific. Luhmann's (1995, 2002) theory describes how micro, immediate knowing might be drawn from a macro knowing and communication system in a communication event. These macro systems are functionally differentiated (Luhmann, 1995, p. 53) because they organise and structure particular kinds of communicative sense-making or knowing. As such, communication and knowing systems are what Luhmann (1995) has called 'social systems'.

Diewald and Albert (2007, p. 4) describe Luhmann's socially differentiated communication and knowing systems well:

Luhmann's entire theory is about the operation of social systems – nothing less, but also nothing more: it is about the question of how social systems manage that communication can continue, that it is constantly rejected and accepted, and that it leads to new communication; it is about symbolically generalized media of communication, such as power, money, or truth.

Communication and knowing systems are thus social knowing systems, because they co-ordinate social meaning distinction selections that might otherwise be described as 'ways-of-knowing'. Such social systems classify knowledge selectively by allowing certain and not other distinctions to be connected in communication (Bechman & Stehr 2002, pp. 71–72). Rasmussen (2005) echoes this point when he says "Learning consists therefore of being able to make a distinction through which it is possible to describe one thing and not another".

What this also means is that differentiated knowing and communication systems cannot but overlap²⁴ each other; there are no hermetically sealed systems. There are also, unsurprisingly, subsystems of knowing and communication organisation within larger ones (Luhmann, 1995, 2000, 2002). For instance, historically, design has been regarded as a subsystem of the system 'art', and commerce may currently be considered a subsystem of the system 'economics'.

²⁴ I have used the word 'overlap' in a simplistic way here, to avoid complicating the point I want to make. In Luhmann's (1995) social systems theory, system overlap is the structural coupling, or the interpenetration of systems. This is, however, only as a result of the autonomous development of the systems concerned, that have structured some of the same meanings, and therefore both systems can be called upon in certain instances (Luhmann, 1995). For instance, power structures may be common to both politics and government as separate systems of communication.

Luhmann's theory is taxing, because it is chiefly about connections and relations. The reader of Luhmann is not afforded principles or theoretical points of reference. But it was for this very reason that Luhmann enabled my thinking about relational mechanisms in design pedagogy. It is, too, the way Luhmann links communication with cognition that offers insight into communication about the knowing of visual meaning in the design studio. This is chiefly because Luhmann regards cognition or knowing (rather than knowledge) as *ways-of-knowing* that are reproduced *in communication*.

4.2 Luhmann's Theory of knowing in Communication

As I have described in Chapter Two, articulating visual design meaning in the design studio is necessary but fraught with difficulty. The possibilities for articulation are extremely wide, yet specialised to *visual object meaning*.

The empirical or observable surface of visual design meaning emergence is communication about students' designed objects. Non-verbally communicated meaning relies on prior knowledge; we can understand visual cues and visual objects only because of what we have already come to know about them, through life experience or more formal learning. Because of the emphasis on visual meaning, knowledge that pre-exists a pedagogical event in the design studio must be summoned in communication between teachers and students.

Luhmann addresses the difficulties entailed in this empirical surface of meaning communication. Luhmann's theory concerns how pre-formed knowledge might be brought to communication between two or more people whose thought processes cannot otherwise be shared (Luhmann, 1995, 2002).

Luhmann's theory of communication is quite different to the sender-receiver transmission model developed by Shannon and Weaver in 1949 (Brier, 2004). In essence the difference lies in the idea that what is said by one person to another is not unproblematically transmitted as an intact message that just needs to be 'sent' from a sender to a receiver. The receiver, to decode the intended message, will have

to draw upon an abstract 'horizon'²⁵ of distinction possibilities that lies outside of the immediate communication event (Luhmann, 1995, 2002). Here lies the cognitive element: this external reference is, in the Luhmannian view, essential to understanding in any communication event.

According to Luhmann's theory (1995, pp. 139–147; 2002, pp. 157–160), in a communication between two or more people, one person will venture a meaning intention, merely as a communicative gesture such as 'welcoming' or 'appealing' or 'inquiring'; this is called an 'utterance'. The other person(s) will then need to select a distinction from a horizon of possible distinctions that best fits the first person's utterance. This range of possible distinctions is called 'information'. The selection of an information distinction is a cognitive process, it is implicit, and it is made in order to be able to respond to the first person's meaning intention. The other person's distinction requires discriminating among other possible information distinctions, so it is a *selected* associative distinction. The selection is a distinction in the sense that it distinguishes among variations on the 'horizon' of available information distinctions (Luhmann, 1995, p. 140). The horizon of distinction possibilities is to some extent contextualised by the situation in which communication takes place, but the particular selection of a distinction may bring misunderstanding. Communication may easily fail at this point.

Seidl and Becker (2006, p. 18) explain an associative distinction as a selection using the example of wearing a red tie. The red tie is an object 'utterance' like a designed object is an utterance, before it is imbued with meaning; it is just a signal that some or other meaning is intended. But if the wearing of a red tie is associated with a socialist conviction, this means that the distinction 'socialist' is selected from the many other distinctions that could possibly be associated with the wearing of a red tie (perhaps flamboyance, possibly bad taste, unorthodoxy, or assertiveness, for instance). Noteworthy here is that it is the relation between the red tie and the selected distinction that allows sense-making. The person doing the sense-making in response to the red tie utterance is the 'other person' mentioned above, or in Luhmann's terms the 'observer'; who uses the selected distinction 'socialist' to

²⁵ Luhmann developed the idea of a horizon of possible meaning distinctions from Husserl's phenomenological view of meaning-making (Rasmussen, 2005).

indicate the red tie. But there is something more subtle here; as Stichweh (2000, p. 10) describes. Rather than simply a selection or distinction of meaning which is then imposed upon the utterance, it is the differential relation between an indicating utterance and a meaning distinction that allows sense-making or understanding.

Luhmann's (2002, p. 160) theorisation of the link between understanding or knowing or cognition and communication is as profound as it is uncompromising:

It is a matter of different selections, whose selectivity and field of selection can be constituted only through communication. There is no information outside of communication; there is no utterance outside of communication; there is no understanding of outside of communication.

Observation²⁶ or indication by distinction is then tripartite (Figure 4.2, below). Observation as understanding consists of:

- something that is indicated, (or an utterance),
- an implicit distinction of what is indicated, selected from
- distinction-selection possibilities (from information).

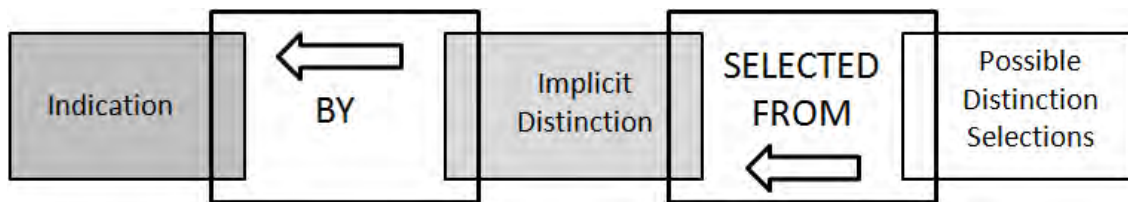


Figure 4.1 Tripartite indication by a selected implicit distinction

In this tripartite observation *both* the second part, the implicit distinction, and the third part, distinction selections, enable the indication, the first part. An implicit distinction needs to be selected from selection possibilities before it can indicate something. This process is asymmetrical in that both possible distinction selections and an implicit distinction selected from these possible distinctions refer to the indication.

²⁶ Luhmann used Spencer Brown's Laws of Form to in conjunction with phenomenological ideas to formulate his observation theory.

But in the Luhmannian view, the process of indication by distinction is not a linear process. It is rather the simultaneous presentation of an implicit distinction and a set of possible distinctions that enable an indication. Therefore, I revise the linear diagram shown in Figure 4.1 in a triangular form, to show this simultaneity of implicit distinction and distinction selections.

The revision in Figure 4. 2²⁷ shows the indication of an utterance or communication move as dependent on *both* an implicit distinction and a set of possible distinctions.

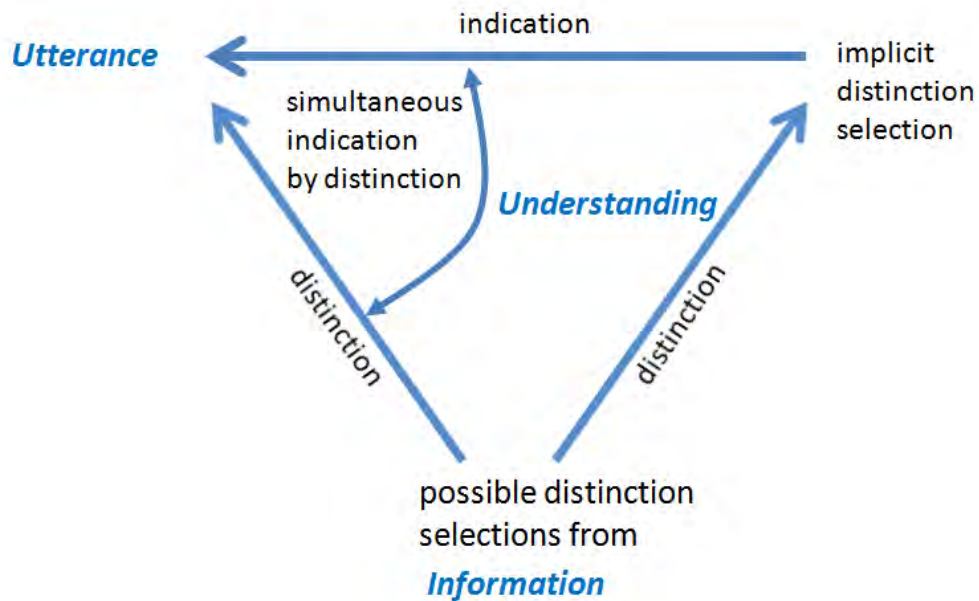


Figure 4.2 Simultaneous indication of an utterance by a selected implicit distinction.

The proposition of simultaneous indication of an utterance by an implicit distinction and a selection from information distinction needs to be put into a design pedagogical context. In Figure 4.3 overleaf I use Haldane Martin’s famous ‘Zulu Mama Chair’© as a stand-in for a student design, as ‘utterance’. Martin’s chair uses a Zulu basket-weaving technique in place of the wire used to construct the original ‘Diamond Chair’ by Harry Bertoia in the early 1950s (Bertoia Chair, n.d.). In the diagram the teacher implicit distinction selection plus the range of possible distinction selections make for the indication.

²⁷ I developed the Figure 4.2 diagram from Kockelman’s (2007, p. 377) diagram of Peircean semiosis where there is a tripartite relation between an interpretant, an object and a sign. Brier (2009) has mapped Luhmannian theory onto Peirces’s semiosis, but not in the way that I do in Figure 4.2 and following figures based on this diagram

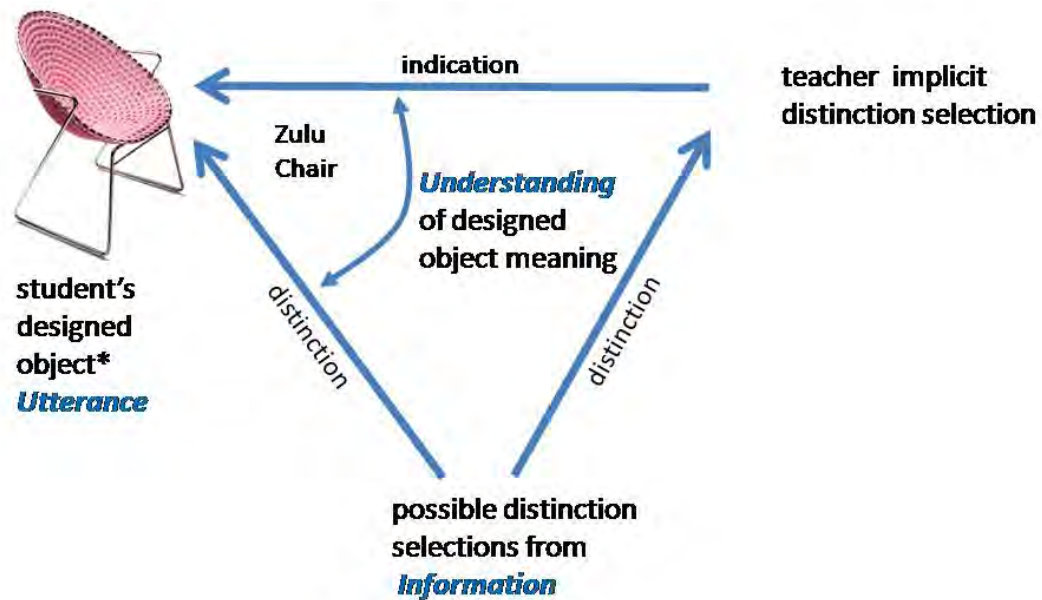


Figure 4.3 Understanding of a designed object as 'utterance' by means of an implicit information distinction 'Zulu'

Haldane Martin's™ Zulu Mama Chair© is used as the student's designed object by kind permission of Haldane Martin.

Were this chair to be a student design and not a marketed product, the teacher's distinction selection 'Zulu' might initially be implicit in the understanding of the design. This implicit distinction relates the chair to a system or perhaps a sub-system of knowing and communication, like Zulu culture or Zulu basket weaving. What cannot be ignored though, is that the 'Zulu' distinction leaves aside other possible distinctions, like those of retro 1950s furniture, or 1950s chairs.

The differential relation of an indication to an implicit distinction is the core idea here. Luhmann emphasises that the differential relation can only come from the selection of an associative distinction from other possible variations of associative distinctions, and that those associative distinctions that are left aside do hold significance. The distinctions left aside when something is selected also enable that selection.

4.2.1 A Design Meaning Example

As I have mentioned before, the open-ended nature of design briefs adds to the communication difficulties between teachers and students. Design briefs to which

students respond only loosely orientate communication about the visual meaning relevance of their designs. So in the design studio stage where students and teachers consult about design meaning potential, certain meanings might be mooted. Schön's (1985; 1987) frame experimentation describes this experimental 'trying out' or framing of meaning alternatives between the student and the teacher. This frame-experimentation corresponds to applying selected 'information' distinctions to the designed object as 'utterance'.

Here Luhmann's indication by distinction is important. Though design teachers may be explicit in their indication of design meaning, they may use implicit framing distinctions.

This relates to Seidl and Becker's (2006, p. 19) note that though meaning may be understood in a communication, this does not mean that it is accepted. The cognitive implicit distinction used to indicate an object or utterance brings an understanding that may also be rejected. The point here is not whether the student accepts the indication and the distinction on which it relies, but rather, whether the student understands it.

To show how Luhmann's implicit distinction selections may or may not be understood and accepted in the design studio, I mount an imaginary example of a student design. In this example, the brief given to students is to design an engaging money box for a child.

The student thinks about designing the child's money box in the old fashioned children's toy tradition of people looking like animals or animals looking like people. Figure 4.3 overleaf shows such a vintage child's money box (the researcher's own), where a pig is represented as a human game keeper.



Figure 4.4 A vintage child's money box that depicts a pig as human game keeper

In this imaginary design studio scenario, the teacher has responded positively to the student's design development idea of animals as humans or humans as animals, and advises the student to try out various options. The student, doing some internet research, finds the pair of images below (Figure 4.4) on the website TotallyLooksLike.com.



Figure 4.5 Winston Churchill's resemblance to a bulldog

Source: TotallyLooksLike.com (n.d.)

So the student sketches a money box that amalgamates Churchill with a bulldog. The next time the teacher comes to the student's workstation, he or she says, "Winston Churchill? Do you think that's appropriate?" The student says, "I thought this would be amusing for a child and you can see the common features between the man and the dog."

The implicit distinctions used by the teacher and the student here are at odds. The teacher is drawing on a 'British imperialism' distinction while the student is drawing on a 'man as dog' distinction.

The further significance of these implicit distinctions lies in the question of a horizon of distinction possibilities that might be available to both students and teachers in respect of any student's design. I raised this question of a horizon or a repertoire of meaning possibilities in Chapter Two, where Smith (2007) showed that Schön's (1987) reciprocal framing of design meaning between teacher and student rests on the idea of a repertoire of meaning resources. Also in Chapter Two, I referred to design pedagogical commentary on the design studio as the site of a community of practice (Lave & Wenger, 1991), where students are held to become immersed in a professional practice knowledge repertoire. Luhmann, by contrast, construes 'repertoire' as those distinctions that are selected from a shifting horizon of distinction possibilities in successive communication events (Luhmann, 1995, 2002).

There are at least three ways in which the Luhmannian idea of distinction selections affects communication in the design studio.

First, design teachers often expect students to explain the visual meaning of their designed objects. But how the students explain meaning may not tally with the ways in which teachers might think it ought to be articulated. Though tacit knowing might possibly be shared, if ways of communicating about this knowing between teachers and students are at odds, visual sense-making around the students' designed objects will be jeopardised.

Second, it is unlikely that design teachers always remember the framing revisions and reconceptualisations of meaning mooted with students during the development stages of these designs. Indeed, it has been a student complaint that design teachers do not remember meaning relevance discussions (Blair, Blythman & Orr, 2007). But it is not reasonable to expect teachers to remember such discussions. Student numbers, and the unstructured and ambiguous nature of design knowing, and the diversity of visual meaning relevance trajectories preclude this.

Third, teachers and students must make visual meaning together, but do not have much in common. One must remember that communication interactions in design pedagogy are unlikely to be between people who are members of the same 'community of communicative interaction' (Sayer, 1992). Teachers and students are usually from different age groups, so professional and life experience is unlikely to contribute to shared knowledge. The pedagogical context may also put limitations on communicative sharing of visual meaning, if it is assumed, as it is often is, that teachers know better about the visual meaning relevance of student designs than the students do (Oak, 2000; Blair, Blythman & Orr, 2007; Ng, 2011).

Luhmann has expressed the view that communication, calling as it does upon implicit distinction selections from different distinction horizons, is an improbable proposition (Luhmann, 1990, p. 87). Put in a Luhmannian light, sharing the relevance of design meaning of students' designed objects that have never been seen outside of the confines of the design studio is like pulling rabbits out of hats. Therefore, teachers' implicit cognitive distinctions that frame meaning are all the more important to student learning about making design meaning. Gedenryd (1998, p. 199) says that the process of designing is a 'representation hungry' process which he defines as:

Reasoning about absent, non-existent, or counterfactual states of affairs [where there is a need to be] selectively sensitive to parameters whose ambient physical manifestations are complex and unruly (for example, open-endedly disjunctive).

Gedenryd's mention here of the need for "selective sensitivity" within disjunctive and open-ended parameters is very significant. As Fleming (1998, p. 46) has shown,²⁸ 'language-laden talk refers a designed object to some object or objects 'out there', or available on a horizon of distinction possibilities. The selection of distinctions in design pedagogical communication events does come from 'out there' and does involve language that refers to objects 'out there', on a horizon of possible distinction selections. Unlike a repertoire of meanings, however, such a horizon is made up of systems, subsystems and overlapping systems of knowing and communication, all of which lead recursively onward.

²⁸ I referred to Fleming's object-laden language' in Chapter Two (Section 2.4).

4.2.2 Potential Design Meaning and the Recursivity of Communication

For communication to have taken place, understanding must pave the way for continuing communication (Luhmann, 1995, 2002). There is significance in this continuation of meaning, since design teachers mostly expect that designed object meanings should be found relevant beyond the confines of the design studio, in social life contexts, at some future time. Dilnot (2006, p. 5) has in this regard, defined the whole enterprise of designing as one of potentiality.

Gedenryd (1998, p. 156) believes that designers must create in their designs a future that does not yet exist. This future oriented thrust needs understanding of how an existing design might be changed in a way that might be found visually relevant in the future, in social life.

Together with this future trajectory, visual design object meaning calls upon past design meanings, which are the design precedents or points of reference for future design meanings (Michl, 2002). When design meaning is discussed in the design studio, teachers may expect but not ask for this meaning span to be explained. This was noted in Chapter Two, where Dannels et al. (2008) put such teacher implicit expectations into stark perspective.²⁹ To put the design meaning span of past to future meaning in a Luhmannian context, communications always contain both backwards and forwards references. As Stichweh (2000, p. 10) says:

One reads [it] forwards when one looks at a sequence of communications, as communication as an ongoing process in time. On the other hand, one must read it backwards, too, as a communication only begins with the second participant who *understands* in the act of understanding projects the difference between *information* [an implicit design meaning distinction selection] and *utterance* [the student's designed object] on the first participant. In this respect any communicative event is retrospective, it depends on the projection of difference on past events.

Translated into the simpler language of indication, implicit distinction and distinction selections, the retro- and prospective nature of communication events is represented in Figure 4.6 overleaf.

²⁹ I reported on Dannels et. al.'s teacher expectations in Section 2.4 of Chapter Two.

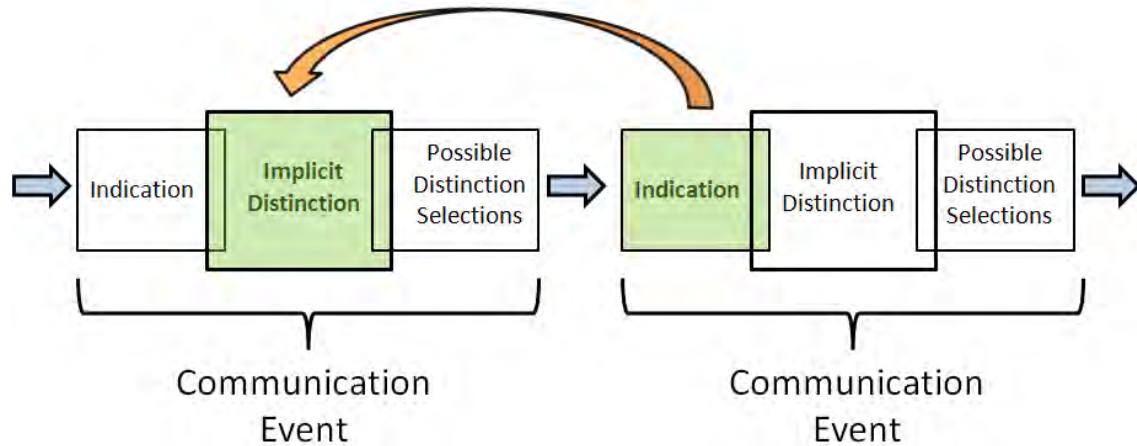


Figure 4.6 Retrospective indication by implicit distinction leading prospectively to further communication events

In Luhmann's communication theory, following distinction selections follow then extend the meaning of preceding distinction selections (Luhmann, 1995, p. 147; Seidl & Becker, 2006, p. 20).

The retro- and prospective nature of communication means that a communication unit is formed if the unit recursively provides for further communication (Seidl & Becker, 2006). The understanding is that "A communication never comes as a single event/thing; rather it is situated in the background of preceding and subsequent communications" (Kadirov & Varey, 2008, p. 8). The reason for this is that a communication selection or distinction "attracts further communication: it recruits communications that direct themselves to aspects that selectivity has excluded" (Luhmann, 1995, p. 140).

Luhmann's communication theory then opens up the dubious question of repertoires of meaning in design pedagogy. Essentially, Luhmann shows how any design meaning can only be indicated by a distinction, and how that meaning distinction relies on connection to other retrospective and prospective distinctions.

In view of the recursivity potential of a communication event, it is also important that communication is not constituted by language alone. Instead, for Luhmann, communication depends on networks of meaning (or more precisely, sense-making

networks), that may or may not be accessed by the use of language in a communication event. Davis (2011, p. 172), cites Luhmann, 1986 who explains:

The synthesis of [communication] cannot be pre-programmed by language. It has to be recreated from situation to situation by referring to previous communications and to possibilities of future communications which are to be restricted by the actual event.

In this light, the recursivity of design meaning depends more on *knowing and communication systems* than on language constructions or cultural constructions. Implicit associative distinctions draw on different cognitive and communicative systems, and understanding in communication may be precluded for this reason alone. Differences in the selection of distinctions then supersede differences in the use of language. Similarly, if there are cultural differences in the selection of distinctions, this merely means that a different horizon of possible distinction selections is entertained. Both language and culture then come down to the cognitive selection of distinctions, and it is the potential for distinction recursivity that makes or breaks communication.

Taking a communication event to be *one* discussion about *one* student's design, there is a restriction of future possibilities for design meaning to that particular event. But in the development stages of one student design, there are successive communication events that explore alternative future meanings.

While for each communication event, the implicit distinctions selected by the teacher are surely seated within recursions of preceding and subsequent understandings, for different 'design futures'³⁰ there will naturally be implicit distinctions that are entrained within different recursions. In this scenario, both students and teachers have to communicate across *different* recursive distinction systems, representing alternative futures for the designed object.

I have given here a Luhmannian micro-level account of design meaning emergence in a communication event. As Luhmann sees it, tacit or implicit distinctions enable or

³⁰ Evans and Sommerville (2007) have written about design futures as a field of study where designed products are considered in similar terms to business futures markets.

constrain explicit communication. The question of shared relevant meaning emergence is then in the Luhmannian observation view, one of communication and cognitive distinctions.

4.3 Knowing and Communication Systems in Design Pedagogy

When the distinctions I have described are recursively connected in communication events over time, they are, in exactly this way, organised as systems of cognition and communication (Luhmann, 1995, 2000, 2002). Broquet (2009, p. 2) usefully puts it that in communication events, cognitive distinctions “get loose” from the participants and become structured within systems of communicable knowing. This is the understanding of communication systems as cognitively functioning systems that Luhmann (1995, 2000, 2002, 2006) has theorised. As I mentioned in Section 4.2, communication organises *the selection* of cognitive distinctions, with the result that there cannot be information or understanding without that communication limits the field of selectivity within which such a selection is possible (Luhmann, 2002, p. 160.) Simply stated, this means that what we know, we know through communication, and *the way in which we know it* is by communicative selections that allow communication about a specific issue to carry on. It is Luhmann’s view that communication *allows there to be specific issues* in the first place.

Implicit distinction-selections that are made by persons and groups in concrete communication events are recursively connected in an abstract social knowing and communication system, as shown in Figure 4.6 overleaf.

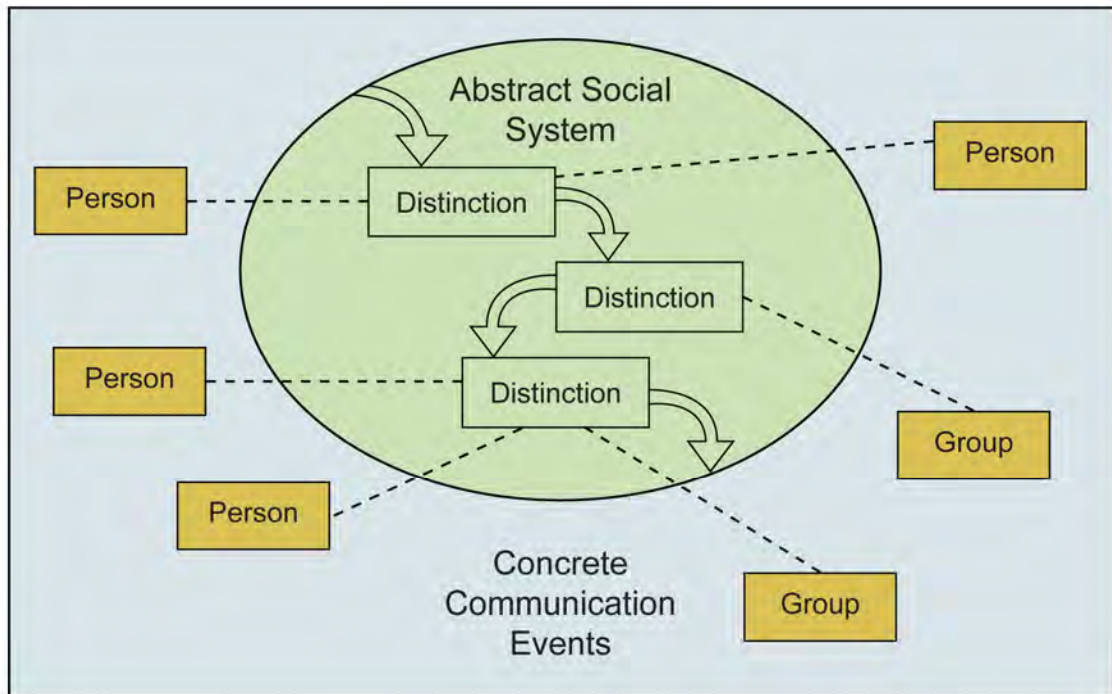


Figure 4.7 Concrete person and group communication events and an abstract social knowing and communication system

Source: Adapted from Naruse and Iba (2003, p. 5)

It might seem that abstract systems of knowing and communication are a most prescriptive idea to bring to the meaning of students' designs. But if one accepts that meaning is a matter of associations, there is immediately a need to limit, select, or choose what can and cannot be associated. In speaking or writing, meaning can progress in the speaking event or the reading event; but when we are faced with a visual object, pre-formed associations limit sense-making. To understand a vase, a car or a garment requires particular prior associations, so understanding visual objects is not a matter of plucking meaning out of the ether.

On the count of pre-empting or prescribing sense-making then, it is more the case that Luhmann's systems *make it possible* for associated knowledge to be accessed and shared in a communication medium (Brier, 2006).

If design teachers' ways-of-knowing are seated in differentiated knowing and communication systems and subsystems, so are the implicit associative distinctions

they make in the design studio. The connection of design teachers' implicit associative distinctions to knowing and communication systems may then be construed as 'pedagogical ways-of-knowing'.

4.3.1 Pedagogical Ways-of-Knowing and Knowing and Communication Systems

Earlier I presented Luhmann's view that any cognitive act in communication involves what he calls an observation (see also Luhmann, 2002; Seidl 2007; Baecker, 2008a; Aguado, 2009; Farias & Ossandón, 2009; Lee & Brosciewski, 2009; Knudsen, 2010). Much like the previously explained implicit meaning distinction-selections that are projected onto an object or 'utterance', observation is indication by distinction, and the object/utterance is replaced by the term 'indication'. In Luhmann's observation theory it is *a system* of communicatively organised cognitive distinctions that is indicated by an implicit distinction.

Such a system, as I have described in the previous section, comprises of recursive distinctions. The distinction used to indicate an utterance is already part of a previous communication, and the previous communication is linked to another previous communication. When specific kinds of system-organised implicit distinctions are drawn upon, then the observer of such a system³¹ indicates that system by reproducing cognitive system distinctions in communication events.

If these linkages become specialised to communication and knowing systems and subsystems, and if, as Luhmann has it, communication organises all communicable knowing, then design teachers may well draw upon distinctions that indicate knowing and communication systems, overlapping systems or subsystems. According to Luhmann (2000, 2002, 2006) then, design teachers may be observers who reproduce *system* cognitive distinctions in design studio communication; and these

³¹ Because a human system observer uses system distinctions, Luhmann (2002, 2006) regards the abstract system as the observer, and keeps human observers in the concrete environment of an abstract system. Luhmann has for this reason been criticised for reifying systems (Grant, 2004). Yet Luhmann emphasises that systems cannot speak or hear, and need human communicators (Seidl & Bekker, 2006). This may be a question of perspective; Luhmann seems more interested in the emergence of abstract systems and less so in the concrete events that allow them to emerge.

reproduced system cognitive distinctions might constitute design teacher or pedagogical ways-of-knowing.

Just as persons involved in communication events select a distinction from distinction possibilities in order to indicate a meaning, so system observers in their communication also leave aside the unselected distinction possibilities of a system of knowing and communication. Observation by distinction is a system-level observation that indicates (or reproduces) the system (Luhmann, 1995, 2000, 2002, 2006).

A teacher system-observer's way-of-knowing would then in the same way also indicate a particular system of knowing and communication, by implicit distinction from distinction possibilities. This rather opaque idea is best explained by Bechman and Stehr (2002, p. 69):

That an observer may label this as this (and not as that) is due to a distinction in which both moments, separated from each other, can only be understood in relation to each other; the distinctive units only possessing their own identity in the difference to the other. To be able to characterise something as something, one has to have already distinguished it from its distinctive other: what deserves to be called true, for example, is measured by the difference from appearance; and to speak of the past makes sense only with reference to a present that can be distinguished (constitutively) from it. Even if it is not explicitly raised as an issue, this other side of something termed as this or that is always present in every determination of speech or gesture we make. It is a permanent horizon.

My further supposition here is that in a design studio event, a teacher-observer implicitly draws upon a system of knowing and communication selected from amongst other systems, and a distinction selected from that system. This is illustrated in Figure 4.8 overleaf.

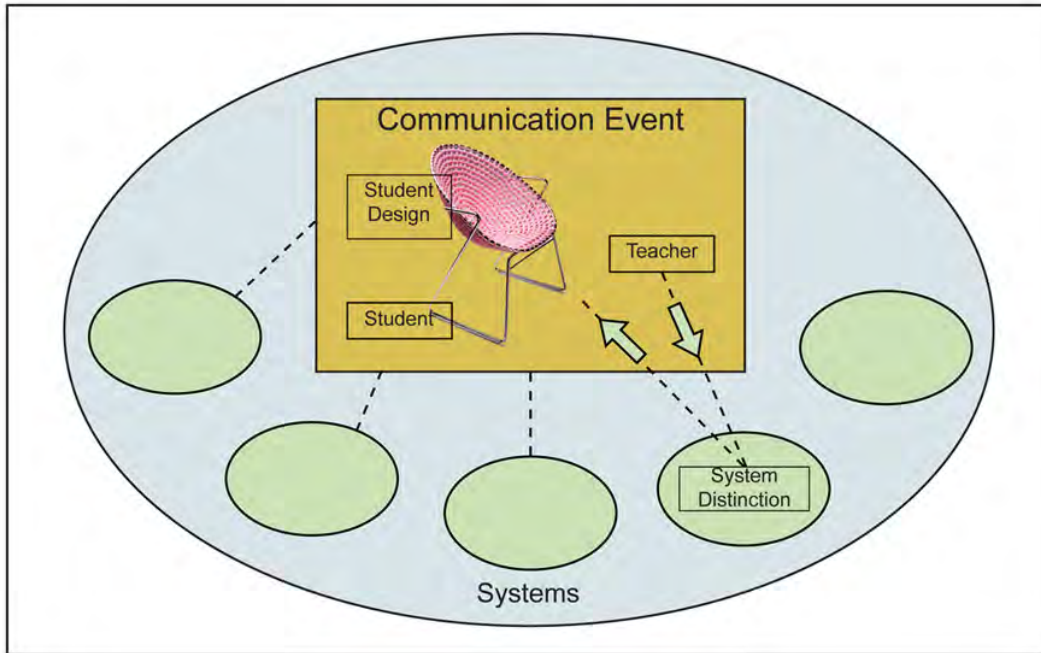


Figure 4.8 Teacher-observer of a cognitive system distinction that indicates design object meaning

A teacher-observer would then use an implicit distinction to reproduce distinctions organised within a cognitive system of communication. This is shown in Figure 4.8 below.

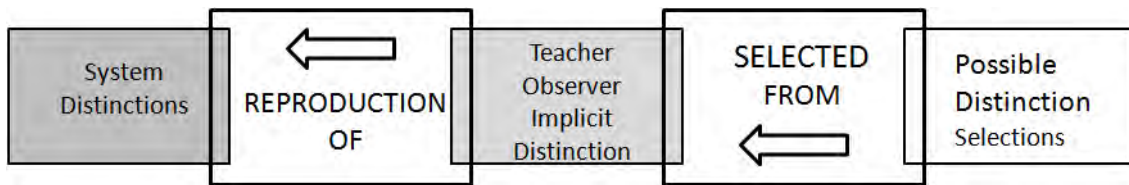


Figure 4.9 A teacher-observer’s implicit reproduction of a cognitive system distinction in a communication event.

There is, however, more to be considered about why a design teacher might have cognitive allegiance to any particular system knowing and communication over another. This leads to system structures as structures of expectation.

4.3.2 Pedagogical Observation and Expectations

Communication and knowing systems structure expectations (Luhmann, 1995; Mingers, 2002; Vos, 2002; Gonzalez-Diaz 2004; Hartzog, 2006). As Tang (2008, p. 13) points out, Luhmann regards expectation as social expectations of the form meaning might take, rather than the personal expectations of an individual. This sits well with pedagogical ways-of-knowing as expectations.

Observer expectations arise when an observer is 'structurally coupled' to a system of knowing and communication. Structural coupling means that an observer's own structured knowing is held in common with knowing structured within a communication and knowing system (Luhmann, 2002; 2006). For example, a doctor is structurally coupled to the system of knowing and communication called 'medicine'; a university is structurally coupled to the system of knowing and communication called 'higher education', and Americans are structurally coupled to the system of knowing and communication called 'the United States of America'.

The very significant link here to teacher-observers is that pedagogical ways-of-knowing represent teachers' expectations of how students might know visual design meaning. Further, it is in communication that such structured expectations are reproduced, and are likely to be reproduced in the design studio. This suggests that design teachers entertain distinction expectations that influence what they observe about a student's designed object. This proposition is illustrated in Figure 4.10 overleaf, where I use the same designed object stand-in featured in the previous figures illustrating design pedagogical sense-making, Haldane Martin's Zulu Mama Chair©. In Figure 4.10 the teacher system observer's expectation (as an implicit distinction) plus the distinctions that are not selected combine to indicate what is observed about the designed object.

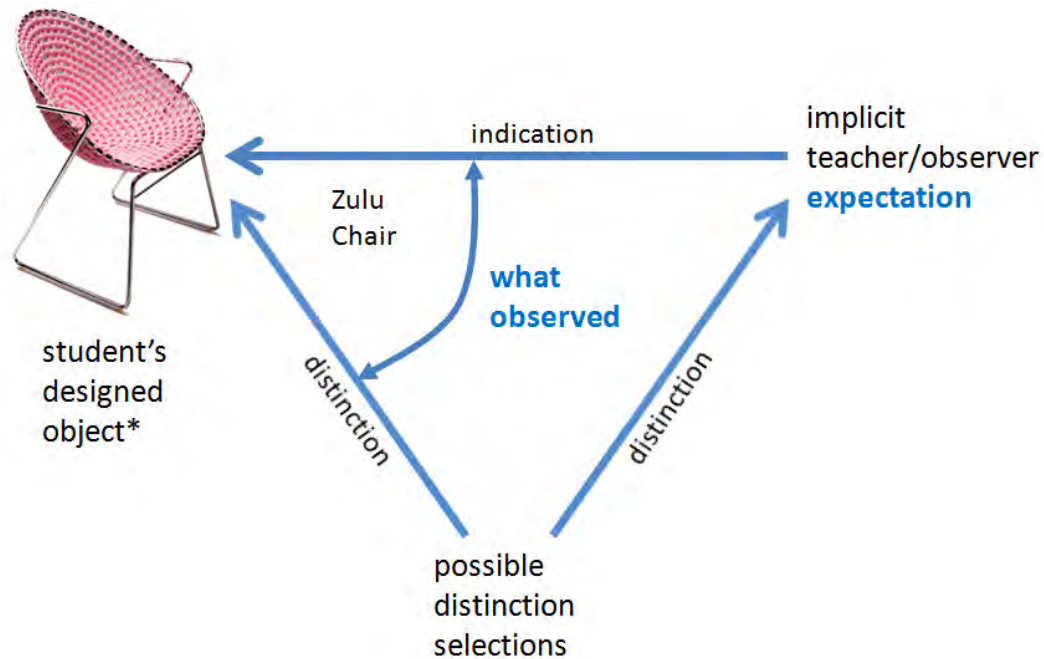


Figure 4.10 Teacher system- observer's expectation of design meaning

Haldane Martin's™ Zulu Mama Chair© is used as the student's designed object by kind permission of Haldane Martin.

4.4. Systems as Relational Mechanisms in Design Pedagogy

So far I have explored the ways in which teachers expect students to know, as structured by systems of cognitive and communicative expectation. Reproduced cognitive system distinctions have been shown as pedagogical expectations, or pedagogical ways-of-knowing. The notion of these cognitive system distinctions as selections from possible or potential cognitive distinctions also resonates with the idea of design meaning as potential future meaning (Gedenryd, 1998; Dilnot, 2006).

Because reproduced cognitive system distinctions act to separate or leave aside possible cognitive distinctions in communication, I have argued that they function as relational mechanisms in the CR sense. These cognitive distinctions allow a relation to a system of knowing and communication, and also the relation of such a cognitive distinction to other possible cognitive distinction selections. Systems as relational mechanisms of communication and knowing depend upon human observers,

because system cognitive distinctions are communicatively reproduced by human observers.

4.4.1 Systems as Way-of-Knowing Mechanisms

Systems of knowing and communication structure observer expectations over multiple communication events, over time. Because these systems are self-referential,³² only cognitive distinction selections that can be related to the existing system structure are selected. As in the case of a micro communication event, these distinctions are selected from a horizon of distinction possibilities, or 'environment'. According to Heylighen (1997, unpagged):

[t]he simplest form or structure there is, is a distinction. A distinction divides a class of phenomena from the complement or background of that class (all phenomena that do not fit into that class). A distinction structures experience into two parts: one is the indication of phenomena to be put together in a class; another is the phenomena to be discriminated from that class.

Heylighen refers here to the concept of a knowing and communication system environment as consisting of those phenomena that are discriminated from the system. Yet the environment is system-relative and a system 'presupposes' its environment (Luhmann, 1995, 2002). Schumacher (2002, unpagged) puts this well: "Each system [thus] determines what counts as its relevant environment, i.e. which differences make a difference versus those aspects that remain indifferent". As an example, design education is a knowing and communication system and the environment of design education is design professions, design manufacture and technology, designed products and artefacts, and so on. So if the observers of a system like design education notice changes in the design education environment that relate to design education, for instance if collaborative design becomes important in that environment, then collaborative design as a cognitive distinction of design practice will be related to what design education means. Collaborative design then becomes communicatively and cognitively incorporated in the system 'design education'.

³² The language of social systems theory describes an abstract system as referring selected distinctions to itself. This is of course impossible; only human observers can select distinctions, using a system of knowing and communication frame of reference.

Knowing and communication system structures do not exist other than when human observers indicate them by distinction (Luhmann, 2002). These system structures are just the way in which distinctions are organised on a macro level, so system structures are not pre-given in a determinative sense. Rather, a macro system structure limits the micro “combinatory possibilities” (Luhmann, 1995, p. 283) of distinctions in communication. In this sense the system structure is whatever, at any particular historical moment is condensed as the macro system structure of knowing, like ‘design education’, or ‘maritime law’ or ‘autobiography’, for instance.

What is important though, is that a macro knowing and communication system both limits and allows micro relational cognitive distinctions to be made. This is the basis of my argument that a macro knowing and communication system is a relational mechanism. Such a system is also a relational mechanism of emergence because it is an historically formed macro structure, and historically formed cognitive distinctions organised within such a macro structure are reproduced in communication events, like those that occur in the pedagogical ambit of design studio events. Figure 4.11 overleaf illustrates the relation between implicit teacher way-of-knowing distinctions, macro historical design communication and knowing systems structures, and the empirical, micro level where implicit teacher cognitive distinctions may be experienced in design studio communication.

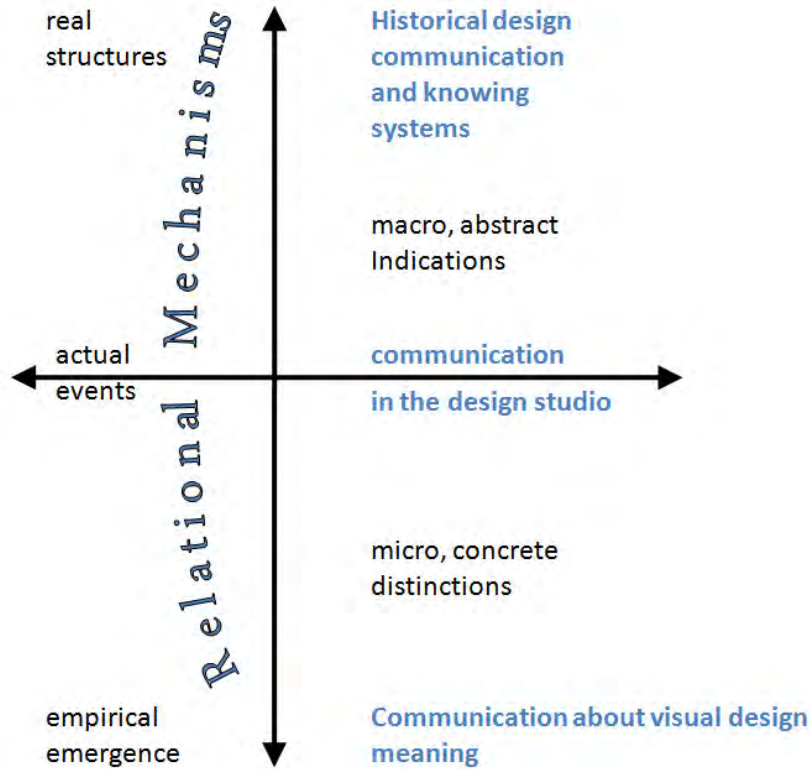


Figure 4.11 Implicit way-of knowing distinctions as a relation between macro, abstract historical structures and micro, concrete communications.

A knowing and communication system structure continues to emerge over time because new distinctions selected from the environment or horizon of distinction selections will be related to previously system-structured distinctions. What is not selected continues to be constitutive of what is selected, in the sense of 'this and not that', which is the same as to say, this indication, by virtue of that distinction.

The historical formation of knowing and communication system structures stretches over different time spans. For instance, in a gender-related systems or subsystems ideals of female beauty took five hundred years to include androgyny. In a much narrower space of time, systems or subsystems of sexuality came to include the idea of sex as recreation. In a narrower still passage of time, media systems or subsystems such as television found the idea of dog training viable. One more example, this time of a social institution as a system or subsystem may show the structural depth of the cognitive dynamics of knowing and communication systems. There is a system of knowing and communication called the 'South African government' which

has operated as a republic since 1961. Since the 1994 scrapping of the apartheid ideology of the South African government, those who counted as political villains now count as political heroes. This is a structural meaning change in a system that is still organised around exactly the same core knowing and communication function, that of governance. Luhmann's (2006, p. 56) cognitive and communicative system distinctions then refer to "structures that have been around for some time and to the historical state of society in this very moment with its specific issues".

Significantly, Luhmann is quoted as saying that he "thinks primarily in historic terms" (Farias & Ossandón, 2009, unpagged, citing Vanderstraeten's 2007 paper quoting Luhmann in German). Luhmann's comment refers to the reproduction of historically formed knowing and communication system distinctions.

4.5 Design Pedagogical Ways-of-Knowing: The Abductive Conjecture

In my view, the design pedagogical context is one where Luhmann's theorisation is both of emphatic importance and extremely helpful in finding a way of accounting for how it is that teachers and students might arrive at shared visual design meaning. Luhmann's theorisation suggests that the pre-formed knowledge that teachers bring to knowing the visual meaning of students' designs may be communicatively structured on a macro system level. Differentiated macro systems of knowing and communication might then condition communication about design meaning. The opening conjecture is, then, that *in design studio events, teachers may use implicit distinctions that are structured by differentiated knowing and communication systems*. These may be systems that structure the articulation of *this* and not *that* visual design meaning.

Using Luhmann, I have argued that design teachers reproduce historically formed pedagogical ways-of-knowing when they comment on the visual meaning of students' designs. The ways in which teachers expect students to know may involve implicit cognitive distinctions within historical systems of knowing and communication. Theoretically, these historically developed and recursive systems continually organise cognitive distinctions as communicable knowledge. When

teachers implicitly relate specific cognitive system distinctions to students' designs then, some and not other visual design object meanings may be favoured by the teachers. Therefore pedagogical ways-of-knowing so constituted may be regarded as relational mechanisms that enable and constrain the emergence of shared design meaning.

This abductive conjecture is a re-contextualisation of the research context as established by research questions. At the beginning of this chapter, I showed how the research context of design pedagogy is delineated:

In what different ways do teachers think the visual meaning of students' designs can be known? In other words, *what are the different pedagogical ways-of-knowing that operate in the design studio?*

How does verbal communication affect pedagogical ways-of-knowing visual design object meaning?

Why might particular, non-arbitrary design object meanings emerge through pedagogical ways-of-knowing?

Within these linked contextual issues, Luhmann's theorisation might most significantly explain the capacity for communication in the design studio to address potential future meaning in the social world. To quote Gedenryd again, design studio communication concerns "reasoning about absent, non-existent, or counterfactual states of affairs" (Gedenryd, 1998, p. 199). The notion of distinctions made as selections from possible or potential distinctions also resonates with the idea of design meaning as potential future meaning (Dilnot, 2006; Gedenryd, 1998).

Largely the abductive conjecture is a conjecture about relational mechanisms in design pedagogical ways-of-knowing. The relational mechanism conjecture is supported by the notion of the structural coupling of teacher-observers to systems of knowing and communication. System distinctions represent recursive and historically structured expectations, and teacher systems-observers may be structurally coupled to some (not all) system-structured expectations.

Such a historically recursive system of knowing and communication might then operate to relate certain distinctions and not others, as a relational mechanism of design meaning emergence. Figure 4.12 below shows these relational mechanism components of the abductive conjecture:

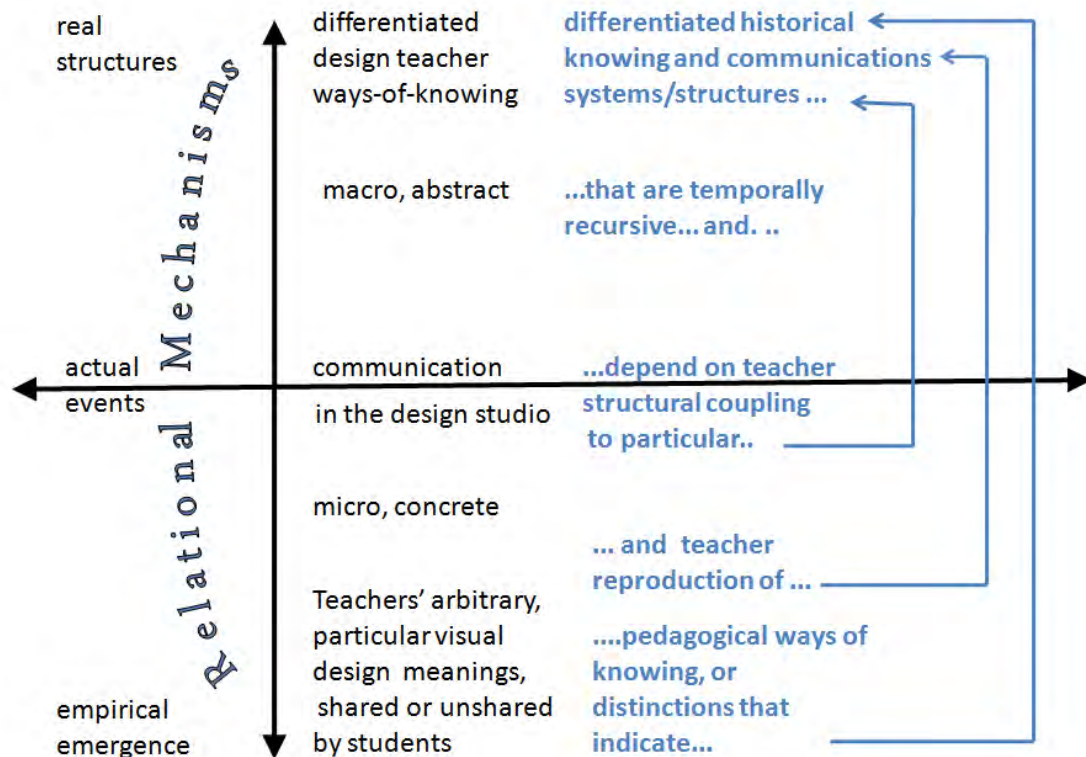


Figure 4.12 Relational mechanism components of the abductive conjecture

Significantly, it is not the meanings of individual designed objects *per se* that are considered to be organised and structured by communication systems. Rather, the communicative concept-dependency of designed objects depends on ways-of-knowing or ways of observing. Diwald and Albert (2007, p. 3) say of this: “meaning is only meaning as communicatively constituted meaning – it does not emanate as a given, but always requires observation”.

Ways-of-knowing as conditioning relational mechanisms cannot, however, comprehensively explain the sharing or not of visual design meaning. How teachers think students know design meaning is not the only factor impinging on design

meaning emergence and this thesis in no way makes such a claim. But pedagogical ways-of-knowing loom large in the situation of dissent between teachers and students. Pedagogical ways-of-knowing may therefore be abductively considered to be relational mechanisms that serve to condition the possible emergence of shared design meaning. As I have argued in Chapter Two, pedagogical ways-of-knowing are a highly significant factor in this dissent, because, as Austerlitz et al. (2008, p. 9) say, they are both tacit and equivocal.

The question that arises then is: what evidence might there be of all of these promising connections between design pedagogy and design meaning in the design studio? The issue of this evidence, and of the conjectured mechanism that has been derived from Luhmann's theorisation, necessitates the observation of design pedagogical ways-of-knowing design meaning, or second-order observation.

4.6 Second-Order Observation and the Abductive Conjecture

To take a few steps back: in Luhmann's view, a knowing and communication system may be indicated by an implicit distinction in a concrete communication interactions between people. The system (1) is reproduced by an implicit cognitive distinction (2), which is also selection from what is not indicated and not organised within the system (3) (Rasmussen, 2005, p. 215). A second-order observation can explicitly observe these three components: the nature of the system of knowing and communication system that is indicated, the specific cognitive distinction that indicates this system, and what cognitive distinctions could have been selected, but were put aside.

For instance, I might speak about being a design educator. The person I am speaking to makes a first-order implicit cognitive distinction of what a design educator is. This cognitive distinction is enabled by differentiating between design educators and other kinds of educator; these other kinds of educator are put aside. But how does this person cognitively distinguish between design educators and other kinds of educator, in order to understand my statement? The distinction the other person may select from amongst other cognitive distinctions might rest on a conception of design education as part of 'art and design' education, as a general

system of knowledge and communication. Therefore the other person may decide that being a design educator is the same as being an art and design educator, as against other kinds of educator.

Alternatively, the other person with whom I engage in communication may just as well select a distinction of design education that rests on *the difference* between design education and art education. Now the very different cognitive distinction is *between* design education and art education, science education, technology education and so on.

These distinctions of what is prioritised and what is side-lined are the essence of second-order observations. Direct observation or report of these different first-order observations at a second-order remove will couch first-order observations within different systems of knowing and communication: art and design, for one, or design only for another.

To add to and underscore this explanation of second-order observation: A second-order observer may directly observe or report about (as a newsreader reports) how the first-order observer observes. The second-order observer is able to 'see' the first-order observer's implicit distinction and the system reproduced by this distinction, because of what the first-order observer chooses to leave aside. What is left aside is other possible distinction selections, which *also* indicate the reproduced system. For another example, if I note that someone has taken a calculated risk, I see risk as indicated and 'calculated' risk as the selected distinction that indicates risk; other possible distinctions of risk as a gamble, risk as peril or risk as opportunity are left aside. Risk is though still indicated as a system of knowing and communication.³³

For a second-order observation to be made, there must be a motivation of common interest, or a 'structural coupling' between the second-order observer and the system of knowing and communication he or she observes. This structural coupling extends too to the first-order observer who reproduces a distinction from this particular knowing and communication system. As Luhmann (2000, p. 56) puts this matter:

³³ I have extrapolated this example from Luhmann's example of taking risks in traffic (Luhmann, 1993, p. 219).

... there must be structural couplings between first- and second-order observations, which guarantee that something is observed at all in the mode of second-order observation.

To put this in terms of research evidence of design pedagogical ways-of-knowing, there is a requirement that data about the interests of design teacher first-order observers and those who might observe them at a second-order level are linked to the same macro systems of knowing and communication, or 'structurally coupled' to these macro systems.

I have proposed that the kind of relational distinction explicitly observed by second-order observers is the same kind of implicit relational distinction made by design teachers on a first-order level in design studio communication with students. I have abductively theorised that this is the relational mechanism of design pedagogical 'ways-of-knowing'.

The following chapter explains more about the use of second-order observation as evidence of the abductive conjecture presented in this chapter. In this following chapter I also set out the abductive methodology of drawing inferences from this second-order evidence.

Chapter Five

Methodology and Abductive Research Method

This chapter approaches the idea of methodology as concerning the philosophic and theoretical framework of a study, with all of the knowledge values and beliefs these entail (van Manen, 1998). My understanding is also that one should aim for alignment of methods with methodological principles (Leshem & Trafford, 2007). Thinking of methodology at the meta-level of research design alignment, I noted Katz's (2002, p. 257) comment that "All research methodologies imply a substantive view of social life". How the methodology of this study could yield a valid or substantive explanation that would be methodologically 'in and of' the research focus, was a major research design consideration.

These guidelines influenced my research focus on design pedagogical ways-of-knowing. My aims for an abductive research explanation were to:

- investigate pedagogical ways-of-knowing visual design meaning in design studio interactions with students, in order to
- write an explanatory account of how these ways-of-knowing manifest in design pedagogy that is accessible and useful for design teachers.

The previous chapter mounted a conjecture about pedagogical ways-of-knowing visual design meaning. This conjecture considered that design teachers bring implicit distinctions to bear on the visual meaning of students' designed objects in the design studio. These implicit distinctions might indicate a system of knowing and communication by cognitive distinction from possible cognitive distinction selections. In this way, indication by distinction constitutes a relation mechanism that accounts for pedagogical ways-of-knowing. According to Luhmann's theory of cognitive communication systems (1995, 2000, 2002), these implicit distinctions might be historically recursive and so might structure communicable knowing about visual meaning in design. Communicable knowing systems limit the combinatorial

possibilities of indication by distinction (Luhmann, 1995, p. 283). As a result, implicit distinctions will allow *this* rather than *that* visual design meaning to emerge.

Indication by selective distinctions might then function as a relational mechanism of design meaning emergence. Teachers are then implicit observers and reproducers of particular historically formed communication and knowing system distinctions. Teacher selection of these distinctions from other possible distinctions then accounts for 'pedagogical ways-of-knowing'.

In examining this abductive conjecture, I sought to confirm that knowing and communication systems do in fact have a relational effect on knowing the meaning of student designs in the design studio. Pending such an appraisal, identifying and explaining the effect of historically persistent design knowing and communication systems in design pedagogy was the ultimate goal.

Luhmann's second-order observation afforded an opportunity to find evidence of this abductive conjecture. Essentially, in this study design educators' second-order observations of cognitive distinctions that indicate design meaning constituted this evidence.

5.1 Second-Order Observation as Evidence

In Chapter Four I showed how, in Luhmannian theory, an observer's selected distinction is an implicit indication of meaning in a communication event (Luhmann, 2000, 2002). But when such observations are themselves observed, implicit distinctions can be discerned. The discernment of others' cognitive observations is theorised by Luhmann as second-order observation.

Second-order observation is a cybernetic concept where the second-order observer is attuned to first order observations that feeds back to or indicates his or her his or own store of communicable knowing (Luhmann, 2000, p. 54-56). Second-order observations are of *how* first-order cognitions occur, specifically in terms of what distinctions a first-order observer uses to indicate the second-order observer's own systems of knowing. This makes second-order observation a different proposition to

what is generally seen in research as a second-order researcher rendition of first-order research participant accounts. As Luhmann (2000, p. 62) says “Second-order observation observes only *how* others observe”[Author;s emphasis]. Second-order observation may directly observe cognitions made in communication events, which may take highly varied forms – they may be acts of visual, written, or spoken communications (Knudsen, 2010). These are, in Luhmannian terms, all cognitive distinctions that distinguish indications (Knudsen, 2010).

Then second-order observation may be indirect observations from unspecified sources, such as ‘this country is going down the drain’ or ‘no child should be left behind’. In the former example, a second-order observation might concern a first-order observation about economic downturn, and in the latter example, a first-order observation about access to education. Luhmann says that second-order observation is of cognition and only of cognition, but then Luhmann sees cognition in every communication. For Luhmann, as I have said, communication may take many forms. But it is only communication when there is recursivity; when understanding retains a previous implicit distinction and impels the making of another distinction. The communication examples of ‘the country going down the drain’ and of ‘no child should be left behind’ are examples that demand both distinctively retrospective and distinctively prospective understanding, and both demand structures of associative understanding.

Second-order observation as evidence is typical of an ethnographer who observes social groups, themselves indicating and distinguishing meaning in their social practices (Lee & Brosziewski, 2007, p. 258).

Of the first-order observer, Luhmann (2002, p. 165) says that there is no observer before there is an observation and Seidl (2004, p. 22) also says there is no observer before there is a meaning distinction. It is in the choice of a distinction that the observer “betrays his presence” (Luhmann, 2000, p. 54). Any observation occurring in a communication event most importantly “refers to the observer, not the observed”, and:

We do not see an object as it is; we see the object as it emerges through the specific distinction used in the act of observation ... Everything we know is a product of observation and refers to the observation, not to the observed.

A second-order perspective observes *how* a distinction is made, more than what distinction is made. But this is feasible only if the second-order observer is 'structurally coupled' (Luhmann, 2000, p. 56) or cognitively attuned to the first-order observer's system of knowing and communication. The second-order observer is therefore sensitive to *selective* distinctions which put aside other possible distinction selections.

What can be confusing is that it is the act of observation, rather than the human observer who performs the act, that is observed at second order. This fits with Varela, Thompson, and Rosch's (1991) description of enacted cognition, where what is said or done (though not necessarily directly observed) is the act that creates distinctions. As Arnellos, Spyrou and Darzentas (2003, p. 5, citing Beer, 2000) also say, observers and observation are in an enactive sense embodied in system of knowing and communication networks. Historically formed system networks structure observations. As Seidl clarifies, "the knowledge structure [network] of the system is what determines what distinction will be drawn in an observation" (Seidl 2007, p. 18).

Here is the reason why second-order observations are significant to the CR project of abductive explanation. From the second-order or knowing onlooker perspective, knowers' or observers' cognitions or observations are seen in a structured light. What the second-order observer then observes is a structured cognitive event, made in a communicative medium. The first-order observer is then embodied by the system and system distinction within which his or her act is intelligible.

This first-order observer or knower in the case of this study is the hypothetical design studio teacher.

A second-order perspective is also only obtainable retrospectively (Luhmann, 1995, 2002, 2006), just as newspapers report on events that have already happened. The time lag between the event and the second-order view of the event can be momentary, as in the case of live television broadcasts. For another example, if I re-

construe something that has just been said by placing it in a broader context, I make a second-order observation. Second-order observations can also occur centuries later, as in the case of an historical view of the French Revolution.

Self-observation can also be second-order observation. This can be seen in the idea of reflective observation (Kolb, 1984) when one construes learning experiences retrospectively in a mediated way: one is able to see the experience as distinct from other experiences. This is a self-second-order observation, or our own later observation of our earlier observation, which cannot, in hindsight, but be seen in the light of other potential distinctions for indication.

A second-order observer discerns the distinction made by a first-order observer as a *selected* distinction that leaves aside alternative distinctions (Luhmann, 2002, pp. 114–115; Schwer, 2006; Seidl, 2007, p. 18). In other words, as I have explained about Luhmann's theory of cognition in first-order communication events, an observer-participant responds to the 'utterance' of another person by selecting a distinction that can be applied to the utterance. The distinction that is chosen from a set of possibilities constitutes *an* understanding of the utterance. In the same way, the second-order perspective is of the first-order observer's selection of a distinction from other possible selections. Merely to say 'the doctor prescribed an extended period of rest' is to put this cognitive event of prescription within an implicit set of choices, and 'a period of rest' gains its particular import precisely because it is one cognitive distinction among others. This is the sense in which a second-order observer observes *how*, or in what *way* a distinction is made by a first-order observer. Through a second-order observation, a first-order observers' observation then acquires contextual depth (Baecker, 2008a) as a cognitive *event*. This is the value of second-order observations that are motivated by the same interests as those of the first-order observer, in this case ways-of-knowing in design.

Ways-of-knowing observed at second-order require there to be an embodied first-order observer who makes the cognitive distinction observed by the second-order observer. Someone must do the knowing that is so observed; knowing requires knowers. There is another good reason to regard second-order observations of design knowing as evidence of first-order ways-of-knowing in design: simply to

explain, describe or relate how a design knowing distinction comes to be a particular distinction among others requires considerable commitment.

In Figure 5.1 below, I show a second-order view of an embodied, first-order teacher-observer's implicit distinction. In this diagram', the reproduced distinction is that of an 'iconic' design conceptual distinction. As I showed in Figure 4.1 in Chapter 4 (Section 4.2), both the distinction that is selected, and the distinctions that are not selected, combine to inform a second-order observation. These unselected distinctions might, in the case of the exemplar system 'design conceptualisation', comprise of 'iconic, contemporary, or cult distinctions, amongst others.

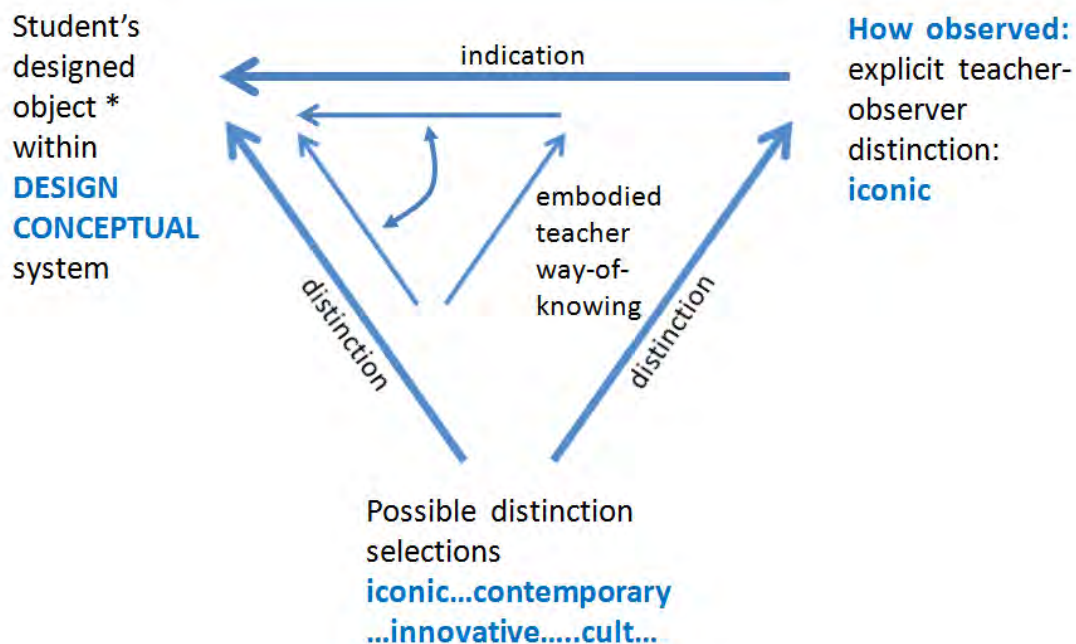


Figure 5.1 A second-order observation of how a teacher-observer observes a designed object .

Luhmann's indication by distinction (2000, 2002, 2006) as depicted in Figure 5.1 may be made clearer by pointing out similarities with a phenomenographic approach to distinctions as variations.³⁴ The distinctions 'iconic'; 'contemporary', and innovative depicted in Figure 5.1 are related variations of design meaning conceptualisation. Discerning one distinction variation depends on the availability of other distinctions

³⁴ I am grateful to Professor Linda Drew for pointing out this similarity.

variations, so that there is a necessary relationship between distinctions as cognitive discernments selected from among a variety of possibilities for cognitive discernment (Marton and Trigwell, 2000).

5.1.1 The Abductive Conjecture and Second-order Data

The abductive explanation attempted here is that pedagogical ways-of-knowing are relational mechanisms in the CR sense. The relational mechanism elements, as I have posited them in Luhmannian terms, are:

- the indication of knowing and communication systems
- by means of selected cognitive distinctions
- that leave aside other potential communicable cognitive distinctions.

Clearly these elements involve a concrete observer who selects distinctions in order to indicate. As Christis (2001) has pointed out, Luhmann entertains a duality between abstract systems of knowing and communication and the concrete persons or observers who constantly call upon these abstract systems. This duality is, for Christis, an ontological separation in the manner of Bhaskar's CR separation of the level of empirical experience from abstract social structures (Christis, 2001, pp. 340–344; see also Brier, 2009, p. 29; Hickman, 2011).³⁵ Christis's term for this ontological duality is 'grammatical realism', meaning that how things come to be is in some way ordered. In Luhmann's as well as Bhaskar's view, structures or systems are reproduced in events; this is the grammatical principle they share.

I have then treated Luhmann's (2002, p. 179) theorisation of relations between persons and systems of knowing and communication as a substantive of CR relational mechanisms. Luhmann (2002, p. 179) is especially clear on this relational causality:

³⁵ A number of commentators have also connected aspects of CR and Luhmannian theory, for instance, Mingers, (2002); Bryant, (2006); Elder-Vass, (2007); Montiel, (2007); Skliarevksy, (2007); Fuchs, (2009); and Wan, (2010).

Meaning comes into play only on the level of observation ... with the ability to negate (as distinguished from the ability to affirm); with the ability for logical modalization, for a simultaneous presentation of other possibilities and, building on this, for modalities such as necessity, impossibility, and contingency; with temporal orientations that can describe, with the help of the distinction between future and past, what happens in the operative present and what differentiates the system from its contemporary environment; and last but not least, with concepts of causality.

An important aspect of this rather dense quote from Luhmann above is that a second-order observation observes not just a distinction but a distinction as a *selected* distinction, a selection that is most importantly made by means of “the simultaneous presentation of other possibilities” (Luhmann, 2002, p. 179). These other possibilities can arise from the past or refer to an anticipated future. While a second-order observation is in and of itself retrospective, what is observed can therefore be a forward-looking though antecedent first-order observation.

Examining the abductive conjecture about relational mechanisms then required that abstract communication and knowing systems could in the Luhmannian sense be found to have an antecedent structuring effect on the actual events of design pedagogy. This would mean that design teachers reproduce historically formed knowing and communication system distinctions. These distinctions, as Keller (1999, pp. 78–79) says, might be part of knowing and communication systems as “networks of recursively produced and reproduced communications”.

Abstract knowing and communication systems could then be considered to be real structures that have effect on events in the CR sense. Similarly, actual design pedagogical events are actual events in the CR sense, where events are held to be real and to take place whether they are observed or not. Therefore the antecedent structuring effect of abstract knowing and communication systems could, in the CR sense, be considered to be a relational mechanisms, specifically relating cognitive distinctions to indications in communication events such as those of the design studio. This was conjectured to be the mechanism of pedagogical ways-of-knowing that might enable or constrain the shared emergence of the visual meaning of students’ designed objects.

5.2 Abductive Research Data

Silverman has asked searching questions about the status of the specific field or context in which a research study takes place: how is the field described/delineated, “since it is neither a here-and-now situation, nor a situation in which mankind as a whole is characterised through the fundamental properties of every one of its activities?” (Silverman, 2000, p. 197). In this section I provide research setting answers to Silverman’s questions.

5.2.1 Macro and Micro Considerations

I have attempted to show that design pedagogy involves micro and macro ways-of-knowing. An analysis of research evidence must, however, consider how it is that macro and micro evidence will be discerned, and how these might be connected. To open up the micro-macro question methodologically, I draw on two views of this question.

First, Fuchs (1988, p. 124) mounts arguments against ‘microsociology’. In Fuchs’s view what might be considered ‘individual’, and what might be considered ‘interaction’ is no more concrete or less abstract than “the concept of ‘state’ or the Watson-Crick model of DNA” so micro level data is not necessarily empirical data. This is very much the position taken by Bhaskar. Direct experiences and events are not what they seem, and do not easily give up their secrets (Bhaskar, 2008).

In Chapter Three I gave the example of football hooliganism in this respect (Carter & New, 2004, p. 6, citing Marsh, Rosser & Harre). Attending a football match and witnessing hooliganism will not enlighten one about why it is happening. Similarly, observing a design studio critique will not explain how it is that teachers attribute visual meaning to students’ designed objects. These micro events are affected by macro structures, and the mechanisms responsible for this need a research explanation. Sawyer (2004, p. 266) points out the relational mechanism importance of the micro- macro question:

Many sociological theorists use the philosophical notion of emergence to argue that collective phenomena are collaboratively created by individuals yet are not reducible to individual action (Sawyer 2001). In the social sciences, emergence refers to processes and mechanisms of the micro to macro transition ...

With reference to Sawyer's mention of "mechanisms of the macro to micro transition", second-order observation is observation of micro way-of-knowing distinctions that are framed within macro indications of knowing structures/systems of communication. This framing is, however, only detectable in a second-order observation of a system-structured cognitive event.

In both the CR and Luhmannian theoretical accounts then, there are relational mechanisms that bring macro structures into relation with micro events and experiences. In Figure 5.2 below I align CR macro structures with Luhmannian macro structures. Bhaskar's concept of structure refers both to an entity and to a structuring or relational mechanism. For example, we may think of 'Law' as a social institution or entity. At the same time, law is a process and a mechanism. Also in Figure 5.2 below I give parity to relational mechanisms and Luhmann's system relations between communicative and cognitive indications and distinctions. Then Bhaskar's level of concrete events and experiences is on par with Luhmann's concrete communication events and the experience of implicit distinctions that Luhmann theorises.

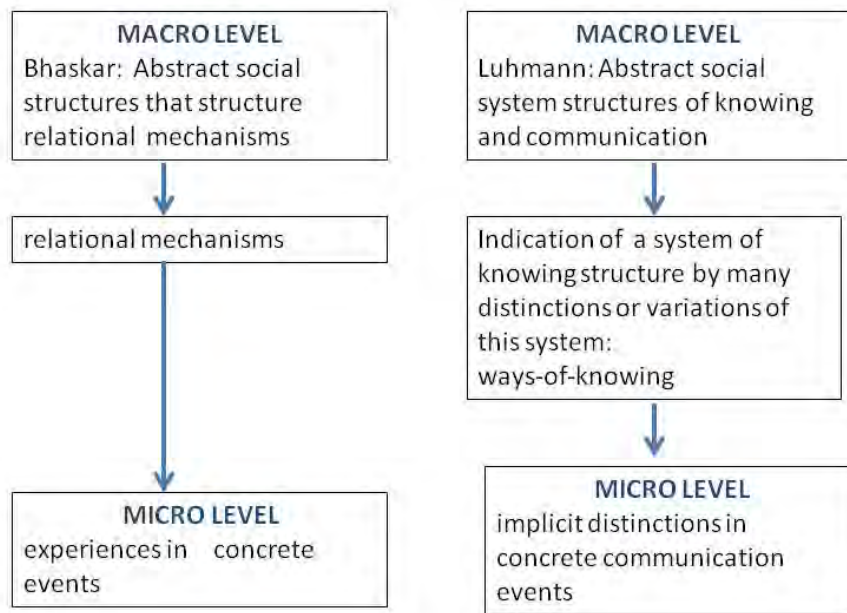


Figure 5. 2 Alignment of Bhaskar’s Critical Realist ontology with Luhmann’s knowing and communication system structures.

If second-order observation data addresses the research context of design pedagogy, then examining the abductive conjecture I have mounted could be viable. But as Lee and Brosziewski (2007) say, second-order observations that can confirm or contradict others are needed, so that a reasonably large corpus of second-order data becomes necessary. This has significance if the reproduction of system cognitive distinctions is to be established.

5.2.2 Data and the Research Context

A substantive analysis is, for Danermark, Ekstrom, Jakobsen and Karlsson (2002) one where substantial relations are effectual; they have palpable effect. The phenomenon under analysis is taken to be unobviously but substantively or effectually structured in particular ways. The contextualising conditions of a phenomenon are not merely whatever might be empirically observable around that phenomenon, so context is to be carefully considered.

The contextual conditions of design pedagogy were identified as teachers’ differentiated ways-of-knowing visual design meaning, the activation of these ways-

of-knowing in design studio communication events, and the particularising effect of these ways-of-knowing on the emergence of design meaning.

Though there is a great deal of scholarship that refers to these contextual conditions of design pedagogy, they remain opaque and unpredictable. Therefore I have re-contextualised these contextual conditions using Luhmann's theorisation, as an abductive conjecture. This conjecture is nonetheless still about the contextual conditions of design pedagogy that are under scrutiny. So the research methodology, in examining the conjecture, must make room for contextual conditions to surface.

As I showed at the beginning of this chapter, there are three main areas of research context focus:

- different pedagogical ways-of-knowing;
- verbal communication about visual design object meaning, and
- particular, non-arbitrary visual design object meanings.

In respect of the first contextual aspect, I needed data from second-order observers who are structurally coupled to design teachers by virtue of their own involvement with design pedagogy. Only such second-order observers might be able to discriminate among different pedagogical ways-of-knowing.

Concerning the second contextual aspect, I needed data that could show teacher-observers' ways-of-knowing visual meaning in a communicative medium.

Regarding the third contextual aspect, I needed data that could show how teachers' structured distinctions result in the articulation of particular student design object meanings.

Underpinning these contextual aspects is the idea of pedagogical ways-of-knowing as the ways in which teachers might expect students to know. All the same, though, I

have launched a relational mechanisms conjecture about these pedagogical expectations that depends at least upon communicative recursivity.

These data evidence requirements motivated my choice of data sources.

5.3 Data Sources

As I describe in more detail over the following two sections, two sources of evidence provided data about the contextual foci mentioned in the previous section. Both sources involved communication between discussion participants, and both data sources involved second-order observations about knowing visual design meaning. The second data source consisted of discussions among design studio teachers, and served as a check and balance for analytical inference from the first, which consisted of posts to an online academic design forum.

There was, however, nothing straightforward about choosing these data sources. Instead, I came upon the first of these – an academic forum about design education – and realised that in some way this forum suggested my own research problem.

The second source of research evidence was obtained at a point of more clarity in respect of my research approach, but certainly not at a point where I understood the role this source would come to play in the data analysis.

The description of these two data sources that follows thus needs to be seen in light of these research process exigencies. Some aspects of the kind of data each source provided only became clear in the longer term.

5.3.1 Online Design Education Discussion Forum

The first research data source was an online academic design discussion forum. This forum has a large, free-subscription membership of design educators, design academics and design professionals who participate in design education (approximately 2,290 subscribers). Like all forums and blogs, communication is in the form of posts that recursively take up issues raised in previous posts, and these

posts provoke further posts. In terms of Luhmann's (2002) theory of recursive communication, cognitive distinctions recursively made in this communication forum then had the potential to evidence systemic or relational mechanisms.

The online forum is somewhat misleadingly titled PhD-Design, since discussion is not limited to PhD research in design and in fact PhD research is not often mentioned. The forum is public in the sense that anyone can subscribe and any quoted data can thus be traced back to its original context. The forum is hosted by JISCMail (www.jiscmail.ac.uk), who advise forum participants that their contributions may be quoted, and that any persons doing so should cite the contributor. I have complied with this in my analysis of online forum data, as explained in the next chapter.

As I followed contributions to this forum, I became more and more convinced that particular threads³⁶ contained valuable data about pedagogical ways-of-knowing about design meaning. Threads like 'design as research', 'design creativity' and 'pragmatic aesthetics' concern³⁷ ways-of-knowing about design because they speak of the knowledge or thinking that is necessary for producing design meaning.³⁸ There is vigorous contention within each thread, with subscribers joining thread debates whenever they find threads or posts within threads relevant to their own point of view.

Online discussion forum posts were exceptionally valuable because they comprised of unsolicited participation. I found that discussion threads relating to ways-of-knowing design meaning contained numerous (up to eighty) message posts. These threads also featured the posts of widely published design academics of international standing. Forum data provided then provided opportunistic sampling (Patton, 1990).

36 A thread is a series of messages that directly or indirectly relate to one another and are posted in response to each other.

37 I speak of this list service in the present tense because it is an archived resource of posts from 1998 to date which can be accessed by subscribers at any time.

38 The listserv posts predominantly speak of design in general, but reference to specific design specialisations are made.

Significantly, design academic data in this forum setting was *distributed* second-order data, on the basis of both the geographical spread of higher education institutions, and the forum participants being situated across design specialisations.

Distributed data has macro significance for this study, since it evidences ways-of-knowing that are not situationally confined. When forum posts from distributed design educators take the same view, the likelihood is that such a view is organised within a communication system of knowing. As Hutchins (2000, p. 1) points out, distributed cognitions tend to represent a co-ordination of internal thinking with external, material thought objects. There is also, for Hutchins, a temporally distributed aspect³⁹ where earlier cognitions affect later ones. This aspect of distributed cognition seems to highlight the reproduction of way-of-knowing distinctions and indications. There is identifiable cognitive organisation of social and material meaning that transcends individual knowing (Rogers, 1997, pp. 1-2).

The online forum also provided a unique opportunity for design educators to express views in an environment where institutional or design programme policy does not hold sway. I then regarded the forum contributors to be structurally coupled to the research context of visual design meaning, though not necessarily to design studio pedagogy.

I examined discussion threads that arose in discussions only during the period June 2008 and June 2009, so that the quantity of research data would be manageable.

5.3.2 Design Educator Group Discussions

To begin with I requested permission to approach design programme teachers from faculty/institution management at each of the three universities. With this permission I then contacted the design programme teachers informally to introduce myself and my research interest. I purposely contacted more potential participants than would be necessary for a group discussion of five to seven participants per institution

39 Hutchins (2000, p. 1) identifies the origins of distributed cognition theory in Vygotsky's 'Mind in Society' (1975) and Minsky's 'Society of Mind' (1985), also pointing out the "nearly perfect mirror symmetry of these titles".

(Patton, 1990). This was because I feared that teachers who agreed to participate might find themselves otherwise committed on the day of the recorded group discussion. Overall, my approaches were very positively received and generated much conversation.

These design teacher group discussions drew participants from different design programmes located in three South African universities. These institutions offer design programmes like Graphic Design, Jewellery Design, Fashion, Interior Design, and Industrial Design. Group discussions comprised of studio teaching staff from different design programmes so that discussion data was spread across design pedagogy programmes and also spread over the three institutions. Participants were then not close colleagues.

Purposive (Patton, 1990) recruitment of participants for group discussions was then based first on their experience of or involvement in design studio teaching. A further recruitment criterion was the self-identified interest of participants in a discussion about knowing design meaning.

The design teacher group discussion participants were then interested and involved second-order observers of design studio pedagogy. This was on account of their own self-reflective second-order observations, or on account of their intimate knowledge of the ways-of-knowing of other design studio teachers.

In contrast to requirements for using and citing online forum posts, I guaranteed these the anonymity of participants in the three group discussions by using fictional names. Design teachers were provided with an informed consent document that introduced me as a university student researcher and set out the aims and motivation of my study. Consent to participate in the research guaranteed anonymity to participating institutions and teachers. After the research discussions, I provided respective institutional discussion transcripts to the participating teachers. The purpose of this was to allow teachers to re-consider or correct their views as expressed in their group discussion transcript. No corrections were returned.

The three design educator group discussions consisted of five to seven participants each. I participated in each discussion. Group discussions lasted approximately one hour and were audio recorded and later transcribed.

Using second-order online forum data in conjunction with second-order group discussion data has special significance for examining my abductive conjecture of pedagogical ways-of- knowing or cognitions in the design studio. Cognitions do require human minds. That these human minds are the minds of designers (in the forum data) and design studio teachers (in the group discussions) is beyond doubt, because second-order observer data does concern explicitly concern design knowing. The second-order observations of design academics (in the online forum data) and design teachers (in the group discussions) then refer to embodied designers in design studios or design studio teachers, and cannot do otherwise. The roles of these two data sources in moving from the broad level of design studio knowing to the more specific level of design studio pedagogical knowing are diagrammatically represented in Figure 5.3 overleaf.

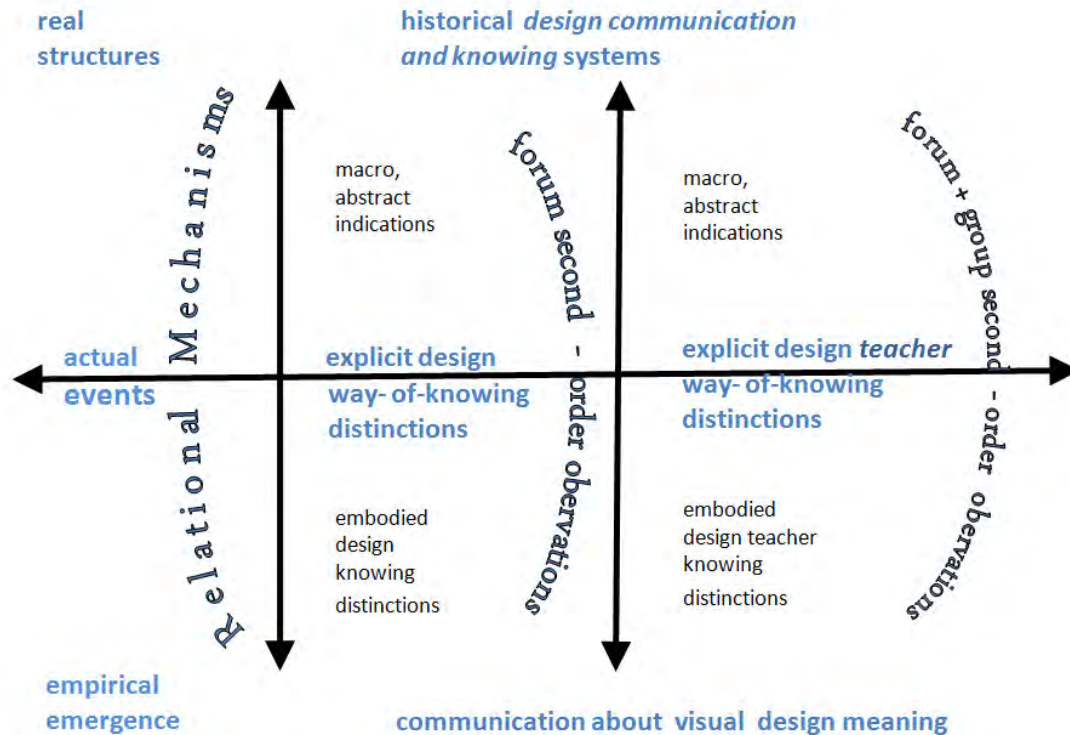


Figure 5.3 Data sources for second-order abductive analysis of relational mechanisms.

The abductive analysis afforded by these two data sources depended on the alliance I have forged in previous chapters between the CR philosophy and Luhmann's theorisation.

5.4 Research Analytical Perspective

My worldview is of an external reality that is extant but never fully knowable. This is the critical realist ontology behind my research approach. As Pratt (2007, p. 32) states the case of CR research:

[The CR] epistemology is transcendental dualist – the inquirer is both part of the reality and partakes of its qualities but attempts at the same time to transcend the limitations of human knowledge and approximate the truth.

I take 'transcendental' to mean those immaterial processes and entities that make things possible, or that are 'behind' what is experienced as reality. Dualism is inherent in this idea; because for something to occur, something else must make this possible. There is, in other words, always a relation of some kind; there is no purified 'this' or 'that' as Latour (1993) has shown about the natural and the social.

A relation is regarded as real purely in the sense that it has effect. This need not be an inscrutable proposition if one merely considers that 'inflation', an abstract concept, might be regarded as the condition of possibility that leads to the concrete event of paying more for bread.

Taking a transcendental dualist position means, as Pratt says, being in two places: the place where things happen, and the place that accepts that these things do not just happen without being triggered in some way. The second place is an uneasy one, because the trigger can never be fully known. Nevertheless a CR researcher makes the attempt to give a provisional and partial explanation of such an explanatory trigger or triggers. There are more adequate and less adequate provisional explanations (Sayer, 1992), but I leave this question to my discussion of research validity and reliability issues in Chapter Eight.

Returning to Pratt's mention of partaking of a reality but at the same time attempting to 'transcend' it, my research position is comprised of two roles. One role is that of a design educator who is concerned about the issue of knowing visual design meaning in design pedagogy. My other role is that of a researcher who seeks to explain the knowing of design meaning as a historically emergent phenomenon.

The links between Luhmann's theorisation and CR philosophy mentioned earlier allowed me to oscillate between these two roles.

5.4.1 Ethical Considerations of the Analysis

I faced a dilemma about quoting or not quoting from the online forum data. On one hand, I wanted to provide an audit trail of research analysis for my reader. But the purpose of quoting was to examine my research conjecture, and that conjecture was not the context in which online forum participants made posts. Selective quoting from posts to this forum then involved a research ethical risk of quoting online forum participants out of context. I weighed this risk in the following way: quoted distinctions were not always expressed in thread posts in such a way as to overtly represent distinctions of ways-of-knowing in design. However, I think that the authors of these posts would agree that the posts I selected as data concern knowing in design. The distinctions made by online forum contributors were also not necessarily distinctions supported by that contributor. But this did not disqualify such a distinction as one that might indicate a system or subsystem of knowing and communication; a contested distinction is still a distinction.

5.5 Abductive Data Analysis

A broad summation of abductive analysis is that it starts from a view of empirical circumstances, seeks a theoretical fit with empirical circumstances, then uses this theoretical fit to conjecture why the empirical situation obtains.

Wad (2001, p. 13) advises that a substantive, contextual methodology is needed to explain relational or generative mechanisms. For Jepessen (2005, p. 5), this is to ask 'how and why' a particular phenomenon came into being, got its specific character

and so on. The emphasis is on the explanation of the constitution of empirical phenomenon.

The explanation sought by critical realists is abductive in nature, as Mingers (2002, p. 300) says:

We take some unexplained phenomenon and propose hypothetical mechanisms that, if they existed, would generate or cause that which is to be explained. So, we move from experiences in the empirical domain to possible structures in the real domain.

To further clarify, Breese (2008, p. 18) describes abductive analysis as:

Interpreting and redescribing the different components from hypothetical conceptual frameworks and theories about structures and relations. The object of study is further developed when placed in new 'contexts of ideas'.

Wad (2001, p. 6) cites Pawson's criticism of Bhaskar's realism that we cannot validate knowledge of a system (presumably, open or closed) if the knowledge of the system is independent of the system. But this is exactly the methodological point to be taken if one chooses to use CR: one will have to rise to the challenge of provisional yet adequate explanation. A perhaps encouraging comment on this from Pawson (1989, p. 50) is that Hesse shows how "elements in the chain fit in with a pre-established network of existing relations". He regards the explanation of empirical relationships as always involving generative or relational mechanisms:

Firstly, any empirical relationship requiring explanation would be interpreted as the consequence of a *generative mechanism*. Secondly, since it is assumed that all generative mechanisms are localized in their action it is necessary to specify the social context where the mechanism is expected to operate. This would involve close definition of the social characteristics of the group of (sic) location to be studied, rather than simply assuming that the mechanisms (and thus laws) act uniformly across population samples. Thirdly, since it is assumed that the action of a mechanism can be obscured by other mechanisms, some method of controlling the effects of these further constraints on the relationship under inspection is required.

Over the two data sources, there was an important question as to the recursivity of explicitly distinctive ways-of-knowing design visual meaning. Baecker (2008a, p. 6)

quotes von Foerster with respect to how researchers might handle the complexity of systems theory – which is not to try to understand or reduce this complexity, but to keep it in view, and instead to look for recursion. Lee and Brosziewski (2007, p.260) point out that:

To observe and understand a communicative event, one must be familiar with the communication that preceded it, with the relevant themes and the possible meanings participants have already publicly constructed and conditioned themselves to remember.

Familiarity with these preceding and following events was most fortunately provided by the recursivity of online forum thread posts. However, such recursivity needed further establishment in the design educator group discussions.

5.5.1 Abductive Inference of Relational Mechanisms

The overall abductive strategy serves the CR aim of providing an explanation of mechanisms or conditions of possibility. As I have said in Chapter Three, CR regards the context in which a mechanism is activated to be a necessary part of the explanation. CR also requires that one use substantive theories in the pursuit of such explanation. The re-contextualisation move of the abductive conjecture seeks to allow the research context to become part of the explanation of mechanism affecting it.

The view I took was that second-order observations in research data could reveal design teacher ways-of-knowing, as well as their location within differentiated knowing and communication systems. An abductive inference that these differentiated knowing and communication systems might be relational mechanisms was then feasible. But the macro, historical nature of such systems, and their micro effect in the concrete context of design studio pedagogy would require further data evidence.

If methodology is the link between the study aims and their achievement (Feast 2010, citing Crotty), then that link centres in the study upon *emergence*. Beginning with the emergence philosophy of CR, I have worked from the idea that there are structure, event and experience levels of emergence. What ‘happens’ is in CR a

matter of what has made it possible for such a thing to happen. Then I have moved to a theorisation of emergence that has purchase on the research context that needs explanation – knowing the visual meaning of students' designs in design pedagogy. Luhmann's theory has been applied to the overall emergence idea of 'whatever happens, something else makes this possible' in the specific instance of the emergence of shared visual design meaning in the design studio. The aim of the methodology laid out in this chapter is to explain relational mechanisms that condition the emergence shared visual design object meaning in the design studio.

Chapter Six

The Abductive Conjecture in the Online Forum Data Analysis

In this chapter I examine the first of the two sets of data mentioned in Chapter Five. This is the online design educator discussion forum;⁴⁰ the design educator group discussions I held with design educators at three different South African universities are discussed in Chapter Seven. For ease of reference, I will refer to 'online forum' in respect of the data from the online design educator forum, and to 'group discussion' in respect of the data from the designer educator group discussions.

Over both data sources, I regarded research participants as second-order observers. In Luhmannian theory, as I stated in Chapter Five, a second-order observer is a 'knowing onlooker' who observes cognitive indications made by distinctions (Luhmann, 2000, 2002). Such cognitive indications by distinctions embody the knower who knows in the distinctive way so indicated. What counted as substantive data in both data sources was this cognitive relation of distinctions to indications of design knowing. That is, I identified different ways-of-knowing in the data and noted the various distinctions called upon to indicate these ways-of-knowing. By these means, I set out to show pedagogical ways-of-knowing that might operate implicitly as cognitive relational mechanisms in design teachers' attribution of visual design meaning to students' designed objects, in the design studio..

Data evincing knowing indications by distinction held the potential to confirm, deny or alter my abductive conjecture about relational mechanisms in design pedagogy. To re-iterate the abductive conjecture that I proposed in Chapter Four:

Design teachers reproduce historically formed pedagogical ways-of-knowing when they comment on the visual meaning of students' designs. The ways in which teachers expect students to know may involve implicit cognitive distinctions within historical systems of knowing and communication. Theoretically, these historically developed and recursive

⁴⁰ This forum is entitled PhD-DESIGN but the forum is not confined to doctoral research in design.

systems continually organise cognitive distinctions as communicable knowledge. When teachers implicitly relate specific cognitive system distinctions to students' designs then, some and not other visual design object meanings may be favoured by the teachers. Therefore pedagogical ways-of-knowing so constituted may be regarded as relational mechanisms that enable and constrain the emergence of shared design meaning.

By virtue of the common interests or structural coupling of design academics with design teachers, design ways-of-knowing might refer to a broad spectrum of pedagogical ways-of-knowing. Therefore I examined the online forum data first, for evidence of design knowing that might possibly constitute pedagogical ways-of-knowing as relational mechanisms.

6.1 Tracing Ways-of-Knowing in the Online Forum Data

The online forum data consisted of forum threads and individual, dated posts by design academics within these threads.

Particular threads caught my attention because they dealt with design knowing themes. To start with, and in order to not anticipate systemic ways-of-knowing in design studio communication as relational mechanisms, I identified threads in which different knowing themes appeared. These knowing themes mostly surfaced and resurfaced across threads over weeks and months, showing design academics' preoccupation with these themes. For instance, three threads titled 'Creativity–Design–Innovation' (May 2008), 'Methodologies, performative placemaking and distributed creativity' (January 2009), and 'Creativity and Nature vs Nurture' (February 2009)⁴¹ all concerned distinctions of *creativity*, and specified distinctions of what sort of knowing creativity might be.

To illustrate how I drew upon the online forum data, I show in Figure 6.1 overleaf a thread I selected, 'Design as Discourse', that appeared in July, 2008 and attracted some fifty posts. This thread is only one selected from amongst the other threads appearing in July 2008. I regarded the knowing theme 'design as discourse' as a possible system of knowing and communication, especially as design as discourse

⁴¹ These online forum threads and all that follow in this chapter are available at the PHD-DESIGN page of the JISCMail listserv (<https://www.jiscmail.ac.uk/cgi-bin/webadmin?A0=phd-design>).

as a knowing theme re-surfaced as ‘Symbolic Design cues’; ‘Actor-Network theory - discourse on object level’; ‘Toward an actor network theory of design’; and ‘Seeking refs on how artefacts mediate power’.



Figure 6.1 Choice of a thread from the PhD-Design Archives.

The following figure 6.2 shows sequential ‘design as discourse’ posts made by different forum contributors, during the month of July, 2008. I examined these posts for indications of the theme ‘design as discourse’ by variational distinctions.

design as discourse		
design as discourse	Jurgen Faust <jurgen@JFAUST.COM>	Mon, 7 Jul 2008 18:17:23 +0100
Re: design as discourse	Eduardo Corte Real <eduardo.corte-real@IADE.PT>	Mon, 7 Jul 2008 18:20:31 +0100
Re: design as discourse	Juris Milestone <juris@TEMPLE.EDU>	Mon, 7 Jul 2008 13:40:37 -0400
Re: design as discourse	Terence Love <t.love@LOVE.COM.AU>	Mon, 7 Jul 2008 20:58:16 +0100
Re: design as discourse	Bill, Amanda <A.E.Bill@MASSEY.AC.NZ>	Tue, 8 Jul 2008 08:21:35 +1200
Re: design as discourse	Filippo A. Salustri <salustri@RYERSON.CA>	Mon, 7 Jul 2008 16:48:25 -0400
Re: design as discourse	Klaus Krippendorff <kkrippendorff@ASC.UPENN.EDU>	Mon, 7 Jul 2008 16:57:01 -0400
Re: design as discourse	Alan Young <alan.young@AUT.AC.NZ>	Tue, 8 Jul 2008 10:53:57 +1200
Re: design as discourse	Gavin Melles <GMelles@GROUWISE.SWIN.EDU.AU>	Tue, 8 Jul 2008 11:42:59 +1000
Re: design as discourse	Klaus Krippendorff <kkrippendorff@ASC.UPENN.EDU>	Mon, 7 Jul 2008 22:40:16 -0400
Re: design as discourse	Gavin Melles <GMelles@GROUWISE.SWIN.EDU.AU>	Tue, 8 Jul 2008 13:12:34 +1000
Re: design as discourse	Alan Young <alan.young@AUT.AC.NZ>	Tue, 8 Jul 2008 16:34:09 +1200
Re: design as discourse	Keith Russell <Keith.Russell@NEWCASTLE.EDU.AU>	Tue, 8 Jul 2008 15:29:05 +1000
Re: design as discourse	Jurgen Faust <jurgen@JFAUST.COM>	Tue, 8 Jul 2008 06:36:41 +0100
Re: design as discourse	Terence Love <t.love@LOVE.COM.AU>	Tue, 8 Jul 2008 08:01:06 +0100
Re: design as discourse	Terence Love <t.love@LOVE.COM.AU>	Tue, 8 Jul 2008 08:29:21 +0100
Re: design as discourse	Gavin Melles <GMelles@GROUWISE.SWIN.EDU.AU>	Tue, 8 Jul 2008 17:51:59 +1000
Re: design as discourse	Terence Love <t.love@LOVE.COM.AU>	Tue, 8 Jul 2008 08:55:41 +0100
Re: design as discourse	Keith Russell <Keith.Russell@NEWCASTLE.EDU.AU>	Tue, 8 Jul 2008 18:07:06 +1000
Re: design as discourse	Jurgen Faust <jurgen@JFAUST.COM>	Tue, 8 Jul 2008 09:12:40 +0100

Figure 6.2 Sequential posts within the forum thread ‘design as discourse’

Next, Figure 6.3 shows an explicit distinction or variation of the ‘design as discourse’ theme (the highlighted phrase “things like race, class, culture power, etc.”) made by a forum contributor. This is way-of-knowing about design as discourse embodies the first-order knower who takes such a view – either as a second-order reflective self-observation of the forum contributor’s own knowing, or another or other first-order knowers who think of ‘design as discourse’ in terms of “race, class, culture, power etc”. the Here, as in other posts, it is most significant that the post refers to the previous forum post distinction or variational understanding of design as discourse, a distinction made by another forum contributor. Over forum threads that encompass knowing themes, it was evident that new distinctions referred to foregoing distinctions. This shows the recursivity of Luhmann’s communication events, where a prior distinction is indicated in order to make a new one, as communication proceeds (Luhmann, 2002).


Subject: [Re: design as discourse](#)

From: Juris Milestone

Reply-To: Juris Milestone

Date: Mon, 7 Jul 2008 13:40:37 -0400

Content-Type: text/plain

Parts/Attachments:  [text/plain](#) (35 lines)

I agree - excellent question.

I'm not sure if there is irony meant in Eduardo's post, but wouldn't it be abstract distillation to attempt to define design as not discourse - albeit a potentially useful abstraction for certain purposes (I would genuinely like to know what they are), but still, a kind of artificial isolation, as if to say that design operates in a total material and social vacuum?

For my interests, accepting design as discourse is a first step. And staying with Foucault, the pertinent questions have to do with effects and results of that discourse - who benefits? how? in what way? and how does this articulate with things like race, class, culture, power, etc.?

Juris Milestone

← Explicit distinction of ‘design as discourse’

Figure 6.3 Thread post showing an explicit distinction that indicates ‘design as discourse’ as a knowing theme.

What is also evident in this post and the reference made in this post to the previous post is that distinctions as related variations all indicated the knowing theme or potential system of knowing and communication design as discourse.

After a careful examination of these distinctions and indications in forum threads appearing from June 2008 to June 2009, I identified nine way-of-knowing themes that evidenced design knowing and communication system characteristics. These nine knowing themes are listed below. The workings of my analysis of these themes are given in following sections.

Design Creativity. Creating a designed object is a cognitive act, but there was contention in this knowing theme about what kind of cognition creativity involves. For instance, as I described in Chapter Two, creativity is construed as sometimes personal knowing and sometimes as social knowing.

Design Definitions. Definitions in the threads concerning this knowing theme viewed *designing* as a cognitive act, but an act that might be defined by different goals.

Design versus Art. Forum discussion over the threads concerning s knowing theme took up the ubiquitous question of how design might be different to art, in terms of what kinds of knowing are involved in each.

Design as Discourse. Threads about this knowing theme concerned how it might be that designed objects can be understood as discursive – for instance, how they might represent or subvert historical traditions of style like what might be considered ‘baroque’ or what might be considered ‘kitsch’, or as Buchanan (1996) has mentioned, how designed objects might challenge or advance social norms.

Design Research. Posts within the threads referring to this knowing theme dealt with ‘finding out’ or forms of mental processing in order to know what issues might impact on the appeal of a particular design.

Design Thinking. This knowing theme concerned ways of thinking through designing as a process toward producing a viable visual object.

Design Methods. knowing through formalised strategies for thinking through and dealing with visual design problems was the theme of these threads.

Group Collaboration. This knowing theme saw group-think and group-work as having advantages over individual efforts.

Design Aesthetics. How it is that the visual aesthetic appeal of a design might be known was the theme of this thread.

Cognitive distinctions in respect of these knowing themes were ubiquitous across the threads in which they appeared. These design knowing themes recurred over the history of the online forum archives. This longevity was not surprising because these themes appear often in historical, theoretical and educational design scholarship. Overall, these themes involved contention between online forum contributors about 'designerly ways-of-knowing' (Cross, 2007a). Figure 6. 4 illustrates the second-order indication of knowing themes by explicit distinctions.

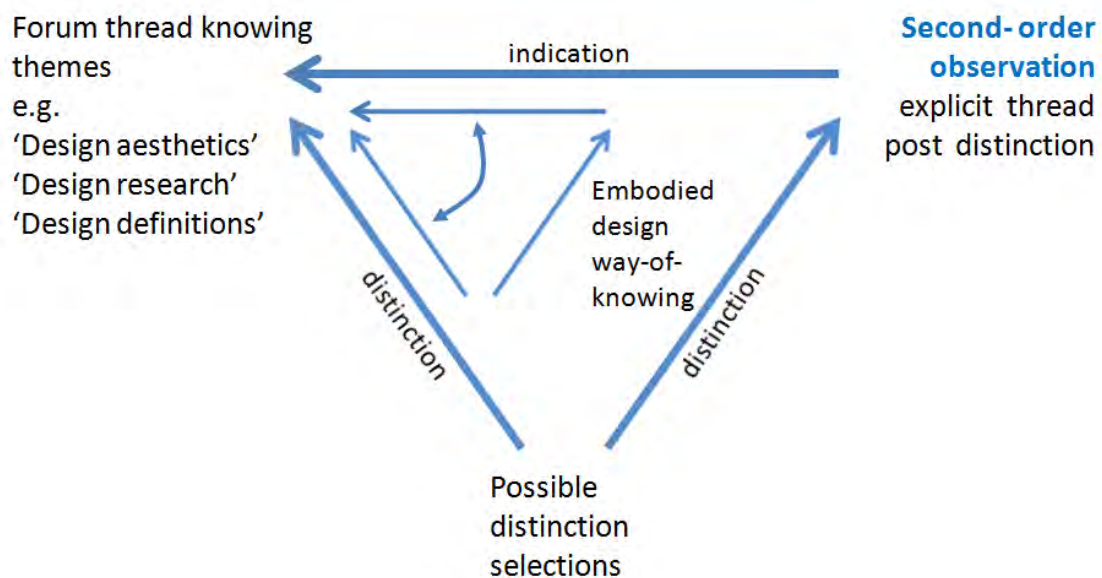


Figure 6.4 Second-order observation or indication of knowing themes by means of explicit distinctions.

In the analytical examination that follows, I attempt to show how online forum posts within knowing-themed threads exhibited the relational duality that both Bhaskar (2008) and Luhmann (2002) espouse: the relation between an abstract system or structure, and an actual cognitive event. Explicit distinctions were asymmetrically related to knowing themes in that they patently indicated these themes. This relation between a way-of-knowing distinction and a knowing theme was my guideline for selecting posts as data.

The research concern with visual design meaning was sometimes satisfied by explicit reference to designed objects, and at other times there was implied reference to designed objects.

As I have said, in the data a great many distinctions indicated each of the data knowing themes. My purpose was, however, to identify the scope of way-of-knowing distinctions that might indicate knowing themes. I selected posts on this basis, and in the following section I illustrate my analysis with what I judged to be sufficient quotes from the data to illustrate the scope of variation amongst knowing theme distinctions.

My further purpose was to show differentiation among pedagogical ways-of-knowing. This needed a staged analysis over both data sets. In the online forum data, it was possible to identify selective distinctions that indicated what *might* be knowing and communication systems and subsystems. But only when I could find some evidence of enduring historical structures could these putative systems and subsystems be considered to be relational mechanisms, in the CR sense. In the following analysis I footnote the thread titles I drew upon in respect of each knowing theme, because these thread titles sometimes made obscure reference to thread contents.

Posts made by the online forum design academic contributors are referenced by name and day, month and year date. I have taken this citation route because of the ethical considerations regarding design academic posts, mentioned in Chapter Five. As I have said in this regard, I tread a fine line between recognition of academic distinctions of design ways-of-knowing, and the use of these quoted distinctions for my own research purposes. The citation format I have used is intended to allow my reader easy access to the online forum posts from which I quote portions of the

design academic contributor's observations, should they wish to follow up on these. I now move to a discussion of each of the identified nine ways-of-knowing with brief examples from the data of the distinctions being called upon in each.

For the first knowing theme, Design Creativity, I show the workings of my analysis method (Henning, van Rensburg & Smit, 2004) in a bit more detail. This same analysis method was called upon for the identification of all nine of the knowing themes. In the interests of space and the logistics of demonstrating the process within the confines of a thesis, I therefore use this first knowing theme to give an analytical exemplar of the online forum data (which is the second-order view of a design academic) of micro, distinctive ways-of-knowing as seated in macro systems or structures of knowing and communication.

6.1.1 Design Creativity⁴²

Borjesson (23 May, 2008)⁴³ asserts that design innovation as a creative way of knowing does not mean innovation as novelty:

Design and innovation is so intimately linked that young designers seem to seriously think that by creating something new they are innovative. Innovation has no value of its own if it does not mean *development* [my italics].

For Borjesson, creative innovation requires a development of what has gone before. I then regarded '*development*' as a distinction or specification of how creativity might be viewed as be as a cognitive act.

For Scott, design creativity drives "new ways of looking at existing problems", involves "seeing new opportunities" and may also "[exploit] emerging technologies and changes" (Scott, 27 May, 2008). In this understanding, ways in which design could be creative then required the designer:

⁴² As I have already mentioned, the threads in respect of this particular theme include: 'Creativity–Design–Innovation'; 'Methodologies, performative placemaking and distributed creativity'; and 'Creativity and Nature vs Nurture'.

⁴³ This is thus the first of the references to the forum data. In this case the reference is to an online comment made by a design academic named Borjesson and the comment was made on 23 May 2008.

*to look at existing problems in new ways,
to see new opportunities, and
to exploit technological change.*

Morelli (23 May, 2008 and citing Verganti) said that creative innovation “produces substantial changes in the universe of language/meanings, and consequently generates technological changes of minimal or radical dimension”. Ways in which design could be creative required the designer:

*to produce substantial change, and
to generate technological change.*

For Bill (27 May, 2008) a distinction of creativity “that resides in the person” is countered by the distinction of creativity as “organised externally”. From this kind of perspective creativity “is mainly an issue of who the audience is when someone is talking about design” (Sobh, 28 May, 2008). Ways in which design could be creative then required the designer:

*to draw on personal understandings,
to address social understandings, and
to design for an audience.*

Albinsson (22 May, 2008) feels that creative “innovation is associated with the challenge or alteration ...”. Creativity is differently conceived by Jurier (2 February, 2009) “as somehow where economic value is hung, even if, in fact, this is mythical” – and not about “a series of pure ‘innovations’ that punctuate an otherwise stable tradition”. Ways in which design could be creative then required the designer:

*to challenge or alter, and
to generate economic value.*

A blander view of creativity was that creativity is just “a form or subset of general intelligence” (Curedale, 16 February, 2009). A way in which design could be creative required the designer *to think intelligently*.

Design creativity as a way-of-knowing thus called upon a number of cognitive distinctions in the data, a few of which have been briefly illustrated here with data excerpts, as requiring a designer:

to innovate through development
to look at existing problems in new ways,
to see new opportunities,
to exploit technological change to produce substantial change,
to generate technological change,
to draw on personal understandings,
to address social understandings,
to design for an audience,
to challenge or alter,
to generate economic value, and
to think intelligently.

The explicit distinctions of design creativity above are discernable in data only because they are second-order observations. Distinctions seen at a second-order level construe the distinction as representing a first-order observer's act of cognition, like 'drawing on personal understandings; or 'seeing new opportunities' or 'challenging'. The distinctions here are shown in both a cognitive and communicative light.

The distinctions identified above suggested how different design teachers might think design students could *creatively* know design object meaning. At this stage the conjectured role of distinctions that indicate ways-of-knowing was clearly borne out in the data. Due to the likely structural coupling between design academics and design studio teaching, I further surmised that these distinctions could occur implicitly to design studio teachers. While many of those posting to the forum are indeed design studio teachers, this cannot be taken as a given. Confirming that design teachers do indeed make such distinctions could, however, therefore only be done when the group discussions among design teachers who have direct experience of the design studio were examined, as is discussed in the next chapter.

6.1.2 Design Definition⁴⁴

The design definition thread posts made cognitive distinctions of ways-of-knowing what it is that defines design.

Friedman (25 June, 2008) distinguished design as “a process of planning to create something new (or to reshape something that exists) to meet a need, to solve a problem or to transform a less desirable situation to a preferred situation”. Design was thus defined by the ability of the designer:

*to create something new,
to reshape something that exists,
to meet a need,
to solve a problem, and
to transform a less desirable situation into a preferred situation.*

Salustri (19 June, 2008) asked whether design was concerned only with material culture: “Are you excluding the possibility of [the] immaterial?” A way in which design was defined then required the designer:

to address both material and immaterial culture.

Bürdek’s (15 June, 2008) opinion was “that design functions to improve the relations between products and users, and this is mainly a question of function and meaning”. This way in which design was defined then required the designer:

to improve relations between products and users.

Friedman (25 June, 2008), explained that the term design is “rooted in older Latin words, the most important being *designare*, a word that means ‘to mark out’”. To mark out or delineate is the nature of the act of design for Friedman. A way in which design was defined then required the designer:

⁴⁴ This theme emerged in the threads: ‘Definition of design; Working across multiple design sectors’ (was previously ‘A simple definition of Design’; ‘A Short Definition of Design’; ‘The non-opposite definition’; and ‘The Design Domain’).

to mark out [or specify].

Milestone (15 June, 2008) offered a definition of design “as a mobilising metaphor”. Design for Milestone might also essentially “coalesce elements of many different positive notions or ideas, or discourses, into a technology of organisation and change”. Ways in which design was defined then required the designer:

*to coalesce elements of different notions or ideas and
to mobilise design through metaphor.*

Simon’s (26 June, 2008) sense of design is that it is essentially connected to “embodiment”. A way in which design was defined then required the designer:

to embody [meaning].

Chambers (12 June, 2008) favoured an encapsulated definition of design as “seeking differentiation through insight. A way in which design was defined then required the designer:

to differentiate [design meaning] through insight.

Both a specific and a generic definition came from Cahalan (13 June, 2008), as follows. The specific definition: “Design is the research, analysis and creation of innovative products and services which shape the human experience.” Ways in which design was defined then required the designer:

*to create innovative products and services, and
to shape human experience.*

The generic definition was: “Design bridges the gap between the present and the future as a catalyst for improvement of the human condition.” Ways in which design was defined then required the designer:

*to bridge the gap between the present and the future, and
to improve the human condition.*

Overall, some of the cognitive distinctions identified in the data as defining design then required the designer:

to create something new,
to reshape something that exists,
to meet a need,
to solve a problem,
to transform a less desirable situation into a preferred situation,
to address both material and immaterial culture,
to improve relations between products and users,
to mark out or specify,
to coalesce elements of different notions or ideas,
to mobilise design through metaphor,
to embody,
to differentiate through insight,
to create innovative products and services,
to shape human experience,
to bridge the gap between the present and the future, and
to improve the human condition.

Ways-of-knowing show asymmetrical indication by calling on selected distinctions. In this case of the design definition ways-of-knowing, design is an abstract systemic structure that is indicated by distinctive acts of cognition like ‘improving the human condition’ or ‘mobilising design through metaphor’. This asymmetrical relation of cognitive acts of distinction to ‘Design’ is one of ontological duality, where concrete acts (of cognitive distinction) are put in relation to abstract structures.

6.1.3 Design versus Art⁴⁵

The design versus art thread posts seemed to refer to cognitive distinctions of art versus design. The entwined histories of art and design were discussed in Chapter Two. Similarities and differences between art and design have long been debated

⁴⁵ This was a single thread, which was titled as such.

(by, for instance, Palmer & Dodson, 1996 ; Barnard, 1998; Buchanan, 1996; Archer, Baynes & Roberts, 2005a).

A commonality between art and design saw both as endowed with “high cultural capital” (Bill, 4 June, 2008). Knowing design meaning was then construed as:

high cultural capital.

Milestone (June, 4 2008) suggested some fairly politicised distinctions of design as a “total social fact, along the lines of Mauss' gift,⁴⁶ or a technology of governmentality along the lines of Foucault, or related to class and taste along the lines of Bourdieu's field of position takings”. Milestone also thought “Design in mass media and consumer culture is a powerful force that is shaped outside the purviews of professional designers”. Distinctions of the ways in which design meaning could be known that are called upon here were:

*as class and taste,
as social politics, and
as a media force.*

Huppatz (2 June, 2008) thought the contemporary consumer design field was becoming narrower but at the same time becoming more closely associated with art. Milestone (4 June, 2008) made a “star system: of famous designers” (like the star system of famous artists) link between art and design. Ways in which design meaning could be known were:

*as art-related, and
as referring to famous designers.*

Bill (5 June, 2008) wondered whether engineering designers “need to express and realise their creative 'inner qualities' in the same way as the 'art and design' designers do?” A way in which design meaning could be known was then:

⁴⁶ Mauss' gift refers to the anthropologist Mauss' research on social conventions around gift giving and receiving.

as reflecting the designer's 'inner qualities'.

Milestone (6 June, 2008) thought that “the aesthetic variety [of design] (architecture, product design, fashion)” mainly contributed to media representation being “embedded in a symbolic economy of cool or new or tech” where “new subjectivities are created ... so as to align populations with the needs and desires of political economic order à la 'design'”. This distinction viewed design meaning as located in a symbolic economy that produces popular design subjectivities. A way in which design meaning could be known was then:

*as embedded in a symbolic economy, and
as producing subjectivities.*

Overall, design as cognitively related to art could then address design meaning:

*as high cultural capital,
as class and taste,
as social politics,
as a media force,
as art-related,
as referring to famous designers,
as reflecting the designer's 'inner qualities',
as embedded in a symbolic economy, and
as producing subjectivities.*

Distinctions comparing design to art showed how cognitive acts in design must, as Gedenryd (1998) has asserted, place a designed object in a future scenario of public life. As in the case of the previously two identified ways-of-knowing, design creativity and design as defined, each cognitive distinction of design as different to or the same as art entailed a trajectory of design meaning toward social life. This is evidence of the value-laden and socially divisive reach of these cognitive distinctions. The relation of distinctions to future meanings is, in the Luhmannian scheme, one where selected distinctions ‘attract’ further distinctions that selectivity

has put aside (Luhmann, 1995, p. 40). By calling on ‘this’ distinction, rather than ‘that’ distinction, there is the possibility of some future meanings and not others.

On these grounds, the conjecture of ways-of-knowing as relational mechanisms could be further pursued.

6.1.4 Design as Discourse⁴⁷

The design as discourse posts seemed to make cognitive distinctions of ways in which design discourse embodies design knowing.

Young (8 July, 2008) said that “once we’ve decided that something [a design] is ‘important’ ... we cast back to see where it began, what the important events were, and who the important people were, in its history”. This is a representational way of knowing through design precedent. Along these lines, Russell (29 June, 2009) mentions “the concept of artefacts as Affect Machines”. Ways in which design meaning could be known were:

*as reference to important historical designs, and
as producing affective response.*

A more contemporary vision focused on interpretive reference to social memory and material culture (Berk, 21 April, 2009). A way in which design meaning could be known was:

as social memory and material culture.

The idea of design as discourse for Friedman (22 April, 2009) could be seen as object-text interpretation: “One can use text interpretation and Wilhelm Dilthey's approach to the human sciences to understand all things human and human-made, including objects”. A way in which design meaning could be known was:

⁴⁷ This knowing theme was identified in the following threads: ‘Design as discourse’; ‘Symbolic Design cues’; ‘Actor-Network theory - discourse on object level’; ‘Toward an actor network theory of design’; and ‘Seeking refs on how artefacts mediate power’.

as object 'text'.

Alternatively, ideological discursive forms could be seen as a cognitive vehicle for a designed object, as Hepworth (24 April, 2009) mentioned: “an object's ability to channel or tap into a dominant discourse is part of why masses of people fall in love with it”. A way in which design meaning could be known was:

as channelling or tapping into a dominant discourse.

The socially structured view of design as discourse was given by Krippendorff (7 July, 2008). Krippendorff's distinction of design as discourse firmly states that “design discourse ... is a way of coordinating with others the realisation of artefacts or intervening into existing reality. Discourses produce objects”. A way in which design meaning could be known was:

as producing discourse.

For Stolterman (29 June, 2009) design as discourse concerned “the role and power of artefacts in the field of the philosophy of technology”. A way in which design meaning could be known was:

as concerned with power relations.

A different branch of distinctions that indicated design as discourse conveyed design as discourse in the semantic terms of affordances, symbols, and symbolic cues (Tonkinwise, 14 August, 2008) and semiotic relations (Hunsinger, 21 April, 2009). For Faust (23 April, 2009) the “[discursive] system of thought is visible within the [design] objects”. Ways in which design meaning could be known were:

as affordances,

as symbols,

as symbolic cues,

as semiotic relations, and

as visible systems of thought.

Krippendorff (21 April, 2009) developed the idea of design as discourse somewhat differently as “stakeholder networks within which artefacts come to fruition”. For him, a way in which design meaning could be known was:

as stakeholder interests.

Galle’s (15 August, 2008) design as discourse distinction was of “Design as Communication ... [or] how the designer may communicate with the user of the design product, through that product itself”. A way in which design meaning could be known was:

as visual communication.

Overall, the examples of cited distinctions suggest that design as discourse could then address design meaning:

as reference to important historical designs,

as producing affective response,

as social memory and material culture,

as object ‘text’,

as channelling or tapping into a dominant discourse,

as producing discourse,

as concerned with power relations,

as affordances,

as symbols,

as symbolic cues,

as semiotic relations,

as visible systems of thought,

as stakeholder interests, and

as visual communication.

These explicit cognitive distinctions of design as a discursive knowing system showed the relational properties of indication by calling on selected distinctions. That

selected distinctions were chosen from a range of possible distinctions is made clear by the alternative distinction possibilities within which each post is couched.

Another noteworthy feature of the above cognitive distinctions of design as discourse is the temporal references made by these distinctions. Distinctions of visual representation could just as well refer to Derrida's visual 'texts' (1997), Gibson's affordances (1977) or designed objects as material culture (Attfield, 2000; Ebbesen and Vihma, 2006). There was also again a sense of how these visual meaning distinctions might, for design teachers, carry implicit expectations of future meaning in the social world beyond design pedagogy.

The conjecture of (possibly pedagogical) ways-of-knowing as historically developed relational mechanisms was supported by forum participants' selection of temporally inflected distinctions.

6.1.5 Design Research⁴⁸

This online forum way-of-knowing concerned the debate about whether design praxis can be regarded as research output. My interest, however, focused upon ways of researching in order to design.

Simon (4 July, 2008) pointed to a "haptic" or touch-based way-of-knowing through sculpting that had students "thinking with their hands" and then with their minds. A way of researching for design was then:

by conceptualising from sense data.

At one end of a range of indications of design as a research or inquiry form of knowing lay in Love's (24 September, 2008) assertion that "ALL design methods are information gathering methods". A way of researching for design was then:

⁴⁸ The threads in which this way of knowing was evident were: 'Personal inquiry for Design Research'; 'Design as research; Evidence and Case-based Alternatives'; 'Evidence-Based Design Axioms'; 'Visual material in the development of knowledge – and beyond'; 'But where is understanding'; 'Cultural probes and axioms'; 'Information as an entity rather than an activity'; 'Is design always user-centred?'; 'Looking for referred definitions of consumers Latent Needs'; 'Design practice as design research?'

by gathering information.

Qualifying Love's assertion, Corte Real (24 September, 2008) characterised "imagination [as an] information processing method". A way of researching for design was then:

by mentally processing information.

"Rigorous observation" of design user interactions constituted design research for van der Merwe (23 September, 2008), who later added that such observation should address systems of user needs, and should be conducted "according to accepted research guidelines and principles". A way of researching for design was then:

by formal research procedures.

Sneha (23 September, 2008) also stressed "the necessity of user inclusion" in the design research process, which process ought to be "communicated, analysed, tested or criticised". Ways of researching for design were then:

by including users,

by analysing,

by testing, and

by criticising.

Nelson (18 September, 2008) championed "diverse forms of inquiry" leading to integrated or "composite understandings". A way of researching for design was then:

by diversified inquiry.

Designs themselves needed to be "analysed, reflected upon, tested, criticised ... and to produce theory during the making process" for Butt (23 September, 2008). Butt also emphasised "the invention and generation of ideas" and "original investigation undertaken in order to gain knowledge and understanding" as design research. Ways of researching for design were then:

by theorising designed objects,
by reflecting on designed objects,
by theorising design process,
by inventing ideas, and
by generating ideas.

Mackinnon (21 June, 2008) described design in terms of a rational production of “a solution that meets a perceived or actual need” but at the same time “a highly creative and innovative effort that produces something new or reframes or combines elements in a new and unexpected way”. Ways of researching for design were then:

by reframing elements in a new and unexpected ways, and
by combining elements in a new and unexpected ways.

Butt (19 September, 2008) quoted Swanson’s epistemic summation of design as a “syncretic and integrative discipline”. A way of researching for design was then:

by synthesising and integrating.

Reader (19 September, 2008) turned attention to “the need for visual scholarship across higher education, as a response to the ubiquity of new media”. A way of researching for design was then:

by visual scholarship.

“Routine discoveries” during routine investigation “would always lead to the unexpected” for Sless (20 September, 2008), who added that investigation for design is located at the fluctuating “interface between designers and the public they serve”.

Ways of researching for design were then:

by discovery, and
by researching relations between designers and the public.

On a cautionary note, Krippendorff (22 September, 2008) advised that though “empirical data” might help to make design decisions, such data would remain hypothetical, because the future of a design can only be conjectured. One way of researching for design was then:

by empirical data which can only conjecture the future hypothetical data about the future of a design.

“Cultural probes” (formal procedures for cultural inquiry) might be “about inspiration rather than information” in Barnes’s view (24 September, 2008). A way of researching for design was then:

by using cultural probes for inspiration.

Visual probing of the most promising design options “and then comparing them with client, production and user requirements” was van der Waarde’s (24 September, 2008) design research option of choice. A way of researching for design was then:

by visual probing of the design options.

Matthews (24 September, 2008) favoured “a more designerly, open-ended, ambiguous, pluralistic way of inspiring design concepts”. A way of researching for design was then:

by open-ended, ambiguous, pluralistic inspiration.

Rosenbaum (29 October, 2008) mentioned “cognitive walkthroughs with think-aloud protocols to look at various aspects of user experience”. A way of researching for design was then:

by cognitive walkthroughs to investigate user experience.

Design research involves “[T]he kind of knowledge that can be conceptualised as fluid, dynamic, changeable and applicable in particular sites” for Clerke (7 October, 2008). A way of researching for design was then:

by fluid, dynamic and changeable contextual inquiry.

Burnette (29 October, 2008) felt that design “needs and desires arise in the circumstances of a situation and the potentials through which they might be satisfied is usually where the experience of the practitioner weighs in”. Burnette noted though that practitioner experience is “often under-informed and in need of relevant knowledge”. A way of researching for design was then:

by drawing on informed personal experience.

“Evidence-based design” has been the modus operandi for most design fields, according to Love (30 October, 2008). A way of researching for design was then:

by drawing on evidence.

Overall, various distinctions indicated how design research could cognitively address design meaning:

by conceptualising from sense data,

by gathering information,

by mentally processing information,

by formal research procedures,

by including users,

by analysing,

by testing,

by criticising,

by diversified inquiry,

by theorising designed objects,

by reflecting on designed objects,

by theorising design process,

by inventing ideas,

by generating ideas,

by reframing elements in a new and unexpected ways,

by combining elements in a new and unexpected ways,

by synthesising and integrating,
by visual scholarship,
by discovery,
by researching relations between designers and the public,
by empirical but hypothetical data about the future of a design,
by using cultural probes for inspiration,
by visual probing of the design options,
by open-ended, ambiguous, pluralistic inspiration,
by cognitive walkthroughs to investigate user experience,
by fluid dynamic and changeable contextual inquiry,
by drawing on informed personal experience, and
by drawing on evidence.

The multiple distinctions called upon to form the design research ways-of-knowing variously reflected historical developments in the history of epistemology (Kuhn, 1970). For instance, experimental testing, personal reflection on experience and visual scholarship are historically successive approaches to design research as forms of research inquiry. This evidence supported the conjecture of pedagogical ways-of-knowing as historically formed relational mechanisms.

6.1.6 Design Thinking⁴⁹

The post in which design thinking emerged as a way of knowing seemed to make cognitive distinctions of ways in which design definitions imply design knowing.

Friedman (28 November, 2008) suggested that design thinking might follow Einstein's thinking process of "steps and missteps" exemplifying Einstein's "willingness to think creatively AND willingness to apply intellectual rigour to the problems he chose and the solutions he attempted". A way of thinking about design was then:

⁴⁹ The threads in which this way of knowing emerged were: 'Designers Think Through Einstein'; 'Cultures, Societies, and the Individuals within Them'; 'Intuition in design'; 'Bridging Art and Science'; 'Self Questioning in Design'; 'Using DNA Structure as an Analogy for Design'; 'Bridging Art and Science Intuition in Design'.

*by steps and missteps, and
by means of intellectual rigour.*

Haugen (21 November, 2008) linked “conceptual and abstract thinking” to graphic design. Then she observed that while ingenious design makes sense in hindsight, it relies on the “imaginative and intuitive” capacities. Ways of thinking about design were then:

*through conceptual and abstract thinking, and
through imaginative and intuitive capacities.*

Design thinking was, for Arvola (30 March, 2009), “about employing tacit knowledge” or how “experts leap to solutions and decisions, seemingly without analysis conclusions”. Arvola also connected intuition to design. Ways of researching for design were then:

*through tacit knowledge, and
through intuition.*

The discussion about design thinking turned to the curious idea of using DNA structure as an analogy for design. Love (4 December, 2008) remarked that Alexander (1977) had made it possible to “[connect] generic information about the world to good quality solutions”. A way of thinking about design was then:

by connecting information about the world to design solutions.

A single post to a single thread ‘Self-questioning in Design’ was made by Wölfel (16 December, 2008) who drew attention to self-questioning as an “unconscious practice,” not based on a carefully chosen set of questions. A way of thinking about for design was then:

by self-questioning that is not based on a carefully chosen set of questions.

Rust (13 December, 2008) reported that “constructing and evaluating a set of operational principles” had been done through his students’ design sketching

activities “showing thinking in action as well as an audit trail that connected the original [design] concept with the refined final version”. A way of thinking about design was then:

by constructing and evaluating a set of operational principles.

Swanson (30 March, 2009) thought that decision making was influenced by culture, and that intuition is backed by hard work. A way of thinking about design was then:

through intuition in design decision making, influenced by culture.

Curedale (30 March, 2009) pointed out that learned skills could be subconscious in thinking, while Norman (30 March, 2009) held that expertise draws upon a reserve of subconsciously known patterns. But Norman, echoing Swanson’s post, objected to the term intuition, as meaning “automatic, without conscious awareness” whereas automatic design thinking is the result of many hours of practice. A way of thinking about design was then:

through subconsciously known patterns.

Past experience “was a form of design research” for Blackler (31 March, 2009). A way of thinking about design was then:

through past experience.

Overall, the illustrative distinctions indicate that design thinking could then cognitively address design meaning:

by steps and missteps,

by means of intellectual rigour,

through conceptual and abstract thinking,

through imagination,

through tacit knowledge,

by intuition,

by connecting information about the world to solutions,

*by self-questioning,
by constructing and evaluating a set of operational principles,
through intuition in design decision-making, influenced by culture,
though intuition backed by hard work,
through subconsciously known patterns, and
through past experience.*

As in the case of distinctions of design research as a possible knowing and communication system, design thinking distinctions reproduced disparate cognitive acts: imaginative and intuitive capacities are for instance very much of the ‘art’ way of knowing tradition, versus the experimental rigour of the ‘science’ tradition (Feast, 2010). Nevertheless these distinctions were all framed within design thinking. As such, these temporally located distinctions were grounds for the conjectured reproduction of such distinctions in design pedagogy.

6.1.7 Design Methods⁵⁰

The thread posts through which design methods was identified as a way-of-knowing seemed to make cognitive distinctions of the ways in which design methods involve design knowing.

Online forum posts in respect of design methods concerned the very particular phenomenon of ‘pattern languages’, which were developed by Alexander (1977). Pattern languages are a distillation of design problem types, their characteristics, and successful solutions to these problems. Pattern languages involve typologies as well as ‘grammar’ as the ordering procedure or syntax that should be followed in order to solve the design problem (Todd, Kemp & Phillips, 2004).

Thorpe (8 December, 2008) refers to pattern languages as “creating a viable typology” that informs design. A design methods way-of-knowing was then:

⁵⁰ This way of knowing emerged in the following online forum threads: ‘Pattern Language’ (using DNA etc.); and: ‘What undergirds Christopher Alexander’.

by using a viable typology.

Then Burnette (8 December, 2008) mentions “syllogistic logic (IF this situation exists THEN do this)”. However, for Burnette a pattern language “does set forth both supporting evidence and the reasoning behind a proposed response”. A design methods way-of-knowing was then:

by using syllogistic logic.

Love (5 December, 2008) countered these ideas: “How does one know that a pattern isn't just something that someone thought was a good idea because of some moral, fanciful or idealistically conditioned beliefs about how the world works?”. Love (9 December, 2008) adds that rules for designing constitute “a taxonomy, typology or categorical schema [and] NOT a language”. A design methods way-of-knowing was then:

by using taxonomies, typologies or categorical schemas.

Russell (10 December, 2008) thought the nature of pattern language might be comparable to “theoretical provocations ... [as] fixed ideas which can however still open up a space for new ideas”. Patterns as templates for design might, for Russell, “distract [us] from the obvious ... away from the known details – towards possible combinations and variations that exist in the spaces between ... as an advance on the fixity of the given”. A design methods way-of-knowing was then:

by using pattern templates.

Overall, design methods could then cognitively address design meaning:

by using a viable typology,

by using syllogistic logic,

by using taxonomies, typologies or categorical schemas, and

by using pattern templates.

Distinctions of design methods as a knowing structure harked to the design methods movement that arose in the 1960s (Casakin, 2008). In 2008, at the time when these distinctions were posted, these method-based ways-of-knowing were still being debated. Their cognitively relational significance might then still lead to the emergence of this rather than that (shared or unshared) design meaning in design pedagogy. This effect on the emergence of design meaning was consistent with the abductive conjecture of relational mechanisms.

6.1.8 Group Collaboration⁵¹

The design collaboration thread posts seemed to make cognitive distinctions of the ways in which knowing could be a group process.

Coker (19 November, 2008) avers that “Collaborative skills are independent of design skills ... [and require] a complete rethink of the working philosophy of design without losing the commitment to aesthetic and functional excellence”. A way in which design could be collaborative required designers:

to rethink design without neglecting aesthetics and functionality.

Tonkinwise (18 November, 2008) saw collaborative designing as motivating students to “monitor and learn about their teamwork capacities”. A way in which design could be collaborative required designers:

to monitor design process.

Overall, cognitive distinctions of design collaboration required designers:

*to rethink design without neglecting aesthetics and functionality, and
to monitor design process.*

⁵¹ This online forum theme was evidenced in a short but important forum thread called ‘Group Assessment’. This thread dealt minimally with the assessment of group design work in design education, concerning far more distinctions of design intention as a collaborative effort.

Though this way-of-knowing was only briefly entertained during the online forum research data window of June 2008 to June 2009, ideas about collaboration in design have since received much attention (du Preez, 2010). Cognitive collaboration stands against the historical idea of the designer or artist as a lone genius (Feast, 2010), yet still refers to design intention.

6.1.9 Design Aesthetics⁵²

The design aesthetic thread posts seemed to make cognitive distinctions of the ways in which design aesthetics constitutes design knowing.

Albinsson (26 January, 2009) thought of pragmatic design aesthetics as communicating values in which “stakeholder design errands” are run. A way in which aesthetic design meaning could be known was then:

as concerning client stakeholders.

Dunbar (23 January, 2009) asked how pragmatist aesthetics might help to conceptually reach beyond “product styling” in interaction or communication design.

A way in which aesthetic design meaning could be known was then:

as going beyond ‘product styling’.

Russell (23 January, 2009) cited Norman’s work in connection with “transactional approaches” to pragmatist aesthetics. A way in which aesthetic design meaning could be known was then:

as transactional.

⁵² This way of knowing comprised the following threads: ‘Pragmatist aesthetics in communication design’; ‘Measurement of aesthetics’; ‘Emotional Theory Re: Online judgement of aesthetics’.

Friedman (23 January, 2009) made reference to the “symbolic interactionist tradition” as a pragmatist context for “aesthetics and interaction”. A way in which aesthetic design meaning could be known was then:

as symbolic interaction.

Love (28 January, 2009) differentiated between “subjective feeling-based design [and] rational functionalist design”. A way in which aesthetic design meaning could be known was then:

as subjective feeling-based design.

Dunbar (27 January, 2009) thought that theories of aesthetic experience offered “more than just the sum of identifiable, classifiable qualities possessed by artefacts”. Dunbar cited McCarthy and Wright’s view that design “is as much about what people bring to experiences as what the designer leaves there”. A way in which aesthetic design meaning could be known was then:

as what people bring to the experience of design.

Love (27 January, 2009) brought the discussion about pragmatist aesthetics back to the design user’s internal subjective world, but then stated that he could “only create designs for things in the objective external world”. A way in which aesthetic design meaning could be known was then:

as concerning the objective external world.

Albinsson (26 January, 2009) put a purposive slant on design communication: “I view communication as teleological, it serves the purpose of someone”. A way in which aesthetic design meaning could be known was then:

as serving someone’s purpose.

Overall, design aesthetics could then address design meaning:

*as concerning client stakeholders,
as going beyond 'product styling',
as a transaction,
as symbolic interaction,
as subjective feeling-based design,
as what people bring to the experience of design,
as concerning the objective external world, and
as serving someone's purpose.*

The reproduction of temporal cognitive distinctions about design aesthetics is evidenced here by Blumer's (1969) seminal social research into 'symbolic interaction'. Similarly 'subjective feelings' could be associated with Kelly's construct theory, (for instance, Salmon, 1995) or the general constructivist leaning of design knowing (Cross, 1982). 'Product styling' conceivably refers to Bürdek's product semantics theory of the 1970s (Bürdek, 2005).

These cognitive distinctions of design aesthetics have an emergent significance as they leave the hands of the designer and become product or artefacts in the public domain. This calls to mind Fleming's reference to the potential value-laden, historical, "out-there" meaning of students' designs, as "future artefacts" (1998, pp. 49–50).

Luhmann's (1995) view that seems to apply here is that meaning is always communicatively constituted. Design aesthetic meaning is indicated here by a number of different, but always selective cognitive distinctions that are selected from possible distinctions of design aesthetics.

This, for Luhmann (1995), is how communicative distinctions refer backward to previous distinctions, and forward toward future distinctions that can, in terms of an emergent knowing and communication system, still be made in the future.

.6.2 Online Forum Knowing Themes as Knowing Structures

The foregoing analysis examined nine knowing themes that might be potential communication and knowing systems in the Luhmannian sense, and, correspondingly, nine potential enduring, abstract and macro structures that might historically structure relational mechanisms.

A marked characteristic of the knowing themes of the foregoing analysis is that they evidence asymmetrical indication of a knowing theme by variational distinctions or *ways-of-knowing*. There were also commonalities among knowing themes:

To illustrate this, the knowing themes

- Design Research,
- Design Thinking, and
- Design Methods

seemed to bespeak finding out, (through Design Research) ways of thinking about designing (Design Thinking) or following prescribed strategies for solving design problems (Design Methods). Within these knowing themes, way-of-knowing distinctions like *conceptualising from sense data, using imagination and intuition*, and *using syllogistic logic* seemed to refer to forms of Design Inquiry. Then the knowing themes

- design versus art,
- design as discourse, and
- design Aesthetics

seemed to concern picturing, visualizing (Mirzoeff, 2002, p. 6) or referring to known qualities or ideas. Within these knowing themes, ways-of-knowing concerned for example, design as *social politics, as semiotic relations, and as symbolic interaction*.

I inferred that these way-of-knowing distinctions belong to a broader kind of knowing, that of Design Representation. The knowing themes

- design Creativity,
- design Definition, and
- group collaboration

seemed to refer to creativity as an act marked by particular intentions (Design Creativity) to design definitions as definitions of the purpose of cognitive design activities (Design Definitions) and to group-think as an intentional approach to design (Group Collaboration). For instance,⁵³ *to challenge or alter, to improve relations between products and users, and to monitor design process* were intentional way-of-knowing distinctions.

I inferred that the varied way of knowing distinctions within these knowing themes referred to Design Intent.

6.3 The Temporal Nature of Design Inquiry, Design Representation and Design Intent

Design Inquiry, Design Representation and Design Intent forms of knowing had noticeable temporal features. For instance, designing by using “a viable typology” (Thorpe, 8 December, 2008) derives from the design methods movement that was influential from the 1960s to the 1970s (Casakin, 2008). “To improve the human condition” (Cahalan, 13 June, 2008), was the intent of the idealistic Bauhaus design movement in in the 1950s (Boradkar, 2009). Indeed, one may infer temporal reference in the online forum data that goes back to Enlightenment rationalism. Similarly, references to objects as intrinsically representing particular attributes dates back to medieval craftsmanship (Feast, 2010).

⁵³ These instances constitute my reading of the online forum data.

To examine Design Inquiry, Design Representation and Design Intent forms of knowing in a CR light, I turned to the realist historian Daniel Little. Little has written about enduring ontological 'kinds' of historical phenomena, in contrast to 'types', which are temporally context-specific. Little's criterion for enduring kinds is that they have "deep explanatory properties" (2000, p. 12) that allow inference from one element within them to the next (2000, p. 14). This criterion is particularly relevant to Luhmann's distinction-structured systems of communicable knowing. Types, for Little, are by contrast heterogenous and changing groupings.

Little's (2000, p. 12) explanation of a historically enduring 'kind' follows:

What is a kind? We may refer to a 'kind' as a group of things that share fundamental properties – structural, essential, causal. When 'things' fall into groups that share deep, explanatorily relevant properties, we refer to the groups as 'kinds'. For example, 'metal' constitutes a kind; 'plastic' does not. 'Gold' is a kind; 'mud' is not.

Historical structures like 'feudalism', 'state', 'free market', or 'bureaucracy', do not have the ontological gravity that allows inference to new cases (Little, 2000, p. 13). As Little (2000, p. 23) puts the realist case for 'kinds' of relatively enduring structures:

A social order existed in Northern France in the 12th century that can be classified as 'feudal'. The social order existed; feudalism does not.

Peacock (2000, p. 2) elucidates Little's position by simply stating that enduring structures or systems are "distinct from the knowledge science produces about them".

Commonalities among 'types' of knowing theme were commonalities of inquiry, representation and intent. From an historically structured knowing and communication point of view, Design Inquiry, Design Representation and Design Intent as irreducible kinds. They cannot be reduced to any type or way of knowing within them. They are historically formed and enduring knowing structures that will continue to be indicated by cognitive distinctions over time. As I explained in Chapter Three, real structures that have a structuring or relational mechanism effect are

deemed intransitive, or relatively enduring in the CR view, by contrast with more transitive social structures (Lawson, 2004, p 2).

I further inferred that Design Inquiry, Design Representation and Design Intent are historical knowing structures that structure relations – they are relational mechanisms. In this way, and according to the CR conception of relational mechanisms, concrete micro events are into relation with macro abstract structures (Bhaskar, 2008; Archer 1995; Bunge, 2006, Elder- Vass, 2007a).

The relation between subsumed knowing themes and irreducible knowing structures is illustrated in Figure 6.5 below.

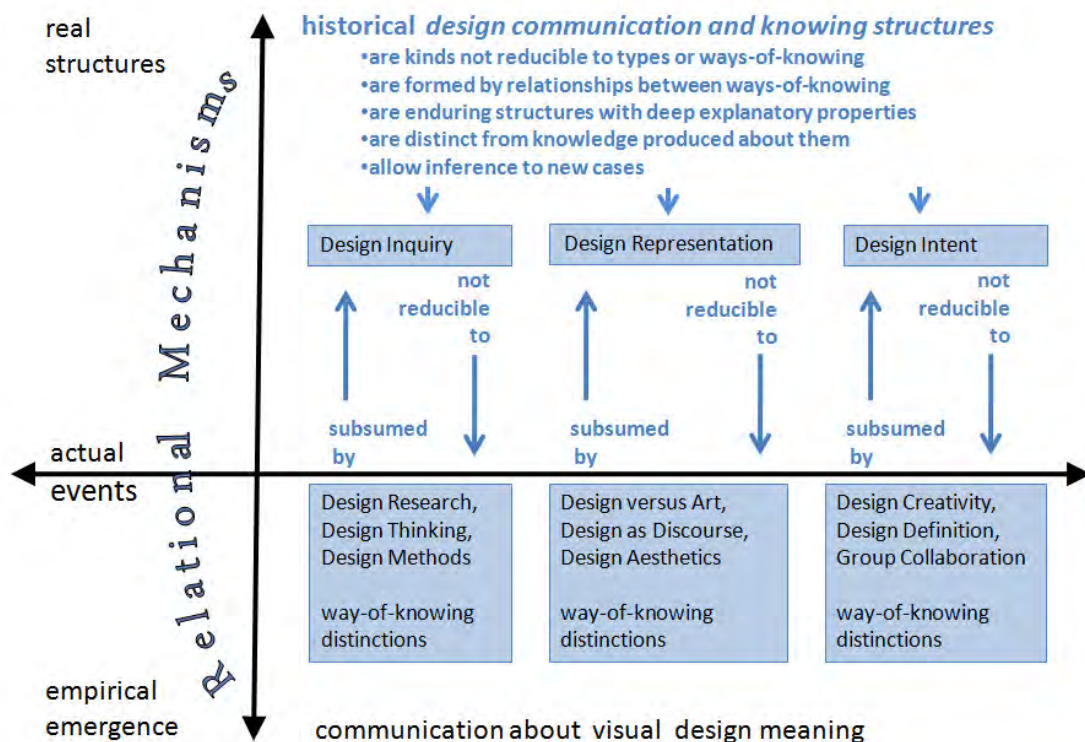


Figure 6.5 Forum data knowing themes as historical knowing structures.

To examine these historically 'deep explanatory properties' (Little, 2000, p 12) of Design Inquiry, Design Representation and Design Intent, I look the status of each as historical kinds, in turn.

6.3 Historical Perspective on Design Inquiry

Design Inquiry is a cognitive act of inquiry that informs design meaning.

To begin with, Dewey's (1938) theory of inquiry is pertinent to Design Inquiry as a relational mechanism, since Dewey combined cognitive inquiry with action, as the practice of design always does (Gedenryd, 1998, pp. 79–80). Dewey repudiated the rationalist tradition of pure intellectual rigour, a tradition which had persisted from the time of the Greek philosophers (Schön, 1992). What came to be known as technical rationality was famously espoused as design problem solving in Simon's 'Sciences of the Artificial' (Simon, 1969/1996).

Schön's (1983, 1987) reflection in and on action countered the rationalistic approach. Schön (1992) has referred to the rational versus reflective dichotomy as a historically entrenched matter of rigour versus relevance. The high academic ground of rigour may fail to establish the relevance of an inquiry, whereas a socially relevant inquiry may not achieve the same rigour. Very much earlier, Dewey (1938) had emphasised that ideas might guide inquiry in a continued and heuristic way, that neither anticipates nor limits the possible results. As Dewey (1938, p. 140) said, "There is continuity in inquiry. The conclusions reached in one inquiry become means, material and procedural, of carrying on further inquiries."

The historical opposition of technical rationalism to reflective practice has also received significant attention in design scholarship (for instance, Dorst 1997; Carvalho, Dong & Maton, 2009; Gedenryd, 1998; Jonas, 2006).

6.4 Historical Perspective on Design Representation

Design Representation is the cognitive act of representing design meaning by means of a particular avenue of visual meaning representation.

A quintessential view of the historical development of design representation is provided by Mirzoeff (2002, p. 7):

As one mode of representing reality loses ground, another takes its place without the first disappearing. The formal logic of the *ancien régime*

(1650–1820) first gave way to the dialectical logic of the photograph in the modern period (1820–1975).

One example of the ongoing replacement of representational modes was mentioned in Chapter Two. Barnard (1998) showed how objects have been regarded in the early *beaux arts* (fine arts) tradition as inherently meaningful. A later, post-Industrial Revolution view sees objects as subject to the meaning attributions of social groups (Feast, 2010).

Faigley (1999) traces how people have become progressively more materially literate since elite, private ownership of art and design objects or images became a thing of the past. Modern means of reproduction have brought increased access to these artefacts, so that they have now become part of global mainstream culture. Such objects have entered into the image language of culture, where they are relatively and contextually meaningful, and no longer hold uncontested power in themselves. Faigley explains how this has happened: photography, then film and later computer-generated images have made the world increasingly visible, and in doing so, have also made the understanding of the material world appropriable and transformable. For the general public, the field of possible associations with visual images and objects has widened exponentially since the late 1980s, when advertising moved from aspirational forms of persuasion to re-circulating cultural and media images, lifting images from one context and placing them in another.

6.5 Historical Perspective on Design Intent

Design intent is the cognition involved in the actual making of a designed object. As Krippendorff (2006, p. 42) has put this, an artefact from the latin ‘factum’ is ‘something done’. ‘Doing’ designing is the intentional production of designed artefacts and requires ways-of-knowing that are enacted in the process of design. Enactive cognitions involve both ‘way-finding’ and ‘path-making’ (Sawada & Caley, 2003, p. 50). In a design practice context, Prentice (2000, p. 523) says of intentional design knowing:

Practical knowledge is acquired through experiential learning; a direct involvement with expressive media, through which ideas and feelings are

realised in visual form. The imaginative outcomes of this creative process in a sense embody the knowledge required for their production.

Prentice's evocative remarks here bring the sense that motivation is the link between intent and creativity in design, and that such creative intent can be 'read-off' a student's designed object.

However, there are two historically opposing ideas about design intent that derive from design's origins in art. One idea, from the Romantic period, is of the individual artist or designer whose feats of creative inspiration constituted intentional cognition (Barnard, 1998, p. 49). Another, and very different post-Industrial Revolution idea, is that of socially intentioned creative design that looks to cultural expression or the challenging of social mores (Barnard, 1998).

6.6 The Abductive Conjecture and Historically Relational Mechanisms

So far, forum data evidence has been called upon to verify the abductive conjecture of historically relational mechanisms of design meaning emergence. The activation of these mechanisms could be seen in the selective, asymmetrical indication of design ways-of-knowing that puts aside other possible design ways-of-knowing. This mechanism involves a design observer who is embodied in the second-order perspective of explicit way-of-knowing distinctions. Most significantly, second-order observations of design ways-of-knowing in the forum data were observational choices that superseded other choices. Prioritised choices of a design way-of-knowing distinction were made by design academics as second-order observers who are interested in observations about design knowing.

According to my analysis of the data, the observational distinctions or choices selected in the forum data indicate Design Inquiry, Design Representation and Design Intent as systems of visual meaning cognition and communication. *Relational mechanisms* involving these abstract systems, however, require concrete acts of cognitive observation – without human observers, there would be no relation and no mechanism.

At this stage, design ways-of-knowing as relational mechanisms could be claimed on the basis of the online forum data. But that these were design *pedagogical* ways-of-knowing could not be assumed. Therefore, I construed the online forum data as representing historically relational mechanisms of design meaning emergence, not necessarily located in the design studio.

In the next chapter, the three identified historically relational mechanisms (Design Inquiry, Design Representation and Design Intent) are examined in data transcripts from the design teacher group discussions. The purpose of this was to investigate these relational mechanisms as *design studio pedagogical* ways-of-knowing.

Chapter Seven

The Abductive Conjecture and Group Discussion Data

In this chapter, I move to the second set of data, the design teacher group discussions. These discussions took place at three different South African universities in 2009. Using the transcripts from these discussions, I appraise my abductive conjecture that pedagogical ways-of-knowing are historically relational mechanisms.

When the relational mechanisms of Design Inquiry, Design Representation and Design Intent were identified in the forum data, I moved to establishing these relational mechanisms in the design teacher group discussions. The very general and ubiquitous relational mechanisms of Design Inquiry, Design Representation and Design Intent were evidenced in the group discussions, and so the activation of these relational mechanisms was established. Because of group discussion participants' involvement with design studio pedagogy, it was then possible to locate Design Inquiry, Design Representation and Design Intent relational mechanisms in the research context of design studio pedagogy.

I found, as I have reported in Chapter Six, many temporal and some historically situated references in the design ways-of-knowing in the online forum data. The group discussion data also offered particular historical references, as I show in my examination of this data, over the following chapter sections.

7.1 The Group Discussions

I regarded the design teacher group discussion participants as interested and involved second-order observers of 'what is known' in the design studio. As I explained in Chapter Six, a second-order observation may be indirect (in the case of an actual event which is not witnessed). Alternatively a second-order observation may constitute a second-order self-reflection on the observer's own observation of

events. The latter case of second-order self-reflection was strongly featured in the group discussions about design studio teaching. Most participants were or had at some stage been design studio teachers, and it was clear from the data that group discussion participants had intimate knowledge of design studio communicative interactions about the meaning of students' designed objects.

The group discussions generated lively dissent among participants, who came from different design programmes, so were not close colleagues. Over the three group discussions, there was a palpable sense of interested engagement. I have preserved the anonymity of participants in the three group discussions by using fictional names, and refer to the discussions as follows:

- Group Discussion A (2 June 2009),
- Group Discussion B (4 June 2009), and
- Group Discussion C (8 July 2009).

I draw on all three group discussions to examine in this data the relational mechanisms of:

- Design Inquiry,
- Design Representation, and
- Design Intent.

My selection of a some brief excerpts from the group discussion data is intended to show both variation and temporal recursivity of distinctions in respect of each relational mechanism.

Since the group discussion data comes from a very different kind of source to the online forum data, I have provided verbatim excerpts from the discussion transcripts. These excerpts are indented, and I have signalled what I identify to be explicit distinctions of design knowing mechanisms by means of bold text.

7.1.1 The Historical Perspective on the Group Discussion Data

As was the case with the online forum data (discussed in Chapter Six) there were many references in the design educator group discussions to ways-of-knowing that have emerged in the past. There were temporal distinctions that indicated that in the design ways-of-knowing or relational mechanisms identified in Chapter Six, it was possible to connect temporal distinctions to Design Inquiry, Design Representation and Design Intent ways-of-knowing because these are historical relational mechanism 'kinds' that link connected but varied distinctions.

In the group discussion data I sought further evidence of these relational mechanisms as being historically structured and recursive over time. From the Critical Realism (CR) point of view, the abductive conjecture involves a relation between abstract structures and empirical events and experiences (Bhaskar, 2008). From the Luhmannian point of view, if these conjectured structures were structures of communicable knowing, they must entail communicative recursion of historically formed distinctions (Luhmann, 1995, 2000, 2002).

My process of analysis was to look for indication of Design Inquiry, Design Representation, and Design Intent by explicit distinctions. I sought the same relational duality that guided the analysis of the online forum data: the relation between an abstract system or structure of knowing and communication, and an actual cognitive event (Luhmann 1995, 2000, 2002; Bhaskar, 2008). This relation entailed, on one hand, explicit second-order way-of-knowing distinctions that embody design studio teachers as knowers. On the other hand, such distinctions also indicated the historical knowing structures of Design Inquiry, Design Representation, and Design Intent. The embodied teacher ways-of-knowing that might evidence the indication of these historical knowing structures are shown In Figure 7.1 overleaf.

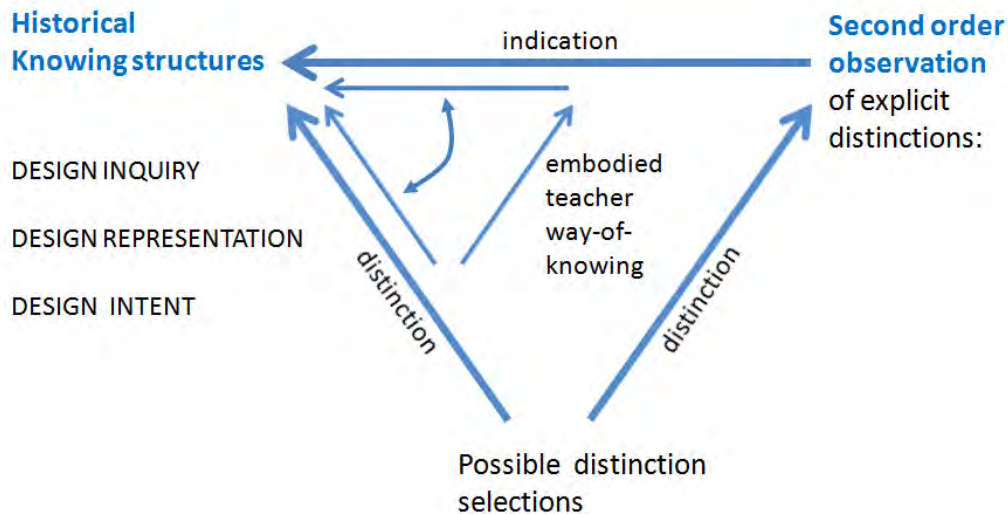


Figure 7.1 Embodied teacher way-of-knowing distinctions that indicate historical knowing structures.

Showing the historical antecedence of distinctions in the group discussions was necessary in order to examine my abductive conjecture that the reproduction of historically formed distinctions in design studio pedagogy represents pedagogical mechanisms or ways-of-knowing. My approach to the matter of temporality and historicity in the group data was not chronological. I followed Luhmann's (1995, p. 79) systemic conception of history:

[H]istory is constituted in the specific meaning dimension of time. By history we do not simply mean the factual sequence of events, according to which what is present is understood as the effect of past causes or as the cause of future effects. What is specific to the history of meaning is that it enables optional access to the meaning of past or future events, and thus leaps within the sequence. History originates in the release from sequence.

This insight from Luhmann is endorsed by Tang's (2008) comment on the historicity of any given phenomenon. A historical perspective is a perspective in which a later event is related to an earlier event. The outcome of this is that the earlier event is imputed to be the cause or condition for the later one. So as Tang (2008) says, earlier events gain their particular significance after they have occurred, but not, in my understanding of Tang, as a linear or sequential progression. This is described as 'historical recursivity' by Rheinberger (2010, p. 40, citing Canguilhem).

Rheinberger explains how discarded historical attitudes and practices discredit those that came before them.

In the analysis that follows I draw briefly on design theory concerning this non-sequential temporal significance of distinctions of design knowing in the data. In this way, I provide grounds for regarding as historically antecedent the distinctions that indicate Design Inquiry, Design Representation and Design Intent. Historical antecedence is deeply ingrained in CR philosophy because of the effect of historically formed abstract structures and events on empirical experience (Bhaskar, 2008), which I described in Chapter Three.

Therefore, in each of the next three sections examining, respectively, Design Inquiry, Design Representation and Design Intent in the group discussion data, I briefly refer back to the broad historical location of these relational mechanisms in Chapter Six.

7.2 Design Inquiry in the Group Discussions

Design inquiry refers to the ways in which teachers think students might inform their designs. In this regard, Dewey's (1938) theory of inquiry pits pragmatism against the earlier emphasis on the technical rationality of a problem-solving epistemology. The separation of rationalist objective analysis from pragmatic, active forms of inquiry means that there are many distinctions of Design Inquiry. These distinctions, I had conjectured, may function as relational mechanisms or pedagogical ways-of-knowing design meaning that enable or constrain the sharing of design meaning between teachers and students.

In the first excerpt from the group discussions, the indication of Design Inquiry is by discussion as a related distinction:

Ella: I mean the whole Socratic – it's more a **discussion**, it's more an exchange of ideas. (Group Discussion A, 2 June, 2009)

The ancient lineage of discussion as Socratic or critical dialogue (Maxwell, 2009) is invoked here as relational mechanism and a pedagogical way-of-knowing.

In the following excerpts, design teachers appear to reproduce a rationalist problem solving distinction of Design Inquiry:

Tony: You **must rationalise your work**, you must always say “Why I did this and why I want this here”. Yes, then **you rationalise your processes**, and that is what we’ll allow you to understand – whether you actually arrived at something that is reasonable or you actually missed out some steps, because you have to rationalise why you moved from this step to the next step and the next step, before arriving at this and judging that this is the right thing. (Group Discussion B, 4 June, 2009)

Marion: So within a project there will be certain **problems that they must solve** ... We give some outline; maybe give some reading, and the students start by collecting information, some research ... (Group Discussion A, 2 June, 2009)

This rational, problem solving indication of Design Inquiry represents a relational distinction by which design meaning can be known. Such a distinction has been widely attributed to Simon’s ‘Sciences of the Artificial’ (1969/1996). Simon developed an approach to rational problem solving based on logic and reason, which was later largely abandoned because it did not take aesthetics into account (Ehn, 2007).

In the next group discussion excerpt, cultural analysis is drawn on as a distinction for Design Inquiry:

Anne: [making a suggestion for project research] Couldn’t you have ... then ... to do a bit of **cultural analysis** to say, you know ... (Group Discussion B, 4 June, 2009)

Cultural analysis is a development in the history of design as a discipline (Whitehouse, 2009, p. 55). This development dates from the establishment of Cultural Studies as a meta-discipline in the 1970s (Whitehouse, *ibid*). Beginning with the landmark work of Raymond Williams (1963), cultural theorists have drawn upon semiotic and discourse analytical methods to investigate the circulation of cultural ideas.

In the following group discussion excerpts, gathering information contrasts with visually collecting information, or collecting information in the mind, as distinctions that indicate Design Inquiry as a knowing structure:

Marion: It is always in the context of a project. (Okay) So the project is there, and obviously each one goes off and they **gather information** ... (Group Discussion A, 2 June, 2009)

Nancy: It's not part of their everyday living and breathing to **visually collect information** ... (Group Discussion A, 2 June, 2009)

Ella: There's a jewellery student that's **collecting in their mind**. You know, he's doing excellent work but he doesn't have any visuals to show ... (Group Discussion A, 2 June, 2009)

In these group discussion excerpts, it is noticeably the individual designer's cognitive processes that are prioritised. In this regard, Casakin (2008, p. 46) notes that the cognitive processes or ways-of-knowing of individual designers became important as a reaction against the prescriptive design methods movement of the 1960s.

Design Inquiry was also related to participative exploration of human experiences and activities:

Ella: Ja, it's basically a space where people can **explore** and where you **include yourself, I think, as another participant** ... (Group Discussion A, 2 June, 2009)

Burns et al. (2006, p. 10) trace participative Design Inquiry back to changes in employer–employee relations after the 1950s. The inclusion of workers in employer decision-making led to a participative design process where designers consulted with their design audience about their needs. In turn, this way of conducting Design Inquiry appears to have become a pedagogical way-of-knowing.

After World War II, Design Inquiry involved an increasing focus on customers and market segments (Burns et al., 2006). Target market analysis was a distinctive form of Design Inquiry in the excerpt below:

Brent: We talked about **target market analysis**, and then we go through this academic process of trying to figure out what might they do. (Group Discussion B, 4 June, 2009)

Design Inquiry as a mechanism was thus found by teacher-observers to involve distinctive pedagogical ways-of-knowing:

by discussion,

by rational problem solving,
by cultural analysis,
by gathering information,
by mentally processing information,
by exploration,
by participation,
by contextual (community) investigation, and
by target market analysis.

The excerpts from group discussion data in this section represent just a sampling of the temporal distinctions that design teachers observed. Though these relational distinctions were not chronologically sequential, they could still be considered to be recursively related to Design Inquiry because of the repeated indication of Design Inquiry by the selection of varied yet related distinctions.

7.3. Design Representation in the Group Discussions

Design Representation refers to ways of visually conveying design meaning. Visual representation of design meaning has historically devolved upon the dialectical poles of intrinsic object meaning, and socially structured human attributions of meaning (Barnard, 1998).

Trend in the first excerpt below can be understood to be a distinction of Design Representation:

*Tony: Okay, these are the 2008 trends, this is what they're doing, very organic shapes, very this, very that and Na, na, na – something very futuristic and all that, and some students are saying “Do we have to **follow** those **trends**?” (Group Discussion B, 4 June, 2009).*

As a transient but collective form of taste, trend in this excerpt is a distinction of Design Representation. Romans (2005), in his history of art and design education, traces the reign of aesthetic trends in taste back to the 1830s and 1840s. During this period “escalating relationships between fashion, taste, and consumerism as a triplet existed in tandem with moral and behavioural imperatives” (Romans, 2005, p. 42).

In the following excerpt, reference to contemporary design exemplifies the same representational understanding of trend as public taste that Romans (2005) described:

Karen: They have to understand what **contemporary** jewellery is and **where it fits in**. (Group Discussion A, 2 June, 2009)

In the two group discussion excerpts below, visual communication and symbolic communication distinctions indicate Design Representation:

Nancy: it explains your awareness of **visual communication out there** and collecting material that you can use ... (Group Discussion A, 2 June, 2009)

Marion: I think Buchanan also says that communication is specifically referring to design, graphic design, as **symbolic communication** as well, which is another layer ... (Group Discussion A, 2 June, 2009)

According to the design theorist Richard Buchanan, visual communication of design meaning is embedded in social practices (Buchanan, 1996). This socially expressive representation of designed objects has led to an anthropological view of design meaning as symbolic consumption⁵⁴ since the 1980s (Margolin, 2009, p. 39).

Context was a distinction that applies to Design Representation in the excerpts below:

Nancy: They have to **contextualise** within the broader contemporary jewellery discipline. (Group Discussion A, 2 June, 2009)

Ella: So it's in that bigger **context** that it's important, instead of sitting on your own designing something (Group Discussion A, 2 June, 2009)

The dispute between rational and pragmatic representation of design meaning is highlighted by emphasis on the context in which designed object meaning may be represented (Cardoso, 2004). Cardoso characterises this dispute as a break with the art history-derived connoisseurship of formal⁵⁵ design meaning in the 1960s and 1970s, and a move to contextual meaning.

⁵⁴ 'Consumption' is a term used in material culture studies that refers to the meaningful incorporation of material objects in everyday activities and practices (Miller, 1987).

⁵⁵ 'Formal' means pertaining to the physical form of a designed object.

There were various group discussion excerpts that showed the relational distinction of questioning traditional designs, as indicating the representation of design meaning:

Karen: Contemporary jewellery **questions** traditional jewellery. (Group Discussion A, 2 June, 2009)

The questioning of establishment values through design became an imperative in the social criticism surge of the 1950s (Jacks, 2002). Designed objects could represent opposition to social norms of “the corporation and the suburb” (Jacks, 2002, p. 44).

Similarly, the following three excerpts refer to the influence of critical theory as a distinction of Design Representation:

Marion: I think **critical theory**, in a sense it is to expose what is not immediately visible, it's to expose domination, it's to expose these things. (Group Discussion A, 2 June, 2009)

Mary Anne: ... encouraging the students to see the **application** of **critical concepts** into design, so it brings ... and vice versa, bringing design into the way that you work through critical ideas. (Group Discussion C, 8 July, 2009)

The critical theory influence on Design Representation addresses social oppression versus emancipation in the critical design movement (Bowen, 2008, p. 441). The critical theory epistemology originates in the 1920s Frankfurt School of social theorists who sought to expose the exercise of implicit dominance in social practices (Bowen, 2009).

The next excerpt refers to the representation distinction of Baudrillard's simulacra:

Mary Anne: ... which becomes a wonderful **simulacral incitement** of the idea. (Group Discussion C, 8 July, 2009)

Baudrillard's (1983) argument was that through advertising and other media influences, objects lose their original meaning. They become simulacra of themselves, mere informative instruments that transfer the image of themselves onto the individuals who consume them, becoming completely identified with the manner

in which they are consumed. This results in a process of meaning classifications and social differentiations that overrides attention to the objects themselves.

A postmodern distinction of Design Representation is made in the excerpt below:

Mary-Anne: I asked her to create a photographic metaphor doing it through analogue and digital. I mean it's flawed and it's full of [inaudible] but it can be used at this level as a kind of allegorical talking about the fixity of truth and solid ideas, totalitarian; as opposed to the sort of floating world of the **postmodern** ... (Group Discussion C, 8 July, 2009)

The design- representational distinction of postmodernism applies to design meaning as “creative stocktaking, with archival interest in the past” (MacDonald, 2006a, p. 56, citing Adair). MacDonald rejects the superficial view of postmodernism as a “post-it, cut and paste” antidote to modernist dogma.

Design Representation as a pedagogical way-of-knowing relational mechanism was thus observed by design teachers:

as trend,
as contemporary,
as visual communication,
as symbolic,
as a vehicle of emotions,
as context-bound,
as critique (or questioning),
as critical theory,
as simulacra, and
as postmodern.

When Design Representation is indicated by any of these distinctions, a pedagogical way-of-knowing is activated. The asymmetrical relation of any of these distinctions to Design Representation is the mechanism of this pedagogical way-of-knowing. The operation of this relational mechanism requires a design teacher to implicitly call on such a distinction in a design studio communicative interaction.

7.4 Design Intent in the Group Discussions

The basis for understanding Design Intent as a relational mechanism brings together two elements: one is the cognitive intention or motivation that accompanies any act of designing; the other is the artefact that is made or created through this act. Historically, however, creative Design Intention has been divided between personal self-expression and cultural expression (Kim, 2006, p. 16).

This intentional distinction between personal design meaning expression and social or cultural design meaning expression was evidenced across the group discussions, such as in the following excerpt:

Vanessa: ... see design firstly as a **personal** victory, before it can be a social victory. (Group Discussion B, 4 June, 2009)

Belief in design meaning as a personal rather than a social accomplishment has been championed since the mid 20th century (Kim, 2006, p. 16).

A reflective distinction of Design Intent was also evident in the data, whereby the student is required to take responsibility for looking back. In the case of the next excerpt, the analogy of a reflective journey is drawn upon. This way of knowing links with Schön's (1983, 1987) reflective practice in design:

Nancy: It's difficult to get them to **get into a journey** and to kind of get them to **understand their own responsibility** ... (Group Discussion A, 2 June, 2009)

A distinctive relation between Design Intent and situated knowing was also evident:

Brent: The interesting thing here, talking about the situatedness and the importance of bodily being in the place where your communication design is going to be ... looking at the habits of people who are passing through that space – “How are they behaving?” and they're taking notes, and they're developing their concept and their copywriting and their design as a result of being in that space. So I think that's ... you asked earlier what I meant by situatedness.

Rebecca: Mm hm. Okay, so it's **situated cognition**? (Group Discussion B, 4 June, 2009).

Situated cognition is a form of Design Intent by virtue of the simultaneity of knowing and socially situated doing. The theory of situated cognition comes from research in educational psychology in the late 20th century (Brown, Collins & Duguid, 1989). The educational psychology view of situated cognition was one of 'cognitive apprenticeship' to the situated demands of a particular knowledge field.

In contrast to the distinction of situated knowing, there was also a universal design meaning distinction to Design Intent. This relied on the view that universal design meaning may still be represented in a designed object:

Olivia: I struggle with is this whole idea of having this one **universal truth** about what is aesthetically pleasing or what is right or wrong. (Group Discussion C, 8 July, 2009)

In the Romantic era individual Design Intent drew upon individual inspiration and imaginative faculties to create universal meaning (Romans, 2005). After the industrial revolution, Design Intent was directed toward more generalised social and contextual meaning (Barnard, 1998).

In the next group discussion excerpt, a relation between ego and Design Intent is evidenced:

Jean: There's another searching for values and meaning where the whole trend, if you like, for lack of a better word, is **against ego** (Ja), **where ego doesn't feature** (Group Discussion B, 4 June, 2009).

Quite possibly, the rejection of egotistical Design Intent connects with what Thomas and Southwell (2003) have identified as 'the cult of celebrity' in design, where designer 'big names' become exalted through popular media, exhibitions and design as lifestyle. Thomas and Southwell feel that this state of affairs is more about the designer than the consumer of design. For Thomas and Southwell the recent focus on human-centred design has shifted the focus from the designer to the consumer of design.

Design Intent was also distinguished as worldview, as illustrated by this excerpt:

Tony: They're also thinking about the way that they want to communicate to the world because they're also informed by a particular **worldview** ... (Group Discussion B, 4 June, 2009)

A Design Intention worldview is regarded as indispensable to students' design processes by Hardman (2009). Hardman's argument is that long-established ideas about design as a problem solving activity do not account for all that is needed in the design process, because such ideas fail to sufficiently take the social context of worldview into account.

Collaboration as a form of Design Intent was championed in the group discussion data, as illustrated in the following two excerpts:

Vanessa: I think we've lost that basic understanding of "**Who am I, who are you**" (mm mm), **groups or having kids work in groups**, it's really strange watching the dynamic. You know, "what can connect us, what can we change, what can we make better, what can we fix?" – those basic human interaction skills are actually severely lacking. (Group Discussion B, 4 June, 2009)

Peter: They are co-facilitators in **a process, in a group context**, so we were talking earlier about how our web designers in the group are in fact the leaders of that particular aspect of the group ... (Group Discussion C, 8 July, 2009)

The ideal of collaborative design has had to overcome a lengthy history of individualistic expression in design. Hileman (1998, p. 1) estimates that the individualist emphasis on design cognition was prominent from the Renaissance to the 1950s. However Feast (2010) has cited research that confirms strong support for collaboration in design since the late 1980s, also noted by Benett and Dunphy (2004).

In the next excerpt, Design Intent is distinguished as an attitude of respect for social difference that rejects conformity. The group discussion participant characterises this as supporting social 'rupture':

Mary-Anne: When I say grow the difference is – I mean – like grow the **rupture** in yourself, in a way that you respond to the students, so it like internalises the difference (Ja) of other people, and internalise that these things are difficult. (Group Discussion C, 8 July, 2009)

The group discussion participant here refers to epistemological rupture as a philosophical term originated by Bachelard (1884–1962) and later elaborated by Foucault, Althusser and Derrida (Bontems, 2010). Rupture is an intentional opposition to social norms.

An expectation that Design Intent can be distinguished as a humanistic attitude is expressed in the group discussion excerpt below:

Vanessa: So we go right back and we talk about **humanism** and we build it up, and we actually don't talk about design, and we don't talk about art, we don't talk about anything like that from the beginning, just talk about these ideas of the space of cultural being, "What is it to be?" (Group Discussion (Group Discussion B, 4 June, 2009)

Design Intent as a humanistic concern emerged in industrial design in the 1950s (Burns et al., 2006, p. 10). A human-centred design process has become recognised as a particular design approach (Thomas & Southwell, 2003, citing Pain et al., 1993).

The distinctions called upon in the data to indicate Design Intent suggest a historically recursive pedagogical way-of-knowing. Drawing together the illustrated distinctions, Design Intent can be seen to mean:

to know personally,
to reflect,
to know by doing (situated cognition),
a worldview,
to collaborate, and
a humanistic attitude.

The asymmetrical relation of any of these cognitive distinctions to Design Intent constitutes a pedagogical way-of-knowing. As such, I argue that Design Intent is a pedagogical way-of-knowing which in turn acts as a cognitive relational mechanism.

7.5 Pedagogical Ways-of-Knowing and the Abductive Conjecture

In the foregoing examination of my abductive conjecture, I have shown three ways-of-knowing that were found in the data to operate as relational mechanisms in design pedagogy: Design Inquiry, Design Representation and Design Intent.

Design Inquiry Design Representation and Design Intent are knowing structures or systems that co-ordinate the implicit selection of cognitive distinctions in communication in the design studio. Consciously or unconsciously, design educators draw from multiple distinctions in their activation of such systems. These systems as structures are organised by communication; communication is the mechanism that organises abstract meaning distinctions such that *this* and *not that* distinction is selectable in any concrete communicative exchange.

In the case of Design Inquiry, ways-of-knowing involve a cognitive act in which visual design object meaning can be known to the design teacher *by means of a form of inquiry*. In the case of Design Representation, ways-of-knowing involve a cognitive act in which visual design object meaning can be known to the design teacher *as a representation*. In the case of Design Intent, ways-of-knowing involve a cognitive act in which visual design object meaning can be known to the design teacher as an indication of *design intent* to create personal or social meaning.

At the same time, communication systems of knowing are historically formed and particular historical distinctions within them may be reproduced by design teachers in any design studio event. The reason why a design teacher may implicitly reproduce particular, historical selections is because that design teacher is 'structurally coupled'⁵⁶ by his or her own store of communicable knowledge to some and not other communication distinctions within the pedagogical mechanisms or ways-of-knowing. For example, a teacher's own knowing about Design Inquiry might espouse personal inquiry by exploration or by reflection on own experience, and not knowledge of the circulation of cultural ideas. Both of these distinctions of Design Inquiry are historically located: personal knowing is constructive knowing, and

⁵⁶ 'Structural coupling' refers to the coupling of a person's own knowledge to a knowledge domain. A simple example of this is the structural coupling of a doctor's knowledge to the knowledge domain of medicine, as described in Section 4.3.2.

constructivist epistemology is historically located in the early 20th century work of Piaget and Dewey, and later Vygotsky and Bruner (Oxford, 1997). Similarly, a cultural understanding of inquiry has come with the cultural studies approach of the 1970s (Whitehouse, 2009). The expectations of design teachers about how their students may know the meaning of design are then anterior to any design studio event. For visual meaning to be known, this must be the case: visual object meaning relies on prior knowledge.

However, in this study, design meaning is considered to emerge in the design studio only if it is shared between students and teachers. Pedagogical ways-of-knowing are then relational mechanisms that enable or constrain the emergence of shared meaning.

The abductive inference here is that pedagogical way-of-knowing mechanisms will impact on any single event of communication about design object meaning in the design studio. Design Inquiry, Design Representation and Design Intent are mechanisms that allow knowing about design meaning to be communicated, but not necessarily shared.

The micro view of the three pedagogical ways-of-knowing mechanisms is as follows: the student's designed object is an 'utterance' or signal of communicative intent (Luhmann, 1995, 2002). The design teacher responds to this signal by drawing on an implicit distinction. If the implicit distinction is one that the student can 'understand' (Luhmann, 1995, 2002), communication about design meaning can continue. This is the case even if the student does not accept the understanding, as I explained in Chapter Four. Communication does not require agreement about what is understood in order to continue (Luhmann, 1995, 2000, 2002), but it does require shared understanding. However, if the student does not recognise the way-of-knowing mechanism at play, or the distinction being drawn upon in its activation, then shared understanding is not possible.

If communication continues, then in the Luhmannian view of knowing systems, further distinctions will be recursively made (Luhmann, 1995, 2000, 2002). This allows the possibility of reaching a shared understanding of design meaning, but by

no means is there any guarantee that this will happen. To put this micro explanation in a macro perspective, design teachers draw on the pedagogical ways-of-knowing of Design Inquiry, Design Representation and Design Intent in order to select meaning distinctions. The meaning distinctions that design teachers may select then draw upon these historically recursive systems of knowing and communication.

The broad abductive inference here is that that pedagogical ways-of-knowing are relational mechanisms that entail historically recursive way-of-knowing distinctions. The dynamics of this inference as it derives from the online forum data and the group discussion data are shown in Figure 7.2 below:

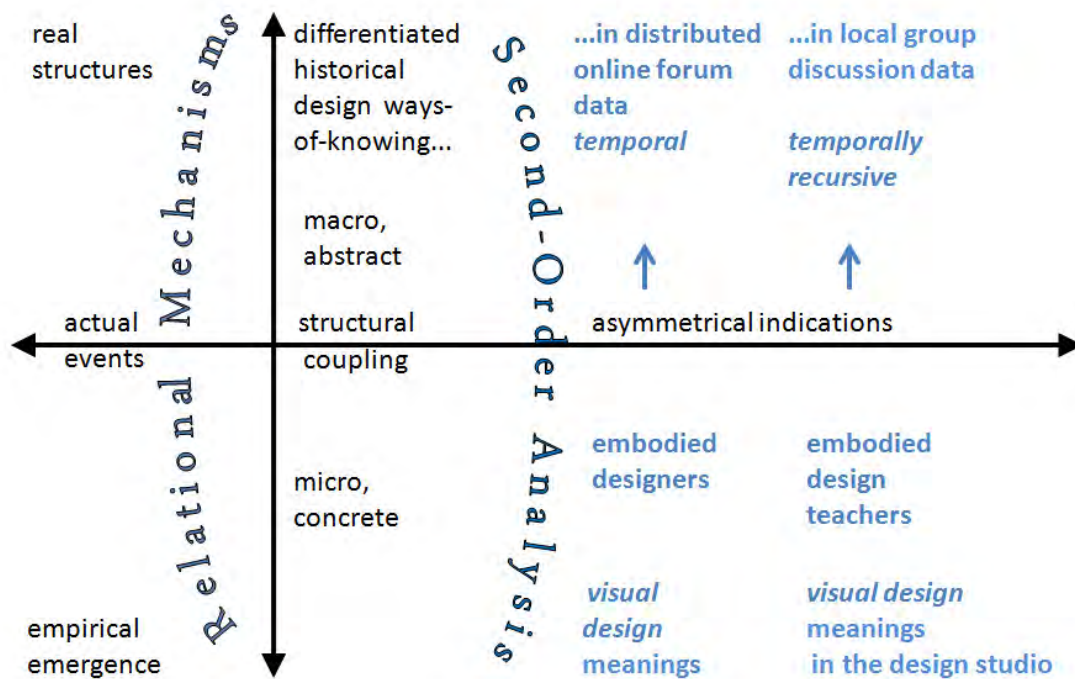


Figure 7.2 Abductive analysis across online forum and group discussion data

In the following chapter, I examine the validity and reliability issues that have so far been implicit in my abductive conjectural and inferential moves. Leading on from this, my focus in the following and final chapter is the research explanation proper, and the implementation of this explanation in design studio pedagogy.

Chapter Eight

Validity and Reliability Issues

From the outset, this study has focused on the general problem of pedagogical ways- of-knowing in any design studio context. It is then incumbent upon me to show why the abductive inferences I have made might be generalizable to design studios and pedagogical ways-of-knowing at large.

Therefore, in this chapter, I explore the traditional research concerns of validity and reliability and what they may mean for this qualitative study as it is positioned within the CR ontology and as it uses an abductive methodology.

In the case of critical realist (CR) research, the researcher role admits to the constraints of human knowing and admits that what might be known does not cover what there is to know. Pawson and Tilley (1997, p xvi) locate the CR position in relation to those of positivism and constructivism:

We have one camp aspiring to precise before and after measurement of a program subject in closely controlled conditions (the experimental evaluators) and another camp seeking empathetic understanding of program participants by sharing in their own natural settings (the constructivist evaluators) *We spurn these as choices because what is under test in realist evaluation are theories of how programs work.*

This is somewhat different to constructivist or interpretivist subjectivity. Fine (quoted by Christis, 2001, p. 337) observes that “discussions between realists and constructivists tend to be desk-thumping and foot-stamping in nature”. The trouble seems to be that what ‘really’ exists tends to be put against knowing what things in themselves are. These two claims about reality, what ‘really’ exists, and ‘knowing what things in themselves are’ do not contradict each other because it is quite possible to allow that things really exist without knowing what things in themselves really are. In consequence, the CR project champions theorising and abstraction in order to explain

CR research pursues the explanation of how programs work (in this case, the program of design studio pedagogy) in the face of a provisional and fallible research stance. Some principles of the explanatory power a study might achieve have been ventured: Different explanations may have more or less explanatory power(Peacock 2000, citing Lawson, p 5). These *degrees* of explanatory power cannot however count as criteria, since there is no way to decide them; there is only *who* decides them (Peacock, 2000, p.5). That should then be those design educators who deal with the problems of meaning-making in studio interactions.

In Chapter Five I identified my abductive research explanation aim of providing to design teachers an accessible and useful account of design pedagogical ways-of-knowing. Now I suggest in what terms design educators might judge the validity and reliability of this study. These terms are:

- The relevance of abductive research inferences to the material design pedagogical research context.
- The rigour of the abductive methodology.
- The generalizability of abductive inferences of pedagogical ways-of-knowing as relational mechanisms in design studio pedagogy.

8.1. Abductive Inferences in the Design Pedagogical Context

Abductive inferences needed constant attention to the *meaning emergence* nature the research focus. The core emergence issue in the context of design pedagogy embraces these emergence conditions:

- prior knowledge is needed for the visual meaning of a student's designed artefact to emerge, yet
- ways of knowing that allow design meaning to emerge are ambiguous and divergent, and

- shared visual design may therefore emerge or not emerge.

Explanation in the CR view centres on emergence. But it is one thing to explain in research, and another thing to regard an explanation for empirical circumstances as *necessarily* concerned with emergence. This is the case of CR research. For Morse, Barret, Mayan, Olson, and Spiers, (2002) ontological and epistemological commitments determine validity judgements. In the case of this research, ontological and epistemological commitments are staked upon the CR view of emergence.

Niiniluoto's example of Beethoven's Eroica symphony may illustrate the CR view of emergence in the context of empirical circumstances:

Niiniluoto (1999, p. 24) shows how Beethoven's Eroica symphony exists in the physical world where it is performed, and in a mental world when we hear it played. But the Eroica symphony exists beyond these spaces and times, and does not depend on such concrete manifestations for its existence. The Eroica symphony has achieved a lasting existence beyond anyone's experience of it, now or in the past. The Eroica symphony is a relatively enduring structure, irreducible to any of its parts, and a structure that can structure the emergent experience of the hearing of this symphony, in events where this symphony is played and experienced and in events where this symphony is heard and experienced, whether or not the symphony is performed, as it were, 'live'.

I venture that the empirical emergence of shared design meaning in the context of the design studio is similarly conditioned by Design Inquiry, Design Representation and Design Intent as enduring structures of knowing and communication in design studio pedagogy.

An abductive inference of emergence also brings the validity requirement that it uses the context in which the explanation is to have material effect as part of that inference (Maxwell, 2004, p. 6). It may seem self-evident that an explanation attempting to explain a situation should include that situation. But inferences about a empirical situation must answer to the research contextualisation of this empirical

situation. The research questions developed in Chapter Three have set out these contextual parameters:

- In what different ways do teachers think the visual meaning of students' designs can be known? In other words, *what are the different pedagogical ways-of-knowing that operate in the design studio?*
- How does verbal communication affect pedagogical ways-of-knowing visual design object meaning?
- Why might particular, non-arbitrary design object meanings emerge through pedagogical ways-of-knowing?

As I have said in Chapter Five, research data sources needed to allow contextual conditions of design studio pedagogy to surface on some level – the different ways-of-knowing of design teachers, communication between design teachers and students about students' designs, and teachers' non-arbitrary, particular attributions of design object meaning. These contextual conditions did surface in the group discussion excerpts in Chapter Seven, as participants described their favoured epistemological positions, how they might communicate about visual meaning with students, and the kinds of visual meanings they expected to be understood. The relational mechanisms of Design Inquiry, Design Representation and Design Intent need though to be more firmly located in the research context of design studio pedagogy. I view the contextual relevance of these explanatory relational mechanisms as follows:

Design Inquiry cannot be a standard procedure but must venture many different ways in which teachers expect students to 'find out'. In turn, this will influence the way in which teachers think it is possible for the students to know design meaning, and will further influence the way in which design teachers communicate with design students. When referring to Design Inquiry, it makes a clear difference if the guiding or implicit distinction used is 'rational analysis' as in Dannels Gaffney and Martin's (2008) study⁵⁷ rather than 'cultural information' per Strickfaden, Heylighen, Rodgers

⁵⁷ I described this study in Chapter Two, Section 2.4.

and Neuckermans (2005, p. 1). These distinctions will respectively favour non-arbitrary and particular design meanings.

Next, Design Representation involves object-laden language that requires shared tacit knowledge of material objects to be applied to the student's designed object at hand (Fleming, 1998). Then there is explicit discussion of language-laden 'out there' abstract objects (ibid). But this separation involves many different historically developed forms of visual representation, and therefore the (often unexamined) ways-of-knowing that visual representation entails⁵⁸.

Lastly, Design Intent in design pedagogy is riven by the ideas of creative cognition as self-expression and creative cognition as cultural expression (Feast, 2010; Polaine, 2011). It seems clear that historically developed polarities of Design Intent will continue to generate intentional ambiguity, and to complicate collaborative approaches to design pedagogy.

8. 2 The Rigour of the Abductive Methodology

There are no fixed criteria from which it is possible to assess in a definite way the validity of an abductive conclusion.

(Dobson, 2012, p. 66)

In the absence of a handy set of abductive validity criteria, Maxwell (1992) regards reliability to be a particular kind of threat to validity. The following account of my efforts toward research rigour aims to show how aspects of this study's methodology have been matched, aligned and connected, as a contribution to, rather than a claim of, reliability.

Rigour as a reliability tenet can only be determined within a philosophical research position (Caelli, Ray & Mill, 2003). That position, in this study, is the CR ontology where there is a 'real' world that cannot be fully known. I have earlier adopted Pratt's (2007, p. 32) "transcendental dualist" description of CR researcher

⁵⁸ Barnard's (1998, p. 3) reference to knowing through allegorical and metaphorical 'images' in Chapter Three provides good examples here.

postionality where “the inquirer is both part of the reality and partakes of its qualities but attempts at the same time to transcend the limitations of human knowledge”. My researcher position is then one where I decline to take a unified or unitary position. A transcendental approach is an emergence approach and necessarily one of analytical dualism, since one considers on one hand immaterial processes, and on the other, what is experienced as reality. A reasoned oscillation between the abstract and the concrete is necessary if relations between them are to be credibly explained.

From the immaterial side of things, it follows from this that at every stage of abductive inference, one must think with and about theoretical concepts and moves (Sayer,1992). How these moves fit with the methodology of a study (as everything the study stands for, tries to achieve, and claims) is especially demanding in the case of CR research. As Quinn (2006, p. 64) explains

For realists, theories and concepts are regarded as more than sensitizing constructs, they are regarded as abstract expressions of entities that exist in the real (intransitive) world (Archer 1998)...[But as] Carter and New point out that “The world to which our concepts and theories more or less adequately refer, the intransitive realm, is neither a product of, nor constituted by, our theories about it” (2004:5); to believe otherwise would be to commit the “epistemic fallacy” (Bhaskar 1989:133).⁵⁹

One must then accept that while theories may have great and significant usefulness, they cannot fully penetrate the real. An abductive methodology is necessarily a ‘theory-heavy’ methodology, and does require of the researcher a willingness to alter theoretical course if necessary (Timmermans and Tavory, 2012, p. 173). An adaptable theoretical approach somewhat counteracts the theory dependence of an abductive methodology. Theoretical adaptability is especially needed in order to respond to how the data pushes the abductive analysis forward (Timmermans and Tavory, 2012, p 175). Inferences from data may need to be supported by further theory.

Here I must interject that I came across the PhD-Design online forum at a fairly early stage in this research. It was my lengthy struggle to understand why this forum seemed to thematise design ways of knowing in a systemic way that finally brought

⁵⁹ I have cited Carter and New (2004) in this same regard in Chapter Three, Section 3.3.

me to Luhmann's (1995) social systems theory and then to his distinction theory of cognition in communication (Luhmann, 2000, 2002, 2006)⁶⁰. Even so, it was the process of pulsing between, on one hand, the PhD-Design online forum with its recursive messages about design knowing themes, coming from globally distributed design academics, and Luhmannian theory that allowed me to laboriously reach an applied understanding of Luhmannian theory. This meant that data came before theory, and a to- and fro- movement between data and theory began early in the study. This practice is recommended as one of research rigour by Morse, Barret, Mayan, Olson, and Spiers (2002).

The theoretical re-contextualisation of anomalous empirical circumstances was then a process of formulating and refining what was to become an abductive conjecture. Luhmann's theory allowed emergence to become a substantive issue, opened to empirical investigation. This led to what Timmermans and Tavory (2012, p. 172) have called cultivated ways of seeing, that are cultivated as the researcher moves through a continuing process of abductive conjecture. Timmermans and Tavory argue that qualitative researchers' immersion in the worlds they study (in this case, design pedagogy) can lead to statements about researcher positioning that oversimplify that positioning. More important than a biographical positioning is a qualitative researcher's theoretical acculturation (Dobson, 2012). This latter is far less a given than biographical positioning, and emerges in grappling with theoretical abduction. As Timmermans and Tavory (2012, p 173-174) say, echoing my own experience:

Discovering new theories depends on the inability to frame findings in existing theoretical frameworks as well as the ability to modify and extend existing theories in novel ways...In depth knowledge of multiple theorisations is thus necessary to find out what is missing or anomalous in an area of study and to stimulate insights about innovative or original theoretical contributions.. "Knowing the theory" means, in essence, knowing the theories.

60 As I have mentioned before, my use of Luhmann's theorization was only possible after realizing that there are two major developments in Luhmann's theorisation. The first development came to wide acclaim as a systems theory revision, (Luhmann, 1995) where Luhmann theorised relations of difference or distinction between communication systems and their environments. The later development built upon systems theory but added Luhmann's cognitive theory of observation by distinction to the system/environment theorisation of communication. It was this later development, that I was at length able to see as substantive to the research context of design pedagogy.

Timmermans and Tavory (2012, 173) further say that abductive inferences attempt to provide generalizable links to empirical circumstances, and the inferential fit with these circumstances must be more plausible than alternative theoretical accounts. Here I observe that though there are many communication theories that take in cognition, they do not accommodate the relational duality between historical structures and empirical events that is afforded by Luhmann's theorisation⁶¹. Another virtue of Luhmann's theory was that it allowed the abductive inference of structures through evidence of relations, rather than the abductive inference of relations from evidence of structures. This was mentioned as a research decision in Chapter Three in section 3.3.1.

8.2.1 Alignment between the Empirical Research Context, CR and Luhmannian theory

Timmermans and Tavory (2012, p 179) mention the "double fitting" of theory and data as an oscillation between the two. In this section, I show how the empirical research context directed theory, how theoretical extensions were indicated by data, and these processes pushed abductive inferences forward.

In Chapter Two I discussed my focus on factors of visual meaning and knowing that impact on design studio pedagogy. In Chapter three I then positioned this focus as one of the emergence of shared design meaning in communication between students and teachers relations. The emergence of shared design meaning was construed within the philosophical framework of CR as shown in Figure 8.1 overleaf.

⁶¹ To my knowledge there is no theory other than that of Luhmann that provides an historical account of mechanisms of cognition in verbal, visual, written or action forms communication.

DESIGN STUDIO PEDAGOGY RESEARCH CONTEXT	← CR EMERGENCE
<p>Research questions about the emergence of shared visual design meaning in the design studio:</p> <p>Different Pedagogical Ways of Knowing?</p> <p>Verbal Communication about visual meaning?</p> <p>Teacher non-arbitrary attribution of visual design meaning?</p>	<p>Critical Realism: what makes empirical emergence possible? Relational mechanisms of emergence</p>
<p>Pedagogical ways of knowing are relational mechanisms that condition the emergence of shared visual design meaning</p>	<p>Abduction in Critical realism</p>

Figure 8. 1 CR emergence and the empirical design studio pedagogy context

In figure 8.2 below I show how the PhD-Design online forum then signalled the substantive emergence theory used in this study.

PhD-DESIGN ONLINE FORUM →	RESEARCH CONTEXT	← SUBSTANTIVE ABDUCTIVE THEORY
<p>Threads and posts within these threads where design academics communicate about knowing visual design meaning.</p>	<p>Different design pedagogical ways-of-knowing.</p>	<p>Luhmann's theory of cognition in communication .</p>

Figure 8.2 The PhD-Design online forum and substantive theory

In Chapter Five I offered an explanation of the alignment of CR and Luhmannian theory. Here I give a brief summary of the alignment of CR philosophy and Luhmannian theory:

The relational duality in CR and Luhmann involves separation and relation of abstract structures and concrete experiences in events. Luhmann's duality between

indication of abstract systems and distinctions that occur in concrete events could then be aligned with CR relational duality.

- Historical structures as relational mechanisms in CR have parity with historically recursive structures of communication and knowing in Luhmannian theory. This brought the opportunity to map Luhmann’s theory of the emergence of cognition in communication onto CR relational mechanisms.
- Events in CR have parity with Luhmann’s cognition in communication events.
- Experience in CR has parity with the Luhmannian theory of understanding with or without acceptance of understanding in communication. This is design teachers and students experience in the design studio of the shared or unshared visual design meaning of students’ designed objects.

Alignment between CR, the research context of design studio pedagogy and Luhmannian theory is shown in Figure 8.3.

CRITICAL REALISM	RESEARCH CONTEXT	LUHMANN
Emergence Ontology (Chapter 3)	← →	Emergence Theory (Chapter 4)
Emergence Context (Chapters 2 and 3).		
Relational Mechanisms in CR philosophy, in the research context and in Luhmannian theory		
Real Structures	Different Pedagogical ways-of-knowing	Knowing and communication systems.
Actual Events	Verbal Communication about visual meaning	Cognition in communication events
Empirical Experience	Teacher non-arbitrary attribution of visual design meaning;	Implicit distinctions that indicate systems.

Figure 8.3 Alignment between CR, the research context and Luhmannian theory.

As required for a substantive abductive conjecture (Danermark, Ekstrom, Jakobsen & Karlsson, 2002), the general research context as defined by research questions was re-contextualised in terms of Luhmannian theory. This is shown in Figure 8.4.


RE-CONTEXTUALISED RESEARCH CONTEXT	 SUBSTANTIVE ABDUCTIVE CONJECTURE (Chapter 4)
<p>Research questions about the emergence of shared visual design meaning in the design studio:</p> <p>Verbal communication about visual design meaning?</p> <p>Verbal communication about visual design meaning carries implicit cognitive distinctions.</p> <p>Different pedagogical ways of-knowing?</p> <p>Teachers' own knowing processes are held in common with cognitive way-of-knowing distinction from different communication and knowing structures.</p> <p>Teacher non-arbitrary attribution of visual design meaning?</p> <p>Teachers' expectations about design meaning affect communication about visual design meaning.</p>	<p>Luhmann's (2000, 2002, 2006) theory offers substantive explanation of CR emergence through relational mechanisms in the design studio.</p> <p>Theoretical re-contextualisation of the empirical emergence of visual design meaning in design studio communication events.</p> <p>Luhmann's (2002) theory of cognition in communication.</p> <p>Structural coupling of individuals to knowing and communication structures (Luhmann, 2000, 2002).</p> <p>Structural coupling brings expectations about social sense-making (Luhmann, 1995, 2002).</p>

Figure 8.4 Re-contextualisation leading to the abductive conjecture.

Also in Chapter Five, I reasoned that the second-order nature of data sources might support the abductive data analysis. I regarded second-order data as especially valid, because second-order testimony is selective and intentional in preferring

particular distinctions over other possible distinctions. The first of two data sources, the PhD- Design online forum constituted a publically constructed and distributed communication of understanding (Lee & Brosziewski, 2007, p. 260) of knowing in design.

Selection of threads in the online forum looked for a relational duality between design knowing themes and variational way-of-knowing distinctions of these knowing themes. This relational duality could, as I argued in Chapter Five, only be discerned as a second-order recapitulation of first-order ways of knowing, as embodied by these ways of knowing. Way-of-knowing distinctions were communicatively constituted by understanding (though not necessarily acceptance) between forum contributors, and there was a recursive progression from one distinctive way of knowing in respect of a knowing theme to the next.

Online Forum contributors reproduced ways of knowing within knowing structures. These online forum contributors are structurally coupled to ways of knowing they distinguish in respect of knowing themes, from a second-order perspective. This means that their own personal ways of knowing coincide with ways-of-knowing within knowing themes. This is also evidenced by online forum contributors' commitment to making way of knowing distinctions, and their asymmetrical relation of these ways of knowing to knowing themes.

Figure 8.5 overleaf shows how the abductive analysis moved through the online form data. The extension of abductive theory to compatible realist historical theory (Little, 2000) allowed the inference of the knowing structures Design Inquiry, Design Representation and Design Intent from knowing themes. These knowing structures could be seen to structure asymmetrical relations between knowing structures and ways-of-knowing, so operate as relational mechanisms.

ONLINE FORUM DATA	← ABDUCTIVE METHODOLOGY
Knowing themes are comprised of forum threads in which participant posts indicate themes through variational distinctions of these themes.	<p>Observation is cognitive indication by selected variational distinction (Luhmann, 2002). (Chapter Four).</p> <p>Indication by distinction is a relational mechanism, in CR terms. (Chapters Four and Five).</p>
Online forum participants are second-order observers who are structurally coupled to design knowing themes and embodied design knowers.	<p>Second-order observers are structurally coupled to systems of knowing and communication and to the embodied first-order observers of these systems. (Luhmann, 2000, 2002).</p> <p>Second-order observers observe the ontological duality between empirical events and abstract systems. (Chapter 5).</p>
Knowing themes show commonalities of design inquiry, design representation and design intent.	
Temporal references are evident in data.	<p>EXTENSION OF ABDUCTIVE THEORY</p> <p>Realist historical 'kinds' are macro enduring structures with deep explanatory properties. Historical types are subsumed by historical kinds (Little, 2000). (Chapter 6).</p>
Design Inquiry, Design Representation and Design Intent are macro historical kinds of knowing and communication that subsume micro design types or ways-of- knowing.	
Micro ways of knowing asymmetrically indicate or relate to Design Inquiry, Design Representation and Design Intent knowing structures.	Relational mechanisms bring macro abstract structures into relation with micro concrete events and experiences (Bhaskar, 2008).(Chapter 6).

Figure 8.5 Abductive analysis of online forum data using extended abductive theory

Taking forward the inference of historically structured relational mechanisms, the second of the two data sources, the design teacher group discussions showed the reproduction of historically recursive design ways-of-knowing. Data evidence drew upon the second-order observations of discussion participants, and their structural coupling to design studio pedagogical ways of knowing. A second-order observation presupposes a first-order observer - there must be a first-order observer for a way-of-knowing to be described. Therefore the group discussion participants either showed reflective second-order self observation of their own design studio teaching, or showed second-order structural coupling to the design studio teachers embodied in their second-order observations.

In Figure 8.6 overleaf the abductive analysis moves through group discussion data, again extending abductive theory to compatible historical theory.

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GROUP DISCUSSION DATA	 ABDUCTIVE METHODOLOGY
Group discussion participants are second-order observers who are structurally coupled to embodied first-order pedagogical way of knowing distinctions in the design studio.	Second-order-observers are structurally coupled to systems of knowing and communication and embodied first-order observers of these systems (Luhmann, 2000, 2002).
<p>Design Inquiry, Design Representation and Design intent knowing and communication system structures are indicated by pedagogical way of knowing distinctions.</p> <p>Knowing and communication structures are relational mechanisms.</p>	Knowing and communication system structures are indicated by selected distinctions (Luhmann, 2000, 2002).
Group discussion participants are design teachers who are structurally coupled to Design Inquiry, Design Representation and Design Intent pedagogical ways-of -knowing in the design studio.	
<p>Pedagogical way of knowing distinctions are historically located.</p> <p>Design Inquiry, Design Representation and Design Intent are historically recursive pedagogical ways-of-knowing. They function as relational mechanisms in the design studio.</p>	<p>EXTENSION OF ABDUCTIVE THEORY</p> <p>Historical developments in design knowing (for instance, Brown, Collins and Duguid, 1989; Thomas and Southwell, 2003; Romans, 2005; Hardman, 2009 cited in Chapter Seven) show historical recursivity of micro pedagogical ways of knowing.</p>

Figure 8.6 **Continuation of abductive analysis in group discussion data using extended abductive theory.**

Figure 8.7 overleaf shows the final abductive inference across online forum and group discussion data.

ABDUCTIVE INFERENCE FROM ONLINE FORUM AND GROUP DISCUSSION DATA

Design Inquiry, Design Representation and Design Intent are historically recursive pedagogical ways of knowing that operate as relational mechanisms of visual design meaning emergence in the design studio.

Figure 8.7 The final abductive inference across data sources.

The PhD-Design Forum archives make for a kind of audit trail of the Forum threads chosen as data, but only if my reader applies the analytical relation between indication (of thread knowing themes) by way-of-knowing distinction.

Member checking of my analysis of group discussions did not seem advisable. Morse (2002) et al. point out that participant members are not in the researcher's shoes and may make interpretations (particularly of their own contributions) that fall outside of the research focus.

8.3 The Generalizability of Abductive Inferences

Behind the scenes of this research so far, I have rejected many of my own understandings along the way, and have similarly rejected various theoretical approaches after immersing myself in them, at length. This was necessary because I could not achieve generalizable inferences using these approaches. I construe generalizable inference in the following way:

The inference that inflation leads to a hike in the price of bread is generalizable but fallible. It may not always (or in every case) be inflation that causes the price of bread to rise.

Sayer (1992, p. 71) makes an acute observation on the generalizability issue:

It is the structure of the world, rather than our theories about it, that make practices possible or impossible... [There is a] difference between theories we know to be convenient fictions (i.e. know to be wrong in certain respects but nevertheless serviceable for some purposes) and theories

which for the time being have not been bettered (i.e. whose limitations have not yet been discovered).

In sum, it is possible to make claims about the generalizability of research inferences as long as the applicable but provisional nature of such inferences is carefully spelled out. Following Sayer, (1992) I offer the generalizability of my abductive inferences in terms of the following particulars:

The abductive inferences from data differentiate between Design Inquiry, Design Representation and Design Intent pedagogical ways-of-knowing. In the first instance it would be most surprising if these ways-of-knowing did not arise in data over both research settings (the Online Forum, and the Group Discussions). This is because inquiry, representation and intent are very concrete aspects of design pedagogy that have been observed in the studies of design pedagogy I have reported in Chapter Two. For one example, Oak (2000) refers to the expectation that students will gather information as the design inquiry process required for designing. Then Teymur (2008) refers to the design representational understanding of architecture as an historical discourse. In another instance, Fleming (1998, p. 41) refers to the romantic notion of individualistic creative design intent. There are many more examples in design pedagogical research studies. That these ways-of-knowing arose in the literature is to be expected. However, that inquiry, representation and intent should operate as relational mechanisms in design pedagogy, and how this should happen, is an entirely different proposition.

When implicit distinctions indicate knowing structures, the mechanism involved is one where an understanding may be achieved that can transcend language and cultural barriers. The understanding, as I have explained in Chapter Four, comes from the simultaneous application of a distinction to an indication or utterance. To illustrate this generalizability issue, in a verbal exchange, the utterance might be the word 'rendezvous'. A distinction selected from other possible distinctions needs to indicate this word, such that understanding ensues. Such a distinction is not necessarily constituted in language or in culture, but is variably constituted as information distinctions – information about an arrangement to meet, information about a specified time and place for meeting, or information about an assignation. If communication turn-taking can accommodate these alternative ways of expressing

the term 'rendezvous', communication can continue. So it is the informational distinction and not the language or cultural distinction that matters most to shared understanding. Cultural and language differences bring the need to alter the course of a communicative interchange, and require that different knowing and communication structures or systems must be considered. It is then not the case that meanings are ordered by language and culture. Rather, it is the experience of communicative distinctions that needs to be translated into language or cultural terms. Design Inquiry, Design Representation and Design Intent pedagogical ways-of-knowing may then accommodate the pedagogical *expectation* of cognitive experience.

In a different way, the inference of relational mechanisms has a generalizability advantage over more determinate understandings. Historically formed communication systems of design knowing like Design Inquiry, Design Representation and Design Intent are irreducible 'kinds' of design knowing that have, as Little (2000) has put this, great explanatory depth. Explanatory depth is afforded by the organisation of disparate yet related distinctions. While these distinctions may differ, they all indicate and relate respectively to a particular knowing and communication structure or system. This allows for the explanation of different pedagogical way-of-knowing mechanisms, which may still, though, be closely specified. In this way Bygstad and Munkvold's (2011, p 13) balance between "too generic and too contingent mechanisms" is struck.

It is too in a macro structural sense that the inference of historical structures or systems of communication and knowing applies across design pedagogical contexts, as Layder (1990, p 32) describes

Although any social structure depends upon the existence of situated activity in a generic sense (that is, without some human agents reproducing its features there would be no structure) they do not depend on this or that specific episode of situated activity

The relational mechanisms of Design Inquiry, Design Representation and Design intent *are generic and situated*, in Layder's terms. Both macro and micro explanatory

power is afforded, where there is parsimony on the macro level of knowing structures and flexibility on the micro level of way of knowing.

The research inferences tendered here do not exhaust the possibilities of design pedagogical ways-of-knowing in the design studio. This research explanation may nonetheless still be considered practically adequate, as Sayer (1992, p. 70) describes:

The reason that the convention [1] that we cannot walk on water is preferred to the convention [2] that we can, is because the expectations arising from 1, but not 2, are realised. They are realised because of the nature of the material interventions (trying to walk on water) and of their material contexts. In other words, although the nature of the objects and processes (including human behaviour) does not uniquely determine the content of human knowledge, it does determine their cognitive and practical possibilities for us. It is not thanks to our knowledge that walking on water doesn't work, but rather the nature of water makes 1 more practically adequate than 2. The fact that 1 is nevertheless still, in principle, fallible, needn't alter our preference for it over 2.

Chapter Nine

The Research Explanation

Research into design pedagogy is crucial but only if such research can speak back to teaching and learning practice. As Drew (2007, p. 1) has said, "All too often, staff who are actively engaged in research perceive that there is only an indirect relationship between what they do as researchers and how it may impact on the design of their courses." Therefore, in this final chapter I tender my research explanation, and then show how it might be implemented in the design studio.

In the foregoing data examination of my abductive conjecture, I have shown three ways-of-knowing that operate as relational mechanisms in design pedagogy: Design Inquiry, Design Representation and Design Intent. These relational mechanisms constitute different pedagogical ways-of-knowing.

Design Inquiry, Design Representation and Design Intent are communicative knowing structures or systems that are historically formed. Particular historical distinctions within them may be reproduced by design teachers in any one design studio event. The reason why a design teacher may implicitly reproduce a particular historical distinction (and not another) is because that design teacher is 'structurally coupled' by his or her own store of communicable knowledge to a communicative knowing structure or system. The coupling of a teacher's knowing to a communication system of knowing orientates the teacher's *expectations*, as I have described in Chapter Four, Section 4.3.2. These are teacher expectations of how students might know the visual meaning of their designed objects. As I have said in Chapters One, Two and Three, I define pedagogical ways-of-knowing as the ways in which teachers expect students to know.

These ways-of-knowing, which I argue function as relational mechanisms in the critical realist sense, are asymmetrical. It is the simultaneous yet asymmetrical distinction *of* a way of knowing *from* a range of meaning potential that crucially favours a meaning attribution. But that is not all; such a simultaneous decision can

per Luhmann (1995, 2000, 2002, 2006) only occur if there is a communicative linkage that allows such a cognition to take place. This linkage is one that has been forged in concrete communication events, and one that has over time become a structured system of knowing and communication.

Such a linkage occurs implicitly in communication events. The implicit linkage is a distinction which indicates a macro, abstract structured system of knowing. Only the asymmetrical indication of a distinction makes it possible to indicate *this* thing and not *another* thing (Rasmussen, 2005, p. 8). The implicit use of *this* and *not that* distinction is selectable in any concrete design studio communicative exchange. As a result, certain design object meanings follow, that may or may not be shared. This means that communication does or does not proceed.

The abductive inference from the three identified pedagogical way-of-knowing mechanisms (Design Inquiry, Design Representation and Design Intent) is that distinctions of at least one of these knowing systems will impact on any single design studio event.⁶² By an 'event' I mean an episode of communication about the meaning of a particular student's design object. Design Inquiry, Design Representation and Design Intent are relational mechanisms that allow knowing about design meaning to be communicated, but not necessarily shared. Most importantly, in this study, design meaning is considered to emerge in the design studio only if it is shared between students and teachers. Pedagogical ways-of-knowing are then relational mechanisms that enable and constrain the emergence of shared meaning.

The relational mechanism of indication by distinction is one where something *happens* as an event of cognition, and something is *done*, which is indication of the meaning of a student's design by means of a distinction. From a CR point of view, the event of an act of cognition is the relation of an empirical act to an abstract structure, as an *event*. Such a relation is *effectual*, and so, *real*. In Luhmann's vocabulary the German term '*vollzug*', means 'effectual' but with a nuance of effect

62 It must be noted that I do not argue that these are the only relational mechanisms at play in the emergence of events and experiences in the design studio, as I explained in Chapter Three, Section 3.3.

as event (Clam, 2000). Interestingly, Eberhard (2004, p. 64) refers to Gadamer's term '*vollzug*' as meaning:

“what takes place in”, also translated from Gadamer as “act”, “occurrence”, “process”, “to bring about” and “to be practised”...[t]he meanings of “event” and “performance” are equally present ... this one word means happening and doing at once.

This conjoined understanding of event and effect is the sense in which pedagogical ways-of-knowing act as relational mechanisms that occur in the 'doing' of design studio communication. Something happens, and something is done in communication between teachers and students about the students' design objects. From the teachers' side of things, implicitly employing particular distinctions of visual meaning makes two things simultaneously happen: A backward connection to previous distinctions happens, and at the same time a forward projection happens of distinctions that hypothetical future consumers of design might understand. What is done, and what happens are fully the sense in which Bhaskar (2008) describes events as 'actual'; events occur whether they are witnessed or not, and real structures condition the way in which events occur. This is the CR sense of relational or generative mechanism. The relational mechanisms of design pedagogical knowing involve the making of implicit cognitive distinctions that draw on Design Inquiry, Design Representation and Design intent structures of communication and knowing.

It is difference or distinction as a mechanism of process, of an impelling relation between one point and another or one event and another that is profoundly important here. Most simply put, distinction or difference allows a communication event to proceed further. This is because the very nature of a distinction is that it can only lead to more distinctions or reproduce ready-made distinctions. A distinction can only stand in relation to other distinctions, and communicative utterances can only be understood in relation to distinctions that leave aside other distinctions (Gren & Zierhofer, 2002). The whole question of a meaning relation then requires that whatever is to be related must first be separated (Rasmussen, 2005). Otherwise, there is sameness and oneness, and no relation is possible. The Luhmannian

understanding of indication by distinction is one of cognitive and communicative relational mechanism *par excellence*.

As an overall thesis, Design Inquiry, Design Representation and Design Intent are relational mechanisms of knowing that make past distinctions present and future distinctions possible in design studio pedagogy.

9.1 The Research Explanation in Design Studio Communication

In a design pedagogical event, teachers attribute meaning to students' designed objects. *This rather than that* student's visual design object meaning is favoured by design teachers, as the literature in Chapter Two shows. I have argued through my analysis that this may be explained by the relational mechanism activation of Design Inquiry, Design Representation or Design Intent as pedagogical ways-of-knowing. Three scenarios of the ways in which these pedagogical knowing mechanisms of knowing may occur are sketched out as follows:

In the first scenario: the teacher looks at the student's designed object. The object is an 'utterance' in Luhmann's (1995) terms; it is a signal that communication of meaning is intended. As I described an 'utterance' in Chapter Four, it is merely a communicative gesture like 'welcoming' or 'appealing' or 'inquiring', although words are spoken. The student's designed object constitutes such an utterance, as a visual form of communication.

The teacher may see the students' object as indicating Design Inquiry as a way-of-knowing. This particular visual meaning derives for the teacher from a distinctive form of inquiry; that of finding references. So the implicit way-of-knowing distinction of Design Inquiry that the teacher calls upon is 'by reference' for instance, to Zulu culture, as in the case of earlier diagrams (in Chapter Four) showing the Zulu Mama chair. In Figure 9.1 I depict referential knowing as a form of design inquiry among other forms of design inquiry. Design Inquiry ways-of-knowing involve a cognitive act in which the design object meaning can be known to the design teacher *by* means of a form of inquiry, rather than *as* a representation, or *to* express a design intention.

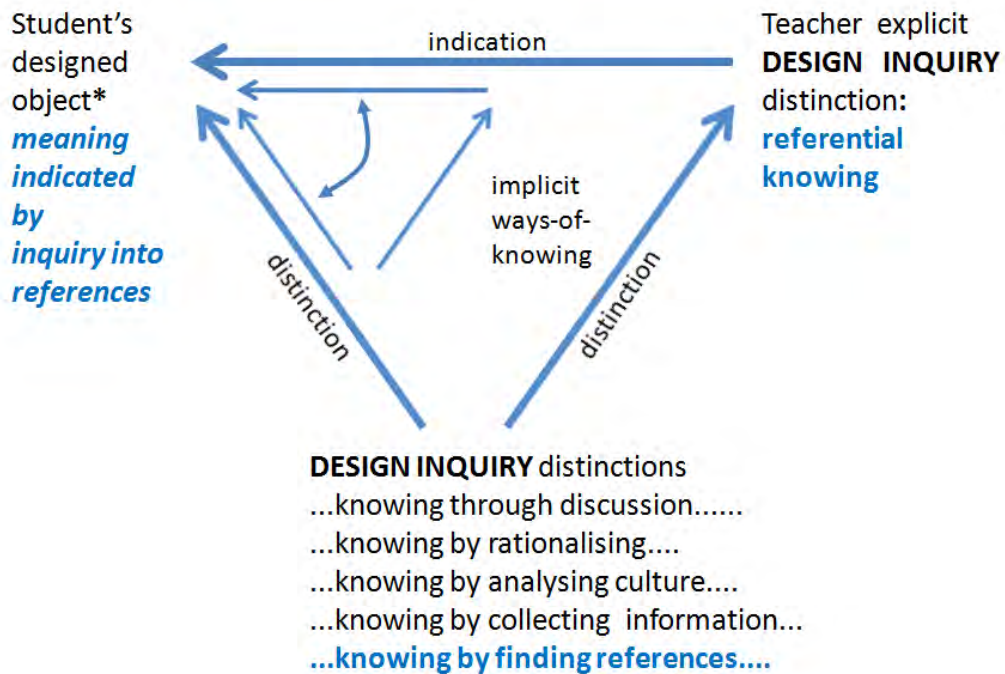


Figure 9.1 Design meaning as indication of Design Inquiry by the inquiry distinction of 'finding a reference'.

In a second scenario, the same process occurs where the designed object is viewed by the teacher as an utterance which signals a way-of-knowing. However, this teacher may see the student's object as indicating Design Representation as a way-of-knowing. The student's designed object is for the teacher a distinctive form of representation, one of representation as discursive. Representational ways-of-knowing involve a cognitive act in which the design object meaning can be known to the design teacher as a discursive form of representation, rather than *by* means of a form of inquiry, or *to* express a design intention. This is illustrated in Figure 9.2. overleaf.

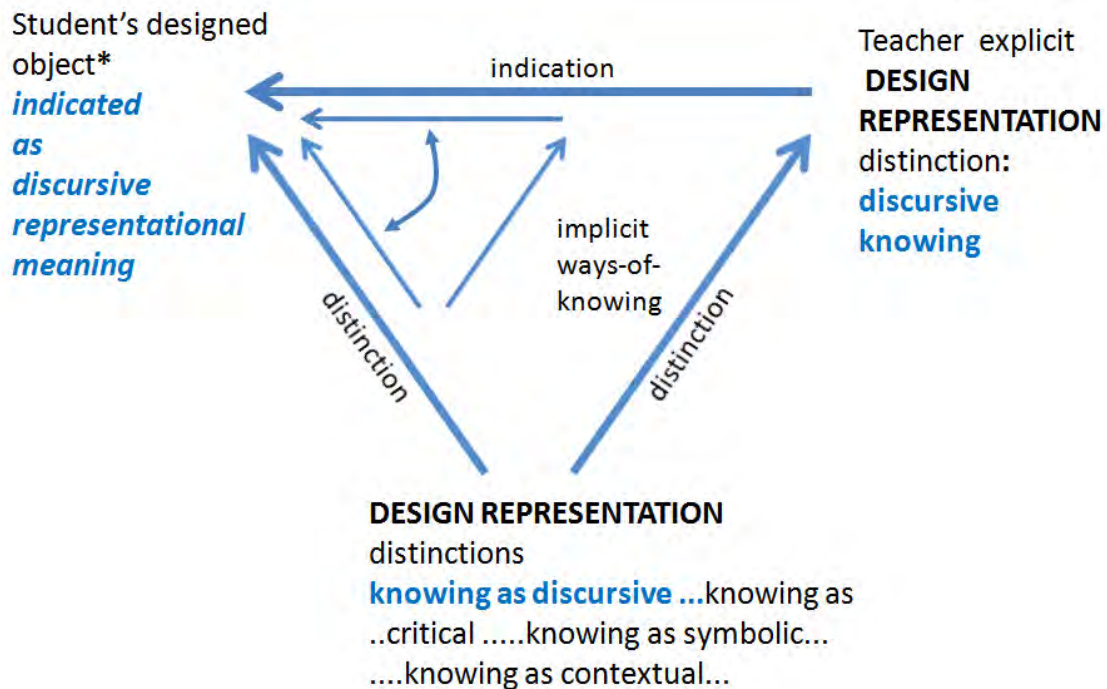


Figure 9.2 Design meaning as indication of Design Representation by the representation distinction of 'discursive knowing'.

In a third scenario, the teacher again views the student's designed object as an utterance which signals a way-of-knowing, but this time the teacher may see the student's object as indicating Design Intent to express social meaning. So the implicit way-of-knowing distinction of Design Intent the teacher uses is that of social knowing, as shown in Figure 9.3 overleaf. Design intent ways-of-knowing involve a cognitive act in which the design object meaning can be known to the design teacher as an indication of Design Intent, rather than *by means of* a form of inquiry, or *as a* representation.

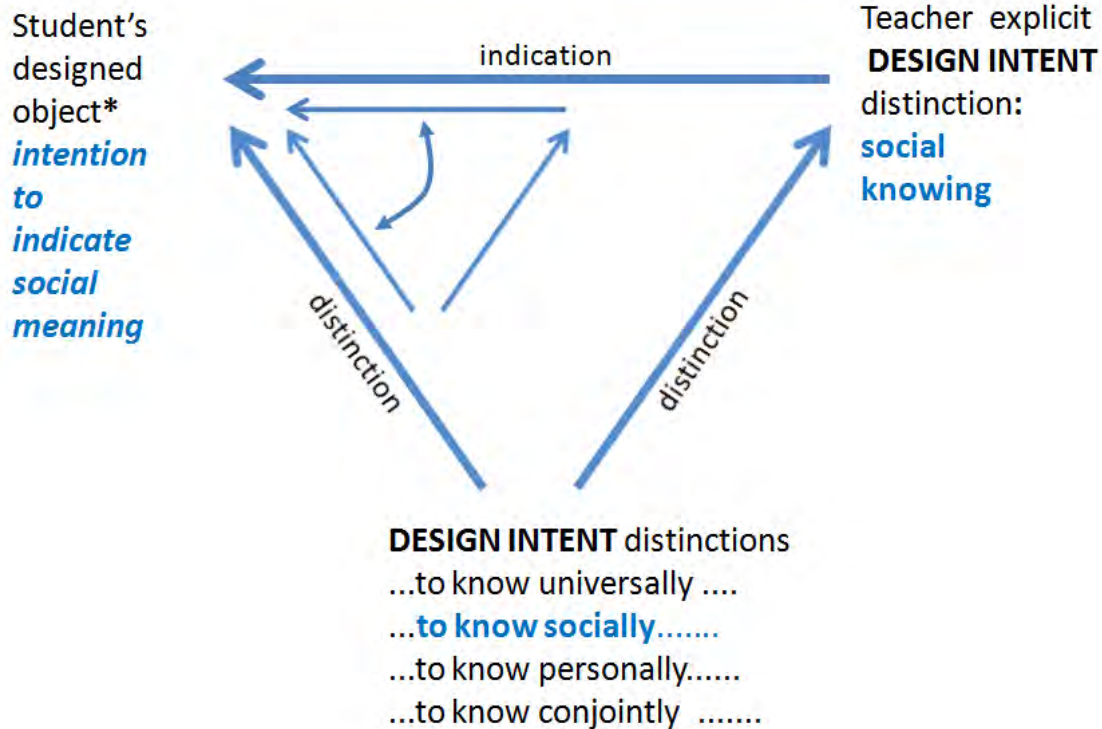


Figure 9.3 Design meaning as indication of Design Intent by the intentional distinction of 'social knowing'.

I have inferred that in each of these three instances of Design Inquiry, Design Representation and Design Intent, the teacher makes an instantaneous distinction that indicates a structured attribution of meaning to the student's designed object. This attribution simultaneously incorporates what the designed object does not mean, or what is not selected as a meaning distinction. Only in this way can a distinction indicate a specific design meaning in relation to Design Inquiry, Design Representation or Design Intent. This is the relational mechanism of indication by selective distinction.

These pedagogical ways-of-knowing have some significance for the schism between apprentice-style studio pedagogy and the ideal of participation in a design studio 'community of practice' (Lave & Wenger, 1991) ideal. The comparative virtues of these surviving but different forms of design pedagogy were discussed in Chapter Two. However, if teachers could use Design Inquiry, Design Representation and Design Intent ways-of-knowing to explain their own thinking about design meaning, student dependence on teacher judgement may be reduced. Similarly, if the

relational mechanisms of Design Inquiry, Design Representation and Design Intent can be used on a community of practice (Lave & Wenger, 1991) basis, this style of studio pedagogy may become less reliant upon teacher repertoires of content knowledge.

Teacher reflection on the construction of design briefs and the scaffolding role that design briefs may provide in terms of ways-of-knowing may be a significant consideration. The open-endedness of design briefs that I have referred to in Chapter Two might be somewhat ameliorated by referring to Design Inquiry, Design Representation and Design Intent options. This is an aspect of communication between teachers and students in which the expectation of ways-of-knowing can become clearer.

9.2 Formative and Summative Assessment Implications

As I found in my Master's research into design assessment (Kethro, 2007), there is a gap between teachers' design knowing repertoires, and their hopes for student learning. This translates into a dichotomy between teacher feedback and student learning autonomy.

This gap might possibly be narrowed by using Design Inquiry, Design Representation and Design Intent way-of-knowing distinctions as assessment constructs (Hopkins & Antes, 1985)⁶³ that are used in learning contracts between teachers and students. Learning contracts usually negotiate between students and teachers what learning objectives and values are at stake, the manner in which they are to be accomplished, when this should happen and on what basis assessment should proceed (Knowles, 1986). For this reason, learning contracts are especially valuable for assessment and feedback on the complex performance that designing an object usually entails for a design student. I offer that Design Inquiry, Design

⁶³ I note here that according to Hopkins and Ante (1985) an assessment construct expresses that which cannot be observed or measured, so must be abstracted. For instance, one cannot measure a room, unless one applies abstract constructs such as length, breadth and height. The constructs length, breadth and height cannot, however be verified unless they are placed within a context that supplies terms of verification, for example 'a room'.

Representation, and Design Intent way-of-knowing distinctions may afford useful constructs for the negotiation of student design learning contracts.

I envisage learning contracts in design as follows: In the formative stages of design studio learning students may make revisable self-evaluations of the cognitive and communicative significance of their designed object, using their own selection of Design Inquiry, Design Representation and Design Intent way-of-knowing distinctions.

Inevitably, learning contracts are disposed toward assessment. Messick's analysis of construct validity is a helpful guide to how such formative self- or teacher assessments might refer to ways-of-knowing as constructs. Messick shows under-representation of a construct as one assessment issue (Messick, 1989, p. 7). In communication about a contractual assessment of visual design meaning this could mean a lack of explanation of Design Inquiry, Design Representation or Design Intent distinctions of visual design meaning. Messick also mentions variance from construct relevance. In this case, there may be shifting choices of distinctions within Design Inquiry, Design Representation or Design Intent. There might too be superfluous way-of-knowing constructs (Messick, 1989, p. 7). Finally, Messick's view is that related indicators of a construct (in this case, where the construct is *either* a Design Inquiry, a Design Representation or a Design Intent way-of-knowing) should serve to exclude construct variations or distinctions outside of a selected knowing and communication structure.

Using these distinctions in formative feedback on learning contract goals may support autonomous student learning, provided that way-of-knowing constructs are not deterministically applied, and are rather used to foster a closer focus on a rationale for visual design meaning. Where learning contracts are negotiated, such a ration is *communicated*. Outside of a learning contract, however, implicit distinctions may not come to light.

In summative modes of evaluation, way-of-knowing distinctions as constructs may be more useful simply for discriminating between what is fore-grounded and what is back-grounded in communication about visual design meaning.

9.3 The Research Explanation and Design Pedagogy

It is clear that there are many design studio teachers who foster their students' personal growth and promote their students' ability to draw on independent experience in designing. Teachers want to understand in the student perspective, and teachers notice shifts in student meaning making in the design studio, from formative to summative stages of assessment. These teacher attitudes have been reported in Chapter Two, and are made most clear in Marton and Booth's (1997, p.179) inspiring understanding:

[Pedagogy depends on] meetings of awareneses, which we see as achieved through the experiences that teachers and learners undertake jointly. Teachers mould experiences for their students with the aim of bringing about learning, and the essential feature is that *the teacher takes the part of the learner*. The teacher focuses on the learner's experience of the object of learning. Here we have (what we call) 'thought contact', (with) the teacher moulding an object of study (for the students).

Concern about student learning is the motivation for this study. 'Thought contact' is a critical learning issue in design education, because the object of learning in design disciplines always concerns interpretation. Design is a dialogue between objects and people in which certain interpretive references will inescapably operate, and in which other interpretive references may be brought to bear. The idea of relational mechanisms that co-ordinate such visual interpretations has several more general implications for teachers who seek to support student learning:

As an heuristic strategy for communicating with design students about their designed objects, the teacher may make propositions of design meaning that are couched in Design Inquiry, Design Representation or Design Intention terms. In response, the student may clarify their route to design meaning.

Then, If students and teachers think about the backwards linkage of a selected distinction to pre-conceived distinctions, as Luhmann's theory of communication suggests, the possibilities for learning integration (Biggs, 1996) may be enhanced.

Teachers and students may also together project the forward recursion of the design object meaning distinctions 'out there' in the social world. Visual design meaning

may be considered to be a continuum of linked communicative distinctions, rather than the imposition of a static interpretation. The chain of meaning connection starts in the design studio when students are developing their designs, when as Gedenryd (1998) says, students are starting to situate their designs in the future. The question of distinctions of design meaning that are selected from other possibilities for further, future and recursive distinctions can be seen in the light of learning transformation (Mezirow, 1991, p. 12). In a sense this relates to Mezirow's perspective transformation, where a prior interpretation is used to construe a new one (1991, p. 2). This may bring a change in the awareness of design meaning distinctions, and even a change of focus (Yan, 1999) as a learning transformation.

Beside these considerations, it seems possible that the pedagogical knowing structures of Design Inquiry Design Representation and Design Intent might be construed as *design* ways-of-knowing. Design ways of knowing were first theorised by Cross (1982). There may be room for extending Cross's seminal work to the relationally structured design pedagogical ways-of-knowing explained in this research.

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