

MAPPING THE MEANING OF KNOWLEDGE IN DESIGN RESEARCH

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Knowledge plays a vital role in our life in that it reflects how we understand the world around us and thus determines how we act upon it. In this sense, knowledge is of particular importance for designers because they act to shape our world. Conventionally, knowledge creation has been assumed by (design) research. However developments of using practice within research have pointed to knowledge creation within and through practice. This has raised the question of the meaning, role and format of knowledge in both research and practice, and about the compatibility between knowledge of research and practice.

The research presented in this paper has set out to investigate the concept of knowledge with regard to this question. The paper begins by considering some of the main problems with knowledge in research within design, and more generally in the creative and practice-led disciplines. It then examines the meaning of knowledge in relation to its philosophical foundations. On this basis, the discussion reconsiders the meaning, role and format of knowledge, and the impact of this for the conduct of research.

1. INTRODUCTION: WHY ASK?

What are the meaning, role and format of knowledge in research and practice?

This question has arisen for design in the UK, as well as more generally for creative and practice-led disciplines (CPDs), because research regulations and requirements in the UK remain silent about what knowledge and understanding mean in the context of their specifications while implicitly prioritising propositional knowledge over knowledge that cannot be expressed in that form (Niedderer 2007).

This has led to a number of problems concerning the role and format of knowledge in research and practice in the UK. For example, because of the language-based mode of propositional knowledge, the implicit prioritisation of propositional knowledge seems to exclude certain kinds or formats of knowledge associated with practice, which are often called practical, experiential, personal, or tacit knowledge and which evade verbal articulation. Polanyi (1958: 50) puts the importance that practitioner-researchers assign to practical knowledge succinctly into words:

‘Rules of art can be useful, but they do not determine the practice of an art; they are maxims, which can serve as a guide to an art only if they can be integrated into the practical knowledge of the art. They cannot replace this knowledge.’

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CALL FOR PAPERS:

CASE STUDIES IN RESEARCH: KNOWLEDGE AND INQUIRY

CALL FOR PAPERS:

Designers use the term ‘design’ to cover a wide range of activities and types of problems, and we have many differing, often incommensurable and opposing models of design and its theoretical and methodological bases. As a result, we also have a history of lively debates over specific theories. These debates have not been able to resolve differences.

Many regions of design are not well defined, and in such situations, researchers can find that apparently straightforward problems can lead to fundamental questions about the nature of design, what kinds of philosophical and theoretical positions that can frame the research and ground the methods, and their implications with regard to knowledge: what kinds of knowledge are possible within the frames needed to do the research.

‘we want to hold a discussion on how research steers theory’

In short, we want to hold a discussion on how research steers theory. Our idea is to look at research and theories in design not primarily as related to subfields per se, but to see theories as products of research problems themselves: the topics studied and the questions being researched.

Rather than look at abstract problems of research and theory, we want to present actual problems as case studies.

In this way, we can clarify design by mapping its terrain of activities and problem types with their fundamental theoretical and methodological requirements.

Over the next two years, DRQ will collect and publish articles on these topics and replies to those articles, using its regular publication schedule to build a discussion. If you have an interest or idea for an article or other submission, please contact the editor, Peter Storkerson.

TOPICS:

We seek papers that explore issues including:

- ontological and epistemological implications or requirements of a research problem
- status of knowledge, its bases and levels of certainty
- conflicts between the knowledge that is possible in a given situation and the research goals.
- how research fits into fundamental paradigms: scientific, humanist, phenomenological, pragmatic, etc., and how those approaches compare in their strengths and weaknesses
- working across the boundaries of humanism and science: the extent to which a research problem requires use of more than one basic philosophical frame and how different frames can be reconciled

SPECIFICATIONS:

3,000 to 6,000 words

APA guidelines

FOR INFORMATION OR SUBMISSIONS:

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Emerging Trends in Design Research

11-15 November, 2007

Hong Kong Polytechnic University

<http://www.sd.polyu.edu.hk/iasdr>

Call for Papers



February 27	Abstracts deadline
March 26	Paper selection & invitation
June 1	Full paper due
August 1	Review return to author
September 1	Complete paper

Description

This is a large, international design research conference with an intensive and high quality programme. Keynote speakers will be invited from other disciplines—the social sciences, computing, and business, for example. Multiple paths through the papers will be suggested to help participants find synergies among people and papers. Ample time will be available for informal meeting and discussion. Please consider your research interests in terms of the following description and consult your calendar for availability.

Emerging Trends in Design Research

Design Research is becoming more acceptable as a knowledge resource in collaborative actions, in practical applications, in building scholarly foundations for the discipline, and in post-graduate programmes worldwide. Some research follows well-worn paths of investigation and development, and some research strikes out into new territories of disciplinary overlap, technology development and application, large system dynamics, difficult to solve social problems, fundamental knowledge development, or needs for better processes or methods. Emerging Trends is particularly interested in design research explorations that respond to our changing life context, globally, locally, economically, educationally, socially, technologically, and particularly through design research interventions.

Emerging topics

Design Process issues:

- ▶ identifying the limits of user research
- ▶ making collaborative decisions
- ▶ managing information resources
- ▶ evaluating innovation potential
- ▶ exploring multimedia and multimodality

Design Research issues:

- ▶ developing collaborative research strategies
- ▶ exploring digital convergence
- ▶ managing multiple problem/solution perspectives
- ▶ translating research findings to design action
- ▶ communicating research findings effectively
- ▶ creating research community
- ▶ developing new research methods
- ▶ funding basic research in design

Design Education issues:

- ▶ blending art and science
- ▶ identifying fundamental knowledge for design
- ▶ creating distance learning approaches for design
- ▶ exploring industry-academia research partnerships
- ▶ developing quality assurance for design education

Social issues:

- ▶ controlling privacy
- ▶ controlling environmental degradation
- ▶ supporting human equality
- ▶ supporting development in undeveloped regions
- ▶ changing human behavior

'Rules of art' in this context refers to subject specific knowledge expressed in form of theories (maxims). Polanyi indicates that, while useful, there is another kind of practical or personal knowledge that is necessary to complement this theoretical knowledge in order to make it applicable. However, what exactly this knowledge is and how it can be included in research has remained elusive. This has created problems with the inclusion of practical knowledge in research and in turn with the applicability of research findings within practice.

Researchers in the creative disciplines have tried to overcome this problem through the use of creative practice in research in order to achieve the inclusion of tacit knowledge, which in turn has caused debate about what is formally acceptable as knowledge in research (Niedderer 2006). This research sets out to review current concepts and understandings of knowledge and their relationships with regard to the implications for research in design and other creative and practice-led disciplines. The aim of this inquiry is to help clarify the role, format and inclusion of tacit (experiential) knowledge in these disciplines, in particular as regards its inclusion through the use of creative/professional practice, and to identify potential solutions or ways of dealing with the identified problems.

While this investigation has evolved from a national problem in the UK, the problem has also proven to be one of international significance, which is attested by many international discussion lists concerned with this problem (e.g., PhD-design <<http://www.jiscmail.ac.uk>>), conferences (e.g., Research into Practice <<http://www.herts.ac.uk/artdes1/research/res2prac/confhome.html>>), and publications (e.g., Durling et al. 2002). In this paper, the problem is therefore discussed on a generic level in order to maintain its international relevance. Similarly, while the problem is one of particular relevance to design, it is also shared by the wider community of creative and practice-led disciplines (e.g., art, craft, education, and health & nursing), and it is here discussed as such. In explanation and justification of such a generic understanding, which accommodates subject-specific individualities, Starszakowna, 2002, argues that

'the concept of knowledge in art and design is, or should be, no different from the concept of knowledge in other disciplines. It is the constant search for, and ultimately the acquisition and dissemination of, a body of knowledge within particular areas or parameters which signifies a specific discipline. While the par-

ticular form that this knowledge might take will therefore vary, both between disciplines and within specialist areas within disciplines, such acquisition of knowledge is universal' (Abstract).

A final aspect that might need clarification is the distinction between research and practice that is used in this paper, because either may occur in the context of the other. For example, a practitioner might also work in the academy and pursue research to inform their practice. Therefore, as distinguished previously (Niedderer 2005/2007), the term 'research' is being used to denote the systematic inquiry to the end of gaining new knowledge, and a 'researcher' is a person who pursues research (e.g., in design). 'Practice' is used to refer to professional practice (e.g., in design) or to processes usually used in professional practice to produce professional work for any purpose other than the (deliberate) acquisition of knowledge. 'Practitioner' accordingly refers to anyone who works in professional practice.

2. WHAT IS MISSING?

This section examines two examples from CPDs in order to draw out more clearly the problems of knowledge in research, how these problems are related to the prioritisation of propositional knowledge, and how the practice knowledge of these disciplines is different. Before we look at the examples, we need to clarify what we mean by propositional knowledge. Propositional knowledge is most commonly defined as 'justified true belief'. Grayling (2003: 37) explains that

'this definition looks plausible because, at the very least, it seems that to know something one must believe it, that the belief must be true, and that one's reason for believing it must be satisfactory in the light of some criteria – for one could not be said to know something if one's reasons for believing it were arbitrary or haphazard. So each of the three parts of the definition appears to express a necessary condition for knowledge, and the claim is that, taken together, they are sufficient.'

Despite of continued criticism, the definition of knowledge as 'justified true belief' has remained the prevailing definition, and Niedderer (2007) has shown that this understanding of propositional knowledge is implicit in the definition of research because of additional requirements such as the textual/written presentation of an intellectual position (proposition, thesis – 'true belief'), because of

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the logic of verification and defence of this intellectual position through argument and evidence (justification), and the requirement for generalisability/transferability and explicit and unambiguous communication.

The following two examples show that there arise difficulties with this conventional understanding of research at different stages, and that it is at those stages that tacit knowledge is missing. One of the selected two examples is from design/engineering, the other from music. The examples have been drawn from existing literature which is concerned with the problem of knowledge in relation to practice. They have been chosen because they offer discussion of two important generic knowledge areas of CPD's, one of which is related to procedural knowledge and expertise using the example of technical development, while the other is related to experiential knowledge and connoisseurship, using the example of aesthetic evaluation and judgment.

EXAMPLE 1:

In the 1960's, a Canadian research laboratory successfully developed and built a so-called TEA-laser. British attempts to replicate the laser on the basis of written information or a third-person-informant however failed as long as the tacit knowledge of informants who had participated in building the original laser was not included through their personal engagement in the replication-project (Collins 1985, Neuweg 2002: 42). Collins' (1985) study of the replication attempts further showed that an extended period of contact was required between the expert and the learner to transfer the tacit knowledge, and that the learner could not tell whether they had acquired the relevant knowledge or skill until they tried it.

This example suggests that tacit knowledge is developed within the research process and as part of the research (here: the development of the laser), and that it evades the conventional textual communication means of research. Polanyi (1958: 53) describes this situation as follows:

'An art which cannot be specified in detail cannot be transmitted by prescription, since no prescription for it exists. It can be passed on only by example from master to apprentice.'

In summary, knowledge which 'cannot be specified' is usually associated with practical knowledge and skill. It belongs to vocational training and is (today) widely regarded as distinct and excluded from academic research, because it withstands articulation and argumentation and thus wider

dissemination (Herbig et al. 2001). Nevertheless the inclusion of tacit knowledge seems essential for success, both in terms of tacit knowledge being brought into the research process as well as in terms of its communication for application, and is therefore associated with expertise, which can be defined as 'an intuitive grasp of the situation and a non-analytic and non-deliberative sense of the appropriate response to be made' (Berliner 1994: 110; cf. also to the understanding of expertise in the 5-stage model of Dreyfus and Dreyfus 1988).

EXAMPLE 2:

For the second example, I want to draw on an example which Polanyi uses and which concerns the 'touch' of pianists (Polanyi 1958: 50). He makes the observation that, technically, it is difficult to account for the difference in touch, which is so prized, and which distinguishes any great pianist. Also, it seems fairly impossible to describe it sufficiently either for the purpose of teaching, or for the purpose of evaluation. This becomes clearer if we cast this example in terms of research. If one were to conduct a comparative study between the 'touch' of different pianists, how were we to measure and evaluate the different 'touches' if they evade scientific measurement and analysis? In this case, judgement would need to rely on (perceptual) experience and personal judgement, also known as connoisseurship. Connoisseurship in the context of this investigation is referring to an ability for very fine (qualitative) discrimination that is (usually) beyond scientific measurement and that is acquired through extensive training (Polanyi 1958: 54, Beeston and Higgs 2001: 110).

In these two examples, we have seen that tacit knowledge is an important requirement for achieving best results in research and practice, which is associated with expertise and connoisseurship. In particular, tacit knowledge plays an important role both in the research process and in evaluating and communicating research outcomes. In other words, tacit knowledge seems important for the generation and application as well as the experience and judgement of research and its results, and for creating new experiences, abilities, and knowledge. In the following, we shall examine what exactly we understand with tacit knowledge, why and how it has this important role, and how it relates to propositional knowledge, drawing on philosophical sources in order to give the discussion a better grounding.

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3. WHAT KINDS OF KNOWLEDGE?

We have talked about two different kinds of knowledge, tacit and propositional, but these two terms are not usually paired. Rather, 'tacit knowledge' tends to be paired with 'explicit knowledge' (Neuweg 2002). 'Propositional knowledge' is variously paired with 'non-propositional knowledge' such as experiential or perceptual knowledge (knowledge by acquaintance) and/or 'procedural knowledge' (Williams 2001: 98, Grayling 2003). While the explicit - tacit knowledge-pair has been formed to denote and distinguish knowledge by the characteristic of communication, propositional and non-propositional knowledge pairs provide distinctions concerning their nature. However, the relationship between propositional and non-propositional knowledge seems not as clear-cut as that of explicit and tacit knowledge, because we find a number of different kinds of knowledge clustered under 'non-propositional knowledge'.

In the creative and practice-led disciplines, a variety of further terms are being used such as practical knowledge, skills knowledge, process knowledge, personal knowledge, implicit knowledge, professional knowledge, situational knowledge, control knowledge, complex knowledge, conventional knowledge, cognitive knowledge, codified knowledge, public knowledge... (e.g., Polanyi 1958, Reber 1989, Higgs and Titchen 1995, Nonaka and Takeuchi 1995, Refsum 2002, Eraut 2003, Abidi, et al. 2005, Miles, et al. 2005). Most of these terms seem to have been created as descriptors for different kinds of phenomena of knowledge. While some of them offer important distinctions for their field, to discuss all of these terms in detail is beyond the scope of this paper. This research focuses on the distinction between propositional and non-propositional, and explicit and tacit knowledge, which seem to be the most important pairs, in order to investigate in more detail their meaning and their relationship. Where possible I will point out and differentiate synonym terms.

Since knowledge is essentially a philosophical concept, this investigation looks at philosophical concepts of knowledge before re-introducing them into the problematic of CPDs. Although there are also a number of different terms of knowledge used in philosophy, there seems to be some consent about what the central terms are: propositional knowledge, knowledge by acquaintance, and procedural knowledge (e.g., Hospers 1990, e.g., Williams 2001, Grayling 2003). Grayling (2003: 39) explains that the definition of knowledge as justified true belief 'is intended to be an analysis of knowledge in the propositional sense' rather

than of knowledge that one might gain by being acquainted with something or someone, or that enables someone to do something (skill).

While there has been much debate about this definition of knowledge in the attempt to defeat or improve it, until now it has remained the central definition. An extensive and plausible defence is provided by Williams (2001) who proposes an approach that can be seen as a mediating way between the two opposed positions of Foundationalism and Coherentism. While Foundationalism relies on foundational beliefs based on empiricism for the justification of knowledge ('prior grounding requirement') which creates problems with accounting for any internal reality or the reality of other minds (Williams 2001: 81ff), Coherentism relies on an intrinsically coherent system of beliefs that in turn has difficulties with accounting for our knowledge of (external) reality (Williams 2001: 117ff).

In mediation of these two approaches, Williams (2001: 159-172) proposes a third approach, which he calls 'Contextualism' and which assumes that we can rely on our experience of external reality until we have reasons to challenge it (default and challenge requirement). Context-dependent, this allows us to assume certain beliefs as foundational beliefs without the requirement of foundational atomism, but it also releases us from the circularity of Coherentism. These assumed foundational beliefs may be opened to scrutiny if the context changes. Williams argues that this approach is permissible because of the normativity of knowledge, which is not some a priori given, but itself a human construct. The Contextualist approach seems to describe the way in which research operates well in that it takes certain beliefs as foundational on which it then tries to construct a coherent argument (cf. Niedderer 2007). In the following discussion, I will therefore adhere to Williams' contextualist approach to (propositional) knowledge.

While propositional knowledge has been at the centre of epistemological discussion, knowledge by acquaintance and procedural knowledge seem to have been under-represented in these discussions, and although philosophers have looked at these concepts separately (e.g., Bonjour 2001, Gunther 2003, e.g., Maund 2003, Crane 2005), a satisfactory integration of these issues with epistemology so far seems outstanding. Therefore, we now examine the intrinsic characteristics of these concepts in an attempt to relate them for the purpose of this research.

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4. RELATING DIFFERENT KINDS OF KNOWLEDGE

Having discussed the definition of propositional knowledge, we now need to look more closely at the characteristics of propositional knowledge. Propositional knowledge, which is associated with the aspect of knowing that is usually expressed in form of statements that can be verified or falsified and that allow us to credibly believe that something is one way or another. In contrast, procedural knowledge refers to knowing 'how to do something in the sense of an ability or skill' (Grayling 2003: 38). Sternberg (1999) associates procedural knowledge with tacit knowledge, because its essence is difficult to put into words as we have seen in the examples above. Drawing on Anderson (1976), Reber characterises procedural knowledge further by distinguishing it from declarative knowledge, which is here used as a synonym to propositional knowledge and which points to its explicit character.

'Anderson's key distinction is that between declarative knowledge, which is knowledge that we are aware of and can articulate, and procedural knowledge, which is knowledge that guides action and decision making but typically lies outside of the scope of consciousness' (Reber 1989: 16).

While Reber makes a generic distinction between procedural and declarative knowledge as tacit and explicit respectively, this is not the complete picture because some parts of procedural knowledge can be made explicit. For example, in the example no.1 (above) it is possible to have explicit instructions of how to build the TEA laser. This explicit part of procedural knowledge is called propositional or conceptual content (Williams 2001: 140, Gunther 2003). The other part, which is tacit and which is accordingly called non-conceptual or non-propositional content, is not yet well understood because it seems persistently to evade articulation and to lie beyond any norms of declarative knowledge.

Although I have introduced the concept of propositional content in the context of procedural knowledge, it is more commonly associated with experience or perception. This brings us to the third of the recognised categories: knowledge by acquaintance. Knowledge by acquaintance is more often talked about as experiential knowledge, as perceptual knowledge, or as sensual knowledge. The term 'sensual knowledge' is used to connote the unmediated reception of external reality through the senses. 'Perceptual knowledge' is used to connote the reception of external stimuli medi-

ated through human faculties (Maund 2003: 58/59). 'Experiential knowledge' is used in Williams (2001: 69-80) to connote the entirety of both, which is the sense in which I will use it in this paper. However, the notion of experiential knowledge is not uncontentious. Because of its phenomenal nature, experiential knowledge is sometimes disregarded in terms of having a status as knowledge:

'Having a headache isn't knowledge though you certainly experience (are acquainted with) the headache; but knowing that you have a headache is. Seeing some colours in your visual field isn't knowledge; but forming concepts from your sensations and recognising that it's an animal stalking in the underbush, is. You couldn't have knowledge without acquaintance, but acquaintance alone is not yet knowledge' (Hospers 1990: 19).

This problem points us back to, and is ameliorated by the idea of propositional content, because like procedural knowledge, experiential knowledge can be associated with displaying propositional and non-propositional content. For example, in the example no.2 (above) one may be able to experience the quality of a certain sound. One may also be able to recognise what one's experience means (non-propositional content) and thus to name it and to describe it (propositional content). However, one may not be able to justify one's experiential knowledge other than through pointing back to one's experience, which means that it is not necessarily possible for others to follow one's judgement, and which may be seen to distinguish it from propositional knowledge. Also, one may not be able to describe one's experiential knowledge adequately with regard to replication (cf. example no.1).

This indicates that the part of experiential knowledge that allows us to make sense of our experience seems elusive to articulation. Equally elusive to articulation is that part of procedural knowledge that allows us to act upon it as we have seen above. Thereby that latter part seems to be based strongly on the former. Further, through the propositional content, both experiential and procedural knowledge seem closely related to propositional knowledge, while propositional knowledge seems to receive its meaning from the experience that tacitly underlies it (Neuweg 2002). For example, written language – as a prevalent means of communication and storing knowledge – is constituted by arbitrary, socially agreed signs, materialised (e.g., with ink on

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paper) which mean nothing until one knows and understands that these signs express concepts and what they mean (Neuweeg 2002: 45).

From these considerations, I would like to draw some tentative conclusions on the relationship between the three kinds of knowledge by proposing that experiential knowledge be taken as the basis for the other two kinds of knowledge. In this way, propositional knowledge can be understood as the norms and principles by which to understand experiential knowledge, while procedural knowledge can be understood as experiential knowledge in action. To avoid misunderstanding, I would like to add that this proposition remains firmly rooted in Williams' contextualist framework, and is not a fallback to foundationalist principles, but simply tries to describe in more detail the relationship between the different kinds of knowledge (Figure 1).

5. TACIT KNOWLEDGE AND RESEARCH

Having discussed the nature of, and relational model for the three different kinds of knowledge, we now need to discuss the format of these different kinds of knowledge before we can consider the benefit of this inquiry for design research in terms of the desired inclusion of tacit knowledge within research.

Above, we have seen that propositional knowledge is usually associated with explicit knowledge, while non-propositional (experiential/procedural) knowledge is usually associated with tacit knowledge. However, as we discussed in section 4, there is a tacit component (non-propositional content) to propositional knowledge, which allows it for us to become meaningful, and there is an explicit component (propositional content) to non-propositional knowledge, which allows for its partial communication. This indicates that the notions of explicit and tacit knowledge cannot simply be associated with propositional and non-propositional knowledge respectively, but that these concepts over-

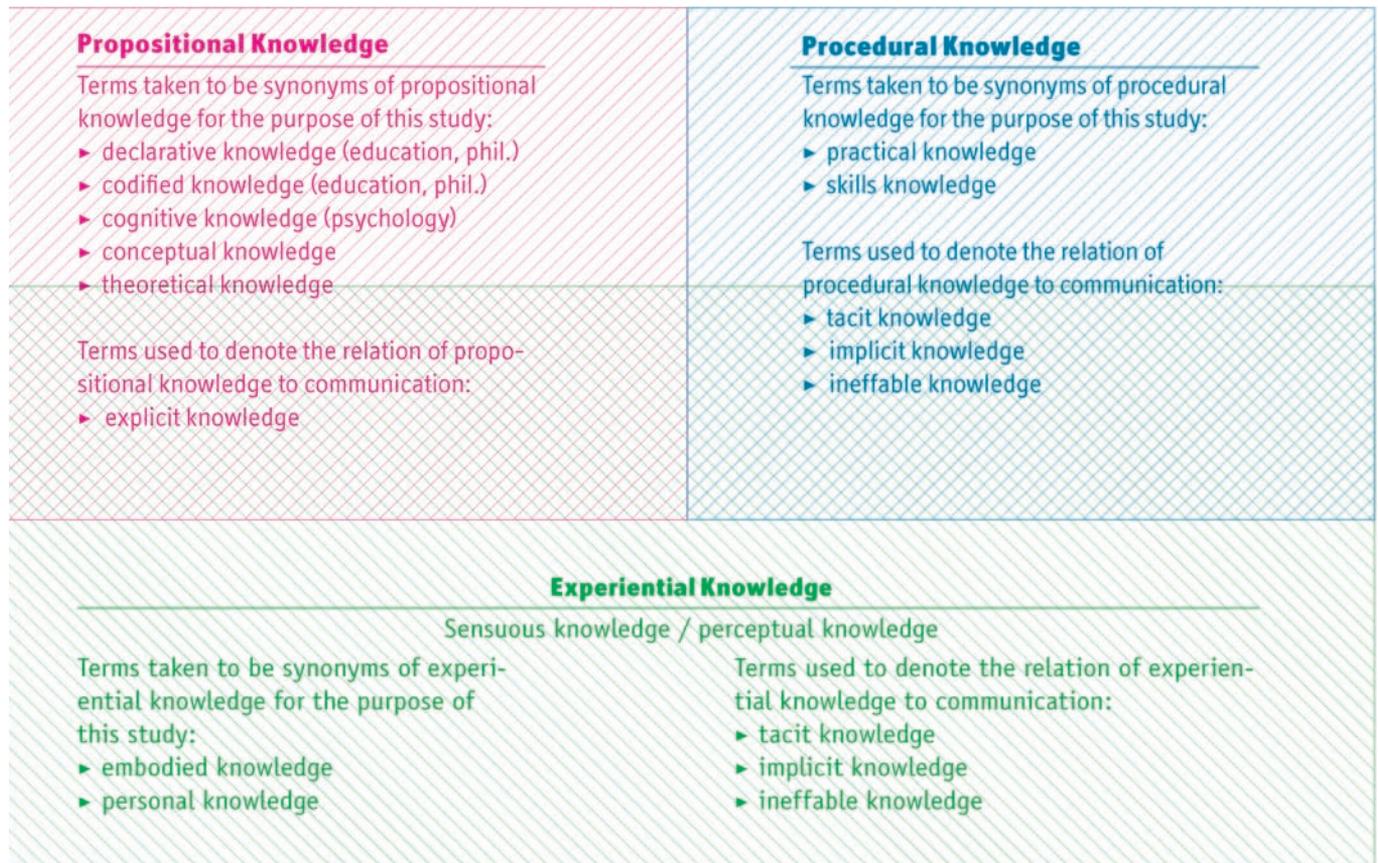


Figure 1: the relationship of propositional, procedural, and experiential knowledge

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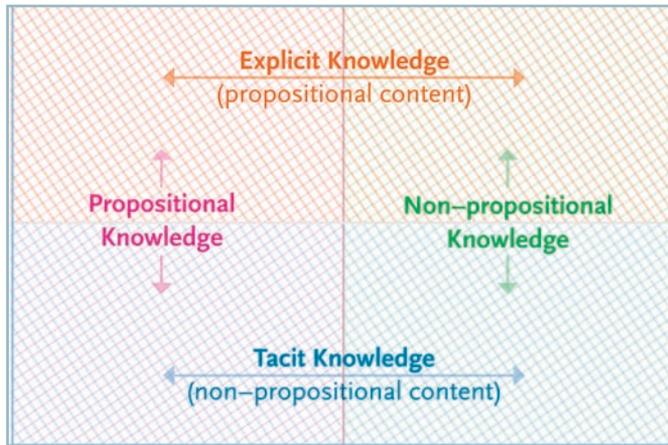


Figure 2: orthogonal relationship of propositional and non-propositional knowledge to explicit and tacit knowledge

lay one another ‘orthogonally’, and that the concept of explicit and tacit knowledge rather pertains to the notions of propositional and non-propositional content (Figure 2).

In section 2, we have seen that current notions of research are intrinsically related to the notion of propositional knowledge because of matters of logic and communication and that research has no problem with propositional knowledge, because it can be made explicit through verbal means, which adheres to research requirements.

Following our conclusion of the orthogonal relationship between propositional/non-propositional and explicit/tacit knowledge, we can link the notion of propositional content of both propositional and non-propositional knowledge to explicit knowledge, and that of non-propositional content of propositional and non-propositional knowledge to tacit knowledge. Rephrasing the above in this light, this means research has no problem with explicit knowledge or propositional content of knowledge. However, there have been problems with the aspect of tacit knowledge or non-propositional content of knowledge. By its nature, tacit knowledge evades research due to the current requirements of research. On the one hand, tacit knowledge therefore lacks recognition in research, while on the other hand our examples have shown that tacit knowledge is vital both for the development and communication of knowledge in research in design and other CDPs.

Therefore, in the following, it seems important to investigate why non-propositional content remains tacit and thus elusive to research and how one might deal with it. Three

questions are worth considering here: i) Why is tacit knowledge tacit? ii) What are the problems with being tacit for research? and iii) How can they be overcome?

i. There are several sources that consider why non-propositional content is tacit. Most prominently, Polanyi (1958: 55) explains it with the concept of focal and subsidiary awareness. A common example is driving a car where one needs to be aware of the road and the way one is going (focal awareness) while operating the car without being conscious all the time of single actions with the pedals, gear-stick etc. (subsidiary awareness). This kind of split awareness has the great benefit that we are able to act, because would we have to be aware of all stimuli and subsidiary actions all of the time, we would not be able to act at all.

ii. If tacit knowledge has this great benefit, we have to consider next what are the problems with it for knowledge creation within research? The main argument why there are problems is that research requires a conscious scrutiny of knowledge for the purpose of verification. While propositional content is open to this scrutiny, because it can be made explicit by verbal means, tacit knowledge seems to evade it. This has raised the question whether the tacit knowledge can be regarded as knowledge at all. If we follow Williams (2001: 175) who argues that we can speak of beliefs as knowledge if they can be verified, we may conclude that tacit knowledge should be regarded as knowledge if we can show that it can be verified. That tacit knowledge can be verified, I would argue, becomes most obvious in relation to procedural knowledge (as knowledge in action) where every action constitutes a judgement over what is right (to do) in every given moment and thus the knowledge is tacitly verified within and through action and its result. We can explain this further if we assume with Williams (2001) that the two content states of knowledge are inseparable (100), and that therefore even where we speak of tacit knowledge, propositional content is involved albeit it has not been made explicit. We can therefore assume experiential and procedural knowledge to adhere to normativity and judgement – even when tacit – and that the judgement can be made explicit ‘posthumously’ through analysis and explanation. In conclusion, this analysis seems to indicate that there are no intrinsic problems with the understanding and inclusion of tacit knowledge and further of non-propositional knowledge(s) in research as such. Indeed, the

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significance of this holistic understanding of knowledge for CPD research is expressed in Winch's writing (1958), which is summarised by Smeyers (2006: 479):

'Winch's position implies that the discussion has to start from a particular social intercourse or 'practice'. It follows that the empirical observational methods (and statistical techniques) cannot possibly be the only yardstick. Instead, the human situatedness of the phenomena being researched requires that all our observations, arguments, and considerations must be based in our practices. Normative and value-laden elements have to play a crucial role throughout educational research and not just in the first or final stages' (as shown here) (Smeyers 2006: 479).

However, despite this positive assessment there seem to remain some practical problems with the integration and communication of tacit knowledge in research, because of the requirement for the explicit analysis and explanation, (i.e., justification) which is required for example by university regulations and regulations of national research funding bodies in the UK, such as AHRC (2006) and RAE (2005).

- iii. The problem with communicating tacit knowledge in research discussed under ii) concerns on the one hand the integration of tacit knowledge into research, and on the other hand it concerns the communication of tacit knowledge that is part of the findings of any research.

Firstly, concerning the inclusion of tacit knowledge in research, designers and other practitioners have taken to e.g., as part of their research in order to be able to draw on the tacit knowledge inherent in their practice. Above, we have discussed that in principle there should not be any problem with the inclusion of tacit knowledge. However, the lack of clarity about knowledge has led to a lack of clarity about how to use practice within research (e.g., Biggs 2002, 2004; Durling et al. 2002). These problems pertain both to research regulations as well as research practice. For example, although research regulations (e.g., AHRC 2006) formally allow practice into the research process, they do not explicitly specify its purpose or role within research. In terms of research practice and methodological conduct, the lack of specification as well as of the understanding of knowledge has led to a loose use of practice within research which in turn has caused problems with the recognition

of the validity of using practice as a method and means in research for making tacit knowledge available to the research process.

These considerations suggest that this problematic can be overcome on the one hand by an appropriate framing of practice-led inquiry within research. A very good example is Whiteley's research into the development of artificial limbs through drawing and modelling (Whiteley 2000). They suggest further that, on the other hand, an explicit acknowledgement of the intrinsic importance and role of tacit knowledge in the research process through research regulations and research requirements would be of benefit to research in the creative and practice-led disciplines as well as the provision of clear guidelines of how to do so.

The second problem, which concerns the communication and sharing of tacit knowledge for application in practice, is more profound. Neuweg (2002: 45) sums this problem up in pragmatic terms, declaring that 'although tacit knowledge is not teachable, it is coachable.'

This indicates that there is an intrinsic problem with the communication of research, which has significant consequences for the dissemination of research as well as on research education, and suggests that rethinking these issues is required to progress the identified problems. In particular, this problem will need further research to establish appropriate methods and procedures to overcome the problem. While there have been many approaches to this problem, these are situated in different areas such as knowledge management (e.g., Nonaka and Takeuchi 1995, e.g., Nonaka, et al. 2006), education (e.g. Neuweg 2004), nursing (e.g., Higgs and Titchen 2001), and need analysis and synthesis for application to the problem of research in design.

6. CONCLUSION AND FUTURE RESEARCH

This research has investigated the meaning, role and format of knowledge in research and practice, with particular reference to research in the creative and practice-led disciplines. To this end, we discussed that problems with the recognition of tacit knowledge within research have arisen because of the implicit prioritisation of propositional or explicit knowledge in research, and we used some examples to analyse the nature of these problems. We established that tacit knowledge plays an essential role in our ability to obtain highest achievements in practice as well as in research,

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often expressed as expertise and connoisseurship, and that therefore the deliberate inclusion of tacit knowledge within research is important and necessary.

In order to understand better how to include tacit knowledge within research, (e.g., through the use of practice within research) in sections 3 and 4, we examined the meaning and relationship of the prevalent concepts of knowledge in philosophy. The discussion has sought to clarify the meaning and relationships of prevalent concepts such as propositional and non-propositional knowledge (including experiential and procedural knowledge), propositional and non-propositional content, and explicit and tacit knowledge. Section 5 has used the understanding of knowledge gained in the previous sections to consider knowledge with regard to its format of communication, and with regard of the consequences of this for the role and format of knowledge, in particular tacit knowledge, in research.

We concluded that there is no fundamental problem with including both propositional and non-propositional knowledge in the research process, (e.g., by means of using practice) because non-propositional knowledge, too, has propositional content, which can be made explicit, and by means of which its use can be acknowledged. However, we found that there are problems concerning the communication of the outcomes of research, because the non-propositional/tacit component of knowledge is at least equally important as its explicit counter part for the applicability of any outcomes in practice or in further research, and because tacit knowledge by its nature evades verbalisation and therefore evades communication, dissemination and knowledge sharing.

With regard to methodology and conduct, this research suggests therefore that it would be desirable for future research to analyse and synthesise existing approaches in terms of verbal/textual and non-verbal communication (e.g., description/narrative, examples, models, prototypes, case studies [video] demonstration, coaching, etc.), according to the four categories of knowledge content (propositional content of propositional knowledge, propositional content of non-propositional knowledge, non-propositional content of propositional knowledge, and non-propositional content of non-propositional knowledge). A mapping of this kind would serve to gain a better understanding of any methods and their application within research. With regard to research policy (regulations and requirements), it would be important to acknowledge the existence and importance of non-propositional/tacit knowledge, how it can be included

under current requirements, and how research results can be communicated inclusive of its tacit component to facilitate application in practice.

Kristina Niedderer

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Kristina Niedderer

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Her research interests range across conceptual and philosophical issues in craft and design, fundamental principles and practices of using practice within research, the nature and role of knowledge in research and practice; research education, and developing principles for research exhibitions. She has experience of peer review of research quality through conferences and journals, through PhD supervision, and authoring research papers. She has lectured on research issues at various European universities, and is involved in collaborative research networks.

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SHAPING THE FUTURE?

The 9th International Conference
on Engineering and Product Design Education

13–14 September, 2007

School of Design at Northumbria
University, Newcastle upon Tyne, UK

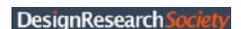
The conference will bring together representatives from education and industry who have an interest in shaping the future of design education. It will provide a forum for educators and researchers from product development, engineering and industrial design, together with industry and government representatives to discuss current educational issues and the nature of design education in the future. This year's conference theme, 'Shaping the Future?', will provide the opportunity for participants to exchange ideas and build collaborative relationships.

Topics:

- ▶ Design and local community
- ▶ Design and government
- ▶ Teaching tools and techniques
- ▶ Developing links with industry
- ▶ Design curriculum development
- ▶ Philosophies of design education
- ▶ Professional development in design
- ▶ Cross-disciplinary projects
- ▶ Work-based learning
- ▶ Future industry needs
- ▶ Learning environments
- ▶ Industry based student projects
- ▶ Assessment
- ▶ Professional doctorates
- ▶ 'New' Knowledges for design
- ▶ Design manifestos

Presentations:

- ▶ Paper and poster presentations
- ▶ Roundtable discussions
- ▶ Exhibition
- ▶ Workshops



CURRENT RESEARCH IN DESIGN

TABLES OF CONTENTS FROM LEADING DESIGN JOURNALS: WINTER-SPRING, 2007

Beginning with this issue, DRQ is including listings of recent articles in journals that cover design theory, research and methods. Journals and listings will be expanded as information becomes available.

ARCHITECTURAL DESIGN, 77:1,

JAN-FEB 2007

ISSN: 0003-8504

[WEB LINK](#)

Elegance in the Age of Digital Technique

Ali Rahim, Hina Jamelle

☛ Elegance and maturity in digital design

Lightness and fluidity: Remarks concerning the aesthetics of elegance

David Goldblatt

☛ Development of a 'new, multifaceted, sensual rationality' in designs

Material elegance

Manuel DeLanda

☛ Objective interpretation and measure of elegance

Frozen void: The elegant affect of the evolved object

Kivi Sotamaa

☛ Elegance in process for elegant outcome

Arguing for elegance

Patrik Schumacher

☛ Elegance and complexity in architecture

Surface continuity: An elegant integration

Ali Rahim, Hina Jamelle

▶ Greg Lynn, FORM, DADAGROWS, Florence • part-to-whole relations • BMW Leipzig Factory • work-group-based gradient fields • luminous effects • spatial forms

Everything is curved: The Mercedes-Benz Museum, Stuttgart, Germany

Ben van Berkel, Caroline Bos

▶ spatiotemporal experience • Möbius strip • the Klein Bottle • UN Studio • space-enhancing techniques • trefoil

Elegance, attenuation, and Geometry: Herta and Paul Amir Building, Tel Aviv Museum of Art

Preston Scott Cohen

▶ Baroque architecture • projective geometry • Albertian perspective • anamorphosis • quad panelized facade

Beyond the structural skin Zaha Hadid Architects: Marsa Dubai residential Tower

Ali Rahim, Hina Jamelle

▶ inventive structural system • Islamic motifs • Fenestration variation

The Economies of Elegance Migrating Coastlines: Residential Tower, Dubai

Ali Rahim, Hina Jamelle

▶ Transformation of four tubes • Sheikh Zayed Road • two contiguous 5-storey buildings • inflections • concrete fabrications in Guangdong

Performing elegance

Hani Rashid

▶ 'internationalism' • Asymptote, Carlos Miele Flagship New York • Shanghai, Dubai and Singapore • new cityscapes

Deus ex machina: From Semiology to the Elegance of Aesthetics

Mark Foster Gage

☛ Production of elegance in large scale projects, expertise and awareness of 'extreme differentiation'

(K)not a loop

Hani Rashid

▶ The Möbius Dress • Möbius strip • two-dimensional surfaces • three-dimensional form • splitting rule • industrial recycled felt • interiority and exteriority

Notes on designing surficial elegance

Benjamin H Bratton, Hernan Diaz Alonso

▶ Mayan cinema • Xefiotarch • Hernan Diaz Alonso's microtechniques • animation software • Baudry, Deleuze, Penley • Xefiotarch, Art Hotel, Puerto Plata, Dominican Republic

ARCHITECTURAL DESIGN, 77:2,

MAR-APR, 2007

ISSN: 0003-8504

[WEB LINK](#)

SPECIAL ISSUE:

LANDSCAPE ARCHITECTURE SITE/NON-SITE

Site/non-site: Extending the parameters in contemporary landscape

Michael Spens

☛ "As the world teeters on the verge of environmental collapse, landscape architecture has taken on a new significance ..."

From Mound to Sponge: How Peter Cook Explores Landscape Buildings

Michael Spens

➔ Peter Cook: from mound to city earthscape.

New architectural horizons

Juhani Pallasmaa

☛ Contra over-intellectualism in architecture: joining 'outer and inner landscapes'

Recombinant landscapes in the American city

Grahame Shane

☛ Emerging approaches to landscape in urban spatial and social contexts

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Urban American landscape

Jayne Merkel

- Transforming 'abandoned industrial sites' into 'new kinds of parks'

Toronto Waterfront Revitalisation

Sean Stanwick

- 'reviving the city's engagement with its waterfront'

Operationalising patch dynamics

Victoria Marshall, Brian McGrath

- Urban landscape design in Hoboken New Jersey

Recent works by Bernard Lassus

Michel Conan

- Innovative French landscape design

Deep explorations into site/non-site: The work of Gustafson Porter

Michael Spens

- Kathryn Gustafson, Neil Porter: light and water, site and context

'Activating nature': The magic realism of contemporary landscape architecture in Europe

Lucy Bullivant

- New approaches to 'the greening of public urban spaces'

Landscapes of the second nature: Emptiness as a non-site space

Michael Spens

- Poetics of space: projects in Leipzig and Seoul

City in suspension: New Orleans and the construction of ground

Felipe Correa

- Post-Katrina reorganization

Impressions of New Orleans

Christiana Spens

- Hurricane Katrina • gulf coast • Eeysian fields

Is there a digital future landscape terrain

Lorens Holm, Paul Guzzardo

- 'landscape terrains that establish agora-like meeting places as a basis for electronic exchange and progression'

DESIGN JOURNAL: 9:1-3, 2006

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Patron or consumer: Governments, design and purchase

Hamza Cinar

Optimizing multidisciplinary Contributions for the Smart Clothing Development Process

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Metaphors as an unconventional reflective approach in architectural design

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Theorizing design

Rachel Cooper

Theorizing things: Status, problems and benefits of the critical interpretation of objects

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Product Talk

Josiena Gotzsch

Risk in design: Key issues from the literature

Robert Jerrard and Nick Barnes

Seamless knitwear – the design skills gap

Kate Sayer, Jacquie Wilson and Simon Challis

Design-based knowledge transfer partnerships

Bob Jerrard

Enhancing the design capabilities of small and medium-sized enterprises Through knowledge transfer

Ian Montgomery and Brian McClelland

Clusters: A possible alternative to ktps for improving design knowledge?

Kathryn Burns

Transfer or emergence: Strategies for building design knowledge through knowledge transfer partnerships

Tom Inns, Seaton Baxter and Emma Murphy

Professionalizing a cottage industry: Ktps and design group development

Seymour Roworth-Stokes

Democratizing innovation: Eric von Hippel:

The user innovation revolution: Charles

Leadbeater

Mike Press

DESIGN MANAGEMENT REVIEW, 8:1, WINTER 2007

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Analytic enhancements to strategic Decision-making: From the designer's toolbox

Ravi Chhatpar

- 'The iterative, user-centric methodologies of design can supplement the rigor of traditional analytical approaches to allow for more-accurate and flexible evaluation of strategic options'

Creating Better Connections: Strategic gains from holistic design

Gus Desbarats

- Judging the quality of design by business results: 'data gleaned ... to demonstrate how to measure design success, understand what drives strategic change, and recognize traits that lead to positive design-led results'

Design on Stage - The Red Dot Design Award

Peter Zec

- 'What do these awards tell us about design's contribution to business?'

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Delivering Success Through Design: Reinventing the batting helmet

Dave Franchino

- ▶ From zero to 30% market share in three years.

Design with heart

Robyn Waters

- ▶ Building Target's philosophy of 'trend from the inside out.'

Designing for the Times

Joe Duffy, Eric Block

- ▶ Suggestions to 'help designers connect more cleanly with clients and with consumers.'

Innovation, Growth, and Getting to Where You Want to Go

Ryan Jacoby

- ▶ Using constraints and structure to increase and sustain innovation.

Let's brandjam to humanize our brands

Marc Gobe

- ▶ Developing new languages for humanizing brands to emotionally connect with people

Managing design - designing management: Two sides of the same idea

Gabriele E. Krause

- ▶ Corporate transformation: constructing an 'integrated corporate strategy', finding a designer, and creating a 'new corporate and design entity.'

The customer continuum: Turning casual web users into brand advocates

Gwyneth Dwyer

- ▶ 'a "customer continuum" that moves e-visitors from awareness to allegiance.'

What's the story? Aligning mission, vision, and strategy with your brand

William Faust

- ▶ 'a case study ... to summarize what companies should do internally to build a strong brand'

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Products and practices: Selected concepts from science and technology studies and from social theories of consumption and practice

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Printing contemporary handwoven fabrics (Aso-oke) in Southwestern Nigeria

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Étude sur le mouvement d'art décoratif en Allemagne (A Study of the decorative arts movement in Germany)

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Book Review:

- ▶ Lester Beall: Space, Time & Content. Roger Remington

DESIGN STUDIES, 28:1, JAN, 2007

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Nigel Cross

The Enactment of design through language

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- ▶ design philosophy, design theory, research methods

Applications of affordance and semantics in product design

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- ▶ affordance, interface design, product design, user behavior, perception

Research on predicting models of annoyance under the operation of digital hi-tech products

Jing-Song Huang, Min-Yuan Ma and Chien-Hsu Chen

- ▶ industrial design, human factors, interface design, annoyance

Comparing synthesis strategies of novice graphic designers using digital and traditional design tools

Catherine Stones and Tom Cassidy

- ▶ design tools, drawing, graphic design, computer aided design, design strategy

Evaluation of complex systems

Charles L. Owen

- ▶ evaluation, modeling, planning, systems design, Structured Planning

DESIGN STUDIES, 28:2, MAR, 2007

ISSN: 0142-694X

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Viewpoint: Design for development: Towards a history

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Ethical issues in engineering design processes: Regulative frameworks for safety and sustainability

Anke van Gorp

- ▶ engineering design, ethics, design practice

On the conceptual framework of John Gero's FBS-model and the prescriptive aims of design methodology

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- ▶ design methodology, design models, design knowledge, descriptive and prescriptive modeling, philosophy of design

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- ▶ architectural design, design theory, design problems, problem-solving, problem setting

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Guidelines to minimize variation When estimating product line commonality through product family dissection

Henri J. Thevenot and Timothy W. Simpson

- ▶ product design, design tools, user participation, product dissection

A method for establishing an online design audit platform

Tung-Jung Sung and Manlai You

- ▶ design audit, information design, interface design, design management

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APR 2007

ISSN: 0142-5471

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Max Louwerse

No laughing matters: The use of humor in texts

Heather H. Mitchell

Comparing typefaces for airport signs

Robert Waller

- ▶ legibility, signage, transport information, typographic research, wayfinding

Images as anti-smoking fear appeals: The effect of emotion on the persuasion process

Rian Timmers, Per van der Wijst

- ▶ antismoking warnings, emotion, fear appeal, persuasion process, target group

An Interview with Information Designer: Eric Kavanagh

Saul Carliner

Medical communications and information design

Jorge Frascara, Stan Ruecker

- ▶ medicine, pharmaceuticals, printed communications, typography

Knowing your audience: Audience analysis and audience participation in the field?

Leon de Stadler and Sarah van der Land

Information mapping: Effects of text features and reader characteristics on performance and appreciation

Rob Le Pair, Carel Jansen, Hubert Korzilius, Jolanda van Gerdingen, Susanne de Graaf, Rentia Visser

- ▶ appreciation, effectiveness, efficiency, format features, Information Mapping, non-native speakers, structured writing

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- ▶ Wayfinding: Designing and Implementing Graphic Navigational Systems. Craig M. Berger,

INTERNATIONAL JOURNAL OF ART AND DESIGN EDUCATION,
26:1, FEB 2007

ISSN: 1476-8062 0260-9991

[WEB LINK](#)

SPECIAL ISSUE: LESBIAN AND GAY ISSUES IN ART, DESIGN AND MEDIA EDUCATION

Preface: 'anything you can do': Proposals for lesbian and gay art education

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Identity politics and the queering of art education: Inclusion and the confessional route to salvation

Nicholas Addison

Queering art teacher education

Kimberly Cosier and James H. Sanders III

Photography in pink classrooms

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Sapphos to baby dykes: A photo-essay

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What to collect? Museums and lesbian, gay, bisexual and transgender collecting

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Lesbian teachers Walking the Line between inclusion and exposure

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The Warren Cup: Highlighting hidden histories

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Hidden histories: The experience of curating a male same sex exhibition and the problems encountered

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Book Reviews:

- ▶ Sex objects: Art and the dialectics of desire. Jennifer Doyle
The boy. Germaine Greer.
- ▶ Sex, love and homophobia: Lesbian, gay, bisexual and transgender lives. Desmond Tutu, Amnesty International, Vanessa Baird and Grayson Perry.
- ▶ Hello sailor! The hidden history of gay life at sea. Paul Barker and Jo Stanley Harlow

INTERNATIONAL JOURNAL OF DESIGN,
1:1, APR, 2007

ISSN: 1329-7147

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Exploring types and characteristics of product forms

Wen-chih Chang, Tyan Yu Wu

- ▶ emotion, pleasurable products, product forms, cluster analysis.

A usability evaluation of web map zoom and pan functions

Manlai You, Chun-wen Chen, Hantsai Liu, Hsuan Lin

- ▶ web map, zoom, pan, interface design, usability, human-computer interaction

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Effects of RSVP display design on visual performance in accomplishing dual tasks with small screens

Chien-Hsiung Chen, Yu-Hung Chien

- ▶ display, mobile communication, rapid serial visual presentation, small screen, visual performance.

Guerrilla wars in everyday public spaces: Reflections and inspirations for designers

Pieter Desmet, Paul Hekkert

- ▶ experience, aesthetics, meaning, emotion, design psychology.

Framework of product experience

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It looks like a Toyota: Educational approaches to designing for visual brand recognition

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- ▶ brand identity, design semantics, education, product design, visual recognition

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ISSN: 0957-7572

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Design and technology productions among middle school students: An Indian experience

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- ▶ cognition, design and technology education, design productions, middle school students

The structure of students' knowledge and self-concepts.

Part A: The structure of students' knowledge formed in information education

Akihito Kito, Jun Moriyama and Masashi Matsuura

- ▶ knowledge level, computer literacy, junior high-school student, information education

Teaching for CAD expertise

Ivan Chester

- ▶ CAD, expertise, metacognition, strategic knowledge, procedural knowledge, declarative knowledge, spatial ability, scaffolding, mental set

The structure of students' knowledge and self-concepts.

Part B. The structure of students' self-concepts in industrial high school

Kazunori Shimada, Jun Moriyama, and Masashi Matsuura

- ▶ self-concept, industrial high school, structural analysis

A learning methodology using Matlab/Simulink for undergraduate electrical engineering courses attending to learner satisfaction outcomes

Mario J. Durán, Sergio Gallardo, Sergio L. Toral, Rocío Martínez-Torres and Federico J. Barrero

- ▶ educational technology, electrical engineering, electric machines, learner satisfaction and software-based methodology

Sparking self-sustained learning: Report on a design experiment to build technological fluency and bridge divides

Brigid Barron, Caitlin Kennedy Martin, and Eric Roberts

- ▶ equity • design experiment • learning resources technological fluency, professional development, computer science

Sytse Strijbos and Andrew Basden eds: In Search of an integrative vision for technology: Interdisciplinary studies in information systems

Marc J. de Vrie

INTERNATIONAL JOURNAL OF TECHNOLOGY AND DESIGN EDUCATION, 19:2, MAY, 2007
ISSN: 0957-7572

[WEB LINK](#)

A phenomenographic study of greek primary school students' representations concerning technology in daily life

Christina Solomonidou, and Athanassios Tassios

- ▶ daily life technologies, primary education, social factors in representing technology, students' representations, teaching technology, technological literacy

The effect of alternative approaches to design instruction (structural or functional) on students' mental models of technological design processes

David Mioduser and Osnat Dagan

- ▶ design process, design functions, mental models, technology education

Creativity in school design & technology in England: A discussion of influences

David Barlex

- ▶ creativity, curriculum, design & technology, designing, pedagogy

Designers as teachers and learners: Transferring workplace design practice into educational settings

B. Mawson

- ▶ design process, learning, teaching, workplace

Teachers learning about technology and technology education: Insights from a professional development experience

Sarah J. Stein, Ian S. Ginns and Christine V. McDonald

- ▶ teacher knowledge development, technology concepts, teacher professional development, technology education

Continued p. 19 →

Can twenty years of technology education assist 'grass roots' syllabus implementation?

Ian Spurway Ginns, Stephen J. Norton, Campbell J. McRobbie and Robert S. Davis

- ▶ technology education, technology education research, technology syllabus, teacher practice, teacher professional development

Programming for the internet and experiential learning: A new approach incorporating a constructed world

Adam P. R. Taylor

- ▶ engineer, construction, culture, experiential learning, identity, internet programming, sense making,

JOURNAL OF DESIGN HISTORY, 20:1, SPRING, 2007
ISSN: 0952-4649 [WEB LINK](#)

Selling China: Class, gender and orientalism at the department store

Sarah Cheang

- ▶ cultural nationalism, gendered consumption, nostalgia, second-hand goods, social exclusivity, women

Invisibility: Memory, masks and masculinities in the great war

Katherine Feo

- ▶ crafts, First World War, masculinity, plastic surgery, prosthetics, weapons technology

How an excavator got aesthetic pretensions—Negotiating design in 1960s' Norway

Kjetil Fallan

- ▶ corporate interior design, interior design history, Knoll, Florence, Knoll look, Knoll Planning Unit, modernism, humanized

'I am not a decorator': Florence Knoll, the Knoll Planning Unit and the making of the modern office

Bobby Tigerman

- ▶ corporate interior design, interior design history, Knoll, Florence, Knoll look, Knoll Planning Unit, modernism, humanized

Reviews:

- ▶ Imagine no possessions: The socialist objects of Russian Constructivism. Christina Kiaer
- ▶ Printed textiles in the classic French style, Toiles for all seasons. French and British printed textiles. Susan Hooper
- ▶ Home truths: Gender, domestic objects and everyday life. Lesley Ellis Miller
- ▶ A foot in the past: Consumers, producers and footwear in the long Eighteenth Century. Penelope Alfrey
- ▶ Negotiating domesticity. Spatial productions of gender in modern architecture. Susan R. Henderson

JOURNAL OF ENGINEERING DESIGN, 18:1, JAN-FEB 2007
ISSN: 0954-4828 [WEB LINK](#)

Taguchi optimization in the design of a printer registration system

Douglas K. Herrmann

- ▶ Taguchi optimization, orthogonal array, compound noise, Taguchi techniques, parameter design, robust design

Improvement of a low-cost water jet machining intensifier using reverse engineering and redesign methodology

N. Geren, M. Bayramogbrevelu, U. Escedilme

- ▶ design, product design, product development, water-jet cutting, intensifier design, high pressure sealing, Reverse engineering and redesign

Identification of different demographical customer preferences for product conceptualization

Wei Yan, Chun-Hsien Chen, Li Pheng Khoo

- ▶ product conceptualization, customer segmentation, product platform, demographic customer differences, design knowledge hierarchy, Kohonen association

An activity-based modelling approach for assessing the key stakeholders' corporation in the eco-conscious design of electronic products

Christine Ping Ge, Bo Wang

- ▶ eco-conscious design, corporation strategies, activity-based modelling

A method for structure sharing to enhance resource effectiveness

Amareesh Chakrabarti, Vishal Singh

- ▶ structure sharing, resource effectiveness, simplicity, integration, cost

The idea exposure paradigm in design idea generation

Matti Perttula, Pekka Sipilä

- ▶ product design, design management, best practise

JOURNAL OF ENGINEERING DESIGN, 18:2, MAR-APR 2007
ISSN: 0954-4828 [WEB LINK](#)

Web-based virtual reality

Stig Ottosson, Lars Holmdahl

- ▶ virtual reality, web, Internet

A design structural matrix approach displaying structural and assembly requirements in construction: a timber case study

Anders Björnfort, Lars Stehn

- ▶ assembly, constructability, design structural matrix, modularity, standardization

Evaluation of ergonomics in a virtual manufacturing process

T. Dukic, M. Rönnäng, M. Christmansson

- ▶ ergonomics, manufacturing, human modeling, visual demand, virtual verification

Toward a taxonomy of concept designs for improved robustness

Rajesh Jugulum, Daniel D. Frey

- ▶ P-diagram, Taguchi methods, theory of inventive problem solving, TRIZ

Continued p. 20 →

A grammatical approach for real-time design of engineer-to-order products

Zahed Siddique, Jiju A. Ninan

- ▶ web-based mass customization, real-time design, engineer-to-order products, grammatical design approach

Perception of gap and flush in virtual environments

Casper Wickman, Rikard Söderberg

- ▶ tolerance simulation, virtual verification, distance judgement in virtual environments, non-nominal visualisation, perception parameters

JOURNAL OF URBAN DESIGN, 12:1, WINTER 2007

ISSN: 1357-4809

[WEB LINK](#)

Quantitative classification of neighbourhoods: The neighbourhoods of new single-family homes in the Portland metropolitan area

Yan Song, Gerrit-Jan Knaap

- ▶ architecture: architectural structure & design, built environment, city & town planning, urban design, urban studies

Fear and fantasy in the public domain: The development of secured and themed urban space

Rianne Van Melik a, Irina Van Aalst a, Jan Van Weesep

- ▶ architecture: architectural structure & design, architecture: architectural structure & design, built environment, city & town planning, architectural aspects, planning, urban design, urban studies,

California garden suburbs: St. Francis Wood and Palos Verdes Estates

Fukuo Akimoto

- ▶ architecture: architectural structure & design, architecture: architectural Structure & Design, Built Environment, City & Town Planning, Architectural, City & Town Planning, Architectural Aspects, Planning, Urban Design, Urban Studies

From megastructure to megalopolis: Formation and transformation of mega-projects in Tokyo Bay

Zhong-Jie Lin

- ▶ Architecture: Architectural Structure & Design, Architecture: Architectural Structure & Design, Built Environment, City & Town Planning, Architectural, City & Town Planning, Architectural Aspects, Planning, Urban Design, Urban Studies

Classic English hill towns: Ways of looking at the external appearance of settlements

Stephen Owen

- ▶ Architecture: Architectural Structure & Design, Architecture: Architectural Structure & Design, Built Environment, City & Town Planning, Architectural, City & Town Planning, Architectural Aspects, Planning, Urban Design, Urban Studies

Re-writing the city: Putrajaya as representation

Ross King

- ▶ Subjects: Architecture: Architectural Structure & Design, Architecture: Architectural Structure & Design, Built Environment, City & Town Planning, Architectural, City & Town Planning, Architectural Aspects, Planning, Urban Design • Urban Studies

VISIBLE LANGUAGE, 40:3, FALL, 2006

ISSN: 0022-2224

[WEB LINK](#)

A comparison of Maya and Oracle bone scripts

William Chaing

Typography behind the Arabetic calligraphy veil

Saad D. Abulhab

- ▶ calligraphic forms of Arabic script and digital technology

Analyzing multimodal interaction within a classroom setting

Heloisa Moura

- ▶ 'the specific place of action and multimodal interaction within the learning process'

Children's responses to line spacing in early reading books or 'holes to tell which line you're on'

Linda Reynolds, Sue Walker and Alison Duncan

- ▶ 'study designed to find out whether children's reading would be affected by line spacing that is wider or narrower than the commonly used default values.'

- ▶ Key words (from listing)

- ⌘ Editor's summary (from abstract)

- ⌘ Quotation (from abstract) with or without editor's summary.

UPCOMING EVENTS

DESIGN CONFERENCES WORLDWIDE

ARTEMIS YAGOU

- | | | |
|--|--|--|
| <p>2007
 28 Apr–3 May
 San Jose, U.S.A.
 Reach and Beyond
 Human Factors in Computing
 Systems. CHI2007-Annual
 ACM/SIGCHI Conference:
 Human Factors in
 Computing Systems.
 http://www.chi2007.org</p> <p>17-18 May
 Kingston, U.K.
 Fashioning the Modern Interior
 The Dorich House
 Annual Conference.
 http://www.kingston.ac.uk/design/mirc/conference07.html</p> <p>27-30 May
 Stockholm, Sweden
 Design Inquiries:
 Second Nordic Design
 Research Conference.
 www.nordes.org</p> <p>11-13 Jun
 Wrexham, U.K.
 The Narrative Practitioner:
 Developing Excellence
 in Research, Education
 and Practice.
 a.carson@newi.ac.uk</p> <p>11-13 Jun
 Tokyo, Japan
 14th CIRP International
 Conference on Life-
 Cycle Engineering.
 http://cirp-lce2007.jspe.or.jp/</p> <p>13-15 Jun
 Washington DC, USA
 Creativity and Cognition 2007
 – Seeding Creativity: Tools,
 Media, and Environments.
 http://www.cs.umd.edu/hcil/CC2007/</p> <p>18-20 Jun
 Helsingborg, Sweden
 First European Conference
 on Affective Design and
 Kansei Engineering.
 http://www.kansei.eu/</p> | <p>20-23 Jun
 Thessaloniki, Greece
 3rd International Conference
 on Typography and Visual
 Communication.
 http://afroditi.uom.gr/uocompress/3rd_int_conference/introduction.html</p> <p>26 Jun
 De Montfort, U.K.
 In theory? Encounters with
 Theory in Practice-based Ph.D.
 Research in Art and Design.
 e.rooney@lboro.ac.uk</p> <p>29 Jun
 Hatfield, U.K.
 The Experiential Knowledge
 Conference 2007:
 New Knowledge in the
 Creative Disciplines.
 http://www.art-design.herts.ac.uk/ekc/ekc1.html</p> <p>14-18 Aug
 Copenhagen, Denmark
 Fashioning Technology: Design
 from Imagination to Practice.
 The International Committee
 for the History of Technology
 Symposium 2007
 http://www.icohtec2007.dk/</p> <p>22-25 Aug
 Helsinki, Finland
 Designing Pleasurable
 Products and Interfaces
 UE+/User Experience Plus,
 Designing Pleasurable Products
 and Interfaces.
 http://designresearch.uiah.fi/dppio7/</p> <p>28-31 Aug
 Paris, France
 Design for Society
 16th International Conference
 of Engineering Design
 http://icedo7.org</p> | <p>5-7 Sep
 Kingston, U.K.
 Design/Body/Sense:
 Design History Society
 annual conference.
 http://www.design-bodysense.co.uk/</p> <p>12-14 Sep
 London, U.K.
 Designs on eLearning:
 Learning and Teaching with
 Technology in Art Design
 and Communication.
 http://www.design-sonelearning.net/index.php?section=1&item=3</p> <p>12-16 Sep
 Brighton, U.K.
 ATypl 2007 Conference
 http://www.atypi.org</p> <p>13-14 Sep
 Newcastle upon Tyne, U.K.
 Shaping the Future?
 EPDE07 – The 9th International
 Conference on Engineering &
 Product Design Education.
 http://www.cfd.r.co.uk/epde07/</p> <p>19-21 Sep
 Montreal, Canada
 Digital Thinking in Architecture,
 Civil Engineering, Archaeology,
 Urban Planning and Design
 : Finding the Ways
 EuroPIA.11: 11th International
 Conference on Design
 Sciences & Technology
 http://europia11.free.fr/</p> <p>29-30 Oct
 Farnham, U.K.
 Sustainable Innovation
 07-Global Building and
 Construction.
 Systems, Technologies,
 Products and Services 12th
 International Conference
 http://www.cfsd.org.uk/</p> |
|--|--|--|

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29-31 Oct **Mexico City, Mexico**
Second MX Design Conference
<http://www.dis.uia.mx/conference/>

12-15 Nov **Hong Kong**
Emerging trends in design research.
International Association of Societies of Design Research
<http://www.sd.polyu.edu.hk/iasdr/>

Artemis Yagou

Livenarch III

5-7 July, 2007 — Trabzon, Turkey

Contextualism in Architecture:

Contextualism as the resolution of the identity-creativity dilemma

This conference will critically examine ways of mediating the totalizing and homogenizing effects of globalization, especially on urban form and architecture-city relationships. The goal is for scholars and professionals to discuss modes of interventions which do not retreat to imitation, dissimulation or minimalism, but rather to argue for creative solutions emerging from geographical and cultural locale.

1. Theories and Fictions:

- ▶ Theoretical foundations, frameworks, and concepts
- ▶ Philosophical, ethical & social implications (In relation to designing for social/cultural/contextual particularities and extremes-climate, geography, devastated cities, specially protected areas, the underprivileged, the peripheral and the marginal, etc.)

2. Creative design methods and tools:

- ▶ Design guidelines, methods, and processes
- ▶ Narratives, myths and fantasies

3. Innovative solutions: cases of socially appropriate solutions, style and appearance:

- ▶ Urban transformations
- ▶ Contextual architecture
- ▶ Building elements, furniture and objects

Poster Session

Poster submissions in line with the congress theme are encouraged. Two standard sheets [50X70cm] are welcome.

Forum

The Turkish scene which is open to Turkish architects mainly. Lecturers, keynote speakers and referees' contributions are encouraged.

<http://www.livenarch2007.org>

SUBSCRIPTION:

DESIGN RESEARCH NEWS

Professional and educational service of the Design Research Society

Design Research News comes once a month with all the news on the world of design research carefully assembled, well written, and free of charge.

Design Research News provides information on design and design research to 7,000 subscribers around the world: an international audience of experts in design research, design practice, and design education.

Information on:

- conferences
- publishing opportunities
- funding
- competitions
- articles
- exhibitions
- books

All areas of design:

- ▶ industrial design
- ▶ graphic design
- ▶ product design
- ▶ design history
- ▶ philosophy of design
- ▶ design theory
- ▶ art
- ▶ engineering
- ▶ anthropology
- ▶ architecture
- ▶ systems design
- ▶ design management
- ▶ CAD
- ▶ ergonomics
- ▶ psychology
- ▶ computer science
- ▶ information design
- ▶ informatics
- ▶ design for development
- ▶ and many other subjects.

DESIGN RESEARCH NEWS ONLINE:

<http://www.jiscmail.ac.uk/lists/design-research.html>

MEMBERSHIP:

DESIGN RESEARCH SOCIETY DESIGN RESEARCH QUARTERLY

The Design Research Society is the multi-disciplinary learned society for the design research community worldwide.

We have an international design research network in around 40 countries comprising members who maintain contact through our publications and activities.

Our members are from diverse backgrounds, not only from the traditional areas of design, ranging from expressive arts to engineering, but also from subjects like psychology and computer science.

We:

- ▶ Recognize design as a creative act common to many disciplines
- ▶ Understand research and its relationship with education and practice
- ▶ Advance the theory and practice of design
- ▶ Encourage the development of scholarship and knowledge in design
- ▶ Contribute to the development of doctoral education and research training
- ▶ Share knowledge across the boundaries of design disciplines
- ▶ Facilitate networks to exchange and communicate ideas, experience and research findings among members
- ▶ Disseminate research findings
- ▶ Promote awareness of design research
- ▶ Organise and sponsor conferences, and publish proceedings
- ▶ Encourage communications between members internationally
- ▶ Respond to consultative documents
- ▶ Collaborate with other bodies
- ▶ Lobby on behalf of members' research interests
- ▶ Recognise excellence in design research through awards
- ▶ Sponsor e-mail discussion groups and a monthly e-mailed newsletter: **DESIGN RESEARCH NEWS**
- ▶ Publish **DESIGN RESEARCH QUARTERLY** to members.

FOR INFORMATION OR TO JOIN THE DESIGN RESEARCH SOCIETY ONLINE:

www.designresearchsociety.org

'Pull Quote'

'...a combination of science thinking and design thinking is better than either alone as a source of advice.'

SEVEN NEW FELLOWS OF THE DESIGN RESEARCH SOCIETY

THE FELLOWS TO HAVE THEIR APPOINTMENTS CONFIRMED ARE:

- **PROFESSOR RACHEL COOPER** UNIVERSITY OF LANCASTER, UK
- **PROFESSOR ALPAY ER** ISTANBUL TECHNICAL UNIVERSITY, TURKEY
- **PROFESSOR JACK INGRAM** UNIVERSITY OF CENTRAL ENGLAND, UK
- **PROFESSOR JUDITH MOTTRAM** NOTTINGHAM TRENT UNIVERSITY, UK
- **PROFESSOR VESNA POPOVIC** QUEENSLAND UNIVERSITY OF TECHNOLOGY, AUSTRALIA
- **PROFESSOR KEIICHI SATO** ILLINOIS INSTITUTE OF TECHNOLOGY, USA
- **PROFESSOR MARTIN WOOLLEY** UNIVERSITY OF THE ARTS, UK

In March 2006, the Design Research Society's Council instituted a new grade of membership—Fellow of the Design Research Society—to acknowledge an individual as having an established record of achievement in design research and attainment of peer recognition as a researcher of professional standing and competence, with:

- ▶ a research qualification or equivalent (normally a Doctorate or a Masters degree by research)
- ▶ at least seven years experience of working at postgraduate level in research related to design, or research-based design practice
- ▶ significant record of achievement in design research, as evidenced by, for example, publications of international standard, and/or conducting successful research projects, and/or successful education of postgraduate research students.

The first appointments arose from nominations made by DRS Council members. The appointment procedure was carried out by Professor Nigel Cross, President of DRS

and holder of a DRS Lifetime Achievement Award, with the support of three other distinguished and experienced members of the DRS Council: Prof Bob Jerrard, Prof John Langrish and Prof Sue Walker. Past-President Prof Richard Buchanan advised the panel.

A general procedure for applications and appointments, open to all DRS members, is now being implemented, and will shortly be announced on the DRS web site. A Fellows Election Committee, appointed from amongst the existing Fellows and chaired by Nigel Cross, will consider applications. The aim of the scheme is not to reward only the most exceptional people, but to provide a measure of consistent professional contribution to design research. In time there may also be ways in which the 'College' of Fellows can contribute to the Society and our discipline as a distinct body.

In the first round of invited applications, fourteen Fellows were appointed. With this round, there are now twenty-one Fellows of the Design Research Society.

