IMAGINATION'S PROMISE

practice-based design research for sustainability

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INTRODUCTION

Perhaps the most important role for design today is to explore ways of re-uniting our material world with a world of meaning – with ethics, inner growth and spiritual wellbeing. Currently, we are far removed from such a conception of design, implicated as it is in an aggressively competitive, profit-centred corporate system that not only seems to have lost its moral compass but is also severely affecting the natural systems of the planet. In this world of unrestrained, consumer-based capitalism, material 'beauty' has become merely the façade of technological progress, which is the dynamo of corporate growth. This superficial version of beauty conceals a ruinous path. It is a shallow, debased beauty divorced from notions of goodness and right action; the outer aspect of a world of things alienated from perennial truths.

Within such a system it is virtually impossible for the discipline of design to effectively and substantially address the interrelated issues of environmental responsibility, social obligation and personal meaning. A quite different arena is needed, one in which new directions can be explored and more beneficent conceptions of material culture developed; conceptions that are more comprehensively considered in terms of nature, society and self. This arena requires profit and other such motives to be set aside in order to encourage and value freedom of thought. It becomes necessary to explore an alternative path, one that contests a century or more of manufacturing and marketing conventions that are propped up by an increasingly untenable ideology. This is the ideology of progress and growth, which in reality tends to mean technological progress and growth in profits, with attendant growth in production, consumption, resource depletion, waste, pollution and exploitation. Consequently, it is unrealistic to think we can formulate immediate 'solutions' that would be either commercially feasible or pragmatically admissible within this existing production complex; not least because the norms and expectations of its ideology are still prevalent, powerful and proving resistant to change. Instead, there is a need for creative exploration and

the development of propositions that respond to the principles and ethos of sustainability. And such propositions require reflection and debate, to ensure emerging directions are both substantive and robust.

In this context, for design to contribute in a significant way, we have to consider the role of design practice, which represents the creative core of the discipline. More specifically, we have to consider the role and place of design practice within design research and scholarship, and its potential contribution to knowledge advancement.

Design has relatively little history of academic research, and when we consider the role of practice, the term 'research' becomes somewhat problematic. 'Research' is generally understood to mean the collection of information about and the systematic inquiry into a subject in order to discover facts and principles. Now, it is certainly true that design practice can be used to delve into a subject, to learn about process and material possibilities, and to probe areas of interest. However, the creative methods employed are rarely systematic, the collection of information may support but is not core to the activity, and facts are rarely discovered via this process – although it can lead to the development of principles and understandings about relationships. One cannot collect information, systematically inquire into, and discover facts and principles about that which does not yet exist. This is a critical difference between traditional notions of research and the processes that are characteristic of the arts, including the applied arts. The essential core of creative design is not concerned with investigating what already exists but with envisioning what could be. It calls not on the power of rationalization and methodical examination but on the power of human imagination and open-minded exploration.

Nevertheless, the term 'design research' is widely used, and it will be used here – but with the understanding that it refers to a process that includes design practice as a creative mode of exploration, expression and learning, coupled with learning from literature, debate, writing and publication, and with critical thinking and reflection. Also, as with other practice-based disciplines, dedicated practice and the accumulation of experience can enhance accomplishment and contribution. Such a process might be better described by terms such as design scholarship or scholarly research, both of which imply academic learning and attainment, but without such strong connotations of systematic method and primary data acquisition. For the discipline of design, creative practice is a primary mode of discovery and a significant facet of the learning process but, as we shall see, its contingent nature tends to defy systematization.

In this discussion, based on more than two decades of engaging in academic design practice, I describe how the activity of designing, as a component of the research methodology, can be a powerful way of probing, developing and illustrating ideas and arguments. I explain the basis for creating propositional objects, and show that when such objects are developed within a fundamental design research agenda, they can be an effective means of challenging conventions, positing questions, and offering directions for reform. And of course, any such reform must more effectively and more substantially align design practices with notions of material culture that conform to an ethos of sustainability. Therefore, I will consider in some detail how the creative and inherently unpredictable design process can further our understandings of a sustainable material culture by integrating disparate, often diverging, priorities into a unified whole. This aspect of the discussion is complemented by a series of exploratory objects, which serve to demonstrate the relationship between issues raised by sustainability and the design of functional artefacts. These examples also begin to indicate the potential of *propositional design* to advance knowledge.

PROPOSITIONAL DESIGN'S CONTRIBUTION TO DESIGN RESEARCH

It is incumbent on design to develop discipline-appropriate research modes that can confront the challenges raised by sustainability, advance knowledge and contribute to new understandings. For the reasons indicated above, it may not be able to do this effectively within professional practice. However, it can do so within academic, research-based practice. In this context, design engagement has to be included as an essential ingredient of the research methodology because without it we are not being true to the discipline and its particular modes of *thinking-and-doing*. These modes are vital to the development of creative ideas and insights, and to the development of design knowledge, whether explicit or tacit. Moreover, as an element of a research methodology whose purpose is primarily *exploratory* and *conceptual*, the activity of designing should be regarded less as a problem-solving activity and more as a question-asking activity. By bringing together a variety of ideas and, through creative practice, translating them into tangible form, questions can be raised about the nature of material culture in relation to sustainability or, indeed, in relation to any other issue of concern. The resulting artefacts, which are effectively *questions-in-form*, exist within a continual process of exploration, debate and knowledge development.

To include *designing* as a bona fide constituent of an academic research methodology, we must be clear about its purpose, its mode of progression and its potential contribution within a comprehensive research process.

Many forms of academic inquiry adopt a procedure that includes breaking down the topic into its constituent elements, categorization, investigation and prioritization. This is an analytical approach to research. Designing, however, is concerned less with analysis than with synthesis. It composes, organizes and constructs, and resolves and integrates disparate factors. It is concerned with the entirety, and seeks articulation by sensitive consideration of the whole, taking into account factors such as function, aesthetics and materials. In the process, the designer is realizing, discerning, becoming aware of hitherto unknown or unrecognized relationships and connections, and *discovering through a symbiotic, creative process of thinking-and-doing*.

As an element of design research, the role of *designing* is to manifest the implications of abstract arguments through the creative process – through imagination and postulation – by combining particular elements and materials into specific forms and expressions, based on rigorously developed general theses and criteria. The results of such work are not design *solutions* but design *propositions* that ask us to consider if this or that synthesis is a useful contribution to our developing understandings of where design could and, more importantly, should be heading. Such propositions can enable us to see things in new ways, to question our assumptions, to grasp new possibilities and directions. They constitute an holistic, non-textual form of expression that encompasses and conveys ideas, arguments and possibilities. Hence, this kind of non-commercial, academic, research-based designing, together with its outcomes, can be termed *propositional design.*

The purpose of propositional design is to pose questions about our material culture, to challenge industry conventions and disciplinary norms and, importantly, to offer constructive possibilities that begin to tease out a different path. Such propositions can probe, stimulate debate and begin to open up new design directions. As such, propositional design has a dual function – first, it offers critique of the existing condition, and second, it poses *questions-in-form* as to how these criticisms might be constructively addressed. It is a key element of a research approach that also includes theoretical discussion and advancement through reasoned argument, together with continual reflection on the relationship between general, theoretical, abstract ideas and specific, tangible design outcomes.

This type of propositional design is similar in several respects to what Dunne refers to as *critical design* (Dunne, 2005, p. 63). These kinds of practice, which are characteristically conceptual, are used to explore alternative notions of material culture. They can address a wide variety of issues and concerns, and they might employ a range of approaches. Dunne and Raby, for example, focus on the "social, cultural and ethical implications of existing and emerging technologies" by employing satire, extrapolating trends, sounding a cautionary note about possible futures, and blurring "the boundaries between the real and the fictional" (Dunne and Raby, 2011; Dunne, 2005, p. 84).

The approach taken in this present discussion, of propositional design within a research agenda centred on sustainability, employs a rather different process, and has a distinctive emphasis and tenor. Its focus is the (ever-changing) present, rather than possible technological futures. And it emphasises enduring notions of human meaning through 'quiet' interventions that aim to achieve a harmony between our *material culture* and *nature, society and self*. In doing so, it draws on contemporary sources as well as long-standing philosophical and spiritual traditions. While it tends not to employ satire or fiction, it does centre on advancing design knowledge through the researcher's direct engagement in the creative 'thinking-and-doing' design process. As a significant aspect of a larger research approach, in which design artefacts emerge from and contribute to theory, particular emphasis is placed on the interplay between theorizing, designing and reflecting (Figure 28.1) (see Walker, 2011, pp. 125-141):

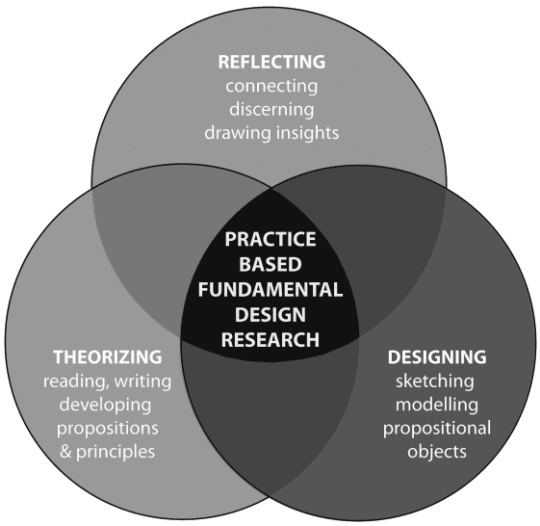

FIGURE 28.1 Practice-Based Fundamental Design Research.

- **Theorizing**: developing sound theoretical positions through reasoned argument and analysis, articulating the potential implications of these arguments for material culture, and developing intentions and criteria for design engagement. This aspect of the research process requires contextualisation and extensive reading, writing and thinking, all of which are carried out in conjunction with designing and reflecting on emerging outcomes.

- **Designing:** the transmutation of the theoretical implications and criteria into design propositions that encompass and express ideas, and which ask if these discrete manifestations offer cogent and constructive contributions or directions forward. This phase utilises design and visualisation skills involving materials, sketching, making, and manifesting.

- **Reflecting:** pervading the whole process, contemplation of the theoretical ideas and criteria, and reflecting on the propositional outcomes can connect up and synthesise the endeavour and act as a springboard for subsequent phases of research. Reflecting on the readings, writings and design propositions involves periods of contemplation where, seemingly, nothing is being done. However, valuing and giving time to reflection can yield spontaneous, intuitive awarenesses and sudden insights in which discontinuities and discordances become unified and harmonies are found. Reflection is critical to the process and, like the activity of designing, it is also a practice-based activity, which benefits from discipline, persistence and experience.

This creative, propositional ingredient enables design research to encompass the full span of the discipline and comprehensively address its various aspects, from the logical and the diagnostic to the emotional and the aesthetic. For this reason, *designing* can be seen as an essential ingredient of an holistic design research approach that combines:

- rational analysis, cognitive knowledge and explanation with intuitive decision-making, tacit knowledge and expression;
- theory and general principles with discrete, case-specific syntheses.

Within this approach, critique of the existing condition is inevitable, while also being urgently necessary if the relationship between the design of our material culture and the principles of sustainability is to be confronted. However, design is also a creative discipline and tends to be inherently constructive and optimistic. The development of propositional objects within practice-based research remains true to this hopeful, positive spirit. It is a phase of the process that requires the researcher to wrestle with current shortcomings and new opportunities through imaginative practice. And it results in discipline-appropriate

outcomes that articulate the implications of arguments and provide a focus for discussion and further development.

Through such means, design research can offer alternative conceptions of material culture that rest on a firm footing of reasoned argument and scholarly inquiry. Moreover, within academia, design has the freedom to embrace arenas of human apprehension that have long been excluded from conventional, too-narrowly-defined notions of 'product'.

For these reasons, *propositional design*, together with other forms of critical design that may emphasise rather different priorities and processes, can be viewed as essential elements of design research that seeks to advance ideas and knowledge about the practices, products and potential of design.

These forms of 'academic' designing are so essential to design research because when we engage in the creative process of designing we are dealing with the intimate relationships between materials, form, aesthetics and intention as we strive to find synthetic resolution within the particularities of *specific* propositions. Without this creative engagement, any implications, findings or recommendations from theoretical arguments remain un-transmuted, un-tested, and un-informed by the tacit knowledge, intuitive decision making and expressive sensitivity that *designing* can bestow. The *doing of* design can inform the *knowing about* and *knowing from* design; one learns and apprehends significance through the process of doing. Without the doing, this knowledge remains unrecognised and unrealised. As we engage in the process of designing, we move from one sphere and scale of expression to another - from general theory and abstract ideas to specific manifestation and concrete expression. Yet, despite this change in mode of expression, we are still attempting to articulate ideas and conclusions that emerge from academic inquiry, reasoned argument and creative exploration.

It becomes clear that the role of the propositional object within academic design research can be quite different to that which we normally associate with product design. It is not an overture for a stand-alone product intended for use by a third party. In commercially-oriented or applied design research, object concepts and product proposals are commonly used to gauge people's responses – through focus groups, surveys, or observational studies. This kind of qualitative data acquisition is not necessarily appropriate for propositional objects that explore and express theoretical ideas within an academic research agenda; this is a form of fundamental or pure design research rather than applied. By way of comparison, we would not normally gather qualitative data to gauge people's responses to a set of findings from a research paper. Instead, such conclusions are disseminated via conference

presentations, journal papers and books, and the validity and value of the conclusions are assessed by an informed audience of peers. Propositional objects, as an element of fundamental design research, can be treated in the same way (see later).

Propositional Design in Fundamental, rather than Applied, Design Research

When the design researcher engages in propositional design practice within an agenda of fundamental design research, the aim is to develop an ongoing series of probes – each new creative exploration building on the insights and reflections stimulated by preceding design explorations, literature reviews, and research papers, together with new ideas and information from additional sources. In this way, propositional design becomes an essential contributing element within an integrated and cumulative process of inquiry, learning and knowledge advancement.

Hence, academically-based propositional design practice differs in purpose and outcome from commercial design practice. Each designed artefact is:

- a provisional resolution of continually evolving issues, insights and considerations;
- incomplete in itself – it is always supplemented with theoretical arguments etc.;
- intimately linked to the preceding and the following theses and design explorations;
- regarded as a question or propositional query rather than a conclusion or solution.

In addition, over time, a succession of sketches and object propositions is accumulated and this too can be revealing and contribute to knowledge. The twists, turns and developments – when reviewed *in totum* - can yield further insights, which may have gone unrecognised while immersed in each of the incremental stages of the work.

And as I hope to demonstrate, by incorporating creative work within a broader design research process that focuses on sustainability, the discipline can begin to demonstrate how functional objects might become more comprehensive and more substantive expressions of human meaning and purpose.

PROPOSITIONAL DESIGN'S CONTRIBUTION TO KNOWLEDGE

We see that propositional design practice can be part of a comprehensive design research process that comprises *theorizing – designing – reflecting*. However, for such design practice

to be considered a legitimate element of research, it has to contribute in some way to the advancement of knowledge and the development of understanding. Therefore, let us consider three interrelated sources of potential knowledge that are specifically associated with the creative activity of designing:

1. Knowledge attained from the creative designing process
2. Knowledge attained from the artefacts of the designing process
3. Knowledge attained from a body of work

1. Knowledge attained from the creative designing process

The design process, like any creative activity, is open-ended and unpredictable (Rust *et al*, 2007, 13). It follows its own path and its own pace. It cannot be hurried and it is often rather uncomfortable, for the very reason that one does not know where it is going or, indeed, if it is going anywhere. There is an inherent and unavoidable element of risk; it requires ways of working that cannot be planned in detail. One is following one's nose, as it were, allowing the process to unfold. One proposition leads to another, one reading or piece of writing leads to sketches or three-dimensional studies that, in turn, generate more writing, reading, drawing and making. The path is characterised by twists, turns, backtracks, sidetracks, and dead-ends (Figure 28.2). To identify its potential contribution to research and scholarship, knowledge that may be acquired from this process must be distinguished from existing knowledge that we may bring to the process. We must also try to identify any discipline-specific contributions to knowledge that may not be acquired by other, non-design means.

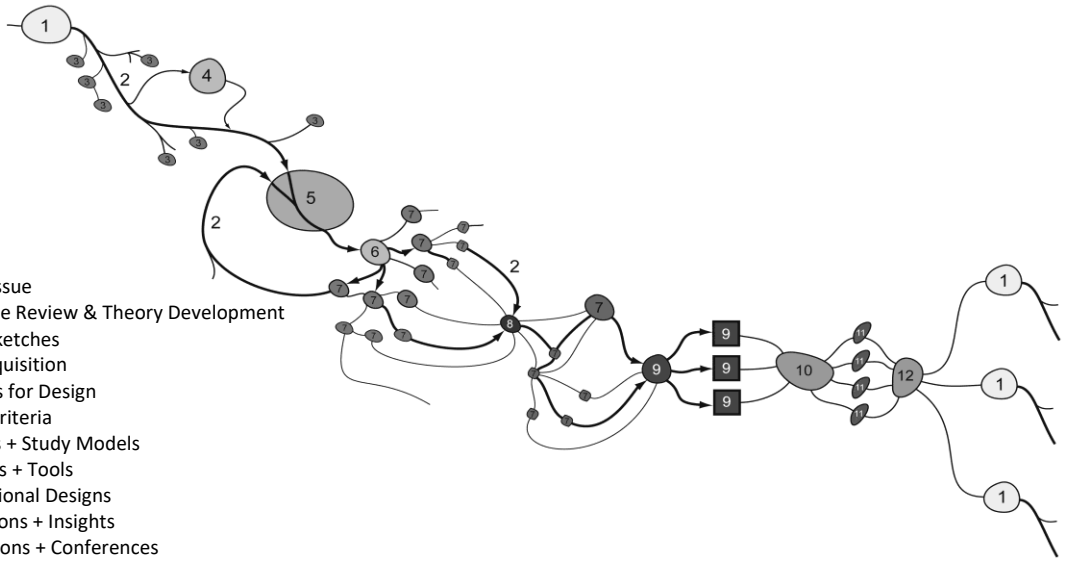

FIGURE 28.2 The Propositional Design Process

Existing knowledge can include procedural knowledge (knowing how to do something), declarative knowledge (rules and methods to be applied) and heuristic knowledge (rules of thumb) (Rogers and Clarkson, 1998). Engagement in the process of designing will often incrementally add to these kinds of knowledge. Additionally, in the research context, when we refer to knowledge it is common to think of facts or data obtained by applying investigative methods that separate out information about a subject into its constituent elements. This type of explicit knowledge is acquired by employing analytical techniques. Such methods and techniques, which may precede or interpose the creative designing process, are used in many other disciplines and therefore the kinds of knowledge they may yield are not distinctive to the activity of designing. Such procedures can just as easily be implemented, and the resulting information and knowledge acquired, without recourse to design expertise.

The types of knowledge to be gained from the creative process of designing tend to be less dependent on analytical techniques and are often less explicit; in fact, they are usually rather difficult to articulate. They include knowledge gained from immersing oneself deeply in the process, familiarizing oneself with a variety issues and considerations pertinent to the inquiry and then exploring possibilities through expressive means by externalising and visualising ideas. The process is one in which relationships are spontaneously recognized between previously unconnected ideas, resonances occur, and discoveries are made. It is also a process that includes serendipity. The designer is continually generating ideas, making connections and attempting to separate out the wheat from the chaff to effectively express the essence of the issues under consideration. In identifying and clarifying the crux of the matter being addressed there are periods of discernment and points of realization. Through such means, new insights are gained, new ideas emerge and new knowledge is developed. One aspect of this is a knowledge of congruities and harmonious composition, rather than a detailed knowledge of separate parts. During the process, the designer gains a new awareness, a new comprehension of possibilities. Associations are revealed and connections are made that are intuitively regarded as appropriate or ‘right’ in the context of the project. Hence, engagement in *designing* enables learning and discovery through doing. In this way, design practice cultivates and incrementally adds to *knowing how* as well as to *knowing what*, and we can also *know from* doing design because the process allows us to make new realizations that would otherwise remain unacknowledged.

The difference between the kinds of knowledge attained from analysis (breaking apart, separating out) and from synthesis (bringing together, working in unison) is exemplified in other activities that, like design, require a combination of practice and creative sensitivity. For example, we can explain to someone how to play a musical instrument. We can describe in minute detail the principles involved, the physical actions required, and the musical notation. They may be able to accept and understand all these things intellectually, but they will only be able to play the instrument with any degree of proficiency once they have spent long hours practising and learning through direct experience. In other words, once they *know how* to do as well as *knowing what* to do. However, they will only be able to make an original, creative contribution if they use that proficiency to challenge conventions and probe and explore new directions. They have to be not only technically proficient but also sufficiently experienced, sensitive and motivated if they are to employ their *know-how* in creative, expressive ways that add to our understandings through an originality of expression or contribution. The same is true of the creative design process, which includes the designer's skills and experience in combination with an informed basis for challenging conventions and exploring new areas. These aspects of the designer's *particular* knowledge partly reside in *knowing what* (intellectual understandings) and *knowing how* (practical techniques and skills) but also include *knowing from doing* design – i.e. learning, understanding and developing knowledge during the use of intellectual knowledge and practical skills and techniques in the process of *designing*. As such, these creative, expressive *knowing from doing* aspects of the discipline represent vital ingredients of "designerly ways of knowing" (Cross, 2001).

It becomes apparent that, when propositional design is included as a significant element of design research, a number of important contributions are assimilated into the research procedure that would be difficult or impossible to incorporate by other means. In moving from theory to the activity of designing, a shift is made from explicit knowledge in the form of text-based explanations and descriptions, data analysis and intellectual arguments to form-based manifestations, aesthetic harmonization and intuitive knowledge. Rationalized lines of reasoning, objectivity and cognitive ways of knowing become complemented by experiential knowledge, spontaneous insight and direct discernment in the expressive exploration and development of a unified whole through the implementation of practical techniques and skills. Linear, logical thinking takes second place to integrative thinking and contemplation. Hence, by incorporating creative design practice in the research process, explicit intellectual knowledge is combined, via practical knowledge or *know-how*, with

implicit tacit knowledge. Tacit knowledge is not learned via rational, logical means but is developed through practice, experience, perception and feeling during the unifying process of designing. It is informally acquired; one may not even be aware of it or its process of acquisition (Blackler, Popovic and Mahar, 2010). Synthesis of ideas into a unified propositional artefact is an outcome of engaging in *designing* in order to develop knowledge. Polanyi, a key authority on tacit ways of knowing, regards this process of integration as the critical contribution of the tacit dimension and the basis of all knowledge development and advancement (Polanyi, 1966, p. 7).

The aim of practice-based design research for sustainability is to probe and delineate key issues and to explore new directions for material culture. In this process, the creation of propositional artefacts requires aesthetic (sense-based) judgements. Consequently, human emotions (feelings about the emerging object) will play some part in determining the artefact's expressive qualities. In many respects, this is entirely appropriate, because one requirement of sustainability is that we take a more comprehensive approach to our endeavours. Within the designing process emotions can influence the particularities of expression, and will be an ingredient in determining the essential nature of the object; I expand on this later.

Hence, the design process can be understood as a way of becoming *intimately familiar with and knowing about* an area of concern. The designer builds this familiarity by engaging in the creative process of thinking-and-doing and in this way new knowledge and insights are gained. We might refer to these as *the knowledge and insights of synthesis*; they encompass a comprehension of the issues together with a clear or deep perception about how they might be combined into a unified whole. If they are to be useful and be open to scrutiny these insights and knowledge, which include tacit ways of knowing that may not be expressible in words, have to be articulated in some manner. And the most appropriate mode of articulation is the designed artefact itself.

2. Knowledge attained from the artefacts of the designing process

It is important to recognise that the meanings of creative works are not explicit, but are open to interpretation, and to misinterpretation. However, unlike creative works in a gallery or on a store shelf, in the context of design research creative propositional works are elements within a broader research process. They are complemented by arguments and explanations, not necessarily of the work itself, but of the ideas underlying and being addressed in the creative

work. In this way, the explicit and the tacit, the analytical and the synthetic, and the intellectual and the intuitive – which represent different ways of encountering the world, different ways of understanding, and different aspects of being human – contribute to the advancement of knowledge.

The artefacts that emerge from the designing process represent attempts to encompass and express ideas and areas of concern via a unified form. As elements of fundamental design research, such propositions must be considered and critiqued in a rather different way from the artefacts of applied design. The factors relevant to commercial projects, such as economic viability, manufacturability, market appeal, positioning, brand recognition, and ergonomics, are of little import here. Instead, the concern is with the conceptual nature of material culture.

In the context of this present discussion, such design work can aim to offer original insights about *existing products* in relation to sustainability, or about how *new products* might be created so as to be in closer accord with sustainability. In contemplating the work, we might ask if it enables us to see and understand the issues from fresh perspectives and in ways that are useful and valuable. If so, we can consider how it is doing this and what is the nature of those insights and understandings. For instance, the propositional design work might suggest:

- a way of 'seeing' older, unwanted products anew, and revaluing them;
- a beneficial approach to how we view or use materials and how, or indeed if, we process materials for use in products;
- a new language of design that has implications for how we conceive of 'products';
- how localization, an important aspect of sustainability, can be integrated into a globalized manufacturing system;
- how deeper notions of human meaning – the communal, the compassionate, the ethical and the spiritual – might be inculcated into our material culture.

Hence, propositional artefacts can enable us to become deeply familiar with the ways in which design can contribute to sustainability. Knowledge is gained from looking at, using, and interacting with the artefacts – reflecting on their presence, their qualities of articulation, their meanings, intentions and intimations. If the work encapsulates and manifests ideas in creative ways, then it will make us aware – enable us to know – of new possibilities. It may

demonstrate new ways of addressing the issues, or represent an entirely different, more sustainable system for making material culture.

Any contributions to knowledge are encompassed in the particular objects under scrutiny, and the conventional way of determining the merit and contribution of such knowledge is through a process of informed critique and review.

3. Knowledge attained from a body of work

As we have seen, in this kind of creative research one idea or development tends to follow on from what has gone before in an unpredictable manner. When immersed in a particular practice-based project or stage of exploration, the researcher might be unaware of the changes that are occurring over time. Therefore, potentially, there are new understandings, insights and knowledge to be acquired by examining a body of work developed over an extended period. Key changes, points of departure, or stages of realization may be identified. Hitherto unrecognised insights may be perceived and, in the process, new knowledge is acquired. This kind of knowledge might not be evident if we examine just one instance of design practice, one artefact, or even a limited range of artefacts. But by standing back and reviewing a body of work, we may become aware of significant transformations, or see a gradual emergence of qualitative differences in approach, materials, form, or modes of expression. Then we can consider what these observations might mean, what they signify, and what they might suggest for taking the work forward.

Hence, design knowledge can be attained from a longitudinal examination of the propositional artefacts emerging from practice-based research. Along with the agendas attached to the specific artefacts, it may be possible to build up a comprehensive understanding of the factors that can affect, and the possibilities for, design for sustainability.

Critique and Modes of Evaluation

Normally, when a particular stage of academic research reaches a natural endpoint, one or more scholarly papers are developed that describe the issues, methods and findings. And recommendations are made that may provide a basis for the next stage of the research. Implicitly, such findings and recommendations ask questions of the reader, who in the first instance would usually be a peer-reviewer i.e. a person qualified to judge its merits and contribution. For example, do the findings hold water? Are they reasonable, given the

accompanying explanation, arguments and method? Are they valid? Are they original and/or significant? And are the recommendations reasonable given the findings?

The propositional object within practice-based design research can have exactly the same function. The mode of expression is different, and it necessarily encompasses aspects that are particular and essential to the discipline but which lie beyond rational, analytical explanation. Even so, the propositional object is a form of research finding; it is an expressive encapsulation of reasoned arguments and criteria that address a particular set of issues. As such, the propositional object can provide a basis for the next stage of the research, and it asks questions of the reader/viewer. Does this proposition hold water? Is it reasonable, given the accompanying explanation, arguments and design criteria? Is it a valid synthesis and expression of the issues being addressed? Does such a synthesis offer an original or useful contribution to our understandings?

The usual procedure for obtaining peer-review is via papers submitted to academic conferences or, particularly, scholarly journals. It may be possible to obtain peer-review by other means, such as through exhibition, but this can be more problematic because such forms of review do not generally fit so readily into established academic norms. Moreover, this kind of propositional design work is only part of a research process that also includes development of theory, and reflection. Propositional artefacts in the academic context are *not* stand-alone items. Therefore, all these elements need to be articulated if the peer-reviewers are to properly evaluate the soundness and significance of the work. This integration of propositional artefacts via designing combined with theoretical development and discussion via writing is a distinctive characteristic of the research process. However, it is an approach that is not widely recognised, even in discussions of practice-led research (Rust *et al*, 2007), nor does it fit comfortably into Frayling's three categories of research *into*, *through*, or *for* design (Frayling, 1993/94).

Depending on the particular issues being addressed and the methods used, appraisal of the propositional artefacts would refer to some or all of the following considerations:

- the qualities of its language, its ambience, the nature of its essential condition as a thing;
- the precision and clarity of its articulation with respect to the intentions;
- the qualities of the materials and the making, and their appropriateness with respect to the intentions;
- the composition, harmony of the form, and aesthetic qualities of the whole;

- the originality, and the value and significance of this originality with respect to the intentions;
- the overall contribution to our understandings *through* and *of* design.

In other words, we must ask if the designed artefact, in conjunction with the accompanying arguments and intentions, is effective in encompassing, demonstrating and furthering our understandings and knowledge of the issues under scrutiny. In this regard, it is important to recognise that a designed artefact asserts both its own existence and the ideas and values that it embodies, and together these can be a persuasive means of expressing arguments, scholarly findings and original directions forward. Buchanan has referred to this as 'declaration by design', which he describes as a form of 'epideictic or demonstrative rhetoric'; a form of argument that stems from norms and materials of the past and suggests possibilities for the future, but is, nevertheless, primarily addressing attitudes and approaches of the present (Buchanan, 1989).

Hence, within the field of design scholarship, propositional artefacts can provide a means of embodying issues of concern and reflecting on their implications. In turn, this can foster additional lines of inquiry, generate further readings and fresh arguments, and lead to new avenues of creative exploration. Significantly, because propositional artefacts are capable of embodying intuitive decision-making and modes of expression together with emotional and tacit ways of knowing, in addition to more explicit ways of knowing, they can make an original and discipline-appropriate contribution to the advancement of design knowledge. Such knowledge cannot be acquired solely through conventional intellectual and analytical methodologies.

PRACTICE-BASED DESIGN RESEARCH FOR SUSTAINABILITY

Let us now consider more specifically how the creative research process can be applied to the area of sustainability, and what it might tell us about our conceptions of material culture.

We have seen over the course of the last few decades various developments that in some manner have addressed *design for sustainability*, including design for human ecology and social change (Papanek, 1971), green design (Burrall, 1991), ecological design (Van der Ryn and Cowan, 1996; Fuad-Luke, 2002) and sustainable design (Datschefski, 2001), to name but a few. These have been accompanied by a host of procedures for designing differently, many of which, in one way or another, consider the whole life cycle of products.

These developments in design have helped raise understandings and awareness, and have generated a host of examples and innovative possibilities.

Today, there is a wide variety of products being produced that attempt to respond to the challenges posed by sustainability. These include solar powered and hand-cranked products that avoid use of disposable batteries; electric cars that reduce distributed exhaust emissions, products made from recycled materials and products that replace other, less sustainable products – such as cloth grocery bags instead of disposable carriers. While these kinds of commercially available products can incrementally ameliorate certain aspects of our ways of living, we must be cautious of directions that seem to suggest that we can consume our way to sustainability. In this respect, within the existing paradigm, many 'greener' products can actually be counterproductive because they tend to support rather than challenge consumption-based ways of living that are fundamentally, and often grossly, unsustainable.

In addition to incremental changes, we have to look beyond current ways of living, accepted ideas of material goods and traditional notions of design. Practice-based academic inquiry represents an important and germane way of doing this because it endorses the creative process and gives rein to human imagination. Given the scales of social inequity and environmental damage associated with contemporary consumption-based lifestyles, academic research in *design for sustainability* is duty bound to explore radically different possibilities. Directions must be developed that challenge the ideologies, ways of understanding the world and notions of human purpose that permeate contemporary culture, all of which are intimately tied to our inherently *unsustainable* ways of living. Such explorations involve environmental considerations, social concerns, and economic issues, and bring to the fore ideas about socio-economic justice, localization and design for and from place, and product-service relationships.

Also, as I have previously argued, in common with a number of other authors, deeper notions of human meaning, inner development and spiritual wellbeing are vital to a more comprehensive understanding of *sustainability*. The inadequacies of our current approaches are linked to a lack of appreciation of these deeper issues and the development of the inner self (Schumacher, 1973, pp. 44-51; Papanek, 1995, pp. 49-74; Orr, 2003; Senge *et al*, 2005, p. 66; Walker, 2011). Our most profound notions of human meaning defy rationalistic understandings and lie beyond, but are not incompatible, with reason, and they resist analysis. They therefore lie outside the scope of scientific inquiry and philosophical positions that give credence only to naturalistic materialism, as well as the constraints imposed by evidence-

based research methodologies. Nevertheless, they have always been vital ingredients of human understanding and wellbeing and are critical aspects of the world's most enduring philosophies, worldviews and spiritual traditions. They represent vital aspects of being human and, therefore, must be included as significant, if not critical, ingredients of any comprehensive notion of sustainability.

It is here that the intuitive, tacit, creative design process can make an important contribution to understandings and knowledge. Through engagement in the design process, propositional objects can be developed that grapple with these ideas, transmute their implications, and begin to express inherently ineffable notions and apprehensions through visualization, manifestation and form. Such artefacts can encapsulate and synthesise ideas and indicate new possibilities and new realizations through non-verbal, visual means. As such, they can be a powerful means of demonstrating alternative ways of thinking about the world, and can point in directions that are more holistic and, potentially, more fundamentally sustainable in their ethos. In this way, through the continual development of intellectual understandings in conjunction with creative design propositions and probes, design knowledge for sustainability can be advanced. Moreover, it can be advanced in a manner that embraces the human imagination and is more comprehensively representative of human understandings and potential than is possible if we restrict our notions of research to intellectual approaches, rationalistic arguments and evidence-based criteria.

Indeed, if inner development and spiritual growth are key to deeper understandings of sustainability, these aspects simply *cannot* be effectively addressed or expressed via techniques that rely solely on intellectual argument, data acquisition, and analysis. 'Outer' knowledge that is concerned with utilitarian needs and acting in the world has to be complemented with 'inner' knowledge, and *being* rather than *doing* or *having*. As in the creative process itself, apprehension of these inner ways of knowing is also tacit, experiential and intuitive; and inner progress is critically dependent on individual discipline and practice. Understandings of 'inner' development, which in all cultures has been long associated with our most profound notions of meaning, are traditionally expressed in *symbolic* rather than *literal* forms, because such apprehensions are intuitively recognised but lie beyond description or explanation.

While these deeper aspects of human awareness and knowledge, and their potential relationship to sustainable forms of material culture, cannot be effectively or wholly addressed via conventional research methodologies, they do lend themselves to creative,

expressive modes. For this reason, *design for sustainability* research that adopts a practice-based approach is well placed to tackle and find ways of manifesting and communicating these vital aspects of the human condition. In doing so, it will be exploring the relationship of these issues to the creation of a more sustainable and a more meaningful material culture, and its production, use and disposal.

In pursuing such a direction, it is important to recognise the role of human emotions. Our 'feelings about' the things we create represent the connection between the 'inner' and the 'outer' person; they connect an inner sense of meaning with our outer actions. This connection between inner and outer, through the emotions and human feeling, is related to the idea of *meaningful actions*, and it is precisely here that *reflection* becomes such a vital ingredient of thoughtful, practice-based research and scholarship. It behoves us to reflect on the emotions invoked by objects and their creation. We must consider our 'feelings about' the design decisions we make and the kinds of objects we are creating, and we must consider the kinds of emotions designed artefacts are intended to invoke in others. We must beware of seeking to develop designs that cultivate feelings of exclusivity, rivalry, vanity or pride – either in ourselves during the creative process, or in others once the designs are completed. Such emotions are at odds with notions of social equity and compassion that are fundamental to an ethos of sustainability in which deeper, aspects of human meaning and the importance of spiritual growth are fully recognized.

PROPOSITIONAL DESIGNS FOR SUSTAINABILITY: EXAMPLES

For illustrative purposes, a number of propositional objects created within my own scholarly practice are included in Figure 28.3. Each of the objects shown is one of a series developed within a particular phase of research that examined a specific aspect of design for sustainability (Walker, 2011). As an individual thing, each object is merely an inquiring probe, a minor vignette, a question in form. The value of each lies in its role as a contributor in the development of ideas, as a manifestation of a particular stage of understanding, and as a focus for reflection and for spurring on the next stage of exploration. Hence, these artefacts are not conclusions or design 'solutions' but merely points of synthesis along the way.

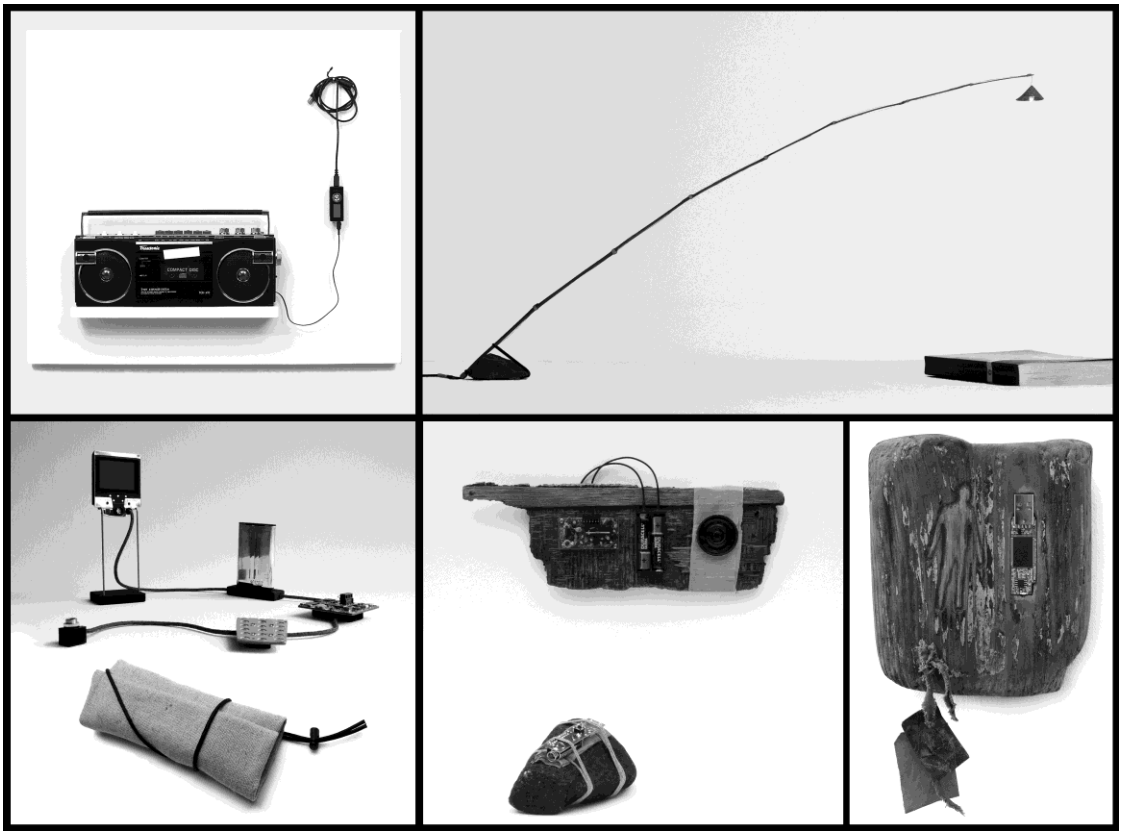

FIGURE 28.3 Propositional Objects from Practice-Based Design Research for Sustainability

'Replay': (top left) is an example from a series that focussed on how unfashionable, discarded, but still working electrical products could be seen anew, and re-valued with little or no modification to the product itself. It comprises a white wall panel with shelf onto which is mounted an old cassette stereo linked to an MP3 player. The panel re-frames the out-of-date stereo, thereby separating it from its surroundings. In this way, a valueless product becomes a key constituent within a larger composition. This enframing panel de-contextualises the older product and presents it anew within a larger composition. In doing so, its old-fashioned styling, its obsolete cassette drawer, and its scars of age all become important features of a new functional work. Hence, this direction questions conventions of 'newness' and the short-lived *aesthetics of perfection* that characterises today's unsustainable notions of 'product'.

'Bamboo and Stone II': (top right) combines unprocessed natural materials with off-the-shelf lighting technology in a small desk lamp concept. Being off-the-shelf, the technological components can be easily re-paired or replaced, and because these elements were not

designed for this specific object, when the lamp is no longer wanted they can be readily re-used in other applications. The unprocessed elements can be returned to the natural environment with no ill effect. This proposition points to a system that brings together large scale mass-production with local materials, and combines product manufacture with local parts supply and maintenance. Within such a system, the use of raw and generic elements eliminates or significantly minimizes product waste and reduces shipping and packaging. The inclusion of natural, locally available elements also begins to create a material culture that has an aesthetic identity linked to place.

'Wrapped Attention': (bottom left) is a propositional object that explores mobile communication products in ways that challenge assumptions about convenience, and address concerns, emerging from various areas of research, related to multitasking and distracted use patterns. This mobile phone concept aims to discourage impromptu use, and facilitate focussed, single-pointed attention. In addition, because it is volumetrically unconstrained, future replacement parts can be integrated with old, which over a series of upgrades could reduce e-waste by ca. 80%. Products that rely on rapidly advancing technologies quickly become obsolete, discarded and replaced. This proposition explores 'product' as a thing that is capable of continual evolution, rather than as a fixed, short-lived commodity.

'Lagan Bell': (bottom middle) combines aspects of the previous two propositions and includes symbolic references about history and identity. Found elements are brought together with new, mass-produced circuitry and silk fabric; the silk industry once being a significant part of the local economy. The object exposes rather than encloses – revealing circuitry and batteries that are normally hidden. This adds a level of comprehension to 'things' and discloses – and therefore raises questions about – common practices, such as the use of non-rechargeable batteries.

'Memoria Humanus': (bottom right) introduces figurative symbolism, with references to time, memory and meaning, evoked through worn surfaces, marks and insignia. The primitive form serves as a keeper, a physical location for a detachable memory device in the form of a USB card. This exploration is concerned with development of form that is expressive and symbolic of deeper human stirrings, aspects of being human that reach beyond utility and materialistic explanation. Physical and virtual memory come together in an attempt to create

an aesthetic harmony between the technological and the natural, the archaic and the contemporary, the useful and the meaningful.

Body of Work: In reviewing the body of work, represented here through five examples, we see a transformation through time. 'Replay', for all its benefits in terms of sustainability, represents an outmoded, 'modernist' notion of material culture - one characterised by an aesthetic of functional minimalism with clean lines and pristine surfaces. It is an aesthetic that is anonymous and unlocated. Through these examples, we travel from an homogeneous, mass-produced aesthetic to a material culture whose heterogeneous aesthetic emerges from and reflects place, cultural identity and local needs. We travel from a notion of 'product' as primarily something to be produced, sold and forgotten, to a product/service combination in which localization of maintenance, repair, parts replacements, upgrade and re-use become fundamental to the essential nature of the object. In turn, this can reduce disposal, waste, and consumption, create local employment and contribute to a more distributed and more equitable economy, and result in a less profligate, more intelligible and more intelligent version of material culture. Finally, over the course of these developments, culminating here with 'Memoria Humanus', we travel from a notion of product that is primarily concerned with worldly 'utility' to an object that combines utility with deeper notions of human meaning – the mythical, the meaningful, the symbolic and the spiritual.

CONCLUSIONS

In this discussion I have attempted to demonstrate the critical importance of including practice-based modes of inquiry in our approaches to design research and scholarship for sustainability. Through such means, it becomes possible to address those very things that are too often omitted or are incapable of being dealt with via conventional analytical, evidence-based modes. The aesthetic and the emotional, when aligned with deeper notions of beauty and goodness, become linked to understandings of profound meaning and spiritual growth; which many regard as essential to any comprehensive notion of 'sustainability'. Thus, these aspects can be seen as vital considerations in our attempts to develop a material culture that is more equitable, more moderate, more sustainable and more nourishing. Practice-based modes of inquiry can yield new understandings of material culture, new approaches to design and new knowledge about process and product. There is great potential, great opportunity and an urgent need for the design disciplines to take on these challenges and develop discipline-

appropriate modes of research. Such an approach to the design of our material culture would begin to re-unite industry with art, and business with ethics, wisdom, goodness and beauty.

NOTE:
Since the original publication of this paper, I have been contacted by someone who expressed concern at my use of a quotation from the writings of Eric Gill who, while acknowledged as one of the most prominent artists and designers of the 20th century, also, it has been revealed, sexually abused his daughters. Separation of the work from the artist raises important and difficult moral questions. In this instance, I now consider the Gill quotation to be inappropriate in this paper, especially because it referred to interrelationships and interconnections. I have therefore decided to remove it and references to it from this revised online version. I am thankful to the person who brought this matter to my attention.

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