Worth-Focused Design, Book 2
Approaches, Context, and Case Studies

Gilbert Cockton, University of Sunderland

This book introduces the concept of worth for design teams, relates it to experiences and outcomes, and describes how to focus on worth when researching and expressing design opportunities for generous worth. Truly interdisciplinary teams also need an appropriate common language, which was developed in the companion book Worth-Focused Design, Book 1: Balance, Integration, and Generosity (Cockton, 2020a). Its new lexicon for design progressions enables a framework for design and evaluation that works well with a worth focus.

Design now has different meanings based upon the approach of different disciplinary practices. For some, it is the creation of value. For others, it is the conception and creation of artefacts. For still others, it is fitting things to people (beneficiaries). While each of these design foci has merits, there are risks in not having an appropriate balance across professions that claim the centre of design for their discipline and marginalise others. Generosity is key to the best creative design—delivering unexpected worth beyond documented needs, wants, or pain points. Truly interdisciplinary design must also balance and integrate approaches across several communities of practice, which is made easier by common ground. Worth provides a productive focus for this common ground and is symbiotic with balanced, integrated, and generous (BIG) practices. Practices associated with balance and integration for worth-focused generosity are illustrated in several case studies that have used approaches in this book, complementing them with additional practices.

ABOUT SYNTHESIS

This volume is a printed version of a work that appears in the Synthesis Digital Library of Engineering and Computer Science. Synthesis books provide concise, original presentations of important research and development topics, published quickly, in digital and print formats.
Worth-Focused Design, Book 2
Approaches, Contexts, and Case Studies
Synthesis Lectures on Human-Centered Informatics

Editor

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SYNTHESIS LECTURES ON HUMAN-CENTERED INFORMATICS #47
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KEYWORDS
worth-focused design, value-centred design, value-sensitive design, design synthesis, critical creative design, interaction design, innovation
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Preface

Computers are now everywhere, supporting websites, in mobile devices, on desktops, and in public information systems, ticket sales kiosks, home appliances, in car-systems, and much more. Our digital age can feel radically different to previous ones, but continuities reach back decades, centuries and even millenia. For example, the many professions involved in design and development of digital artefacts all predate computers in some way. Visual designers have been with us for millennia, engineers for several centuries, and modern professional (business) managers for around one century. Human factors (ergonomics) barely predate the invention of the stored program computer approximately seven decades ago. Professions bring value systems that shape both their attitudes toward design and also their expectations for design practice. These value-driven expectations begin with education and are refined and reinforced by the professional bodies that steadily superseded craft organisations during the Industrial Revolution.

Design is inherently *axiological* (Biedenbach and Jacobsson, 2016): value trumps fact. Disciplines that construct themselves as objectively value-neutral cause friction in multi-disciplinary settings, as they lack the critical reflective practices that expose and acknowledge unavoidable value orientations. A companion book, *Worth-Focused Design, Book 1: Balance, Integration, and Generosity* (Cockton, 2020a), developed a basis for the co-existence of the different disciplinary value systems that have joined the software design mix since the 1950s.

Initially, computers were the domain of engineers, focused mostly on hardware, at first, and then increasingly on software. Once computers became important commercial and administrative tools, business schools developed Management Information Systems as a specialty. Once consumer markets developed for hardware, software, and computer services, established management disciplines such as marketing and innovation extended their interest to digital products and services. With digital convergence for all existing audio-visual media, design and media educators and professionals extended their interests and expertise into multimedia and interaction design (IxD). At least three value systems now overlap in software design practice. At the risk of oversimplification:

- engineering seeks demonstrable solutions (preferably optimal) to clearly specified problems;
- management stresses outcomes, with digital artefacts judged by their value achieved through ownership and use by organisations and individuals; and
- creative design stresses delight and appreciation, with consumers being surprised by, admiring, and enjoying outstanding imagination and realisation.
While optimal solutions, achieved value, and audience delight can and do overlap, it is possible (and very common) for one or two to be achieved without the other. An engineering solution can have no obvious value for any human activity and will not excite possible consumers. Similarly, designers can be outstandingly original and creative but overlook specific user needs and technical realities. Also, management strategists can champion new product or service propositions for which there can be no viable technical and/or creative realisation in any foreseeable future.

Brown’s (2009) framing of design thinking as something that “brings together what is desirable from a human point of view with what is technologically feasible and economically viable” is not systematically achieved in practice. Unfortunately, current approaches to developing digital products and services tend to be firmly rooted in one value system, as manifested in their preferred work products:

- problem analyses, requirements specification, and analysed designs of solutions (engineering);

- business cases and value propositions (business management); and

- radically novel artefacts that have not been previously envisaged (creative design).

Each discipline would like to own the single “centre,” but this makes it hard to balance respect for values of capability, rationality, and desirability. However, a hybrid methodology that aims to blend the best of disjoint value systems will introduce new problems of integration across different professional work streams. This book exploits a new framework for progressing designs from its companion book. With it, it covers the details of balancing and integrating design work around a Wo-Fo. This book presents practical approaches and support for reflection with support from several detailed case studies.

**TAKING LEAVE OF OUR CENTRES**

For much of my research career, and in my teaching and practice, I was uncritical of the risks associated with championing one set of disciplinary practices as “the centre” for design work. A centre was a good idea. We just had to find the right one. I came to argue that we should stop centring on users and usage, and centre instead on value. This radically new value-centred design (VCD) would focus on experiences and outcomes from use of digital products and services.

Value too turned out to not be good enough as a centre. Worth was much better, as it expresses a balance between positive and negative values (Cockton, 2006). As I was moving from users and usage to value and worth, John Heskett was moving his graduate seminar on Design and the Creation of Value with him from Chicago to Hong Kong (Dilnot, 2017). However, Heskett and I had different aims.
Heskett sought to improve design's ability to communicate how it creates and adds value by drawing on economic theory, although for Dilnot (2017, p. 11), Heskett “never conflates 'economic value' with value or values per se.” Interestingly, his focus on economic value was often turned to other perspectives on value and values (Heskett, 2017, Appendix B). Heskett’s audience were governments and C-level management.

My audience was design teams in both research and development. I sought to improve design teams’ understanding of worth and their explicit ability to make use of it when designing interactive systems. Heskett was carrying out research into design, and I was carrying out research for design (Frayling, 1993).

My attempts to shift the focus of design, first to value and then worth, were supported by a UK NESTA fellowship from 2005–2008. I was mentored by two distinguished design researchers and educators, who awoke a dormant interest in creative design practice. However, even toward the end of this fellowship, when I spent three months at Microsoft Research Cambridge, I failed to support concurrent creative practices (Cockton et al., 2009a). Centring on worth was effective for integrating across completed design work on a digital Family Archive, but not for directing, balancing, and scheduling additional work. A better balance was needed for design work.

I began to explore balance through the concepts of design choices within Abstract Design Situations (Cockton, 2009a, 2010), which involved four different design arenas (Cockton 2013a, 2013b). This developed into the framework presented in the companion book. The concurrent work on design arenas in this framework lets creative design-led activities go generously beyond known needs, wants, desires, and dreams of identified beneficiaries to a more open and broad design purpose. Design could thus be BIG—Balanced, Integrated, and Generous—by balancing design activities across a project and also integrating these activities in ways that left room for creative opportunities alongside well-grounded insights about beneficiaries.

Changing design’s centre from users via value to worth was less effective than supporting multiple foci, being worth-focused (Wo-Fo) some, but not all, of the time (and actually, not much of it, relatively). Multiple changing integrated foci increase the manageable complexity of factors under consideration during design. Rather than:

- placing all our trust in a single centre (such as users, usage, value, values or worth), BIG expects, and supports, multiple dynamic foci; or

- focusing predominantly on positive or negative outcomes, a Wo-Fo considers the balance of both, based on the understanding that positives can outweigh, or compensate for, negatives.

This book brings these two positions together. The first was developed in the companion book. The second is developed in this book using the context from the first.
The resulting complexity may feel very challenging, with so many factors under consideration. A key aim of this book is to communicate how such complexity can be managed and thus avoid the (often unacceptable) compromises that methodologies with centres and fixed processes (such as HCD) impose on design teams. BIG design combines existing perspectives from human-centred design (HCD), value-centred design (VCD), and worth-centred design (WCD). The last two are variants of HCD, but BIG design subsumes them all. User-centred design (UCD) and user experience (UX) practices co-exist alongside (or either side of) Wo-Fo and design-led practices.

The case studies illustrate how the complexity of a Wo-Fo in combination with three others can be managed in design projects. One case study combines the full BIG framework with a Wo-Fo (George, 2016). This Ph.D. is online and can be consulted for details of a complete design research project, as can another Ph.D. thesis (Camara, 2012) and a Master’s dissertation (Vu, 2013).

WHO SHOULD READ THIS BOOK?

This book is for everyone who is aware in any way of limitations of current approaches to IxD at their current career stage. Students or professionals working within constraining engineering or innovation (design thinking) methodologies can learn how to open up their work to more creative practices while maintaining a focus on worthwhile experiences and outcomes. Similarly, designers working in loosely structured practices such as agile development or unconstrained exploratory design can learn how to add useful and productive structure to their work, especially a clear sense of design purpose coupled with the ability to ground this in understanding of beneficiaries and evaluations of usage. Managers and directors can learn practices and perspectives that take them beyond the limitations of current design thinking, design-led, agile, and lean practices and improve their tracking, scheduling, and subtle direction of concurrent design work.

LETTING GO WITHOUT LOSING YOUR GRIP

One advantage of focusing on worth in design is that it applies to the progression of design work as much as the outcomes of design. If we are generous with our beneficiaries as designers, then we must also be generous with our own design teams. We need to understand what is worthwhile about a range of disciplinary and professional practices. We then need to take the best of each and reduce their drawbacks. Benefits can make drawbacks worthwhile, but when drawbacks are reduced or even removed, design practices become even more worthwhile.

Thinking in terms of worth means that we must assess both the positives and negatives of specific disciplinary and professional practices and respond appropriately. As designers, we primarily serve others, and not our disciplines or professions. We must critically reflect on the values into which we have been socialised by education or professional practice. We should be comfortable with having our values challenged and be able to assess their impact on our design practices. We need a
strong grip on how we get design work to work, and that means letting go of values that cannot be
demonstrably realised by effective action.

Gilbert Cockton
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Acknowledgements

This book has its roots over 25 years ago in the work of my first two Computing Ph.D. students at Glasgow University. Steven Clarke (1997) responded to second-wave HCI (Rogers et al., 1994) by exploring the nature of links (connections, in this book) between contextual research into beneficiaries and the design of software artefacts. He moved away from assumptions of synchronised clean interfaces between phases of software development cycles to incremental asynchronous connections. Darryn Lavery developed methodological resources for the systematic study of evaluation work that was to develop into a resource-based approach to design work. Clarke’s Ph.D. work is the first case study in this book.

Ph.D. students and colleagues in computing at Sunderland University built on Lavery’s research from 1997–2009. Alan Woolrych and Mark Hindmarch developed an understanding of informative and expressive resources in evaluation work. Sharon McDonald and Kelly Monahan demonstrated the flexibility of HCD methods by repurposing contextual research approaches for evaluation. Alongside this continuing work on evaluation, specialised approaches and resources for contextual research were developed for accessibility (Eamon Doherty, Paul Gnanayutham, Brendan Cassidy), culture (Fuad AL Qirem), and e-learning (Susan Jones).

From 1999–2005, I directed regional support projects for the digital sector in the northeast of England. Industrial board members on three projects improved my understanding of business strategy. I became more aware of the limitations of HCD approaches to contextual research and usability evaluation in the broader context of developing and marketing digital products and services. I thus chose to focus VCD for my UK NESTA fellowship. I had the very good fortune to be mentored by Gillian Crampton-Smith. Gillian and her husband, Phil Tabor, developed my understanding of perspectives from creative design education and research. During this fellowship, I was seconded to Microsoft Research Cambridge (second case study on this book) and was an international advisor to the Finnish TEKES VALU project (third case study). At Microsoft, Abigail Sellen, David Kirk, and Richard Banks were particularly helpful with the development of worth sketching and mapping, which Sari Kujala and Piia Nurkka developed Wo-Fo resources further on the VALU project. I developed a range of Wo-Fo resources during my NESTA fellowship.

The rejection of fixed design and evaluation methods, and their reconceptualization as approaches and resources, developed during two European COST networks, MAUSE and TwinTide, with applications in consultancy as part of the regional CODEWORKS digital support project. Resource functions underpinned work by my Ph.D. students in Northumbria University’s School of Design from 2010 onwards. Malcolm Jones discovered multiple resource functions (rather than
types) in his Ph.D. on storytelling resources (Jones, 2020). Jenni George’s Ph.D. applied a wide range of new design theory to a Wo-Fo case study (George, 2016). The Why-Frames in Chapter 4 were invented at Northumbria University’s former Centre for Design Research by Louise Taylor and Joyce Yee.

The research framework that was refined within the TwinTide project and by Ph.D. students has been the basis for teaching undergraduate and postgraduate students in Italy, Slovenia, Iceland and the Netherlands. It has also been the basis for workshops and courses at conferences in Finland, Germany, Estonia, U.S., Sweden, Canada, and the UK. I have gained much from the hundreds of participants on these courses, and share some experiences as a final case study in this book. My framework has also been extended in response to several Ph.D.s that I have examined, and collaborations arising within the TwinTide COST network, in particular with Kasper Hornbæk, Erik Frøkjær, Marcin Sikorski, Igor Garnik, Marta Lárusdóttir, and Åsa Cajander.

This book is thus the result of dozens of collaborations and several funded projects. I have also benefitted from independent use of the approaches that I have developed, as covered in Chapter 6. I have been very fortunate to have received advice, ideas, knowledge, and guidance from a wide range of colleagues in academia and business, as well as the trust and enthusiasm of colleagues who have independently applied my approaches. Most recently, as Co-Editor-in-Chief of ACM Interactions magazine, I have had the opportunity to interact with colleagues at all stages of their careers, which has refreshed and extended the framework presented here.

Gilbert Cockton
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Wo-Fo Success Needs Appropriate Design Progressions

This book’s companion, *Worth Focused Design 1: Balance, Integration and Generosity* (Cockton, 2020a), co-evolves a new lexicon and framework for design *progressions* rather than *processes*. Such RILED processes are Rational, Idealised, and Linear, originating in Engineering Design, but superseded for over three decades now by concurrent engineering (Umemoto et al., 2004). As argued in Book 1 (Cockton, 2020a), agile development and Design Thinking methodologies remain closer to RILED than to concurrent engineering. Neither are appropriate contexts for a Wo-Fo, but design progressions based on concurrent engineering are.

Concurrent engineering developed from studies of innovation in Japanese manufacturing (Takeuchi and Nonaka, 1986), as did knowledge management, since the loss of a rigid linear staged development process will make it harder to manage the knowledge inputs and outputs from design work. Having a Wo-Fo is an innovative practice as it focuses on experiences and outcomes, and not artefacts or the detailed practices of their beneficiaries. Innovative practices have to be creative. Creative work cannot be planned up front, not only at process level, but also at the level of iterations in agile development. In creative work, you do not know exactly what you are going to do, and thus you cannot fully plan it in advance. RILED processes are thus associated with obstructing innovation (Christensen and Kaufman, 2008). Any process that is drawn with a simple chain of boxes and arrows is a linear process, irrespective of any iterative loops, backtracking, and notes about arrows that have been left out to simplify a diagram. Calling it agile or Design Thinking makes no difference to the fact that such a process is more RILED than wholly concurrent.

The companion book argues for three key realities of creative work: co-evolution, backtalk, and generosity. Rather than follow an orderly rational sequence, design work co-evolves. Originally, this was seen as co evolution of problem and solution spaces, as in Wicked Problems (Rittel and Webber, 1973). However, what evolves cannot be a problem and a solution, since a defining characteristic of a wicked problem is that its final framing is impossible until a solution has been accepted. This is not problem solving. It is not even problem setting. As long as we keep words such as “problem” and “solution” in our design lexicon we will always be prone to linear thinking, since problems must precede solutions.

Book 1 (Cockton, 2020a) instead argued that what co-evolves is an artefact and its *memoranda*. At the start of a design progression and subsequently, no final artefact is under development. Instead, various *antefacts* are developed as sketches and a broad range of prototype forms. Work on
1. WO-FO SUCCESS NEEDS APPROPRIATE DESIGN PROGRESSIONS

*a_tefacts* happens in one design arena (*a_tefact* generalises antefact and artefact). The other design arenas are memoranda, things to be borne in mind when working on *a_tefacts*. What co-evolves are all the arenas in a design progression.

The companion book derived for design arenas from Heskett’s (2005) analysis of the origins of design outcomes. As well as choices about “means” (*a_tefacts*) there also choices of “ends” (purpose), “who benefits,” and evaluations. This gives us four design arenas: *a_tefact*, purpose, anyficiaries, and evaluations. As with *a_tefacts*, anyficiaries generalises beneficiaries and maleficiaries, since all benefits require some sacrifices in turn. However, *a_tefacts* do not distribute benefits and sacrifices equally. Some benefit more than others, and others suffer more than some.

Design arenas provide the bases for balance and integration that are obstructed by a fixed process in RILED. Work on a design arena is no longer restricted to a single stage. Instead, design arenas are worked on concurrently, so attention must be paid to their balance. This can be supported by tracking representations for design progressions. Moving away from RILED moves away from fixed interfaces between process stages, which is a simple mechanism for (hopefully) integrating work from different design arenas. In concurrent design work, connections can be made in any way at any time. There are no fixed forms of connection. Instead, connections are formed by backtalk from one design arena to another.

Co-evolution and backtalk are symbiotic. Backtalk is a shorthand for Schön’s (1992) “reflective conversation with the materials of a design situation.” This both co-evolves and connects design arenas. It also enables the third key reality of creative practice: generosity, in the absence of a fixed set of upfront requirements, and also the lack of a rational value system that sees delivering to specification as the highest form of achievement, design teams are free to deliver the most worth possible. The purpose design arena is the focus for this worth. Generosity results when design teams can frame purpose from several perspectives. The purpose of design is not only to create something, nor just to have a successful validation, nor just to meet users’ needs and wants while removing their pain points. The purpose of design is all of these *and more*. “More” here is generosity, going beyond what is specified or (implicitly) requested to a vision for product strategy that delights.

This book present concrete approaches, practices, and examples of Wo-Fo approaches within BIG design contexts. Chapter 2 introduces the concept of worth, advocates best practices, and reviews approaches to researching and communicating design purpose as worth. Chapter 3 examines balance for the other three design arenas. Chapter 4 presents a broad and versatile range of approaches and resources for integrating across all four design arenas. Chapters 5 and 6 present several case studies. Chapter 7 reviews the past, present, and future of BIG Wo-Fo design.

Having replaced process with progression, we have one other RILED word to remove from the design lexicon: *method*. This is replaced in the design lexicon by approaches, resources, and functions.
1.1 APPROACHES, RESOURCES, AND FUNCTIONS

This book takes a broad informed view of design work. It extends its companion book’s rejection of fixed re-usable processes in its high-level framework by rejecting fixed re-usable design and evaluation methods. These may be managerially attractive, but desiring control (Dorst, 2017) and actually having it are different. Managers value control, but critical creative work control cannot be achieved through heavy handed planning of process or activities. Takeuchi and Nonaka (1986) thus stress subtle management control. There is no subtlety in fixed procedures slotted into fixed top down box and arrow processes. A significant design project is a unique design project. All bets are off at the outset.

A method is a complete sequence of steps for achieving a result. It is a process in miniature, but as Gedenryd (1998) has shown, method has a much longer history, beginning with ancient Greek philosophy and foregrounded in Descartes’ fourth Rule for The Direction of the Mind:

…by a method I mean certain and simple rules, such that, if a man observe them accurately, he shall never assume what is false is true, and will never spend his mental efforts to no purpose, but will always gradually increase his knowledge and so arrive at a true understanding of all that does not surpass his powers.

Descartes regarded mathematics as the ideal model of reasoning, as did Alexander (1971) when looking back on the failure of the 1960s design methods movement, and Parnas and Clements (1986) when arguing for faking a rational design process.

We must side with Alexander, Jones, and other pioneers of design methods who all owned up to failure. Methods, like processes, devalue “people, product, and content” (Fallman, 2003). We reject fixed re-usable methods in favour of approaches. Approaches are incomplete procedures supported by incomplete sets of resources (Woolrych et al., 2011). Resources too are typically incomplete and are used alongside as well as within approaches. They are critical to effective work in arenas (Cockton, 2020a, Section 4.1.1). Approaches and their resources must be adapted and completed in design work. Just as wicked problems can only be defined once a solution has been adopted, so too do “wicked” methods only look complete in a rear-view mirror: looking forward, they are stepping stones when an approach is chosen, often with large gaps or tiny footholds. Designers must work to get methods to work. In reality, methods are achievements, not premonitions. However, this openness and incompleteness makes them open to “people, product and content” to an extent and in a manner beyond fixed upfront processes and methods. Designers need “to invent ad hoc approaches, or draw inspiration from unorthodox sources or take inexplicable creative leaps” (Gaver and Bowers, 2012), but later explanations of such leaps do help!

This alternative realistic framework of approaches and resources is completed by functions. Work with approaches and resources is typically communicated in some way (expression, performance). Approaches and resources have potential functions that are realised by both intent and
surprise during design work. Five functions were used as examples in Book 1 (Cockton, 2020a, Section 4.1.1), and nine others were used previously without comment, but as nouns (e.g., integration, association, invigoration). Functions are typically indicated adjectivally, i.e., directive, expressive, ideative, informative, inquisitive, integrative. While many functions are cognitive, others are affective (invigorative, protective), social (affiliative, deliberative, performative), or axiological (ameliorative). The 14 current functions are:

1. **Adumbrative**: scopes all design work from enduring paradigms to improvised design moves;
2. **Affiliative**: strengthens bonds and common ground within design teams;
3. **Ameliorative**: targets specific worth at all extents of design work, supporting disciplinary and professional values with specific practices;
4. **Deliberative**: triggers and supports discussion with design teams;
5. **Directive**: guides design and evaluation activities;
6. **Expressive**: externalises design work;
7. **Ideative**: triggers creative moves within design work;
8. **Informative**: provides data, knowledge, and insights to support design work;
9. **Inquisitive**: triggers questions about current and future design work;
10. **Integrative**: forms connections across design arenas;
11. **Invigorative**: provides confidence and energy for ongoing design work;
12. **Performative**: presents design work to audiences beyond a core design team;
13. **Protective**: redirects current and ongoing design work to maintain its worth; and
14. **Reflective**: supports design team members’ individual reflections on design work.

These 14 functions are not exhaustive, but are finer grained than functions used elsewhere, e.g., investigative, explanatory, explorative, and persuasive (Vistisen, 2015); Lawson and Dorst’s (2009) five general groups of design activities: formulating, representing, moving, evaluating, and managing. “Representing” corresponds to expressive above and “managing” to directive, but the other three have no obvious counterparts. They are above resource level: “formulating” corresponds to framing of arenas or connections; “moving” to design transitions at any level from moves to episodes; and “evaluating” to a design arena. A problem with such heterogeneous frameworks is that
gaps are hard to spot, since a clear low-level omission could be argued to be covered by an existing higher-level group. In contrast, resource functions have the same level of abstraction. They are not restricted to resources, and also apply to approaches and episodes as overall cumulative function (George, 2016), but nevertheless remain homogeneous at their level of application. This has made omissions easy to spot, with ideative, reflective, deliberative and affiliative functions added since Cockton (2013c).

Some may take issue with the names of some functions, particularly adumbrative, ameliorative and invigorative. I would argue that these are appropriate as regards precision (e.g., an umbra, or shadow, is less sharp than a boundary line) and they also have reflective and inquisitive functions that reasonably prompt thoughtful responses from designers and researchers. Four alternative name sets for different audiences and uses were provided in Cockton (2013c). A further action-oriented name set for the current 14 is: scoping, affiliating, valuing, deliberating, directing, expressing, ideating, asking, informing, integrating, invigorating, performing, protecting, and reflecting.

Functions replace the types in Woolrych et al. (2011) where, for example, a report produced toward the end of a user testing activity was an expressive resource. However, a test report may be: informative about possible design changes; performative as a social resource; invigorative for its target audience; and protective against project risks. Rather than having a single type, a resource can have multiple functions. This was the basis for developing resource function theory. The difference is that expressive resource no longer refers to a fixed type resource, but to a resource and one of its potential functions. This is much less wordy than “resource with a potential expressive function.” An expressive informative resource is like a long red scarf, which is not a type of scarf but one with two non-exclusive highlighted attributes. The scarf can also be woollen and woven, just as an expressive informative resource can also be performative, invigorating, and protective.

Textbook methods tend to have two primary functions: to direct and express. They are often supported by resources with informative functions. For example, Heuristic Evaluation is primarily an informative resource (its heuristics), but extends to an approach when combined with a directive procedure for applying the heuristics (Woolrych et al., 2011). A problem report format (Cockton et al., 2004) adds an expressive resource for further support. Fallman (2003) contrasted “first-generation” design methods that aim to systematize and formalize (i.e., have a directive function), with “second-generation” ones that support learning, collaboration, and creative practice (i.e., have informative, affiliative, performative, and ideative functions).

A resource may have one primary function, often informative, but further functions can be realised. Indeed, careful resource use can achieve ten or more functions. This is how design work manages complexity by addressing multiple important concerns in a single move. Just as resources are mobilized for success in political arenas (Renn, 1992), so design resources are mobilized by activating their potential functions. Resources can give design organisations a strong competitive advantage (Stevens and Moultrie, 2011), and this includes resources for design purpose (Winkler and
Some economic theories address resource advantages (e.g., from specific design co-products) better than others (Weber, 2017). Takeuchi and Nonaka (1986) exposed the importance of human capital, skills, and knowledge. In practical terms, resources and the approaches that develop and apply them form a palette (Friedland, 2019) that can be structured into a playbook for specific project and programme settings (Gajander, 2019).

As with process plans, there are no guarantees from textbook resources. Design teams must work to get resources to work. Teams only know what their methods were, never what they will be. Every method realisation is unique. Approaches are templates.

Human-centred design (HCD) methods focus on primary research to inform design work using empirical human science practices that are primarily directive, with ameliorative functions focused on process more than outcomes, with the assumption that a badly used method can have no good outcomes. This overlooks the many possibilities for “repair” in design work, which follow from the use of spoken language, where repair is a common feature of dialogue. Again, such adaptive uses of language can realise resource functions: “inquiry is an aggregate process with several component functions” (Gedenryd, 1998). Gedenryd notes how the interactive structure of design work brings important advantages over working intramentally, i.e., wholly within a single designer’s head.

Primary research will figure in most substantial IxD work. However, it is not the only research mode, especially for the a_tefact design arena, where much research is secondary, which is focused on standards, trends, innovations, and technology. Similarly, other arenas draw on secondary research, as well as personal resources, and also on critical and creative practices. Whatever the mode of research, expression and sharing of outcomes is important. Such outcomes can be framed as results, findings, insights, proposals, requirements, opportunities, and more, but whatever we call them, they need to be captured, shared, discussed, and used.

Book 1 (Cockton, 2020a) developed a template for good BIG progressions, having set processes aside. Similarly, this book presents not methods, but approach and resource templates that realise their potential functions through thoughtful creative work. There are no guarantees. Instead, there are challenges that effective design teams routinely overcome through judgement, wisdom, and courage.
CHAPTER 2

Framing Design Purpose as Worth

Book 1 (Cockton, 2020a) considered design work that progressively departs from a normative process as design problems get less tame. Differences between ideals and realities are primarily ones of structure. RILED phases each focus on a single design arena. Problem phases must logically precede “solution” phases. Systematic interfaces between adjacent phases are imagined, with phase outputs acting as inputs to generation, derivation, translation, or other design activities that are conceived as quasi-mechanical operations. None of these RILED assumptions hold in creative design practice.

A focus on worth or any other consideration will only be effective if it is “at home” with a range of design practices. This is why Book 1 (Cockton, 2020a) addressed these first. Its Chapter 2 considered creative design practice. Its Chapter 3 used fiction to critique uncritical positions of engineering design management and its HCD offshoot. Its Chapter 4 developed BIG design paradigms that can give due weight to creative, engineering, and management considerations. Its Chapter 5’s tracking and reflection practices make space for critical creative work while keeping room for the rational values of engineering design management. Much of this tracking initially has an *adumbrative* function, i.e., to roughly outline the scope of current design work at decreasing levels of abstraction. To adumbrate is to overshadow (*umbra* is Latin for shadow). As with any shadow, the edges provide the main detail. It is only with such an open “zoomable” programme and project infrastructure that we can consider how a Wo-Fo approach to design purpose can be “at home” within appropriately broad design practices.

This book focuses on advancing and integrating design arenas without losing sight of their locales of use, i.e., the broader assemblages of projects, organisations, and communities of practice. This chapter focuses on purpose as a relatively underexplored design arena. Chapter 3 surveys approaches to a_tefacts (antefacts then artefacts), anyficiaries (beneficiaries and maleficiaries), and evaluations. After that, Chapter 4 focuses on integration across design arenas. Chapters 5 and 6 present case studies that use the approaches introduced in Chapters 2–4.

Making decisions is not the only way to advance design arenas. Indeed, when observing design work it can be difficult to see whether, when and how design decisions are being made. Chapter 4 has examples of how design decisions occur implicitly through integration, especially during Davies and Talbot’s (1987) *imago* when an idea is experienced as THE right idea. Unlike much research on abstract disembodied decontextualized “creativity,” having “original” ideas is of little interest to design research. Creative designers ideate prolifically. They are unlikely to be admitted
to Design Schools if they cannot already demonstrate and discuss the geneses and development of their ideas up to and beyond an imago experience.

Design School studio education practice has emergent creative progressions with “crits” (critiques) at their heart. Critique in design education and professional practice is wide ranging. It is not wholly an evaluation activity. Often, there may be no evaluation of an artefact in a crit. While evaluative feedback from peers and tutors can provide valuable direction, much direction actually arises from questions rather than statements. Design work is advanced in many ways. This includes advances through: questions (inquisition); discussion (deliberation); suggested research or experiments (direction); new ideas (ideation); possible connections (integration); designer's knowledge (information); and social (association) and emotional functions (protection, invigoration).

Initial design work is both open and focused. For Darke (1979), designers “fill boxes with concepts.” Knowledge ranges from Dorst’s (2015) open generic themes to focused craft knowledge about making final artefacts. All forms of knowledge can be in play at the same time (Guindon 1990).

2.1 WORTH AND THE AXIOLOGY DESIGN

Simon (1969) views design as “changing existing circumstances into preferred ones,” which requires resources with ameliorative functions. Amelioration improves something (melior is Latin for better), as required for preferred outcomes. Worth is the balance of (ameliorated) positive experiences and outcomes over (alleviated) negative ones. Worth is a universal framing for design purpose.

Axiology is the philosophy of value. The term “represents an attempt to bring together, and critically examine, a wide variety of already existing and overlapping questions related to the essence of goodness, right conduct, value, and obligation” (Hiles, 2008). Given Simon's “preferred” circumstances, design research, and practice both require an axiological basis.

As the balance of achievable benefits over possible costs and risks, worth is a matter of judgement. There has been no improvement on Bentham's (1789) proposed calculation over 200 years ago:

Sum up the values of all the pleasures on one side and of all the pains on the other. If the balance is on the side of pleasure, that is the over-all good tendency of the act with respect to the interests of that person; if on the side of pain, its over-all bad tendency.

Bentham’s calculus has various names (felicific, utility, hedonic, or hedonistic), complemented by terms for units of pleasure (hedons) and pain (dolors), which came later, not from Bentham. Bentham and followers' failure to deliver on a quantified calculus has led to his thinking being replaced by a simpler focus on positive value or undifferentiated utility, which has drawbacks.

There are a few empirical approaches to specific utility. In marketing, conjoint analysis elicits consumer data on relative preferences for features, functions, or benefits (Green and Srinivasan,
However, the “rigorous” mathematical basis of this analysis can be undermined by unwarranted distorting assumptions. Rigour has little value without ecological validity. Some recent Human-Centred Informatics (HCI) research has applied economic approaches on utility to the worth of a sorting feature in an investment task (Nov and Su, 2018). The cost of using the sort feature was varied between 0% and 10% of the investment gains, letting price elasticity be investigated. Younger, less experienced investors made more use of the sort feature, but all usage declined as costs increased. Use of the sort feature was associated with higher investment gains. Although this study has a very narrow scope, the use of economics concepts generalises to considerations of worth. Price elasticity explains why users can accept costs in return for benefits, since any purchase or use involves foregoing costs for benefits. However, costs and risks can become too much for the benefits received. Usage is not worthwhile there.

The challenge is to extend consideration of price denominators beyond experimental uses of “money,” which admits mathematical rigour, to a broader range of costs and risks that do not reduce to numbers. Breadth is very important for the purpose arena. Nov and Su’s study avoids a single valence by considering benefits (investment gain) and costs (percentage of gain foregone to use sort). They avoided one of three drawbacks associated with axiological HCI.

### 2.1.1 AVOIDING THE SINGLE VALENCE DRAWBACK

A first drawback appears when only positives or negatives are explicitly in focus, but not both. Bentham’s approach to utility considered both, as did Doblin (1978), with good/bad analysis identified as a tool for innovation. Much Value-Sensitive Design (VSD; Friedman et al., 2006) focuses on avoiding negatives. In contrast, value-centred design (VCD; Cockton, 2004b, 2005) mostly focused on achievement of positives. We should consider both positives and negatives, as well as neutrals. The occupational psychologist Herzberg (1966) developed a two-factor theory for workplace motivation. The first factor (group) of motivators leads to satisfaction. The second, hygiene factors, leads to dissatisfaction. However, absence of motivators leads not to dissatisfaction, but to a lack of satisfaction, which is not the same as dissatisfaction. Similarly, removal of adverse hygiene factors leads not to satisfaction, but to undissatisfaction. The important point here is that there is a neutral middle ground with no positive or negative valencing. Thinking only in terms of positives and negatives is not enough. We must consider three valences when designing for worth.

Herzberg’s workplace motivators were achievement, recognition, the work itself, responsibility, advancement, and growth. His hygiene factors were company policy, supervision, relationship with boss, work conditions, salary, relationship with peers, and security. Tuch and Hornbæk (2015) have identified Herzberg’s factors in relation to user experience (UX). They studied smartphone ownership and usage, identifying technical quality and price as hygiene factors, and utility and
convenience as motivators. Utility, being able to do useful things with a smartphone, was qualitative in contrast to Nov and Su (2018). Convenience was often expressed in terms of efficiency.

The need to focus on polyvalent worth, not monovalent value or values, is understood in design, economics, marketing, and also ethics, where the controversial principle of double effect is relevant in many contexts (Woodward, 2001). Design teams need not resolve the general ethics of double effect, where an intentional positive goal can compensate for a (known) negative consequence. Instead, they can focus on balances of worth and decide whether users and other stakeholders can forego specific costs in return for specific benefits. A worthwhile balance, however, does not mean that attempts to reduce adverse consequences should stop. Nor should the latter be exaggerated (as dystopian), but nor should there be excessive celebration of benefits (Gaver and Bowers, 2012).

2.1.2 AVOIDING THE ABSTRACT VALUES ONLY DRAWBACK

Anti-utilitarian thinking often narrows utility’s meaning down to narrow instrumentalism. This introduces a second drawback, where mundane instrumental values are seen as being less worthy than noble “human values.” The former become hedonic and transient, unlike the latter ethical and spiritual guides for people’s highest achievements. Kheirandish (2018) thus restricts her design resources to human values in contrast to Boztepe’s (2007) instrumental “product” values. Human values are one of a family of terms for a realist universalist position on values, others being “substantive values,” “deeper values,” and “inner values.” Walker (2017) refers to all three, but without examples when each term is used. To her credit, Kheirandish (2018) tested her belief in fundamental values and could not be empirically validate many as resources for design work.

Street (2012) reviews the arguments for substantive values that follow from the argument that “valuing beings” must have reasons in their humanity for what they value. To avoid an infinite regress of reasons, it is attractive to propose a fixed set of terminal values for all people at all times in all places, which are “deep” enough and personally “inner” anytime anywhere. The reality of means-ends chains is that an infinite regress can only be avoided by deciding where to stop. At the extreme, this is a single value, such as Aristotle’s eudaimonia, translated simply as happiness or welfare, or drawing on the Greek (eu means well, daimonia is “spiritness”), as human flourishing or prosperity (Anscombe, 1958). This is far too abstract a place to stop. Design teams need to be more concrete.

High status values are much more abstract than the worth achieved through ownership and use, regardless of how superficial some may find that. Achievement of more concrete user value (e.g., Boztepe, 2007) is easier to design for and evaluate than satisfaction of more abstract human values. Noble values may make a design team feel worthy in political or spiritual terms, but such values must direct work in support of improvability. If values are not evaluable, then e-valu-ation work is severely constrained. Similarly, within the a_tefact arena, it must be possible to appraise the likely impact of specific capabilities as designed on achievement of desired values for stakeholders.
When framing worth through positive values (benefits) and negative ones (costs, risks), abstract values can provide scope, whereas concrete values direct attention to specific usage experiences and outcomes and their evaluation. Abstract values are best used to group more concrete ones, so work on design purpose be both top down and bottom up. Such an approach has been developed by van de Poel (2013), who “translates” values into design requirements via more concrete mediating norms. Similarly, Winkler and Spiekerman (2019) associate overarching values with one or more of five dimensions, and refine each value into specific aspects.

This second drawback is compounded by confusion between value and values. VSD is strictly values-centred design, in that it focused design on human values of ethical import, and not on the broader and more concrete value of a digital product. Worth-centred design (WCD) avoided this confusion by combining VCD and VSD. Concrete value (VCD; Cockton, 2004b) is combined with abstract (ethical) values (VSD). Achieving positives (VCD) is combined with avoiding negatives (VSD). VCD and VSD overlap in the sense that VSD also addresses positives, even though its ethical focus connotes avoidance of negatives. However, there is little overlap on the range of abstraction, with VCD focused on specific valuable concrete outcomes in the world, and VSD focused on abstract ethical values that span many possible usage outcomes. A Wo-Fo spans all these differences.

2.1.3 AVOIDING THE INDIVIDUALS’ VALUES ONLY DRAWBACK

A third drawback arises from the loss of Bentham’s consideration of both individual and collective worth elements (e.g., association, friendship, benevolence, power, malevolence, enmity), some of which can be either positive or negative (e.g., reputation, memory). Much research for design focuses on what is worthwhile for individuals, whereas Cockton (2006) covered both individual and collective worth, as did Rokeach (1973) in his landmark study, where he defined a value as

> an enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode of conduct or end-state of existence

Rokeach also highlighted the textually obvious connection between values and individuals’ evaluation: values are “relatively general and durable internal criteria for evaluation.” In design, such criteria need to be externalised whenever possible.

Social innovation work inevitably develops collective value, but consumer-oriented products can be overly individual in focus, missing opportunities arising from a balanced value proposition that includes collective worth. While a narrow focus leaves fewer values to be reconciled during design, these values still need to be reconciled in the world. It is best to anticipate this and design for this. Difficulties of incommensurability are bound to arise (Heskett, 2017) and judgement and wisdom are the best resources to apply here. There are no objective procedures that can help. Even
2. FRAMING DESIGN PURPOSE AS WORTH

so, Davies and Talbot (1987) identified individual/collective as a common theme in designers’ work, so risk of over individualisation is reduced by such personal design resources.

Heskett (2017) spent decades studying the relationship between design and economics. He assessed major economic theories for their ability to include design competence as a source of competitive advantage. Collective value extends to the organisations that develop and market digital products. Important values here are technical feasibility, financial viability, and compatibility with the product range. Strategic Design can combine these into whole new business cases (Stevens and Moultrie, 2011). Such values and business cases are not restricted to commercial for profit organisations. Worth in Strategic Design primarily results from design work practices that in turn improve the worth of digital products developed by or for an organisation. However, design research practices do bring additional considerations, such as aesthetic knowledge and scientific value and communication with audiences through books, exhibitions and other expressive and performative resources (Gaver and Bowers, 2012).

This book mostly focuses on the worth of digital products and associated design work practices. Chapter 7 considers worth in relation to design progressions.

2.2 WORKING ON DESIGN PURPOSE

It is worth making BIG design Wo-Fo, but only if worth is broadly scoped to avoid the three drawbacks above by being:

1. *trivalent* by considering a balance of positives, negatives, and neutrals. Value propositions wholly focused on positives risk ignoring potential negatives. The anyficiaries arena concept keeps both maleficiaries and beneficiaries in scope;

2. *multi-layered* by ranging from the most abstract noble values to concrete and instrumental value, avoiding confusion between value and values, and not favouring “deeper” values over instrumental or experiential value; and

3. *multi-lens* by considering collective as well as individual value(s).

Dilnot (2017) notes the complexity of realistic value propositions

*Design is therefore … the creation and or the addition not just of “value,” but of complex multiple “values” that embody, express and enable capabilities.*

The “emphasis is very emphatically on the plural” (Heskett, 2017), which requires a broadly scoped concept of worth that can involve any mix of positive, neutral and negative, abstract and concrete, noble and mundane, and individual and collective. Such a concept can preserve the scope of Bentham’s ranges of pleasures and pain without committing to forms of calculation that underlie much classical economic (choice) theory. Worth extends the simple value propositions of much business practice to be-
come multi-layered (value consistent with values) and multi-valenced (positives, neutrals, negatives). The concept of worth as a design resource is potentially both informative and directive in function, sensitising design teams to, and directing them to contemplate, many value considerations.

Design teams who are informed and directed by the concept of worth can immediately recall potential positives and negatives that may be relevant for a new project. Working on design purpose can thus begin with the design team, understood broadly as all those who will be involved in a project and ideally will contribute to its inception. Not all team members are creatively educated designers, but include a wide range of stakeholders and specialists. Approaches are needed that can include a diverse team in design work. Managers’ desire for early control can delay the involvement of a broad team, leading Winkler and Spiekerman (2019) to defend their values resource as a tool for management when developing an initial value proposition before involving system designers who “can probably arrive at such a list with a little reflection.” The evidence is that designers can definitely articulate values. Heskett (2017) illustrates this with seven words from one paragraph by Gordon Russell, a furniture designer who was the first head of what is now the UK Design Council: healthy, good, quality, sham, standard, seemly, satisfying. Section 2.4 adds scores of publicly shared experiential values from architecture and interaction design.

Over the last decade, a wide range of canvas resources have been developed that are very well suited to multidisciplinary project inception. The Value Proposition Canvas (Osterwalder et al., 2014) lets a multi-expert design team collect ideas about pains and gains in the context of Jobs to be Done (Kalbach, 2019). “Jobs” represent work and similar goals, while pains and gains represent the negatives and positives associated with pursuit of these goals. This canvas avoids a risky sole focus on positives common in too much business work on value propositions.

The starting point of work on any design arena is subjective (inter-subjective for teamwork). Rational design polemics often devalue the subjective, but all well-grounded studies of creative design work treasure it (e.g., Darke, 1979). In (well) under an hour of brainstorming or similar activities such as brainwriting (Warfield et al., 1975), a design team can fill out an initial Value Proposition Canvas.

Ultimately, subjectivity cannot be avoided. It is better to value it as hardwon expertise when faced with a complex set of positives, neutrals, and negatives. A team must make judgements on the acceptability of a resulting balance of worth on the basis of benefits that have been achieved (motivators) or unachieved (neutral) and of costs and risks that have been removed (neutral) or reduced (hygiene factors). The absence of an intended benefit is not a negative for stakeholders from Herzberg’s (1966) perspective. As regards unachieved benefit, relevant stakeholders will be unsatisfied rather than dissatisfied. Similarly, costs and risks that are reduced or even removed will leave relevant stakeholders undissatisfied rather than satisfied.

Judgements of achieved worth must weigh achieved positives against persisting negatives. There is no calculus for this yet, and one cannot be expected soon given lack of progress since Ben-
tham’s initial attempts over two centuries ago. However, subjectivity can be balanced by evaluation work. Similarly, the relevance of intended positives and negatives to stakeholders can be addressed by stakeholder research within the anficiaries arena.

2.3 RESEARCH ACTIVITIES FOR DESIGN PURPOSES

Reviews of modes of research for design purpose as worth begin with secondary research resources, then critical reflective resources, then primary research approaches, and lastly expressive resources.

Primary research is not sufficient for design purpose, especially when only focused on users. Potential users do not have the proactive innovative vision of product management and design teams. User research must be augmented with a project sponsor’s product goals. Current technology usage and experience may be of limited relevance. For major innovations, design purpose needs to go beyond empirically grounded needs, wants and similar. Similarly, user studies may not provide majority support for purpose in projects motivated by political or environmental values, e.g., promoting intersectionality (Erete et al., 2018) or sustainability.

2.3.1 SECONDARY RESEARCH RESOURCES

In May 2019, a Google search for “Lists of Needs and Wants” reported 229 million hits. Over a month later, this had dropped to 179 million, but a search for “Lists of Human Values” reported 1.17 billion hits. No design team should ever be short of inspiration when reflecting on possible purposes for a design! Worth spans a range of psychological constructs such as values, needs, wants, drives, dreams, nightmares, pleasures, pains, lacks, and motivations. These are all in scope for intended worth as positive benefits to deliver and negative costs and risks to avoid. Despite this veritable tsunami of information, researchers in HCI have drawn up their own proprietary lists. VSD has drawn on an evolving set of “human values with ethical import,” such as these 13: Human Welfare, Ownership and Property, Privacy, Freedom from Bias, Universal Usability, Trust, Autonomy, Informed Consent, Accountability, Courtesy, Identity, Calmness, and Environmental Sustainability. This list is not assumed to be comprehensive. As the authors note, “the list of other possible moral and non-moral values could get very long very quickly” and could include “peacefulness, respect, compassion, love, warmth, creativity, humor, originality, vision, friendship, cooperation, collaboration, purposefulness, devotion, loyalty, diplomacy, kindness, musicality, or harmony” (Friedman et al., 2006). This more than doubles (from 13 to 32) the values that could be considered.

There is no need, however, for a single list, even less so for a short one. For example, Shneiderman (2003) reported that his “quest for clearer statements of human needs led me to a simple formula for life: Living, loving, learning, leaving a legacy” (Covey et al., 1994). Rationalist values are clear here: statements must be “clear” and formulae need to be “simple.” In contrast, creative design practices thrive on ambiguity and complexity. Both originate in the world. There is less and
less chance of escaping them. As the challenges addressed by design become more open, complex, dynamic, and networked (Dorst, 2015), preferences for simplicity veer toward escapism.

There is no clear upper limit to the number of values that can be considered during the course of a design project. If there is one, it is not less than 10 or 20, which tend to be the upper bounds for what some researchers imagine design teams can manage. Winker and Spiekerman (2019) assembled a list of 31 overarching values relevant to sustainable design. Each was associated with a range of 2–32 specific aspects, resulting in a list of over 200 possible considerations. This value collection is intended for “innovation teams and engineers … [to] consider during requirement engineering,” groups who are too often inappropriately assumed to need simple clarity.

Lists of values of any length can be used alongside each other. There is no need to merge and integrate them into one resource for use on all design projects. A selection of lists can be placed on a double-sided sheet of paper for use in projects and courses. I have done so without problems with almost 200 course attendees over the last 5 years. Adopting specific values from lists has ameliorative and adumbrative functions: the former expresses design purpose (as an initial DAN); the latter scopes it. Juxtaposition of lists has a potential deliberative function that prompts design team discussion on the directive value of each list.

The lists on the following pages show Rokeach’s (1973) list of Instrumental and Terminal Values, Kahle’s simplification of these for consumer product design (Homer and Kahle, 1988), and Schwartz’s (1992) Basic Values. The lists are from the Center for Nonviolent Communication (CNVC, 2005). These four lists have been chosen to undermine each other as standalone informative resources. Their differences promote inquisitive and reflective responses. For example, Kahle’s reduction of Rokeach’s list from 36 to 9 values, and the loss of Rokeach’s instrumental-terminal distinction prompts design teams to reflect on what is lost and gained in a quest for clarity and simplification. The CNVC list (75) is more than double Rokeach’s combined value lists (36). The groupings of values in Rokeach, Schwartz, and CNVC are an additional informative resource.

The four lists can be further augmented with ones that have been explicitly developed to support design work, e.g., Kheirandish, (2018) and Kujala and Väänänen-Vainio-Mattila, (2009). However, the benefits of juxtaposition should not be lost. Dorst’s (2015) open, complex, dynamic, and networked design challenges must be matched by requisite variety (Ashby, 1958) of design resources, which must also be open and complex through choice, dynamic through adding and changing resources during a project, and networked through reflection and deliberation that expose synergies and tensions between different lists of values.

In summary, existing lists of values, need, and wants or other axiological resources can be used to achieve some or more of the following functions (and possibly others):

- **Informative**: by alerting team members to values that they have not yet considered;
• **Inquisitive**: by prompting questions in relation to gaps, overlaps, different vocabulary and groupings, and other contrasts between published lists and personal constructs;

• **Ideative**: generative by spotting gaps in lists and filling them;

• **Reflective**: by reconsidering, prioritising, triaging, or otherwise considering the relative importance (if any) of different values to a design project, a quasi-predictive use;

• **Deliberative**: by the design team discussing any results of the preceding four functions;

• **Affiliative**: by the preceding two functions providing a design team with initial common ground. Aliasing (alternative names for values) can respect vocabulary differences;

• **Directive**: by framing with values, an exploratory role that can “go some way to uncovering aesthetic and socio-political values” (Gaver and Bowers, 2012); and

• **Adumbrative, Ameliorative, Expressive, and Directive**: by noting (prioritised) values in a purpose DAN for further investigation. This cluster is typical of successful design work, where multiple functions are realised simultaneously.

**Rokeach Instrumental**

<table>
<thead>
<tr>
<th>Cheerfulness</th>
<th>Courage</th>
<th>Broad-mindedness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambition</td>
<td>Politeness</td>
<td>Logic</td>
</tr>
<tr>
<td>Love</td>
<td>Honesty</td>
<td>Obedience</td>
</tr>
<tr>
<td>Cleanliness</td>
<td>Imagination</td>
<td>Helpfulness</td>
</tr>
<tr>
<td>Self-control</td>
<td>Independence</td>
<td>Responsibility</td>
</tr>
<tr>
<td>Capability</td>
<td>Intellect</td>
<td>Forgiveness</td>
</tr>
</tbody>
</table>

**Rokeach Terminal**

<table>
<thead>
<tr>
<th>True friendship</th>
<th>Freedom</th>
<th>National security</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mature love</td>
<td>Pleasure</td>
<td>Sense of accomplishment</td>
</tr>
<tr>
<td>Self-respect</td>
<td>Social recognition</td>
<td>A world of beauty</td>
</tr>
<tr>
<td>Happiness</td>
<td>Wisdom</td>
<td>A world at peace</td>
</tr>
<tr>
<td>Inner harmony</td>
<td>Salvation</td>
<td>A comfortable life</td>
</tr>
<tr>
<td>Equality</td>
<td>Family security</td>
<td>An exciting life</td>
</tr>
</tbody>
</table>

**Kahle**

<table>
<thead>
<tr>
<th>Fun and Enjoyment</th>
<th>Sense of accomplishment</th>
<th>Sense of belonging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excitement</td>
<td>Self-Fulfilment</td>
<td>Being well respected</td>
</tr>
<tr>
<td>Security</td>
<td>Warm relationships</td>
<td></td>
</tr>
<tr>
<td>Self respect</td>
<td>with others</td>
<td></td>
</tr>
</tbody>
</table>
Schwartz’s Basic Values
- Openness to change
- Self-direction
- Stimulation
- Self-enhancement
- Hedonism
- Achievement
- Power
- Conservation
- Security
- Conformity
- Tradition
- Self-transcendence
- Benevolence
- Universalism


<table>
<thead>
<tr>
<th>Connection</th>
<th>Physical Well-Being</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>acceptance</td>
<td>air</td>
<td>awareness</td>
</tr>
<tr>
<td>affection</td>
<td>food</td>
<td>celebration of life</td>
</tr>
<tr>
<td>appreciation</td>
<td>movement/exercise</td>
<td>challenge</td>
</tr>
<tr>
<td>belonging</td>
<td>rest/sleep</td>
<td>clarity</td>
</tr>
<tr>
<td>cooperation</td>
<td>sexual expression</td>
<td>competence</td>
</tr>
<tr>
<td>communication</td>
<td>safety</td>
<td>consciousness</td>
</tr>
<tr>
<td>closeness</td>
<td>shelter</td>
<td>contribution</td>
</tr>
<tr>
<td>community</td>
<td>touch</td>
<td>creativity</td>
</tr>
<tr>
<td>companionship</td>
<td>water</td>
<td>discovery</td>
</tr>
<tr>
<td>compassion</td>
<td>Honesty</td>
<td>efficacy</td>
</tr>
<tr>
<td>consideration</td>
<td>authenticity</td>
<td>effectiveness</td>
</tr>
<tr>
<td>consistency</td>
<td>integrity</td>
<td>growth</td>
</tr>
<tr>
<td>empathy</td>
<td>presence</td>
<td>hope</td>
</tr>
<tr>
<td>inclusion</td>
<td>Play</td>
<td>learning</td>
</tr>
<tr>
<td>intimacy</td>
<td>joy</td>
<td>mourning</td>
</tr>
<tr>
<td>love</td>
<td>humor</td>
<td>participation</td>
</tr>
<tr>
<td>mutuality</td>
<td>Peace</td>
<td>purpose</td>
</tr>
<tr>
<td>nurturing</td>
<td>beauty</td>
<td>self-expression</td>
</tr>
<tr>
<td>respect/self-respect</td>
<td>communion</td>
<td>stimulation</td>
</tr>
<tr>
<td>safety</td>
<td>ease</td>
<td>to matter</td>
</tr>
<tr>
<td>security</td>
<td>equality</td>
<td>understanding</td>
</tr>
<tr>
<td>stability</td>
<td>harmony</td>
<td>Autonomy</td>
</tr>
<tr>
<td>support</td>
<td>inspiration</td>
<td>choice</td>
</tr>
<tr>
<td>to know and be known</td>
<td>order</td>
<td>freedom</td>
</tr>
<tr>
<td>to see and be seen</td>
<td></td>
<td>independence</td>
</tr>
<tr>
<td>to understand and</td>
<td></td>
<td>space</td>
</tr>
<tr>
<td>be understood</td>
<td></td>
<td>spontaneity</td>
</tr>
<tr>
<td>trust</td>
<td></td>
<td></td>
</tr>
<tr>
<td>warmth</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
There are many ways to use lists of values in a design project, which extend beyond theory’s roles as explanatory, predictive, or generative (Löwgren, 2013). The wide range of potential functions makes it unwise to offer any method for using lists of values and other secondary research in design work. Lists may be used in breakout groups in project inception workshops, but can also be used individually or collectively during reflective activities (e.g., Sprint Retrospectives in Scrum software development). Values may also be encountered indirectly through a team’s “previous eclectic research” (Gaver, 2011). For the Equator 1 design workbooks, this spanned “possible views on the home ranging from previous work in HCI, sociology, and the arts to psychoanalytic accounts of the home, descriptions of the home as a hiding place for contraband, and popular news articles about unusual domestic activities.” Such eclectic reading is not wholly within the purpose arena, but instead forms a concourse. It challenges close adherence to Lévi-Strauss’ position on the universe of instruments in bricolage being closed (Fallman, 2003). There is no need to stick with whatever is at hand, bringing into question the appropriateness of bricolage as a model for design work, which forges both new means and new ends, especially in IxD where concerns have expanded beyond functionality and usability to the emotional, aesthetic, cultural, and critical (Gaver and, Bowers 2012).

Overall, the functions of secondary research for design purpose are primarily some mix of informative, inquisitive, ideative, and expressive. They support, following Darke (1979), filling the design purpose box with concepts. Having concepts to hand helps.

2.3.2 CRITICAL AND REFLECTIVE RESOURCES

Design teams are never without some resources. Each individual member joins a project with relevant knowledge and experience. Secondary resources in design work can, will, and should be augmented with autobiographical ones. A key aspect of Strategic Design is leveraging the existing intuitions and judgement of creative designers (Stevens and Moultrie, 2011). This extends to design research portfolios, where annotated highlights “reflected our own views, focusing on what they would want to promote in the future,” “political theorizing in a sense,” but “grounded in people’s specific experiences and identities” (Gaver and Bowers, 2012).

Davies and Talbot (1987) stressed the importance of RDI designers’ careers to understanding how and why they form and accept the ideas that become the “right” ones, and how they draw on a range of themes such as public/private en route (Cockton, 2020a, Section 2.1.4). Subjective personal perspectives should never be excluded in principle, especially in co-design contexts where participants can be new to design work. Only right ideas come with risks, but designers spend much time testing and challenging before committing to them (Darke, 1979; Davies and Talbot, 1987). However, initial transcendence of client dreams may not be grounded in user research, but in the vision, empathy, and receptiveness of the design team. Generous design goes beyond evidenced needs.
Creative designers augment published secondary lists of values, etc., with their own experience. Le Dantec et al. (2009) discussed their own research experiences with a values focus in design and then collated a list that did not match that of Friedman et al. (2006). Unsurprisingly, “many of the values that were expressed locally in each of our case studies can be connected to one or more of the values of ethical import,” but not in a value-norm hierarchy as in van de Poel (2013). However, additional values were important in their case studies, e.g., pride, durability, justice, being knowledgeable, being normal, independence, identity control, and staying connected. These arose in specific project locales, i.e., technology for the homeless, acceptable RFID use in ubicomp, and domestic technology. The values in Le Dantec et al. (2009) added to the secondary literature.

Lists from secondary research clearly have limitations. The well-grounded critical reflection of Le Dantec et al. (2009) reminds us of the need for teams to be aware of their past practices and to draw on these judiciously as resources. Le Dantec et al. also argue for appropriate empirical research, which we will turn to next after considering a “discount” approach to concepts for design purpose.

I developed a resource (Cockton, 2009b) that acknowledges a need for simplicity when time or other resources such as budget are short and there is not time for involved inception workshops or extensive research on beneficiaries. Such resource gaps introduce major risks, which can be mitigated to some extent with appropriate activities.

The starting point for a quick approach is a locale where an envisaged digital product will be used. Webs of worth spin out from co-located anficiaries who experience the locale differently. Such worth webs locate anficiaries in overlapping contexts of individual and collective (de)motivators. A very simple approach to individual motivation is taken by adopting Alderfer’s (1972) motivational categories of Existence, Relatedness, and Growth (ERG). Collective motivation is addressed as IKK social structures: institutions, kin (family), and kind (community). Relatedness links individual to collective worth, as do Locales (L), multiple places in a single space.

The resulting L-ERG-IKK (Locales for Existence, Relatedness, and Growth, and Institutions, Kin, and Kind) framework (Cockton, 2009b, for those allergic to theory!) relates places and social structures to individual needs and wants. A third dimension of Mind–Body–Spirit was subsequently added as a further inquisitive resource for thinking about possible purpose. While many will take issue with a Mind–Body dualism, and others with adding Spirit too, these common sensemaking categories extend the range of individual and collective (de)motivators considered for design purpose beyond more focused concepts such as Bourdieu’s field as used by Dorst (2015).

Figure 2.1 shows this extended L-ERG-IKK+ model as a Rubik’s Cube. L-ERG-IKK+ is primarily an inquisitive resource with an ameliorative focus. It is adumbrative as it effectively begins, critiques, or extends the scope of design purpose. It is barely informative, doing little more than foreground worth web locales that relate minds, bodies, spirits, and associated existence and growth needs to relatedness needs in the context of families (kin), communities (kind), and institutions. It is important to relate individuals to the intersecting biological and societal contexts that make then unique.
A commonsense view of institutions is taken of them as formal organisations, rather than adopting New Institutionalism and its blurring of boundaries (Meyer and Rowan, 1977). This is not to deny that marriage is an institution in one sense, nor that institutions as cultural practices underpin communities: both kin and kind have institutionalized aspects to them (North, 1991) as formal rules (constitutions, laws, property rights) and informal restraints (sanctions, taboos, customs, traditions, codes of conduct). While as social structures, kin, kind, and institutions all have things in common, there are also important differences between them.

Conceptual blurring in L-ERG-IKK+'s does not impact its main inquisitive function, since its superficial (and somewhat fraught) “information” rapidly transitions into questions structured around the axes and their intersections. Each of the 27 cells is essentially a question to a team, e.g., is “spiritual growth” in “families” a focus for your design? What about maintaining “bodily existence” needs in some “community” context? Creative moves here are not bisociative (Koestler, 1964) but trisociative.

Lists of values, etc., provide more structure and content than L-ERG-IKK+, and are thus better used first in team settings, to avoid a looking at blank sheets of paper for too long. Used once an initial purpose DAN is populated, L-ERG-IKK+ is a compact quick way to scan for gaps, especially ones that can be filled by team knowledge. L-ERG-IKK+ can be used during project inception and at reflective points at the end of design episodes.

2.3.3 PRIMARY RESEARCH RESOURCES AND APPROACHES

Secondary research and reflective resources are relatively low cost, but with risks that can be addressed by primary research. Formative evaluation of prototype use is one way to do this and can become summative in Lean UX experiments with Minimal Viable Products (MVPs; Gothelf with Seiden, 2013). The latter evaluations are used to test assumptions about purpose and whether an
MVP can deliver it. Where assumptions prove to be mistaken, primary “just-in-time” research can improve understandings of anyficiaries. In ISO 9241-210 (ISO, 2019), all research underpinning user requirements must be completed before design begins. However, this can only hold for the first release of a digital product or service, as from that point there is always a fielded system in use. Lean UX’s just in time approach to primary research (Gothelf with Seiden, 2013) is more realistic.

Primary research approaches for design purpose overlap with those for anyficiaries. The main difference is their outputs. For design purpose, only benefits, costs, and risks are of interest, expressed at relatively high levels of abstraction. Other important aspects of beneficiaries or maleficiaries are left for the anyficiaries arena. These can be very concrete and make or break a design, but even so they are not strategic as a focus for design purpose.

<table>
<thead>
<tr>
<th>PEOPLE: A Happy Family</th>
<th>PLACE: A Nice Home</th>
<th>OBJECTS: Treasures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manifest identities</td>
<td>Newly less cluttered</td>
<td>Treasures sold/passed on</td>
</tr>
<tr>
<td>Increased family empathy</td>
<td>Nurturing: somewhere you want to be</td>
<td>Protected heirlooms</td>
</tr>
<tr>
<td>New shared times as a family</td>
<td>Living family heritage: a past you want to revisit</td>
<td>Well displayed</td>
</tr>
<tr>
<td>Manifest status for external social standing</td>
<td>Enviable: somewhere others want to be</td>
<td>Materialisation with enhancements</td>
</tr>
<tr>
<td>Stronger family past</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stewardship obligations discharged</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stronger roots in past</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Achievement of closure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New pride in improved organisation, enhanced</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caring for each other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A wide range of empirical research approaches can be used to fill design arenas with evidence as well as concepts. For the Family Archive programme at Microsoft Research Cambridge (Cockton et al., 2009a), a draft report of ethnographic research (published later as Kirk and Sellen, 2010) was used to identify values relevant to a family’s archiving of physical and digital possessions. A list of values was assembled, used, and revised in workshops. This was then collaboratively triangulated against a large corpus of field photographs of possessions in people’s homes taken by the
field researcher. No revisions were required to Table 2.1, and many photos evidenced each manifested value. As with culture, values can only manifest themselves through people (words, deeds), places, and things. Toward the end of my role in the Family Archive research, a list of candidate values was organised into a table using these three categories. Table 2.1 shows ten values that would manifest themselves in people, and four each for values that would manifest themselves in changes to a home or to the precious objects within it. Many of these values remained in scope for family communication research at Microsoft Research Cambridge for several years.

Table 2.1’s header is a basis for a Design Arena Frame (DAF) (Cockton, 2020a, Section 5.3): *A Happy Family in a Nice Home with Treasured Objects*. The values in the three lists are sufficient as basic DAN (Cockton, 2020a, Section 5.4) for design purpose, organised into three subarenas: people, place, and objects. They can all be marked as interfaces from purpose to evaluation as measures and thresholds can be developed for each. Questionnaires have also been used for research on purpose. In the VALU project (Cockton et al., 2009b), online sentence completion questionnaires were used to interrogate the gambling experiences of two demographically distinct groups. Answers to each question (in Finnish) were grouped by similar meaning for each group. Table 2.1 shows histograms of responses for each group. Two collaborative workshops later grouped responses into values for design purpose that abstracted over users’ responses (Chapter 5). For commercial reasons, these were not published (a few can be seen in Chapter 5), but as above, they are a basis for a DAF and DAN for purpose.

Primary research methods need to fit project cultures. Ethnography was used with a research group that was primarily qualitative in the research underpinning (Table 2.1). Sentence completion was used for an online gambling organisation that strongly preferred quantitative research, hence the histograms in Figure 2.1 and subsequent analyses and uses of quantitative data.

Laddering interviews have also been used in values-focused user research. Zaman and Abeele (2010) used laddering to explore young children’s game preferences. In a laddering interview, respondents are asked *why?* questions, with the answer to one question forming the focus for a subsequent one. This moves the respondent from a focus on attributes (here game features and qualities) to usage experiences and onto values (with specific prompting if required). In Zaman and Abeele’s study, questions did not proceed beyond the consequences of playing different games for children. These are a basis for researcher generalisations to values if this is appropriate (as in collaborative generalisations from sentence completion in the VALU project). Laddering here was not used as part of a research through design project, but as with sentence completion, it can provide axiological data below the level of values that can inform the formation of design purpose.
Similarly, Le Dantec et al. (2009) used interviews in their design research. Their retrospective analyses revealed gaps and overlaps between Friedman et al.’s (2006) values and the espoused values in their interviews. Even so, there were overlaps with VSD’s human values of ethical import.

Secondary and primary research can be combined. It is not an either/or situation. Secondary and personal resources can seed initial thinking for an arena and support subsequent reflection points. Also, what is primary research for one project becomes secondary for future ones, as with Table 2.1.

### 2.3.4 EXPRESSIVE RESOURCES

The resources for design purpose above are mostly ameliorative, adumbrative, informative, and inquisitive, with possible reflective and deliberative functions, and some suggestions for directive procedures. The lists of values, when printed on a double-sided sheet of paper, are also given an expressive function as inputs to work within the purpose arena. Alternatives forms to plain printed text include cards such as the HuValue tool (Kheirandish et al., 2019) and Envisioning Cards (www.envisioningcards.com/; Friedman and Hendry, 2012).

The outputs of design purpose activities can also be expressed visually, perhaps sharing the mental imagery behind design ideas (Davies and Talbot, 1987). Visual resources are also well suited...
to co-design and early evaluation activities. In 2015, I taught BIG Wo-Fo approaches to Industrial Design Master's students at the Technical University of Eindhoven. One approach that I outlined was to express intended worth using adverts to communicate intended purpose. One group created a brand (We Luisteren—We Listen) that integrated across three arenas. Four posters were designed to communicate a mix of artefact features and usage outcomes (Figure 2.3).

These four posters were the main outcome of a one-week design project where these students also chose to use: an early form of PADS (Proportional Abstract Design Situations) based on Keller’s (2005) research process visualisation; stakeholder research; paper prototyping; high fidelity wireframes; worth mapping (see Chapter 4); and formative evaluations of the prototypes and posters.

The value groups guiding the We Luisteren concept were openness, helping others, community and feeling heard, grouping values as follows.

- **Openness**: Sincerity/Trust/Cooperation/Truth/Seeing consequences of actions/Control
- **Helping others**: Altruism/Service/Caring
- **Community**: Sense of Belonging/Cooperation
- **Feeling heard**: Recognition/Reflection/React/Equality/Acceptance/Making a Difference/Power/Control

The student groups were given Kahle’s and the CNVC lists of values on the third day of teaching, as well as Herzberg’s motivators and hygiene factors. Only six of the above 15 values are in one of those lists (all from the largest, CNVC), demonstrating the value of personal knowledge and group deliberation in scoping purpose. There is repetition (Control) and poor wording (“react” is not a value, but responsiveness would be), but there was no evidence of adverse impact.

The posters hint at features of a proposed app, as well as the value that can be delivered. A common advertising structure is in use here, with messages about valuable outcomes supported by points about app features (except the bottom right poster). These posters span express a two-arena concourse (purpose, antefact), unlike the posters prepared by student groups using the HuValue tool (Kheirandish, 2018).

Visual representations of values can have a valuable expressive function. Visual expression was used for the Family Archive (Cockton et al., 2009a), where photos from field work (Kirk and Sellen, 2010) were collaboratively grouped by the values in Table 2.1. The photos were organised into a Powerpoint stack with title slides at the start of each group. Each title was a value from Table 2.1. Collage versions of this stack were proposed as “worth boards,” replacing the visual and branding elements of “mood boards” in creative design with strategic purpose elements.
Figure 2.3: Four Wo-Fo student posters (Manon Barendse, Nicky Liebregts, Danielle Smits, and Rachel van Berlo).
Textual and visual representations are thus expressive resources for inputs to, and outputs from, design purpose activities. While design and evaluation methods have tended to only have been communicated textually, visual representations are being used more. For example, approaches associated with the Value Proposition Canvas (Osterwalder et al., 2014) have rich visual representations, with the last author (Trish Papadakos) designing their presentation.

2.4 EXPERIENCES, OUTCOMES, AND THE BALANCE OF WORTH

The previous section focused on worthwhile outcomes, which complement worthwhile usage experiences. HCD has mostly focused on quality in use and fit to context (Cockton, 2004a, 2004b), which has been, and remains, very valuable. The overall worth of an interactive digital product is its balance of worthwhile experiences and outcomes (Cockton, 2008c). User experience varies in its contribution to what makes an interactive product worthwhile. For some applications, for example games or media players, user experience can be a major determinant of worth. For others, such as productivity software for office work or applications for creative professionals, outcomes outweigh experience. There should be an appropriate balance of worthwhile transient UX and lasting outcomes: positive outcomes can outweigh, or compensate for, some negative UX; similarly, worthwhile experiences may compensate for less worthwhile outcomes.

Experience values tend to be instrumental, while outcome values tend to be terminal (Rokeach, 1973). HCI research has looked at experience values more than outcome ones, but with diverse terms, e.g., experiential qualities (Löwgren, 2013) or interactivity attributes, with a preliminary set of seven dimensions to express the quality of interaction (Lim et al., 2011): concurrency, continuity, predictability, movement range, movement speed, approximativity, and responsivity. These apply to low-level interaction rather than affective experience, which is associated with much larger sets of attributes that can provide a basis for evaluation questionnaires. They can be positive or negative in specific contexts. A mix of valences may be sought for experience values. For example, Gaver’s (2011) Prayer Device concept mixed intimacy and potential discomfort.

Hassenzahl (2004) developed four scales to evaluate user experience: two for hedonic quality (identification and stimulation); one for pragmatic quality; and one for evaluational constructs. The latter has two scales (ugly-beautiful and bad-good), and the others have seven, for example: complicated-simple (pragmatic quality); easy-challenging (hedonic quality-stimulation); and gaudy-classy (hedonic quality-identification). This formed the basis for the 28 scales of the Attrakdiff questionnaire, but translation into other languages cannot keep all scales distinct. For example, when translated to Icelandic, only 27 of the scales could be used (Ísleifsdóttir and Lárusdóttir, 2008). Even when axiological vocabularies do not need to be translated, wording can bring challenges. One way
to maintain consensus and understanding in design teams is to use aliases (i.e., using synonyms for benefits, costs, and risks), until the interface from purpose to evaluation forces convergence.

Even with 28 scales, Attrakdiff is relatively concise. The Microsoft Desirability Toolkit (or Product Reaction Cards; Benedek and Milner, 2002) has 118 cards bearing single words or phrases that users can select to indicate how they feel when using a product. Examples include: stressful, gets in the way, patronizing, time-consuming, intimidating, inviting, confusing, sophisticated, frustrating, fun, and exciting. One hundred and eighteen may seem a lot to some, but they can be used quickly in evaluations with users.

Experience vocabularies are large. For example, dozens of values relevant to architectural design can be found in even a very short introductory text (Ballantyne, 2002).

- Privacy, serenity, anchor point, landmark, nationhood, show, extravagance, exuberance, pomp, civilisation, craft, beauty, mass, proportion, austerity, mystery, awe, magnificence, glamour, familiarity, visibility, atmosphere, originality, novelty, generosity, simplicity, openness, harmony, lavish, escapist, cultivated, hopeful, stable, authoritative, confrontational, challenging, ingratiating, dominating, comfortable, reverent, optimistic, theatrical, and cosmopolitan.

As noted above, axiological values for outcomes have even larger vocabularies: a search engine can currently indicate over 175 million hits for “lists of needs and wants” and over a billion for “lists of human values.” We should avoid making assumptions about how many is too many. If you highlight all of the adjectives in reviews and adverts in a selection of car, fashion, or interior design magazines, you will soon reach 1,000 valenced words that may be relevant to Interaction Design. Reviewers and designers share these vocabularies. Creative designers routinely work with repertoires of hundreds of values for design purpose. Imagine design magazines that never use more than a few dozen valenced words and you will be imagining boring, unimaginative, mean, and repetitive publications that cannot communicate the qualities of designs to engaged audiences.

### 2.5 CHAPTER SUMMARY

BIG Design promotes Balance, Integration, and Generosity for all design activities. It is almost wholly agnostic about preferred research approaches, other than requiring equal respect in principle for primary research, secondary research, and personal knowledge and experiences. Generosity is not possible without personal ideas and insights from design teams. Generosity involves going beyond stated or discovered requirements with strategic vision from designers “certainty of knowledge of something worthwhile” (Darke, 1979).

Balance and integration will combine generous purpose with appropriate work in other design arenas. A balance of experiences and outcomes and disciplines and sources is needed. Within each,
further balance is needed, e.g., between individual and collective worth, across physical and mental phenomena, across stakeholder groups and social contexts, and across past, present, and future.

As Richard Banks noted early during the Family Archive project, ideas can come from anywhere. Few become “the right idea” or contribute directly to it, but the fortunes of any idea or insight in design are not known until integration crowns the right idea. Balance must be maintained until integration work prunes design arenas back to the insights and ideas that drive the successful design forward.

The best design combines innovative vision, creative craft excellence, and well-judged research and evaluation. HCI has focused on research excellence (not always well judged), with more recent acknowledgements of the importance of creative excellence. Strategic vision received less attention until the emergence of Lean UX (Gothelf with Seiden, 2013), although at least one IxD book at the start of the dotcom boom did address strategy (Mok, 1996).

There is much talk of value in agile software development (Beck et al., 2001), but little practical support for making it a design focus (Cockton, 2016a). Explicit informed Wo-Fo approaches fill this gap. We are just moving beyond the early stages of developing an understanding of purpose for IxD that is compatible with human-focused practices. There is still much to learn from the business world (e.g., Osterwalder et al., 2014; Kalbach, 2019), but little can be imported directly without adaptation.

Work on design purpose is largely about Darke’s (1979) “fill[ing] boxes with concepts.” The importance of this should not be underestimated. Data from contextual research and evaluations may be seen as more substantial, as may concrete craft work on apps, websites, appliances, kiosks and other IxD artefacts. However, with no clear sense of purpose, it is hard to plan evaluations and contextual research, and to weigh up artefact design alternatives. A focus on worth can direct focus in other arenas, which we consider next.
CHAPTER 3

Mixing Balance at All Scopes of Design

Design purpose is the most abstract design arena. In the other arenas, design teams interact “intimately with the concrete elements of the situation” (Carroll, 2000).

Chapter 2 covered Wo-Fo approaches and resources for filling out the purpose arena. This chapter takes a more general approach to the other arenas, since there are very extensive research and professional literatures on IxD and interactive technologies (a_tefacts arena) and on HCD (evaluation and anyficiaries arenas). These cannot be properly reviewed in the space available here to add much of consequence. The synthesis series on HCI, of which this book is part, provides many useful overviews of HCI, HCD, UX, and IxD approaches. This chapter augments these and other texts with additional BIG considerations for studying anyficiaries, and designing, developing, and evaluating interactive digital products. The main focus is on the complexity of balance in design work. This has largely been considered so far as balance of disciplines, qualities, perspectives, design arenas, and connections, of interfaces within design arenas, and of experiences and outcomes for the purpose arena. As we consider design work below the level of design arenas, complexity increases substantially, adding concerns over balance of approaches, resources, functions, sources, voices, power, forms, and content. These are considered as they arise below.

Balance in BIG Design is not measured by scales of justice, but by sliders on a sound mixer. A good balance is a good mix. Design work is like sound mixing in that at any time a slider can be pushed up (through more work) or down (though less work or by setting aside). Design work sliders operate at all scopes from major design paradigms through organisational palettes, playbooks, projects, episodes, activities, approaches, and resources down to single design moves. The current mix for any unit of design work can be appropriate or adverse. With apt tracking resources, reflection and deliberation, adverse balances can be spotted and addressed, and favourable ones celebrated.

In Chapter 4 (Cockton, 2020a), we focused on major design paradigms and design arenas, and in Chapter 5 (Cockton, 2020a) on progression, projects, episodes, connections, and interfaces. We now focus on balance:

• of design arenas in projects;

• within design arenas (approaches, resources, power); and

• within approaches and resources (functions, qualities, disciplines, content, sources, voices, forms, design arena scope).
The pervasiveness of Abstract Design Situation (ADS) structures across all scopes of design activities involves design arenas from the most abstract to the most concrete:

- major paradigms (Cockton, 2020a, Chapter 4);
- organisations’ Strategic Design: playbooks, palettes, and processes (Chapters 5, Cockton, 2020a; Chapter 1–4);
- projects as a Sequence of MADS (SoMADS; Cockton, 2020a, Chapter 5);
- episodes (Cockton, 2020a, Chapter 5); and
- approaches and resources (Section 1.1).

Even design moves of several minutes or less have an ADS, which is a key part of a common theoretical basis for design work at all scopes: the Working to Choose (W2C) framework (Cockton, 2013b). W2C takes its name from the work needed to make design choices. Design options rarely come ready made. Design teams have to work to develop, commit to, make credible, and express options. Choices are more often made tacitly. For some time, there may be no favoured option, but as connections build and strengthen, options are side-lined by a Darwinian survivor, THE right idea (Davies and Talbot, 1987). If a fittest survivor weakens, side-lined options come back into play.

W2C systematically relates ADS to design work via: Meta-Principles for Designing (M-P4D; Cockton, 2009a), and a resources model of method use in design (Woolrych et al., 2011). W2C has a tongue in cheek formula (Cockton, 2012):

\[
W2C = ADS + M-P4D + A/R
\]

\[
Working to Choose = Abstract Design Situations + Meta-Principles for Designing
\]

\[
+ Approaches divided into Resources
\]

Meta-Principles for Designing co-evolved alongside Heskett’s different choices of alternatives (a.k.a design arenas). Existing sets of IxD principles were not comprehensive. Four example sets focused on different arenas: artefacts (Direct Manipulation principles; Shneiderman, 1983); anyficiaries (Dourish, 2001); anyficiaries and evaluation (Gould and Lewis, 1985); or anyficiaries and affected in creative design contexts (Brown, 2009). Different disciplines underpinned each: design (Shneiderman, 1983; Brown, 2009), applied psychology (Gould and Lewis, 1985), and phenomenological social theory (Dourish, 2001).

A set of meta-principles was derived to cover all design arenas and more disciplines. In contrast to principle sets derived from a posteriori disciplinary analyses, four meta-principles were derived a priori using basic concepts from Choice Theory (Allingham, 2002). The first was receptiveness (Cockton, 2009a), which was implied by Heskett’s (2005) choices from alternatives. Design teams must be receptive to possible options across arenas. However, only some options will converge into