New Process, New Vocabulary: Axiofact = A_tefact + Memoranda

Gilbert Cockton
School of Design
Northumbria University
Newcastle upon Tyne
NE1 8ST, UK
Gilbert.Cockton@northumbria.ac.uk

CHI'17 Extended Abstracts, May 06 - 11, 2017, Denver, CO, USA

ACM 978-1-4503-4656-6/17/05…$15.00
DOI: http://dx.doi.org/10.1145/3027063.3052755.

Abstract
Rational idealized linear engineering design (RILED) models, with homogeneous work stages, still underpin much HCI research and practice. Human-centred activities dominate stages corresponding to engineering's problem analysis and validation/ verification, while other work stages receive less attention (e.g., requirements specification, progressive detailing of design). This juried alt.chi paper argues for parallel design work with heterogeneous episodes that can be design-led, human-centred, strategy-driven or evaluation-based, or a mix of some or all of these. To support this. it motivates and develops a vocabulary to replace RILED's lexicon of stage, iteration, problem, solution, implications, requirements, and validity.

Author Keywords
Engineering Design; Creative Design; BIG Design; Design Arenas; Abstract Design Situations.

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Introduction: Propaganda for Proper HCI
Interaction Design (IxD) must be agile and solve the most wicked societal problems. Time is short, but intractable problems abound. We must work much

1. As this is alt.chi

The introduction is an extreme account of norms about what design teams *should* do: what they can (or do) do is irrelevant. Norms concern value, not fact.

Rational idealized linear engineering design (RILED) is stubborn, and we should all know better. Indeed, almost all of us in HCI and IxD do think that we do know better, which is most probably true in principle. The problems lie in practice, or rather in practices, and especially ones that reproduce and maintain RILED discourses. There is a rhetoric here that is very resistant to the facts of creative design work.

In the best of alt.chi's traditions of controversy and challenging the status quo, this paper explores how HCI can abandon unrealistic and even harmful idealized practices and the language that promotes them.

Box 1

faster to achieve much more: costs must drop while benefits must rise. We must do more with less.

Continual competitive innovation however is not the only discourse in town for HCI. We must also be rigorous and reliable. We must ensure complete usability, positive user experience, business value and many more positive design outcomes. To do this, we must have a disciplined repeatable well managed development process. For user-centred design (UCD), HCI's dominant discourse, we require resources for thorough user research and rigorous usage evaluation.

We must ground value in facts: about stakeholders' wants and needs; and their problems and difficulties. These must be real, known in advance and the only bases for design requirements. We must then demonstrate value through facts about positive user experiences, and about positive usage outcomes for stakeholders. These must be satisfy real needs and wants and completely eliminate real problems, demonstrated through criteria for design success, with all evaluation methods fully planned in advance.

IxD must be systematically rational and evidence-based, solving problems that no-one fully understands using only the resources made available. It must deliver on time, within budget and to specification, through perfect planning: we need to know exactly what to do and when, from the outset. We need to know everything that we need to know before we start to design anything. Best of all, by adhering to rational, objective and evidenced standards of design conduct, there is no need for any creativity, which as we all know can be very risky. Creative ideas are such dangerous risky things.

This uncritical opening credulous orthodoxy (see Box 1 opposite) sets the scene for a critique of misplaced ideals that are inimical to design excellence. In complying with the above rhetoric, we end up, Janus-faced, as scientists in Latour's studies [13]: looking from one side to understand the uncertainties, provisionality, and contingencies of science-in-the-making; and also, looking from the other to adhere (or be subjected) to the ideals of ready-made science and its methods-to-go routes to absolute eternal truths. We thus end up looking one way to the *ready-made design* of process and method prescription, and the other to the candour and realism of *design-in-the making*.

The facts of design work are well known, as two seminal papers make clear. Our problem is that RILED (Box 1) still holds sway within HCI, and thus two seminal papers from outside of Interaction Design, one from Planning and the other from Product Design, have had limited or mistaken influence in HCI.

Two Seminal Papers Little Known to HCI

In 1973, *Dilemmas in a General Theory of Planning* [14] reflected on planning, a design discipline that has long been participatory and politically fraught. This paper's influence is evidenced by over 10,400 citations in its original and republished form (14/2/17). In it, Rittel and Webber rejected the universal applicability of a RILED process that analyses problems, defines them, specifies requirements, and then derives, refines and validates solutions. Such a 'relay' process only works for *tame problems* that are already well understood, and where alternative solution options already exist. Other problems are *wicked*, and need a different design process. Box 2 (over) shows the distinguishing characteristics of wicked problems.

2. Conklin's Characteristics of Wicked Problems [6]

Rittel and Webber argued for distinguishing properties of "planning-type problems" [14], which Conklin later distilled and filtered down to six characteristics [6]:

1. You don't understand the problem until you have developed a solution.
2. Wicked problems have no stopping rule
3. Solutions to wicked problems are not right or wrong.
4. Every wicked problem is essentially novel and unique.
5. Every solution to a wicked problem is a 'one-shot operation'.
6. Wicked problems have no given alternative solutions

The above correspond in order to Rittel and Weber's properties except their 4th [14] on the lack of tests for solutions to wicked problems. Conklin's 4th characteristic is the 7th property in [14].

Box 2

Over a decade later, Takeuchi and Nonaka developed a similar position for product design and development, with a popular accessible publication [15] (over 2,300 citations on 14/2/17, with almost 32,200 citations for their prior book *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation)*. In [15], RILED's relay was replaced by a rugby scrum, bound together and driving in the same direction. It is this paper that has indirectly impacted HCI through the Scrum software development methodology [5]. This predominant agile methodology rejected RILED's big up front activities of problem analysis and definition, monolithic requirements specification, and conceptual design. This removed the opportunity for lengthy preliminary user-centred research into anticipated contexts of use. Resources for adequate usage evaluation were also obstructed by the rapid sprint cycle. The indirect impact of [15] on UCD via Scrum has thus largely been negative.

HCI has taken little notice of both these seminal papers. Their impact was indirect. For Takeuchi and Nonaka's *The new new product development game* [15] impact was via Scrum and thus partial. Many valuable insights into concurrent product development and associated organizational learning were lost in Scrum's selective exploitation of [15].

Scrum did help software engineering to lose much of the Janus-face that inevitably follows allegiance to RILED. More generally, the agile development movement (Agile) [5] has rejected the myths of ready-made project planning and the use of requirements to rigidly and irrevocably separate problems from solutions until the grim reaper of validation is invited to pass judgement. However, Latour's Janus-face is not yet fully lost, as Agile preserves some RILED norms (Box 3 over), but it also offers an opportunity to drop the last vestiges of HCI's Janus-face.

Similarly, awareness and acceptance of wicked problems in HCI and IxD has also been partial and indirect via the increasing contribution of design research and practice (and only when RILED is ignored). At best, an understanding of wicked problems has opened HCI to more creative IxD practices. At worst, wicked problems are regularly misunderstood, especially by those youthful idealist designers with critical, speculative or disruptive orientations who proclaim a noble aim to solve some wicked problem. However, the very nature of wicked problems is that they cannot be solved. Confusion here is understandable, since typically problems can (1) be stated in advance (2) in ways that let solutions be verified and/or validated (neither are true of wicked problems by respectively the 1st and 4th characteristics in Box 2: they are only true of 'tame' problems).

The biggest problem with wicked problems is that they are not problems in the way that tame ones are. Also, 'wild' and not 'wicked' is the opposite of 'tame'. A 'wild' problem is like a mustang (horse, not car), which needs to be ridden to tame it, but like any mustang, there is always a risk of a complacent rider being thrown off at any time. However, misunderstandings in HCI and IxD have domesticated 'wild' Wicked Problems.

The true nature of wicked problems can be easily misunderstood because Rittel and Webber stayed within the language of the discourse that they tried to escape. 'Problems' and 'solutions' are core constructs in the normative discourse of engineering design, which in

3. Unpacking RILED norms

RILED norms are:

- *Idealized*: valuing myths over realities
- *Rationalist*: systematically and objectively argued and derived through some logical form
- *Linear:* following a systematic sequence of activities amenable to rational defence

It is important to distinguish Latour's two Janus faces here [13]. Actual situated 'wild' engineering design carried out by humans corresponds to Latour's *science in the making* with all its uncertainties, provisionality, and contingencies. 'Wild' engineering design is creative work and closely resembles traditional design practices. RILED corresponds to Latour's *ready-made science*, with its certainties, absolutes and uniformity. Only 'tame' routine engineering design can show ready-made characteristics.

Box 3

turn intersects considerably with the normative discourse of ready-made science: problems correspond to phenomena of interest, requirements to hypotheses, and solutions to results.

Houston, You Have a Problem and We Caught It Off You

Despite their separate design domains of planning and products, Takeuchi and Nanaka and also Rittel and Webber 'blame' NASA for RILED norms: directly, with their phased program planning (PPP) system; and indirectly through the planning-programming-budgeting system (PPBS). RILED norms, for both planning and engineering design, are clear in PPBS and PPP.

Now, planning, products and space programmes may appear to have little in common, just as the relevance of all of this to Interaction Design may also be questioned. However, design is not a set of disjoint silos and there are commonalities across all design domains. Indeed, it was such similarities that allowed some transfer of leading edge product design principles to Software Design (both Scrum and Lean have their roots in Japanese design for manufacturing).

UCD's first and enduring methodology [9] laid a cuckoo in RILED's nest. The realities of what designers (most loosely construed) actually did was to be subordinated to RILED norms. No design would begin until users and tasks were understood through human science research practices [9]. No design would judged adequate through empirical measurement (again, presumably using human science research practices, but no examples were given in [9]). UCD thus colonized problem analysis and verification/validation, but left other development stages to existing software engineering practices for requirements, design and development. Effectively, there was no D in UCD. This became the basis for the ISO UCD process [11] and its four stages (Box 4 over) that restrict development work to one form of activity, unlike the parallel methodology advocated in [15] (but effectively outlawed by Scrum's closed window rule that bans changes to requirements during sprints [5]). Scrum has not embraced the parallel heterogeneous work that Takeuchi and Nonaka saw as essential to effective product innovation.

HCI's younger generation may argue that Gould and Lewis [9] and ISO UCD standards (2012!) are all in the past now, and that we now not only all understand the realities of creative design, but have also abandoned linear design processes. This is not the case in software engineering, where under a veneer of Agile mantras, linear practices persist, but nor is it so in some contemporary design thinking practices such as Google Ventures Sprints [12], which do not depart extensively from a linear development sequence (Box 4), although they are more design-led than [11].

Overall, HCI and IxD remain Janus-faced, but with the balance swinging from ready-made design (RILED) to design-in-the-making. We continue to draw (upon) squiggly lines of what designing 'really is' (Figure 1) when presenting a more didactically friendly linear rational process with homogeneous stages.

Rather than partially play Takeuchi and Nonaka's *new new product development game* [15] (as Scrum does [3]), we need not only to parallelize development, but also be clear on what should happen in parallel. We cannot assume that UCD development stages can simply be delinearised for coordination in parallel.

4. ISO 9241-210 and Google Ventures Sprint

ISO UCD standards have four development stages:

- Understand and specify the context of use
- Specify the user requirements
- Produce design solutions to meet user requirements
- Evaluate the designs against the requirements

These four phases are iterated until project completion, originally all in the same order each time, but the most recent version of the standard [11] allows iteration from evaluation to any previous stage.

In the spirit of Agile, a Google Ventures one week sprint [9] replaces requirements with sketching followed by selection of a 'winner'

- Map
- Sketch
- Decide
- Prototype
- Test

Box 4

Figure 1: What Design is really like (Monochrome Miro Remix)

Looking to Creative Design

If creative design does have a Janus-face, it is unlike Latour's for Science [13]. It knowingly fails to meet RILED ready-made norms. Creative design is always design-in-the-making, but clients often feel more secure with some semblance of ready-made design. This can be provided as part of client management, but it does not warp designers' self-identity.

From Heskett's outcomes to Design Arenas

We must put ready-made RILED to one side and look to Creative Design for un-RILED elements and qualities. In considering which forms of design activity may happen in parallel, we can look to John Heskett's four sources of creative design outcomes in his introductory overview on design [10]:

> The forms and structures of the immediate world we inhabit are overwhelmingly the outcome of human design. ... The human factor is present in decisions taken at all levels in design. ... Choice implies alternatives in *how ends can be achieved*, for what *purposes*, and *for whose advantage*. ... also... by what means we can *evaluate* their effect or benefit. [*emphases* added]

Four sources of design outcomes arise from choices of:

- Purposes (or ends)
- How ends can be achieved (i.e., means)
- For whose advantage (i.e., beneficiaries)
- Evaluations

These *design arenas* (see Box 5 over) help us to escape the RILED discourse that trapped Rittel and Webber. Instead of problems and solutions, there are logical antecedents and responses, which are constantly in flux, i.e., the logical design antecedents of beneficiaries and purpose, and the designed responses of artefacts and evaluations. An artefact is a response to understandings of beneficiaries and purpose, while evaluations, ideally in the context of beneficiaries and purpose, respond to artefacts. Artefacts are always preceded by some understandings of beneficiaries and purpose (even if these are respectively 'anyone' and 'to make the artefact'). Such interactions between design arenas need to be explored.

Interactions between Design Arenas

RILED logically requires interactions between design arenas to be ones of logical linear dependencies between homogeneous stages, i.e.:

- Beneficiaries entail Purposes for design
- Purposes entail both Artefacts and Evaluations
- Evaluations entail modifications to Artefacts (giving rise to iterative design).

RILED limits iterations to specific sequences of development stages (although not all stages are always be after the first iteration), limiting interactions between design arenas. Alternative bases for such

5. ISO 9241-210 and Design Arenas

The ISO UCD standard [11] development stages can be mapped to Heskett's origins of design outcomes [10] as follows:

- *Beneficiaries*: Understand and specify the context of use
- *Purposes*: Specify the user requirements (ends)
- *Artefacts*: Produce design solutions (means) to meet user requirements
- *Evaluations*: Evaluate the designs against the requirements

In a parallel process however, these cannot be thought of as stages, so we need to express their homogeneity in another way. They can be thought of as *Design Arenas*, i.e., coherent conceptual spaces where distinct forms of knowledge or making practices support distinct aspects of design work.

Box 5

interactions follow from three key characteristics identified by research on creative design practices [3]:

1. co-evolving problem and solution spaces
2. conversations with design materials;
3. generosity.

It is important to stress that antecedents are logical and not temporal. An antecedent may change in response to a response, i.e., understandings of beneficiaries or purpose will *co-evolve* in response to the crafting of artefacts. Such co-evolution results from conversations with design materials [3]. This forms interactions beyond RILED's linear dependencies, making generosity possible, i.e., commitments to design purpose that go (well) beyond any implications for design arising from an initial brief or challenge. Ideas for generous elements of design purpose can arise during the formation of an artefact or during its evaluation. They do not need to correspond to requirement specifications that are logically implied by user research into beneficiary needs and wants.

Generosity is the hallmark of the best creative design [3]. It casts off the RILED shackles by letting design purpose drive design independently of context or requirements. Alongside conversations with design materials and the resulting co-evolution of problem and solution spaces, organic creative development emerges that cannot be preplanned to meet RILED values.

A New Un-RILED Vocabulary

RILED's words are failing us. For example, in a parallel process, it makes no sense to talk of iterative design. If there can be work in any design arena at any time, then design work can be like a rugby scrum, but more often it will be closer to how backs play in rugby, with the ball being passed freely along their line, with long and short passes both ways. However, there is actually more than one ball, and managing this presents new post-centric design challenges when no design arenas are assumed to be dominant (e.g., beneficiaries and evaluations in UCD). We must put aside any notion of a centre, as well as the idea of iteration.

In a new un-RILED vocabulary: a single 'centre' is ousted by multiple foci; sequence by concurrency; and there is no place for simple forms of iteration. This seeds a vocabulary that is compatible with the realities of creative design. RILED's 'problems' and 'solutions' have already been replaced with four design arenas that do not map onto problems or solutions. Artefacts that deliver on design purpose are not solutions to problems, since design purpose need not be specified as problems to be solved. Similarly, beneficiaries are best not thought of as problems, but vital parts of any solution. Also, new artefacts may introduce new problems. Evaluations clearly straddle problem and solution spaces to the extent that they assess how artefact solutions deliver on design purpose.

The goal of design practice is to support delivery of an artefact. The three other design arenas can only have value (design research apart) in relation to their contribution to the quality of the designed artefact. Drawing on Latin, they are *memoranda*, things to be borne in mind. In design research, the discovery of memoranda for future IxD work may be the primary goal, and thus artefacts are means to an end (as a product or service becomes once in actual use). Rather than try to split design arenas into problem and solution spaces, it is more revealing and less confusing to think in terms of artefacts and memoranda.

6. Renaming a Design Arena

The Latin root of *bene-ficiaries* is those for whom *good is done*. However, design work may not be wholly focused on doing good for everyone: there may be *maleficiaries*, those to whom *harm is done*. For example, design against crime in the physical or digital world should not benefit criminals, and instead should harm them. We need a word to span both beneficiaries and maleficiaries. A new word for those for/to whom *anything is done* can be formed: *anyficiaries*. This portmanteau word has a scope beyond those who are deliberately designed for or against, and includes those who have been inadvertently harmed, such as the old, young, disabled or those who are in some other way diverse from some design norm (e.g., face tracking software that only works with Caucasians).

Box 6

We can replace the unhelpful and confusing notions of problems and solutions with a new duo of artefacts and memoranda. The latter do not have implications for (some random unknown) design. They can have *implications for A design*, but such implications must be worked at and out in specific contexts of design work. Direct implications of memoranda are relatively rare. Integration across design arenas can be hard work. As part of replacing the RILED vocabulary, implications need to be replaced with *integrations*.

We can further seed an Un-RILED vocabulary with the names of design arenas as long as these are faithful to creative design practice. Purposes and evaluations are adequately named as design arenas, but beneficiaries and artefacts need to be renamed. Box 6 opposite extends the positive notion of beneficiaries to a more comprehensive neologism of *anyficiaries*.

We also need to rename the artefact design arena. For much of the design process, there may be no concrete artefacts in their target materials (e.g., paper prototypes rather than working software), nor may concrete artefacts in the target materials be the final deliverable. Recognizing how the naming of wicked problems traps us within RILED discourses, we also must avoid confusion over different versions and manifestations of artefacts by refining our vocabulary.

The Latin root of *artefact* is the thing that has been *made by some art*, the final version of a released product, service or research object. All prior versions, in whatever material form, are *antefacts*: no final artefact has yet been made. For much of a design process, there will only be *antefacts*. Just as for wicked problems, you don't understand the problem until you have developed a solution, so you don't have an artefact until you move beyond antefacts. However, there is still a design arena active before a penultimate antefact becomes a final artefact. As with anyficiaries, we need a comprehensive neologism, but this time we leverage typography to create *a_tefacts* (pronounced *ahtefacts* much as we pronounce Ms. relative to Mrs.)

Integration between Design Arenas

To further extend our Un-RILED vocabulary, we need to consider how design arenas are integrated. There can be no assumption of *downstream utility* or implications for design from RILED's sequence logic, where work carried out earlier in a process is expected to direct and guide work carried out later. Agile was in part a reaction to the waste of many upfront software development activities that clearly had disappointing downstream utility [5].

Agile processes are becoming less RILED (Box 7 over). Lean UX [8] has developed effective strategies here for 'just-in-time' work in the anyficiaries and evaluation arenas. A_tefacts can be progressed using design-led activities, but this inevitably generates assumptions and conjectures that need to be researched, either through testing a prototype (evaluation) or through focused contextual studies (anyficiaries). Integration here is sequential rather than concurrent, but orthodox RILED sequences are not fully followed (Box 7). Even so, a more dramatic break from RILED is needed.

With one or more design arenas active in a 'phase' of design work, it may be more appropriate to think of design as drama, with 'acts' instead of phases or stages. There is much reconceptualization to do, and we need to think creatively about appropriate

7. A little less RILED

In Google Venture Sprints [12] a challenge (purpose arena) precedes mapping (anyficiaries arena). Having purpose in place from the outset also allows requirements to be bypassed with a move directly from insights (mapping) to sketching and deciding. This results in rapid progression through the a_tefact design arena.

Lean UX [8] uses prototypes or minimal viable products (MVPs) to shift speculative (wasteful) work from the anyficiaries arena (when nothing's been designed, what should we research?) to an integrated (productive) evaluation arena: is this MVP delivering on purpose for beneficiaries, and if not what is wrong: the artefact, our design purpose or our evaluation benchmarks or approach? 'De-ril-ing' here involves problem analysis work within evaluation.

Box 7

metaphors and analogies. However, several 'scenes' (activities specific to design arenas) may be running concurrently, as in an episode of a soap opera, so 'episode' may be a more suitable term than *'act'* for a coherent well bounded segment of design work.

Episodes differ in the *balance* of activities within specific design arenas and in the *integration* across them. RILED's ready-made design takes care of balance through sequence and iteration, and of integration through the downstream utility of implications for design. In post-centric concurrent design work, balance and integration cannot be left to the hidden hand of the process. Both need to be explicitly worked at, with new approaches and resources to support such work.

Balance

There is no single correct balance between design arenas. While purpose can be the keystone arena, it may take up a relatively low proportion of design time. Every project is different. Design teams may develop preferred processes with specific balances overall, but the balance of design arenas will change across different development episodes, both in terms of what is intentionally planned and what actually happens.

It helps to be able to see balance and integration during design work at different levels of detail. Simple visualisations support monitoring and adjustment. These can be based on the concept of an *Abstract Design Situation* [2], expressed at different levels of abstraction [7]. For the Most Abstract Design Situation (MADS [7]), only the presence of design arenas and their interconnections are shown. UCD as a RILED process has a different MADS for each stage, with only one active design arena and an incoming and outgoing integration link. In contrast, an example evaluation based concurrent episode (Figure 2) is more complex.

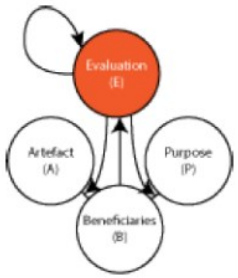

Figure 2: Example MADS [7] involving all four design arenas and several integrating links

A first level of detail can be introduced by using sizes (e.g., of circles) to show the relative balance of each design arena. Such Proportionate Abstract Design Situations (PADS) were used to track anticipated and actual design work across phases of a large design research project [7] (Figure 3).

Figure 3: Example PADS comparing anticipated active design arenas at start of a design activity and actual findings at the end [7]

PADS were also used effectively in a one week design sprint by Professional Doctorate students, with student design teams adjusting balance on a daily basis. One student reflected at the end of the week:

8. Integration Resources

MADS indicate integration as connections between design arenas. More detailed worth-focused resources such as worth sketches, maps and tables [7] improve integration between a_tefacts and purpose, and can be extended to integrate with beneficiaries and evaluations. [7] integrated evaluation and purpose through target and measurement strategies. Established UCD resources (e.g., personas and scenarios [1]), as well as agile resources (e.g., use case tables [1]) can be extended to integrate two or more arenas. When resources integrate, memoranda can better direct design work. Rather than passing multiple balls between players, design arenas are lashed together in three-legged races (or even four- or five-legged ones when a resource can integrate three or four arenas).

Box 8

> I was quite sceptical ... "You just drew 4 circles - and you call it a framework?" - I asked. - "No way! A framework is something that takes a lot of labour to make and a lot of effort to study!"
>
> However, after I actually experienced some ... real work, I [can] change my mind. … it might look simple [and] intuitive. But when you accept some of these "intuitive" things, suddenly the chaos of the creative work clears up and you see the things you actually have to do.

PADS thus support reflection *for* action, a *prospective* rather than retrospective activity (reflection *on* action can be wholly retrospective) [3]. Balance can be adjusted by devoting more attention in a future development episode to specific design arenas. If only one design arena is in primary focus, then the episode can be design-led (a_tefact dominant), human-centred (anyficiary dominant), strategy-driven (purpose dominant) or evaluation-based (as in Figure 2). Post-centric design thus enables appropriate dynamic focus(es) during different episodes of design work.

More concrete representations for design arena overviews (tabular) and progress lists (textual) were also developed in [7], and were used to support reflection *on* and *for* action at a more detailed level than simply recognizing and correcting imbalance. As with graphical MADS and PADS, design arena overviews and progress lists representations are snapshots of design work at a specific point in time that support monitoring and adjustment of balance. These more concrete representations provide a basis for agile resources such as Kanbans (progress boards [4]) for tracking and managing work for a single design arena.

Integration

RILED processes have not delivered ready-made integration as promised by their presumptuous inbuilt logics of sequential entailment and 'implications for design'. A move from homogeneous linear stages to concurrently heterogenous episodes needs more IxD research on explicit *integration* activities within and between episodes of design work. Box 8 presents a few integration resources that can support such activities.

Connecting design arenas is crucial to design quality. For Charles Eames: 'Eventually everything connects—people, ideas, objects … the quality of the connections is the key to quality per se' (eamesfoundation.org). We have two design arenas here: anyficiaries (people) and a_tefacts (objects). Ideas may be ones about purpose, but for Eames evaluation came down to the quality of connections. Integration and evaluation are one and the same here, which does not allow for evaluations driving integrations across design arenas, as advocated in UCD. It makes sense to think of integration across all design arenas as additional to evaluation.

Integration can be concurrent or sequential, but it is never automatic, as on RILED's ready-made face. For this reason, if Kanbans are used to plan and track work within each design arena (as above), then a fifth integration Kanban is also needed [4], supported by resources such as those in Box 8 opposite. Such a Kanban could confirm when we have delivered an artefact with demonstrable worth through effective integration with relevant memoranda. We can add a further neologism for an a_tefact that demonstrably delivers worth: an *axiofact* is *value that has been made* through convincing connections with apt memoranda:

9. A BIG Lexicon

[16] supports *Arte Útil* (Useful Art) with a lexicon of conceptual institutions to be retired (from art) and emerging concepts that underpin its goals. We must do the same for BIG design [2].

RILED concepts to retire

1. Problem
2. Requirements
3. Solution
4. Stage/Phase
5. Implications for any design
6. Centre
7. Validity
8. Iterative sequential process

New concepts to consider

1. 2 and 3: Design Arena
    a. A_tefact
    b. Memoranda
        i. Purpose
        ii. Anyficiaries
        iii. Evaluations
4. Episode
5. Integrations for this a_tefact
6. Foci
7. Axiofact
8. Balanced concurrent drama

Box 9

Axiofact = A_tefact + Memoranda

Axiofacts generalize to both design practice and research. While the artefact is the motivating arena in design practice, design research may be more focused on novel memoranda and only produce antefacts. Axiofacts cover both situations.

Conclusions

It is time for HCI to lose its Janus-face, and help to align IxD practices with the realities of creative design ([8] and [12] have made some progress here with inspiration from outside of HCI). RILED however is a very powerful ideology, and no agile or design thinking practices have yet completely shaken it off. RILED will maintain its hold as long as alternative approaches use its still dominant vocabulary to oppose it. A more congenial replacement vocabulary is needed (Box 9).

An un-RILED post-centric design process will be balanced and integrated, but will also be *generous* through the relative autonomy of the purpose design arena, where design teams can be strategic about the worth that they intend to deliver. A fully un-RILED post-centric design process will thus be balanced, integrated and generous (BIG [2]). Novel approaches and resources are needed to support balance and integration. Ones based on varying levels of abstraction for episode structures have been developed [7], alongside detailed resources for design work (Box 8).

BIG design [2], supported by structured reflection (MADS, PADS [7]), multiple Kanbans [4], and inherently integrative resources [1,7] is being developed to show that fully un-RILED design processes are possible. Processes are no place for unrealistic norms and misplaced ideals that impose rationality on creative practices. Well-placed ideals lie in ends, not means. We need to focus our values on what is delivered, and not how it is delivered. With a strong focus on design purpose, which is key to BIG design [2,7], there is less need to rely on a fixed process to deliver value. If anything, the more we focus on fixed processes, the more chance we have of waste and loss of value. There is no need for ideals about process means when the realities of creative design work have evidenced success over millennia. Design practices are not perfect, and need to evolve, especially in the context of research through design. However, the starting point has to be how design actually works and where it may be improved, rather than the rarified ungrounded abstract rationalism of outsiders who uncritically bring values from Janus-faced disciplines.

Acknowledgements

MADS, PADS, and Design Arena overviews and Progress Lists were originally developed and applied in Jenni George's PhD research [7] and then applied independently and successfully by five energetic project groups of Professional Doctorate Students (plus one solo project student) in February 2016 at the Technical University of Eindhoven (TU/e). My sincere thanks and gratitude are due to these research students for developing, applying and advancing use of Abstract Design Situations [2] to reflect both critically and practically for research through design. The idea of using Kanban boards to track design arenas and integration [4] resulted from working with the TU/e students, many of whom immediately made use of Kanban work progress concepts once they were introduced (midway, unplanned and generously) during a week of project-based studio teaching.

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