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DESIGNERLY WAYS OF RESEARCHING
DESIGN KNOWING AND THE PRACTICE OF RESEARCHING

DESIGN-LED RESEARCH, REFLECTIVE PRACTICE, DESIGN KNOWING, VISUAL THINKING

I have spent almost a decade questioning, exploring, advocating for a world where research into the practice of design was not predominantly shaped by philosophers, cognitive psychologists, historians or engineers. This pre-occupation with the role of the practitioner in design research led me to undertake a PhD that considers the ways in which research into design might better reflect a designer's perspective, expertise and motivations. Yet, in a world that is coming late to the realisation that our problems cannot be addressed by one discipline alone, I have come to wonder how misplaced my motivation was to defend the legitimacy of practice-led research. I now find myself questioning the loyalty (or myopia) that led me to accentuate the positive of practice-led research while ignoring the limitations of a research approach centred on practice. However, with some critical distance I now see the value of being pushed into a corner to defend one's territory. For arguably it is the contested nature of design research that has productively driven the breadth of multi-modal methods and strategies that we now see emerging. In a world that increasingly calls for research collaborations that transcend any conventional notion of discipline it is imperative that we have an informed respect for other disciplinary approaches, just as it is important that we have our own way of understanding what design practice has to offer the context of research.

Aligning criteria for research with design practice this essay proposes characteristics of designing that may resonate with practitioners interested in research that respects the core values of design. Responding to the question of how research into the practice of design might better reflect a practitioner's perspective, expertise and motivations this essay speaks to the capacity of design to be performative, negotiative, adaptive, situated and discursive. The insights presented in this visual essay are extrapolated from a design-oriented research project undertaken by the author, that specifically questions how visualising as a research method might interrogate the often only tacitly understood praxis of design. This visualisation research case study developed a critically, reflective process I called *figuring* and it is the insights from this research experience that inform this essay. This essay proposes that figuring is a design-led research strategy conceived to amplify the back talk of designing in a research context. The essay aligns the research method with the output, working with the speculative-yet-reflective nature of figuring to visually interrogate ways in which design practice might align with basic principles of what we understand research to aspire to be.

THE CRITICAL ACT OF FIGURING This visual essay deploys figuring as a method for researching the potential of design praxis in the context of research. In valuing that the visual artefact can be productively ambigious the thesis came to respect the critical value of working towards, rather than fixing, an understanding of the somewhat elusive nature of design knowing. With an emphasis on *becoming*, the project recognises the value of operating in a suspended state of figuring out, rather than determining a fixed position on how designers' should undertake research. The sequence of the essay reflects the multi-modal interplay between reflection and action that defined the research process. The diagrams initiate a way of thinking through a fragment from a theoretical paper, and the text presents a formalised way to extrapolate from and make explicit the reflective conversation enacted by the situated process of figuring.
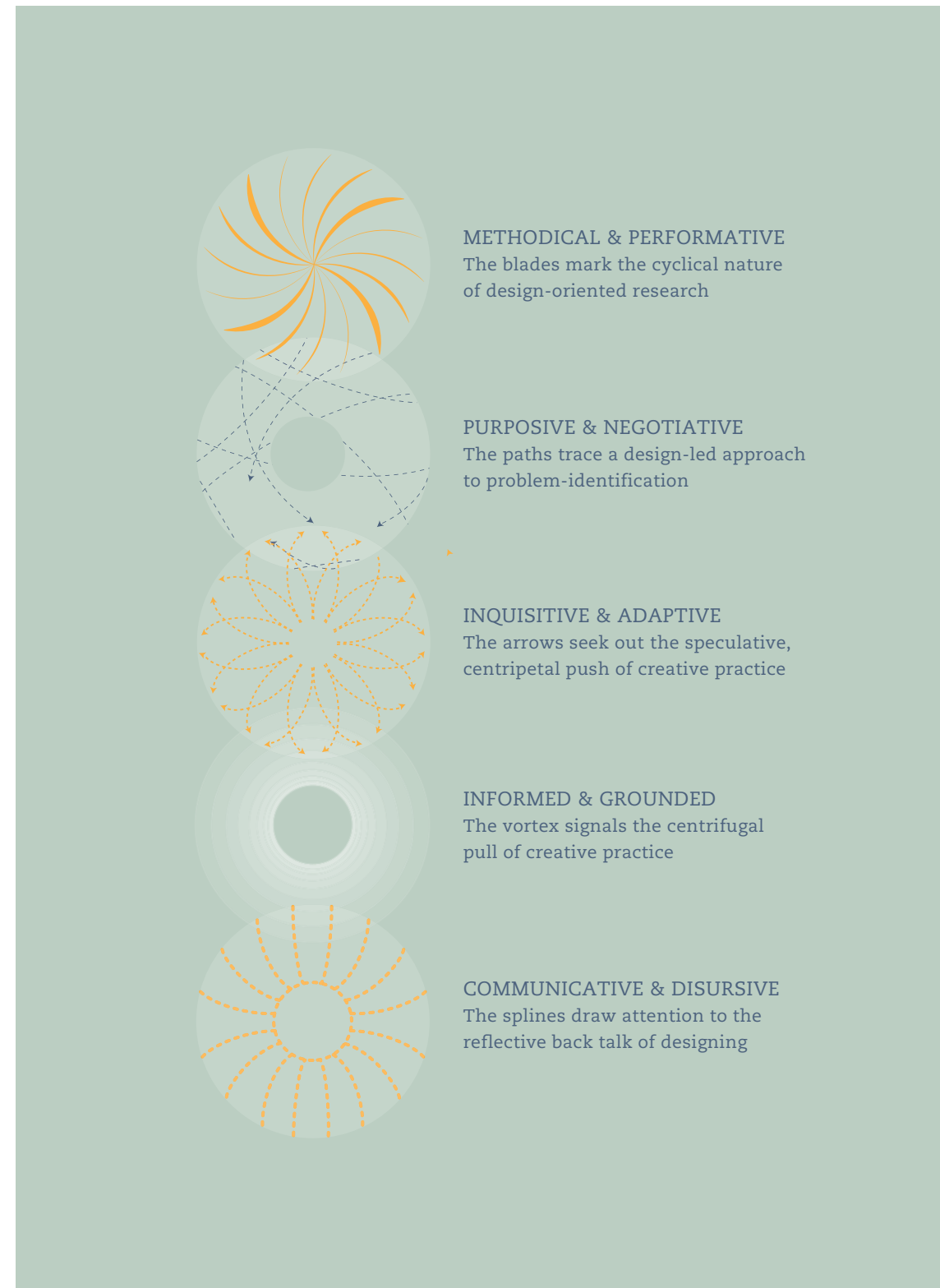
Figuring is the name I adopted for a designerly way of drawing. The drawing style evolved over a period of years, showing it to be a thoughtfully critical process for sustaining a period of speculative reflection. Figuring allowed me to extend the process of negotiating complex ideas, which as a researcher I found to be a useful strategy for drawing attention to the often-times tacit process of designing. A close reading of the affordances of this visualisation process led me to Terrence Rosenberg's proposition that outlines the "fragile balance" of creative practice (2000). Adapting Bakhtin's idea, Rosenberg describes the tension at the heart of creative practice as coming from negotiating the centripetal and centrifugal forces at play. The centripetal impulse pulls the practitioner toward what he or she knows, drawing connections with established practices. This pull is countered by the practitioner's centrifugal impulse to seek the unknown, to deviate from the normal in search of new possibilities.

In this visual essay, this push and pull is negotiated through the process of figuring what I came to call a *proposition diagram*. The term proposition diagram refers to the coming together of two modes of drawing that Bryan Lawson describes as being at the heart of the design process: the *diagram* and the *proposition sketch* (2004). Given that these modes of drawing serve quite different functions a practitioner would normally choose between the possibilities-driven agency of the proposition sketch or the reflective utility of the evaluative diagram. In this way figuring seeks to intentionally manipulate the push and pull of creative practice by bringing together these two essential visual tools and designerly attributes we associate with design praxis. To do this figuring interlaces the diagram's ability to provisionally fix certain elements so the designer can navigate complex moving pieces, with the proposition sketch's speculative capacity to put forth possible ideas for a situation the designer is still exploring. Emerging from the earlier visualisation research case study, the proposition diagram presents a visual strategy that draws on both the material and cognitive knowing of the designer.

RESEARCHING DESIGN KNOWING I am a practitioner-researcher driven to explore the potential of designing as a method for investigating how designers' think and act in the world. This project is framed by philosophical discourse into design knowing while being committed to the situated, action-research of project-based research. And there lies the challenge.

Nigel Cross identifies methods for researching design thinking to include interviews, protocol studies, simulation trials, observations and case studies, plus reflection and theorising — noticeably ignoring the practice of designing as a research method in and of itself (2007). Even as Cross makes a strong argument for why designers have a disciplinary responsibility to account for how they think and act in the world, he pays no attention to how his phrase *designerly ways of knowing* might offer a complementary method for investigating how designers' design. At the risk of oversimplifying this complex situation, there appears to be two basic sides to this disconnect. First, there is the broad issue of how we evaluate good research and how we make sense of the limitations and opportunities presented by designing as a research method. Second, there is the issue of what motivates designers and how research methods might resonate and work with a designer's strengths. From both perspectives the tension arises from conventional approaches to research often appearing at odds with how designers might intuitively approach a project. Motivated to address the limited participation of the designer as researcher this essays explores models for research that work with the expertise of the designer, while acknowledging the need to consider this in the context of a broader conversation of research standards.

With reference to Bruce Archer, Cross outlines a basic set of five characteristics by which to assess the methods and intentions of what he calls good research (2007). This visual essay explores the possibility that these characteristics – "purposive, inquisitive, informed, methodical and communicable" – can accommodate a design-led approach for researching design praxis (Cross, 2007, p126). In aligning designerly ways of knowing with criteria for research the design community does not need to emulate the kinds of knowing generated by other disciplines, but instead to be able to understand how a practitioner's knowing might complement the perspectives an interdisciplinary community of researchers' bring to the scholarship of design. The goal then need not be to produce evidence-based research or a fully theorised position on design praxis, but to present appropriate strategies for designers' interested in interrogating the oftentimes tacit knowing of creative practice. This project seeks to model how a design-oriented investigation might ultimately offer strategies for articulating, triangulating and ultimately translating situation-specific insights. The goal being to enable the practitioners' perspective to play a part in informing how we build higher order understandings of design praxis.

METHODICAL & PERFORMATIVE
The blades mark the cyclical nature of design-oriented research

PURPOSIVE & NEGOTIATIVE
The paths trace a design-led approach to problem-identification

INQUISITIVE & ADAPTIVE
The arrows seek out the speculative, centripetal push of creative practice

INFORMED & GROUNDED
The vortex signals the centrifugal pull of creative practice

COMMUNICATIVE & DISURSIVE
The splines draw attention to the reflective back talk of designing

METHODICAL & PERFORMATIVE

[Practice-led researchers'] tend to 'dive in', to commence practising to see what emerges...This is not to say these researchers work without larger agendas or emancipatory aspirations, but they eschew the constraints of narrow problem setting and rigid methodological requirements at the outset of a project.

(HASEMAN 2006, P3)
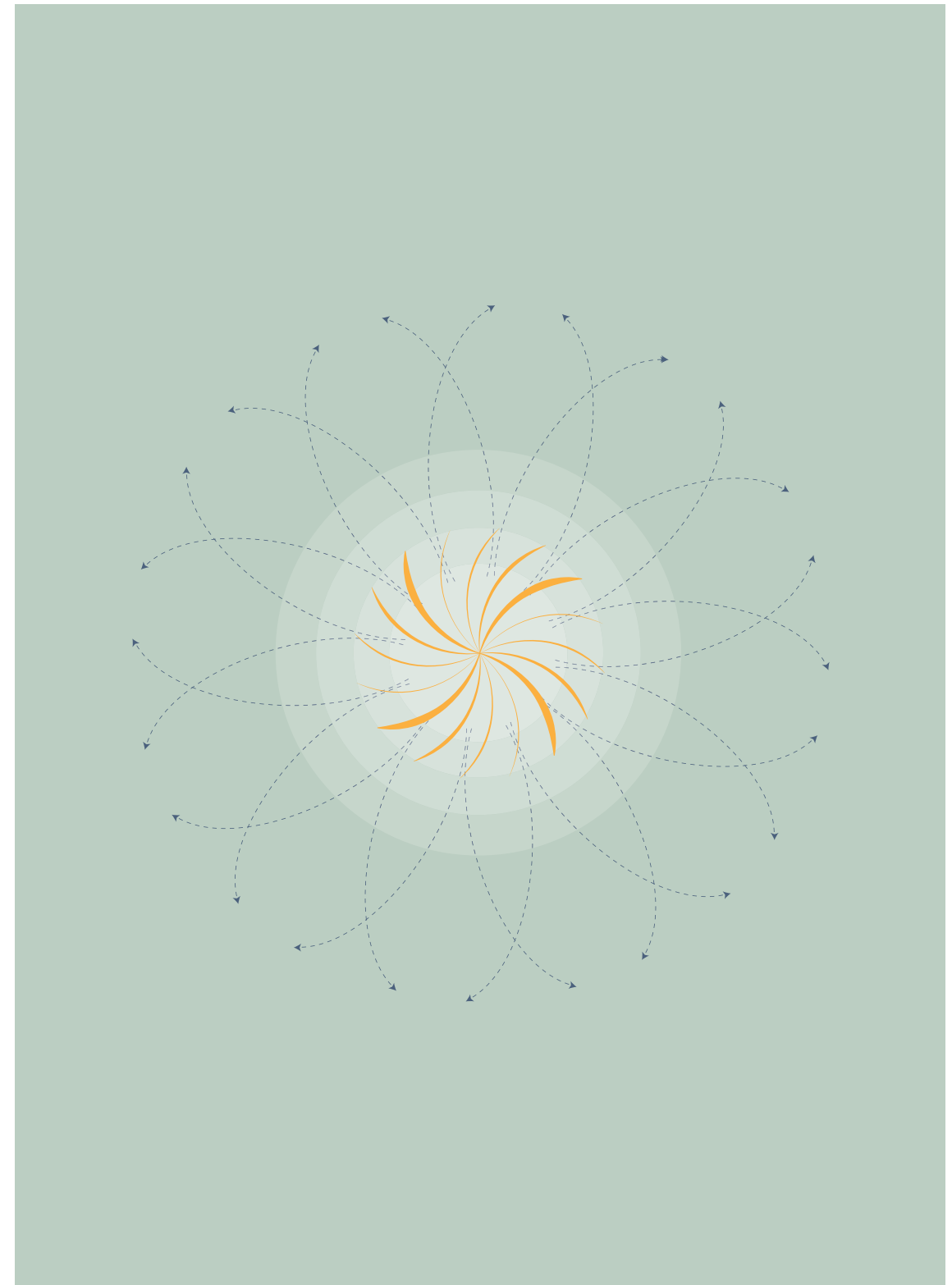
PURPOSIVE & NEGOTIATIVE

Designers tend to use solution conjectures as the means of developing their understanding of the problem. Since 'the problem' cannot be fully understood in isolation from consideration of 'the solution,' it is natural that solution conjectures should be used as a means of helping to explore and understand the problem formulation.
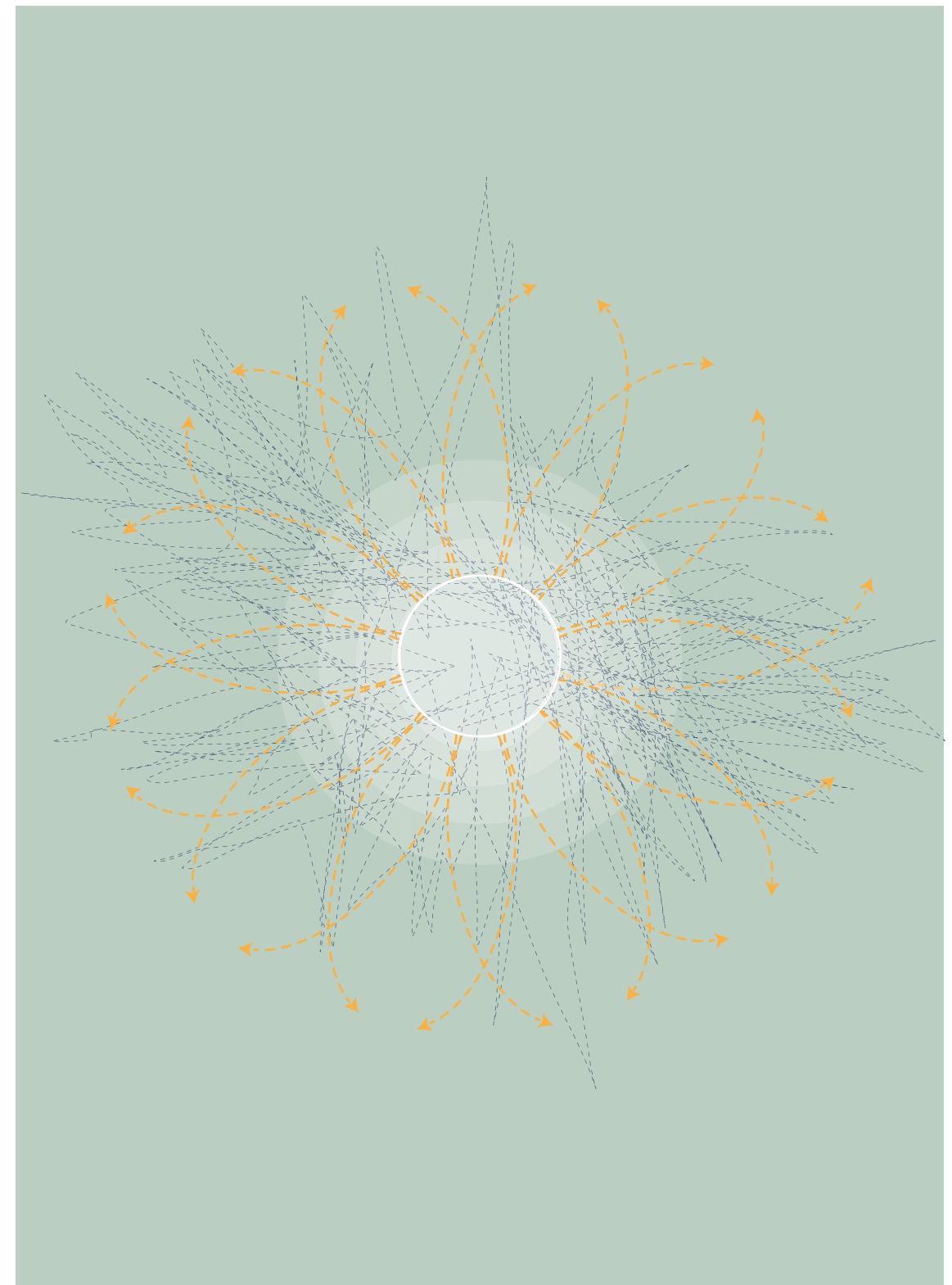
(CROSS 2007, P102)
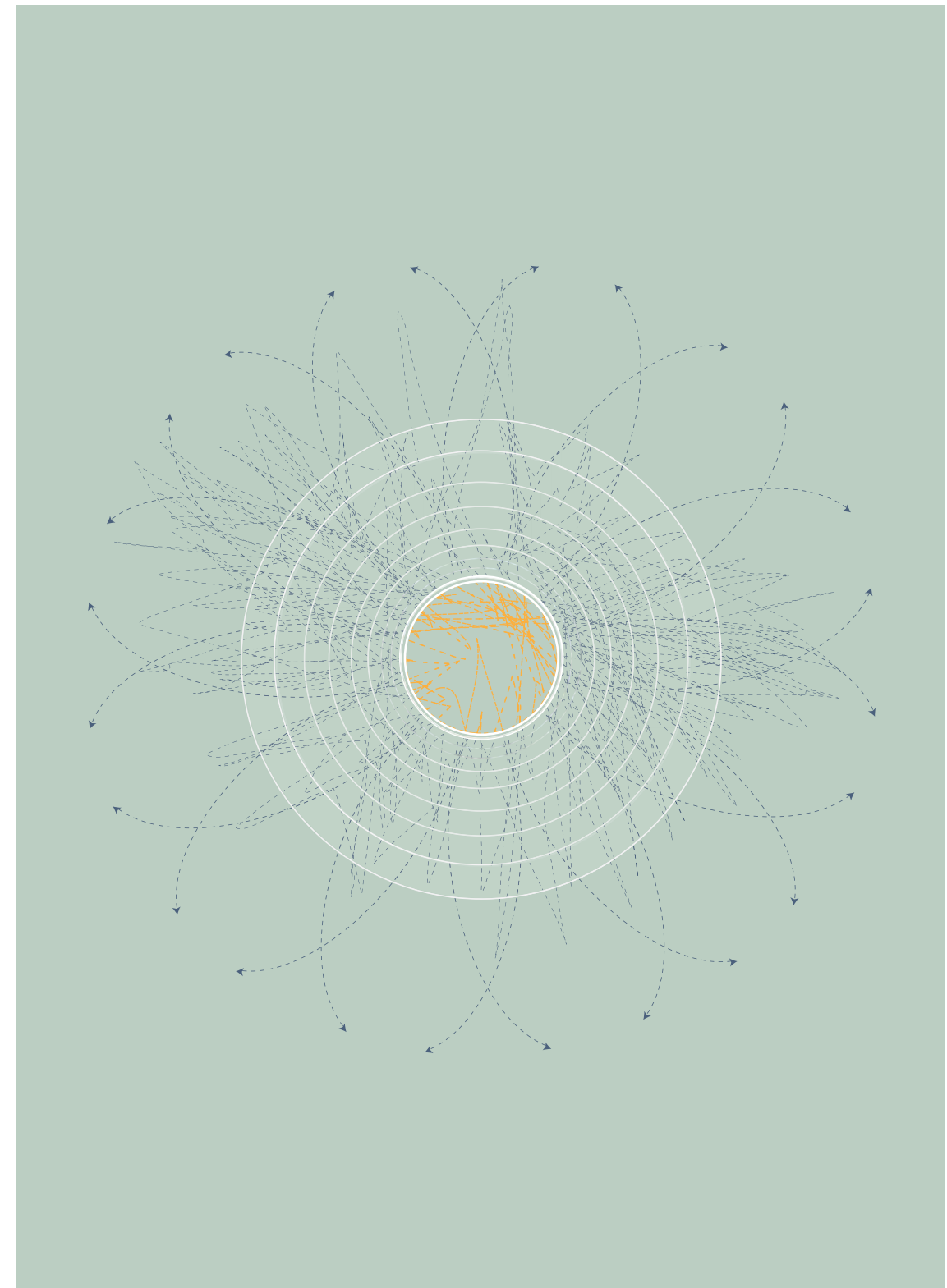
INQUISITIVE & ADAPTIVE

The designer often telescopes a mass of fragmented bits of information and then usually after a period of incubation invents a coherent and often elegant proposition that embodies all or most of the rag-bag of bits.

(SWANN 2002, P54)

INFORMED & GROUNDED

Research by design conciliates theory and practice. Such research helps build a genuine theory of design by adopting an epistemological posture more consonant with what is specific to design: the project...The epistemological figure is that of embedded, implicated, engaged, situated theory. Situated in what? In the project, of course.

(FINDELI 1999, P108)
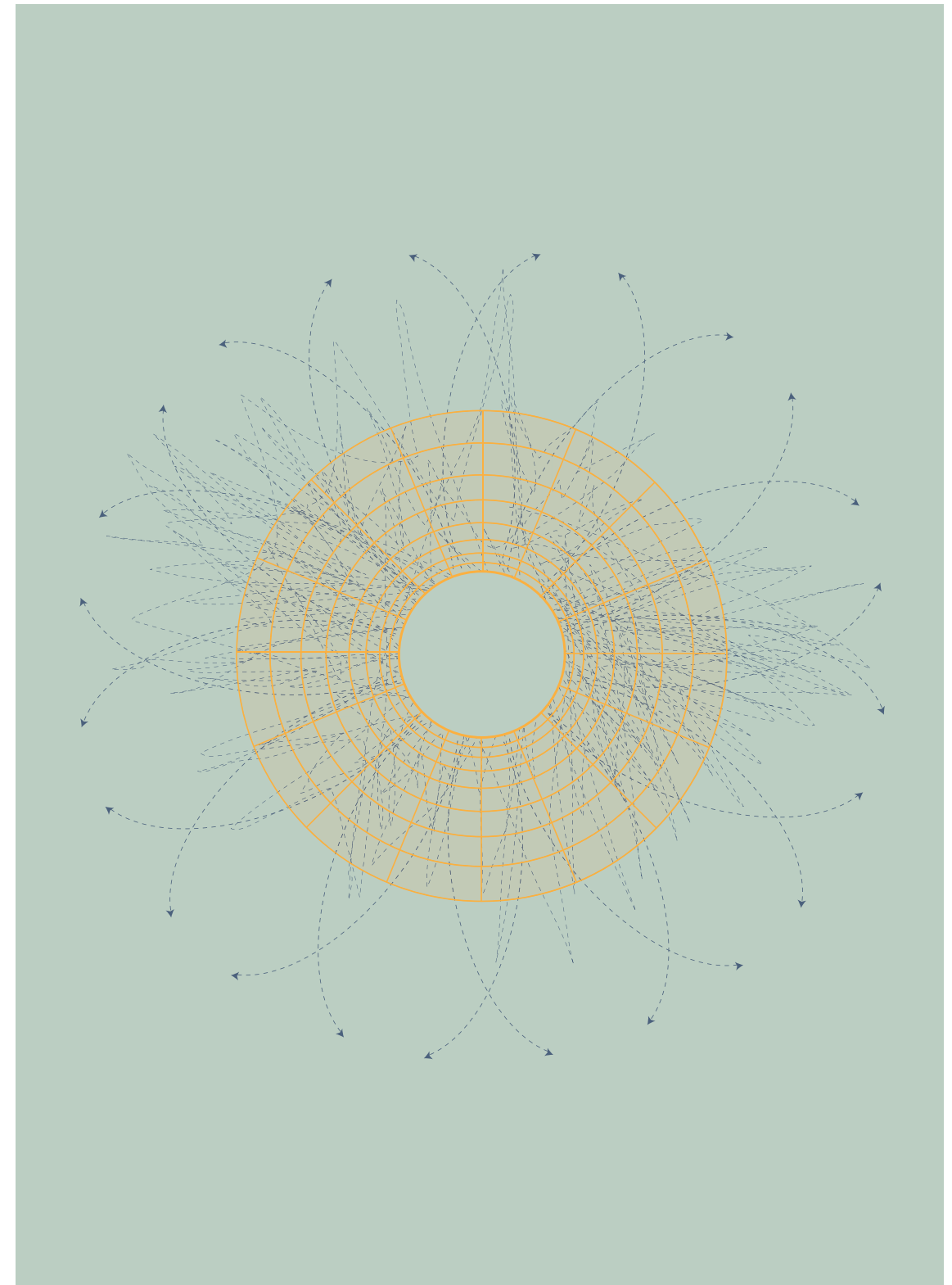
COMMUNICATIVE & DISCURSIVE

Elements of the design situation meet the designer in the virtual world of the design and express desires, capacities and resistances…And this is why it is back-talk; it is not informational feedback, data about this or that, but words, metaphors, conversational phrases, sensations that have a cognitive component, but also an affective or performative component.

(TONKINWISE 2007, NP)
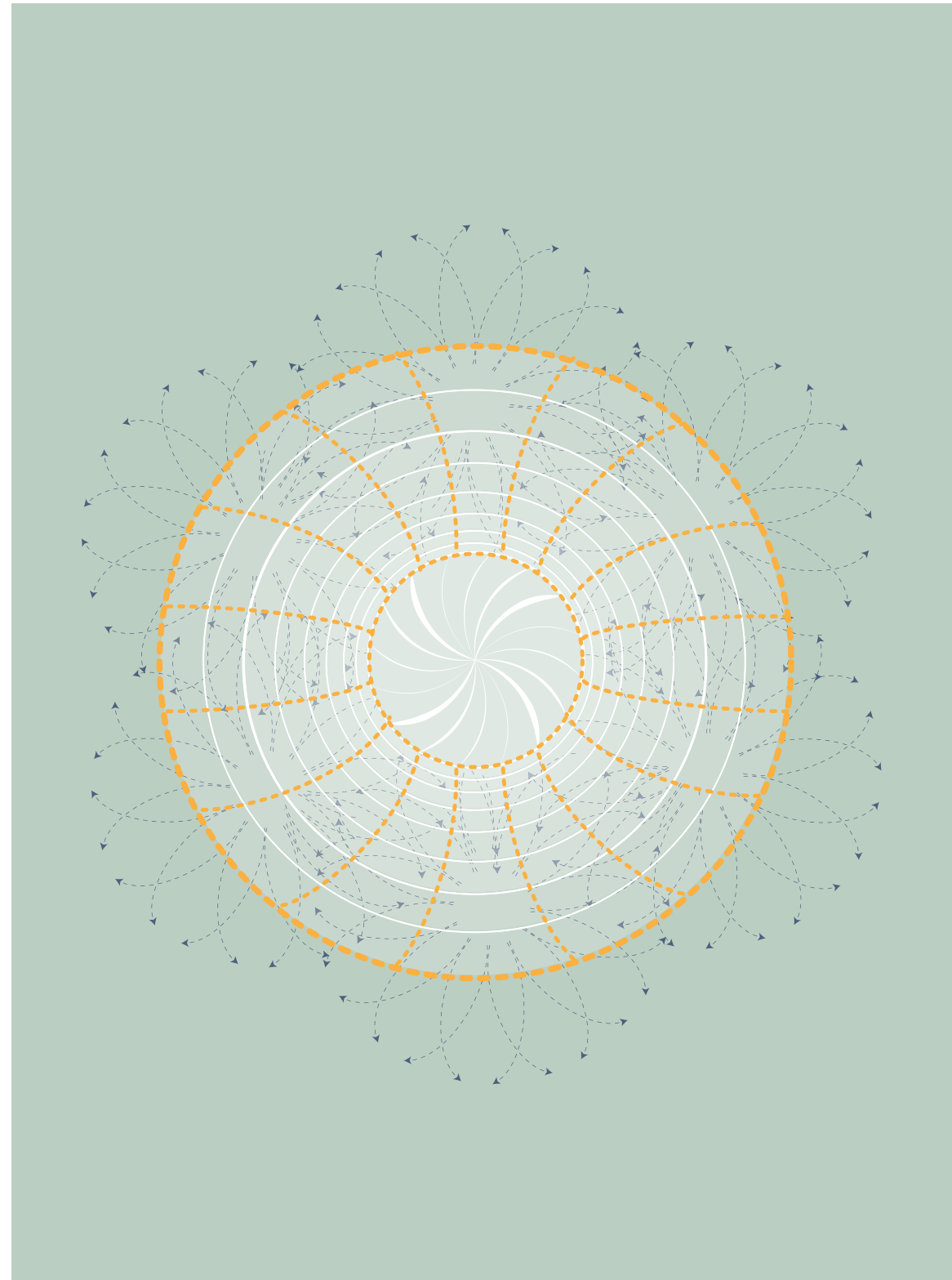
METHODICAL & PERFORMATIVE
MULTI-FACETED, PRACTICE-LED, ACTION-ORIENTED: PROPOSE, MAKE, DISCUSS, REFLECT

One of the five criteria that Cross names when he identifies the attributes we should look for in strong research is the need for research to be methodical. So to what extent can the *practice-led* orientation of design address this criteria for a "disciplined" approach to research (2007, p126). If we accept that different disciplines appropriately have different ways of accounting for how to be 'methodical' it becomes possibile to envision a methodical approach to research that respects the nature of enquiry embedded within the domain of design.

With consideration for how design-led research might be methodical it is worth pulling back from the process of designing to reflect on the practice-led, iterative nature of design practice. For the thinking-through-making aspect of figuring can also be understood in relation to how the situated practice frames the action and critique that drives the design process. Recasting the conventional action research cycle of: plan > act > observe > reflect the figuring research project proposes a methodological approach that cross-appropriates aspects of action research and grounded theory. In adapting methodologies from other disciplines it becomes possible to define a purposeful yet intentionally revisable action plan: propose > make > discuss > reflect.

Consistent with Haseman's observation Stephen Scrivener makes a case for why practice-led researchers might not benefit from beginning a research project by reviewing the literature of the field (2004). Scrivener further argues that the act of *making* is the central driver for the practitioner and generates the material for thought when it comes to modes of studio-led research. These insights illuminate why it may be counter-productive for the designer-researcher to interpret methodical as adhering to a pre-conceived sequence of steps. In accord with the nature of design enquiry it is useful for research strategies to support the feedback loop between the designer-researcher and the design work, as well as between the research audience and the research situation. The crafting of a research program that enhances feedback calls for multiple research activities, the consideration of the subject from multiple perspectives and the communication of the research through multiple modes. The *multi-faceted* nature of this research program may not lend itself to pre-determining the research direction yet it can tap into the cognitive discipline a practitioner brings to the act of designing. The fluid yet complex character of such a research program requires a researcher who can successfully navigate input from multiple fronts and negotiate the reflective conversations generated by the different modes of enquiry.

PURPOSIVE & NEGOTIATIVE
SOLUTION-FOCUSSING, CENTRIFUGAL PULL & CENTRIPETAL PUSH, CO-EVOLUTION

The design attribute that seeks to address Cross's call for research to be purposive is the "*solution-focussed*" nature of designing (Cross, 2007, p29). In considering the need for a topic to be identifiable and capable of investigation we can make the connection to how a designer works with the speculative, opportunistic nature of designing in the process of problem-identification. Haseman's call for a performative approach to research embraces practitioners' responding to the questions or hunches that emerge from practice rather than counter-intuitively setting out to fix a hypothesis or an area of investigation from the outset. This approach could potentially be interpreted as the researcher neglecting the requirement that research be clearly identified and yet by beginning with a question of direct relevance to the researcher there is immediately an argument for the hunch being worthy of investigation. This performative approach establishes an investment on the part of the researcher and potential resonance for other practitioners.

The reason this hunch-driven approach can still move the research purposefully forward is connected with the designer's capacity to be pro-active in the process of problem framing. The process of simultaneously evolving the problem by exploring solutions potentially offers a new way of identifying and investigating areas of research.
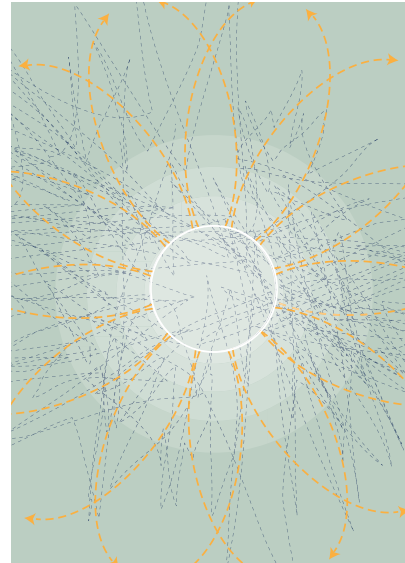
The figuring project used this notion of co-evolution of problem and solution to define the research program, the object of study, the design projects, and ultimately the main argument of a thesis. Figuring teases out this principle of solution-focussing by attending to the already mentioned *push/pull* of creative practice. The iterative approach of figuring diagrams is conceived to facilitate the way a designer negotiates the incommensurate conditions at play. In this respect the primary goal of 'troubling' the centripetal/centrifugal tension is to 'notice' or pay attention to what is being negotiated. This can provide a guiding strategy for incrementally attuning the research to stay on course, effectively charting a purposeful, yet flexible approach to the research program. Focusing on the core negotiations of the figuring diagrams helped to make explicit the thinking-through-making space at the heart of design practice. In drawing attention to the embodied act of figuring the research challenged and advanced my base understandings of design. By making explicit the "continual process of positing possibilities" I better understood the potential of 'negotiating' when it comes to framing research (Dilnot, 2005, pp10). I see this designerly way of knowing as central to what is distinctive about a design-oriented approach to the practice of researching.
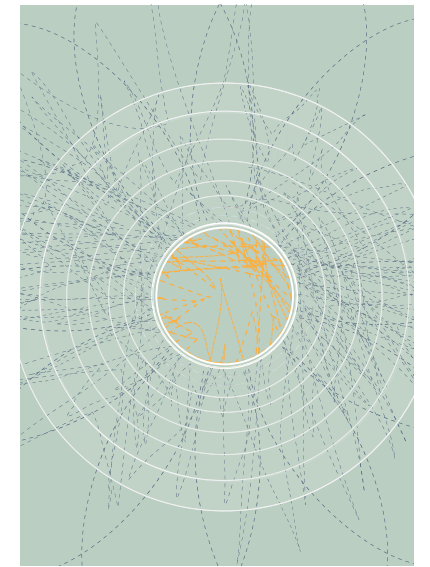
INQUISITIVE & ADAPTIVE
SPECULATIVE, OPPORTUNISTIC, PROPOSITION SKETCH, SYNTHESIS, EMERGENT

Cross also draws out the importance of the research being inquisitive, making explicit that the research must seek to acquire new knowledge. This underscores the necessity for the goals of research to trump the distinctly different set of ambitions that guide professional design practice. But assuming a commitment to make a scholarly contribution to the domain of design then the question becomes whether the designer's interest in *synthesising* ideas from a range of diverse inputs is an appropriate strategy for knowledge seeking. Just as a scientist uses deductive thinking to research notions of universal truth, it is consistent with the cultural values of design ("practicality, ingenuity, empathy") that the designer use abductive thinking to research the most "appropriate" proposition (Cross, 2007, p18). The abductive leap allows the researcher to work with the designer's ability to tackle situations from multiple perspectives. In seeing connections across and between disparate sources of content it becomes possible for new ways of seeing the research problem to be disclosed. This inquisitive approach seeks a different kind of knowing, a knowing evaluated for how successfully the research insights propose new understandings of the field that ultimately transform the research situation. In this way the creative process offers an approach to knowledge seeking that usefully establishes the conditions for realising what has not been seen before (Scrivener and Chapman, 2004).

Figuring facilitates this mode of enquiry by working with the *proposition sketch*, embracing the emergent, adaptive nature of the design process. Building on the previous argument that the 'co-evolution of the problem and solution' presents a strategy for identifying the research problem, the speculative material act of generating a design proposition feeds the abductive leap. This iterative process of prototyping potential solutions allows the researcher to tackle the kinds of 'fuzzy' problems and situations that are not easily defined at the outset but can be considered by proposing into the research situation (Rittel and Webber, 1973). Figuring works with the capacity of the proposition drawing to graphically ask "what if?" — a strategy for seeing unforeseen opportunities, disclosing new ways of understanding, and refining the insights of a research situation (Lawson 2004, p53). The 'becomingness' of figuring suits a mode of enquiry that values leaving some questions unanswered…if not unexamined. Arguably the material artefact does have limitations as an outcome of research, but the adaptive, emergent process of moving 'toward' an understanding is something design is equipped to negotiate. I settled on the verb 'figuring' since it resists locking-in a conclusive theoretical position by intentionally visually representing ideas that elude being all figured out (Rosenberg 2007).

INFORMED & GROUNDED
REFLECTIVE, PROJECT-BASED, DIAGRAM, PROVISIONAL SOLUTION, SITUATED

Complementing the idea that research be explicitly seeking to generate new knowledge, Cross outlines the need for research to be informed by previous and related work. When it comes to design-led research how does the *project-based* orientation fit with this notion of informed research? Alain Findeli introduces the notion of "project-grounded research" by characterising this approach, developed within a doctoral program, as a hybrid between action research and grounded theory research (1999, p111). His approach grounds the research in the projects, allowing the theory to emerge from the applied project experience and ensuring that the researchers are valued for their academic and professional design expertise. However, Findeli does caution that although we must recognise the importance of the design project it is also critical that we not mistake the project as the central purpose of the research.

Design precedents clearly inform the practice of a designer, as does the reflective practitioner's "repertoire" of previous experiences that he or she draws upon when designing in an unfamiliar situation (Schön 1983). Yet in a research context perhaps the gift of the project to design research is the 'field' the project provides as a space where research questions can be iteratively reformulated and reflection be "stimulated and nourished" (Findeli p111).

Literature on design epistemology, philosophy and creative praxis unquestionably informed initial first moves when I began one of the various visual essay projects that comprise the figuring case study. Yet once the process of designing began the *diagram* presented the primary tool I used to interrogate how my own tacit understandings of praxis sat in relation to the theoretical positions. Using the diagram to provisionally fix certain elements I could propose visual frameworks as a strategy for thinking through theoretical arguments. As a strategy for exploring the tacit nature of design praxis the process of figuring diagrams enabled me to negotiate my own position as I proposed design iterations, half-formed theories or tentative conceptual frameworks. In this way the field of the project creates a space for the practitioner where each move offers a step toward becoming better informed about the topic under investigation. The diagram can support Donald Schön's notion of reflective conversation between the designer and the grounded project, as well as the back-and-forth between the established discourse and the designer's embodied knowing (Schön 1992). In this way the project productively drives the recursive nature of design enquiry, allowing the research to be informed by the iterative, situated, grounded context of practice.
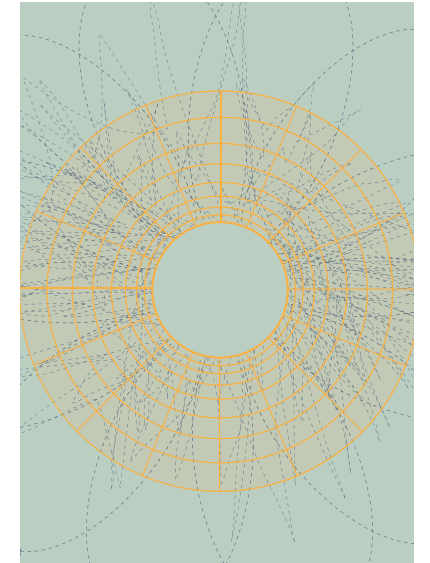
COMMUNICATIVE & DISCURSIVE
MULTI-MODAL, PROPOSITION DIAGRAM, REFLECTIVE CONVERSATION, BACK TALK

The fifth and last research characteristic Cross mentions emphasises the value of generating results that are accessible to others (2007). A design-oriented approach is less interested in whether the research is 'repeatable' but does seek to produce insights whose relevance for others can be corroborated. Exploiting the *multi-modal* nature of design practice, a design-oriented approach can potentially work with the act of dissemination as a discursive, evolutionary practice that supports corroboration. A multi-modal approach may be useful for drawing an audience into 'critique' research insights since the designer's practice of alternating between different activities (for example, designing, writing and framing) is connected to his or her ability to disclose new ways of seeing (Akin and Lin, 1995). Integrated into a research program, these modal shifts can do more than provide a space by which the practitioner can independently 'notice' new insights; multi-modal enquiry can help the audience to potentially see things from a new perspective by advancing a new conceptualisation of the content (Doloughan 2002). Framing the act of dissemination as an ongoing, interpretative process allows research presentations and publishing to be a discursive phase whereby the researcher can evaluate the potential of insights based on how the ideas resonate with his or her peers.
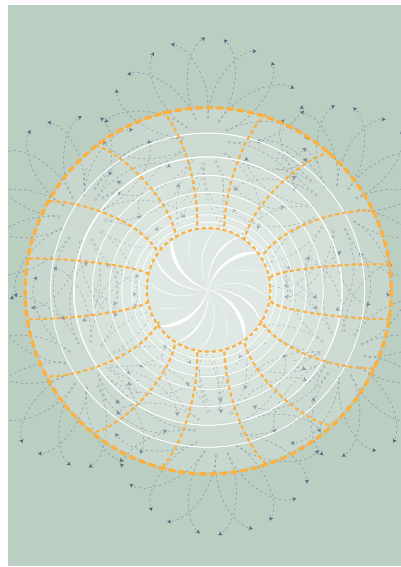
Figuring worked with this multi-modal approach by allowing the keywords, captions or annotations for the *proposition diagrams* to evolve in conversation with the ideas and for the work to be critiqued throughout the process. Resisting the default graphic design position of communicating a fixed idea the figuring projects intentionally introduce ambiguous elements to the visual language. This speculation-led approach to reflection amplifies what Schön calls the 'back talk' of practice. In this way figuring attends to the reflective conversation between 'the designer' and 'the situation', the design and 'the audience.' The conversation with the situation highlights the ways a speculative move might serve to evaluate the conditions, forces and agencies at play. The immersive conversation with the design is the force behind the grounded push from the known and the speculative pull to the unknown. Lastly, the back talk with the audience is embodied in the invitation to engage the audience in figuring his or her own understanding of design praxis. This reflective conversation with the overall research situation allows the researcher to synthesise an analytical approach of assessing "what is" with a design-led projective approach of wondering "what shall be" (Jonas, 2007, p206).

CONCLUSION This essay works with insights that emerged from a research project where visual essays were designed as a practice-led method for exploring, from multiple perspectives, the topic of design praxis. In the process of 'figuring' out what could be learned from the previous research project this visual essay adopts the speculation-led reflective process outlined here and works with the same visual language to explore how design-oriented research might work with Cross's criteria for good research. While acknowledging the value of "situated knowledges" and the "partial perspectives" they disclose (Haraway 1988), the essay extrapolates from this experience to illuminate ways in which the practitioner might deepen a designer's expertise and understanding to support the evolution of his or her own approach to design-oriented research. More generally the paper shares discursive diagrams and proposes a critical framework as steps toward visually and theoretically prototyping ways in which the practice community might come to articulate the different ways that designers' might legitimately navigate the research experience.

One thing we do not seem to learn from experience, is that we do not often learn from experience alone. (MASON 2002, P8)

Given the emphasis in the essay on reflective practice and designing as research methods it was essential that I had the skills for creating some critical distance from my own experience, to effectively be able to see my own familiar practice anew. John Mason ascribes the "discipline of noticing" as essential to the work of researching your own practice (Mason 2002). In this context figuring presents a process for critical thinking through action that works with the idea of productive disturbance, offering in turn a strategy for deepening the designer-researcher's conversation with the situation. If conventionally, in creative practice, the desire to deviate is moderated by the impulse to stabilise, I propose that when a designer is figuring this creative tension is troubled in a way that allows the designer to be more conscious of the negotiation in play. Yet figuring does not pretend to on it's own facilitate a level of critical distance, nor does it work independently as a tool for communicating research. My experience concurs with Findeli's claim that the practice element is primarily here to support the research. Disclosing key practice insights from a design research project requires the insights to be translated into higher order understandings of praxis and the creative artefact has limited capacity for doing this.

It is beyond the scope of this paper to detail the ways in which approaches to grounded theory and action research became an integral part of the overall research program. Still, it is important to note the value of the practice-led project. For the close reading of the agency of figuring highlighted the value of speculation-led reflection and the role negotiation plays in amplifying the back talk of designing, empowering me to use these insights to appropriate strategies from other disciplines who have wrestled

with this idea of critical distance. This practice knowing directly informed how I went about adapting research methods from other disciplines so they were more responsive to my own expertise. In understanding the merits of a multi-modal approach to communicating the research I sought to iteratively triangulate visual, written and verbal activities to promote an adaptive research program that was constantly in negotiation with a peer community. The propose > make > discuss > reflect action cycle led to a language and framework for discussing the insights and assessing their resonance with others.

Design-oriented research is adopted here as a term that seeks to recognise some of the limitations of a straight practice-led approach, while maintaining a commitment to the values and expertise a designer might bring to the practice of research. The goal is for this research to propose, through image and text, a way of understanding design that transcends the nature of everyday studio practice to address the requirements of a research practice.

Whereas (scientific) researchers are concerned with the truth of their propositions, established by observational evidence, designers are concerned with the plausibility and compellingness of their proposals.
(KRIPPENDORFF, 2007, P72).

Working from Klaus Krippendorff's observations of what motivates designers, it is possible to comprehend how researchers with a design background might enjoy the research context for the space it affords to negotiate conflicts that have escaped resolution, to investigate opportunities ignored by others, and to introduce possibilities that others may not realise (2007). Not accepting routine reflection-on-action or reflection-in-action as sufficient in a research context (Schön 1987), this proposition addresses the call for more disciplined noticing by interlacing the speculative, yet reflective expertise of the designer to co-evolve the problem with the solution with the expertise of the designer to negotiate and iterate in response to reflective conversations with the situation, design and audience.

In aligning Cross's criteria for research with attributes of design praxis, the argument for ways that design knowing might apply to research kept returning to these two core competencies of design. While designing the diagrams within this visual essay a recurring theme underscores the designer's capacity to temporarily-fix-an-idea-while-still-imagining-what-that-idea-might-become. It is this speculative, reflective and negotiative capacity of designing that the designer can and should bring to research. Add this way of thinking to the opportunities presented by the practice-led, project-based aspect of design and it becomes possible to not just argue for what research should be, but to embrace an approach to research that productively animates the performative, negotiative, adaptive, grounded, and discursive orientation of design.

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NOTE A more comprehensive account of the figuring case study and the broader research project: *Design Research and Reflective Practice: the facility of design-oriented research to translate practitioner insights into new understandings of design* can be found online at: www.lisagrocott.net.