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Systemic Design, Education and the Design Research Agenda

A report and reflections on a workshop at the RSD5 Symposium, October 2016

Abstract

Since 2014, an international collaborative of design leaders has been exploring ways in which methods can be augmented, transitioning from the heritage legacy focus on products and services towards a broad range of complex sociotechnical systems and contemporary societal problems issues. At last year's RSD4 Symposium, DesignX founder Don Norman presented a keynote talk on the frontiers of design practice and necessity for advanced design education for highly complex sociotechnical problems. He identified the qualities of these systems as relevant to DesignX problems, and called for systemics, transdisciplinarity and the need for high-quality observations (or evidence) in design problems. Initial directions found were proposed in the first DesignX workshop in October 2015, which have been published in the new design journal Shè Jì. In October 2016, another DesignX workshop was be held at Tongji University in Shanghai, overlapping with the timing of the RSD5 Symposium. The timing of these events presented an opportunity to explore design education and research concepts, ideas and directions of thought that emerged from the multiple discussions and reflections through this experimental workshop. The aim of this reporting paper is to reflect and present the process and experiences for those who maybe interested in the approach.

Keywords: systemic design, design education, design methods

1. Introduction

The RSD5 symposium convened in Toronto in October 2016 provided an opportunity to gather intelligence from a wide range of design practitioners with perspectives on design research, associated educational programs, and progress on developing a community on systemic design.

> We want to propose ways to sustain relationships between RSD and DesignX, beginning with a RSD5 half-day workshop. The workshop was to explore the relationships between systemic design, existing educational programs and the DesignX agenda. We invite RSD participants engaged in both of these contexts to join in a collaborative discussion aimed at further developing the design and education agendas in these discourse communities. We aimed at capturing experiences and insights from design leaders, educators and practitioners in Toronto, as input, validation and/or suggestions for further development of the DesignX education and direction.

This summary reports on three stages in the learning process: (i) setting of the workshop context; (ii) issues presented as highlights from group discussions; and (iii) post-workshop questions fusing further reflections for additional complementary research. This last stage poses questions for future exploration.

1.1 The workshop framed a context for conversations, encouraging visual artifact creation

Conducted in the same week as the *Emerging Practices Design Research and Education Conference* in Shanghai, RSD5 symposium participants in Toronto, were invited to contribute towards "sketching some future paths for design professionals". The intention was to be mindful of some of the ideas occuring between the Shanghai and Toronto events, using this

Design X themed workshop. The symposium theme of "Systemic Design for Social Complexity" invited participants to bring stories, cases, methods, hopes, trials and error for mutual learning and shared insight.important.

1.2 Attendees from the systemic design symposium

As one of 14 pre-symposium workshops offered to 300 attendees, 26 participants were attracted to attend the "Future Paths for Design Professionals", that focused on ties to the previous DesignX themes. The workshop was a half-day event, that was convened at the Relating Systems Thinking and Design (RSD5) Symposium, 2016.

Over 2 hours, 26 participants were briefed on the recent discourse to date on research and education agenda in deisgn, and were invited to self-organize into 5 groups for discussion. Group representatives then reviewed flipchart sketches tracing their dialogue, giving brief verbal recaps of key points. Subsequent reflections by the workshop facilitators raise three questions on: (i) echoes of the Design Methods movement in the 1960s-1970s; (ii) changes in social and technological contexts in the 21st century; and (iii) contemporaneous advances in complementary agendas. These are topics currently in discussion in not only in the design research community at large, but also in the systemic design symposia conducted over the past five years.

The workshop room was filled to capacity, laid out with tables and chairs that would later encourage breakout group conversations.

Participants in the "Future Paths for Design Professionals" workshop, RSD5, October 13, 2016

In order to guide participants towards productive conversation, the workshop opened with the a high-level review of some journal articles published to date, the historical context with DesignX with the systemic design community, and a suggested frame for thinking through and recording issues on shared flip chart paper.

2. Workshop context

As described in the introduction, the first stage of the learning process was the setting of the workshop context. A summary of the various parts for this contextual process are as follows:

- Facilitation by Susu Nousala began with the orientation process, an introduction of the key excerpts from *Shè Jì* (2014-2015). Initially there was a full workshop discussion where the material was introduced.
- Peter Jones recounting of the experiences and discussions between previous DesignX and RSD participants, as he was also one of the authors of the *Shè Jì* excerpts and therefore could give more in depth reflection regarding both events.
- David Ing introduced for the group participants an alternative to the traditional pattern format of "solution to a problem in context", with a service systems thinking approach.
- The next stage had participants physically moving from their initial seating into self-organizing groups. Time was allowed for free-flowing discussion based on personal interests. Sketching on poster-sized sheets with large markers were encouraged, to track the course of the conversations. These drawings and words become cues for members to reflect on their paths, and reflect on interests shared and divergent. The facilitators monitored progress, to encourage at least 3 rounds of issues with voices to be covered in the time allotted.
- Posters were moved from tabletops to the walls. Group members were asked to debrief the room of participants on highlights from their conversations.
- With the conference continuing to run for a few days more, all of the posters were displayed in public. The original participants were invited to engage in a further deepending of reflection and discussion by asynchronous text.

2.1 Summary of the excerpt orientation from She Ji articles (2014-2015) posted on the wall

Prior DesignX meetings in Shanghai have involved position papers and discussion amongst top experts in the field. For this workshop in Toronto, practitioners who were unfamiliar with the renewed interest in design research were provided with a light briefing on the progress that had picked up in the last few years. The primary agenda for the workshop was, however, to gather the views by those in everyday design practice, on research and education that might respond to the challenges faced on the ground. This participation was intended to broaden the perspectives on design research with additional voices, to validate and/or add to concerns that had previously surfaced. Resulting artifacts from this workshop might be further developed by academics and practitioners working together to bridge concerns and potential futures.

In fall 2014, "The Design Collaborative" of six university educators were "discussing how design can address the complex socio-technological systems that characterize our world" (Norman, 2014). How "can design play a role? Do our educational methods, especially the emphasis upon craft, prepare designers for this? What can design add?"

By fall 2015, the international design journal *Shè Jì* had published a series of articles that had neatly documented the Design X progress. These articles were useful, as they documented the chronological discussion points made to date, making it possible to create a literature review based on these specific *Shè Jì* articles.

2.2 Workshop briefing process

The process began with Susu Nousala providing excerpts of direct quotations sourced from *Shè Jì*, to familiarize workshop participants. These excerpts were shared with the participants through readings, discussion and reviewing ideas or issues. The excepts were printed out in large font and posted on the wall forming a "shrub" consisting of "branches" of key concepts. The excerpts provided a springboard from which participants could develop key points, that

emerged from sharing the readings and discussion. Participants could also review the excerpts and/or full hardcopy journal issues provided by workshop facilitators.

The workshop "shrub" of *Shè Jì* text excerpts remained on the wall throughout the session so that participants could consult with the reference points during the discussion period. These points may not have been completely novel or futuristic. They were meant, however, to summarizes of the flows of ideas put forth over several years in the prior development of DesignX.

Whilst there were many points that participants could consider, some selections listed below resonated as key points surfaced for participants, sparking group conversations.

2.2.1 An interdisciplinary gap

The journal *Shè Jì* and the DesignX symposium address an interdisciplinary gap perceived as having persisted in the design disciplines since the 1970's (K. Friedman, Lou, & Ma, 2015, p. 1). While the journal's title 'shè jì' means to "establish a strategy" the subtitle refers to design and innovation in an economic context. According the founders, the journal intent is to "reinvigorate the concept of *Shè Jì* at the level of science and technology, and at systemic and strategic levels" (K. Friedman et al., 2015, p. 3). While the "economics" of *Shè Jì* is still building its literature, the design context seems largely oriented toward business, social policy and other evidence-oriented sectors. The editorial intent of the journal meets DesignX in addressing the interdisciplinary gap of design research addressing complex systems.

Interest from the management and organization communities has led to design thinking, and revisiting creative inquiry and the quality of experience (Buchanan, 2015).

The development of design research can be integrated with in the design curriculum through cross- disciplinary teams working in communities of practice (Poggenpohl, 2015).

2.2.2 Complex sociotechnical systems

The DesignX position paper in 2014 led to a series of developments, including formal articles in the inaugural issue of *Shè Jì* centred on design for complex sociotechnical systems, and reporting of the 2015 DesignX workshop in Shanghai (Norman & Stappers, 2015a).

The first DesignX workshop deliberately sought adjacent disciplines relevant to sociotechnical systems, including Flach's (2015) commentary from cognitive psychology and cognitive engineering. Flach makes point of the need for engagement and learning in STS, especially reconsidering the level of commitment necessary in designing for complex systems, as designers can't expect to "sit outside the sociotechnical system and throw solutions over the fence" (Flach, 2015).

2.2.3 Human-centric

In another commentar, coming from a human-centric design perspective, the reduced ambition of small modular steps was seen as counter to design's tradition of bold thinking associated with giant creative leaps (Myerson, 2015).

In response to the two commentaries (plus a third by Jones, outlined below), the authors of the original article responded that DesignX is not limited solely to one person, one phase, nor one solution. A creative collaboration between actors and stakeholders, would include development and preparation through design education (Norman & Stappers, 2015b).

The shift with DesignX could be less emphasis on the "making", and more about (a) defining that which is to be made, and (b) the content (K. Friedman, 2015).

2.3 A brief first-hand account of Design/X participation in 2014-2015 was given

Peter Jones shared a brief summary of his history with the DesignX movement. As a participant in the October 2015 DesignX meeting in Shanghai, he had also offered a

commentary (Jones, 2015) in *Shè Jì* that emphasized the centrality of social complexity in all sociotechnical design contexts. Issues of systemic and design-led approaches have now brewed for 45 years since Cross' declaration of design methods for complex problems (Cross, 1972). Amongst the workshop groups, the team most interested in design education grappled with the issues of educational responsibility and next generation modes and disciplines. This coincided with developing views of solidarity, and calls to address the complexity of innovation policy for shared societal contexts such as climate change, new economic systems, and international affairs.

Norman's nine system dynamics proposed as characteristic in sociotechnical problems were simplified as (1) social and psychological factors of system participants and designers and (2) technical and systemic factors within STS problems. With complex systems, a DesignX Theory of Change would involve recognition of (1) initial conditions; (2) knowledge of social systems by internal and external stakeholders; and (3) the time required for change to become institutionalized.

Jones also touched on the intent of the workshop to act as a bridge between DesignX and the Systemic Design communities, towards continuing future discussion.

2.4 Groups conversations were encouraged along a generative pattern language format

David Ing introduced a template for each group to frame their ideas and discussions, based on a (forthcoming) paper on a pattern language for service systems (Ing, 2016). As an alternative to the traditional pattern format as a "solution to a problem in context", a service systems thinking approach advocates:

- Who and What (voices on issues);
- How and Why (affording values); and
- Where and When (spatio-temporal frames).

Within a discussion period of less than 2 hours, convergence on just the first item (i.e. who and what) would be considered good progress.

3. Issues and perspectives

Participants' group presentations centered around a variety of perspectives. Participants were asked to move (i.e. sit in a seat different from that currently inhabited) and self-organize amongst common interests. The tables were pulled apart.

3.1 Each of the five groups oriented towards a different voice on issues in design

Groups were invited to select representatives to review the sketches on their flip charts, and relate highlights of the conversations.

Group 1's discussion centered on social designers: For a design professional, what can a community of practice do to develop our roles as social leaders on multidisciplinary teams for change?

Group 2's discussion centered on design educators: For a design educator, what specialized expertise requires preparatory knowledge and practices enable participants (citizens) to engage and lead transformations extended from the lab and studio to the arena and agora?

Group 3's discussion centered on designers working in policy: For designers working in policy, what can and should they do that others can't do?

Group 4's discussion centered on designers engaged with stakeholders: For designers engaged with stakeholders (customers to planet), what are the value(s) associated with the products and services co-created in the bigger system?

Group 5 's discussion centered on design learners: For design learners, what is the best way to continue ongoing learning with real life that includes learning by failing?

3.2 Across the presentations, some preliminary themes emerged

Since the workshop was only two hours, the possibility of bring togethering the same or similar groups at a later date was discussed, towards extending discussions of the topics with exploratory reflection, after workshop/conference had closed. This approach was not actively pursued, yet was considered as a useful suggestion.

As a preconference workshop, a wide range of design practitioners did have the opportunity to discuss generally the development of methodological techniques and approaches for working in a collective manner. This group work also allowed considering the rapid and ever changing dynamics of the topics chosen and experienced by each group.

One emergent theme was on designers in communities of practice, raising questions on elements necessarily for effective communication, dissemination and germination of ideas. This echoed changes that should be observed in design practice today, and published in the first issue of *Shè Jì*:

> Based on observed changes in design focus largely due to the widespread availability of technology, design research and its role in education and practice need to be newly situated. [....]
>
> Communities form around ideas, key people, institutions, programs, books and journals. They provide the context and glue from which we can build without having to begin from scratch (Poggenpohl, 2015, p. 44, 56).

The way of doing things, the context and focal points are clearly very important. The issue of finding a common point or "foot hold" is often a difficult thing to grasp, prompting questions such as, where to position themselves and the problem within a larger sphere? In a systemic approach, thinking both at the focal and the domain levels simultaneously are common place. What is less common place is the emphasis of the skills required to comprehend shifting contexts for design, it's practitioner, student and trainers (Nousala, 2009).

Another emergent theme was on the learning of designers. For a design educator, what specialized expertise requires preparatory knowledge and practices enable participants (citizens) to engage and lead transformations extended from the lab and studio to the arena and agora, landscape of technology? The current impact emerging from the technological landscape of Big Data and the IoT (Internet of Things) seems to be a significant factor for the shift in design education. This impact is influencing how design educators prepare individuals, including participation in design domain development. M.P. Ranjan was cited in the challenge between a designed object at hand, and the context.

> Several years ago, [M.P] Ranjan and I were at a conference on design for social business. Opened by Nobel Laureate Muhammad Yunus, it was organized in Milan by Jürgen Faust. During one of our conversations, Ranjan said:
>
> "I think we need to redefine what we are doing and think that design is not about making the object, but rather about defining what one shall make and in what context. The word 'context' for me is very important, and when we talk about context, we think about the globe, about climate change, and ecology, and so on. All these things emerge from that one square foot of land on which you are standing. Can you do something with that one square foot of land?" (K. Friedman, 2015, pp. 81–82).

Both Ranjan and Poggenpohl were speaking about context in a similar way to that of systemic thinking. When thinking about context, it's necessarily to take into consideration the scale and focus from which the the action/s (in the case of Ranjan's discussion, it "making") is being taken. From this view point, both systemic and design approaches will always have a common point from which to work with.

The combination of context, focal point and dynamic horizontal thinking is powerful. The ability to cross domains without losing the focus whilst remaining conscious of the whole is an ability we need to experience and also pass on. How this is embraced is what current educating and facilitating needs to step up and continuously evolve, so as to match dynamic landscapes. The question of what can you do with your square foot of land is probably one of scale, something that systems thinking understands well. The translation of what that looks like and how to tell the story is something that design does well. So it seems, that for the translation of a dynamic and complex landscape of the future we will need to better understand the educational skill sets to deliver this combination in continuous cycles. Future emergent methodologies maybe combinations of know-how of "pathfinders" from several different domains that have already know what pathways to combine. It maybe argued that this combination is not so new, but these approaches have yet to become common place.

4. More questions

Post-workshop reflections have led to some questions for subsequent inquiry. These workshop's collection of discussions and outcomes exposed some interesting questions for future deliberation.

4.1 Are we echoing unresolved issues from the Design Methods movement of the 1960s-1970s?

The interest in a design research agenda across multiple academics, practitioners and institutions worldwide is leading to the current generation revisiting questions explored by leading figures who are retired and/or no longer active in discussions.

The *Design Methods Movement*, officially formed circa 1966, was "the result of post war optimism and a belief that making design more scientific would help to produce a better world" (Langrish, 2016, p. 1). The movement splintered by the early 1970s, including Christopher Alexander writing that "I think it is absurd to separate the study of designing from the practice of design", while Horst Rittel spearheaded the use of a systems approach in a "second generation of design" after establishing the idea of "wicked problems". A predisposition towards science presuming physics as the ultimate foundation has been challenged by broader perspectives of living systems through biology.

Design research recognizes that design professionals embody practices that can be shared and developed across a community. "Communities form around ideas, key people, institutions, programs, books and journals. They provide the context and glue from which we can build without having to begin from scratch" (Poggenpohl, 2015, p. 56).

Simultaneously, the career progression of design professionals progress sees many individuals working beyond the frame of what might be traditionally labelled as "design research". The professional field labelled as "design" is "full of fundamental contradictions and deep inner tensions that continuously feed discussion in the field" (Dorst, 2015, p. 30). The expanded field spans (i) commercial success versus common good; (ii) creation versus problem solving; (iii) utopism versus pragmatics; (iv) outcome materiality versus immateriality; and (v) art school versus academic degree.

A distinction can be drawn between in academic degrees in (i) design that "is about producing design" with the capability of reflecting on designing; and (ii) design studies that "is about reflecting on design as it has been practiced, is currently practiced, and how it might

be practiced" (Margolin, 2016, p. 8). In graduate studies, Ph.D. programs in design differ "from doctorates in established fields and disciplines is that there is no set of intellectual norms against which to measure the value of a new degree, nor is there a community of scholars who can pass judgment on its merits" (Margolin, 2016, p. 5). If there was a distinction between advanced degrees in (i) producing design, and (ii) design studies, multiple legitimate standards might be established in peer reviews for journals, and pedagogical programs contingent on the types of projects or interventions engaged.

4.2 Is design research responding to 21st century changes in social and technological contexts?

The design research agenda now has an enlarged set of contexts in which to play, as compared to the *Design Methods Movement* of the 1960s-1970s. Designers used to focus primarily on material products, focused on physicality and associated phenomenology of human experience. The 1980s brought personal computing, leading to the rise of interaction design in the 1990s. The first decade of 21st century heralded "the world is flat" (T. L. Friedman, 2005) with ubiquity of the Internet and open borders of globalization. The second decade of the Internet is grappling with the Internet-of-Things, cognitive computing, and re-emergence of localization as national governments respond to populism.

Thus, the DesignX position paper asked whether education emphasizing traditional crafts in design is preparing "designers for work in and with complex sociotechnical systems" such as healthcare, transportation, government policy and environmental protection (Norman & Stappers, 2015a, p. 84). Nine unique properties of complex sociotechnical systems have been proposed in three categories of (i) the psychology of human behavior and cognition; (ii) the social, political and economic framework of complex sociotechnical systems; and (iii) the technical issues that contribute to complexity. The suggested way forward for designers has been proposed "to avoid trying to construct or redesign a large, complex system in one step", and instead reaching the solution "through modularity, and the introduction of numerous small, incremental steps" (Norman & Stappers, 2015a, p. 93).

4.2.1 A variety of responses

This position paper led to a variety of responses. Amplifying that "the design process never ends", educators are encouraged to recognize that rapid change and future uncertainties drive a need "to continuously learn and adapt", leading to designers who can participate with organizations that are "self-organizing, continuously redesigning themselves" (Flach, 2015, p. 98). The sensible approach of taking small, modular steps "goes against the grain of more than 50 years of project-based design education in which designers have been taught to think big and bold outside the constraints of any system, and to learn through trying, making, and failing" (Myerson, 2015, p. 101). In designing a broader theory of change, designers who are willing to live with the consequences of their proposals should recognize that engaging deep users and stakeholders "must be identified and often discovered over time" if a socio-technical systems design project is to be reframed (Jones, 2015, p. 103).

The skills required for design leaders in the 21st century have been mapped as four inter-related geographies: (i) Design 1.0 of traditional design; (ii) Design 2.0 of product/service design; (iii) Design 3.0 of organizational transformation design; and (iv) Design 4.0 of social transformation design (NextDesign Leadership Institute, 2011). These geographies represent ranges across (a) stakeholders few ↔ many; (b) processes partial (downstream) ↔ complete (upstream); (c) scale of challenges small ↔ large; (d) complexity low ↔ high; (e) fuzziness of challenges defined ↔ undefined; (f) sensemaking activity and toolbox small ↔ large; (g) language is an intuitive process of a single designer combining

both content and process expertise ↔ an externalized process of separated content and process roles in strategic co-creation.

Progressing from Design 1.0 to Design 4.0 geographies increasingly sweeps in technical engineering and social sciences into larger creative systemic challenges. Educators in engineering, management and design all face this issue of crossing discipline lines. For designers to actively lead in multi-disciplinary endeavours, they have to assume both the privileges and burdens as translators and integrators across the knowledge domains. A Design 4.0 geography of social transformation design calls for solidifying a poly-disciplinary network of researchers and academic institutions, across professionals from private and public sectors into a community of interest that becomes a community of practice (Garduño Garcia, Nousala, & Fuad-Luke, 2015, pp. 367–368).

4.3 Is design research coevolving alongside advances with complementary agendas?

An expansive view of design research includes episteme (know-why), techne (know-how) and phronesis (know-when, know-where, know-whom) (Ing, 2013, pp. 539–541). Design research not only shapes, by is shaped by its interactions with contemporaneous engagements with agendas driven by field work. The popularization of the term "design thinking" may mean an "imaginative act of the mind", "cognitive processes of the brain of the designer" and/or "creative inquiry", where "management has become a logical extension" (Buchanan, 2015, pp. 12–15). In addition to a management agenda, design research interacts with practitioners and academics with alternative agendas..

An architectural agenda with "the user as inhabitant of a system" expresses the "social and political human truths of the design process" (Steenson, 2016, pp. 1–5). Popularized the Christopher Alexander and adopted by the software development community, "the language of patterns is a format that organizes the parts, wholes and relationships in a design problem". Creating and interacting things in the world are mediated by design languages that "play an important role in the expression of the unfolding of meaning of objects" (Rheinfrank & Evenson, 1996, pp. 65–69).

A communicative agenda sees design languages as the means by which (i) designers bulding meaning into objects, so that objects express themselves and their meanings to people; (ii) people learn to understand and use objects; and (iii) objects become assimilated into people's experiences and activities. Synthesis maps represent a systemic visual language resulting from collaborations of a multidisciplinary teams study and proposing complex issues within wicked problems (Jones & Bowes, 2016). GIGA-mapping combines design, systems thinking and visualization not to "tame" problems, but instead try to grasp, embrace and mirror the complexity and wickedness of real life problems (Sevaldson, 2011, p. 2).

A dialogic agenda with design research supports systemic research methods with four design modes: (i) a design or visual mode relevant to a research intention for understanding, and a research intention for producing in a novel or unknown future; (ii) a cybernetic and quantitative reasoning model enabling a research intention for prediction (particularly with systems engineering); (iii) an evaluative mode for a research intention for system and organizational change; and (iv) a social and participatory mode for a research intention of action research, organizational development and co-creative social design. "In systemic design, any or all four intents may emerge in a relevant research application. In some cases at least one of each intent for the different stages in research may be appropriate" (Jones, 2014, pp. 3–5).

A social innovation agenda with "research through design" is closely related to action research methods. The design activism movement "requires opening design to continuously act on social problems, which involves stakeholders in collaborative way to generalize the problem-solving outcomes and knowledge" (Song & Lou, 2016, p. 286). As more experience

with this approach is gained, a "designerly way of action research" that refines ideation and exploration phases may become better established.

A sustainability agenda with design has evolved from early interests in environmental and social issues. Design for Sustainability (DfS) be categorized as four levels of innovation: (i) product innovation, including green design and ecodesign, emotionally durable design, the nature-inspired design of cradle-to-cradle and biomimicry, and design for the base of the pyramid; (ii) product-service system innovation, including value propositions satisfying from function delivery rather than products, and shifting from ownership to access and sharing; (iii) spatio-social innovation, including design for social innovation, the natural-inspired design of systemic production of material and energy flowing from outputs of one process into the inputs of others; and (iv) socio-technical system innovation involving sustainability science, future studies, theories of transition, and cities as complex adaptive systems (Ceschin & Gaziulusoy, 2016, pp. 2–8). Some design approaches orient more towards an environmental dimension ranging from insular to systemic; others more towards a socio-ethical dimension from ranging technology to people; with designs for systems innovations and transitions the most ambitious as oriented as systemic with people. In a commercial context, defining a "successful sustainable business" incorporating sustainability metrics into traditional accounting practices, decision making and the business model can be approached using a business canvas template (Upward & Jones, 2016).

An emancipatory agenda with "good design" not just as "good business", but "grounded on a clear ethical justification" challenges a presumption the economic growth is ultimately necessary (Garduño Garcia, 2017, p. 21). Constructive design research and experimental design pedagogy were methods applied on Aalto LAB Mexico in 2010 with freedom philosophically connected as a guiding principle for design embracing sustainability.

The above list of agendas for design research is not exhaustive, but instead draw attention to the variety of forces potentially at play in horizontal knowledge development and transfer amongst individuals and groups. Further, the emergence, evolution and sustainment of knowledge on design research occurs at multiple scales, e.g. project teams, small businesses, larger organizations, industry forums, industry clusters, urban districts and nation states (Nousala & Hall, 2008, p. 1). Dynamic learning approaches for longitudinal development of robust groups or communities (e.g. action based learning, action research, living labs) include experiential learning cycles for independent, self-determining and self-governing innovation (Song, Nousala, & Aibéo, 2015, pp. 49–51).

5. Further inquiry into the nature of systemic design can critically extend design research

The two hour workshop in October 2016 resulted in a rich body of conversations amongst participants that is only partially reflected in this summary. It is hoped that the opportunity for subsequent session with differing members of the discipline will (such as the session carried out with a cohort of Ph.D. students from the Tongji University College of Design and Innovation) deepened the inquiry into the purposes and meaning for design research. Engaging practicising designers on issues with current and prospective work opens up blind spots towards which educational programs should respond. The questions raised in the post-workshop reflections could be expanded, exploring additional perspectives that have not as yet been recognized or appreciated.

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