

Tipping points in design-led collaboration: attending to moments of emergence in design facilitation practice

Ollie Hemstock, Helen Simmons, Mark Bailey, Nicholas Spencer, Sophie Coombs
School of Design, University of Northumbria, Newcastle (UK)

Design-led collaborative practice is a rapidly developing disciplinary area where professional, trained designers work beyond their traditional disciplinary landscape often to address complex situations through people-centred approaches. Good design facilitation involves thinking, feeling and experiencing what is happening to adapt to the inevitable unpredictability that occurs when working in co-creative environments. Through a case study of 92 design-led innovation support workshop sessions with SME scale businesses, data was gathered which provides empirical evidence to the existence and characteristics of 'tipping points' – crucial moments of tangible emergence – experienced by a team of design facilitators. Inductive analysis of data pointed to 4 key types of tipping points relating to; co-creation, agency, uncertainty and direction. This paper suggests how these different tipping points can be identified and how design facilitators might respond to each of them differently for positive outcomes.

Keywords: design facilitation, emergence, co-creation, participatory design, design practice

Copyright © 2022. Copyright in each paper on this conference proceedings is the property of the author(s). Permission is granted to reproduce copies of these works for purposes relevant to the above conference, provided that the author(s), source and copyright notice are included on each copy. For other uses, including extended quotation, please contact the author(s).

Introduction

Participatory and collaborative design approaches are increasingly locating professional, trained designers beyond the traditional disciplinary landscape of the 20th Century (Buchanan, 1992; Tonkinwise, 2015). Expanding the disciplinary landscape of design practice engages designers in inter-disciplinary and multi-stakeholder contexts (Jones, 2017; Sevaldson & Jones, 2019), often to address complex situations (Spencer & Bailey, 2020). Within such contexts, designers must adopt new capacities and assume a range of different roles (Howard & Melles, 2011; Yee et al., 2017). The role of design facilitator has been reported in literature for more than a decade (Body et al., 2010; Light & Akama, 2012; Luck, 2007). However, design facilitation practice remains a developing discipline, it currently lacks definition and is indistinctly characterised (Mosely et al., 2021; Villaman, 2020).

To compound the issue, the global pandemic has catalysed a widespread shift towards online remote working, many collaborative activities that had previously taken place in-person are now being hosted digitally in virtual space (Kent et al., 2020; Mennig & Tamanini, 2021; Wilkerson et al., 2020; Zimmermann et al., 2021). This is discussed in a growing body of research that tends to focus on effective use of digital technology and software platforms, as well as how methods, tools and scripts can be adapted for virtual delivery. For design facilitation – in addition to being a developing discipline – there remains much still to be understood about virtual deployment, particularly in respect of how rapidly digital collaboration tools and technologies are maturing (Hemstock et al., 2022; Mennig & Tamanini, 2021).

This study explores the experience of design facilitators (DFs) during practice in rapid design-led interventions (Gribbin et al., 2018), which in this case constitute multiple sets of a collaborative innovation workshop programmes involving small and medium sized enterprises (SMEs). Between 2016 and 2022 this workshop programme has been delivered in several different locales as either co-located (in-person) workshops, or virtual workshops using video conferencing and digital

collaboration tools. This inquiry is structured around a single case study focusing on the workshop programme. An exploratory-deductive approach (Casula et al., 2021) is followed to examine a working hypothesis, qualitative methods are used to gather data from DFs experience of delivering approximately 245 hours of workshop sessions. The study develops an understanding of the dynamics of design facilitation practice in rapid design-led interventions from the perspective of expert practitioners.

Argumentation is made from the stance that design facilitation is an emerging practice (Aguirre et al., 2017; Bødker et al., 2017; Hayes et al., 2021), which takes place in a complex social environment, and is subject to diverse and unpredictable phenomena that have been previously described as *elements* within this environment (Hemstock et al., 2022). This study is interested in how DFs respond to emergence through practice in the workshop setting, as a flow of reflective dialogue between practitioner and these *elements* as “materials of the design situation” (Schön, 1992). The working hypothesis used to initiate this enquiry suggests the existence of tipping points, which are tangible moments of emergence, perceptible by DFs during workshops. This study examines the working hypothesis to understand whether tipping points do indeed exist, and if so, what their characteristics are, and who they involve and affect.

Background

Design facilitation can be understood as the “act of drawing on and applying design processes and approaches to enable dialogue and ideas to emerge within participatory design contexts” (Mosely et al., 2021, p. 11), with the intention of addressing complex problems through creative and analytical methods (Bailey et al., 2019; Jones, 2017; Rieple, 2016). It is a form of practice that is rapidly establishing itself as a core competency for designers, who are increasingly engaged in “people-centred” approaches (Napier & Wada, 2017, p. 162). Design facilitation is mainly applied in orchestrating collaborative activities and participatory processes, such as workshops, where designers act as intermediaries between the initiator of a project and the stakeholders it affects (Villaman, 2020, p. 29).

Methods used often involve empathetic approaches to engage with stakeholders, to gain a meaningful understanding of their social, economic and political perspectives (Napier & Wada, 2017, p. 157). Whilst design facilitation shares some of the skills of general facilitation, the role is differentiated by how the designers guide a group through a collaborative process, often to envision a preferable future that is co-created from multiple stakeholder perspectives (Body et al., 2010, p. 61). In this role, designers enable co-creation by establishing safe environments that support group participation in addressing a problem (Howard & Melles, 2011, p. 154).

The practice of design facilitation is still evolving, and literature recognises that it is currently indistinct and lacking a common definition (Mosely et al., 2021; Starostka et al., 2021; Villaman, 2020). Design facilitation is poorly defined and inconsistently represented, and utilised for a variety of purposes, both within the design discipline and externally (Mosely et al., 2021, p. 10). Starostka et al. (2021, p. 836) highlight the essential role of design facilitators in transposing design thinking into settings of diverse audiences through their own interpretations, but also suggest that facilitators understanding of design thinking is inconsistent. They state that pre-occupation with “defining and conceptualising the design area” has led to lack of empirical study of diverse practices of design (Starostka et al., 2021, p. 842).

Several contributions recognise emergence as inherent in the practice of design facilitation, as a consequence of the complex social nature of collaborative and participatory engagements (Aguirre et al., 2017; Bødker et al., 2017; Hayes et al., 2021; Kimbell, 2009, 2012; Light & Akama, 2012). Lichtenstein (2014, p. 1) describes the phenomena of emergence as “the creation of order, the formation of new properties and structures within complex systems”, it represents the creation of new higher-order outcomes from the interaction and interdependency of lower-order parts (Aguirre et al., 2017, p. 199). Emergent outcomes cannot be predicted by understanding each individual part of the system in isolation (Lichtenstein, 2014, p. 1). From the perspective of complexity science, emergent outcomes are characterised by instability, tension and unpredictability present in open systems that lead to non-linear change (Kearney & Lichtenstein, 2022, p. 3). This resonates with Villaman’s (2020, p. 34) articulation of the complexity and unpredictability of facilitation and participatory practices, which are non-linear and contingent on many layers of imperceptible factors.

A growing body of design facilitation literature discusses the implications of emergence on practice. Akama & Light (2012, p. 69) suggest that practitioners are in negotiation with emergent dynamics, where facilitation involves thinking, feeling and experiencing what is happening. The dynamics at play in co-creative and participatory design are understood as existing beyond the boundaries of the engagements themselves, as messy, unclear activities and processes that take place backstage (Bødker et al., 2017, p. 248). Drawing from an Ingoldian anthropological perspective, Hayes et al. (2021) use the metaphor of flowing lines to represent dynamic influences that flow into and through these engagements. The

frontstage engagements are necessarily conditioned by the flow of storylines, which are already animating and framing what is possible in the engagement (Hayes et al., 2021, p. 530).

There is apparent similarity between the concept of flowing lines, and the identification of elements as unpredictable, inter-related and contingent phenomena in the environment surrounding workshop engagements (Hemstock et al., 2022). Design facilitation is an “intricate relationship” between the personal attributes of the practitioner, and the shared attributes of the environment that requires apprehension of- and attention to “interdependencies and interrelations” of practice (Mosely et al., 2021, p. 11). Unexpected, unpredictable emerging situations require practitioners to adjust their courses of action, gain new understanding of the situation as it unfolds, and adapt their systems of knowing-in-practice (Light & Akama, 2012, p. 69).

Aguirre et al. (2017) provide a valuable framing of design facilitation in relation to emergence, although tools provide only one lens through which to view practice. Design literature considers other lenses including, but not limited to, attitude (Gribbin et al., 2017; Michlewski, 2008), mindset (Dosi et al., 2018; Hemstock & Spencer, 2019; Howard & Melles, 2015), and roles (Howard & Melles, 2011; Sanders & Stappers, 2008; Yee et al., 2017), but to better understand design facilitation it is necessary to expose how design facilitators attend to emergence through practice, in the moment. Empirical study into the nature of this form of design practice is essential to advancing constructive debate and development of the field (Starostka et al., 2021, p. 842). Well-designed collaborative and participatory programmes must adapt to the inevitable unpredictability that occurs when (co-)designing within “the dynamics of a complex adaptive system, which by definition has many interdependent parts making independent decisions” (Body et al., 2010, p. 68). Hence, design facilitators not only need to design and deploy context-specific tools to engender non-linear change (Kearney & Lichtenstein, 2022) but also negotiate emergence by “feel and experience” (Light & Akama, 2012, p. 69). This paper explores how design facilitators attend to the complex, unpredictable dynamics that are in flow during workshops, and how the practitioner thinks, senses, acts and relates while in dialogue with the design situation.

Methodology

The study reported by this paper is situated within a larger research project titled Creative Fuse Northeast 2.0 (CFNE2). This is a major ongoing action-research project undertaken by a consortium comprising the 5 UK universities located in the Northeast region of the England. CFNE2 is joint funded by the European Economic Regional Development Fund (ERDF) and the UK Arts and Humanities Research Council (AHRC), and aims to investigate the potential of the Creative, Cultural, Digital and IT sectors as catalysts for innovation and regional prosperity (www.creativefusenortheast.org.uk). This study is a co-reflection on DFs experience of delivering innovation workshop programmes as part of CFNE2, and relevant selected research projects which preceded it.

A single case study framework (Yin, 2018) is used to structure an exploratory-deductive inquiry (Casula et al., 2021), where this framework offers an effective means to understand a phenomenon by exploring its context, process, influences and implications (Flyvbjerg, 2013). Qualitative methods are used to gather primary data from expert DFs involved in delivering the workshops, and include questionnaires, semi-structured interviews and focus groups. As DFs involved in workshop delivery, the authors form a constituent part of the object being studied and recognise the need to observe and declare how their position could influence the collection and interpretation of data (Simons, 2014, p. 81).

Working hypothesis

The literature demonstrates that design facilitation practice does not yet represent a well-developed body of theory from which robust hypotheses may be formed. This study follows an exploratory-deductive mode of inquiry that is led by a working hypothesis that acts as a guide for examining an emergent phenomenon (Casula et al., 2021, p. 1722). Working hypotheses allow an explorative study to follow a deductive inquiry as they are not bound by the relational expectations of typical deductive *explanatory research* (ibid.). The working hypothesis that initiates this study is formulated based on insights from a previous inquiry into DFs experience of designing and facilitating virtual co-creative workshops (Hemstock et al., 2022). These insights were the subject of several iterations of reflection, through which the working hypothesis was defined.

During participatory co-creative interventions, design facilitators may experience *tipping points* as tangible moments in the chemistry of the setting where emergence becomes perceptible. From the perspective of design facilitators, tipping points may be perceived according to the following characteristics:

- A recognisable change in the direction or focus of the discussion, that the client does not then go back from.
- A moment where fragments of ideas suddenly come together to form a new concept.
- A change in the dynamics of the workshop - the client moves from 'responding' to co-exploring, framing their own prompts and finding their own lines of exploration.
- A noticeable change in the energy of the session.

The Case: Innovation Workshop Programmes

The case study is centred on workshop programmes run by the design department of Northumbria University, UK, as part of their CFNE2 research and engagement activities, *Get Ready to Innovate* (GRTI) and *Get on and Innovate* (GOAI). Both workshop programmes are participatory, co-creative and *design-led* (Bailey et al., 2019), comprising 12 hours of innovation support, provided by expert DFs to SME-scale enterprises. Both programmes are fully-funded and are provided free-of-charge to beneficiaries, who will be referred to hereafter as “clients”. GRTI ran as part of the previous phase of Creative Fuse North East (CFNE1), which involved three members of the current DF team, members of the same DF team also helped run GRTI for the separately funded *EKG Starters* (<https://egkstarters.com/>) initiative in Alabama, US (table 1).

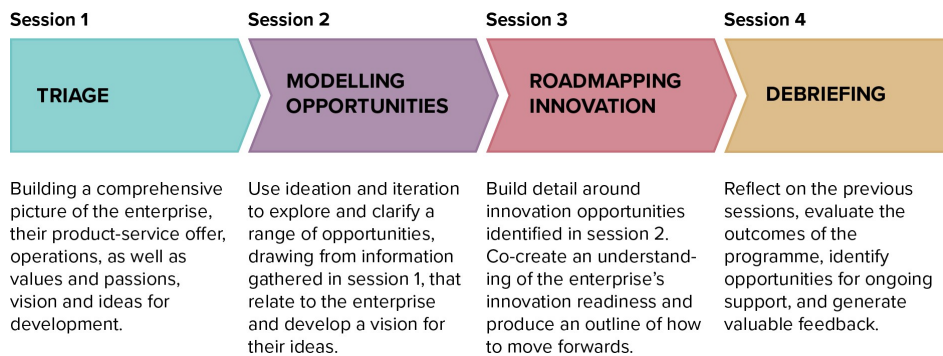


Figure 1: Taken from Hemstock et al. (2022). Workshop structure – 4 collaborative sessions, each lasting 3 hours, and typically scheduled over a four-week period.

The two programmes, GRTI and GOAI are differentiated by the stage at which the client organisation or enterprise is at in respect of their innovation objectives at the time of registration. GRTI offers a broad inquiry that helps clients to understand their innovation readiness and formulate a pathway of actionable strategic objectives (Gribbin et al., 2018, p. 8), whereas GOAI is project-focused and helps to contextualise an innovation idea to better understand key decision points and outline decision-making criteria. Both programmes represent workshops as a means (Ørngreen & Levinsen, 2017, p. 72), where the arrangement is based on focused collaboration between client and DFs. In such co-creative arrangements designers tend to behave as facilitators and participants (Aguirre et al., 2017, p. 199), collaborating towards a shared goal defined by the client. The two programmes are considered sufficiently similar for the purposes of this study to form a single case.

- Unit of analysis: rapid design-led interventions (four, 3-hour workshops) comprising both GRTI (inclusive of CFNE1, CFNE2, and EKG Starters) and GOAI (CFNE2 only), totalling delivery to 23 separate clients.
- Units of data collection: *DFs who are responsible for the delivery of workshop programmes.

Table 1: Innovation workshop programmes, dates held, design facilitators involved and their role

Programme	Dates	Design Facilitator	Role
CFNE1	2016-2019	DF1*	Senior Design Academic
		DF2*	Senior Design Academic
		DF3*	Early Career Researcher
		DF7	Early Career Researcher
		DF8	Early Career Researcher
		DF9	Early Career Researcher

EKG Starters	2020-2021	DF3* DF4* DF5* DF7 DF10	Early Career Researcher Early Career Researcher Early Career Researcher/Lead Author Early Career Researcher Early Career Researcher (US)
CFNE2	2020-2022	DF1* DF2* DF3* DF4* DF5* DF6* DF7 DF11 DF12 DF13 DF14 DF15 DF16 DF17 DF18	Senior Design Academic Senior Design Academic Early Career Researcher Early Career Researcher Early Career Researcher/Lead Author Early Career Researcher/Second Author Early Career Researcher Design Masters Student Design Masters Student Design Masters Student Design Masters Student Design Masters Student Design Masters Student Design Masters Student Design Masters Student Design Masters Student

Table 2: Innovation workshop programme delivery for 23 client enterprises, according to the workshop programme type, the project within which the programme was delivered, the mode of delivery and the average ratio of clients to facilitators.

	Project			Delivery Mode		Ratio
	CFNE1	CFNE2	EKG Starters	Virtual	In-person	Client:DF
Client A	GRTI				X	1:2
Client B	GRTI				X	4:3
Client C	GRTI				X	3:3
Client D	GRTI				X	1:3
Client E			GRTI	X		1:3
Client F			GRTI	X		1:3
Client G			GRTI	X		1:3
Client H			GRTI	X		1:3
Client I		GRTI		X		1:3
Client J		GRTI		X		2:3
Client K		GRTI		X		1:3
Client L		GRTI		X		1:2
Client M		GOAI		X	X	1:3
Client N		GOAI		X		1:3
Client O		GRTI		X		1:3
Client P		GRTI		X		1:3
Client Q		GRTI		X		1:3
Client R		GRTI		X		2:3
Client S		GRTI			X	3:3
Client T		GRTI			X	1:3
Client U		GRTI			X	1:3
Client V		GRTI			X	1:3
Client W		GRTI			X	1:3

Methods of data collection

Qualitative methods were used to collect data for the purposes of this inquiry, the primary dataset was compiled using the following methods and scheduling:

- Semi-structured interviews: two co-reflective interviews were arranged to inquire into the experience of DFs in designing and delivering virtual co-creative workshops, refer to Hemstock et al. (2022). The interviews were 1.5 hours in duration and convened virtually using video conferencing, with audio recording and automatic transcription. In this study, these interviews mainly inform the working hypothesis, but also contribute data pertaining to how DFs perceive conceptual *tipping points*.
 - Interview 1: DF1 and DF2 who are senior design academics.
 - Interview 2: DF3, DF4, and DF7 who are early career design researchers.
- Questionnaire: a qualitative questionnaire responded to by 6 members of the DF team, introduced a definition of *tipping points* based on that which forms the working hypothesis of the study. Respondents were asked to briefly discuss to what extent they agreed or disagreed with various aspects of the description, and subsequently identify if they had experienced such *tipping points*. Questionnaires were sent out separately to each DF team member and responses were returned individually without conferring between DFs, and results were not disclosed to the team.
- Focus group: a 1.5 hour duration focus group arranged to facilitate critical co-reflective debate between DF1, DF3, DF4, DF5 and DF6 about the nature of *tipping points*. Prompts stimulated debate around occurrences, experiences, constitution, perception, conditions and dependencies relating to the concept. The session was convened virtually with audio recording and automatic transcription.

Supplementary data is provided for the inquiry in the form digital white boards populated by DFs and clients during workshops, and 25-30 minute semi-structured and transcriptions of sign off interviews with clients that take place at the end of delivery. Digital white boards provide records of the workshop sessions that help to contextualise occurrences of the tipping points reported by DFs. Additionally, in some instances the sign off interviews contain corroborating evidence from a client perspective.

Mitigating Methodological Bias

This study involves practitioners reflecting on their own practice, the subsequent potential for methodological bias is acknowledged. The research design includes measures to mitigate against bias, particularly during stages of data collection and data analysis. In addition, by framing a working hypothesis the researchers have explicitly articulated their preconceived ideas and expectations about the phenomenon under examination. The following measures were implemented:

- Data collection: two members of the DF team (lead author and second author) led the data collection process, the rest of the DF team were not involved in formulating the working hypothesis, designing the data collection methods, or creating questions and prompts. Questionnaire respondents were asked to individually respond, without conferring or sharing their responses with the rest of the team, and all questionnaires were returned before the focus group was held. A member of the CFNE2 project team, who is not a DF, was present during the focus group to provide an outside perspective, particularly by formulating questions to help elaborate on semi-structured prompts.
- The same two DFs who led the data collection were also responsible for data analysis, other DFs were not involved in interpreting the datasets. The authors interpreted the raw text data independently, following pre-agreed evaluation objectives. Categories were agreed through critical discussion, and where key insights could be corroborated through multiple accounts of the same instance, or by supplementary data. DF accounts of tipping points that appeared inconsistent, could not be corroborated by supplementary data, or represented only a single perspective were considered unreliable and were omitted.

Analytical Procedure

Primary data collected using questionnaires, interviews and focus groups is qualitative in nature and exists as textual content. The analytical procedure followed combines conventional and directed modes of content analysis (Hsieh & Shannon, 2005) as a two-stage process. This was deemed to appropriate for an exploratory-deductive inquiry that is led by a working hypothesis, where there is little existing theory surrounding the phenomena being examined (Hsieh & Shannon, 2005, p. 1279).

The first stage represents a deductive, directed mode of analysis that uses the working hypothesis as a framework to identify instances where DFs explicitly identify tipping points that they perceived during workshop delivery. The working hypothesis posits 4 provisional characteristics of tipping points, these formed initial categories with which to begin interpreting the data. The authors recognise the potential for confirmation bias when applying a theoretical framework in a directed mode of content analysis. However, the inquiry does not seek to confirm the working hypothesis, but rather use it to initiate and guide the inquiry. Supplementary data in the form of digital white boards, populated during workshops with clients, aided the authors in contextualising their interpretations to determine their consistency.

The second stage of analysis followed a more conventional inductive mode of exploration, with the objective of understanding the nature of tipping points. The authors focused on the rich accounts given by DFs about the occurrences, experiences, constitution, perception, conditions and dependencies surrounding moments of tipping points. This allowed identification of at what stage in the workshop session tipping points emerged, as well as some of the conditions perceived to be involved. Examples of a non-linear change (Kearney & Lichtenstein, 2022, p. 3) were used as evaluation criteria to formulate categories that represented the nature of tipping points more accurately than the propositional characteristics outlined by the working hypothesis. Similar to the first stage, the authors referred to supplementary data to corroborate DFs accounts with records created during the workshop, and in some cases with client sign-off interviews.

Findings

Inductive analysis of primary data highlighted misalignments between the provisional characteristics of tipping points outlined in the working hypothesis, and how tipping points are represented by DFs when reflecting on their experience of workshop delivery. DF perceptions of tipping points allowed new characteristics to be formulated, that either supersede or extend those initially provided by the working hypothesis (table 3).

Table 3: Characteristics of tipping points as described in the working hypothesis, compared to amended characteristics that were defined from inductive analysis of the data.

Tipping points as characterised by working hypothesis (superseded)	Critique of working hypothesis	Tipping points as characterised by DFs	Exemplars
A recognisable change in the direction or focus of the discussion, that the client does not then go back from.	DFs can only perceive changes during contact-time with the client, so unless this change is reversed in a subsequent workshop session, it is not possible to ascertain how sustained a change might be beyond the conclusion of the workshop set.	Direction: a recognisable change in the direction or focus of the collaborative exploration.	<p>“When presenting back the findings of the fieldwork it felt like [Client M] was seeing the value [...] and recognising new things about how the organisation is operating”</p> <p>“It was much more subtle with [Client O] and it was the moment when he transitioned from being defensive to being willingly reflective”</p> <p>“[Client F] said it was a revelation. But she didn't implement it. It kind of stopped at the end of the session. So yes, there was a tipping point [...] but it didn't transform into anything after that”</p>

A moment where fragments of ideas suddenly come together to form a new concept.	The hypothetical characteristic does not accurately represent the nature of such a tipping point. This has been amended based on text segments from DFs.	Co-creation: a co-created idea that resonates with the clients' aspirations and motivations, whether these are explicit or implicit, and that the client can act on.	"It was about framing that actually, motivation for change was a primary driver [for Client B]. So, a model was developed that described those things in relationship" "it's not just a bright idea, [...] it's not only that it's a bright idea that resonates with their motivations, they can act on it. They're the things that create the tipping points"
A change in the dynamics of the workshop - the client moves from responding to co- exploring, framing their own prompts and finding their own lines of exploration.	Data analysis suggests that tipping points are more representative of how agency can shift between actors in the process, and how these shifts can positively or negatively impact the workshop.	Agency: a change in the dynamics of the workshop that is led by the client, where this is a clear shift in agency, ownership of the process.	"We've changed gear, something slightly different is happening [...] there were points where we were bystanders, [DF6] was an illustrator and [DF5] and [DF1] were bystanders and [Clients S] were running the session" "[Client J] just started lobbying 'what if' questions into the mix left, right and centre, she was kind of taking control of the situation"
A noticeable change in the energy of the session.	Recognised as being more representative of chemistry, about how DFs can sense the dynamics of the workshop, rather than a specific identifier of tipping points.	(Superseded)	"I recognised when we framed the current and the future enterprise in a way that resonated with [Client K], you could sense that by the energy that they then put into exploring it."
	(Introduced based on inductive analysis)	Uncertainty: a strong sense that the client does not see potential value in the direction of the inquiry or does not have sufficient trust in the process to tolerate ambiguous and uncertain directions of exploration.	"[Client O] seemed to be disengaging, becoming more defensive. [DF1] and I both sensed this during the session and reflected on it immediately after [...] we worked quite hard to try and get the workshops back on track" "There was a noticeable negative change [...] where the line of inquiry we had chosen seemed to fall flat and wasn't seen by [Client M] as all that useful in comparison to her expectations"

Specific instances of tipping points were identified in the primary data through deductive analysis, focusing on content where DFs are specifically referring to instances where they perceived tipping points to occur. As well as an account of how each DF experienced tipping points, it was also possible to identify which client was involved, where the impact was considered positive or negative on the flow of the workshop, and in some cases when during the workshop programme these moments occurred. Each tipping point was then categorised according to the characteristics identified through inductive analysis. Table 4 presents instances where DFs were unanimous about the timing, nature and impact of tipping points for 8 separate clients.

Table 4: Instances where 2 or more DFs identified the same tipping points for a particular client, and consistently agreed on when the moment occurred.

Client	Session TP identified	TP impact	Description	Category
E	2	Negative	A personality clash damaged the rapport and trust in the group so much that the client became visibly disengaged for the remainder of the programme. Where agency is about how the client took ownership of her level of participation.	Agency
K	2	Positive	A complex contextualised diagram supported by discussion created a substantial tipping point, client understood new concept and embedded DFs as resources in their planning.	Co-creation

Q	2	Positive	The client gained clarity through diagrams which helped to frame opportunities in a chronological order, showing benefits to the business and stakeholders in a way that made them achievable. The client gained confidence through this viewpoint.	Co-creation
H	2	Positive	The client was able to visualise their business and find an area of focus.	Co-creation
B	3	Positive	The client recognised one of their primary motivations through the creation of a model/diagram. This then allowed a conversation around that new realisation.	Co-creation
R	3*	Positive	Through a homework activity the client was able to realise their abilities and define their role in the organisation. This boosted their confidence and their engagement in the workshop. *The tipping point appeared to happen as a result of a task completed between sessions. DFs didn't see it occur but saw that it had happened.	Agency
M	2	Negative	The DF shared an idea with the client, but it didn't resonate with them and added to the sense of overwhelm.	Uncertainty
M	4	Positive	Information shared by the DF following a shadowing exercise created a positive tipping point for the client where they gained a new understanding of the tacit knowledge and informal systems in their enterprise.	Direction
O	1	Negative	The ambiguity created as part of the data sharing process, appeared to cause discomfort for client who withdrew and became defensive.	Uncertainty
O	2	Positive	The client saw the value of the design process after a new frame created for the enterprise gave them clarity on their own brand values.	Direction

There were instances with 7 other clients where DFs accounts were consistent in respect of the nature and impact of the tipping points for each client, however the timing of the moment was either unspecified or DFs were not in consensus about when the tipping point occurred (table 5).

Table 5: Instances where 2 or more DFs identified the same tipping points for a particular client but could not form a consensus about when the moment occurred.

Client	Session TP identified	TP impact	Description	Category
P	1,2,3	Positive	The client took ownership, working hard in collaborating, taking thoughtful comfortable silences (which are difficult to do online).	Agency
D	Unspecified	Positive	Co-reflection helped the client realise the root of their implicit aspirations.	Co-creation
A	Unspecified	Positive	The primary motivation of the client was recognised through creation of a model (diagram) that allowed discourse to be formed around that realisation.	Co-creation
I	Unspecified	Positive	The client saw a new perspective on their enterprise, appeared to realise their own design confidence/mindset and started using design language.	Agency
C	Unspecified	Positive	Using diagrams the client gained clarity on the critical role of the founder within their enterprise	Co-creation
J	2,3	Positive	The client started to use design terminology when exploring possibilities with the DFs. The client took advantage of the 'space' created to take ownership of their enquiry.	Agency
S	1,2,3	Positive	Clients took agency in the enquiry and facilitated between themselves at times, using design terminology.	Agency

No tipping points were identified by DFs for clients N, U and V. Data pertaining to clients F, G, L, T, and W was not

considered sufficiently reliable and was omitted from the results.

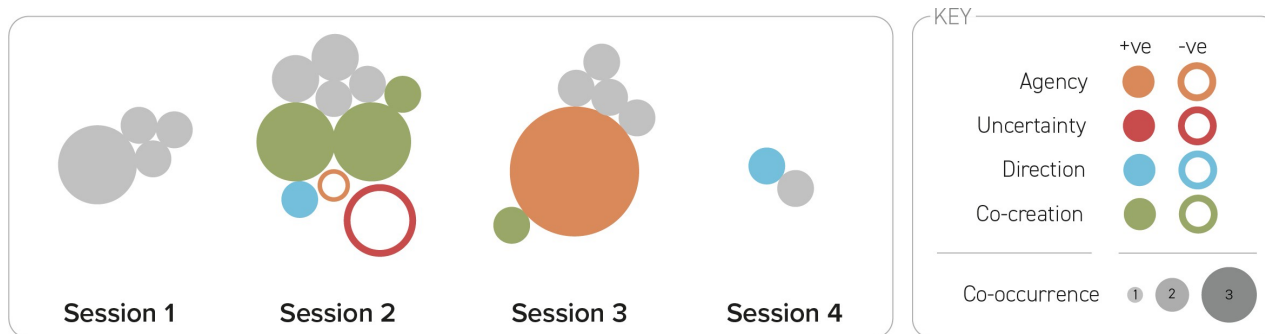


Figure 2: Tipping points experienced by DFs for each client, clustered according to the sessions where DFs experienced these phenomena. Dot size indicates co-occurrence of tipping point perceived by DFs, where increasing size represents greater co-occurrence. Dots shown in grey represent tipping points where DFs perceived their occurrence at different moments during delivery.

Discussion of Findings

This study finds empirical evidence that DFs experience ‘tipping points’ as significant moments when a non-linear change is tangible in the emergent flow of dialogue during workshops. These moments can have positive and negative impacts on the progress and outcomes of the workshop. This section describes the different characteristics of tipping points based on DFs accounts of how they have been experienced, and synthesises understanding of the conditions present when they occurred. Consciousness of these key moments would enable DFs to better identify and respond to them in practice.

Co-creation

Lichtenstein (2014, p. 5) identifies aspiration as stimulus for emergence in organisations. Clients enrol on GRTI and GOAI workshop programmes because they are driven by an opportunity to create new value in the context of their enterprise, market, or community. In this way, DFs are intervening in an already existent emergent flow that the client channels into workshops. Co-creative tipping points stem from the dialogue that is unfolding, where DFs probe the situation (Carrion-Weiss et al., 2021, p. 10) by introducing partially formed ideas to discover what the innovation is, what the position is, what significant change is desired, and what success looks and feels like for the client. Through this dialogue client and DFs move towards a shared understanding of the client’s circumstances. Co-creation tipping points occur when an idea emerges that resonates with the clients’ aspirations and motivations, whether these are explicit or implicit, and that the client can act on.

Agency

Agency tipping points indicate a new fluidity in the roles within a workshop where both DFs and clients become pro-active participants (Aguirre et al., 2017, p. 199), sharing the ownership of the dialogue with the materials of the situation. They can be identified when a client assumes a facilitating role during the workshop, by posing their own questions and prompts which beg a response of both themselves and the DFs. When agency tipping points occur the accounts given by DFs suggest they recognised the need to step back and behave as reflective bystanders, allowing space for the client to realise their agency. Enabling this agency creates an environment of authentic collaboration which may result in the client pursuing exploratory tangents. This may reveal previously imperceptible elements that were already conditions of the situation, and subsequently animates them (Hayes et al., 2021, p. 532) as discursive within the dialogue.

Uncertainty

DFs may endeavour to maintain a degree of ambiguity that keeps the dialogue open to new directions, and “on the move for as long as possible” (Hayes et al. 2017, 532), while working towards discovery of an idea that resonates strongly with the client’s implicit or explicit aspirations. When uncertainty is productive it allows all

participating to remain open and receptive to emerging opportunities without being fixated. When not productive, the uncertainty causes the client to lose faith in how the direction of inquiry could lead to the creation of value that is relevant to them. According to DFs experience, an uncertainty tipping point happens when the client moves into this space of unproductive uncertainty, something DFs sensed as a gradual decline in engagement or defensive behaviour of the client. Unproductive uncertainty demanded carefully considered attention from the DF. Where the client has sufficient trust – in both the DFs abilities and the process itself – then ambiguity can be tolerated for more prolonged periods.

Direction

DFs must remain ready to respond to unexpected elements as they emerge during the flow of the workshop, when a direction tipping point occurs, DFs are reassured by an adjustment of course that resonates well with the client. The most profound direction tipping points, as reported by DFs, occurred following an uncertainty tipping point which had led to apparent discomfort and disengagement by the client. In these instances, DFs dropped the line of enquiry completely and re-oriented with the materials of the situation, to find a collaborative exploration point from which to start probing again. Direction changes show that the dialogue is responsive to clients' goals and can be re-shaped to better align with their aspirations. From DFs accounts, it can be speculated that clients' trust in the process can be reaffirmed through this demonstration of adaptability and purposeful movement towards a shared understanding of the client's circumstances.

DFs have described positive tipping points as the "ah-ha moments when the penny drops, the horizon comes into view as the fog clears". For the DFs, these moments are satisfying because they represent where the effort of maintaining ambiguity, probing with partially formed ideas, and guiding the client through cycles of iteration delivers an emergent outcome, in the form of a non-linear change. Consequently, the DFs can step back slightly from the intensive dialogue to observe how the client establishes agency with the idea. The client's outlook is often transformed as well because they have seen that all the questioning can lead to a conceptual leap, one that presents a potential future that resonates with their values and motivations.

Co-creation tipping points frequently occurred in session 2 of GRTI (and occasionally in session 3), this is interesting when contextualised within the structure of the workshop programme. Session 1 involves a broad exploration of the client's enterprise, its surrounding context, and draws on their history and ambitions to elucidate their values, which often creates a divergent and ambiguous mass of content. The intention of session 2 is to make sense of this ambiguity through rapid ideation, shaping concepts around various focal points, and often involves DFs manifesting nascent ideas as diagrams, illustrations and visual models. In the flow of this dialogue, the DF and

client collaborate to discover an idea that reveals a new potential future – a bright idea, that resonates with the client's aspirations, and that they can put into action. Some conditionalities for agency tipping points can also be foregrounded through the context of the workshop programmes. The sessions are planned and structured but flexible, the process can adapt to provide space for clients (as well as DFs) to explore multiple lines of inquiry. The sessions are loosely scheduled permitting appropriate rhythms to organically emerge, allowing clients to proceed at their own pace. Clients often feedback that the workshops gave them permission to step away from the day to day running of their enterprise, and to enter into a reflective dialogue with their situation.

While positive tipping points can be observed more passively, a more active response is demanded of negative tipping points. Left unaddressed these can cause the client to become at best defensive and at worst withdrawn or disengaged. Negative tipping points are a difficulty felt by DFs, a sign that something important is missing or has not been recognised. In these instances DFs offered the clients additional support between workshop sessions, to learn more about the client's implicit motivations to help redirect the flow of the dialogue. In the accounts given by DFs about uncertainty tipping points, their interventions led to the experience of direction tipping points, signifying that a line of inquiry the client considers valuable was being pursued. DFs are trained to work in conditions of uncertainty and have experienced workshops where clients appear comfortable to maintain a state of ambiguity for long periods. In other instances, DFs perceived uncertainty to result in a negative tipping point where the client became disengaged, unable to see the value to them or their enterprise. DFs are not generally aware of a client's tolerance for ambiguity and so must attune and react to this during the workshop to avoid negative tipping points.

Limitations:

This study relies heavily on the DFs perspective in order to understand and define tipping points as a phenomenon. The dataset does not include purposefully collected data to gain robust insights of how tipping points may be perceived by clients. This study can only report on what has been observed during workshops, even though it is acknowledged that things that happen before, between and after workshops (Bødker et al., 2017) can also be influential in the overall outcome of the intervention.

Conclusion

The situation within which design facilitation is practiced is well reported in literature, and is often characterised as complex, multi-faceted, unpredictable and non-linear. This study is concerned with how design facilitators attend to this complex unpredictability in the performative flow of practice, in a design situation that is in a continuous state of becoming. In this situation design facilitators need to be prepared with the appropriate methods and tools, but also be agile and ready to adapt, to change course as they sense and experience the emerging process.

Based on reflective accounts given by a team of design facilitators, in respect of their experience of delivering co-creative innovation workshops with SME-scale enterprises, this study presents empirical evidence for the existence of tipping points. These represent moments where the emergent flow of the situation becomes tangible to design facilitators and signify a non-linear change in the dynamics of the workshop. The inquiry determines four key characteristics of tipping points that describe significant shifts in co-creation, agency, uncertainty and direction, as well as describing the conditions in which they arise and the impact they have on the progress and outcomes of a workshop. Impacts of tipping points were often reported to be positive, but they can also be negative and demand careful, well considered handling by design facilitators. Schön (1992) describes design as a reflective conversation with the materials of the situation, and in design facilitation this dialogue is evident between the practitioner and the predictable and unpredictable, material and immaterial, conspicuous and imperceptible phenomena flowing through the co-creative and participatory situation. An increased awareness of tipping points may enable design facilitators to be more alert to the effects of their share in this dialogue, and better able to identify and respond to key moments as they emerge through practice.

There are limitations to this work, and this study is an initial attempt to understand tipping points from a design facilitator perspective. Further research is required to combine this understanding with the perspectives of other stakeholders involved in such co-creative and participatory design situations. A broad range of perspectives would allow research to explore to what extent it is possible for design facilitators to interject into conditions present in these situations in order to engender positive tipping points more deliberately.

Acknowledgements:

This paper reports on a study conducted within the wider Creative Fuse North East 2.0 (CFNE2) research project, which is funded by the European Economic Regional Development Fund (ERDF) and the UK Arts and Humanities Research Council (AHRC). The authors would like to express their gratitude towards all those from enterprises and organisations in the UK's North East region that have generously collaborated in the workshop programmes.

References

- Aguirre, M., Agudelo, N., & Romm, J. (2017). Design Facilitation as Emerging Practice: Analyzing How Designers Support Multi-stakeholder Co-creation. *She Ji*, 3(3), 198–209. <https://doi.org/10.1016/j.sheji.2017.11.003>
- Bailey, M., Chatzakis, E., Spencer, N., Lampitt Adey, K., Sterling, N., & Smith, N. (2019). A design-led approach to transforming wicked problems to design situations and opportunities. *Journal of Design Business and Society*, 5(1), 95–127. https://doi.org/10.1386/dbs.5.1.95_1
- Bødker, S., Dindler, C., & Iversen, O. S. (2017). Tying Knots: Participatory Infrastructuring at Work. *Computer Supported Cooperative Work: CSCW: An International Journal*, 26(1–2), 245–273. <https://doi.org/10.1007/s10606-017-9268-y>

- Body, J., Terrey, N., & Tergas, L. (2010). Design facilitation as an emerging Design skill: A Practical Approach. *DTRS8: Interpreting Design Thinking, University of Technology Sydney, Sydney, 19-20 October*, 61–70.
- Buchanan, R. (1992). Wicked Problems Thinking in Design. *Design Issues*, 8(2), 5–21.
- Carrion-Weiss, J., Bailey, M., & Spencer, N. (2021). Design Listening: what designers hear and how they respond. *IASDR 2021: With Design*.
- Casula, M., Rangarajan, N., & Shields, P. (2021). The potential of working hypotheses for deductive exploratory research. *Quality and Quantity*, 55(5), 1703–1725. <https://doi.org/10.1007/s11135-020-01072-9>
- Dosi, C., Rosati, F., & Vignoli, M. (2018). Measuring design thinking mindset. *Proceedings of International Design Conference, DESIGN, 5*, 1991–2002. <https://doi.org/10.21278/idc.2018.0493>
- Gribbin, J., Spencer, N., & Bailey, M. (2018). A Rapid Design-Led Approach to Innovation Readiness: Advantages and Challenges. *Design Management Journal*, 13(1), 4–16. <https://doi.org/10.1111/dmj.12040>
- Gribbin, J., Young, R., & Aftab, M. (2017). Understanding the dynamics of attitudes within a design and business focused collaboration. *Strategic Design Research Journal*, 10(2), 126–133. <https://doi.org/10.4013/sdrj.2017.102.05>
- Hayes, N., Introna, L. D., & Cass, N. (2021). Participatory Design as the Temporal Flow of Coalescing Participatory Lines. *Computer Supported Cooperative Work: CSCW: An International Journal*, 30(4), 507–538. <https://doi.org/10.1007/s10606-021-09405-4>
- Hemstock, O., Bailey, M., Spencer, N., Simmons, H., Coombs, S., & Richardson, C. (2022). *Three degrees of influence in virtual workshops: towards an understanding of co-creative facilitation practice in technologically mediated settings*. <https://doi.org/10.21606/drs.2022.323>
- Hemstock, O., & Spencer, N. (2019). Slow knowledge in the ‘real world’: Using slow practice to actively engage commercial collaborators in doctoral research. *Running with Scissors, 13th EAD Conference University of Dundee*, 22(April), 885–900. <https://doi.org/10.1080/14606925.2019.1595406>
- Howard, Z., & Melles, G. (2011). Beyond designing: roles of the designer in complex design projects. *Proceedings of the 23rd Australian Computer-Human Interaction Conference on - OzCHI '11, May 2014*, 152–155. <https://doi.org/10.1145/2071536.2071560>
- Howard, Z., & Melles, G. (2015). Exploring the role of mindset in design thinking: Implications for capability development and practice. *Journal of Design, Business & Society*, 1(2), 183–202. https://doi.org/10.1386/dbs.1.2.183_1
- Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, 15(9), 1277–1288. <https://doi.org/10.1177/1049732305276687>
- Jones, P. (2017). The Systemic Turn: Leverage for World Changing. *She Ji*, 3(3), 157–163. <https://doi.org/10.1016/j.sheji.2017.11.001>
- Kearney, C., & Lichtenstein, B. (2022). Generative Emergence: Exploring the Dynamics of Innovation and Change in High-Potential Start-Up Ventures. *British Journal of Management*, 0, 1–17. <https://doi.org/10.1111/1467-8551.12604>
- Kent, F., George, J., Lindley, J., & Brock, T. (2020). Virtual workshops to preserve interprofessional collaboration when physical distancing. *Medical Education*, 54(7), 661–662. <https://doi.org/10.1111/medu.14179>
- Kimbell, L. (2009). *Design practices in design thinking* (pp. 1–14). paper presented at the European Academy of Management, Liverpool, UK. <http://www.lucykimbell.com/stuff/Practicedesignthinking.pdf>
- Kimbell, L. (2012). Rethinking design thinking: Part II. *Design and Culture*, 4(2), 129–148. <https://doi.org/10.2752/175470812X13281948975413>
- Lichtenstein, B. (2014). Why Emergence. In *Generative Emergence* (pp. 1–41). Oxford University Press.
- Light, A., & Akama, Y. (2012). The Human Touch: Participatory practice and the role of facilitation in designing with communities. *Proceedings of the 12th Participatory Design Conference (PDC '12)*, 61–70. <https://doi.org/10.1145/2347635.2347645>
- Luck, R. (2007). Learning to talk to users in participatory design situations. *Design Studies*, 28(3), 217–242. <https://doi.org/10.1016/j.destud.2007.02.002>
- Mennig, P., & Tamanini, J. V. (2021). On the design and conduction of virtual workshops: Experiences from going digital. *IMCIC 2021 - 12th International Multi-Conference on Complexity, Informatics and Cybernetics*,

Proceedings, 2(IMCIC), 135–139.

Michlewski, K. (2008). Uncovering design attitude: Inside the culture of designers. *Organization Studies*, 29(3), 373–392. <https://doi.org/10.1177/0170840607088019>

Mosely, G., Markauskaite, L., & Wrigley, C. (2021). Design facilitation: A critical review of conceptualisations and constructs. *Thinking Skills and Creativity*, 42(July), 100962. <https://doi.org/10.1016/j.tsc.2021.100962>

Napier, P., & Wada, T. (2017). Defining Design Facilitation: Exploring and Advocating for New, Strategic Leadership Roles for Designers and What These Mean for the Future of Design Education. *Dialectic*, 1(1), 154–178. <https://doi.org/10.3998/dialectic.14932326.0001.110>

Ørngreen, R., & Levinsen, K. T. (2017). Workshops as a research methodology Aalborg Universitet Workshops as a Research Methodology Ørngreen, Rikke; Levinsen, Karin Tweddell. *Electronic Journal of E-Learning*, 15(1), 70–81.

Rieple, A. (2016). Theoretical Context for Strategic Design: An Introduction to Design Thinking. In N. W. Nixon (Ed.), *Strategic Design Thinking* (pp. 3–21). Bloomsbury Publishing.

Sanders, E. B.-N., & Stappers, P. J. (2008). Co-creation and the new landscapes of design. *CoDesign*, 4(March 2008), 5–18. <https://doi.org/10.1080/15710880701875068>

Schon, D. A. (1992). Designing as reflective conversation with the materials of a design situation. *Research in Engineering Design*, 3(3), 131–147. <https://doi.org/10.1007/BF01580516>

Sevaldson, B., & Jones, P. (2019). An Interdiscipline Emerges: Pathways to Systemic Design. *She Ji*, 5(2), 75–84. <https://doi.org/10.1016/j.sheji.2019.05.002>

Simons, H. (2014). Who are we? Studying our 'Self.' *Case Study Research in Practice*, 1998, 81–95. <https://doi.org/10.4135/9781446268322.n5>

Spencer, N., & Bailey, M. (2020). Design for complex situations: Navigating 'matters of concern.' *International Journal of Design*, 14(3), 69–83.

Starostka, J., Evald, M. R., Clarke, A. H., & Hansen, P. R. (2021). Taxonomy of design thinking facilitation. *Creativity and Innovation Management*, 30(4), 836–844. <https://doi.org/10.1111/caim.12451>

Tonkinwise, C. (2015). *Committing to the Political Values of Post-Thing-Centered Designing (Teaching Designers how to Design how to Live Collaboratively)*. 1–23.

Villaman, N. (2020). *Fostering resistance: Acknowledging notions of power exertion and politics in design facilitation* [Aalto University]. <http://urn.fi/URN:NBN:fi:aalto-202006073634>

Wilkerson, B., Aguiar, A., Gkini, C., Czermainski de Oliveira, I., Lunde Trellevik, L. K., & Kopainsky, B. (2020). Reflections on adapting group model building scripts into online workshops. *System Dynamics Review*, 36(3), 358–372. <https://doi.org/10.1002/sdr.1662>

Yee, J., Jeffries, E., & Michlewski, K. (2017). *Transformations: 7 roles to drive change by design*. BIS Publishers. Yin, R. K. (2018). *Case Study Research and Applications: Design and Methods* (Sixth Edit). Sage Publications.

Zimmermann, N., Pluchinotta, I., Salvia, G., Touchie, M., Stopps, H., Hamilton, I., Kesik, T., Dianati, K., & Chen, T. (2021). Moving online: reflections from conducting system dynamics workshops in virtual settings. *System Dynamics Review*, 37(1), 59–71. <https://doi.org/10.1002/sdr.1667>