

**Improvising with metaphors in the design process of a new media system: A communication perspective**

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The theme of the 2013-2014 CMMI Fellows Program is

“Our lives lived in new media”

## Introduction

This year's CMMI fellows program wonders about our lives lived in new media. Before sharing some of the results of my own inquiry into this question, I think it makes sense to provide a definition of new media and to share an overview of some current research topics in new media. And before defining the 'new' in new media, I follow Lister et al, who define media as:

...'communication media' and the specialised and separate institutions and organisations in which people worked: print media and the press, photography, advertising, cinema, broadcasting (radio and television), publishing...(Lister, Dovey, Giddings, Grant, & Kieran, 2009, p. 640).

Starting from this, they define three key characteristics that distinguish the new media from the old media. They say that:

First, new media are thought of as epochal; whether as cause or effect, they are part of larger, even global, historical change. Second, there is a powerful utopian and positive ideological charge to the concept 'new'. Third, it is a useful and inclusive 'portmanteau' term which avoids reducing 'new media' to technical or more specialist (and controversial) terms (Lister et al., 2009, p. 664).

A review of recent scholarship seems to support the claim that new media can be considered part of a larger historical change. The research ranges widely and concern such phenomena as geopolitics, neuroscience, idiocy, and, of course, communication. For example, new media have been used to fuel insurgencies of all types from the early 90's to today, The Arab spring, the occupy movement, and the protests in Istanbul's Taksim square, are but a few instances of such insurgencies where local indignation is shared through social media and then joins people on the streets to strive for more equality and democracy (Sancho, 2014). In another example of new media research, Choudhury and McKinney provide insight in the details of the debate, led by Susan Greenfield, that the internet is changing our brains for the worse (Choudhury & McKinney, 2013). In yet another perspective on new media, Goriunova argues

that rather than ignoring the idiocy of much do-it-yourself creativity spread through social networks, we should appreciate it as a way of understanding individuation and subjectivation (Goriunova, 2013). And Schandorf looks into how non-verbal embodied gesturing finds its way into new media communications and concludes that new media extends rather than limits the face to face communication that serves as its foundation (Schandorf, 2013).

What already becomes clear from this small sample is that the subject of new media and the way it impacts our life is highly controversial. For example, while new media supports insurgencies, they are also used by the oppressing governments and economic elites to disseminate power (Hogan, 2011). And while new media may enhance face to face communications, we are not engaged in face to face communications with the people physically near to us while using the new media to be close to others. Such controversies have been part and parcel of the emergence and adoption of any new technology in society, from the book to the loom, and from the steam engine to the personal computer. Still, it can be argued that the intended and unintended consequences of technologies created since the industrial revolution have had a greater and faster impact on our lifeworld, physically and socially, for better and for worse, than those before the industrial revolution. So how can the new media help us overcome some of the complex problems we face? How do we mitigate for its intended use against a free and open society? And how can we become aware of its unintended consequences and start unmaking them? In other words, what does it mean to live the good life, a life that moves forward and upward, in new media?

In search for answers I focus on the people who create the new media: systems designers. Systems designers influence our daily experience of new media through their design in at least two ways. First, by determining what we can technically and functionally do with the

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new media, they prefigure how we will use them to help us shape our social worlds. Second, by providing artefacts that become part of that very social world, new media profoundly change the communication contexts that we act in to and out of. These influences on our daily experience through the artefacts that new media designers create have an impact on our lives that we are only just beginning to understand. So who are these designers? How do they shape their intent into form? How aware are they, and how are they aware, of the ways in which they make our systems? To approach answer to these questions, I take a communication perspective on one case study in which systems designers created a new media system. Specifically, I use the communication perspective to look at the metaphors (a designers' power tools) that our own team used in our design conversations while creating a new media system called Embodied Making and at how we made sense of how those metaphors became embodied in the system we created. I hope that through this we learn more about how one group of system designers made sense of their own powers, and lack of powers, to shape a system to support their intentions. In turn, I hope that understanding this helps us - as designers of our (social) worlds - to make those worlds better.

### **Design and metaphor**

I will first provide a short review of the role of two forms of metaphor in the design of systems. Let me start by sharing a story.

As a fresh PhD student at Fielding Graduate University, one of the first meetings I attended was Jane Peterson's final oral review. I was drawn to her session because I had inferred from its description that Jane had applied Lakoff and Johnson's theory (Johnson, 2007; Johnson & Lakoff, 2002; Lakoff & Johnson, 1980, 1999) to understand how engineers, working

at the leading edge of biotechnology, nanotechnology, information technology and cognitive science, conceive of human beings. In her study of the conceptual metaphors used in the MIT media lab conference Human 2.0, dominant metaphors in the engineers' language were MAN IS A MACHINE, MINDS ARE COMPUTERS, and BRAINS R US (Peterson, 2009). Jane wondered what these conceptions mean, especially as these designers create technologies that become part of human beings' bodies. Peterson argues that the values that drive these metaphors shape the technologies the designers make and that these technologies, in turn, shape our lived reality. Jane's work in uncovering these metaphors and her critical analysis left an eerie silence in the room after she had finished presenting.

In *Metaphors we live by*, Lakoff and Johnson (1980) pointed out that most of our abstract concepts are metaphorical. They then started gathering neurological, physiological, and neuropsychological evidence to support their claims. In *Philosophy in the Flesh*, they summarize their findings: the mind is embodied, most thought is unconscious, and most human concepts are metaphorical (Lakoff & Johnson, 1999). Even though there are some interesting controversies around what Lakoff and Johnson call *embodied realism*<sup>1</sup>, most scholars agree that metaphors are a matter of thought and experience as much as they are a matter of language. In Lakoff and Johnson's view, we interact with the world, including others, through our bodily senses, perceptions, feelings and emotions. When we do this our concrete experience correlates with abstract experience. For example, when we grasp a toy and at the same time recognize that we have grasped that toy before, we experience grasping (concrete) and recognition (abstract) at the same time. In the act of grasping and recognizing, relationships are created between those

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<sup>1</sup> For a critical review of embodied realism, see my working paper at: [https://www.researchgate.net/publication/267029020\\_A\\_critical\\_review\\_of\\_embodied\\_realism\\_Disruption\\_continuity\\_and\\_rhetoric\\_responsibility](https://www.researchgate.net/publication/267029020_A_critical_review_of_embodied_realism_Disruption_continuity_and_rhetoric_responsibility)

two experiences, which, when repeated often, are also reflected in the brain (Gallese & Lakoff, 2005). Most of this process is non-conscious and continuous. A baby, for example, who is held close to her mother day by day uses the physical warmth of that experience to make sense of the abstract feeling of affection that she experiences at the same time. This repeated experience gives rise to the primary metaphor WARMTH IS AFFECTION. In language, we see this metaphor turn up in expressions like *a warm person*, or *a warm smile*. Based on a few hundred such primary metaphors we develop complex metaphors for increasingly abstract concepts. The more important the abstract concept for our lives, the more metaphors we have to make sense of its experience. Take love for example, where we have many, many complex metaphors of which LOVE IS A JOURNEY, LOVE IS AN ORGANISM, and LOVE IS ILLNESS are only a few examples. Johnson summarizes it as follows:

The best biology, psychology, and phenomenology available today teach us that our human forms of experience, consciousness, thought, and communication would not exist without our brains, operating as an organic part of our functioning bodies, which in turn are actively engaged with the specific kinds of physical, social, and cultural environments that humans dwell in (Johnson, 2007, p. 1).

So, if we think about systems from the perspective of embodied realism, our everyday experience of those systems co-shapes the ways in which we sense, perceive, feel, and ultimately think. This is a continuous, recursive and developmental process of which both systems designers and users of systems are part. The non-conscious metaphors that shape the thinking of designers become part of the systems they create. And the use of systems shapes the experience of their users, reinforcing the metaphors embodied in the system and giving rise to new experiences and thereby new metaphors through their application in the world.

Embodied realism is useful to understand how metaphors emerge from our interactions with others and the environment, but embodied realism is limited in helping us understand how

designers consciously use metaphors to create systems. Schön looked at how designers use metaphor's generative capacity to design systems (Schön, 1983, 1993). For example, when a group of product developers tried to improve the sloggyness of a synthetic paintbrush, one of the product developers observed that a paintbrush could be seen as a sort of pump. This idea was explored further, and it turned the attention of the developers away from problems with the bristles themselves to the spaces between the bristles. If a paintbrush were a pump, the spaces in between would be its channels. This showed a dissimilarity between natural and synthetic bristles, namely that the synthetic bristles bent under a different angle which hindered the flow of paint through the 'channels'. By pursuing synthetic bristles that bent more like natural bristles, the product developers were able to improve the synthetic brushes. Schön calls the metaphor A PAINTBRUSH IS A PUMP generative because the researchers chose to develop their seeing the paintbrush as a pump beyond the mere metaphorical notion to identify and experiment with specific entailments of the metaphor to construct a new reality. The ensuing experimentation with the analogy between the natural and synthetic bristles is what constitutes the generative capacity of the metaphor.

Using metaphor consciously to generate new realities is not easy. Cornelissen, for example, provides a review of how scholars have constructed metaphors for the concept of organization over the decades, and how these constructions, despite having adopted novel metaphors from a changing society, are still dominated by the conceptual metaphors of organization as structures which are made up of objects (Cornelissen & Kafouros, 2008). Other research studies show that the workings of metaphors on the non-conscious and embodied level are so pervasive that we can assume the hard work of generative metaphor designing at best hindered and at worst impossible because of the embodiment of metaphors in our cognition and

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in our existing (social) systems. In one study by Larson and Billetera (2013) for example, six different experiments showed that people who experience physical imbalance while making a buying decision make more balanced decisions than those who are on solid ground. In two other experiments by Zhong and Leonardelli (2008), it was found that thinking about an experience of social exclusion makes people estimate the temperature in a room significantly lower than those who don't think about social exclusion. In a third study, Kille, Forest and Wood (2013) found that people who sit on wobbly chairs and at wobbly tables, perceive other's love relationships as less stable, and would prefer stable psychological traits in potential romantic partners. And Morris et. al. (Morris, Sheldon, Ames, & Young, 2007) found that students who were asked to make investment decisions based on agent metaphors, in which the stock market was conceptualized as a living being using subjective metaphors made riskier investment decisions and drove up the value of their portfolio more than students who invested based on stock market news with more literal and objective metaphors.

What these studies show is that metaphorical concepts in language, whether experienced through language itself or through other modalities such as the embodied cognition of balance or temperature, influence our perception and our decision making. Therefore, increasing our conscious awareness of the workings of these embodied, non-conscious, conventional metaphors seems key to the success of applying conscious generative metaphors in systems design. Furthermore, it seems important for systems designers to become aware of how experience is under continuous influence of other and environment at the non-conscious level. If we want to create systems that help us evolve forward and upward, how can we train ourselves to bring this desired movement into our systems while at the same time mitigating the forces pulling us down, dragging us back, or chasing us forward at breakneck speed?

### **Research approach**

This report presents the case study of the design process of Embodied Making, a method and a system for large scale sense making and complex systems design that we created in our organization between 2011 and 2014<sup>2</sup>. We approached the design process of Embodied Making as an action research project. We saw each other as co-researchers and developers of the method, and where we desired, we wanted to use the results of both the process and the research to improve our work (Greenwood & Levin, 2007; Reason & Bradbury, 2001, 2008).

The name Embodied Making was given to the method and tooling we have been developing after our second brainstorm session. It reflexively refers to the theories and research that informed it, which, to a large extent, overlap with the theories and research informing this paper and my dissertation project. Amongst others, Embodied Making was inspired by Embodied Realism (Johnson, 2007; Johnson & Lakoff, 2002; Lakoff & Johnson, 1980, 1999), the Coordinated Management of Meaning (Pearce, 1989, 2007; Pearce & Cronen, 1980), Architecture (Alexander, 1964, 1979; Alexander, Ishikawa, & Silverstein, 1977), and Organizational Improvisation (Barrett, 1998, 2012; Kamoche, Pina e Cunha, & Vieira da Cunha, 2002; Weick, 1998).

Embodied Making started from the desire to create a system that would support business processes in a complex, non-deterministic, human way. A system that would help these processes to come to life rather than the current systems for the management of business processes, which often take all life out of the situations they are supposed to support<sup>3</sup>. We

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<sup>2</sup> During the research period, I was a partner and co-founder in Product Foundry and in its predecessors Coena and PerfectArch. See: <http://www.product-foundry.com/>

<sup>3</sup> Exemplified by the infamous 'computer says no' sketches in the comedy Little Britain. See: <https://www.youtube.com/watch?v=I3IxMQsazAM>

started brainstorming with the intent to join our experience and knowledge to shape this new system.

The data was gathered over the course of three years and consists of recorded design conversations, artefacts of the design process, the realized system, and reflections on the design process where we made retrospective sense of the relationship between self-identified 'metaphor' breakthrough moments in our design conversations and the embodiment of those metaphors that we observed in the design artefacts and the system. In order to scope the study to manageable proportions, we started analysis once the system was finished to a degree that it could be used without us, the designers, present. We sat together with the system and we wondered what key metaphors we recognized as part of the system. From the options generated from that reflection we chose the metaphor A PROCESS IS A RIVER OF FORCES and we recollected breakthrough moments in which this metaphor took root and was further developed. I went back to the recordings of those breakthrough moments and transcribed them. I also gathered the artefacts available at that time in the systems design process. We then came together for a second round of reflections where we wondered about the relationship we saw between our conversations in the breakthrough moments, the design artefacts we used in those moments, and the system as it is today. We recorded those reflections as research data as well. Figure 1 provides an overview of the key episodes for the emergence of the river of forces metaphor that we identified in the Embodied Making design process.

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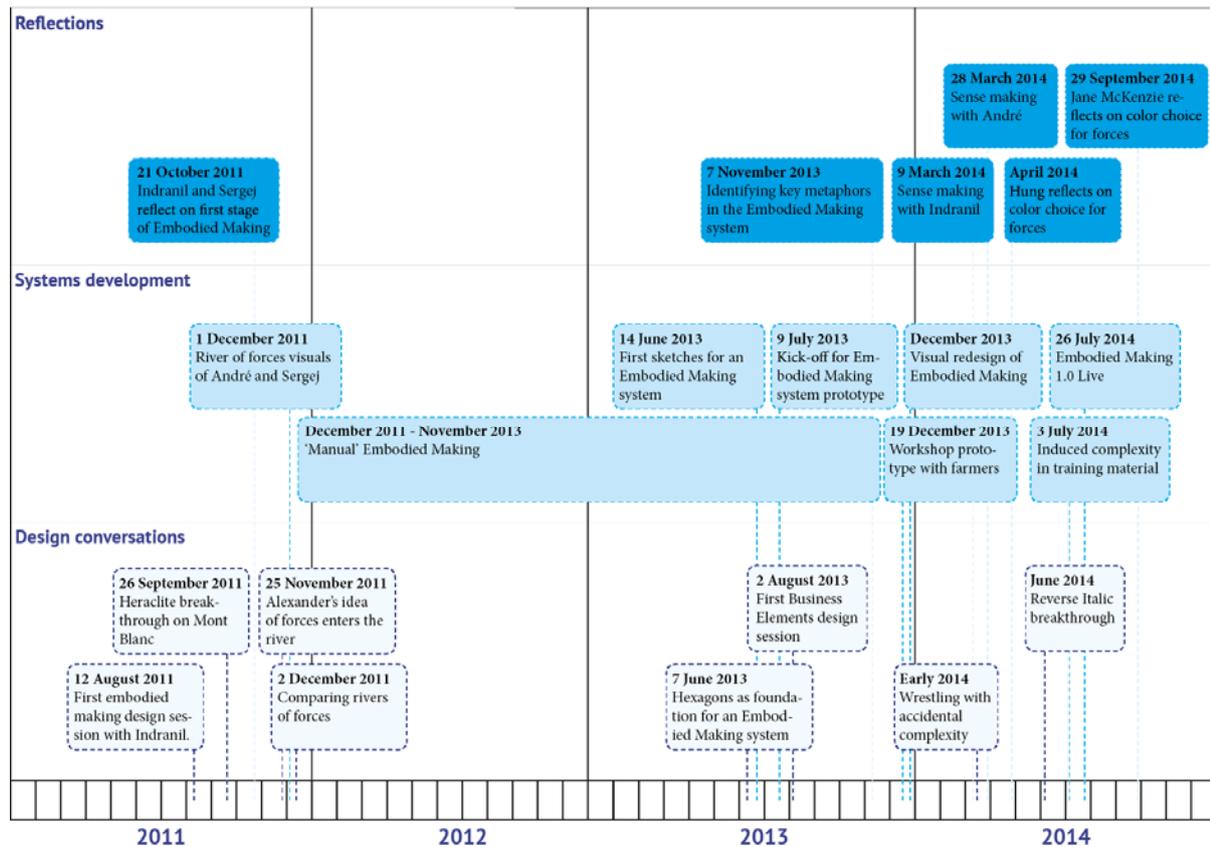


Figure 1: Linear overview of key episodes in the Embodied Making design process

First, I will share the story of Embodied Making and share images of relevant design artefacts for the RIVER OF FORCES metaphor that we created in those key episodes. Then I will provide a few detailed transcripts of conversational turns in the breakthrough conversations that show both generative and conceptual metaphors at work. Next, I will share some of the sense we ourselves made of the relationships between the finished system and the moments in those conversations. All this will then be discussed from a communication perspective.

### **The story of Embodied Making**

The metaphor A PROCESS IS A RIVER OF FORCES emerged after initial brainstorming in which we had identified the river as an apt metaphor to think more fluidly and naturally about processes. We were also inspired by rivers from philosophy (Heraclitus, 2003), and literature (Hesse, 2008), but we were not so happy with the dominance of the ‘natural’ and ‘linear’ entailments of the metaphor that we saw. We sure saw value in the notion of a process moving from A to B, and we also saw value in a metaphor that lets us think about nature but we were struggling to apply the river to systems in the way Hesse could make it work for Siddhartha. Our efforts so far left out too much of human being to really work. We achieved a breakthrough on September 26, 2011, when we were on Mont Blanc, together with our Romanian team. Our visual designer told us that Heraclitus may have meant that the man stepping into the river changes the flow of the river while at the same time, the flow of the river changes the man. Both are changing together, in interacting as well as by themselves in flowing and growing. Where earlier we had made sense of the river from the man’s perspective, we could now see the man from the river’s perspective too. This new way of seeing helped us realize that the river metaphor, taken this way, could cohere the complex interaction between users and systems that we were looking for.

On 25 November we achieved a second breakthrough. In earlier talks, Indranil had suggested the work of Christopher Alexander (Alexander, 1964, 1979; Alexander et al., 1977) as an important inspiration for our method and system, but we were struggling with how to apply his ideas in practice. Then Indranil shared a video he found about how 37 Signals, a software company, applied the work of Christopher Alexander in their design process<sup>4</sup>. Their

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<sup>4</sup> See: <http://vimeo.com/10875362>

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practical way of working with the forces that shape a design context, and how those forces should be balanced in the form of the design provided us with a second breakthrough. The metaphor of A PROCESS IS A RIVER was expanded to A PROCESS IS A RIVER OF FORCES.

In the night of 1 December, we each worked on making a river of forces as a design artefact, where we balanced around 60 forces that we had identified as shaping the stories we had gathered about contact management systems. On 2 December 2011, we compared the outcomes of our river of forces exercise, displayed in figures 2 and 3 below.



*Figure 2: Sergej's paper river of forces*

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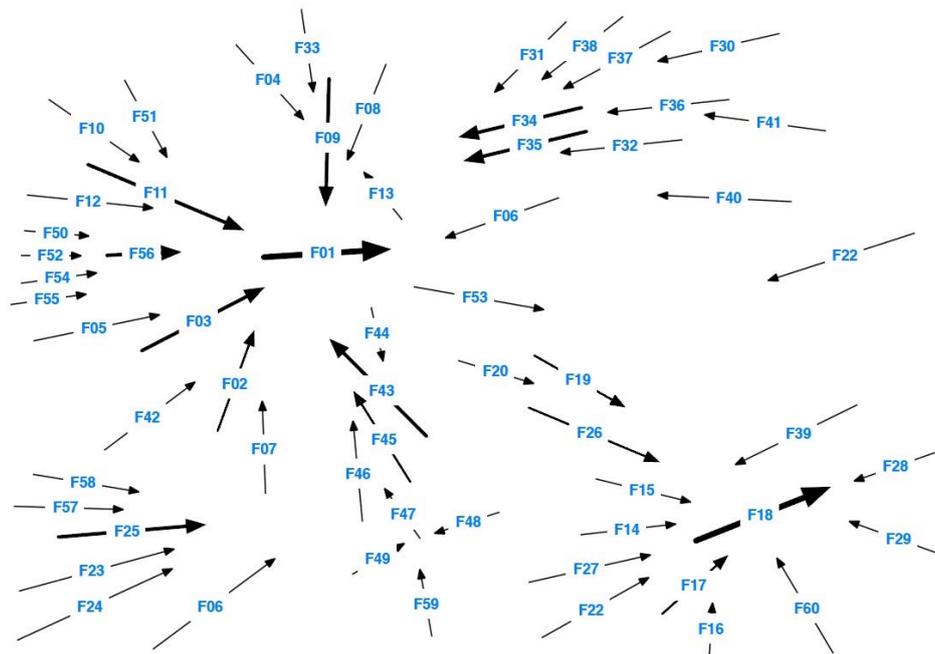


Figure 3: André's digital river of forces

After that session, we started applying Embodied Making in our own product development, our own ventures, and in our paid consulting work for clients. We applied Embodied Making with startups and enterprises in oil exploration, education, healthcare, software, and agriculture. We were happy to see early adoption of our ideas with a large client in telecommunications who provided us with generous space for the application and development of our emerging method. Many of the ideas in Embodied Making were developed in concert with that first adopter (Bhattacharya & Hartges, 2012). We kept getting together every Friday to further develop the method, but we mostly applied Embodied Making as it was at that point: gathering stories, surfacing forces, and shaping solutions and patterns that balance the forces elegantly. There was no direct digital support for working with the method during this period other than collaboration systems (like Google Sites) to share information, and designer tools (like Microsoft Visio and Adobe Indesign) to visualize stories, forces, and

solutions. A few examples of Embodied Making artefacts from this 'manual' period are shown in figures 4, 5 and 6.

#### Forces in Contact Management

- F01. Desire to keep in touch with some people more than others.
- F02. Desire to be kept up-to-date with close acquaintances.
- F03. Desire to keep some people up-to-date about yourself.
- F04. A friend of a friend isn't necessarily my friend.
- F05. Reassurance from knowing others want to keep in touch.
- F06. Desire to keep in touch isn't reciprocated
- F07. Desire to meet new acquaintances again soon.
- F08. Affected interest in other people to preserve social appearances.
- F09. Caution of new and unfamiliar contacts
- F10. Desire to share only some contact information with others
- F11. Preference to be contacted in a specific manner
- F12. Desire to know a few people well than a lot poorly
- F13. Desire to know a lot of interesting people ("networking")
- F14. Desire for adding contacts to be fun.
- F15. Desire that updating contact info is inviting and fun.
- F16. Desire to have fun while browsing contacts.
- F17. Desire for effortless contact lookup.
- F18. Dislike of excessive data entry.
- F19. Dislike of repeatedly giving the same info on different sites.
- F20. Dislike of repeatedly giving the same info on the same site.
- F21. Lack of commitment to learn new tools.
- F22. Irritation with frequent releases.
- F23. Contact Information is available whenever needed.
- F24. Reliability of contact information.
- F25. Rapid access to contact information.
- F26. Access to contacts from other applications/websites.
- F27. Desire to access contacts on any device
- F28. Fear of service provider going out of business.
- F29. Some applications can only use some contact details
- F30. Desire to know how personal information is being used by others.
- F31. Desire to have ownership of my own data.
- F32. Desire to exclude some parties from knowing about contact changes.
- F33. Desire to only permit trusted people with all information.
- F34. Anxiety that identities can be assumed and stolen by impostors.
- F35. Anxiety that information can be used for social engineering.
- F36. Distrust of commercial social networks and their use of personal data.
- F37. Awareness of who's accessing contact data.
- F38. Aversion to have contact information shared with a 3rd party.
- F39. Desire to have contact information accessible by permission.
- F40. Desire for secure transfer of contact information.
- F41. Irritation with special offers, advertisements or newsletters
- F42. Desire to show 'best side'

*Figure 4: A selection of forces in contact management*

## AutoVenture

- ▼ Home
  - SEO
- ▼ Blue Ocean Strategy
  - Autovalla roles and services
- ▼ Branding
  - Branding Exercise
  - Candidate Names
  - Mood Boards
- ▼ Business Plan
  - Deejay' Workspace
  - Final Business Plan
  - Indranil's Workspace
- ▼ Car Wash Journal
  - 1. Prospects
  - 2. Car washer Recruitment
  - 3. Operational issues
  - 4. Solution Components
  - 5. Trade-off analysis for different methods of CarWash
  - 6. Break-even analysis for steam car wash.
- Carbook Social Networking
- ▼ Competitors
  - Competitor Websites Comparison v1.1
- Day 9
  - Dependencies among Services, Partners and Staff
- ▼ Forces
  - Fo1 The next car is the dream car.**
  - Fo2. Rising income among working professionals
  - Fo3. Frequent releases of new car models.

[Forces >](#)

### Fo1 The next car is the dream car.

(2+), (3+), (4+), (6+), (7+), (8+), (9+), (10+), (20+), (21+), (24-), (25-), (31+)

+ Fo2. Rising income among working professionals.  
*"I have a great job now where I am earning a lot of money. I can buy my dream car now!"*

+ Fo3. Frequent releases of new car models.  
*"I really like the new Maruti SX4. It's my new dream car!"*

+ Fo4. Tendency to buy cars beyond means.

+ Fo6. Availability of easy financing options.

+ Fo7. Family members help finance car purchases.  
*"I really need this car because it's my dream car. I hope my family and friends can help me buy it."*  
*"This car is everything I want in my dream car, but it's too expensive. Maybe I can get a loan to buy it."*  
*"This really is my dream car. I hope my dad helps me buy it"*

+ Fo8. Cars are important social status symbols.

+ Fo9. Larger cars are seen as prestigious.

+ Fo10. Newer cars are seen as prestigious.

+ Fo20. Connections with powerful people are seen as important.

+ Fo21. Social circles influence car purchasing decisions.

- Fo24. Fuel is expensive

- Fo25. Car maintenance is expensive

+ Fo31. Desire for comfort in the car.

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### Comments

 **Sergej van Middendorp**  
Add a comment

Figure 5: Some force interactions in the river of forces of an online car marketplace in India

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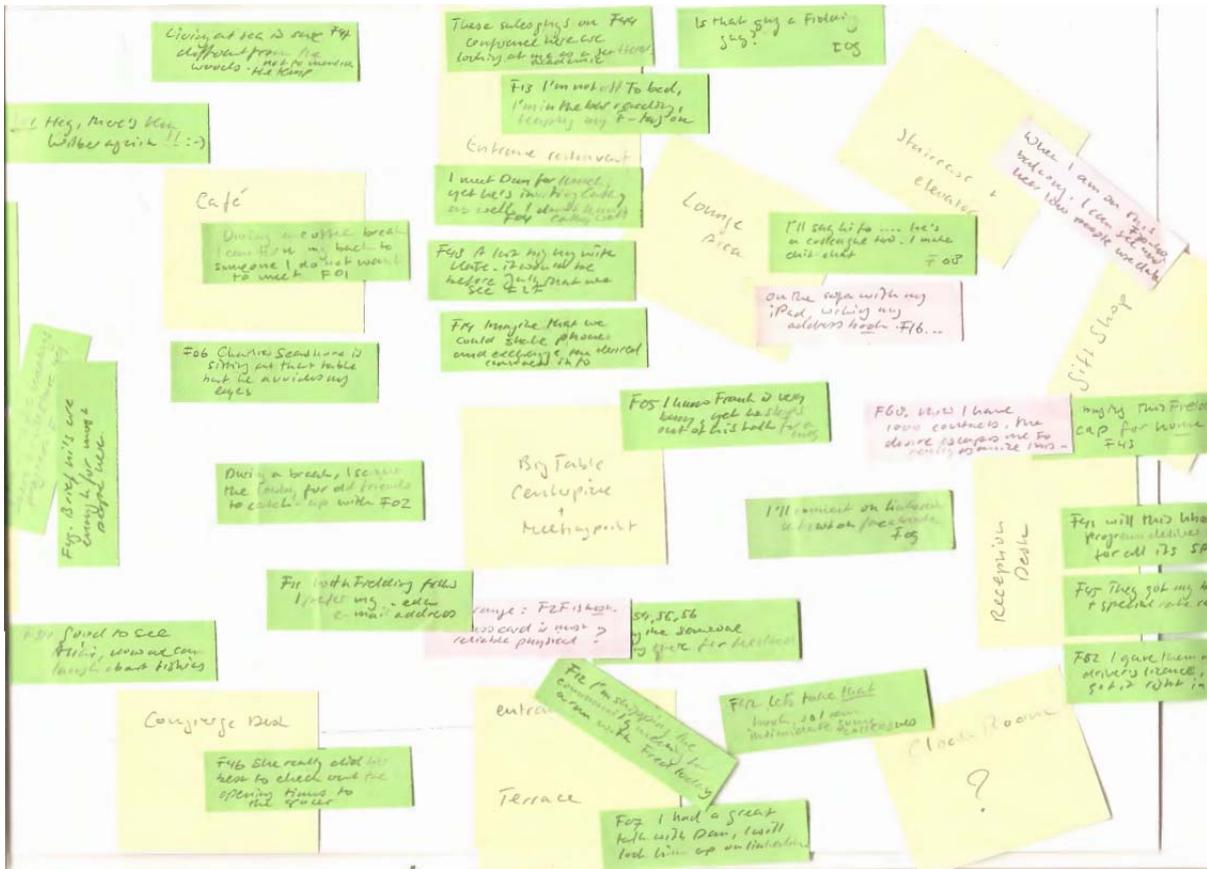


Figure 6: Force interactions for contact management framed in a metaphorical hotel lobby<sup>5</sup>

On 7 June 2013, Indranil, André and I got together over lunch and we started thinking about a system to support Embodied Making. André suggested the form of the hexagon and the idea of an infinite canvas to support Embodied Making. We each went home with homework to think about how such forms would support the method. On 14 June, we got together to compare notes. Figures 7, 8, 9, and 10 show the diagrams Indranil, André and I came up with for that

<sup>5</sup> To give coherence to a collection of solutions we also use metaphor. In this case we had used a hotel lobby as inspiration to give language to the solutions. The first among you who is courageous enough to decipher my handwriting in figure 6 and tell me which real hotel lobby is the analogy for this figure gets treated to a fresh beverage of choice next time we are together.

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session. We thought that André's diagram was most advanced in capturing the river of forces and we chose that design to go with.

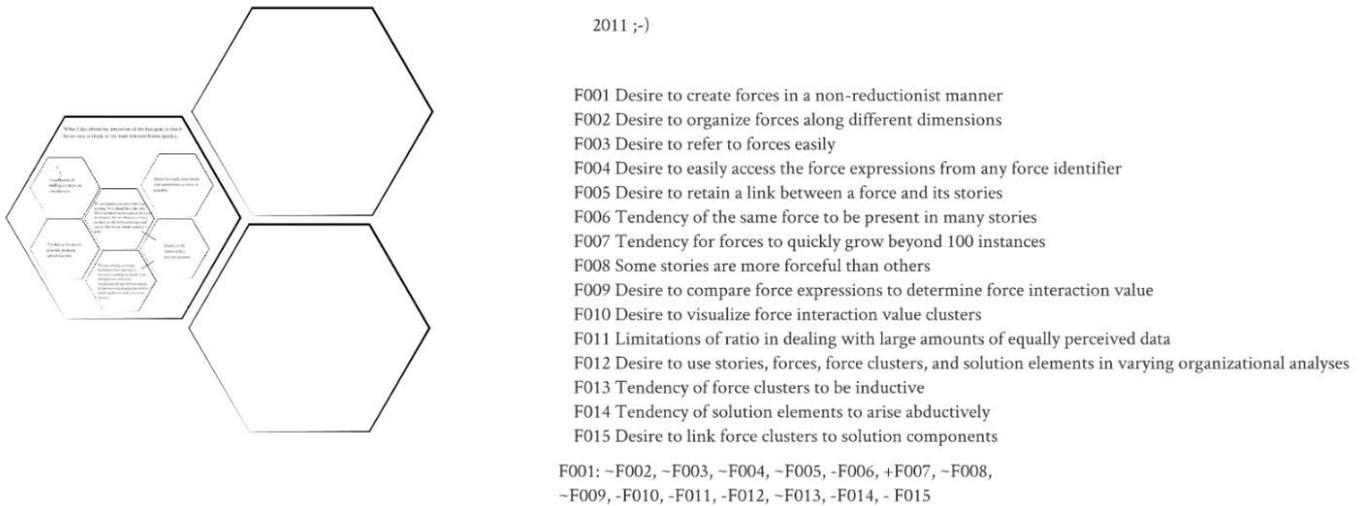


Figure 7: Sergej's hexagon ideas and a short analysis of forces for Embodied Making itself

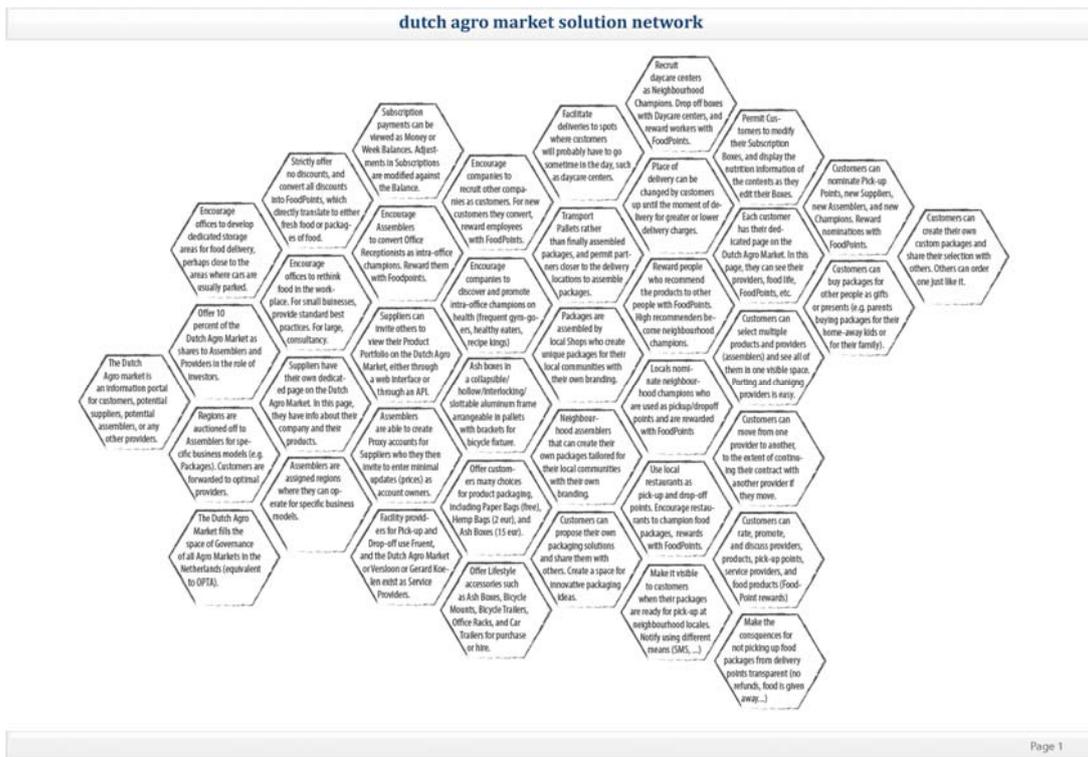


Figure 8: Indranil's Dutch agro market solution network

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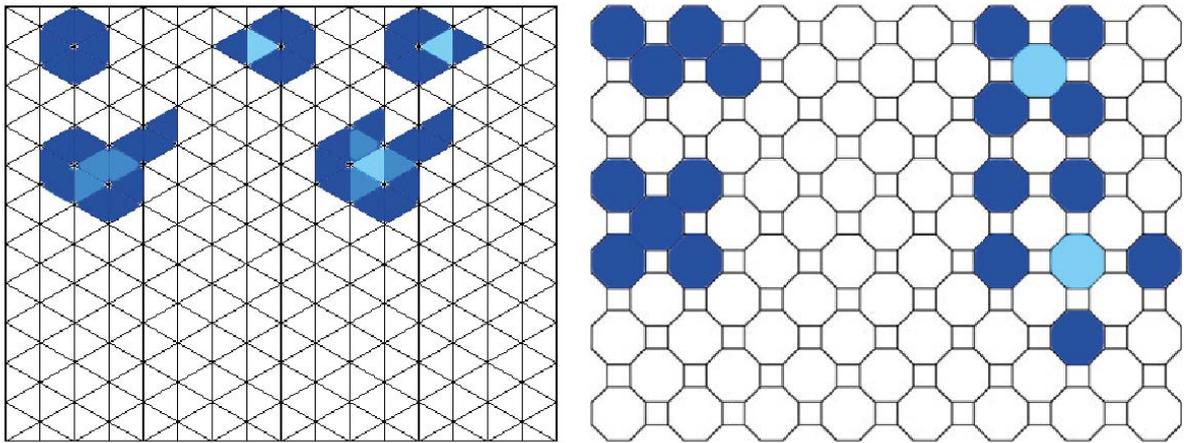


Figure 9: André's first hexagon and octagon try-outs

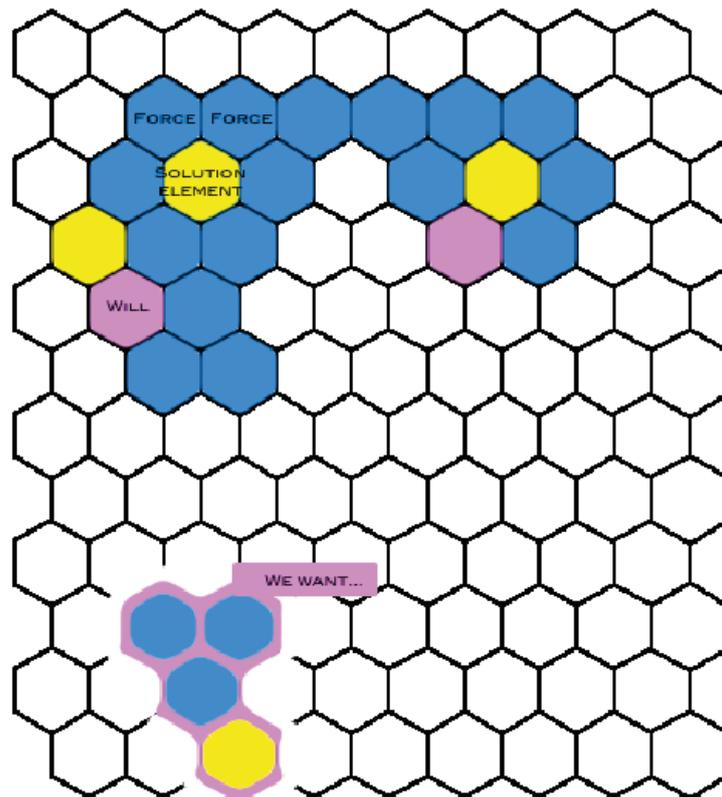
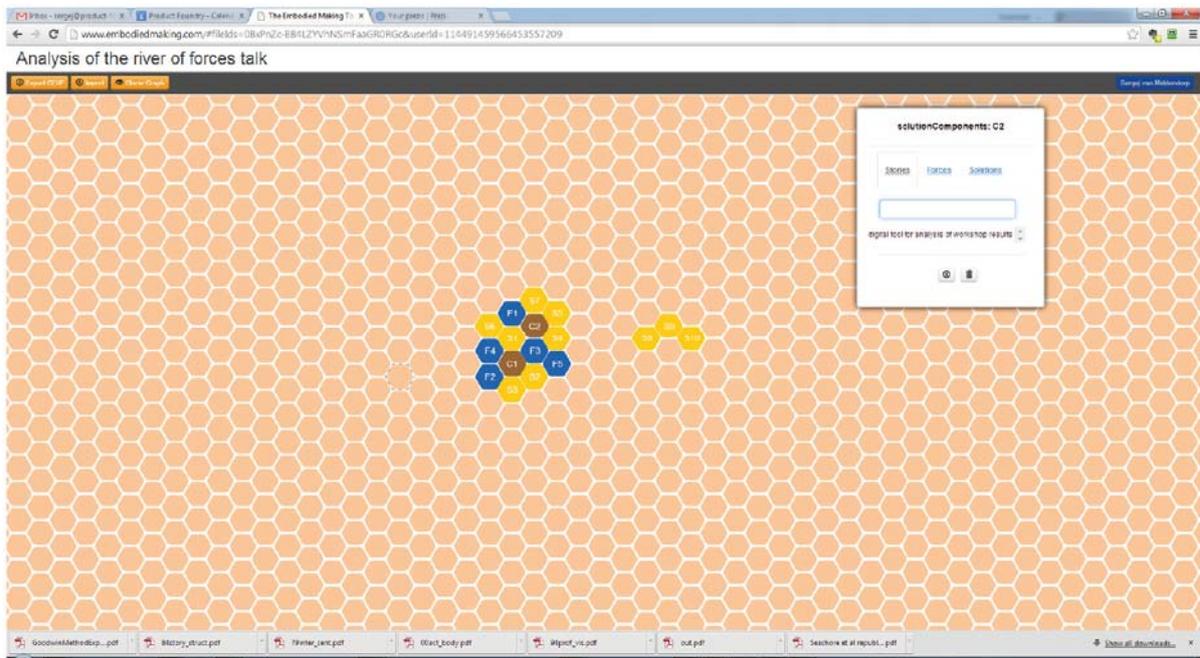


Figure 10: The design we selected for the Embodied Making system

We tasked our newly formed software development team in India with the creation of a prototype system and in October 2013 the whole company got together in Valencia, Spain for a

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few days of face to face work. In one of our workshops, André and the Indian team presented the first beta version of the Embodied Making system which, at that time, looked like figure 11.



*Figure 11: Embodied Making system beta October 2013*

Because there were quite some technical and usability issues with the prototype, we decided we wouldn't use this version of the system with clients. So when I was facilitating workshops with Dutch greenhouse farmers who were using Embodied Making as a game to find solutions for problems in their logistics processes, I combined our manual Embodied Making system with a paper prototype on the table which followed the form of the emerging new system. Figure 12 is a picture we took at that workshop.



*Figure 12: Outcomes of Embodied Making workshop with farmers*

Around the time of the workshops with the farmers, we had hired a new visual designer in our Amsterdam team. He was part of the farmers' workshops and created a redesign of Embodied Making which was implemented in the prototype by the Indian team. Figure 13 shows what Embodied Making looked like after the redesign.



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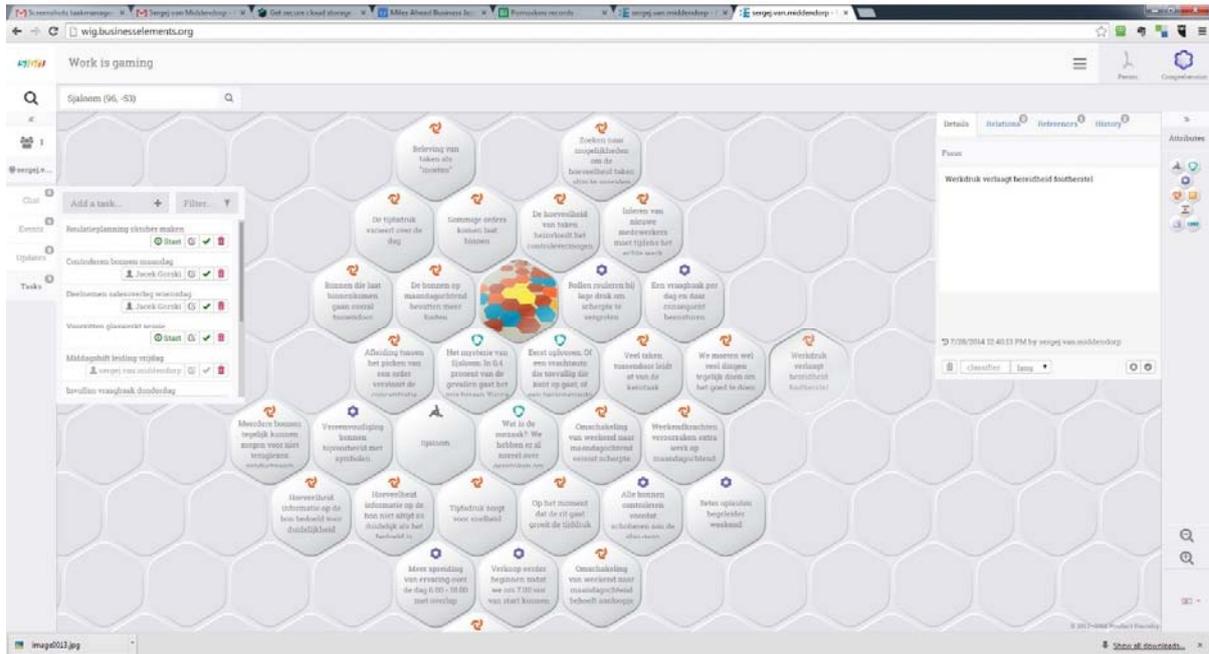


Figure 14: Embodied Making tooling (screenshot on 16 October 2014) with farmer's river of forces (Copyright Product Foundry)

### Retrospective sense making of Embodied Making

In a session on 7 November 2013, Indranil, André and I reflected on the metaphors we could see in the prototype of Embodied Making and we pointed out a number of breakthrough moments in the past years where those metaphors took root, matured, and grew in new directions. In that session, the river of forces metaphor was identified as the most pertinent metaphor shaping Embodied Making. I went back and retrieved the recordings of the sessions that contained those breakthrough moments. I made an index of all moments and suggested a few for further analysis. We chose a few, one of which (from the 2 December 2011 session) we felt was especially pertinent to how the river of forces metaphor became embodied in the system:

- (1). Sergej: I think this is the way to go. André's visualization (points to figure 3 above) is better than eh. A paper process (points to figure 2 above) could help for a workshop. But it should definitely then be put in to this form.

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- (2). André: Yes, that's a good thing, because if you are doing the workshop, if you are working on a screen, then it's somebody controlling the keys that is making the decisions. Simple as that. They will make a comment, and you would go like: "yeah, whatever, I am thinking of my own force now."
- (3). S: With paper elements, people can move them around and negotiate better and bring things better together.
- (4). A: Based on the discussion, you should capture that later I think digitally.
- (5). S: Yeah.
- (6). A: Yeah.
- (7). Indranil: Yeah, yeah.
- (8). S: And in addition to having the papers, there should be a way to indicate these strengths, or lengths of the arrows and...
- (9). I: Please Sergej, eat something.
- (10). S: Yeah, I know, but I am still struggling with this, so then...
- (11). A: Ok, I'll stop then, haha.
- (12). I: Ok, I'll stop too, I finished all the oranges.
- (13). A: I finished the cheese. hihi.
- (14). S: Yes this is really much much more difficult to grasp.
- (15). I: Yeah, I saw you didn't upload this one I guess (points to figure 3 above), I saw others.
- (16). S: I did.
- (17). I: Oh, you did upload this one?
- (18). S: I took a number of pictures of the process, so I first finished this one and then took a picture, then I finished this one, took a picture, finished this one and I took notes and thought aloud all the time. So we can go back and see oh, what was I thinking at F10. Oh, I can't do it right now because we are recording. But eh, haha, we can do this one if we want to, and we don't need to now I think, eehm. Although rigor tells me that it would make sense to make some comparisons and go back and forth between what we have here in maybe three, four rounds, like we just started doing around the big arrow (points to F01 in figure 2 above) and check what Indranil got and what I got and if there is a major difference that we should revisit, but...
- (19). I: Actually, I think a better way, because we discussed, ah, ok...
- (20). S: There's already many lessons learned here.
- (21). I: Many lessons learned, and I'd like to go back and reflect a little more, but what I think we should do is, aaahm, like you have this, so lessons for me, certain things go. Valuable things for me, this is really good. These little indexes next to it. And I think this is the best thing, to do over time right? So, the river is important. Then the overall view is really important. Paper based stickies for eehm, workshops, and then eehm...
- (22). S: Then putting it into a digital format and also extending the, the... Maybe that could already be done, that should be captured in the workshop. Like what are the key arrows around what things converge. Because that determines what is relevant to put into detail first.
- (23). A: Yeah, good. And also this can be in the same order right? So you start with the thickest, then you start with the less thick. Yeah, because that helps you, because then you are not

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- doing it from top to bottom, but you are just doing the arrows from thick to thin right?
- (24). S: Yeah, and at some point you can say OK, we are now comfortable...well, that helps the back and forth between eh, making a diagram, eehm, revisiting the river, ehm, adding a new force, then putting it in somewhere, ooh it's a pretty big force we just discovered, hey wow, OK, then we should make some more stories. Because the stories will never really be finished. In the end.
- (25). A: That's a good point yeah, you can make, also create more stories for the bigger ones, because you definitely want to invest more there. And then at some point you can stop.

After transcribing this section (in early March 2014), I gathered the design artefacts displayed in figures 2, 3, 9, 10, 11, 12 and 13 above and I chaired two reflective sessions with the transcript and the artefacts on display: one with Indranil on 9 March 2014 and one with André on 28 March 2014. The key question for these reflections were: what relationships, if any, do we see between the things we said and did in the breakthrough moment and in the artefacts of the systems design and the system itself? What strikes you? What surprises you? What is the role of metaphor in how the system was shaped? Below are three selections from the transcripts of those reflections:

- (2). Indranil (I): Yes, indeed. Eeehm. So there's, there's eehm Embodied Making, the method. And then in the application of the method, I do think that the role of metaphor in coming up with the method is not that big. We use it to explain the method, certainly. A lot of analogies and a lot of metaphors and a lot of eehm, narratives like the leaf on the river, that really works right? That's an adaptation by the way right? The...if we put the leaf on the river. Then we observe the phenomenon of the leaf being placed on the river. But it is more used to understand the other currents because if we do it on the table right? That's a great metaphor, the river metaphor. And we of course use analogies and especially like the force-interactions that you get a feeling of the forces. The river metaphor is very powerful. So, eeh, much like sea captains, or eehm, Mark Twain writes about it by the way, about the river, in his biographical works, about his, you know, role as a river boat worker. How after a while the - on the Mississippi, how a river boat captain gets a full feeling of the river, you know? He sees a little white stripe, he knows that there's a rock there, he knows how big it is, you know. He understands the river ebbs and flows, and so, whenever you read narratives of sea men, or river, people who, sailors, on the water, they talk about how they have a feeling of it, you know, a feeling of how it is sometimes treacherous.

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So yeah, eeehm, that's the force interactions, it's really important to understand analogy or metaphor in order to understand how something would feel...

...

- (63). Sergej: Where the forces were blue (points to figure 10), and I think we even, and he, eh, he had some will on the bottom there you see? We want. And some clustering of four forces. And now of course, we have these workshops, and we have this (points to figure 13). Although this is already a bit older. We all know what it looks like now right? When we say business as a landscape. Do you see any relation with the river metaphors we used earlier?
- (64). I: I think business as a landscape also sort of emerged right? The infinite canvas. It just sort of happened, like hey let's make it an infinite canvas.
- (65). S: That's true, that was also in my mind like a suggestion. Like let's try this.
- (66). I: And then, when (Designer) wanted to put in anchors, eehm, the fact that the anchors were eeh, the anchors were actually landmarks, with the church analogy?
- (67). S: Yeah, but for me, when he said anchors, indeed for me, you have this river of forces that you're navigating, and you want to sort of settle down certain things right, so the thing doesn't just flow on, so I keep this here.
- (68). I: Ok, so he used the term more from a traditional, a traditional, ehm,. I think he got it from traditional applications, like Photoshop and stuff.
- (69). S: Ah, they use anchors as well right, to secure paths.
- (70). I: yes, it's his main tool right? But, I think I changed the term to landmarks. I think we should actually change the term to landmarks.
- (71). S: Yeah, a landscape is a broader concept than a river only. And the way we apply it in explaining Embodied Making it is tied with forces right. Not the other concepts that we use, yeah. Like the stories, and certainly not, the...
- (72). I: The landmarks are important because of that story with the church right?

### And from the reflection with André:

- (60). André: ...well actually a lot of the metaphor is lost.
- (61). Sergej: Mmmh.
- (62). A: Right, so even the...something happened unconsciously or consciously. But at one point we said like OK, we keep talking about the river of forces. In which solutions emerge right? By which solutions emerge. So then we made the analogy with the real river, and we say OK, but what does emerge in a river you know. Well, based on currents you can have different... So you can have a collection of branches. Or whatever.
- (63). S: Yes.
- (64). A: Or you get dirt or whatever, collecting because of the forces. And then with the colors for example, we made a direct translation, initially, OK forces are blue, and the solutions are yellow, which is the color of sand or mud, or branches you know. Dirt in the water. Could be green.
- (65). S: Mmmh.

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- (66). A: So, we added, some of the metaphor really directly impacted the visual elements.
- (67). S: As you created this one for example (points to figure 10 above).
- (68). A: Yeah, that was the reason for the call actually. So that matches the metaphor here. And you will only see it when you know it. But the forces look like water.
- (69). S: Yeah, streaming around something, in this case a solution element, yeah.
- (70). A: But then that got lost because we didn't share the same metaphor with (Designer). So he just sees colors and replaces it with something else.

### And another bit from the reflection with Indranil:

- (76). I: ...The way I personally see the distinction is when an analogy becomes embedded in language it becomes metaphor. As long as we're conscious that something is like something else, and not in the same. So for example when I am describing the infinite canvas, and how we need to change anchors into the term landmarks. Ehm, then ehm, I have to explain the analogy you know? With the church example.
- (77). S: ah, I get it. Let me pause, as I understand you yeah? So you say, the landmark is a metaphor. I want it to be a metaphor, but in order for it to become a metaphor, indeed an analogy, the story of the church to explain why landmark is an important extension of the landmark metaphor to deal with time, for example.
- (78). I: Exactly.
- (79). S: Yeah, is this a good way of explaining it?
- (80). I: Exactly. because then if people understand the landmark metaphor, the landmark analogy, it becomes metaphor, because then they apply the analogy, and then it becomes living metaphor. Then they say, eh...
- (81). S: Let's put a landmark here so we don't lose sight of this set of products.
- (82). I: Exactly. Or let's put a landmark here as a, then basically people start implicitly understanding that this is a configuration of space. Ehm. It took me a while to come to the landmark term right. Because initially, I was using the term standard bearer remember? A Roman standard bearer. And initially, I was just saying here be dragons yeah? Because ehm, eh, when you the mythical...You know the term here be dragons?

## Findings and makings

From a communication perspective, the question is not what is found, but what is made, how it is made, what we are becoming while we make it, and how we can make it better (Pearce, 2007, p. 53). There are traces of answers to these questions in our own reflections

above, and to an extent, we can consider these findings and makings one way of answering the research question. To expand on our sense making, I will continue the story of the reflection with André, where we noted that something got lost from the metaphor and discuss the role of metaphor in the next episode of that story. I will also discuss the presence of another prevalent non-conscious metaphor in our design conversations and discuss how this metaphor possibly led us away from generating the RIVER OF FORCES metaphor the way we wanted it.

In preparing for the farmer's workshop, I was a bit hurried and even though I had bought paper in the colors matching the colors of the Embodied Making design, I non-consciously used the red hexagons for the forces and the blue hexagons for the solutions. We only noticed this in retrospect in the 28 March 2014 reflection with André. Here we concluded that our own failure to persist the generative metaphor, combined with my inadvertent use of red for forces, had influenced our designer in making suggestions for making forces red and solutions blue. In reflection, my intuitive embodied sense of FORCES ARE RED feels more natural than the entailment of the river of forces metaphor, where FORCES ARE BLUE. Later, when we asked our designer if he was influenced by my use of colors in the farmer's workshop, he said no. His choice for color was inspired by the chakra system, which he had also used as a foundation for the design of our company Product Foundry's house style. He wanted to extend the house style into Embodied Making. The root, sacral, and solar plexus chakras are associated with red, orange and yellow, and these chakra's resonate most with the concepts of force, will and power. Solutions, on the other hand, need thinking, forming, and intuiting, which in the chakra system are closer associated with the throat and the brow, which in turn are associated with blue and indigo (Douglas, 2002). So for our designer, the generative metaphor was FORCE IS ROOT/SACRAL/PLEXUS CHAKRA and SOLUTION IS THROAT/BROW CHAKRA and

this entails red(-ish) for force and blue(-ish) for solution. So despite the fact that our designer's choice (and the subsequent non-conscious adoption of that choice by our team) was not directly influenced by my own switch in color during the workshop (which we assumed), it was informed by another generative metaphor with color choices that correlate with my own non-conscious choice in preparing for the workshop. Color theory, despite its controversies, seems to support the natural 'feel' of the colors that ended up in Embodied Making (O'Connor, 2011). André, in turn 70 (page 27), is probably right that entailments of our carefully crafted generative metaphor got lost in part because we didn't share the river of forces metaphor with our designer.

In Indranil's turn 2 (page 25), we see an example of a story that strengthens the generative force of the river metaphor. His story of how Mark Twain developed a feel for the Mississippi river is exactly the sort of story we might have told our designer if we had been conscious of our intent to embody the river of forces metaphor in the system. In turn 76 (page 26), Indranil shares how he sees analogy as a way to reinforce a metaphor. It is by sharing the story behind a metaphor that we make sense of the metaphor itself. A metaphor comes to life when its story is shared and when we can relate the story to our experience. A metaphor dies when we no longer know its story or when its story doesn't relate to our experience any more. These observations are consistent with embodied realism's notion of dead metaphor (Lakoff, 1987).

The conceptual metaphor in the reflection above was easy to spot (if hard to pin down). But what about those metaphors that are hidden just below the surface of our consciousness? We can use conceptual metaphor analysis to increase our awareness of (non-conscious) conceptual metaphors. Conceptual metaphor analysis explicitly takes embodied realism as its

starting point (Rohrer & Vignone, 2012)<sup>6</sup> and helps us to rigorously identify conceptual metaphors in discourse. I want to illustrate the possible influence of one conceptual metaphor in particular, that a first-pass conceptual metaphor analysis uncovered as prevalent in our design conversations: the location event-structure metaphor of causation. In this metaphor:

States Are Locations (interiors of bounded regions in space)  
Changes Are Movements (into or out of bounded regions)  
Causes Are Forces  
Causation Is Forced Movement (from one location to the other)  
Actions Are Self-propelled Movements  
Purposes Are Destinations  
Means Are Paths (to destinations)  
Difficulties Are Impediments To Motion  
Freedom Of Action Is The Lack Of Impediments To Motion  
External Events Are Large, Moving Objects (that exert force)  
Long-term, Purposeful Activities Are Journeys (Lakoff & Johnson, 1999, p. 179)

We can see this metaphor at work, amongst others, in turn 1 (page 23): “I think this is the way to go,” (MEANS ARE PATHS); turn 4 (page 24): “you should capture that later” (STATES ARE LOCATIONS); turn 8 (page 24): ”there should be a way” (MEANS ARE PATHS); turn 10 (page 24): “I am still struggling with this“ (DIFFICULTIES ARE IMPEDIMENTS TO MOTION); turn 18 (page 24): “So we can go back” (STATES ARE LOCATIONS). All these are cohered by the overarching LONG TERM, PURPOSEFUL ACTIVITIES ARE JOURNEYS.

The temporal linearity of the journey that is entailed by this metaphor is prevalent in our design discourse. It probably gives expression to our desire to achieve our purpose - a working Embodied Making method and system - as soon as possible. But we can also see that it has unintended consequences because it sets us up as travelers in a physical environment. In this metaphor, we can only be in one place at a time. In turn one, I say ‘better’ because I am trying

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<sup>6</sup> In contrast with metaphor analyses that emerged from linguistics, which (of late) state they cannot be used to identify conceptual metaphors see: <http://www2.let.vu.nl/oz/metaphorlab/metcor/documentation/MIPVU.html>

to judge which of the two ‘ways’ will help us better achieve our purpose. When I see myself at ‘a fork’, the conceptual metaphor’s prefigurative force makes it hard to switch to, for example, a quantum consciousness in which I could be on both paths at the same time. And as we ‘stick together’ rather than ‘splitting’ up on a long journey, André and I try to retain the value of the two different forms by putting them in order on the path to our destination (first this, then that).

Two years later, (figure 12), I am in a workshop with paper on the table. The workshop works really well, and I now consciously experience that there is indeed value in this form as we had said on December 2, 2011. Our business partners in the farmer’s project also agree and we conclude that based on this experience we may want to create a physical board game for playing Embodied Making on the table to complement the digital system that is almost done. But once we were at a place where the digital system was good enough to start using with clients, the plan for this table version quickly receded into the background (been there, done that?).

In later design conversations, we can see that the BUSINESS IS A LANDSCAPE metaphor is used to come to solutions for sharing information about products on the Embodied Making canvas. These conversations are part of the creation of Business Elements, the business process support system that we are now creating on Embodied Making. I am not sure that our non-conscious use of the location event-structure metaphor of causation was generative to the choice of this metaphor, but it strikes me that for the more concrete domain of product management, we chose BUSINESS IS A LANDSCAPE as a metaphor. In turns 64 and 65 (page 26) we cannot remember a generative metaphor breakthrough moment that led to the metaphor, it just emerged. This suggests that the non-conscious was at play here. The interplay between the two metaphors, river and landscape, leads to funny metaphor mixes, such as the

one in turns 66 to 69 (page 26), where anchors changed to landmarks, and where we infer that in Adobe's tools - the experience domain that informed our designer - anchors are used to "secure paths".

Relative to a purpose, there is value in both linearity and reflexivity and the two metaphors for the river are not mutually exclusive. When we step into a river, we can immediately feel its main current and its overall temperature. We can choose to take broad strokes and swim with or against the current. And we can also choose to pause and feel a bit longer, so that subtle differences in our perception have a chance to appear. As we slowly wave our hand in the water, little whirlpools may be felt swirling around our fingers. The waves that we first noticed on the surface of the river now seem to sport a second layer of little waves, which flow at a different pace from the larger waves beneath them. If we hold our hands still and we reach a bit deeper, little changes in temperature begin to be felt. All this can happen within a fusion of the two metaphors, where we can feel subtly and deeply while we move in a direction at the same time, maybe floating gently down the river. André may be subtly aware of these two notions in turn 62 on page 26 above when he says: "we keep talking about the river of forces in which solutions emerge right? By which solutions emerge". Note how the primary metaphors - *in* and *by* - help make the subtle distinction between the reflexive and the linear river here. To be able to make this fusion, or distinction consciously, to choose the one over the other, and/or the one *and* the other, relative to the purpose of the application of the metaphor requires an increasingly reflexive awareness. At this point, where we risk drowning in reflexivity because of a possibly perceived lack of movement in any direction, Steier suggests: "to get on with the conversation at another level" (1991, p. 168). So let me do that.

### **Conclusions and implications**

We were able to trace the emergence of the metaphor A PROCESS IS A RIVER OF FORCES and to make sense of several breakthrough moments in which that metaphor became embodied in the new media system that we were creating. In the brief analysis above we can see that the emergence of the river of forces metaphor was under threat of being watered down by our non-conscious use of the location-event structure metaphor for causation. In addition, the river of forces metaphor was under threat of being dissolved in other - and other's - generative metaphors. This happened either when our own conscious attention to the generativity of our chosen metaphor lapsed, or when we engaged with others beyond our core design team and forgot to tell them the river metaphor's story. We also noticed an emerging story where the location-event structure metaphor for causation asserted non-conscious force on our later choice for BUSINESS IS A LANDSCAPE, a generative metaphor which might further drain the power of the river of forces metaphor in our system.

From a critical perspective, we can also say that the complex and emergent nature of this project makes it hard to determine boundaries and to establish order between questions, literature, method, data, findings, and discussion. And the reflexive nature of this project makes it hard to distinguish between theory, research and practice and even between theorists, researchers and practitioners. For example, both the literature in embodied realism and the literature in CMM have influenced the design of Embodied Making. These literatures are not lenses that we acquired after the fact of designing. They were used to look ahead to what would be designed, they informed the moment of designing, and they were used to reflect on the design outcomes. This not only creates a reflexive relationship between the methods used to shape Embodied Making and the methods used to make sense of how we shaped Embodied

Making. This also creates reflections back from Embodied Making to the literature. As Steier says, research (from a constructionist perspective) is:

... A circular process, in which reflexivity is the guiding relationship allowing for the circularity. This looping back may [...] unfold as a spiraling, if we allow for multiple perspectives, and acknowledge that 'the same self' may be different as a result of its own self-pointing (Steier, 1991, p. 2).

A rigorous, recursive, reflexivity seems a good way to embrace the complexity and emergence of a project like this one with what Tarride (2013) calls implexity, a way to make sense of complexity while keeping the whole that creates the complexity intact. Figure 15, shows one way in which our learning about metaphors in the design process can inform CMM and how CMM can inform our future designing with metaphors.

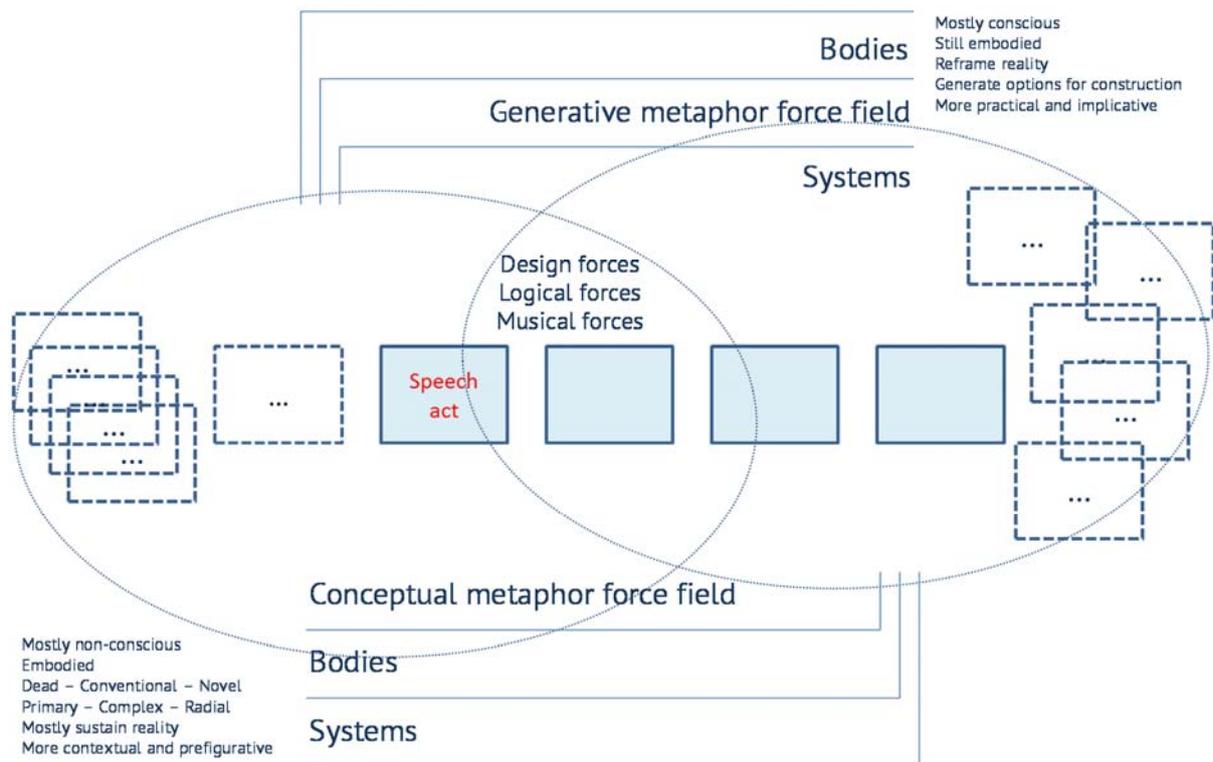


Figure 15: Generative and conceptual metaphor force fields around a pattern of communication

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In the heart of the image is a story unfolding it in time through speech acts. The dotted cluster of speech acts to the left of the story symbolizes the (shared) memories of past stories that can become part of this story as it is unfolding. The dotted cluster of speech acts to the right symbolizes the future possibilities that can become part of this story as it is unfolding. The two ellipses symbolize a generative metaphor force field and a conceptual metaphor force field. The generative metaphor force field asserts mostly practical and implicative logical forces flowing from the power of generative metaphor to consciously (re)frame and construct reality. The conceptual metaphor field asserts mostly prefigurative and contextual logical forces flowing from the power of conceptual metaphors to non-consciously sustain past and current realities. At the confluence of both metaphor(ical) force fields we find the present, where novel conceptual metaphors may awaken our consciousness to help us start shaping the present, because not all conceptual metaphors are non-conscious. Here we also see initially generative metaphors shaping the present non-consciously, because we are not continuously conscious of our chosen generative metaphors. In fact, in the confluence, we see that both conceptual and generative metaphor theory start from the same epistemological source, even if they part ways to highlight different aspects of reality (Schön, 1993, p. 137).

When we are aware of our bodies as they shape the system, they form the highest context in the hierarchy of the generative metaphor field. In this configuration, we generate the metaphor field with the fullest intent and awareness possible. The system forms the highest context in the hierarchy of the conceptual metaphor field, thereby influencing our bodies to non-consciously persist past realities. In the center, at the confluence of both fields, the one interpenetrates the other. Or, if we take the long history of our bodily interactions with the system seriously (Bateson, 2004, p. 283), we could see this confluence not as a meeting place of

two rivers, but as an estuary where the river of conscious purpose meets the sea of evolution. In the estuary, both conscious purpose and evolution ebb and flow, enabling and limiting our abilities to make the present together.



Figure 16: St Helens Beach estuary, Australia, retrieved from <http://freeaussiestock.com/>

We can assume that the new media are here to stay. In order to increase our potential to shape them and use them for making better social worlds, I take an abductive leap from our experience in this project and I suggest *ingroove*, a blended metaphor practice inspired by Embodied Making and supported by three literatures that together can help us increase our generative metaphor field. It is in this space that we make and use new media systems, and it is in using those systems that we make (part of) our social world.

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We can increase the generative metaphor field to shape our physical and digital systems through *architecting* by practicing the work of Alexander, who says that: "...our liveliness, our thirst for life, depends directly on the patterns in the world, and the extent to which they have this [...] themselves." (Alexander, 1979, p. 122). By practicing Alexander's analysis of forces and by shaping patterns and pattern languages that support life, we increase our generative capacity to shape physical and digital systems.

We can increase the generative metaphor field to shape our social systems through *communicating* by practicing the heuristics of the Coordinated Management of Meaning. Pearce says: "...we now know that literacy changes the form of consciousness of the reader and of the societies in which literacy is primary. I believe that communication literacy does the same thing" (Pearce, 2012, p. 2). By practicing the tools that Pearce and the community of CMM scholars and practitioners have evolved, we increase our generative capacity to shape our social world.

We can increase our reflexive awareness of both the generative and conceptual metaphor fields through *improvising* by practicing the principles of jazz improvisation. Barrett says that "musicians need a song, a motif, a set of notes on which to embellish and create an improvisation" (Barrett, 2012, p. 67) and that "creativity is enhanced when emphasis is placed on coordinating action with minimum consensus, minimal disclosure, and minimal, simple structures (Barrett, 1998, p. 611). By practicing the structures of architecting and communicating as jazz musicians, we increase our awareness of the conceptual metaphors that form the minimal structures and learn to see them as open to improvement, to improvising, to generating a better future here and now.

## References

- Alexander, C. (1964). *Notes on the synthesis of form*. Cambridge, MA: Harvard University Press.
- Alexander, C. (1979). *The timeless way of building*. New York, NY: Oxford University Press.
- Alexander, C., Ishikawa, S., & Silverstein, M. (1977). *A pattern language: Towns, buildings, construction*. New York, NY: Oxford University Press.
- Barrett, F. J. (1998). Creativity and improvisation in jazz and organization: Implications for organizational learning. *Organization Science*, 9(5), 605–622.
- Barrett, F. J. (2012). *Yes to the Mess: Surprising leadership lessons from jazz* (Kindle version.). Boston, MA: Harvard Business Review Press.
- Bateson, M. C. (2004). *Our own metaphor: A personal account of a conference on the effects of conscious purpose on human adaptation*. Cresskill, N.J: Hampton Pr.
- Bhattacharya, I., & Hartges, M. (2012). A product lifecycle management pattern language for telecom operators. *Cutter IT Journal*, pp. 12–16.
- Choudhury, S., & McKinney, K. A. (2013). Digital media, the developing brain and the interpretive plasticity of neuroplasticity. *Transcultural Psychiatry*, 50(2), 192–215.  
doi:10.1177/1363461512474623
- Cornelissen, J. P., & Kafouros, M. (2008). The emergent organization: Primary and complex metaphors in theorizing about organizations. *Organization Studies*, 29(7), 957–978.  
doi:10.1177/0170840608090533
- Douglas, A. (2002). Mapping the matrix: Healing vision and communication. *Group Analysis*, 35(1), 89–103. doi:10.1177/053331602400933954

- Gallese, V., & Lakoff, G. (2005). The brain's concepts: The role of the sensory-motor system in conceptual knowledge. *Cognitive Neuropsychology*, 22(3-4), 455–479.  
doi:10.1080/02643290442000310
- Goriunova, O. (2013). New media idiocy. *Convergence: The International Journal of Research into New Media Technologies*, 19(2), 223–235. doi:10.1177/1354856512457765
- Greenwood, D. J., & Levin, M. (2007). *Introduction to action research: Social research for social change* (2nd ed.). Thousand Oaks, CA: Sage Publications.
- Heraclitus. (2003). *Fragments* (Bilingual edition.). Penguin Classic.
- Hesse, H. (2008). *Siddhartha*. London: Penguin.
- Hogan, P. (2011). Your brain on new media: Communicative democracy, tyranny, and enabling ambivalence. *Theory in Action*, 4(1), 48–69. doi:10.3798/tia. 1937-0237.11004
- Johnson, M. (2007). *The meaning of the body: Aesthetics of human understanding*. Chicago, IL: University of Chicago Press.
- Johnson, M., & Lakoff, G. (2002). Why cognitive linguistics requires embodied realism. *Cognitive Linguistics*, 13(3), 245–263. doi:10.1515/cogl.2002.016
- Kamoche, K. N., Pina e Cunha, M., & Vieira da Cunha, J. (2002). *Organizational improvisation*. London, United Kingdom: Routledge.
- Kille, D. R., Forest, A. L., & Wood, J. V. (2013). Tall, dark, and stable: Embodiment motivates mate selection preferences. *Psychological Science*, 24(1), 112–114.  
doi:10.1177/0956797612457392
- Lakoff, G. (1987). The death of dead metaphor. *Metaphor and Symbolic Activity*, 2(2), 143–147. doi:10.1207/s15327868ms0202\_5

- Lakoff, G., & Johnson, M. (1980). *Metaphors we live by*. Chicago, IL: University of Chicago Press.
- Lakoff, G., & Johnson, M. (1999). *Philosophy in the flesh: The embodied mind and its challenge to western thought*. New York, NY: Basic Books.
- Larson, J. S., & Billetera, D. M. (2013). Consumer behavior in “equilibrium”: How experiencing physical balance increases compromise choice. *Journal of Marketing Research*, 50(4), 535–547.
- Lister, M., Dovey, J., Giddings, S., Grant, I., & Kieran, K. (2009). *New media: A critical introduction* (2nd Kindle.). London, United Kingdom: Routledge.
- Morris, M. W., Sheldon, O. J., Ames, D. R., & Young, M. J. (2007). Metaphors and the market: Consequences and preconditions of agent and object metaphors in stock market commentary. *Organizational Behavior and Human Decision Processes*, 102, 174–192. doi:10.1016/j.obhdp.2006.03.001
- O’Connor, Z. (2011). Colour psychology and colour therapy: Caveat emptor. *Color Research & Application*, 36(3), 229–234. doi:10.1002/col.20597
- Pearce, W. B. (1989). *Communication and the human condition*. Carbondale, IL: Southern Illinois University Press.
- Pearce, W. B. (2007). *Making social worlds: A communication perspective*. Malden, MA: Blackwell Publishing.
- Pearce, W. B. (2012). Evolution and transformation: A brief history of CMM and a meditation on what using it does to us. In C. Creede, B. Fisher-Yoshida, & P. Gallegos (Eds.), *The reflective, facilitative, and interpretive practices of the coordinated management of*

Improvising with metaphors: A communication perspective

- meaning: Making lives, making meaning*. Madison, NJ: Fairleigh Dickinson University Press.
- Pearce, W. B., & Cronen, V. E. (1980). *Communication, action, and meaning: The creation of social realities*. New York, NY: Praeger.
- Peterson, M. J. (2009). *Human 2.0? Conceptual metaphors of human beings in technologists' discourse: A study of the MIT Media Lab's Human 2.0 symposium* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database. (UMI No. 3351801)
- Reason, P., & Bradbury, H. (Eds.). (2001). *Handbook of action research: Participative inquiry and practice*. London, United Kingdom: Sage Publications.
- Reason, P., & Bradbury, H. (Eds.). (2008). *The Sage handbook of action research: Participative inquiry and practice* (2nd ed.). London: SAGE Publications.
- Rohrer, T., & Vignone, M. J. (2012). The bankers go to Washington: Theory and method in conceptual metaphor analysis. *Nouveaux Cahiers de Linguistique Française*, 30.
- Sancho, G. R. (2014). Networks, insurgencies, and prefigurative politics A cycle of global indignation. *Convergence: The International Journal of Research into New Media Technologies*, 1354856514541743. doi:10.1177/1354856514541743
- Schandorf, M. (2013). Mediated gesture Paralinguistic communication and phatic text. *Convergence: The International Journal of Research into New Media Technologies*, 19(3), 319–344. doi:10.1177/1354856512439501
- Schön, D. A. (1983). *The reflective practitioner: How professionals think in action*. Surrey, United Kingdom: Ashgate.

Improvising with metaphors: A communication perspective

Schön, D. A. (1993). Generative metaphor: A perspective on problem-setting in public policy.

In A. Ortony (Ed.), *Metaphor and thought* (2nd ed.). Cambridge, United Kingdom: Cambridge University Press.

Steier, F. (Ed.). (1991). *Research and reflexivity*. London, United Kingdom: Sage Publications.

Tarride, M. I. (2013). The complexity of measuring complexity. *Kybernetes*, 42(2), 174–184.

doi:10.1108/03684921311310558

Weick, K. E. (1998). Introductory essay: Improvisation as a mindset for organizational analysis.

*Organization Science*, 9(5), 543–555.

Zhong, C.-B., & Leonardelli, G. J. (2008). Cold and lonely Does social exclusion literally feel

cold? *Psychological Science*, 19(9), 838–842. doi:10.1111/j.1467-9280.2008.02165.x