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Metaphors in design: an analysis of how we represent design expertise.

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Metaphors in Design: An Analysis of How We Represent Design Expertise

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Abstract

Design and design expertise are often argued about and rarely agreed upon by the design community, which is a result of their multifaceted nature and existing underlying assumptions, theoretical anomalies and fragmented knowledge in the field. Lakoff and Johnson (1980) suggest that metaphors structure our perceptions and understanding. Metaphors affect the way we categorise experiences and organise our ideas (ibid). Based on this argument, the paper investigates the visual and cognitive metaphors related to design, in particular, design expertise (DE), to address how these metaphors shape our understanding of DE. It examines how DE is represented through the use of metaphors and explores the use of metaphors as a tool to recognise, share and acquire expertise.

This paper examines several metaphors, which are identified mainly through reviewing the literature on design knowledge and skills and existing interviews conducted with designers. The metaphors are analysed in a framework that identifies the linguistic roots, associated meanings, underlying theories and their possible impacts on the design discipline.

The analysis of these metaphors reveals characteristics, strengths and limits of how we understand and describe DE. This analysis and discussion will contribute to strengthen an individual's comprehension and positioning on design expertise. It will also input towards how we communicate DE, and how we exchange knowledge, ideas, experiences and skills within the design and business communities, who often do not share the same language and mindset.

Keywords

visual metaphors; cognitive metaphors; design expertise; design knowledge and skills

Introduction

The light bulb, as a visual metaphor, often represents "I have an idea!". Despite the fact that the incandescent light bulb has become obsolete, it is still a symbol of a novel and innovative idea. One may associate it with the breakthrough the light bulb brought in the early twentieth century or with Thomas Edison, as a recognised innovator. Perhaps its real value as a metaphor is due to its connection with sudden illumination. As Wallas (1926) suggests "the art of thought" has four stages: preparation, incubation, illumination¹ and verification. Illumination, an observable property and effect of light, ends the darkness. It describes the moment of "Eureka", "aha!", or a "creative flash", which happens often after incubation, a long period of preoccupation with a problem or a process of hard thinking.

¹ Both illumination and incubation are also metaphors representing the thinking process.

Similarly, the phrases such as “a bright idea” and “it is brilliant” are also based on the implications of it. The light bulb metaphor can, therefore, be assumed to be still valid and relevant. For example, Gordon Murray, an automotive designer (in Cross 2011:33), describes his design process, “in the midst of the pressure, there appears a sudden illumination”.

Metaphors are not an ornamental aspect of language; they structure our perceptions and understanding (Gibbs, 2008; Glucksberg, 2008; Lakoff & Johnson, 1980). Metaphors serve to generate new ideas, solve problems and stimulate creativity (Casakin, 2007; Coyne, 1995). An extensive and well-reasoned discussion on how and why to use metaphors is found in the literature on interface design (Hutchin, 1989). The desktop metaphor should be mentioned here as an iconic example of how metaphors aid to solve design problems. Many elements of a physical office environment, such as files, folders and wastebaskets, were carried over to the construction of the digital interface. The visual correlation between the physical elements of office environment and the digital Macintosh desktop elements elucidates the concept and helps the user easily adapt to a new environment. Basically, the user automatically maps the desktop schema onto the interface in order to understand the concept. However, this kind of mappings sometimes remains very instrumental due to straightforward transferring. Metaphors essentially shape the way we value things as a result of “seeing as”. Schön (1979) discusses generative metaphors and implications of “seeing as” in social policy context.

Schön suggests that generative metaphors, which are constructed by individuals, represent a special way of seeing. In his first example, he refers to the opinion of the experts in the 1950s. That opinion concludes that the community would be healthy when there was no blight or slum area in a city; hence *the slum was seen as a congenital disease*. The existing buildings in the slum were regarded as unsanitary. The area, therefore, needed to be planned to eliminate the conditions of the slum. Redesigning the problem areas, as a result, was focused on building new housing, parks, streets and shopping centres; the disease was cured by the removal or treatment. In his second example, he refers to Herbert Gans’ Urban Village Project in 1962 through the metaphor of “seeing slums as natural communities”. Gans recognised the informal networks of the slum with its homelike stability. Hence, instead of dislocating people from their local areas and *natural communities*, ways of preserving and improving community cohesion were sought. Schön identifies our strong affinity with the *natural* (due to its romantic origins) and our distrust in the artificial, which continues to influence our understanding of the topic. Seeing the slums as health/disease in the first example and nature/artifice in the second had different implications on how the reality was constructed, the problem was framed, and the solutions were found.

Zinken *et al.* (2008, p.363) introduces the term *discourse metaphors* as “a relatively stable metaphorical projection that functions as a key framing device within a particular discourse over a certain period of time”. “Nature is a book” or “the state is a machine” are some of the examples given (*ibid.*). This paper identifies various discourse metaphors that are constructed by the individuals. It also includes generic-evolutionary metaphors, which are widespread and well embedded in the language, which have evolved and developed in time, and therefore are hardly noticeable when used, such as *collecting, recalling, capturing* and *building* expertise. They are often not specific to the design field. Lakoff and Johnson (1980) point out that metaphors are so frequently used in everyday language, people using them are hardly even conscious of how metaphors operate.

Lawson and Dorst (2009) discuss the versatile nature of design through categorising it under “design as”. For example, *design as problem solving, design as learning, design as evolution, design as integrating into a coherent whole, and design as a fundamental human activity*. Some other facets of design can be *design as form giving, design as a tool for innovation*. These examples highlight various values and outcomes of design activity.

Seeing design as problem solving has different implications for design practice than as form giving. However, these metaphor schemas hardly preserve a high level of specificity or rarely draw on relatively rich cultural knowledge in the source domain. *Problem solving* and *form giving* barely function the same way as *Europe is a house* and *nature is a book*, especially the way the meaning is constructed. Cross (2011) also discusses design activity and thinking by means of two metaphors; creative problem solving like the activity of an ant (Simon, 1969) and design as an explorer (Jones, 1980). However, how the design process or DE might itself be metaphorically conceptualised has been seldom asked.

This paper attempts to map metaphors used in design field. It reveals how we comprehend and communicate design expertise (DE) through several metaphors. It discusses the possible implications of these metaphors for design discourse and practice. Lakoff and Johnson claim, "the essence of a metaphor is understanding and experiencing one thing in terms of another" (2003, p. 5). Based on this argument, the metaphors serve to make the implicit explicit. It does not aim to find new metaphors, yet it acknowledges that the new metaphors will contribute to represent the richness of design.

Method

This paper identifies the related metaphors through reviewing, in a way meticulously scanning, the literature on DE and design process. The majority of these sources are fundamental writings on design including works by Schön, Cross, Lawson and Dorst. In order to understand the evaluation of DE and design practice, the researcher also examined twenty-five previously published interviews conducted with designers by various journalists and researchers in the last five years. It is not feasible to access and discuss all the DE related metaphors within a single paper. Therefore, this paper includes a selection of metaphors that are thought to be significant and relevant based on the following criteria:

- Re-occurrence (Is it frequently used? is it a repeating metaphor?)
- Representational quality (Is it clear and expressive? Is it valid?)
- Relevance (Is it related to one of these topics: the design knowledge, design skills, the design process, and the role of design? It is noticed that identified metaphors often do not represent the whole picture of DE, they represent some aspects of it.)

The metaphors are analysed within a framework that identifies their linguistic roots, associated mind-sets and underlying theories.

A limitation of this study is that it uses previously published interviews. Because these interviews are not tailored for this research, the relevant information discussing design process, skills or expertise was limited. In addition, interviewees may not share their experiences and opinions openly when the interview is published in a publicly available source. To overcome this problem, the researcher conducted four additional interviews with design practitioners and professionals using a semi-structured interview schedule to access their opinions on the implications and possible reasons for using metaphors in representing design knowledge, experience and skills. Another limitation is that this paper presents a small selection of metaphors. A great deal of effort has been made to identify as many metaphors as possible. However, many more remain to be discovered and explored. The majority of uncovered metaphors are dead or generic metaphors that are hidden from consciousness.

Findings and Discussion

The study first presents a selection of metaphors in a rather plain fashion. As Table 1 illustrates, the metaphors are listed under the core aspects of design expertise: design skills (as a composite of knowledge and abilities), design process, design outcomes, and design roles. Some of these metaphors are discussed in the following sections, the subsequent categorisation is formed on the basis of what the metaphor implies.

Table 1. A selection of metaphors for design and design expertise

Design Skills	Design Process	Design Outcomes	Design Roles
Thinking out of the box	Black box	Concrete solutions	Magician
Gut instinct	Fairy Dust	Blue sky	Path-finder, way-finder (Juninger, in Bühlmann & Wiedmer, 2008)
Magic	Mystical	Creative Flash	
Illusion	Magic	Light bulb	
Capturing, collecting, re-calling knowledge-experience	Myth	A mental block lifted.	Competitive weapon (Fujimoto, 1991)
Building knowledge	Journey (Cross, 2011; Lawson & Dorst, 2009)	the Eureka	Catalyst (Dunne, in Bühlmann & Wiedmer, 2008)
Design as tight rope walking (Schön, 1983)	Re-inventing the wheel	the aha! moment	Explorer (Jones, 1992)
Repertoire	Incubation illumination (Wallas, 1926)	Signpost (Juninger, in Bühlmann & Wiedmer, 2008)	Wild ideas
Pencil as Spokesman (Richard McCormac, practitioner architect)	Framing the problem (Schön, 1983)	Design as a marker of culture (Jacob Hashimoto, artist designer, 2012)	Bridge (Lake-Hammond and Waite, 2010)
Fresh Eye	Problem structuring-formulating	Design as political windows dressing (Sarasin, in Bühlmann & Wiedmer, 2008)	Link
Connecting	Problem setting (Schön, 1983)	a messy divorce (Christopher Boots, design practitioner 2011)	Connector (Leung, design practitioner 2012)
Bridging (Fruchter & Swaminathan, 2006)	Reflective conversation (Schön, 1983)	Unique twist (Matik, 2011)	Integrator (Fujimoto, 1991)
Cross-pollination (Kelley & Littmann 2005)	Drawing as a dialogue (Santiago Calatrava engineer-architect, in Lawson, 1994)		Midwife (Ingels, architect, 2012)
Repertoire of tricks (Richard McCormac, practitioner architect, in Lawson, 1994)	Catalytic		Hero (Badke ShauB <i>et al</i> , 2010)
	Reflective conversation (Schön, 1983)		White knight, (Badke ShauB, 2010)
	Dialogue (Calatrava, cited in Lawson, 1994)		Illusionist (Jones, 1992)
			Gambit (Lawson 2003)

Acquiring Design Expertise

The first categorisation is based on the conception that expertise is not a skill that an individual is born with; he/she acquires it in time after years of experience, after hours of deliberate practice and study (Ericsson, 2001; Christiaans & Dorst, 1992; Lawson, 1979). The metaphors discussed in this stream include repertoire vs. repository, collection, capturing, climbing stairs/ladder/levels, re-inventing the wheel, journey, pencil as spokesman. For example, Schön articulates (1983) designers' knowledge as a design *repertoire* rather than a set of abstract figures and scientific rules. Similarly, Jesse Catron (2012), a game designer, states that

Of course familiarity breeds proficiency but I think it is important for a designer to have a versatile *repertoire* of mechanics to use according to the goals he is trying to accomplish or the problems he is trying to solve.

Repertoire, a theatrical and performance-related term, is a re-occurring metaphor and has a significant impact on design discourse (Bang, 2009; Lawson, 1994; Stolterman, 2008). It often indicates that a design practitioner, whether consciously or subconsciously, draws from his/her own or other design professionals' previous experiences. Designers *acquire* knowledge intuitively, without the use of a reason or inference; thus, this knowledge is often implicit, tacit and experiential (Bang, 2009). Similarly, *repository* as a metaphor reflects the concept of reusing the design experience. The underlying theory for both metaphors is case-based reasoning. The repertoire refers to internal and digested knowledge, which is regularly performed i.e. reused; the repository, on the other hand, refers to using an external knowledge source. Ye and Fischer (2002) point out that a cognitive barrier to external reuse might stem from a user's unfamiliarity with the contents of the repository. Brown and Duguid (2000, p. 119) underlines, "knowledge is something we *digest* rather than merely *hold*", they suggest that it is reasonable to say, "I've got the information, but I don't understand it," rather than, "I know, but I don't understand" (ibid.). It might be argued that the repository keeps the design information, and the repertoire keeps the design knowledge. Attention should also be paid when internalising the design knowledge, learning to *perform*, and not learning to *store*. Other important aspects of knowledge reusability are the ability and the attention to "capture" and "recall" i.e. organise and retrieve the previous experiences, and use them regularly, which is perhaps a way of making it explicit. Each retrieval and re-use of knowledge is a way of rehearsing and making the knowledge tangible.

Another metaphor of acquiring expertise is "*climbing a ladder*" in which the first step is being a novice, ascending to the expert level, then becoming a master and a visionary. Dorst and Reymen (2003) mention this seven-stage DE model, shown in Figure 1, based on the philosopher Dreyfus and Dreyfus' previous five-stage model (1980).

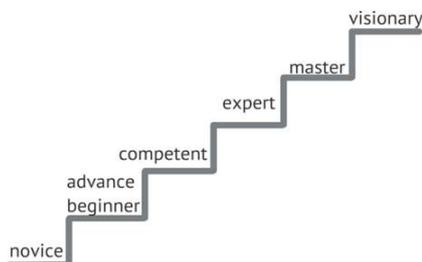


Fig 1. Seven stages of expertise

This metaphor demonstrates expertise acquired in a step-by-step fashion. For Lawson (2003), design expertise requires maturity; unlike musicians or sportsmen, recognition comes after years of practice. It is to a significant extent dependent on gathering experience through time rather than an innate ability. Ericsson (2001) claims that masters seem to consider inborn capacities and innate talent as relatively unimportant; rather, they emphasise the role of motivation, concentration, and the willingness to work hard to improve performance. This metaphor represents a linear and steady development. Yet, Schneider (1985) argues, "practice does not always make perfect".

Efficiency, productivity and practical motivations are also concerns of this stream. Attempts wasting a designer's resources by duplicating existing methods and optimised solutions are often avoided as the metaphoric idiom "reinventing the wheel" illustrates. The approaches that place an emphasis on reusing the knowledge, experience and existing solutions to achieve their innovation goals may rather lead to uninventive outcomes and be perceived as generating incremental designs or improvements.

Journey, as a metaphor, is used widely in various contexts; research and project-based studies, e.g. "Innovation journey" (Van de Ven *et al.*, 2008). MacCormac (cited in Lawson & Dorst, 2009, p.11) uses the journey metaphor to illustrate his design process:

I mean the analogy of a journey is a very interesting one. The design process is a journey, an episodic journey towards a destination which you don't know about, which is what life is and what writing and all arts like; a journey.

Cross (2011) also uses this metaphor to describe the design process; he contextualises design projects in particular. He treats the design brief as the starting point of the journey. So it is a known part of the journey in that sense. He points out the need to "stand back and adopt a fresh point of departure" to bring a new perspective to evaluate it. Similarly, Jones (1992) likened designers to an explorer looking for hidden treasure. To him, a new problem is like an unknown land, of unknown extent, in which the explorer searches by making a network of journeys. He sees design methods as navigational tools and maps. Design methods assist in plotting the course of the journey and maintaining some control over where design goes. On the other hand, Lawson and Dorst (2009, p.21) also use the journey metaphor to describe overall process of developing expertise: "we see the creation of DE as a journey". For them, acquiring expertise is a long journey that starts with graduation (*ibid.*). The journey metaphor here implies acquired expertise. There is an emphasis on the movement; it is a dynamic process.

The word "journey" is derived from French, meaning "a defined course of travelling; one's path in life". Journey, as a metaphor, reflects a process-oriented mindset. Even though the definition states "a defined course of travelling", the unknown seems like an important aspect of experiencing a journey as well as designing. Here, the emphasis is on relying on maps and tools, good equipment and experience rather than exceptional skills. This approach implies an open model that encourages designers to be curious and flexible. Since the designer cannot predict all the obstacles and opportunities that lie on their path towards the goal, all they can do is to deal with the obstacles, seize the opportunities and embrace the unknown.

Spokesman is another interesting metaphor used by Richard MacCormac, a British architect, interviewed Lawson 1994, stated that:

Whenever we have a design session, or a crit review session in the office, I cannot say anything until I have got a pencil in my hand. I feel the *pencil to be my spokesman*, as it were... I haven't got an imagination that can tell me what I've got without drawing it. I use the drawing as a process of criticism and discovery.

Spokesman, an expert speaker who talks on behalf of a group, is the embodiment of his drawing skills, expertise. This metaphor is an interesting articulation of the “show, don’t tell” principle of design. His deep attachment to his pencil reminds us of Polanyi’s (1966) example about how a person learns to feel a tool or a probe as an extension of his/her body and thinking in a similar way that a blind man feels his way by tapping with a stick. As he becomes more proficient in using the pencil, this object transforms into a sentient and independent extension of his hand. Clearly, his pencil is the manifestation of his thinking, so as drawing. This implies a deep relationship between articulation and drawing.

Using the drawing as a process of criticism and discovery can be also found in the metaphor “*reflective conversation with the situation*”, constructed by Schön (1983). In this conversation, the designer reflects and, in a way, talks back towards the construction of the design problem. Similarly, the engineer-architect Santiago Calatrava interviewed by Lawson (1994) comments: “to start with you see the thing in your mind and it doesn’t exist on paper, and then you start making simple sketches and organizing things, and then you start doing layer after layer; it is very much like a *dialogue*.”

All these metaphors above imply a cumulative process of learning and suggest that design expertise is acquired by stressing the value of experience, knowledge and deliberate practice, rather than individual strengths of a designer, unlike the metaphors of the next section.

Design Expertise as a special skill of a designer

The second categorisation builds on the idea that an expert displays a special skill (Akin, 1987; Cross, 1990; Cross, 1999) for perceiving, formulating and solving problems, which is beyond knowing more facts, rules, principles, guidelines and examples (Newell & Simon, 1972; Anderson, 1983). Metaphors in this group may emphasise the value of creativity in DE and imply that expertise belongs to the personality of the designer, or can be understood as an outstanding performance- talent. In some situations, designer’s self image appears as arrogance. This is referred to as a barrier when collaborating with different stakeholders (Rust, 2004; Rust, 2007). Forty (1986, p.242) says seeing design as a distinctive skill of designers may result in ‘the myth of their own omnipotence’. He states “design has come to be regarded as belonging entirely within the realm of the designer” (ibid.). Badke-Schaub *et al.* (2010) criticised these special skills and functions ascribed to the designer, such as high-impact innovative solutions to be applied the market. They used the metaphors “white knight” and “hero” to point out how the value of DE is overestimated by designers.

The example of Juicy Salif the lemon squeezer, designed by Philippe Starck, can be mentioned as a narrative, a root metaphor,² (Sarbin, 1986) to illustrate the distinctive design skill. This root metaphor serves, perhaps strategically, to evoke emotions, to strengthen the design value and to increase sales. Starck claims that design ideas come to him quite “*magically as if out of nowhere*” (!) (Cross, 2011). After receiving the design brief for a lemon squeezer from Alessi, Starck’s design story starts in a restaurant. (Carmel-Arthur, 1999) Starck explains “this vision of a squid like lemon came upon me, so I started sketching it...” (as seen in Figure 2). “If I’m quick”, Starck thinks, “I can design this before the *primi piatti*” (ibid.). In the story, the very next day, he called Alessi and said “your lemon squeezer is ready” (ibid.). The story implies that the way he arrives at the design solution and his ability

² According to Sarbin (1986) narrative is a root metaphor (Pepper, 1942). Narratives, like metaphors, constructs the reality through shaping an individual’s perception of the world. It builds on the idea that meaning is created and communicated through stories and experiences rather than logical arguments and lawful formulations.

of communicating his expertise are his individual skills, which is represented in a way that it is not a result of practice or design methodology. This story and other similar ones embracing design genius seem to embody the design expertise at first glance; however, it does not help to the design profession by attaching the value to the individual competence.



Fig 2. Sketches on service napkin, Juicy Salif, the lemon squeezer (Carmel-Arthur, 1999)

Design Mystery: Magic and Magicians

Magic is often viewed with suspicion by the wider community (Mauss, 1972); thus, demystification of magic is sought after. The demystification of creative design has been the subject of much research. For instance, a positivist movement in the 1980s called “design science” (Cross, 2001; Bayazit, 2004) influenced the design researchers who tried to explain design as a rational (or rationalisable) process, or as rational problem solving (Simon, 1969). A number of researchers, however, reacted against that rationalisation, rather emphasised a phenomenological approach and considered design as a subjective experience (Schön, 1983). There were also attempts to explain the process of designing; Lawson’s book “How Designers Think – The Design Process Demystified” in 1980 and Kolko’s book “Exposing the Magic of Design” in 2011 can be included among them. There are reactions against mystification from practitioners; Vince Frost (2008), a graphic designer, comments, “we (designers) are not mysterious people, our work is really straightforward, it just takes a lot of effort to listen really hard and to explore.”

In 1990, Cross claimed that de-mystification is a deliberate act; he claims, “although there is such a great deal of design activity going on in the world, the nature of design ability is rather poorly understood. It has been taken to be a mysterious talent”. One can notice this statement is still valid (Cross, 2011). Cross claims there exist an interpretation of design ability as “ineffable mysterious art” (ibid). He argues, “so design is not obvious, or we don’t want it to be obvious” (ibid). The metaphors convey mystery and obscure design process include magic, black box, magician, myth, trick, and twist.

Designers sometimes use magic in a positive sense and associate with creativity. Thoreau (2013), for instance, describes himself,

I am a graphic designer who loves creativity and magic, and my aim in life is to share these with you. I believe that we find our truest vision and purpose in the magical world of creativity.

Richard MacCormac (in Lawson, 2003) illustrates his practice as “having a repertoire of tricks” to exemplify his original and surprising ideas. Lawson (2003) likens design to the activity of a gambit, a chess player who needs to create a new and unexpected move in a chess game in order to win. Kolko (2011) also suggests that clients may desire magic because a satisfying magic shows means that the money is well spent on the magician (ibid).

Many misunderstandings about design expertise are perhaps a result of the mystification of the design process. To Jones (1980), “the most valuable part of the design process is that which goes inside the designer’s head and partly out of reach of his conscious control, *in the black box*”. With the black box metaphor, the emphasis is on input and output, which leaves the process unobservable. Kolko (2011) recognises that much of the mystery is related to the synthesis stage of the design process and leaves this stage unresolved, informal, personal and rarely formalised. It leads to ignorance within the companies, he notices; professionals do not allocate enough time and budget to undertake the synthesis stage. Another outcome, Jones (1980) suggests, is that the most of the outputs of design, design thinking or writings are produced without being able to explain them; they remain inexplicable. Another implication was observed during an interview conducted with a respondent from an Innovation Centre, who indicated that they avoid using the word design in conveying innovation and growth message because it rarely communicates well with the business audience. He commented, “the design profession has long since sold themselves on a myth; as a result, people do not understand it.”

Magic is commonly practiced in isolation and secrecy, and a magician never shares how he completes his tricks. Two interviews conducted with design practitioners suggest that the demystification serves to protect the intellectual property (IP). Making the design process inaccessible by putting it into a black box seems to help preserve the IP. Whether it is a reaction to silent design or “we are all designers” (Papanek, 1971) and “everybody designs” (Simon, 1969), or to prevent downgrading design skills is not clear; however, “seeing design as magic or mystery” hardly aid collaboration, design democratisation and participatory design. As a result of the increased importance of collaboration, co-design, and critical design, new metaphors have entered to design vocabulary.

The Role of Designer as Catalyst

Metaphors in design have been changing in parallel to the evolving role of the designer. Anthony Dunne interviewed by Bühlmann (cited in Bühlmann & Wiedmer, 2008, p. 241) the Head of Design Interaction Department at Royal College of Art (RAC) commented,

They [designers] are catalysts, I think it is becoming well known. Certainly here in London—that one possible role for designers in the future is a catalytic role, and a facilitating role

Dunne suggests this new role is an engaging one, and the responsibility of the designer is to connect different audiences such as the public and professionals. Fiona Raby (from RAC) carried this conversation further by claiming that the expertise of designers is to generate questions and to reformulate the problems, rather than to solve them (ibid). In chemistry, when a catalyst participates in a chemical reaction, it often lowers the activation energy to start the reaction, or increase the rate of reaction. The expertise of the designer lies in aiding

collaboration between stakeholders, assisting the design process and increasing its efficiency. Similarly, Bjarke Ingels (2012), a Danish architect, indicates a facilitating role with his metaphor,

In a sense we are facilitators or – I like this idea that the architect is a midwife that we help society continually to give birth to itself –

Some metaphors emphasise the integrating role of design, such as bridge (Lake-Hammond & Waite, 2010), connector (Leung, 2012), integrator (Fujimoto, 1991) and link. Leung (2012), a designer who works for the design community in Canada, comments, “I consider myself as the connector, the community engager, the facilitator and the instigator within the industry.” For instance, a bridge fills a gap between two points, so does a link, it connects a to b, a linear connection; whereas, an integrator can connect more than two points, it might be a more versatile role, integrating different stakeholders. These metaphors place an emphasis on the value of the process of design, collaboration, and democratisation of design. Designers take part in the solution finding, but do not own the solution. Design outcomes also depend on the expertise of collaborators, and the picture of this process is significantly different from Starck’s representation or repertoire of knowledge.

A pervasive image to communicate this facilitating role is the designer + post it notes (Figure 3). The multicolour squares of paper cover walls and windows to convey the quantity of outputs resulting from creative collaboration, yet the overusing of this type of images without the necessary comprehension might downgrade the value of facilitation.



Fig 3. A facilitation image from a workshop

Conclusion

This study presented a number of metaphors that are relevant and significant for DE as different lenses to explain the way designers work and discuss various aspects of design activity. Designers may choose metaphors to communicate their expertise considering the meaning and implications which metaphors generate.

Metaphors affect how we exchange knowledge, ideas, experiences and skills between the design and business communities, who often do not share the same language and mindset. This paper suggests that some of the credibility issues or ambiguities of design stem from the metaphors that we use. Based on Schön’s (1979) generative metaphor process, seeing

design as a black box or magic has different implications than seeing it as a reflective conversation or bridging. Similarly, the implications of unknown are different when unknown is created by a black box or a journey. Our associations with black box, darkness and myth influence the way in which design and design expertise are understood. Black box approach inhibits from observing design process, which makes it difficult to share it with novice designers. Mystified metaphors lead to an unresolved and informal design process in which solutions are often built on personal skills of the designer or simply on serendipity. In addition, this process is undertaken in an undefined period of time and budget. The question remains whether it is a deliberate confusion created by some designers to present each unknown aspect of a design project as a mystery. Acting like a magician and being wilfully obscure about the design process may create a sense of curiosity and help to protect the design knowledge partially but it may inhibit them from successfully collaborating with others. Participation and co-design are becoming increasingly important in the community. A role that encourages communication and creates community bonding seems to be adopted by numerous designers.

This paper should be considered as an introduction to the subject; it opens up a debate on the significance of metaphors on design expertise and discusses their implications on how design expertise is understood. Using metaphors as a way to discuss design expertise is a wide and comprehensive subject and there is room for further investigation. This paper has covered only a relatively small selection of metaphors; there are a lot more waiting to be discussed to represent overall complexities of design. Future research should focus on metaphor experiments that can be conducted with designers and non-designers to investigate the issue by deeper discussions: why they are using these metaphors, what they mean to them. The reflections and evaluations resulted from the experiment will contribute to the understanding of metaphors in design discourse.

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