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Harnessing Hidden Knowledge for Paradigm Change

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Abstract

Can designers re-design the paradigm that threatens human survival? Probably not, if they only apply the specialist skills of their training. Design evolved to make factory-made products and services more amenable to paying customers. If we are to meet the environmental and economic challenges facing us, design needs to become more comprehensive, integrated, self-reflexive and trans-disciplinary. In looking for ways to achieve this, our 'metadesign' approach seeks new synergies by combining existing resources. But new synergies may be 'unthinkable' from within the 'language' of the paradigm that created the problem. In addressing this challenge we used a number of methods to reveal hidden synergies, including non-verbal, pre-verbal and interpersonal forms of knowing. And to make data more transferrable we used simple mathematics to map all of the relations among all of the participants in the team.

KEYWORDS

languaging, metadesign, paradigm, pre-purpose, sympoiesis

Introduction

Our AHRC and EPSRC funded research into 'metadesign' began in 2005, at Goldsmiths, University of London. Since then we have developed many tools and processes; testing some of them in workshops in Bangkok, Oslo, Lisbon, London, New York, Seoul, Stockholm and Tokyo. The ultimate aim of this work is ambitious. We argue that, if governments were to commission transdisciplinary design teams to work at a more strategic level, designers would bring new expertise to the current attempts to save our species from extinction. Our society needs more adaptive and resilient lifestyles that would deter climate change and encourage optimal levels of biodiversity. However, this would mean asking them to intervene at all the necessary levels of infrastructure, belief system, language and business models that sustain the status quo. It would elevate the role of designers from being 'link-fixers' in a chain of discrete products and services to catalysts of a framework for radical change (Wood, 2009). This is a double challenge. For designers to reform the system they will also need to reform the pedagogy, practice, and profession of design. Most are still trained as specialists who will maintain the economic status quo. This may remind the reader that the current paradigm of professional design is a subset of the capitalist paradigm.

Can We Re-Language Paradigms?

In seeking a viable approach to radical social change, Donella Meadows noted that familiar top-down methods, such as legislation, rhetoric, sanctions, etc. are usually insufficient to change a paradigm. For example, the fact that people may adhere to the letter of a radical new law does not guarantee that the existing paradigm will change. Meadows argued that paradigms change when enough people accept a new explanation of their purpose (Meadows, 1999). Paradigms are a complex entanglement of material affordances, 'things', assumptions, codes, deeds, styles, values, names, feelings and beliefs. They endure for a long time because these constituents sustain one another. Humberto

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Maturana and Francisco Varela's theory of 'autopoietic systems' (Maturana & Varela, 1980) offers a good illustration of the mechanism of paradigms. Nevertheless, it may not make them more visible, as they exist inside, as, or for, the cultural and political habits and patterns by which we live (Kuhn, 1962, Meadows, 1999). They eventually come to seem so 'normal', or 'natural', that their presence may hide new opportunities from us. Despite these obstacles, Meadows is correct in her analysis. By 're-languaging' situations in a sufficiently creative and opportunistic way we should be better able to notice new possibilities (c.f. Wood, 2013).

Pre-purposes within Metadesign

Humans often negotiate processes by discussing their purpose. However, this does not guarantee a close accord between purpose and outcome (c.f. Merton, 1936; Anscombe, 1957). If we wish to design new paradigms, rather than following rule-based instructions and external pretexts (Ashby, 1956), metadesign teams may need to self-orchestrate their collective, somatic, and so-called 'right-brain' knowledge (c.f. McGilchrist, 2009). In these self-organising teams of emergent-thinkers, participants may find it unhelpful, or even impossible, to agree on a clear pretext or 'purpose'. For this reason, we coined the term 'pre-purpose', to reminds them that spontaneous impulses may conceal latent opportunities that have yet to be reduced to a 'purpose'. Similarly, in Thomas Kuhn's analysis of institutional beliefs, customs and assumptions he found that they tend to endure long after more satisfactory alternatives have been proposed (Kuhn, 1962). This is largely because, in his examples, leaders of academic communities resisted new ideas if they appeared to threaten a long-established status quo. Similar patterns exist in nature where, for example, a group of species form alliances against interlopers who challenge their dominance (c.f. Stuart Pimm, in Lewin, R., 1997). But these natural systems offer a different organizational paradigm from the one that we find in the corporate world. Ecosystems do not survive by formulating a clear purpose and managing it on a top-down basis. Rather, they achieve it in a 'bottom-up' way, by attaining a requisite level of diversity and harnessing it in order to adapt to prevailing conditions (Kauffman, 2000). For this reason, we made our model of metadesign less predictive, and more opportunistic, than design.

Hidden Knowledge Within Paradigms

In seeking an ecomimetic approach we developed our own tools (c.f. Tham & Jones, 2008) that sought to replace the 'efficiency' of top-down systems with the opportunism that emerges from bottom-up diversities. We adapted management tools that optimise team roles (Belbin, 1993) and are leaderless (c.f. Koestler, 1967). In hierarchical organizations, designers are accustomed to negotiating terms of engagement around a given 'pretext'. The 'design brief', for example, is a summary of requirements for guiding subsequent actions. Elizabeth Anscombe has defined this kind of activity as 'acting under a description' (Anscombe, 1957). While it is effective and familiar; and while the client's words may be quoted in written notes, memoranda, or reports, some design opportunities will, inevitably, be diminished, hidden, or overlooked by this teleological approach. Many synergies remain hidden because they are embedded within the personal thinking (Polanyi, 1969), collective consciousness (Burns & Engdahl, 1998) and, or, group reasoning within teams (Stempfle, & Badke-Schaub, 2002). Some of our metadesign tools sought notation methods that would record bodily gestures in relation to one another, in order to uncover, or to recover, unspoken information. Tacit knowledge is a key constituent of the design paradigm, yet it is difficult to map, share or communicate using alphanumeric writing. This is because co-creative relations include emotional, and other, nuances that are important within collaboration (see figure 1).

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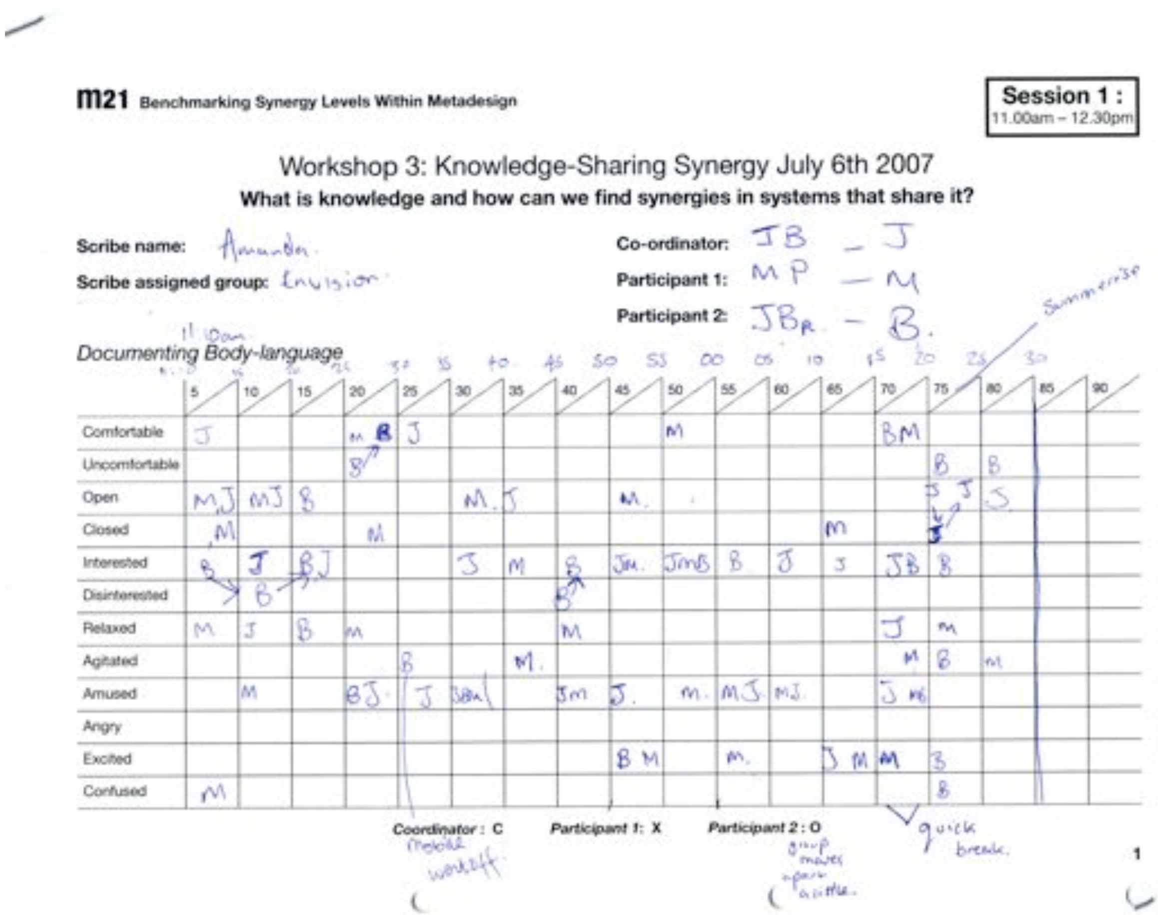

Figure 1 – record sheet for documenting body language within teams

As Wittgenstein put it, "What can be shown cannot be said." (Wittgenstein, 1921). Some theorists see design tasks as 'wicked' or ill-defined problems (Rittel, 1984), which also helps to explain why much of the learning processes that underpin them are likely to be 'informal' even if, in hindsight, they seem planned. These may include playful, 'psychomotor' activities that are 'associative' (Behrens, Hunt, Woolrich, & Rushworth, 2008), or 'latent' (Stevenson, 1954). This means that a high proportion of the knowledge obtained will be in forms that are too 'tacit' (Polanyi, 1969) or 'implicit' (Reber, 1993) to record as unequivocal facts, or clear conclusions. In seeking to make a paradigm change we usually need to manage a diversity of perceptions and knowledge types, which occur in different times and places.

What Holds Paradigms Together?

While the vast scale and complexity of our task remains as daunting as ever, we wanted to emulate living systems in some way, even if it meant reducing the problem to an absurd level. We therefore made the working assumption that living systems and paradigms are synonymous, because each is sustained by a coevolution of the relations that hold their constituent parts together. James Lovelock's depiction of the biosphere as a heterogenous, coevolutionary system greatly inspired us (c.f. Lovelock, 2000). In particular, it persuaded us not to differentiate between animate and inanimate agents when modelling the whole system (this article describes a smaller scale model). Humberto Maturana and Francisco Varela were also extremely useful, as they denote relations within living systems as 'structural couplings' (Maturana & Varela, 1992). While we have found no everyday synonym for this term in English, the Korean word 'jeong' ( ) comes close, as it describes long-standing bonds of attachment and dependency within

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couples, groups, families, or teams. In this sense it emerges as quite an emotional field. When applied in a more ethical or political context, 'structural coupling' has affinities with the African word 'Ubuntu'. And, from a more analytical perspective, Goethe's term 'elective affinities' is also useful, as it emerged from a reflection on how relations work, both from a human, and from a scientific standpoint (c.f. Beck-Gernsheim, 1998). While these terms informed our understanding of the cohesive forces within paradigms, we also needed to map them, and to manage them as effectively as possible.

Hidden Fields of Knowing

One of our practical technologies (The Positional Tool) was inspired by the work of a Gestalt psychotherapist, Bert Hellinger, whose diagnostic workshop methods work at levels that are both somatic and relational. Hellinger designed them for patients who could not address their problems in words, either because their traumas had hidden them from memory, or because they were unable to put their painful experiences into words. We based our methods on a corporate version of 'Systemic Constellations' that was developed by the Nowhere Foundation in coordination with Judith Hemming. Typically conducted in the presence of 'neutral' observers, a facilitator would ask a problem-holder to give a very cursory outline of their predicament by listing the roles of key agents within the problem. The facilitator would then ask bystanders to adopt the roles of these people. Normally, neither the facilitator, nor the volunteers, would know anything about the 'problem' in question. The facilitator would then aske the problem-holder to orientate (i.e. silently and physically) each of the standing characters into positions that best reflect their respective roles in the problematic situation. Many who participate in this process for the first time are astonished at the strength of emotions experienced, and the clarity of insight this process can elicit in strangers who, apparently, knew nothing about the actual people they are representing. Hellinger believed that humans know more about the status of groups of people than they know about the individuals within them. His methods are systemic in the sense that they see beyond the individualised logic of western psychology. Instead, they assume that 'hidden orders' steer the moods, demeanour and actions of any group of people, which is bound by shared circumstances, loyalties, clan or mission (c.f. Udall, 2008).

Mapping Hidden Knowledge

As metadesign addresses issues that are beyond the capabilities of individual designers, we work with heterogeneous teams of co-designers. We therefore needed a way to orchestrate different approaches, including collective, intuitive, tacit, implicit, relational, logical and emotional types of knowing. Hellinger's methods showed that, while the shared beliefs and history of a team may remain unspoken, they may be transferred to new members via exchanges at the tacit, performative, and, or, implicit levels. These processes illustrate what happens in paradigms, in that they illustrate how characteristic behaviours may continue, even after each member of a well-established team has, in turn, been replaced. Many designers are good at working at the boundaries between thought and action (Schön, 1985), where what is 'known' may be as procedural as it is declarative. However, in order to make our methods more integrative, we developed somatic procedures that are intended to facilitate teamwork that would support creative activities. By mapping the knowledge acquired by our teams, we aimed to make it interoperable with data from other teams.

Setting up the Positioning Tool

In order to avoid emotional responses from vulnerable individuals we were careful to apply our 'Positioning Tool' in a professional, rather than in a psychoanalytical, or psychotherapeutic way. We briefed the teams on these dangers when asking each participant to define his, or her, perceived team role, expertise, and interests. In our first experiments we ran two similar teams in immediate succession, so that we could compare them. These took place in a quiet room that measured approximately 5m x 8m, with one side of the space identified as 'the front' (see figures 2, 3 and 4). Team members were issued with marker sheets upon which they wrote their professional title and up to three qualifying keywords that best described 'what they did' (professionally). Each team member was invited to 'walk the space' at his, or her, own pace, in order to 'claim the team territory'. This entailed moving around calmly, and comfortable, either with eyes closed or open, and to stop when each had found, subjectively speaking, a 'good spot'.

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Figures 2, 3 and 4

Once the team members are standing in their preferred positions relative to one another, each was asked to say how he, or she, felt. It is important for the facilitator to make it clear that the response should be experiential, or emotional, rather than analytical, or cerebral. Each person was then given several chances to adjust his, or her, position spatial orientation. This continued until there was consensus that everyone was positioned 'where they ought to be'. Participant marker sheets were placed on the ground, one per team member, and oriented in respect to the 'front' of the room. After the facilitator had marked the spatial orientation of each individual with an arrow, participants were invited to step out of the area and to help to link the marker sheets, using lengths of string. A Relationship marker sheet was fixed at the midpoint of each piece of string. These were used to record details about the exchanges or transactions between the participants. This floor-size 'map' was then scaled-down, and the distances, orientations and body language of each participant was recorded onto the Positions Map.

Mapping Fields as Nodes and Lines

We are aware that, although we are working with ineffable 'fields' of knowing, we are representing them using a notation system that identifies only dots and lines - i.e. as agents and relations. We can also see that what we may mean by 'relations' could be interpreted in a variety of ways. For example, if used to map Thomas Kuhn's account of paradigms within academia we might describe these relations as 'vested interests' (c.f. Kuhn, 1962). Whether this is too big a generalisation will depend on the purpose of the research. In our case we wanted to map whole systems, rather than focus onto the specificities of people, or local situations. Although we knew we were exploring subtle 'fields of knowing', or 'cultures of practice', we found it useful to apply Marvin Minsky's unashamedly atomistic definition of 'consciousness' - i.e. 'a low-grade system for keeping records' (Minsky, 1988). This reductionist approach enabled us to map highly complex paradigms as networks of co-dependent agents (Backwell & Wood, 2009), using Vadim Kvitash's 'relonics' notation system to map all significant interdependent 'players' (c.f. Kvitash & Gorodetsky, 2003). Each player is defined by its 'assets' and 'needs', in the context of the whole group, and what it must do to survive within a given task.

Optimising the Size of Teams

Represented at the simplest level, two participants imply (one) relation, which may become an additional idea. In our graphic notation (see figure 5, below), each line represents a relationship between players (i.e. nodes A, B, C, D, E) in the system.

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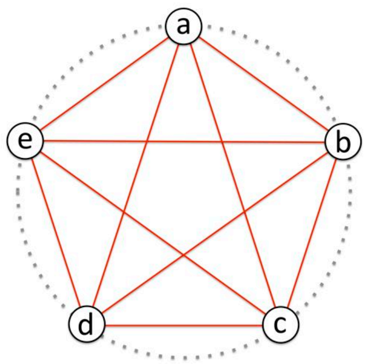

Figure 5

In this case, five players produces ten possible relations. However, our research showed that, for some creative activities, four participants, or agents, is an optimum team number. This is because, while larger teams offer a greater range of creative possibilities, expanding the team beyond four brings cognitive overheads for the metadesigners. Indeed, the ratio of players to relations will rise exponentially, as the number of players is increased. This would provide six interactions, or interrelations, among the members. Reducing the team to three participants would halve the number of interrelations (i.e. from six to three).

Mapping Team Relations

In our team experiments and professional work we selected recruits from a variety of design specialisms. We were also took great care to ensure that our teams represented a high level of diversity of types (i.e. range of knowledge, thinking styles, personalities and backgrounds). We adapted well-known management methods, such as Belbin's 'team roles' (Belbin, 1993) to make it more suitable for creative teamwork. In our professional consultancy we also invited the stakeholders to participate, sometimes alongside appropriate change-makers, such as economists, ecologists and engineers. In this first step we identify the key characteristics and features of each agent and map him, or her, as a node. When completed fully and appropriately, these characteristics should provide a reasonable representation of the group, or team, in question. However, as teams are volatile, the picture is unlikely to be static. Indeed, additional benefits and constraints will emerge and change, during the collaboration processes. Even though are methods are highly reductionist, the mapping process encourages participants to search for synergies. It also helps teams to reflect upon their respective 'needs' and 'assets', as individuals.

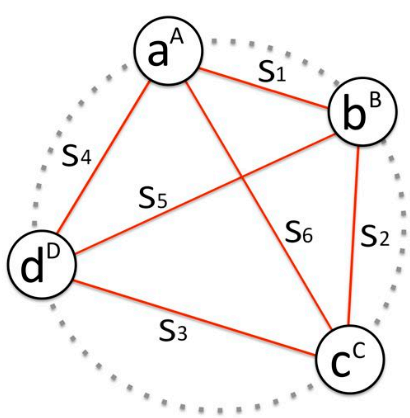

Figure 6

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In our notation, it is important that each node is shown to be connected to every other node within the system (in this case, a team). Figure 6 depicts a group of 4 agents (a, b, c, d) that act as the 'carriers' of four assets (A, B, C, D). These could be ideas, principles, knowledge sets, or skills. When a given relation (i.e. line) brings together a pair of assets it has the potential to generate a synergistic outcome (S1 to S6). In mapping the assets, dependencies or conditional behaviours we chose to differentiate between data that is 'crisp' or 'fuzzy':

Crisp - clearly known; close correspondence with consensual descriptions; calculated.

Fuzzy - subjective; obtained more by judgement or 'feeling' than by precise measurement.

This phase may be revisited many times as more data is discovered or modified and knowledge of each becomes less vague. Since most nodal profiles will be incomplete or derived from naturally limiting perspectives, then consistent 'crisp' data will be rare. This is in a number of respects enlightening and surprisingly helpful since it detracts from the notion of a 'determined formulaic solution' and more appropriately lends itself to becoming a tool, or rather 'a partial tool' that assists in the establishment of more auspicious groups tailored to the task in hand. Our experimenting indicates that groups loosely selected for a task tend towards this position through 'self-tailoring' or honing. If the data is incomplete it begs to derive more detail from the group. This process alone is revealing to individual agents and to the group as a whole. In many of our workshops it has been sufficient to be aware of the bounds of particular attributes of participants, rather than exact 'parameter' values. A number of factors will impact upon the six, paired relationships that exist within a team of four. Here, four factors are shown. These attributed to the agents ('idea-carriers) and the assets ('ideas' etc):

#	Value	Description	Comment
1	**Commensurability**	Extent to which relevant resources, or values are complementary with one another	0 = no match 1 = equal match
2	**Miscibility**	Likelihood that fusion or integration between agents will lead to synergy	0 = fixed separation 1 = fully integrated
3	**'Parental' independence**	Level of uniqueness of the potential synergy. (Intrinsic values of the combination versus the values of its hierarchical 'parents')	0 = outcome fully dependent upon contributing parent(s) 1 = outcome fully independent
4	**Situatedness**	Replicability of the synergy (How dependent it is upon a local context or situation).	0 = independent of situation 1 = strongly situated

Table 1

This provides for an interesting set of possibilities, but before scrutinising the possible relationships more closely it is useful to examine the measures associated with the above factors. All declare a benchmark for either the absence or complete fulfilment of the attribute concerned. This is because the extremes of range are more readily determined and are opposites of each other as would be expected. However, the qualities suggest there would be intervening gradations though the group would be hard pushed to derive a meaningful and agreed scale. This might be viewed then as a 'fuzzy' value set (Zadeh, L., 1974) whereby the range exists but defies certainty of measure.

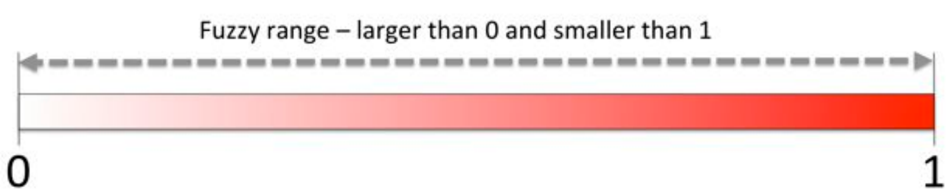

Figure 7

This is complex and only marginally helpful. It can, however, be simplified (defuzzified in Zadeh terms) by pivoting values about the mid-point and suggesting a tendency toward an end value qualified by a loose probability or

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perceptive term (e.g. slightly 1, near zero etc). The mid-point itself is a paradox as in fuzzy terms it tends to neither and both (Kosko, B., 1994).

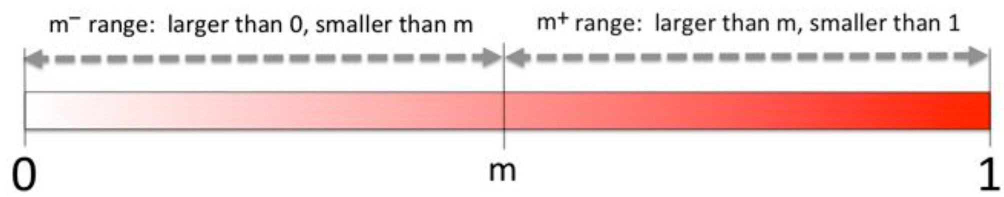

Figure 8

This analysis can easily be extended to produce profiles of the paired working relationships that build as a visual. Consider the attributes of commensurability and miscibility for a pair of agents (a:b) in this process (refer to Table 1 above). Together this will provide an indicator of how well are they matched and their ability to collaborate effectively. As stated earlier, both of these attributes might be considered as bivalent whereas in reality they will demonstrate multivalent qualities giving indicators that are likely to lie in the fuzzy space where 'fixing' is subjective to the perception of each agent, though they may collaborate and agree on where in the fuzzy space best describes their partnership (see Fig. 6, below).

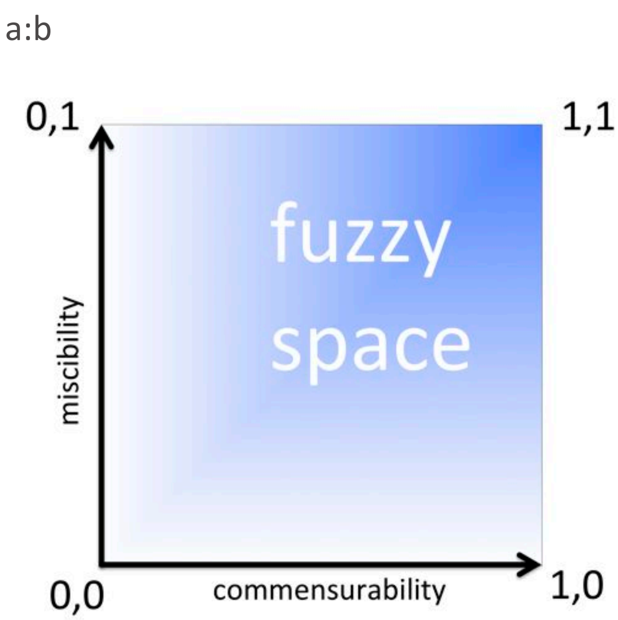

Figure 9

The profile of the pairing with respect to the qualities considered exists anywhere within the square and can be gauged or felt to exist in one region more than another. This reflects a more realistic interpretation of the partnership. We can begin to build upon this with further attributes (parental dependence, situatedness). We can also consider the profiles of the same pair at different stages of their partnership as well as comparing with other partnerships at similar stages. Mapping and profiling in this form aids the understanding of how we can plan for synergies more effectively. Discreet data is hard to ascertain and even when achieved is equally difficult to reliably interpret.

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Analysis of the agents combining the assets they carry can use the exact same process. Using the analysis notation, both asset (idea) and agent (idea carrier) can be shown by:

$$a^A : b^B \rightarrow S_1$$

Interpreted as agent 'a' carrying asset 'A' working with agent 'b' carrying asset 'B' which they attempt to combine to generate a synergy, S1. They, with the help of observers, might then create a profile as in Fig. 7 (below).

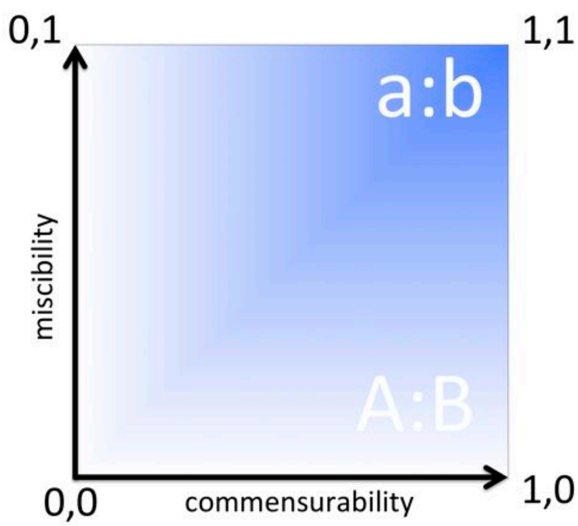

Figure 10

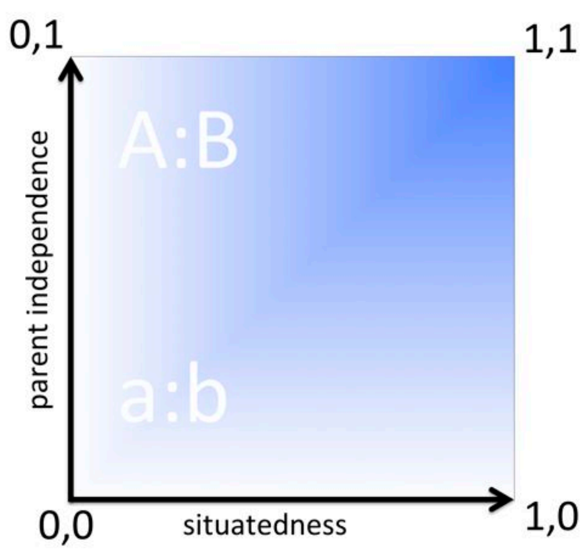

Figure 11

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So we are observing the analysis of a meeting between a and b where each have disclosed their perceptions of the engagement and charted it, collaboratively, as shown. (They could have charted this independently and provided stronger subjective data though with the additional layer of complexity of interpreting the similarities and differences experienced). The profile of the meeting shows that a:b may be friendly and equally matched with a working style that bears little resemblance to their own usual practice. Furthermore, they are both weakly situated i.e. are flexible regarding the context they work within. They are also very effective adapters. The ideas they bring and attempt to combine, A:B, are certainly commensurate though are not so easily integrated. In addition, they are able to produce outcomes significantly different to what they would have achieved independently yet these are most likely to remain within the context in which they were developed.

Conclusions

Our methods help teams to locate unforeseen synergies by drawing attention to team relations that may, otherwise, have gone unnoticed. As human interactions within teams are too subtle and complex to be written, we used fuzzy mathematics to map somatic, experiential and relational data. This enabled us to document knowledge that might, otherwise, have remained hidden. By encouraging participants to review their assumed roles, our tools helped them to see themselves as an important part of a 'living system'. In short, our methods enable teams to harness unseen knowledge and to construct new knowledge from it. They also encourage participants to identify new meanings and, where possible, to invent linguistic terms that might reveal hidden synergies within the whole system.

Dedication

This article is dedicated to the memory of our talented colleague and co-researcher Nic Hughes (pictured in Figure 2, bottom right), who passed away on 12th October 2012 at the untimely age of 44.

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