Making Sense of Mediated Learning in Small Firms

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Abstract

In small firm research in particular, a bias still persists in favour of a resource-based view of knowledge. A social constructionist perspective, however, argues that knowledge creation and learning processes occur instead through continual interaction within a unique social milieu. This paper explores how artefacts mediate these interactions, the types of objects that are used to invoke practices that might encourage transformation, and how artefacts thus act to accelerate learning in particular organizational activities. Understanding is presented of the role of material and symbolic artefacts in the social learning processes of entrepreneurs so that more effective educational and policy interventions can be considered.

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1.   INTRODUCTION

Previous studies suggest that generic training interventions have failed to achieve a significant affect on small firm performance (Storey 2004). Contemporary studies, however, suggest that understanding the characteristics of effective organizational learning might be essential for understanding small firm success. For example, those firms that have a more active 'learning orientation' show increased performance against both financial and non-financial measures (Spicer and Sadler-Smith 2006). How this collective learning is achieved is rarely discussed and we know relatively little about the learning processes in smaller firms. A key challenge, therefore, is to understand how firms 'learn to grow' and how firms' owner-managers[2] learn to negotiate difficulties they always face in sustaining their enterprises (Macpherson 2005). Previous research has focused in the main on the competence and characteristics of the owner-manager. Whilst research in the late 1990s focused on the manager in their situated context, as opposed to development needs per se (Cope 2003; Cope 2005), this emphasis still lay on the individual. This research, however, in line with an emerging consensus in wider organization studies, accounts for the social, cultural and historical dimensions in which learning and growth takes place.

Whilst recognizing there are competing theories of organizational learning, a research bias still persists in favour of a resource-based view of knowledge. Here knowledge is treated as a tangible and configurable organizational asset; this is particularly the case in small firm research (Thorpe et al. 2005). Social constructionists, however, argue that significant knowledge and learning can occur through continual interaction within a unique social milieu (Easterby-Smith and Araujo 1999). So the very meaning of knowledge becomes contested and means that it is derived from engagement and practice. Organizations are the sites where collective social and practical actions takes place that shape knowledge (Schatzki 2001). While this does not always rely on conflict-free collaboration, it often means that there needs to be some kind of 'co-orientation' where actions taken are recognized by others in the organization who view them both from within and across organizational boundaries (Knorr-Cetina 1982; Taylor and Robichaud 2004). Collective learning that occurs between different knowledge domains, we argue, involves more than just the straightforward exchange of knowledge (Star 1989). It must also overcome the inherently engrained characteristics of situated 'knowledge in practice', or 'knowing', which includes: localization (specificity to problems or context); embeddedness (technologies or rules of thumb used in a given practice); and investment in practice (path dependencies) (Carlile 2002). Organizational artefacts have an active role in this process in the way they perpetuate and/or transform practices that sustain organizations (Knorr Cetina 2001; Schatzki 2005).

This paper sets out to explore the role of theses artefacts within the learning process. Data are drawn from a three-year study involving 90 small firms, but the data for this paper are taken specifically from six of those firms studied. The objective of the research project was to consider how the learning process of entrepreneurs might

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[2] For brevity, we use the term 'owner-manager' to describe all those with senior managerial responsibility in SMEs engaged in this research.

be more fully understood in order that interventions to enhance improvements in performance can be designed more effectively. The research approach that we adopted is *informed* by activity theory, and draws on insights from science studies. Activity theory suggests that learning is socially-situated and focused around specific 'objects of activity' (Engeström 2001). As a consequence, the research is less concerned with understanding how data is acquired and focused more on understanding how 'knowing' and learning takes place through an analysis of meaning and practice, and in particular for this paper, the way artefacts (or objects in science studies)[3] both inform and shape that practice. Through the study, we attempt to gain a better understanding of the processes by which the structuring and dissemination of knowledgeable activity takes place within a small firm context.

The paper begins with a discussion of what is known about organizational artefacts and how they mediate learning processes. This is followed by a discussion on how artefacts provide a role in broaching boundaries and can be used as a tool to represent meaning across boundaries in order to bring about collective learning. What follows is an outline of the methods and a discussion on our findings. They show that critical incidents at work can potentially provide the opportunity for different communities and individuals to come together to resolve ambiguities and contradictions that surface when faced with uncertainty. In this process, artefacts are implicated both in stimulating, supporting and directing the trajectory of learning. Artefacts are central to the way in which learning emerges and new practices are settled. For learning processes, the 'insertion' of artefacts that allow engagement, the representation of differences, and that can be suggestive of new practices, may be a novel way of considering how to disrupt taken for granted norms and stimulate learning. As such, the policy implications that can be drawn from our understanding show how such things as equipment, processes, regulations and routines can be used as mediating means for the purpose of leveraging learning in small firms**.**

2.   SITUATED LEARNING, ACTIVITY THEORY AND MEDIATING ARTEFACTS

The accomplishment of work in organisations is essentially dependent on activities or practices that potentially bring many actors into contact in order to accomplish tasks. This, however, is not necessarily an empathetic 'community of practice', in which those actors engage in collaborative activity in order to achieve a set of shared goals. Rather, organizations are sites where tensions, conflicts and power struggles pervade; the objectives of actors, or groups of actors, may be in direct competition, or at least focused on different agendas or understandings of the preferred result of any activity (Taylor and Robichaud 2004). These potential tensions are exacerbated by dispersed expertise and organizational boundaries created by functional divisions as well as by distributed practices, competing objectives and general ambiguity of purpose (Bechky 2003). Within this complex milieu, it is argued that situated learning occurs as members of organizations engage in their day-to-day work, and it is thorough engagements with others in that work that learning trajectories are shaped (Lave and Wenger 1991; Brown and Duguid 1991). Situated

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[3] In activity theory 'objects of activity' are the thing that is undergoing transformation. In this article, we use object and artefact interchangeably to denote a mediating tool or device (symbolic or material) that is used in practices, as part of the activity.

learning theories argue that participation in the social practices of organization is inseparable from learning. The essence of situated learning is they way in which current knowledge is represented in activity and artefacts that define the workplace, but that those same activities and artefacts unfold as their meanings are renegotiated through the nexus of relations that (re)define the social order of organization (Bechky 2003). Organization occurs through object-centred sociality, and learning is accomplished through participation in this social world. As such learning is inseparable from social practice (Lave and Wenger 1991). Here then are two important aspects of learning in organizations: first, it occurs through participation in situated social practices; and, second, those social practices are not necessarily benign, but may involve tension and conflict. Indeed, organizational (collective) learning is evident where disruptions occur, where past meanings are revised, new practices settled (at least temporarily) and transformations are apparent.

A perspective on learning that accepts the situated cultural and historical influences on learning, and also considers that learning occurs through the resolution of tensions that are present within organizational practices, is activity theory. Within activity theory knowledge or *knowing* are considered to be active, creative processes based on day-to-day activities rather than something that is passively absorbed. Past knowledge is represented within the artefacts of an activity system (see figure 1), and it is these artefacts that also mediate the way in which human beings interact with their reality. The concept of mediation within activity theory concerns the way in which artefacts represent past learning and these artefacts are used as tools by those in the organization as they engage in activities of organization. They are important both for the representation and construction of meaning (Engeström 1987; Engeström 1990; Blackler et al. 2000; Engeström 2001; Engeström and Blackler 2005; Miettinen and Virkkunen 2005). It is argued that as experience is accumulated over time, it is the artefacts which are left behind that represent the experiences of those who have solved problems or issues in the past. Artefacts are at once both a representation of past learning, but it can also be symbolic of a future goal (Alder, 2005). These artefacts and routines are not settled and they continually go through a process of testing, negotiation and revision (Engeström, 2001) until a new practice or knowledge is embedded (at least temporarily). Learning may be at its most transformational during periods of crisis as members of the organization struggle to make sense of ambiguity (Starbuck et al. 1978; Hedberg 1981; Fiol and Lyles 1985; Weick 1995; Wijnhoven 2001; Cope 2003). When there is confusion, (re)establishing 'co-orientation' of social and material arrangements is the essence of organizational practice (Taylor and Robichaud 2004).

Thus, all practices are culturally and historically situated within a particular activity system, and learning occurs through the continual resolution of contradictions and conflicts. As such, existing artefacts and routines 'must be made in to an object of enquiry' if transformation and learning is to occur (Miettinen and Virkkunen 2005, p451). Collective activity, rather than representing a settled account of collective socialised or sympathized knowledge, reflects only the current state of affairs. In comparison with the 'communities of practice' literature, this view of situated learning draws attention to social aspects of learning that are less dependent on coherent empathetic relations and identity. In activity theory, artefacts are important because they suggest an intimate and complex relationship between the material and social world, and they highlight the way that material and symbolic objects are deeply

embedded in social practices (Engeström and Blackler 2005, p313). However, in the study of innovations and transformations, artefacts that intervene in the process of organization and learning are often not studied, or written out of the data; they recede into the background and are ignored (Latour 2005).

3.   CRISES, ARTEFACTS AND MEDIATED LEARNING

If mediating artefacts 'emerge within a broader nexus of practices' (Blackler and Regan 2006, p4), then the practical activity that is conducted in a collective search for new realities will be one way of understanding learning processes. Even in small firms, distributed and situated activity creates heterogeneous meanings. This way of thinking about knowledge and activity in firms not only helps in understanding how to organize work, but it also brings some complexity to organizational-wide communication (Bechky 2003). This is because different organisational communities understand and explain things differently and organizations themselves are a 'contested terrain across which different classificatory systems slug it out' (Scarbrough 1996, p200). For a manager to know what actions to take in any given situation is something that needs to be created in a community where meaning has to be negotiated and agreed (at least temporarily), if there is to be a shared capacity for action. Moreover, if owner-managers (and their staff) are to learn from other firms and organizations, they will have to also engage with, as well as to understand, customers needs, or technical and market innovations, in order to identify and benefit from any potential opportunities that may arise, or to enable them to supply the correct type of product or service. For understanding to emerge, separate actors need to interact, negotiate and resolve their different perspectives in order to transform, rather than simply transfer their understanding (Bechky 2003). They can create and author their shared future (Shotter 1993; Holman and Thorpe 2002), rather than simply agree to follow a shared action. It can be particularly difficult for those operating at organizational boundaries to see, understand and represent these differences in understanding between communities (Carlile 2002).

As discussed in the previous section, organizational 'objects' are artefacts of knowing that emerge within a broad nexus of practices necessary to achieve organization. Moreover, they are incomplete and unfolding as those practices continually emerge through negotiation and the resolution of conflicts (Schatzki, 2001). Engeström and Blackler (2005) argue that organizations are, in fact, built and maintained around these partly shared, partly contested, variously understood objects. Objects, or artefacts, have historicity, and the cultural meaning they embody are fragmented and disputed and only partially shared. These difficulties of knowledge sharing and collective learning are rooted in the differences of language, the situated nature of practice, and in disputed meanings and conceptualizations of products or activity caused by the distributed nature of work (Bechky 2003; Carlile 2002). In science studies, the nature of these objects, artefacts, or devices (as they are variously called), is not just representational, but they circulate to define the possibilities of understanding and of practice, both now and in the future. They are intimately embedded in, and part of the network of associations that constitute the social arena (Latour 1999; Callon 1999; Law 1999). Indeed, Knorr Cetina (2001, p438) argues that the objects have the most potential when they have the ability to actually signify gaps in understanding, where they can disrupt existing subject-object associations, and

where they can provide opportunities to (re)present alternative points of view, or modes of action. When objects or artefacts create opportunities to invoke differences between communities, there exists the potential to create common ground and to allow, or encourage, innovation and the reorientation of social practice (Bechky 2003, Carlile 2002). This means that, shared endeavour needs members of the organization, and particularly the strategic management of the organization, to construct practices that encourage the possibility of engaged participation; when creating these practices that broach boundaries, objects, tools, devices or artefacts can help since artefacts mediate social and situated activity (Bechky 2003; Schatzki 2001).

Important also for understanding this notion of materially-mediated social activity is the way crises, tensions and contradictions in the organizational context provide opportunities to question existing practices, and the role that artefacts can play in constructing such events. Crises are considered to be an essential part of the learning process, and it is possible that any event, action or interaction that creates an awareness of alternative conceptions of organizing is a potential learning trigger. Success and failure can stimulate reflective practices in an organization (Starbuck and Hedberg 2003). Breakdowns of consensus or conflict, either internal or external, may stimulate dialogue between groups that can result in expansive learning (Fiol 1994; Blackler 1995; Engeström 2000; Engeström 2000; Engeström 2001; Huzzard and Östergren 2002). Thus, any of the communities that are influential in accomplishing work such as departments, customers, buyers, suppliers, professional networks, or any other significant group with which members of an organization interact, have the potential to disrupt the status quo and to stimulate change (Fox 2000; Swan et al. 2002; Holmqvist 2003). The same could also be said for new procedures, tools or personnel changes, or internal interactions and that provide access to new knowledge and information, such as total quality management (Grant 1996). In other words, the introduction of new 'artefacts' between communities has the potential to disrupt accepted routines and to put existing practices under review, since they may encourage organization members to engage in new activities and form new relationships. Objects and activities that can stretch imaginations, such as metaphorical thinking (Tsoukas 1991; Morgan 1997; Kamoche et al. 2003), challenge behaviours, such as experimentation (Zeitsma et al. 2002), and reform attitudes, such as discursive forums (Coopey and Burgoyne 2000) create the opportunity to challenge accepted discourse and encourage organizational learning. Thus, artefacts are not only implicated in mediating and representing understanding, they also have potential for stimulating disruptions that can trigger learning.

While previous research on artefacts has highlighted their potential transformational role (Carlile, 2004; Bechky, 2003), this research has not investigated the nature of these artefacts, or the types of activity that they might stimulate. Moreover, the role of artefacts in understanding the evolution of knowledge and organizational learning in small firms is under researched. However, if we understand entrepreneurial learning as a situated, social practice, then an investigation of the role of artefacts in the learning process in small entrepreneurial firms must be an important research agenda. Since owner-managers only have influence over others indirectly. To get others to participate, they have to use a variety of means. They have to encourage, cajole and direct the practices of others. They have to structure activity to ensure that different parts of the firm are integrated and that staff appreciate and understand the practices of their co-workers. If activities that are associated with knowledge

management and organizational learning are seen to be mediated through artefacts that represent rules, divisions of labour and tools (including language and discursive structures), since these are symbols of past learning (Engeström 2000), then the types of tools and their practical use within organizations must be important for understanding how learning might be stimulated and supported throughout the organization, and particularly where boundaries occur, both internally and externally. It is in understanding this process that the data in this study are applied. In terms of learning in small firms, this will require analysis of how artefacts are invoked to generate activities that broach boundaries. In particular, we will need to pay attention to: the types of objects that create or stimulate organizational interactions and dialogue; how knowledge communities engage with, and their influence on, the shape of new activities and practices; and the ways in which owner-managers create space for these learning activities to occur.

4.   RESEARCHING MEDIATED LEARNING SMALL FIRMS

The research paradigm of this paper is social constructionism, i.e. an interpretivist ontology coupled with a social constructionist epistemology (Liebrucks 2001). It is further informed by cultural-historical activity theory (CHAT), a social theory of knowledge rooted in soviet sociology (Lektorsky 1999; Miettinen 2004), and thus it is essentially part of the radical humanist sociological paradigm (Burrell and Morgan 1979). The effects on the research design and research methodology are apparent as the research team has to address issues of relativism and epistemology, inherent in interpretivist studies (Burrell and Morgan 1979; De Vaus 2001).

Such issues are solved by the approach of collecting, interpreting and analysing data. The main method of data collection is interviews, which are then transcribed, iterated and re-iterated with the assistance of NVivo, a qualitative software tool. The research design is explicitly interpretivist, retaining the rich data necessary for understanding how mediating artefacts elucidate the creation of socially constituted knowledge. The data used were gathered in a period of four years and they were part of an ESRC grant examining the evolution of knowledge in small businesses. The data was examined through a multitude of lenses essentially informed by CHAT. The choice of case studies was done in a manner that would ensure as much diversity possible for theory building. In the original study there were 90 firms involved. The interviews were semi-structured and revolved around the issue of creating knowledge within the organisation. The motif of the interview process was quite similar; first interview was aiming to cover the creation of the firm with the second and third interviews (where applicable) focusing on the evolution of that business, critical incidents and important pointers. From the primary analysis an emergent theme was that of artefacts in practice; it sensitised the research team over the importance of mediating artefacts and prompted a new search in the literature and a subsequent re-iteration of the data-set.

After a critical, but eclectic, examination of the mediating artefacts literature a novel classification model emerged that identified three different dimensions for each artefact;
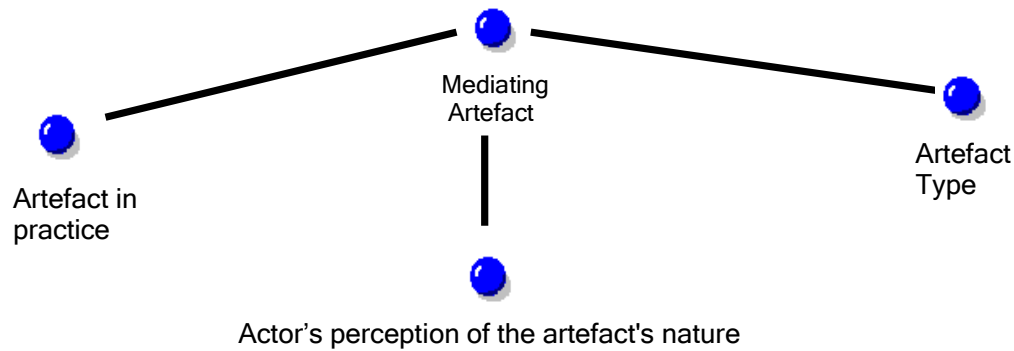
Figure 1: The three Dimension of a Mediating Artefact

The artefact type refers to the activity within the CHAT framework that the artefact mediates. That is essentially informed by Engestrom's writings on artefacts (Engestrom and Blackler 2005) and four types of artefacts are identified; exchange, distribution, consumption and production. The second dimension is that of the actor's (subject's in Engestrom's writings) perception of the artefact and essentially it encapsulates the perception the actor has over the artefact's role in his activities. However the focus of this paper is in the third dimension: the artefact in practice. The categories grouped within this dimension focus on the mediating artefact as a symbolic or material tool, a process or a means to an end. The following practices were identified in the literature as supporting the process of organizational learning and thus instances were coded were tools were implicated in this process.

a. **Discourse and dialogue**; meaning that the tool is used for engagement with actors in the subject's immediate environment e.g. customers, the EBK interviewer, other institutions, groups and communities that dominate the entrepreneur's immediate environment (for example, Coopey and Burgoyne 2000, Fox, 2000).

b. **Identity Formation:** where the artefact is used to formulate the identity of the actors, in clarifying roles and interactions, and is used as part of identity/culture formation (for example, Lave and Wenger 1991).

c. **Reflection:** where the artefact is used to understand better the knowledge gained, the activities the actors are engaging or the reasons that events take place or a symbol to facilitate understandings (for example, Cope 2003; 2005).

d. **Systems and Routines:** where the artefact is used to define participation or the norms, heuristics and institutions that regulate and distribute the nature of practices (for example, Cohen and Levinthal 1990).

e. **Socio-politics and friction:** where the artefact is used to either create or resolve conflict and is used to create political leverage and politicised understandings (for example, Bechky 2003).

f. **Creating Space and time or episodic events:** here the artefact is important in helping to (re)define space or time spent on activities (organizational landscape) and/or as the source of an important episode or crisis in the organisation's history (for example Starbuck et al 1978; Hedberg, 1981).

A schematic representation of the coder created for artefacts in practice can be seen below:
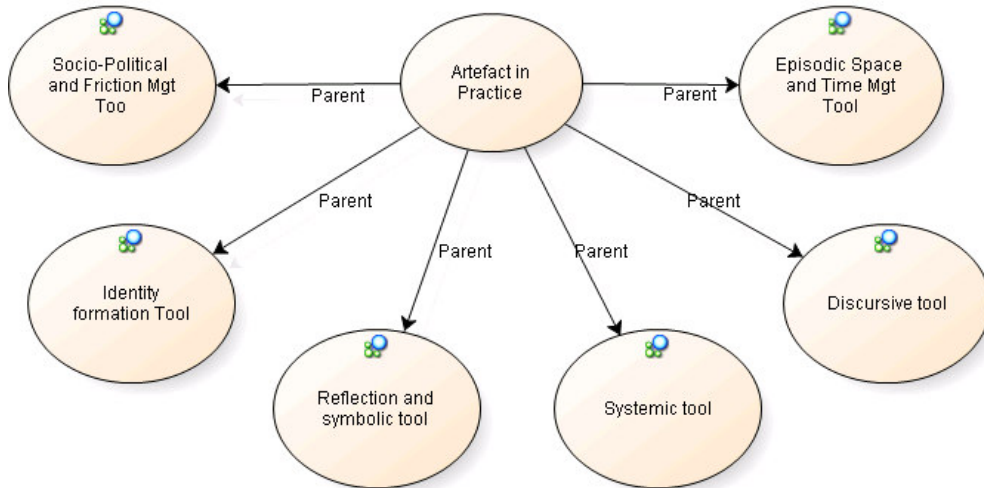
Figure 2: Artefact in Practice

For this research we chose a representative sample of six firms from the EBK database, a choice that allows us to retain the intense and data-rich focus of a qualitative study and enough diversity to allow for theory building (De Vaus 2001; Eisenhardt and Graebner 2007). The primary distinction between the six case studies is that of the artefacts chosen for analysis. For the first group the artefact (the product) is rooted in the material or physical world and often in manufacturing industry while for the second group it is rooted in the symbolic world:

Figure 3: Companies with material/physical products vis-a-vis symbolic products

The six case studies chosen include; small shops (e.g. the Bike Shop), service companies (Spearfish, CCS, Software Solutions) and manufacturing medium-sized firms (e.g. RWE and Fume Cupboards). They are of different size with different organisational structures. Such diversity ensures internal validity for any

9

commonalities identified and supports the replication principle for generalisable theory building from a multiple case study design (Yin 1989; De Vaus 2001). Construct validity was achieved both by anchoring the data in existing literature and by the continuous re-iteration of the data.

The eclectic template described above was used to analyse the six case studies in NVivo 7. Categorisation of the data was done in two waves. First an exhaustive list of all the mediating artefacts was identified (over 4,000 for the six case studies). Any artefact whether it is a process, material object, or a symbol were recorded. Then a second wave of coding ensued where the artefacts were classified according to the three main dimensions in an indexical manner, in accord with the constructionist research paradigm (Kelle 2004). A note of caution here; even if an artefact is recorded multiple times each occurrence is unique because the same artefact will be of a different type, of a different actor's perception and of different use in every single occurrence, a further reason for the choice of an indexical categorisation vis-à-vis a representative categorisation. The results were then probed further by using NVivo 7 query tools especially text search and co-location matrices. First the artefacts in question were isolated per case study and then put into the various categories of artefact in practice. Then a specific artefact is chosen and consideration is given to how the tool is used or invoked in order to contribute to a process of renewal an organizational learning.

5.   ARTEFACTS IN PRACTICE: ANALYSIS OF DATA

As we can see from figure 4, each company underwent two interview rounds while four out of six companies had a third interview. The table further demonstrates that in each company there was heavy usage of artefacts, as it was expected. The numbers shown under the object column are the representative instances of observed mediating artefacts in the text of the interview transcript.

	Artefacts in Practice	Interview length (words)
1 : RWE	549	12,621
2 : RWE 2	339	10,632
3 : RWE 3	263	9,973
4 : Bike Shop	97	2,195
5 : Bike Shop 2	425	8,461
6 : Consumer Credit Services (CCS)	243	7,662
7 : CCS 2	221	5,240
8 : CCS 3	276	5,845
9 : Software Solutions	697	9,530
10 : Software Solutions 2	474	7,288
11 : Software Solutions 3	383	6,199
12 : Fume Cupboards	621	14,929
13 : Fume Cupboards 2	360	9,212
14 : Fume Cupboards 3	289	6,890
15 : Spearfish	217	6,284
16 : Spearfish 2	162	3,974
TOTALS	5,616	126,935

Figure 4: Totals for occurrence per object and for length of interview (words)

An interesting observation is that the larger the interview transcript the higher the occurrence of mediating artefacts within the text. This seems to indicate that when talking about learning in the organisational environment the mention of artefacts seems pervasive, regardless of the business in which each enterprise engages.
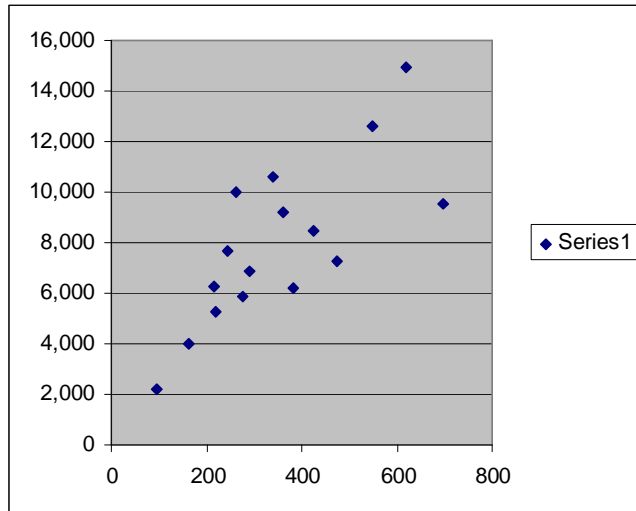
Figure 5: Interview transcript's length against artefact occurrences

The scatter diagram, figure 5, shows the number of words plotted against the number of mediating artefacts identified and seems to indicate that there is a sense of symmetrical growth between text and artefacts used. Such results lend themselves to more statistical probing to identify the significance of this pattern. However this is beyond the scope of this paper. The next step is to probe how these identified mediating artefacts are spread amongst the various uses in practice:

	Discursive tool	Reflection and symbolic tool	Socio-Political and Friction Mgt Too	Identity formation Tool	Systemic tool	Episodic Space and Time Mgt Tool
1 : The Artefact	3647	2722	1419	2387	4095	1289

Figure 6: Co-occurrence matrix of mediating artefacts with indexical coding of the typology of artefacts in practice

It is clear, in figure 6, that the most usual conceptualisation of mediating artefacts in practice is as discursive tools *or* as tools for sense making and the systematisation of the world. The least overt usage, at least quantitatively, identified is that of the artefacts as socio-political and friction management tools. Artefacts as reflection/symbolic or identity formation tools seem to rank quantitatively in mid-level usage. The point here one has to keep in mind is that the definitions that were used for those two categories were very broad and that the coding is indexical and thus these results are definitely not conclusive and just indicative. However it is clear that there is some validity in claims within the theoretical literature that mediating artefacts create organisational space by being used as systemic tools and that they are actually mediating as they are used in discourse whether that is physical or conceptual.

However, so far the exposition has been purely descriptive and quantitative. One has to probe deeper into the data and expose the activity systems under consideration. With more than 5000 coding instances of artefacts in practice this creates a problem in presenting such a wealth of qualitative data and even from just six case studies and 16 interviews in total one has to sample. The sampling may have to be idiosyncratic, but it can be rooted in pragmatism. An essential part of any company's activity is the promotion of their product/service in their chosen market. Thus we can investigate the way a mediating artefact is used or invoked in discussion to indicate how it contributes or is implicitly and explicitly implicated in the organizational learning process. In other words, the use of the artefact in practice is investigated to show how the artefact is essential for the creation/promotion/invention of the product/service and also demonstrate how the same artefact assumes different identities once in practice.

In this regard, for RWE a critical artefact that is primarily rooted in the physical world is the computerised numerically controlled machines (CNC machines) that are extensively used for the production of the components used by their clients. The efficient management of the machines and the human knowledge related to controlling, running and improving these machines absorbs much of the owner's time. For the bike shop, the most relevant artefacts are bikes, as the company provides sales, maintenance and repair services for bikes. For CCS, the choice has been difficult as their main product, trading credit, does not seem to register consistently among the identified mediating artefacts. So instead the focus is on their expansion to a new business, general insurance, and the mediating artefact will be the FSA (Financial Services Authority), a legislative body that regulates general insurance. For Fume Cupboards, their actual product is also the main mediating artefact: the fume cupboards. For Software solutions, the artefact examined will be their software which is one of the major streams of revenue for the company. Spearfish is a PR company and thus is the harder to pin down with a particular product. In many ways the company itself is the project, or rather the image of the company is the product and thus the actual Spearfish brand is taken as the main atrefact for this study. Each of the artefacts appears sufficiently often and has important enough a role within each company as it is presented in the interview data to warrant investigation:

	RWE	Bike Shop	CCS	Fume Cupboards	Software Solutions	Spearfish
1 : The artefact	65 occurrences	137 occurrences	20 occurrences	55 occurrences	31 occurrences	18 occurrences

Figure 7: Total of occurrences per MA chosen

When juxtaposed against the six identified usages of artefacts in practice we can see that the chosen artefacts have been codified for all categories of 'artefacts in practice' with only one exception: spearfish for the code Episodic Space and Time Management Tool.

	Discursive tool	Reflection and symbolic tool	Socio-Political and Friction Mgt Too	Identity formation Tool	Systemic tool	Episodic Space and Time Mgt Tool

1 : CNC machines	51	38	9	22	57	23
2 : Bicycles and bikes	37	37	29	57	108	9
3 : CCS and FSA	17	10	14	13	18	5
4 : Software Solutions	9	19	6	15	17	6
5 : Fume cupboards	53	31	17	16	47	25
6 : Spearfish	11	12	7	14	17	0

Figure 8: MA chosen per case study vis-a-vis the MA usages in practice

At Appendix 1 exemplar quotes are provided of these artefacts as they are used in practice. The next section will address how their use contributes to the learning processes in our case firms.

6.   FINDINGS: ARTEFACTS IN PRACTICE

The artefacts that are used or invoked in practice perform a number of functions in stimulating, supporting or constructing opportunities for learning in our six case studies. While in many cases the artefacts are seemingly in the background and form part of the landscape, often they are brought centre stage within organisations and provide tools and organisational space for learning to occur. In that sense their perceived use and their actual potential may be in tension. It is the way that the artefacts remain malleable, that they retain emergent and flexible properties, that enable them to support emergent and/or unfolding practices and thus become conduits for organisational learning. Often when these material or symbolic artefacts become settled in a new mode, they fade to the background and become part of the actors' perceived landscape of activity once more. In what follows we have examples and a brief description of how these tools were used or invoked in practice to support the process of learning in these case firms. They are taken from our sample of quotes in Appendix 1, but for practical purposes only a couple of cases will be discussed for each type of tool.

6.1 Discursive Tools: Discursive tools provide ways of engaging with others so that dialogue can occur and/or different perspectives can be sought. In that way, they facilitate the construction of social associations and interactions, either real or virtual, such that ideas can be expressed or tensions discussed. So, for example, in Software Solutions, they use their software to create discussion areas where they can interact with their clients or potential customers. In such cases, the interaction is virtual, but the device still provides a way of connecting to and engaging with others outside of the firm. Its use is to provide discursive space to solve problems with different clients and user groups. At CCS, they invoke the Financial Services Authority (FSA) regulations as a way of opening dialogue, both with clients and with the regulators themselves in order that they can review and learn about how their processes may need to be developed and changed in order to prepare for entry into the mortgage market, and how they might use the regulations as a way of engaging in dialogue with potential clients. Thus, the FSA regulations are used as a tool to open discussion with the regulators and as a means to learn about (engage with) a potentially new market.

In this case the FSA regulations are both an existing material artefact and a novel artefact used to prepare processes for a future objective.

6.2 Reflection and Symbolic Tool: Reflection and Symbolic tools indicate that the artefact is used to understand better the knowledge gained, the activities in which the actors are engaging, the reasons that events take place, or as a symbol to facilitate understandings. So, for example, at RWE, when the owner-manager is discussing his decision to invest in computer numerically controlled (CNC) machines, it is the advent of such machines that cause him to reflect on the nature of his current product portfolio, and how that will need to change in the future if he is to stay in business. In other words, the material objects, CNC machines, are both instrumental in his reflection and symbolic of the future direction for his company. At the Fume Cupboard manufacturer, the owner-manger, discusses how the quality and standard of the fume cupboards, already produced and in situ, are used as a symbol of the firm in order to win new business. Here, the owner-manager is battling against what was a poor reputation for quality and using the product as a way of reflecting on the changes and symbolizing the current capabilities within the firm. The cupboards symbolize the learning journey which they have accomplished, but which is still ongoing. Thus improvements in cupboard design and quality are invoked to encourage reflection on the nature of production and the potential to design better products.

6.3 Socio-Political and Friction Management: Here the focus is on how the device or artefact is used to create or resolve conflict, and/or is used to create political leverage and represent or invoke political issues in the learning process. At the Bike Shop, for example, the product, the bike, is considered to represent a challenge to norms of wider society, and one that is particularly relevant when considering issues of environmental sustainability. Thus, in this case, the product is symbolic of conflict and learning, not within the case company as such, but for the owner-manager the bike invokes a means to challenge the wider norms of practices and understanding in society. The bike is a device that opens up debate about the nature of daily travel activities and regulations, both now and in the future. A more concrete or material example, of political and friction management tools is the way in which the CNC machines and the types of products they can produce, becomes the focus of a battle for market share with customers at RWE. The CNC machines are used to engage in a process of conflict management with suppliers and to leverage a niche as a supplier. The consistent quality and quantity of products produced by RWE using the CNC machines provides reassurances to the strategic sourcing departments of his customer, where others without such sophisticated production were less fortunate.

6.4 Identity Formation Tool: The use of these types of tools or devices is to support or sustain the identity of the actors, in clarifying roles and interactions, and is used as part of the introspective identity/culture formation process. So, in the example provided at Spearfish, the actual name is used to invoke or symbolise how the owner-manager sees their role as challenging for an alternative market, hidden from view. While the owner-manger acknowledges the irony of the analogy of Spearfish as a torpedo, given the subsequent climate of military conflicts, nevertheless, the original intention is to provide a symbolic tool that represents the identity of the business in breaking into a tough market by going into battle 'below the line'. Thus the name is a tool around which the owner can build a culture or identity for the firm of fighting for their share of the market. In the bike shop, the product and services provided are very

much symbolic and material representations of the owners identity as an avid cyclist. Here then, the actual bike business represents and evolution of identity from bike user (as a messenger), to bike supplier. The bike is central to that identity development as he learns to take on his new role in the supply chain.

6.5 Systemic Tool: In this case the artefact is used to define participation or the norms, heuristics and institutions that regulate and distribute the nature of existing and future practices. At CCS, for example, the regulations developed by the FSA have resulted in a change to routines across the financial sector. In learning how the regulations should affect the nature of routines and practices within the industry, the owner-manager turns to the practices and rules developed at other financial institutions that have more resources available to develop new procedures and rules. Nevertheless, these new regulations, and the routines copied from others are copied to define new norms of future practice within CCS and to develop new areas of business. In other words, the regulations developed by others are used to review and embed new practices. Learning takes place about the changing nature of accepted practice in the industry. At Spearfish, the name is again invoked to identify the types of practices in which the firm engages. The acronym of Spear, is used to settle an account of the types of processes, services and objectives that the firm has. It provides a representation of existing practices, activities and can be used, or invoked to allow new members of the organization to learn about the nature of existing practices, and also in what markets or what types of opportunities the future development of the business might occur.

6.6 Episodic Space and Time Management Tool: Here we are concerned with the way the artefact is used to (re)define the space or time of organizational activities or as the source of an important social episode in the organisation's history which has a transformational effect on the direction of the firm. In the latter case, the complaints about the quality of cupboard fixtures and the loss of business from a major customer, Astra Zeneca, are used to redefine within the firm the importance of quality products and function as an historical point where the trajectory of organizational was fundamentally changed. This particular instance is a major episode in the refocusing of practices on quality management, rather than on production efficiency, and resulted in widespread changes to the organization of production of the fume cupboards. Quality products are invoked by the owner-manager as both symbolic and material examples of potential for repeat business. At RWE, the change in CNC machines led to a change in the social space of work and in the time spent on activities; there were different physical and systemic periods of organization before and after the introduction of CNC machines as well as a change in the space arrangements especially within RWE's factory. In terms of creating space for learning, the owner-manager discussed how the introduction of the CNC machines provided him with the opportunity to delegate more responsibility for production and to step back into a more strategic role. CNC machines, once set up, changed the delivery time for products and automation processes and allowed the owner to spend time, with his staff, to learn about other areas of production that needed to be improved.

7. THE IMPORTANCE OF ARTEFACTS IN MEDIATING LEARNING EVENTS

As we can see from the data in this paper, humans deploy artefacts and discourses within a variety of practice (Engeström, 2001; Schatzki, 2005), both as part of existing material and symbolic understanding, and as part of the unfolding and emergent nature of social learning. While the importance of artefacts in practice has been identified in CHAT as being representative of past learning, and as mediating the relationship between subject and their object of activity (Engeström and Blackler, 2005), what we show in this paper is that artefacts (objects), both material and symbolic, are also deeply implicated in the process of organizational learning. Previous research has also identified the potential transformational role of artefacts which occupy spaces at the interstices between organizational communities (Carlile, 2004; Knorr Cetina, 2001). Furthermore here we have shown that artefacts occupy a number of roles within the learning process. We show how the learning processes take their form and attributes as a result of their association and relations with these artefacts (Law, 1999), rather than being a separate aspect of practice. So we can see that in the case of RWE, for example, the CNC machines represent the accumulation of past knowledge embodied within the artefact itself. The incorporation of these machines within the ambit of RWE opens up a new vista of opportunity and the trajectory of learning within the organization is clearly tied to the way that the CNC machines are adopted, operated and provide opportunities to engage in new machining practices, new systems of organizing and new markets. Even when the artefact is symbolic, such as the name of Spearfish, this is used to invoke and structure systems and routines within the business, to provide a mechanism for new members to learn about the nature and marketing strategy of the business, and to provide a tool for identity formation of the business as an organization that seeks business 'below the water line' like a torpedo—fast, hidden from view from competitors and effective.

As well as showing how deeply associated are artefacts in the learning processes of these firms, by choosing only one artefact in each firm, we also show their fluid, transient and malleable nature. Artefacts are not only capable of creating, supporting, stimulating one type of learning activity, but when employed in practice, either metaphorically or physically, they can take on a number of roles. Knorr-Cetina (2001) argues that objects may be at their most influential and transformational when they not only provide ways of representing and engaging with different perspectives, but when they can also point to or indicate future possibilities. In the data, we can see how the artefacts are associated with providing or invoking a significant transformational role in each of the cases, but it also interesting to note how that role can shift within the learning process, they can help to form identity, create discursive spaces, and so on This provides two related contributions to our understanding of artefacts in practice. First that they do not occupy a single space in the definition of a learning trajectory, they are multifaceted and can contribute to learning in a number of ways. Second, despite this, it is evident in the data that some artefacts, such as new regulations from the FSA, or the implementation of new machines and software, are particularly influential in shaping the direction and trajectory of learning. Thus, it may be that some artefacts in practice have a particularly influential role in different aspects of learning process. So for example, some artefacts may be particularly useful for reviewing and settling new systems of work, while others may be more effective in supporting identity formation or reflection. This suggests that there may be a rich vein of research opportunity to understand, and to develop, artefacts that support different aspects of learning processes more effectively.

A further insight on the role of artefacts is their dual function as active part of learning and passive part of the landscape of day-to-day organizational life. What was interesting in each of these cases is how each of the artefacts which we have reviewed was perceived as part of the background of day-to-day activities. Fume cupboards and software, for example, while these were the main products, formed the backdrop against which activity was taking place, such as manufacturing or servicing and repairing. However, in terms of quality management (in the case of fume cupboards), for example, the artefact is brought into the foreground by the agent and the fixtures and fittings of the cupboard put under review. In that way, the artefact is shifted within to the foreground; it becomes the focus of attention and once it serves its function as part of the learning process the agent shifts it back again to form part of the landscape of normal activity. These artefacts are thus potentially in tension between their day-to-day functions, and the way that they might be useful for supporting and stimulating the learning processes. They can both stabilize and represent past learning and/or be indicative of future possibilities. What seems important for learning is that objects or artefacts, whether they are in the landscape or the foreground, have an important role in the trajectory of organizational learning. However, when they are brought into the foreground, and made into the immediate and/or deliberate focus they have the potential to surface tensions, to challenge existing relations, and to accelerate the pace of learning. This has a couple of implications for understanding artefact-mediated learning practices. First is that existing artefacts, while they are always implicated in the transformational processes in the organization, they can be part a more active if they are put centre stage and made the 'object of activity' (Engestrom and Blackler, 2005). Second, it may be possible to insert new artefacts into the landscape of the organizations such that they create new associations, encourage reflection, create new forums or spaces for discussion and represent alternative perspectives. Indeed, much like the CNC machines or the FSA regulations in our examples, artefacts can disrupt the status quo and re-create the landscape on which organizational activity has to be pursued, thus changing the learning trajectory of the firm.

8.   CONCLUSION

Within activity theory, artefacts mediate the way that organizational actors can, and do, engage in the social activities necessary to accomplish situated learning. Artefacts, are representations of past learning, but they are also, potentially at least, implicated at the heart of the learning processes/activities since they are deeply embedded in social association between actors, and between actors and the objects of their activity (Engeström and Blackler, 2005). Artefacts both abstract and represent knowledge and knowing, and they can be suggestive of alternative practices and activities (Knorr Cetina, 2001). In that way, it is hard to divorce organizational learning from the artefacts used daily in organizations. Our contribution in this paper is to show how important artefacts are in mediating learning processes, how artefacts can occupy different material and symbolic roles when used in practices that support learning, and to suggest how bringing artefacts to the foreground may be a particularly useful way of stimulating learning in organizations. In this regard, certain artefacts may be more effective than others in supporting different learning practices.

We need to pay more attention to the role of artefacts in practice as they act to support and stimulate learning. Symbolic or material artefacts can, and do, encourage: debate and dialogue; help encourage reflection on the existing nature of activities; are explicitly part of the identity formation—representing particular commitment to a particular mode of belonging; associations; are ways of leveraging political advantage or delineating boundaries of conflict; they stabilize systems of work activity and can encourage routines of exploration; and they represent and can be influential in radically transforming and configuring the changing landscape of a activity. A deeper understanding of how 'objects' might provide a focus for boundary engagements, collective action and organizational transformation is needed. From a policy perspective, the artefacts may be a significant tool in encouraging learning and innovation, particularly in the small firm community, and their role in all types of organizations warrants more research. It is the use of flexible, unstructured and socially-embedded experiences and relations that exemplify the knowledgeable and knowledge-creating entrepreneur. If this is the case, then, it seems important to understand how artefacts, objects, tools or devices are central to those knowledge-making practices; how and what type of artefacts mediate learning practices needs further research.

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Appendix 1- Exemplar Quotes of Artefacts in Practice

	1 : Beverston and CNC machines	2 : Boutique and bikes
Discursive tool	"If you do this and if you invest money in this and that, we'll save you this amount of pounds over the year and then you multiply it by six machines and seven machines, it'll be this amount and the figures were really impressive and I thought, if I do half of that I'll be more than happy"	"Well I knew him from my career before and basically he approached me and said he was going to buy one of these bikes, they cost about £1200, quite expensive, he managed to buy one of these and because he is relying on his bicycle for his income, that's why he pays me maintenance contract, so if anything happens to his bike, like if he rings me up and says, 'oh my wheel is broken', then basically I drop everything to fix his bike, he is a priority, because he pays me every week."
Reflection and symbolic tool	"More accurate, a hell of a lot faster. In some cases, replacing possibly five or six people you know, that was such a development. That also meant that the type of work we were doing which was tool making which was fixtures to whole jobs, also meant that there was less of them required because CNC machines could do far more work. So that started to have a dramatic effect on the business that we were involved with. So it was then decided and it was probably more that I was pushed that way because it was the only type of work that I could get, we started looking at doing small batch production work, machining of making actual components from drawings. Couldn't do large volumes because we didn't have the CNC machines that could do them a lot quicker and bring the price down"	"This is it, I have got a few other ideas that I want to do, the same with the bicycle business but its kind of going off in a different direction, its more about retail and its more about, what I am trying to do at the moment is I am trying to get a counter display unit, I will show you, its basically if you want to buy and inner tube or brake pads or anything related to bicycles you need to come to a bicycle shop, and what I want to do is have a thing where I can sell, have a nice display unit with like inner tubes, small tools, lubricants and spares"
Socio-Political and Friction Mgt Tool	"Then a couple of years later on, indications of another different type of work that they were going, a strategic way of looking at their supply chain and deciding that they were going to do different things and what they did was they grouped parts into groups, all similar and said, right you're good at this type of machining, that company is good at that type of machining, we're going to group all these parts and we want you to bid on it and we'll pick one supplier to make small turn parts, one supplier to make large turn parts, one supplier to make prismatic parts which was all the milling and they decided to go down that route. Again, I came through on my reputation and I got picked as the small turn parts supplier which is what we were good at, at the time. That gave me probably two or three years work before they had another review and then this was the time that I got a bit worried because they had set up what was called a strategic sourcing department, the SS as they're called!"	"Yes I am there are a lot of reasons why the cycling is not as popular as it is in European countries, the kid will just basically see the bike there and have a spanner on them so its just a reflection on our society really, what its like and its unfortunate, a friend of mine is doing research on why children start off riding bicycles and eventually become car owners, but one of the main reasons why people don't ride bicycles we have worked out is status, if you ride a bicycle, an adult perceives themselves as being a poor, lower class citizen on a bicycle as opposed to sitting in the car and a bicycle is so much quicker to get around, I live in Withington and it takes me ten minutes to get from here to Withington"
Identity formation	"I knew it had completely turned round, whereas in previous time people were impressed by what CNC machines you had because they were new	"Well I have always been interested in bicycles so it has just come from that and I used to be a messenger/courier and I just found that there was nowhere to get my bike

22

Tool	technology and if you had one, well that was enough for them to know that you were doing the right thing but we'd got passed all that because every company had started to get CNC machines, so that was no longer a crucial element of how a company was doing, it was more now, what are you doing to try and cost out your waste."	repaired."
Systemic tool	"I don't want to lose that because I can employ a machinist, like I'm in the market now for people, I've got a new machine coming in for I'm in the market for two or three people."	"I had a little bit of savings, and I had to wait until I passed the NES thing because that bought all these tools and you find that with the bike game you have to have the right tools, you cannot just use standard tools because they just don't work properly and that was very expensive."
Episodic Space and Time Mgt Tool	"…we weren't making money, just ticking over, didn't invest in new machines or anything like that and really that probably went on from 1981 till 1985. We weren't involved with the Aerospace industry, just doing basic tool making and fixtures for the new machines. Then CNC Machines started to become the norm."	"…you don't know what you are going to get. Not really had many problems at all. You get the odd smack head coming in trying to sell you a stolen bike and that…but they kind of got the message that we don't really buy bikes. But it's just been hard work really…just hard graft."

	3 : CCS and FSA	4 : KPS software
Discursive tool	"We don't do mortgage sales yet but its in the plan. So I thought I may as well register to do both at one go because there was no incremental cost in adding one on the other. Of course mortgages are more heavily regulated so that has exposed me to the FSA more than would otherwise be the case. They are coming to visit actually. They were disappointed when I told them that I didn't do mortgages, but they are coming anyway. The trouble is that we are now on their radar."	"… in our email we've got set up user groups so we email an individual user or a group of users and we use our own software so in our own software we have expert communities set up so experts in particular areas, again we use our own software, if a question gets asked that you can't answer then it gets escalated to particular experts and we use our own technology with our customers and our partners, so we have user groups set up there which is a collaborative area again using our software which allows our partners to express their opinions, what trends they're seeing in the market, etc."
Reflection and symbolic tool	"So you can be doing a lot of work for nothing. In the home improvement market there is an element of that, but we're much more efficient in making sure we get paid for the work we do. But its just about overcoming it. We can offer our experience, our processing system, our FSA regulation. Other brokers are out there doing it the market is huge probably 100 time bigger. So I don't need it all even 2% is much bigger that what we do. At the end of the day, Robin, it's about getting the contacts, getting the customer applications in and getting paid. It's a very simple model. The challenge is the business relationship thing and making sure we're efficient. There are plenty of people who do it, but do it badly in terms of not making the margin."	"… and the retail solutions centre was a centre where fore leaders from all around the world come and the PWC would present their vision of best practice retailing and also the systems that sit behind that retail experience, so how can you support that best practice and SAD were a part of that along with many other software applications. So my role as the director of the retail solutions centre was to tell the story to the people that came about, here's a mythical company and this is how we run our business, this is best practice retailing and the whole idea was to provoke thoughts and ideas in them as to things that they could maybe do in their own business to improve the customer service, to improve their cost-base"
Socio-Political and Friction Mgt Tool	"Because when we sell our loans we also sell payment protection policy, and any organization selling general insurance has to be authorized by the FSA. So we went through the - well applied in the correct way the paperwork was horrendous. I mean for a small company. An awful lot of people went "Oh no""	"We use email all the time and in our email we've got set up user groups so we email an individual user or a group of users and we use our own software so in our own software we have expert communities set up so experts in particular areas, again we use our own software, if a question gets asked that you can't answer then it gets escalated to particular experts and we use our own technology with our customers and our partners, so we have user groups set up there which is a collaborative area again using our software which allows our partners to express their opinions, what trends they're seeing in the market, etc."
Identity formation Tool	"When I registered with the FSA I registered for two things. First to sell general insurance and mortgage sales. We don't do mortgage sales yet but its in the plan. So I thought I may as well register to do both at one go because there was no incremental cost in adding one on the other. Of course mortgages are more heavily regulated so that has exposed me to the FSA more than would otherwise be the case. They are coming to visit actually."	"So in business that's the first thing that you have to do, try and make sure that you've got a business that, the worst case is that you break even and clearly in the best case, profitable and that's still a battle for us on a daily basis because we have a business that's, in selling software we are not a Microsoft of a Oracle and they have an incredible amount of repeat business and their business is actually quite forecastable, ours is very spiky and therefore we will have a monthly where we make a profit, we'll have a month where we make a loss and we'll have months where we break even and so our biggest ambition as a company is

	to grow our recurring revenues so that on a monthly basis our cost-base is aligned against our recurring revenues, by recurring revenues I mean, when we sell a software licence we also sell support and maintenance with it and that support and maintenance is an annual support and maintenance"
Systemic tool	"We are a company that develops software and sells out to the market, we are what's called an Independent Software Vender, and as such if we don't have a good product then nobody is going to buy it, so in any business you have to have a product or service that is good at what it does, you have to have a market that is receptive that the time is right for that sort of offering that you have got, and you need to be able to execute on it and deploy it effectively and get happy customers, and the starting point for all of that is the product, and what we have done over the last two years, you know since we have been talking we have been focussing very heavily on building the product capability to make it better than class and that has continued"
	"Well they are our invention, but there is a little bit of plagiarism going on in the industry. Everyone is wondering "Well, how do these rules of the FSA work?" I got hold of the draft demands and needs statement from first national bank and amended that. As it settles down everyone will work it out. We're doing it and we're doing it right."
Episodic Space and Time Mgt Tool	"We're actually paying less money for this than we were in Leigh and that kind of leads on, I said there was two reasons why we came here really, the first one was really around image and the second one was that the organisation that we co-located with in Leigh was a company called Attar Software, now we have a loose partnership with them and in fact one of the things that we had evaluated was potentially merging the two business, KPS and Attar Software and when it became obvious that we weren't going to merge then there was no real benefit in us staying in that office, it was costing us quite a bit of money to stay there and the accommodation was not up to the kind of quality that we wanted and really having made the decision that we weren't going to merge the logical thing to do was to then split off, so we still have relations with Attar Software, we still partner with them, the relationship that we've got is strong but….."
	"We knew them or had known them for a while. They asked us to handle their work. We asked them why. The FSA regulations were not being complied with. They had 100's of people in their sales force but they were not doing it right, and they didn't want to train them. So they wanted us to broker for them. That's where the FSA thing comes in. I said "I could make you legal overnight". We could do everything right. They are registered with the FSA but they're not doing it correctly. They are exactly the sort of organization the FSA wants to get a hold of. And they probably know it. So that was nice. They came to us."

	5 : Pf&F and Fume cupboards	6 : Spearfish and "Spearfish"
Discursive tool	"…it would be quite impractical to do that but certain people have certain skills and there are certain people on a fume cupboard, there are people who are better doing one part of a fume cupboard than another, now you learn that by the people working there, the people that are good at doing certain things, they do the certain things and like everything else"	"This is the corporate one. We know a company called The North, which is a clothing label. So because we're based in the North, Spearfish is the North, so we're sending out fifty of these hats and that's the little swing tag we put on it. Basically you open it up and it's got, 'Spearfish is keeping you hot'. So that's the idea. And it's got all the blurb on that side and then, look, 'Made in Manchester'."
Reflection and symbolic tool	"They have a big problem sometimes if it's a competitor, so that's why I changed the word willing, they're willing to show the fume cupboards but sometimes they have to be told in advance who's coming round and what their disciplines are so that if there's any formula, people have a habit of writing the formula on the fume cupboard and they have to rub them off or make sure that they're not going to display anything to them but of course the way companies are going together now,"	"But that's really because the events that we were doing kind of marketed themselves anyway. You know, we'd have an event on and that would be a Spearfish event and people would come to it and they'd know who Spearfish are. That's the reason why we started it really because we could start it from quite a low budget and not really need a marketing budget"
Socio-Political and Friction Mgt Tool	"'I was out this week, I went down to a company down in London and while I was driving down someone said to me, a job up in (…), a sash was falling down, a fume cupboard sash had fallen down and was causing a big problem, Christ what can we do and I said, ok I'm not going to rush, is it one of ours, we don't know, they're going to come back to us and let us know, I said ok I'm not going to cross any bridge, I'm not going to panic or anything, I was driving along down to London, I thought how could it be one of ours because we are very safe. Anyway to cut a long story short, it wasn't one of ours but because of the reputation we have on that site they've asked us could we come in and repair this which is someone else's and not only repair it, could we have a look at every other one that they put in and bring it up to the same standard as what ours is, now that was very, very pleasing for me, it was also a lot of relief because it wasn't out fault"	"It's now Spearfish and Spearfish is… Everyone asks us what is Spearfish? What do we do? So we've now got 'Spearfish is…Changing'. We've got 'Spearfish is…Promoting, Spearfish is Inspiring, Spearfish is Supporting, Promoting, Engaging, Inspiring, Educating'. So that's the council side of it. Because we're engaging, inspiring and educating your audience."
Identity formation Tool	"it would be quite impractical to do that but certain people have certain skills and there are certain people on a fume cupboard, there are people who are better doing one part of a fume cupboard than another, now you learn that by the people working there, the people that are good at doing certain things, they do the certain things and like everything else,"	"Erm, well originally it started as a below the line marketing company. So we were going for something that kind of was below the line. I originally had this idea in my head of it kind of it being, you know, equated to, unfortunately it was bad timing, but equating with the military side of life i.e. it's a torpedo 'cos Spearfish is like the newest torpedo from Marconi. Unfortunately, that angle itself became a very bad one later on in life because we went to war a lot!"
Systemic tool	"The product we make is fume cupboards and fume cupboards have got to be safe and they've got to be good, the only part of the operation which the end user is going to use on a fume cupboard generally speaking is the sash, making sure that the sash goes up and down or goes across and also if they've got the hand wheels which turn to ensure that the gases or the water inside the fume cupboard operate correctly. We make sure that everything is tested on the gas, that there's no leakages at all, we make sure that the sash mechanism is safe"	"So Spearfish came from that and also the fact that we're all Pisceans which is interesting. So we just thought fish. 'Spear' because it said it's, 'Sampling. Promotions. Events. Art. Results.' There's millions of reasons we're called Spearfish and that it's really."
Episodic	"Made people aware that their former practices were no longer acceptable, I'll give you	

Space and Time Mgt Tool	one example, there was a job we did for Zeneca and we put this <u>fume cupboard</u> in for them and the guy phoned me up and said, the <u>fume cupboard's</u> excellent, etc. who put the service fittings on because they look as if they've been put on with a knife and fork, what I remembered then was that the <u>fume cupboard</u> was actually on the back of a wagon ready to go out and the co-director, the man who owns the company and someone else were putting these fittings on, so I went to him and I said, who put those fittings on and he mentioned this guy's name and I went to him and he said, no I didn't Dave put them on and I said, well the bloke at Zeneca said he's never going to give us another job because of the manner in which it was put on looked as if it was butchered."