Generating Real Business Value: Transcending the Socio-Technical Dimension.

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GENERATING REAL BUSINESS VALUE: TRANSCENDING THE SOCIO-TECHNICAL DIMENSION

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Abstract

Changes in technologies which have put computing power on the desktop over the past 25 years give an impression of increased empowerment for the end-user when compared to previous generations of hardware and software. However, in practice, latest developments in desktop computing and related technologies have led to more and more centralized control of 'end-users' workspaces. This phenomenon leads to disempowerment of people, and a perceived failure of IT services to deliver full potential to generate value to businesses. It is possible to see the beginning of a paradigm shift in which companies are highlighting a need for IS developments to be driven by a deepened insight into the real challenges faced by the business. Evidence for this can be found in significantly enhanced commitment of resources towards business analysis and away from traditional technical functions. This has, in turn, given rise to a quest for appropriate tools and techniques for analysis. This paper discusses a revived interest in participatory IS methodologies, and recognizes that existing tools such as ETHICS can be revisited and applied in a modern context. More than ever there is a need today for a revised ETHICS methodology suitable to be used in the 21st century.

Key words: socio-technical design; participatory design; IS methodologies;

1 INTRODUCTION

The starting point for this paper is the authors' recognition of a paradigm shift which is in progress in industry. Sandberg and Targama (2007) point to a shift in management thinking away from traditional, rational planning, directing and controlling towards an emphasis on culture, vision and team-working. However, they point out that this apparent shift has been embraced in rhetoric rather than practice in many cases because the approaches needed to implement it are not yet clearly understood. It is clear that some large companies are not only recognising a need for change but actively putting resources in place to enable this to happen. Skandia, for example, recently announced that routine technical functions were to be outsourced, and resources diverted to increasing the number of business analysts employed from 15 to 100 (Grant 2007). IBM have published a 'White Paper' (Salvage and Dhanda 2007) in which they set out a need for companies to reorganize IT services and adopt methods that can lead to better understanding of the real challenges facing the business.

"Now that IT plays such an important role in the overall success or failure of any organisation, the business rightly expects the IT department to broaden it focus and to take a more mature and holistic attitude to IT service provision. Fundamentally, the IT function needs to step out of the shadows and start taking responsibility for understanding and meeting the business requirements" (p.3).

This clearly resonates with the Skandia decision, above. Bizarrely, engagement of stakeholders (users) is still ignored in many projects as experts are called in to develop systems on their behalf. For example, in development of an ERP system, one company found that none of the supposed 'users' of some functions were willing to use the finished system. Choices facing the company were to remodel the system to make it more attractive to users, to develop a new version which would be more acceptable, or to provide an alternative for those particular tasks. They chose the last of these! (Vowler 2000). Another recent example comes from Marchand and Hykes (2006). Here, developers of a new system were congratulated upon a successful project, coming in on time and within budget with apparent functionality. However, it took the company's auditors to point out that the project had really failed – few people were actually using it. The need for wider stakeholder participation in development of work systems is made very clearly by Colin Thompson, Deputy Chief Executive of the British Computer Society, who writes:

"*We recognize that (these) objectives will demand total professionalism not just of the IT practitioners but across all business functions. Professional people working for fully professional organizations are the key to improving the way we do things and the results that we achieve.*" (Thompson 2006 p7).

It appears to us that a renewed focus on participative approaches to systems design would now be beneficial. In particular, Enid Mumford's work relating to socio-technical design is worthy of reconsideration for the 21st century. During more than 25 years in the field, Mumford's work was often constrained by intensely political environments in which individual consultation and participation were wholly foreign to a prevailing managerialist culture. However, in the light of the paradigm shift referred to above, a modified form of Mumford's ETHICS[1] methodology may now be both well received and helpful. Mumford harnessed socio-technical principles developed by the Tavistock Institute in developing the ETHICS methodology for participatory work design (Mumford 1983). Her aim was to enable design of systems to support enhancement of work satisfaction *and* productivity in tandem. The methodology involves a number of steps which guide and support groups of people in a workplace to establish dialogue regarding job satisfaction and technical requirements. It includes a number of tools and techniques

[1] Effective Technical and Human Implementation of Computer Systems

intended to support individual stakeholders to reflect upon, reorganize and redevelop their activities to meet new challenges in changing environments. This focus on real people, as unique contributors to any work space, has inspired many subsequent researchers. (For a more detailed discussion of ETHICS, interested readers are referred to *Designing Human Systems - The ETHICS Method, which is available online at* http://www.enid.u-net.com/index.htm). A key quality in Mumford's work is its forward trajectory – continually moving the agenda of socio-technical thinking onward. The authors are aware that Mumford's work has sometimes been accused of failing to address the full complexity of organizational systems, and lacking philosophical depth. However, we believe the philosophical underpinning of her work can be implicitly discerned in her desire always to 'look beyond' to the pursuit of further adaptation. It is this that enables contemporary researchers to develop the potential of the socio-technical approach. Hirschheim and Klein (1994), for instance, present a modification of ETHICS for the purpose of incorporating ideals of neo-humanism. Many leading academics have made an impact in their chosen fields by 'standing on the shoulders of giants'. However, others (e.g. Einstein or Vickers) have made progress through the depth and penetration of their thinking and personal reflection, drawing upon previous life experiences. Researchers who have moved forward from the original socio-technical model have clearly demonstrated the philosophical foundations for their work, e.g. Klein (2004; 2007); Nissen, (1984; 2002; 2007). In Mumford's research discourse, the purpose of an information system can be perceived as twofold: to support people in informing themselves, and/or to support people in helping others to inform themselves. We find plenty of support for this stance (for example, Nissen 1984 or Checkland and Holwell 1998). Both of these works also relate 'usefulness' to discussion of sense-making and meaning shaping, as Mumford does. In her research discourse, discussions of problematic issues such as these can be recognized as elaborations upon philosophy in practice. Further criticism laid at Mumford's door includes suggestions that ETHICS, and other participatory approaches, are too elaborate and time-consuming to be practical. Some researchers have responded to this by attempts to render participative design less laborious, e.g. in Multiview, propounded by Wood-Harper, et al (1985). Here, aspects of inquiry and engagement were specifically recognised to be 'too time-consuming, detailed and expensive' and hence were marginalized in the Multiview approach. This resulted, in our view, in oversimplification and understatement of the intensity of end-user engagement required to effect successful design. It also fails to recognize the difficult, creative (and therefore time-consuming) learning processes lying at the heart of successful analysis and transformation of socio-cultural organizational practices. We believe that, in order to achieve intentionally-guided and *sustainable* change within an organizational system, commitment of resources, time and hard work are essential. There are no short cuts, as the experience of Nestlé has shown (see section 4). It is the need for this commitment to which the remainder of this paper is dedicated.

2 SOCIO-TECHNICAL ARCHETYPE

The aim of founder members of the Tavistock Institute, such as Eric Trist and Fred Emery, was to develop ways to harness social science methods for the benefit of society more widely. This led them to become interested in what is now known as action research and to believe that there could be '*no theory without practice, no practice without theory'* (Mumford 2006 p.320). Socio-technical design was envisaged as a means by which human intelligence and skill could be harnessed in conjunction with newly emerging technologies in the post-War period, to bring about radical improvements in work and in life. Practitioners saw two key values as essential: need to humanize work through job design, and democracy in both the workplace and wider society. Gradually, a coherent set of socio-technical principles emerged (Cherns 1976). Researchers considered that a work system should be seen as a set of activities coming together to form an integrated whole, as opposed to a collection of separate tasks, i.e. an open system, interacting with an environment that influences its behaviour. The concept of group working became very significant to members of the Institute in consequence of this view (Pasmore 1988). It was considered important that

work be designed so that individuals would experience variety, stimulation, opportunities to make decisions and to learn, and receive recognition from the outside world for what they did (Emery, 1978). A concept of 'minimal critical specifications' was asserted, in which workers should have maximum freedom to work as they see fit. Emery also developed a principle of adaptive strategic planning. This emphasised importance of shared organizational values, from which organizational goals would be derived. Furthermore, alongside all of these principles, an idea of participative design prevailed, i.e. if work was to be democratic and enriching, so also should be the process by which work systems were designed. Mumford and Weir (1979) reflect that

"*A work system that is designed to achieve objectives defined solely in technical terms is likely to have unpredictable human consequences. The reason for this is that technical decisions taken at an early stage of the design process will impose constraints on the organisation of the human part of the system.* (p.9).

Approaches to inquiry are needed which challenge received wisdom and superficial appearances. Mere examination of a social dimension in addition to technical matters does not suffice. Researchers have drawn upon human/social sciences in order to ground their assumptions in more developed philosophical foundations, e.g. Klein (2004); Nissen (2002). Active and enthusiastic involvement requires both participation and empowerment. Participative design was therefore initiated by researchers who perceived it to have benefits both for the self-actualisation needs of people *and* the efficiency needs of organizations. However, 'participation' is a term capable of more than one interpretation, depending on whose perspective is considered. Participants enjoy varying degrees of engagement with the process – from consultative or representative participation, through to a full 'consensus' approach. Ongoing acquisition of relevant 'knowledge' is needed in order for informed decisions to emerge. Thus, participation involves learning and development of effective relationships. Power within participating groups will also be an issue. Morgan (1997), drawing on Plato, reminds us that people can become trapped within their own constructed 'realities'. This entrapment can prevent individuals and groups from espousing new knowledge which conflicts with established patterns, inhibiting learning and hence processes for effective work design. Individuals need to be motivated and supported to think and express themselves, and to overcome any inhibitions they feel about expressing their ideas. Confrontation sometimes results if controversial opinions are expressed, or people feel that their ideas could be thought eccentric or unworkable and be reluctant to express them (Bednar and Welch 2006). Groups are more than collections of individuals and have dynamic, emergent qualities of their own. Members may react in a hostile way to individuals perceived as non-conforming, and even ostracise them. Individual behaviour within groups may demonstrate manipulative strategies designed to bring about outcomes which best suit individual preferences (see Robinson 2004; and Hoyt 1997). Mumford highlights an important role for facilitators in participative design, but emphasises that control should rest with the participants themselves. This position is supported by e.g. Nissen (1984; 2002), Stowell and West (1985) and Friis (1991). The facilitator's role is:

"… *to help the design group to choose and implement an appropriate problem-solving methodology, to keep the members interested and motivated towards the design task, to help them resolve any conflicts, and to make sure that important design factors are not forgotten or overlooked. The facilitator must in no circumstances take decisions for the design group or persuade them that certain things should be done or not done.* (Mumford 2003 p.41).

Choice of a facilitator with the right qualities is crucial to progress of a project. It can be seen today that professional analysts' ability to understand the challenges facing the business itself are as crucial as their technical expertise. An example of this can be seen in strategic decisions taken by insurance firm Skandia (see Grant 2007 above).

3 BEYOND THE SOCIO-TECHNICAL

Over time, Mumford's work evolved to break away from an original, socio-technical archetype. It is now possible to recognize two different ways in which socio-technical approaches are discussed: those explicitly informed by phenomenology and those that are not. We outline here a desire to look beyond limitations of a narrow socio-technical dimension, and wish to highlight the indivisibility of theory and practice. We regard development of theory as a form of practice in itself. Reflection on practice must underpin a creative process of theory development. Radnitzky (1973 p.389) points to research as a practical process, in which '*research-theoretical foreconceptions and world-picture assumptions*' influence on-going research enterprise. As highlighted by Ciborra (2002 p.16), a tendency can be observed within information systems research to mimic perspectives espoused by those working in the natural sciences, which are proclaimed to be 'objective.' Thus, when observing social phenomena, IS specialists still insist upon recording their observations using abstractions such as entity-relationship diagrams in order to preserve 'objectivity'. Ciborra (2002) points to a danger that we may forget the role of human choice behind the technical artefacts. Nissen (2002) also raises this point in his discussion of inquiry in software practice. Sauer (1993) argues that an information system is not just a collection of artefacts, but that: '*Economic task, organizational, human relations / labour process and technical perspectives are all involved'* (Sauer 1993 p 10). *Purposes* ascribed to such a proposed system must then be included in inquiry. Mumford and Weir (1979) reflect upon this tendency in the following way:

"*The effects of the system on job design, working relationships and job satisfaction are usually seen as by-products of the system, rather than factors which need to be consciously considered and planned…as computer systems, in particular, become more pervasive in the life of organisations, the effects cannot be left to chance or to ad hoc adjustments during implementation*" (1979 p.287-288).

We therefore wish to move beyond confusion inherent in treating technical and social domains as if they are either alike or susceptible to 'objective' investigation. Drawing on work such as Mumford et al (1984), and Checkland and Holwell (1998), it appears to us that it is relevant for systems analysts to ask the question '*What is the purpose of an information system*?' In order to design an information system that is to be assessed as meaningful from someone else's perspective, a designer must achieve some understanding as to what would make it meaningful for that person. This point has been discussed more fully in Nissen et al (2007). When a particular observer is making an observation, the observation can only reflect that individual's own perspective. Since any investigation must be done by a particular analyst, the purpose will always be seen and described from that person's point of view. Support for this proposition is found, for instance, in work of Maturana and Varela (1987). This, again, underpins the view that control over design processes must rest with the participants themselves. It is also here that the significant strength of ETHICS lies. It is not enough that users participate in processes of analysis and design; they must also be empowered to *control* them (Friis, 1991). Whilst we do recognize an essential role for professional expertise in methods of analysis, problem ownership and control by clients is vital. Only then is it possible to avoid arbitrary limitation of the scope of inquiry and problem definition by a supposed 'expert'. While Mumford's descriptions of representative/consultative participation conform to basic ideas of democracy, they do not in any way result in individuals being empowered to own and control their own design processes. Like any other instance of work space design, information systems development represents a special case of action that seeks for intentional, beneficial change in a human activity system (Checkland and Holwell 1998). The term 'analysis' suggests a breaking down process. It is used in this sense within Logical-Empiricist research paradigms, which attempt to investigate and explain phenomena by looking at the structures or behaviours of their component parts. However, in the sphere of human activity such a 'reductionist' approach has long been a subject of criticism, as ignoring possible emergent properties that appear when individual behaviour is considered in a context of systems (Nissen 1984; 2002). Furthermore, recognition of emergent properties of a whole system is insufficient. An individual actor within a human

activity system may represent emergence of a different order. It is possible that the emergent properties associated with that individual may amount to more than those of the system as a whole, when considering the influence of other systems in which s/he is involved. For example, in considering a restaurant as a human activity system we might view the Chef as one contributing component if we choose to draw a boundary around a 'system for providing cooked meals'. However, considered as a 'system for making profits by attracting customers to partake of cooked meals', the emergent properties change, as the identity of the Chef becomes an attracting influence (Bednar 2007). As pointed out by Ulrich in his discussion of boundary critique, perception of a system varies with the stance of the observer (Ulrich 2005). This highlights the importance of effective participation in design – my manager's view of my role in a work system is unlikely to match my own, contextually-created interpretation. This principle of boundary critique led Ulrich to develop boundary questions, which have been used by Bergvall-Kåreborn in her work to expand the application of CATWOE in Soft Systems Methodology. A key purpose for design of systems appears to be enabling beneficial change as defined by some participant in, or observer of, that system. Such change can be seen as an emergent consequence from combined individual and organizational learning and sense-making processes (Bednar and Welch 2005). As such, an analyst's desire to bring about beneficial change requires that both explicit and tacit organizational norms are challenged. We recognize that, if tacit norms are to be challenged, they must first be brought into the open (Argyris 1990). This will require individual and collective courage to embark on a journey into the (as yet) unknown (Bednar and Mallalieu 2001). It is likely that such challenges will be received as unwelcome or uncomfortable by some participants in organizational life (Argyris 1990; Walsham 1993; Mumford 2003). Thus, intentional actions for change in human activity systems are always political processes. If IS can be viewed as a special case of a human activity system, it is desirable that participants in development do not focus upon something narrow and specific, such as information technologies or business processes. Sommerville, in his work on Software Engineering, makes just this point.

"*…human, social and organizational factors are often critical in determining whether or not a system successfully meets its objectives. Unfortunately, predicting their effects on systems is very difficult for engineers who have little experience of social or cultural studies. To help understand the effects of systems on organizations, various methodologies have developed such as Mumford's socio-technics*…" (Sommerville 2007, p.35).

In this context, it is therefore worthwhile to reflect upon the nature of organizational information systems. We suggest that care is needed in considering a work space as a simple fusion of social and technical systems. This could lead to oversimplification of perceptions of a design space, and failure to recognize emergent properties. There is a discussion in Langefors (1995 p 53) of 'organization' as synonymous with an information system. This is highlighted and elaborated upon in the context of the Infological Equation[2]. The equation demonstrates for us the essentially individual and subjective processes of sense-making involved in shaping perceptions of purpose of information systems. Efforts to go beyond socio-technical dimensions, to embrace cultural and philosophical, can be found in work by Checkland (Checkland and Holwell 1998), and Jayaratna in his NIMSAD framework for evaluation of methodologies (Jayaratna 1994). Once again, this shows that the responsibility for analysis can only lie with actors, i.e. the users of a proposed system. Since any description of a phenomenon can only be made from the perspective of a particular observer at a particular time, we believe that it is not appropriate for investigation (analysis and design practice) to be delegated. Mumford and Weir (1979 p.288) make a similar point. Thus, we consider the description 'analyst' to imply roles for the participants themselves. The ETHICS methodology has great potential to provide a vehicle to support this purpose. It has been suggested that we all construct

[2] The Infological equation "I=i(D,S,t)" shows how meaningful information (I) may be constructed from the data (D) in the light of participants' pre-knowledge (S) by an interpretive process (i) during the time interval (t). The necessary pre-knowledge (s) is generated through the entire previous life experience of the individual.

theories of action, which underlie our behaviour (Argyris, 2004). These comprise theories that we espouse (our values, beliefs and action strategies), and theories-in-use which are the mental designs we make for action strategies. The theories that an individual creates while sense-making will be influenced by multiple contextual dependencies arising from her/his experience and environment (Bednar 2000). Such dependencies have been derived through the particular experiences of individual people involved, in the context of their own working situations. The distinctiveness of each work situation lies in construction of meanings that individuals attach to it (Fiske 1982). There is no reason to assume consensus among the different actors as to the desirable properties of a proposed system. Indeed, as the Infological Equation demonstrates (see Langefors 1966), it is not possible for any individual to know in advance precisely what requirements s/he might have. Instead actors need support to engage in a collaborative endeavour to create and shape their own requirements (Bednar and Welch 2007a). We argue against a narrow interpretation of requirements 'elicitation'. We consider rather that individuals partake in a learning spiral, through reflection on sense-making in a work context, in order to *create* those requirements (Bednar and Welch 2005, drawing upon Bateson 1972). Discussion in Nissen (2002) provides support for the view that no system could become meaningful if users' perspectives of usefulness, as opposed to usability, remain invisible. In order to make users' perspectives visible in their uniqueness, and to create systems that could be meaningful for them, we seek approaches where phenomenology is applied as practical philosophy (Bednar and Welch 2007b). Discussion of relevance then serves to illuminate a complex problem space in systems analysis. For illustration of such problems please see, for instance, discussion by Hirschheim et al (1995) and the example from Marchand and Hykes, above.

4 ETHICS AS A METHODOLOGY FOR THE 21ST CENTURY

Drawing on Mumford's work (1983; 1995; 1996; 2003) and other contributions such as Checkland and Holwell (1998) or the first IFIP 8.2 colloquium (Mumford et al 1984), it appears relevant that analysts should ask the question '*How can we find out what makes a system meaningful*?' The demands of research require us not only to seek an answer to this question, but also to discuss its characteristics. Throughout the history of IS, variations of this question have been addressed many times by a range of researchers (e.g. Wood-Harper et al 1985; Stowell and West 1985; Jayaratna 1994; Avison et al 1997, etc). This has resulted in a multitude of methodologies within IS and other fields of organizational analysis, yet still an answer remains elusive. When considering design of a system that is to be assessed as 'meaningful' from some specific other person's perspective, discourse must include more than just the design process. A designer will need to achieve a deepened understanding of a 'design space', which can only be obtained through inquiry into what would make a system meaningful for that specified other person. It is not enough to suggest that users (actors) *participate* in processes of analysis and design (see, for example, Mumford's elaboration regarding the role of the 'facilitator' in ETHICS, cited above). We suggest that the particular instance of organizational change which is IS development is often problematic, due in part to a bundle of 'prejudices', which this and related terms (such as 'user') seem to evoke. See, for instance, discussion by Nissen (2002) in relation to software development. There appear to be preconceptions, which lead people (researchers, analysts and clients etc alike) to suspend critical faculties they might frequently apply in other aspects of daily life. This is clearly demonstrated in Mumford's description of a project in participative design at Rolls Royce Limited Derby Engine Group (Mumford and Henshall, 1979). Despite the fact that the project had been preceded by a training exercise in participative design, progress was initially slow, due in part to the intensely political nature of the problem space, and the impact of representative participation. It emerged that assumptions were made among members of the Design Group that IT applications could only be developed and implemented in particular, fixed ways. They appeared to believe themselves relatively powerless to influence the ultimate design or the processes involved in achieving it. They also expressed misgivings about the participatory approach itself – suspicious that there was a 'catch' awaiting them. Eventually, the Facilitator became aware of these

difficulties, and was able to communicate to the team that IS development could be a flexible process. The rate of progress then improved. This case study confirms our view that support for participants is crucial during the early stages of a project. Vehicles may be needed to improve two-way communication and to channel the efforts of facilitating analysts, and tools developed to support the complexities of the analysis. Mumford and Henshall (1979) describe a number of successful instances in which the ETHICS methodology was used, illustrating as they do so a number of the pitfalls involved in participatory design and how they were addressed in practice. If people are to be empowered to contribute to a process of participatory design in a way that reflects their individual beliefs, as suggested by Hirschheim and Klein (1994), then they must first be supported to explore and create those beliefs in a work context. ETHICS provides tools to help them. It includes not only description of 'steps' and advice for how to support a process of analysis and design, but also templates to support actors in their analysis practice. These are of specific interest as they lend themselves to creative use in complex organizational settings. The original templates are satisfactory for many purposes. However, they are not comprehensive and when it comes to problem (re-) definition and setting boundaries of relevant problem spaces, they are not necessarily very supportive. While this general area is loosely covered by the initial steps in ETHICS, there is a need for some additional guidance, and supplementary templates. Techniques derived from systemic approaches such as Soft Systems Methodology (SSM) can be applied to support users of ETHICS in these early steps, so that they may explore their views about meaningful use in relation to the work system. Drawing on previous practical experience, we have explored this further through our teaching of Systems Analysis over the past few years (University of Portsmouth, 2006). There are ways to combine SSM with ETHICS as a whole in practice, either in parallel for the complete analysis / design process or specifically targeting the issues of steps one to three. We find plenty of support in Mumford's work for commitment to a recurring dialectic between meaningful use and reflection on use. There is a constant elaboration on dialectic between experience level and reflective level. The validity of this commitment has been further explored in Nissen et al (2007). When she speaks of experience of use, Mumford discusses thinking about usability; when she discusses experience of usability, she discusses thinking about usefulness; and when she discusses experience of usefulness, she also discusses thinking about meaningfulness. Attention is continually placed on individual uniqueness, in both levels of experience and of reflection. These aspects are especially recognizable when efforts are made to apply the templates she provides. For a whole generation of analysts, choice of method has always involved compromise. There are methods with rigid and unreflective steps, which exclude human beings from the analysis. There are methods such as SSM, which enabled systemic inquiry into a problem space but then left the participants with no clear guidance as to how to progress the project further. ETHICS provided a bridge which was a partial answer to this dilemma. A number of authors take an eclectic approach when discussing methodologies and development of methodologies. Some have made specific reference and efforts to combine SSM with other approaches, e.g. version 4 of Structured Systems Analysis & Design Methodology (Checkland and Poulter 2006). In their Object-Oriented Analysis and Design methodology, Matthiasen et al (2000) refer specifically to SSM and work by Checkland, e.g. in FACTOR, developed from CATWOE in SSM. They state three objectives in doing this: to appreciate the situation; to cultivate new ideas; and to define alternative systems (p.23). Wood-Harper and his collaborators also incorporate aspects of both ETHICS and SSM in elaborating their Multiview Approach (Wood-Harper et al 1985). It is beyond the scope of this paper to outline a complete and detailed revision of ETHICS. It is, however, interesting to reflect on ways in which systemic inquiry can be incorporated, enhanced and supported more directly – both throughout the methodology and at a strategic meta-level. The first three steps could be modified to include more explicit questioning and critical review of the problem space and the system boundaries presented. This would focus on identifying a problem (Step 1), identifying system boundaries (Step 2), and describing existing systems (Step 3). Tools such as Brainstorming, Mind Mapping and Rich Pictures are useful to support dialogue about these three themes. If all three techniques are applied systematically in each step, this creates a supporting method in its own right. This method then forms a basis for a systemic technique to bring out concepts and

ideas (through Brainstorming), elaborate upon associations among those concepts (by Mind Mapping), and re-focus attention on relationships between concepts and ideas (through Rich Pictures). Multi-modelling as a systemic technique is well established elsewhere, e.g. in work by Gianfranco Minati (2006). It may be helpful to the analysis to use results of multi-modelling to formulate Root Definitions of relevant systems, refined using a version of CATWOE. A Root Definition is an elaborated description (from a specified worldview) of a system perceived to bring about a desired transformation. These are techniques used and promoted by Checkland as part of Soft Systems Methodology (Checkland and Holwell 1998). He also provides guiding questions to help analysts to enrich Root Definitions (e.g. Checkland and Poulter 2006 p.39). In addition, Ulrich's boundary questions can help a user of ETHICS to create and identify a relevant scope for their inquiry, i.e. relevant questions and useful approaches to carrying out inquiry (Ulrich 2005). To take one example, CATWOE might be extended by the use of Ulrich's boundary questions (see e.g. work by Bergvall-Kåreborn 2006).

5 CONCLUSIONS

Mumford and Weir (1979) point out that applying ETHICS is neither simple nor straightforward. It is frequently a complex, time-consuming and iterative process. For this reason, analysts and managers may be reluctant to adopt a participative approach, seeing it as increasing both planning time and project costs. We suggest that such a narrow view is, in fact, counterproductive. Indeed, taking more time, making more effort, and committing more resources in efforts to bring about collaborative learning in organizational problem spaces will, we believe, pay dividends in the longer-term in relation to the usefulness and sustainability of resultant systems. We find evidence for this position, for instance, in an experience of Nestlé. In 1998 the company began a project to introduce an Enterprise Resource Planning system (Worthen 2002). Attempts to base a system on 'best practice' in business processes ran into difficulties. Management were at first at a loss to understand why implementation was unsuccessful. Then an assessment by an independent analyst, reported in the Press, suggested that the project had affected Nestlé's share price because it '*touched the corporate culture'* and was thus perceived as a risk. Reflection showed that lack of involvement by key stakeholders, and undue concentrations on technical matters, were primary contributing factors to the failure. Ultimately, the company decided to scrap the system and recommenced the project from scratch with a more inclusive approach, two years after its initial inception. A project that is finished on time and within budget, with all the functionality required in the specification, is often initially regarded as a success, both by developers and leaders of organizations. However, in practice, stakeholders' views may change as they experience the system in context (Mumford, 1983; 2003). This is illustrated by the example from Marchand and Hykes, described above. While issues relating to participation and empowerment have been recognized as relevant in IS design for more than 20 years (see Mumford et al. 1984), no resolution has yet been achieved. Relevance of these issues has not declined over time. Complexity of organizational IT networks, for instance, is not only comparable to that of the large-scale mainframe systems of the past, but goes beyond what it was previously practical to implement. In the latter part of the 20th century, large investments of financial and labour resources were required to design, install and also to run technical systems effectively. As the systems became smaller, more accessible and more affordable, control over the application of technology passed to the 'end users' themselves, as the needs of the technology no longer dictated the possibilities for its use. However, in the 21st century, continuous developments in complexity of ICT, such as operating system software, have brought about a return to centralization, sometimes under the guise of standardization. This has brought about a consequent decline in empowerment of users. In his preface to a revised edition of Mumford's 1983 work, Hickey states that, despite radical changes in technologies, social values and environment:

"*One thing has remained the same…Organisations insisted on using standard engineering and management practices to build software. The result then as now was a horrendous list of implementation*

failures. Mumford's ETHICS provided a means to approach software development in a new way based on participation and concern for the users. We now have newer technical tools and a more vibrant approach from software developers. The time is right to revisit Mumford's approach and adapt it to the later agile development methodologies." (Mumford et al 2006 p.8).

Problem ownership and control by clients is essential to avoid arbitrary limitation of the scope of any inquiry, and problem definition, by a supposed 'expert'. Nissen (2002) discusses a need to recognize the professionalism of those for whom software systems are intended – who do not think of themselves primarily as 'users' but as engineers, accountants, lawyers, clerks, etc. Systems analysis continues to be problematic, we suggest, due in part to a particular bundle of 'prejudices' and preconceptions, which the term information systems development seems to evoke, that can lead people (researchers, analysts and clients alike) to suspend their critical faculties. Mumford's ambition stands out as avoiding focus on such preconceptions, by her emphasis on empowering end users to take control in defining 'usefulness'. Discussion of the contextually dependent nature of a system's defined purpose leads to recognition that responsibility for analysis (problem re-definition) can never be delegated. It is important to recognize explicitly that every actor will perceive that purpose from her/his own unique perspective. Each individual must therefore be her/his own analyst. However, it must equally be recognized that professional analysts have a role in supporting and facilitating contextual inquiry, and this must by definition involve delegation. There is a paradox for us here, in that each individual's espoused theories and theories-in-use will be distinctive and cannot be resolved into a simple consensus (Argyris and Schon 1974). Through Mumford's discourse about design for future change (e.g. ETHICS), we recognize that such resolution cannot be achieved fully. She promotes the idea that no professional analyst can, or should attempt to, substitute her/his own 'expertise' for contextual experiences of those most closely involved in the relevant problem space. We can see great benefit in application of a revised ETHICS methodology when looking at current development trends in ICTs and their organizational application. One way to advance this would be to incorporate modified features of SSM within early steps of ETHICS. Alternatively, SSM and ETHICS might be combined into one whole. In this way, we can conceive progress to be possible from approaches which are merely participative to those which are genuinely collaborative in nature.

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