Creating an Environment to Encourage Emergent Formation of Information Strategy

Janet T. McDonnell
Department of Computer Science
University College London
Gower Street
London WC1E 6BT
+44 (0)171 419 3692
J.McDonnell@ucl.ac.uk

Steven J. Gould
Friends of the Earth
26-28 Underwood Street
London N1 7JQ
+44 (0) 171 490 1555
steveng@foe.co.uk

ABSTRACT
In this paper we describe a practical attempt to create an organizational environment which can support emergent formation of information strategy. A series of prototypes were co-designed to enable mutual learning about how information technology could support and transform work. This laid the foundations for collaboration on the development of an information strategy which can be continuously evolved. The strategy process involves the informed participation of the many staff whose understanding of information technology has been deepened by their experiences in the participative development of prototype systems to support their work priorities.

Keywords
Information strategy, cooperative prototyping.

INTRODUCTION
Mintzberg classifies the processes by which strategies are made into two contrasting categories namely "deliberate formulation through systematic analysis" and "emergent formation through the interactive learning of people" [1]. We are interested in intervening to encourage an information strategy development process that fits the latter of these perspectives. We use the experience of cooperatively designing information systems [2], [3], [4] with individuals and small groups of people within an organization as a way of enabling them to learn about the radical potential of using information technology to transform their work. Mintzberg associates emergent formation of information strategy with the lack of a formally acknowledged intention to contrast it with planned formulation of strategy. We are interested in how deeper understanding of the work transformation potential of technology can allow people to participate in evolving information strategy for their organizations. In this paper we describe a two-year project based at the headquarters of Friends of the Earth (FOE) in London. During the first eighteen months our emphasis was on the development of a series of information system prototypes through collaborations with individuals and very small groups of staff. Each prototype met some identified need and its development was justified on the basis of conventional assessment of benefits and priorities. However, the collaborative development of these prototypes, viewed collectively, was intended to provide opportunities for experiential learning which would subsequently enable staff to make an informed contribution to the formulation of the organization's information strategy. This larger purpose strongly influenced the way we proceeded with the individual developments. During the last six months of the project effort shifted towards evolving information strategy that can continuously adapt, in response to changes in environment, through the participation of members of the staff at all levels in the organization.

We begin by describing the setting of our intervention[1] to highlight the favorable qualities of its culture for what we were attempting to do. We then present an overview of the work of co-designing the prototypes. This is followed by a review of the potential organizational impacts of IT which emphasizes the potential for radical and unpredictable effects. We discuss the appropriate form for an information strategy which takes adaptation to change into account. We take a systems-view of strategy so as to consider it both as a process and a product. Finally we describe the strategy

[1] This intervention can be classed as action research, practitioner and researcher collaboration "to promote productive organizational learning and to understand the nature of (the organization's) learning processes and systems" [5].

In *PDC 98 Proceedings of the Participatory Design Conference.* R. Chatfield, S. Kuhn, M. Muller (Eds.) Seattle, WA USA, 12-14 November 1998. CPSR, P.O. Box 717, Palo Alto, CA 94302 cpsr@cpsr.org
ISBN 0-9667818-0-5.

which emerged during the last six months of our project and how its continuous evolution is currently being effected.

THE ORGANIZATIONAL SETTING

Our work took place in a third sector organization, that is one which is distinguished from the private sector and the public sector by existing primarily for social rather than economic motives, and having a very strong value-directed ethos [6]. FOE is primarily a campaigning organization. It relies heavily on conducting and commissioning independent research to support its attempts to bring about change in individual attitudes and governmental priorities. Its activities are information intensive. Staff are routinely called upon by the media, those working in education, and by non-governmental and governmental bodies for authoritative comment on matters within their fields of expertise. FOE is part of an international network of over fifty similar organizations. Within the UK its primary activities are research and dissemination of accurate information about environmental matters. Managing information effectively is vital to its successful operation. The organization has an annual turnover in excess of 3.5 million pounds and employs about one hundred full-time staff. Most of these work at the head office, the rest are spread over seven regional offices. Like many other third sector organizations there is a high reliance on a large number of volunteer staff who are often working with a regularity and commitment which makes them difficult to distinguish from formally employed staff.

In third sector organizations staff typically have strong views about what the organization should be doing. The level of commitment of staff to the organization's broad objectives and their degree of awareness of what are the priorities contrast quite strikingly with what is found among a typical cross-section of staff in organizations from the other sectors. Staff expect to be involved in decision making, they feel they are working for a cause, with the result that they tend to have high expectations about effective consultation processes. In the case of campaigning organizations in particular, the sense of mission tends to be very strong and is thoroughly pervasive. Staff are generally very highly motivated. Campaigning organizations are usually addressing enormous problems which means that determining and revising strategic priorities is a constant concern and is therefore a significant and high-profile preoccupation among staff. "There are always more issues requiring attention than resources available. Difficult choices have to be made ... about competing claims" [op.cit., p.283].

Strategic planning and reviewing of strategic priorities takes place relatively frequently. At FOE, for example, recent past practice has been to have an annual cycle of strategic planning. In recent years this has been modified slightly to a two-year cycle in which strategic planning in one year is followed by a formal strategic review in the next. In the five years preceding our intervention there had been two extensive information strategy planning exercises each resulting in the production of a lengthy information strategy document. We comment on these briefly below. In terms of the use of IT to support internal information management, FOE had recently advanced from patchy provision of minimally interconnected personal computers and special purpose workstations to a point where substantial, planned investment in a managed network was supporting a good range of standard word-processing, spreadsheet, database management and email facilities. Circulation of paper-based communications and internally generated documents had been rapidly reducing as a result. However there were no significant computer-based document sharing arrangements nor any conventions for electronic storage, cataloguing or indexing of information resources.

In contrast to the *internal* use of IT to support its work, one of FOE's strategic objectives was to remain at the leading edge in developing and exploiting new forms of IT to support its work in environmental protection. When it launched FOEnet[2] in May 1994 it was one of the first non-governmental environmental campaigning groups to establish a presence on the World Wide Web. Just as the collaboration described in this paper began much publicity was generated in the UK by the publication on FOEnet of the UK's Chemical Releases Inventory which is a database of chemical emissions recorded by the UK Government's Environmental Agency [6]. Thus, to a certain extent, the value of information, and of exploiting advances in IT to use it effectively, was not a controversial issue. What was needed was development of information systems to support the internal activities of as many of the staff as possible so that they might learn how their own work contributions might be improved or transformed.

CO-DESIGNING THE PROTOTYPES

On the one hand the attitude of most of the staff towards new uses of IT to support their work was generally positive for the reasons given above. On the other hand, their experiences with being "consulted" about information strategy planning had been on the whole rather negative. In recent memory one set of external consultants had required almost all staff to complete an extensive questionnaire composed entirely of non-context specific questions suitable (we are tempted to say - equally unsuitable) for any organization. Examples are "what is your job?" and "what information do you need to use for

[2] FOEnet is at http://www.foe.co.uk

your job?". Unsurprisingly many staff had been scarred by this experience. They had received no feed-back on their genuine efforts to cooperate with this difficult request for data nor had there been any useful published outcomes.

With this background, therefore, we set out to get a broad picture of what the priorities for building prototypes might be. We began with a very short period of initial research, sticking to face to face consultations with as many individuals and small groups of staff as possible. From the initial period of inquiry we identified a number of recurring themes and concerns which guided us to where application development might be of strategic assistance. Some of these themes concerned forward planning, information retrieval and internal communications. These matters were mentioned consistently in our discussions with staff and they helped us to focus in on specific work activities and on which staff to work with initially. Throughout the project every opportunity was taken to share information about progress with as many staff as possible. When FOE's Intranet was established at the end of the first year of our work documents relating to the project, particularly drafts, were made freely available to anyone interested.

In selecting any application for prototyping we explored whether there was a promising role for technology assisted information management and whether there was sufficient interest, commitment and enthusiasm from one or more staff with the right work expertise. We also wanted to see that information availability[3] would be increased as a result of the development effort. Keeping in mind our longer term goal of maximizing informed participation in information strategy formation, we needed each application to make a strong impact. We therefore looked for those areas where we could rapidly develop something useful and where the results would have a high profile within the organization. This would increase the visibility of our work beyond those few members of staff who were collaborating actively in each case. We felt that if application areas were judiciously chosen, development would more naturally lead to increasingly informed participation by a growing proportion of staff. A pervasive theme was the encouragement of a culture which could sustain continual improvement through ongoing development of information systems. We wanted to promote a shift away from the idea that improved information management is some fixed goal to be achieved after some finite period of development and organizational upheaval. Processes which support continuous adaptation in changing circumstances are crucial to an organization like FOE. Third sector organizations are not unique in relying for survival on their ability to adapt to rapidly changing external environments but they are being seen increasingly as having plenty to teach the private and public sectors about how to manage in these situations.

When selecting which applications would get our limited resources we assessed the potential for scaling up. In making choices we looked to see whether a prototype could evolve into something that could cope with organization-wide use. Since each prototype set out to replace a current system, to have immediate and high profile positive impact, and to provide further longer term benefits we found it important in each case to engage the participation of staff who represented key users at each of three stages of an application's maturity. We involved someone using the current system, someone who would benefit immediately from the new system and someone who would be able to benefit from the further development of that new system.

The Prototypes

During the first eighteen months of the project we concentrated on cooperative development of prototype applications as a means of learning [8] about the potential for IT to transform working practices. To understand what was going on at this time an appreciation of the scale of our operations is needed. All the developments were taking place at FOE headquarters where there are approximately eighty full time staff. The two members of our project team who were based at FOE increased the number of staff directly associated with IT-supported information management by 20%. At any one time at least half a dozen prototypes were in active development. Each of these typically involved one member of the project team working closely co-designing with 1-3 members of staff whose work the prototype was to support. There would also be other staff, typically 6-8, participating in various advisory and consultative roles in each development. Our experiences in working in this way were similar in terms of benefits and challenges to those described in published work about co-design and participatory design. For our purposes, the development of the prototypes were individual opportunities for experiential learning which, viewed holistically, was the prerequisite to active, informed involvement in information strategy formulation. The experiences provided the basis for organizational competence in sustaining a process of continuously evolving that strategy in the face of constant change. Viewed individually, each prototype was developed to meet identified information management priorities. Prototypes included systems to

[3] By the term availability we mean to combine the qualities of timeliness, appropriateness, accuracy, and comprehensiveness; collectively these describe the usefulness of information for the organization's concerns.

- automatically classify and store internal electronic documents
- automatically publish press releases via the Internet
- act as a profiling agent working on behalf of a staff member or group by gathering, filtering, and presenting documents (internally generated and sought from the Internet) fitting the interests' profile constructed by the user
- provide a Web-based events and campaign manager - a form of Forward Planner for the organization as a whole
- support presentation and retrieval of geographically structured information via a re-usable mapping interface.

The Opportunistic Emphasis

In this retrospective account of the collaborations we can list a representative collection of prototypes and just state our most important selection criteria. Thus, it is easy to lose sight of the extent to which the staff at FOE determined what was important enough to get the attention needed for a prototype to be developed. It is also easy to lose the opportunistic flavor of what was done and the way this contributed in an important way to the success of the prototypes. We offer a couple of examples to try to convey this. The press release management system was developed very rapidly in response to a known problem with managing press releases in different media, for different audiences, with different security and embargo conditions. However, the main reason why it was chosen for attention at a particular time was to respond to an unusually intensive, rapidly moving campaign which had a very high national news profile. By putting effort here we were able to do something immediately useful in the organization, to meet a pressing need, and consequentially to achieve a particularly high internal profile for the system produced. A contrasting example concerns an advancement towards an organization-wide information classification system. We used the office relocation of an entire campaign group and the necessity for them to make use of newly acquired rolling file storage as an opportunity to design with them a prototype classification scheme. It was then possible to test and revise the scheme as an integral part of the unavoidable activity of reorganizing and indexing an existing information collection.

ORGANIZATIONAL IMPACTS OF IT

Advances in information technology continually challenge, or rather undermine, the existing ways in which information is exploited to an organization's greatest benefit. New ways of communicating among groups and among individuals are enabled which change what is considered reasonable with regard to speed, ease of use, reliability, cost, geographical distance and spread. Organizational decision making is also drastically affected when it is possible to store huge amounts of data automatically, retrieve data selectively, combine and reorganize data, make inferences, run simulations, and generally present information in a huge variety of forms and structures [9].

Effects Are Unpredictable

Some of the consequences of using new technology are the intended, planned effects and result in predicted benefits to an organization. However there will be other effects caused by the introduction of new practices that *inevitably* cannot be predicted in advance. Many researchers and practitioners have already addressed this phenomenon. Theoretical insight tells us that emergent systemic properties cannot be seen by examining parts systematically and practical insights show that the operating environment is never clearly bounded [10]. We will not restate the system's theory arguments or the practical evidence which support these insights here but we do assume their consequences in our work. We concentrate on how applications can be developed and an information strategy can emerge *given* that the nature of information systems is such that what they will become in use, and the effects they will have on work practices, are inherently unpredictable.

Effects May Be Strategic

Strategic activities in an organization are usually defined to be those which affect its external impact, the difference an organization makes to its environment, the direction it takes, its viability. Use of IT in information management is therefore strategic to an organization if it changes the way an organization appears from the outside. Sometimes a strategic effect is more narrowly expressed for business organizations as one which changes the way an organization competes [11]. The radical effects of the cycle in which organizations shape, and are shaped by, their use of IT is illustrated in figure 1 in terms of increased information availability. The potential radical impact of changes in the availability of information is not universally accepted by the non-IT managers in many organizations. When there is such acknowledgment, the actions of senior management vary dramatically.

Responsive reactions have in common a concern to take the management of information and the exploitation of advances in IT as a serious priority at the most senior management levels. When the organization is fit and responsive[4] staff at all levels are expected to use their

[4] Perhaps even aspiring to be a learning organization, i.e. one which is "skilled at creating, acquiring, and transferring knowledge, and at modifying its behavior to reflect new knowledge and insights" [12].

initiative and are given powers commensurate with their responsibilities. They are encouraged to make radical proposals for improving organizational practices that are not constrained in scope to their currently defined duties and roles within the organization. Third sector organizations more commonly attract staff who are comfortable with working in this way. Given the right opportunity to develop their knowledge and appropriate levels of technical support, people can identify for themselves what practices are most effective for their own work and what will benefit the organization as a whole.

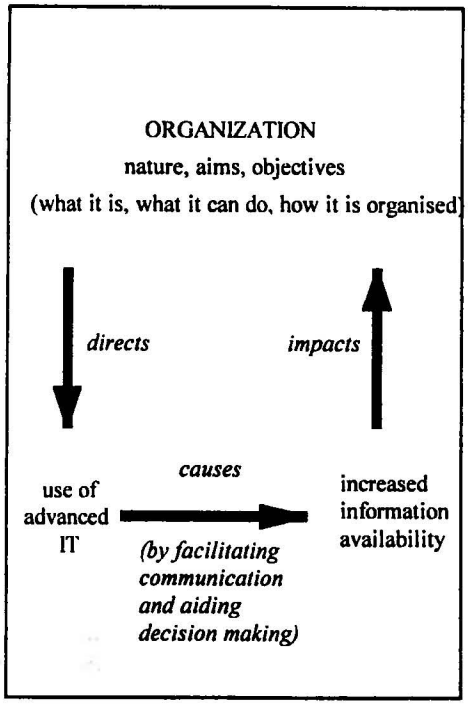

Figure 1. Potentially radical cycle of IT use.

Improvements which accrue from better management of information when it is viewed as a simple commodity are reasonably predictable. The view of information on which such predictions are made is, however, a limited one. The real management challenges, and therefore the ones which will determine the appropriate form for an information strategy, are the inevitable, unpredictable effects that increased availability of information will have on an organization. It is these which give rise to the need to continuously evolve working practices which make best use of information systems.

AN APPROPRIATE FORM FOR INFORMATION STRATEGY

The purpose of any strategy is to guide and direct growth and change. Definitions of strategy vary but are generally agreed to be concerned with the longer term view. The effect of carrying out a successful strategy will be that growth and change will be effectively and efficiently managed with some agreed orientation. The articulation of a strategy and its publication lets those it will affect understand the purposes to which their efforts are directed. In enlightened organizations the sharing of decisions about strategy is generally agreed to be something constructive and positively beneficial which is to be encouraged. Participation in strategy formulation requires that it be articulated in appropriate forms so that it can be discussed, questioned, and revised, as well as being actively realized.

The Trouble With Master Plans

Organizations need information strategies that will give them stability and direction but which will not cause stagnation by imposing policy constraints which discourage responsiveness to opportunities for innovation and improvements in practices. Clearly a strategy must, in some sense, offer a holistic view. It is a framework for purposefully directing activities. However, strategy expressed as a master plan tends not to support adaptation and rapid response to risks and new opportunities. Some organizations satisfy the need for direction by producing an expression of shared values. This is used to inform short term choices about what to do and where to focus resources but avoids suppressing the adaptive behavior necessary for continued longer term well-being. Some organizations therefore establish a direction for information strategy by agreeing a statement of vision. The vision statement gives a sense of coherence to the chosen activities while still giving room for some flexibility, responsiveness, and initiative taking. The framework provided by an expression of shared values "gives people confidence (to experiment, for instance) stemming from stable expectations about what really counts" [13, p.322]. In practice the vision statement is usually accompanied by something less abstract, often a weighty supporting document, expressing in general terms how the vision is to be achieved, namely, a master plan.

Master plan styled strategies emphasize the broad outline at the expense of detail. But it is the details to which individual staff can most easily relate when deciding what to do at a practical level and how to prioritize their work. Statements of strategy expressed in abstract terms are often substantial documents whose inflexible, difficult to maintain form, mirrors the characteristics of what they contain. The strategy, like the document that expresses it, acquires the status of historical curiosity, it becomes an anachronism almost as soon as it is completed[5].

---

[5] At FOE, prior to our involvement, two information strategy planning exercises had resulted in two "strategy documents" of this sort in the preceding five years. A copy of one of them was rendered more useful to us than a

Master plans have the curious effect of suppressing creativity at the same time as lacking sufficient detail to give any specific positive guidance about what to do next. This suggests that it is not detail that oppresses necessarily, perhaps it just depends on what the detail is about. Alexander, working in the context of devising strategy for architectural planning, proposes that detail about what is wrong - in the form of a diagnosis - can be usefully very detailed indeed. Because a diagnosis is concerned with the problems to be addressed, it leaves wide open the scope for imaginative solutions, "with all its detail the diagnosis leaves the people ... <who are proposing actions which will lead to solutions> ... far freer than the master plan, because it fires their imagination, challenges them to invent ways of changing things to repair all the detailed defects of the present" [14, p.157]. Senge suggests that creative tension is the gap between a vision and the truth of current reality [15]. The relationship is what is important. So if our information strategy takes on a form which lets us express vision combined with an accurate picture of current reality - Alexander's diagnostic details - we should be able to give direction, as all strategy must, whilst giving scope for creative responses which fit the organization's changing operating context.

In our project at FOE we are working to create an environment in which an information strategy can emerge and be continually evolved responsively through the informed contributions of many staff. Therefore we keep in mind that the strategy at its operational levels may usefully contain detail expressed so as to result in diagnosis-based action. We need to steer away from expressing strategy in broad outlines using general terms which lack action-inviting details, but at the same time we are aware of the need to provide consistent direction.

Providing Direction

For our information strategy to qualify as a strategy it must offer some order, it must give direction for the organization's growth and change. We looked for a way to do this without incurring the negative aspects of a master plan. Centralized control, operated through a rigid hierarchical framework, produces systems which respond slowly to change and are prone to breakdown once the speed of change exceeds the speed of response. These conditions are handled much more effectively, and more robustly, in systems which are made from components capable of independent evolution which are strongly linked together in ways that can also adapt and change. Our strategy should be of a form that supports de-coupled adaptation and growth. It should be possible to evolve parts of the strategy independently from each other. There should be strong but adaptable links between the components. A strategy which has this form will provide a sort of organic order without imposing reactionary constraints. It is crucially important that the strategy continues to be relevant by adapting to the constantly changing environment in which the organization must operate. Organic order flourishes where individual creative response are encouraged and where the coordination comes from mutual responsibility towards achieving a shared vision [14]. These conditions describe the culture of most third sector organizations like FOE. The information strategy must be able to evolve to cope with the rapidly changing organizational priorities faced by third sector organizations. It must support participation by individuals and groups within the organization as they exercise creativity in finding new work and new ways of working with information. This is essential not only because this is what the organizational culture leads the staff to expect, but also because it is in these abilities that resides the organization's competence to make an impact externally.

Process vs. Product

By referring to the *form* of information strategy in the title of this section of the paper it might appear that we are concentrating on a view of strategy as a product at the expense of the view of it as a process. However, our central concern with the strategy process should be clear from the emphasis we have given to the fundamental need for strategy to be adaptable, to continuously evolve , and why this is crucial for information strategy in particular. Many of Floyd's [16] arguments for a paradigm change in software engineering based on a shift in balance away from a product-oriented perspective towards a process-oriented one can be applied to give insight into the impoverished way the production of information strategy is commonly treated. The failures of many information strategies to be relevant to the working lives of those who should be affected by them are due to the reduction of the strategy process to an occasional flurry of activity in order to produce a strategy document. In our project the collaborative development of the individual prototypes viewed together created the environment for our work on strategy formulation. In the longer term our project is intentionally directed at enabling as many staff as possible to actively collaborate in the strategy process and to do this on a continuous basis.

---

historical curiosity only because it was a draft which had been annotated by hand with comments by a very senior staff member. These comments gave us valuable insights into the relative priorities of the strategic issues dealt with in the document. We learned nothing of interest from the documents themselves.

THE EMERGENT FORMATION OF THE INFORMATION STRATEGY

During the last six months of the project our efforts shifted to the task of devising a way for information strategy to be expressed, monitored and adapted in a way that the organization could sustain. Without losing the holistic view, and the essential link between information strategy and organizational strategy, we worked with staff to identify components of information strategy which will continue to evolve under the ownership of groups of staff who are responsible for, affected by, or interested in each area of strategy. We also established a process whereby these areas can be prioritized and integrated to give an overall view of strategic concerns.

The Information Strategy at FOE

In the work at FOE the main *components* of information strategy which emerged initially were concerned with

- internal communication
- external publishing
- classification
- indexing
- acquisition and storage
- recording
- archiving.

The strategy process and the documentation, which gives those who contribute to any part of it a shared understanding of its current state, are inseparably linked together. Figure 2 gives an overview of how the two relate together. One way in which flexible and adaptable links are realized in the strategy is via the *information groups*. In effect these are the identified stakeholders who have interests one or more of the components. Over thirty information groups are currently defined at FOE. An individual member of staff may belong to any number of information groups. It is also possible to associate the interest of an individual, acting in a particular role in the organization, with a component without the need to form an information group. The links between the information strategy and other strategies, namely the organizational strategy and the IT strategy, are expressed as *general principles*. These principles also capture general information management best practice. They are, effectively, a succinct expression of shared values.

For clarity in figure 2 , *aims*, *processes*, *strategic timescales* and *implementation plans* are shown only once, schematically. One or more instances of each of these exist for each component. It is the linking of components via overlapping information groups which gives the strategy much of its adaptable properties at a high level. Here is where the radical effects of changes in the information

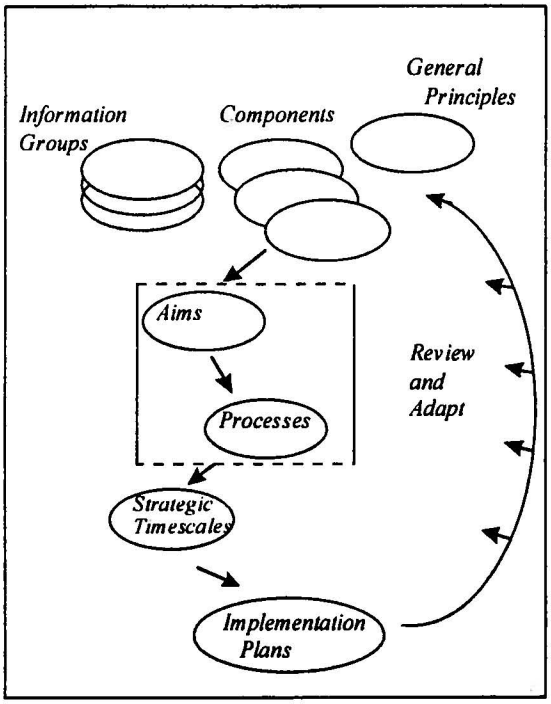

Figure 2. The information strategy.

management environment - coming from shifts in organizational strategy and from innovations in IT - will cause the major strategy changes.

All elements of the strategy are open to revision. Revisions can be determined relatively autonomously. When something with a wider impact arises it is clear where coordination with other parts of the strategy is needed. One way to view the detail of the component strategies as depicted in figure 2 is as a movement from the abstract to the specific. For example, one *aim* associated with the strategy component concerned with classification is to establish and maintain a common set of categories which can be used to classify all research information and to relate the classification to the information's physical location. At a more detailed level an *implementation plan* relating to a short term *strategic timescale* for the *process* of classifying existing material according to classification principles will be traceable to an *information group*, for example the Energy Campaign Team. A process description itemizes each of the tasks associated with it, names staff who have agreed to be responsible for completion of each task and includes other relevant information about each task such as its status, the rationale for who's doing what, notes about what has been agreed, and so on.

Figure 3 shows a simplified example of the documentation linking a set of specific tasks for one process with one of the aims from the classification component. These two

Strategy Component: Classification

Stage: Deriving Processes from Aims

Aim: Establish and maintain a common set of categories by which to classify all research information and determine its location

Processes:

1 Establish classification principles

2 Establish location conventions

3 Classify existing material

4 Map classification to location

5 Identify duplication and ambiguity

6 Refine classification

7 Establish responsibilities in each information group

8 Establish review procedure and times

Strategy Component: Classification

Stage: Pilot Implementation

Information Group: Energy Team

Process: (3) Classify existing material

Task	**Responsibility**
Agree resources	IM Team
Train team classifiers	IM Team
Design classification	Energy Team
Review classification	IM Team
Enter data into s/w	Energy Team
Review progress	IM Team

Figure 3. Linking strategy documents

linked documents are examples corresponding to the area marked out by the dotted lines in figure 2.

The strategy, as a product, exists as a collection of electronic hyper-linked working documents corresponding to the elements shown in figure 2. It is possible, for example, to identify a document showing the processes associated with a specific aim for any specified component of the strategy like the one shown at the top in figure 3.

Movement from top to bottom of figure 2 is also movement from the strategic towards the tactical. Adaptation of the strategy tends to take place most frequently in the implementation plans and so formal review of what is going on and how best to adapt the strategy is more frequent at the detail level just as we would expect. In contrast, at the highest level we expect formal reviews to be taking place in step with the organization's annual strategic planning cycle. By supporting more frequent adaptive iteration as the level of detail increases the strategy does not depend on annual, jerky redirection to correct mismatch between the direction of the expressed information strategy and the direction strategy "ought" to be taking to be responsive to the "real" state of the working environment which is of-course changing continuously.

Evolution and Use

Our prime concern is to support emergent formation of the information strategy through the involvement of whoever has an interest, at any level of detail, in any component of strategy. The documents must *serve* this process and therefore it has not been surprising to find that structure, style and degree of detail varies considerably within the strategy particularly from component to component. At any instant the collection of documents represents the current articulation of the information strategy. The documents have the plastic quality which it has only recently become possible to achieve through the use of Web-based media. This technology also supports the necessary degrees of sharing of information about the strategy among the staff via the organization's Intranet. This sharing is essential to support the high levels of participative involvement in the continuous evolution of the information strategy that we are seeking to maintain. These recent technological developments have therefore allowed us (also) to transform the practices associated with giving form to information strategy as both a process and a product by supporting ways of working which, until very recently, it would not have been possible to imagine.

In the year which has past since the strategy was first put together in the form we have described many developments have taken place which have influenced FOE's information management priorities. Realization of the information strategy and its evolution has not been uniform across all components. This is exactly what we would expect. Components have received attention and resources in line with current organizational priorities. Much activity has centered around internal and external communications and publishing whilst work on classification has progressed very little since an initial pilot project. The major influences on the information strategy at the highest level are organization strategy and IT strategy. The information strategy mostly follows organizational strategic priorities whereas, at FOE, its

relationship with IT strategy is one of mutual interaction. The form of information strategy which is in place does allow flexible response to changes in the environment. What we see is more activity and more rapid iterative review cycles where the need to adapt and make progress has a strong priority at any moment. We also see influences on other areas of the strategy (pressures to adapt) being initiated from areas where most activity is going on via the adaptable links between the strategy components. More effects of these kinds are seen at the tactical levels, this is something we would also expect.

From the point of view of the information strategy per se, the senior staff member with overall responsibility for information management uses the strategy in two ways. Firstly, it is used as a point of reference, to give a shared context in progress meetings, resource allocation, and agreeing priorities about what needs to be done. Secondly, the collection of strategy documentation is used as authority for resources and justification of activities.

About half of the prototypes developed with staff during the project have been scaled up and are in regular use in regional offices as well as at FOE headquarters. Some of the remainder are awaiting the resources needed to make them robust and fully operational. A few others are still used on an unofficial basis by enthusiastic individuals.

We are not able to give a quantitative evaluation of the difference that the experiences of co-designing the prototypes has made to the ability of staff to participate in strategy formulation. The results of this kind of work are qualitative are therefore essentially experienced. We have plenty of personal testimonies. Our most concrete result is the strategy itself. To create it, and to sustain it as something viable and capable of adaptation, requires continuous input of enthusiasm and effort by the staff at FOE. Anyone who has worked with staff from a campaigning organization knows how acutely consciously they balance competing, pressing claims for their work energies. So far the staff at FOE continue to believe that the information strategy is worthy of their attention. It remains to be seen whether this continues to be the case.

CONCLUDING COMMENTS

This work was our first attempt to test out in practice the idea that, given the right experiences through which to develop their understanding, a significant number of staff could contribute in an informed way to the development and continued evolution of an information strategy suitable for their own organizational setting. We could not have had a more favorable situation in which to try to do this. The ethos of the organization we have worked with, the motivation of the staff, and their unusually sophisticated level of understanding about what is strategic has made all the difference to what has been achieved so far. We have found that in other organizations, ones which are bigger, or which are less open to radical ideas, or where there is no culture of staff involvement in important decision making that it is very difficult to make a significant impact quickly with the approach we have described here.

Situations where there is a great deal of change can be turned to advantage rather than presenting objections and barriers provided the changes are addressed as opportunities for positively constructive interventions. We have to admit that the improvement to the technical infrastructure that was going on during the project contributed a great deal of enthusiasm for developing applications to exploit it. This gave us more opportunities to develop prototype systems with many different groups and thus to increase the impact of our work. One senior staff member estimated that developments which were in one way or another attributable to the project had impacted on about 60% of the headquarters staff within the first six months of our starting work. Much of this coverage was due to judicious exploitation on our part of internal activities and external campaigning events that were going on anyway.

The project was actively supported at the highest level in the organization and it is quite clear that this was a tremendously important factor eventually in getting the higher level decisions we needed once we had a good ground swell of operational level supporters. The central importance of information to the organization's "business" gave information strategy a chance of being more center stage than it still is in many organizations.

On a more controversial note, two factors have helped immensely. The first is our conviction that information strategy which is manifested as a brief flurry of activity resulting in a large and unwieldy management report labeled "Information Strategy" has little real impact in most organizations. The second is that most of the staff were more than satisfied in the short term by the prototypes they had constructed with us, and appreciated the knowledge of longer term value to their work that this experience had given them. Our funding was for technology transfer which was achieved by the development of the prototypes and by some of the infrastructure work of our other colleagues from UCL which we have not discussed here. Because of these two factors our attempt to create an environment for information strategy formation was low risk. This is a situation we would recommend to others as progress is not always very tangible in any narrowly defined sense. For example we cannot quantify the differences participation in prototype development made to those who collaborated with us although we can point to quantifiable benefits achieved in each case for the organization from the

information systems developed.

Our formally funded project is now completed but our links remain very strong. During the project one of us (Gould), although employed by the University, worked at Friends of the Earth headquarters on a full time basis. He is now employed there in a permanent post. This gives us ideal access to follow up the evolution of the strategy over an extended period of time. We are also actively following up a number of issues. One is to investigate some of the known negative side effects of developing prototypes (for example the building up of expectations which cannot be followed through) to see what consequential effects they may have on participation in strategy formation. We are also applying the experience we have gained from this work in further collaborations with different sorts of organizations to test our approach in a broader range of environments.

ACKNOWLEDGEMENTS

This work was funded by the Department of Trade and Industry, U.K. and Friends of the Earth Limited. We wish to acknowledge the help of many of the staff at Friends of the Earth whose cooperation made this work possible. In particular, for their formal support of the project, we thank Charles Secrett, Richard Weatherley, Athena Lamnisos, Tony Yates, Mike Walton, and Blake Lee-Harwood. We also acknowledge the work of our colleagues at UCL, Chris Clack and Peter Lidwell, whose work on IT infrastructure was fundamental to the work described here.

REFERENCES

1. Mintzberg,H., Quinn,J.B. and Ghoshal,S. *The Strategy Process* (European edition) Prentice Hall, 1995.

2. Argyris, C. and Schön, D.A. *Organizational Learning II Theory, Method, and Practice* Addison Wesley, 1996.

3. Bødker, S. and Grønbæk, K. Design in Action: From Prototyping by Demonstration to Co-operative Prototyping in *Designing Work Co-operative Design of Computer Systems* J.Greenbaum and M.Kyng (eds.) Lawrence Erlbaum Associates, 1991, 197-218.

4. Kyng,M. Design for Co-operation: Co-operating in Design *Communications of the A.C.M.* 34, 12, December 1991, 65-73.

5. Sachs,P. Transforming Work: Collaboration, Learning, Design *Communications of the A.C.M.* 38, 9, September 1995, 36-44.

6. Hudson, M. *Managing Without Profit The Art of Managing Third Sector Organizations* Penguin Books, 1995.

7. McDonnell,J.T. and Pipes,S. Interactive Pollution Mapping on the Internet: Making Sense of Environmental Information *10th International Conference of Women Engineers and Scientists*, Budapest, Hungary, 1996, 139-144.

8. Bødker, S., Grønbæk, K. and Kyng,M. Co-operative Design: Techniques and Experiences from the Scandinavian Scene in D.Schuler and A.Namioka. (eds.) *Participatory Design: Principles and Practices* Lawrence Erlbaum Associates, 1993, 157-175.

9. Huber,G.P. A Theory of the Effects of Advanced Information Technology in Organizational Design, Intelligence and Decision Making in *Organizations and Communications Technology* J.Fulk & C.Steinfield (eds.), Sage Publications, 1991, 237-274.

10. Angell,I.O. and Smithson,S. *Information Systems Management* Macmillan, 1991.

11. Rowley,J. *Strategic Management Information Systems and Techniques* Blackwells, 1994.

12. Garvin,D.A. Building a Learning Organization *Harvard Business Review*, July-August 1993, 78-91.

13. Peters,T.J. and Waterman, R.H. *In Search of Excellence* Warner Books 1982.

14. Alexander,C., Silverstein,M., Angel,S., Ishikawa,S. and Abrams,D. *The Oregon Experiment* Oxford University Press, 1975.

15. Senge,P.M. *The Fifth Discipline The Art and Practice of the Learning Organization*, Doubleday, 1990.

16. Floyd,C. Outline of a Paradigm Change in Software Engineering in G.Bjerknes, P.Ehn, and M.Kyng (eds.) *Computers and Democracy A Scandinavian Challenge* Avebury, 1987, 193-210.