Changing Libraries: Facilitating Self-Reflection and Action Research on Organizational Change in Academic Libraries

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Visualization and mapping techniques can build a dynamic picture of information practices, including action research, within libraries, raising awareness of how the information landscape at each library may both support and retard research into the library's information practices. These techniques have implications for researchers as they generate richer data than interview or survey techniques, or methods that only take one "snapshot" of the state of practice. The data are also available to participants immediately, thus, allow for co-operative inquiry to take place in the library. Examples are offered from a project under way in two Norwegian academic libraries.

KEYWORDS collaboration, human resources, library staff development, management

INTRODUCTION

Action research (AR) is the theme of the special issue to which this article is a contribution. Levin and Greenwood (2001) believe AR is "the way to conduct research that is epistemologically sound and socially valuable" (103). It is inherently transformative, seeking to investigate practice from within, and change it if necessary.

Practice—more generally, behavior—is a function of both individual personality and the surrounding environment. In essence, this is Lewin's field theory (1951; Pasmore 2001, 39). This environment contains resources, drawn on by professionals as they undertake their practice, and dynamically reworked as a result, through subsequent self-reflection and learning. In short, the available resources are continually shaped by AR.

Practice unfolds at the intersection of many environments, including the personal and professional networks that extend beyond the workplace. But the focus of transformation, for the purposes of this special issue, is the workplace that is the academic library. To understand how AR unfolds, and appreciate a particular context's capacity for promoting and sustaining it, one must do more than declare that this socially valuable form of research is required, and expect changed practice to follow,. One must also analyze how the workplace environment may support, but also potentially retard, AR (cf. Whitworth 2014). The results of this inquiry can then be applied (via further AR) to optimizing the environment for learning, a task undertaken by the communities of practice embedded within, and continually creating, the workplace environment (Wenger 1998; Wenger, White, and Smith 2009).

This article discusses the first phases of a research project, *Bibliotek i Endring* (BiE; translated from Norwegian this means "Changing Libraries"), funded by the Norwegian National Library. BiE is a study of two academic libraries, each undergoing significant changes. The study uses a methodology that is sensitive to the nature of practice and facilitates self-reflection and action research in its participants, focused on learning about the changes that the libraries face, while generating data for analysis by the project team. Thus, it is an example of *cooperative inquiry* of the sort called for by Heron and Reason (2001), having involved significant contributions from the management and staff of the libraries being studied and from academic research communities beyond library and information science.

In this article we focus on methodological aspects of the BiE study and explore its design, particularly the notion of *mapping* the work-place environment, and the contribution this makes to the broader research endeavor of understanding, and undertaking, AR within the academic library.

LITERATURE REVIEW: STUDYING CHANGING PRACTICES

The library profession is in need of research (including AR) into organizational change that is sensitive to the nature of practice, and how practices are *collectively* developed within the library as an information landscape (Lloyd 2010). AR is an *information* practice, and Hultgren writes that (2009): "The concept of information practices can be used to identify and define sets of information related activities and procedures that are created collectively. They can be described as socially sanctioned and structured tools which social groups use to monitor their worlds" (45). And "the relevance of in- formation to human endeavor... [is] dynamic and contextual, and the value of its 'aboutness' is determined through social interaction" (Hultgren 2009, 56). Thus, organizational learning and transformation are invariably *socially situated* practices, dependent on an understanding of the resources available in the local context. Developing this kind of understanding is fundamental to AR, and a product of AR.

However, this collectivist, bottom-up and dynamic view of professional development and organizational learning in libraries is not commonplace in the literature. Many studies of libraries' working practice take a top-down approach, oriented towards the development of training. Librarians are to be directed toward goals that have been set outside the community of practice. For example, Spacey, Goulding, and Murray (2003) discuss staff development, but their position is that in the face of change, "staff need training" and should resistance to change exist or emerge, this "is just something managers have to learn to overcome" (61). Yet, as noted, learning about and transforming practice rests on understanding the resources available to make any desired changes. This process is essential if changes are to be enacted, not just by a manager but by any organizational stakeholder. Spacey et al.'s lack of attention to this suggests their methodology is not attentive to the informal, but essential, role played by communities of practice. To dismiss this as something that managers should learn to overcome neglects the potential value of the resources generated in this way.

Many studies of academic library practice rely on survey and interview methods (e.g., Mphidi and Snyman 2004; Youngok and Rasmussen 2006). A survey or interview can gather useful data, of course, but by definition cannot investigate *actual* practice, only informants' *reporting* of that practice.

Pinfield (2001) discusses changing roles, specifically those of subject librarians, and does refer to their role as, in part, involving their organizing information landscapes. But his article is a guidance document rather than a study. It offers anecdotal evidence from two UK academic libraries but otherwise does not report on empirical research and offers no underlying theoretical framework. Doskatsch (2007) provides a detailed description of changes faced by an Australian

academic library over time; but it is just a single case study, again not set into a theoretical framework or organized methodology. Nevertheless, it shows the depth of understanding of a con- text that can be achieved. Stephens and Cheetham (2011) is a good recent study that addresses broader issues of learning, change and professional development, viewing change and the need for it from a bottom-up, and network-based perspective, but it remains based on a survey and focus group interview methodology. Thus, practices are self-reported by participants, rather than being observed or assessed in context. In addition, like the aforementioned studies, Stephens and Cheetham take a snapshot of the situation rather than gathering data over a period and allowing change to be seen and analyzed.

Turning to literature written regarding professional and workplace learning outside the library sector, insights can be drawn from studies of activities that: "are socially and culturally embedded... learned through interactions with others and... used not only to generate information relevant to the actor's situation but also as a means of orienting in the world, gaining control over one's life and to demonstrate one's position in the world" (Hultgren 2009, 54). These kinds of practices are not just enacted in response to stimuli, such as a demand made by a superior or other clearly identifiable information need, but can also be emergent (cf. Garnett and Ecclesfield 2008), driven by communities of practice, and inherently social.

Cheetham and Chivers (2001) reviewed how diverse professional groups learned informally and influenced practice as a result. They noted the importance of mentoring, learning through teaching others, and learning from clients and customers as well as colleagues. These social interactions needed to take place within an environment that offered "stretching and challenging opportunities" (275), but with adequate support.

This is the domain of *networked learning*, and requires attention to informational resources that are more tacit and exist within the heads of colleagues, rather than explicit and coded into texts such as procedures, reports, and job descriptions. One's location within a social network becomes a resource in its own right: "network members who communicate about informal practice, and know who knows what, exert more social influence than others ... ." (Kleinnijenhuis et al. 2011, 587). One's value to others is, therefore, at least in part, based on others' *perception* of that value. For example, a particular person may be perceived as "good with computers," thus, a first stop for colleagues trying to fulfil an information need, regardless of their actual role and possibly their self-perception (their status becomes a *personal construct* [cf. Kelly 1963; Fransella and Dalton 2000]). Perception of the shape of a social network, and associated information landscapes, will differ from the formal organizational structure. This formalized structure is epitomized by the organizational chart, a representation of chains of command and hierarchy. But information systems designed to fit this hierarchical perception of the

organization may not conform to the perceptions of those actually engaged in work (Pasmore 2001), leading to phenomena such as information anxiety (Kuhlthau 1993), the "subversion" of official procedure in favor of locally developed ways of working (Whitworth and Benson 2014; Wenger 1998), and general difficulties with organizational learning (Blaug 2007).

At the same time, "people's group relations... [serve] as both limitations and opportunities for their actions.. ." (Scott 2000, 9). For instance, Newcomb (1953) noted a tendency for people who are socially close to one another to adopt similar perspectives on events. This can save cognitive work and conflict, but also lead to alternative perspectives being discounted.

Although the advent of social media and similar tools for knowledge management have expanded the notion of "space" and "place," physical location is still a significant influence in information seeking and practice (Hultgren 2009, 243). Tagliaventi and Mattarelli (2006) studied practices in a hospital's oncology unit over a period of time, and noted that different stakeholder groups within the unit— doctors, nurses, technicians, patients etc.—were more likely to share knowledge, and thus develop common perspectives on practice, when spaces existed wherein different groups interacted face-to-face. Tagliaventi and Mattarelli termed this sharing of space *operational proximity.* These spaces included treatment and equipment rooms, but also staff canteens and coffee rooms (hence Waring and Bishop's (2010) "water cooler learning"). In this informal arena, an essential part of the learning infrastructure, micro-moments of learning (Whitworth and Benson 2014) can take place, insights be shared and reflected upon.

Tagliaventi and Mattarelli (2006) noted that the exchange of information across group boundaries required more than the simple existence of a proximal relationship. Returning to the landscape metaphor, these are the regions where the terrain shifts in particular ways. Sometimes the transition is gradual, but in places—such as a sea cliff—the boundary can be very marked. These kinds of boundaries between communities are necessary, permitting the level of specialization required for organizations to functionally operate. But they are also points at which changed perceptions may be required to navigate the landscape:

> The boundaries between communities of practice represent, on the one hand, a barrier between different sets of practice and, on the other, an opportunity for cross-fertilisation and for the discovery of different per- spectives (Engestrom & Middleton, 1996). ... Being able to understand how the knowledge from a different community fits within the context of one's own work requires a process of transformation – not merely of transfer – between communities (Bechky, 2003), or the formation of a common discursive community above and beyond a single community (Gherardi & Nicolini, 2000) .... (Tagliaventi and Mattarelli 2006, 295 [citations in the original])

Oborn and Dawson (2010) noted that: "learning across communities of practice in multidisciplinary contexts emphasizes key boundary processes to negotiate and broaden meaning. As such, multidisciplinary collaboration is not so much to learn *from* each others' talk, but to learn *to* talk in this new arena" (843).

So what allows for the development of shared practices across groups, rather than a series of isolated repertoires? Tagliaventi and Mattarelli (2006) concluded that various factors came into play:

• Physical co-location (operational proximity);
• shared professional values and perspectives on the unit as a whole;
• certain individuals, whether individual team members or others (such as clients— even particular machines or technologies) acting as "brokers" or "boundary objects";
• "organizational citizenship behavior," that is, a willingness to perform tasks that "go beyond their formal duty" (Tagliaventi and Mattarelli 2006, 311), which "offsets rigid divisions of labor" (Tagliaventi and Mattarelli 2006, 312).

Ultimately :

> Knowledge flows between different groups do not occur fortuitously or homogeneously, but systematically avail themselves of specific actors who act as brokers due to an intense sharing of spaces and activities rather than their own intensity of participation in networks of practice. On the other hand, relations with networks of practice are of crucial importance for confronting and developing knowledge in organisations. It is not sufficient that management promotes the participation of individual actors in the activities of their own networks of practice through financial support for subscriptions to workshops, training courses, magazines, etc. In order for knowledge exchanged in networks to spread within an organisation, operational proximity is necessary. Institutionally planned opportunities for exchange, such as meetings and reports, may not be enough. Organisational design should promote as much operational proximity as possible to create the opportunity for a continuous, intense knowledge flow. (Tagliaventi and Mattarelli 2006, 314–15)

The last two sentences invoke the cognitive difference (cf. Blaug 2007) between the relations implied in the formal map of the workplace and the informal one, formed of interlocking communities and networks of practice. How, then, can an academic library draw on the latter to create an environment that optimizes this "continuous, intense knowledge flow"'?

In summary, an understanding of organizational learning within the academic library requires research that is sensitive to informal and everyday practices; to changes over time; and to social relationships that

exist within the workplace that is being studied. This applies both to research that takes place *on* the library, using it (and its librarians) as a subject for research, but also to research that takes place within the library, that is, action research. These have all contributed to the methodology of the BiE project.

Mapping the Landscape: The Research Design of the BiE Project

Our ontological position is that the academic library, as a workplace, is a lived experience, continually constructed by the perceptions and practices of the individuals operating within it. Our epistemology declares it possible to develop knowledge about the organization through revealing these perceptions and practices and how they are communicated and exchanged. This kind of knowledge can be developed both by the research team, standing (formally and methodologically) outside the library; but also developed within the networks of practice that are co-participants in the research. The prime motivation for the project was to facilitate the understanding of change in the workplace among academic librarians, and to explore the techniques that can be used to this end in a professional development setting, recognizing the need to address questions of individual and group psychology when investigating organizational change.

The relationships and informational exchanges within a landscape may be explicit, and relatively formal; for example, one person may be formally placed in a position subordinate or superior to another, or have a job description that is written down, or prioritize the allocation of resources based on principles encoded into a formal strategy statement. However, many such relationships can also be understood as *personal constructs* (Kelly 1963). Individuals tend to construe personal and subjective positions on questions of information exchange, such as who are the significant and credible sources of information in a person's environment, who has a close working relation- ship with the person, who is more distant, what informal spaces exist for communication, and what is appropriate or valid, to communicate within these spaces. Other issues such as perceptions of job security, work/life balance, prior experience, and education also form constructs that shape a person's practice. Yet these are often the hardest elements of an informational landscape to reveal, as they are, by definition, tacitly held (Fransella and Dalton 2000). Therefore, to understand transformation within these contexts, we must look at more than just the *objective, generic* "storage of individual knowledge in organizational structure and routines..."; we must also con- sider *subjective and personal* factors along with the "context-specific" and *intersubjective* or "non-individual knowledge that resides in social relations" (Tagliaventi and Mattarelli 2006, 293). This permits a holistic understanding of how practices interact and how selections and prioritizations are made between them, as they are *validated and valued* in different ways depending on

one's location within the academic library, or the wider institution.

BiE's research questions therefore include: Whose constructs influence whose practices, and how? What needs to be done to maintain an environment in which knowledge formation is distributed among library staff rather than centralized, or taken out of the library altogether? What are the locations of *authority* within the network: is authority centralized or distributed? What are the sources of *innovation* (who are the individuals with the particular combination of personal constructs and locations within social networks who may be the sources of innovation? Do the necessary "weak ties" (Granovetter 1973) exist within the network to allow transformations to be shared between communities of practice, as well as just within them? Where are the boundaries between different communities; around what do these boundaries become defined; and how do these boundaries— intangible but real structures within the libraries—influence the processes of learning and transformation?

The longer term aim of the project is to observe how these networks change over time, using the data to help participants make specific interventions and reviewing the outcome. Thus, the project itself becomes a learning space for the communities of practice within the participating libraries.

Both case studies, A and B, are libraries currently facing significant changes that must be learned about and responded to by the staff. A's host institution is reorganizing five campuses into two and seeking a change of status (securing the right to award research degrees). Case B underwent similar changes five years ago, and though it began the project with a more stable outlook, almost immediately the library director announced his retirement. The library is therefore entering a new period of transition.

Data collection techniques aimed to raise the awareness of researchers and participants regarding the present and evolving state of both libraries. This raising of awareness is an important element of AR. To some extent information seeking itself is an activity "focused on discovering, or becoming aware of, the context in which the individual is embedded and how the system of categories that describes it works" (Hultgren 2009, 76). However, if information-seeking is to contribute not only to learning, but transformation, there needs to be a way to build on this raised awareness. And: "Reflection on the motives for, and meaning of our activities occurs only if the actor sees pragmatic reasons for doing so; otherwise our activities tend to be a 'matter of course' and a part of the 'natural attitude'—things we do without paying much attention to the actual 'doing' and of which information seeking is a case in point. Reflection is a choice one makes, a kind of stepping aside for a moment in order to articulate knowledge of the social context of our activities, even if it is only to oneself" (Hultgren 2009, 85).

BiE therefore sought to generate data about the libraries' learning resources without a separation between researchers and researched, but through collaboration that was sensitive to the dynamics of each context. The data could be analyzed by the project team, but would also be immediately available to the librarians, allowing for reflection, and subsequent work to optimize the learning environments in which they were located. BiE sought to *map* the information landscapes of the two libraries. Maps of physical landscapes use a variety of techniques to reduce complex, three-dimensional space to a two-dimensional representation of that space, into which will be embedded various forms of information, depending on the purpose of the map and its intended audience. Maps of landscapes for hikers, for example, contain different information and use different technical devices to represent it than a map of the same place aimed at drivers or geologists. All maps approximate and simplify, rely on agreed conventions, but a good map nevertheless allows landscape features to be established on the ground, often at fine detail. Certain aspects of the landscape can then be focused on, or explored in detail, with avenues of exploration suggested by the map (Wandersee 1990). Maps can also record change in a landscape.

When drawing a map of an information landscape (cf. Wandersee 1990), one can use techniques collectively known as *concept mapping* (Novak 2010). Despite the fact that the source material—the information landscape—is intangible, maps of this space follow the same principles as just described. They use particular techniques of representation; they cannot depict everything in a space, but must be selective; they are created for particular audiences; and they can be records of change in a landscape and contain various forms of data, including quantitative, qualitative, and relational.

Hultgren (2009) studied how school-leavers in Sweden learned about their opportunities for employment or further study, and among her methods she asked her participants to draw a map of their information "horizon" (2009, especially 101–02, and the maps on 300–05). This generated data for her study, allowing a comparison between participants' different maps and, as she undertook the process both at the beginning of her study and also later on for each participant, change could be seen in the map. She also hoped that "other perspectives or details would come to light through the drawing of information horizons; that participants would be stimulated to further reflection on changes that occurred over time and the relations between sources" (102). However, Hultgren's study was interested only in individuals, and, thus, there was no reason for her to amalgamate her participants' maps.

BiE has used mapping in two different but interrelated ways. In phase 1 we asked participants to visualize their close working relationships, generating data from which we drew maps of the social networks in the two libraries (or "sociograms"—see the following examples). These were presented back to participants for member checking and validation in phase 2. Then, in phase 3—which at the time of writing (February 2014) is still ongoing—participants generated concept maps of their information land-scape, to observe and record

changes in these resources over time. These phases, and insights that emerged from them, are described in more detail in the following sections.

The project has involved the active participation of 12 participants at case study library A and 15 at library B. Both samples represent approximately 60% of each library's full-time employees, drawn from a range of roles including those responsible for collections, digital resources, information literacy education, user service, research support, and management. Social network analysis is more sensitive than other methods to sampling issues (Scott 2000, 60). As the data are relational, omitting 40% of the population will omit 40% of the possible data (Burt 1983). We, therefore, extrapolated from interviews by recording how non-interviewees were mentioned and including them on some sociograms, but in a different format (see the following sections). The validity of our conclusions from phase 1 was then tested in phase 2 of the research, at a mini-conference held at institution A at which member-checking took place, with the sociograms and other observations presented to the co-participants for discussion and deliberation.

All institutional and personal names have been anonymized. The project methodology was approved by the ethics committees of all involved institutions, and participants were always given the option to withdraw from the data gathering process.

Phases 1 and 2: Mapping Social Networks and Operational Proximity

Phase 1 aimed at mapping the state of the social networks within each library, as they stood at the start of the cooperative data generation process. This kind of mapping, as with maps of real landscapes (drawn using the principles of Euclidian geometry), can be used to note not just the existence of a relationship between two nodes in a network, but also a sense of the proximity or closeness of that relationship (Scott 2000, 148–49).

Phase 1 involved a two-part data generation session with each individual participant. The first part consisted of interview questions designed to elicit perceptions of their role; responsibilities; core values; opportunities for learning; and possibilities for transforming practice (see Appendix 1). In the second part, the interviewee took part in a facilitated visualization session. Each was asked to draw a map of their working relationships. The interviewer offered prompts when these had already been suggested by interviewees in the first part, but otherwise the interviewee was free to draw this map how they chose. The process stopped only when the interviewee stated they had nothing else to add to the map. The interviewee was asked to think aloud while drawing the map and their observations were recorded. The interviewer may also have recorded comments to help establish aspects of map creation that

would not have been clear from the recording alone: noting, for example, what the interviewee was drawing at a particular point if he/she was not making comments, or asking for clarification and expansion of what the interviewee meant when they, say, added a symbol to indicate something on the map.
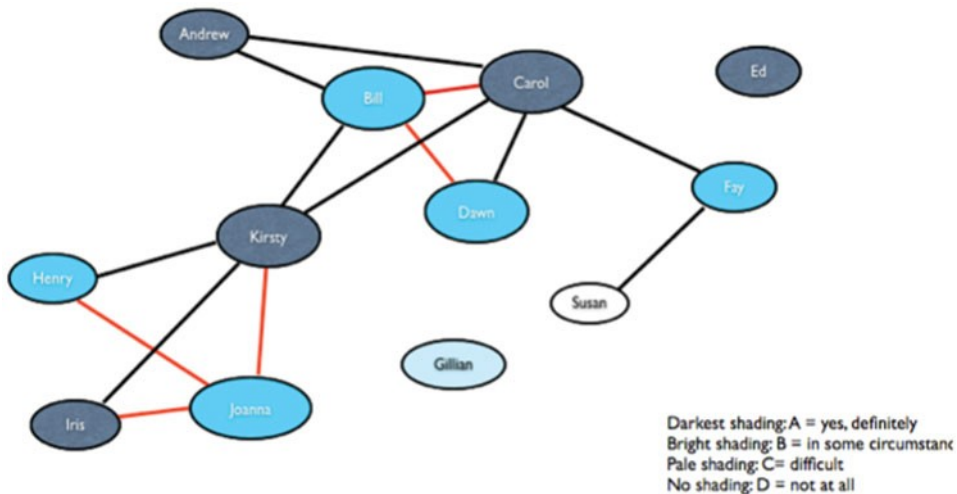

Darkest shading: A = yes, definitely
Bright shading: B = in some circumstanc
Pale shading: C= difficult
No shading: D = not at all

FIGURE 1A Very strong and strong links, library A.

The project team annotated digital copies of these maps, recording the order in which the interviewee had drawn members of their network. We used this as a measure of operational proximity. Recordings of informants' thinking aloud supported this view, in that those drawn first on a given map were often described as colleagues with whom the interviewee had a particularly close relationship, sometimes because of line management but also because of co-location ("they have the office next to me": "we have lunch together most days"; both quotes from informants). A scoring system was developed through which the individual maps could be amalgamated into a composite map of the social networks at both locations, one that would then reflect not just the presence or absence of a relationship between two employees, but its proximity (cf. Scott 2000, 157). A total of 10 points were allocated to the connection drawn first by each interviewee; 7 points for each drawn second; and then 4 points, 2 points, and 1 point for all remaining connections. These data were then processed into sociograms by the social network analysis program, UNICET. (We would like to thank Professor Martin Everett of the University of Manchester who gave generously of his time to help with this task.)

As with all maps, decisions must be taken about what to include on the map and what to omit. The first sociograms presented show the strongest links at each location. Those that scored 10 or more are in red, and those that scored 7 or more are in black (see Figure 1A and Figure 1B).
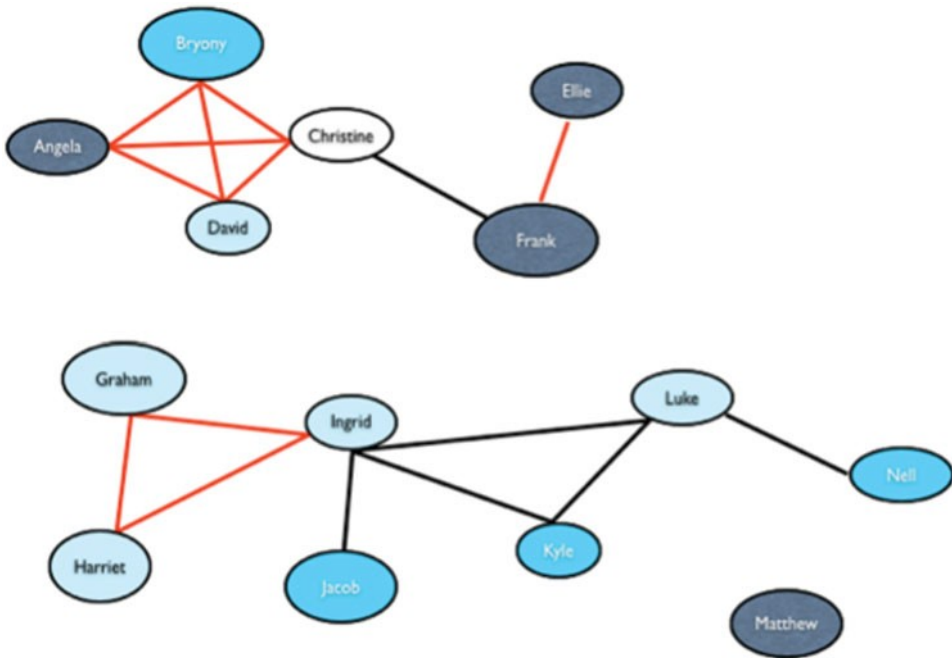

FIGURE 1B Very strong and strong links, library B.

The most obvious characteristic is that the network at library B has two distinct clusters. The very strongly connected cluster of four B employees (Angela, Bryony, Christine, and David) at the top left are the Research and Publication group. Ellie and Frank, also very strongly connected, are the Web and Marketing group and both groups are strongly connected through Frank and Christine. The Library Directors group to the bottom left, with Ingrid, Graham, and Harriet very strongly connected, are linked to the User Services group, but not the other cluster. Matthew is an isolated node: he works in a branch of the library that is physically distant from the main campus libraries, and sees his primary contacts as all residing there instead of elsewhere in the library.

Library A also has isolates, though in Gillian's case this is because (as she recognized in her interview) she had only just begun work there. Isolated nodes are not rendered incommunicado—weaker links, not shown on these diagrams, still connect them to others—but the sociograms illustrate the *relative* isolation of these particular team members.

Discounting these isolates Library A's remaining interviewees formed one connected cluster, with Kirsty being a particularly important node connecting the Library Directors group (at the bottom of the sociogram) and the Research and Teaching groups (at the top).

We cross-referenced these maps with data from the interviews (see Appendix 1) on how they perceived their ability to change their practices and those of others. We classified their view into one of four categories: A, definitely can make changes; B, can make them in certain circumstances; C, difficult to enact change; D, no possibility of enacting change.
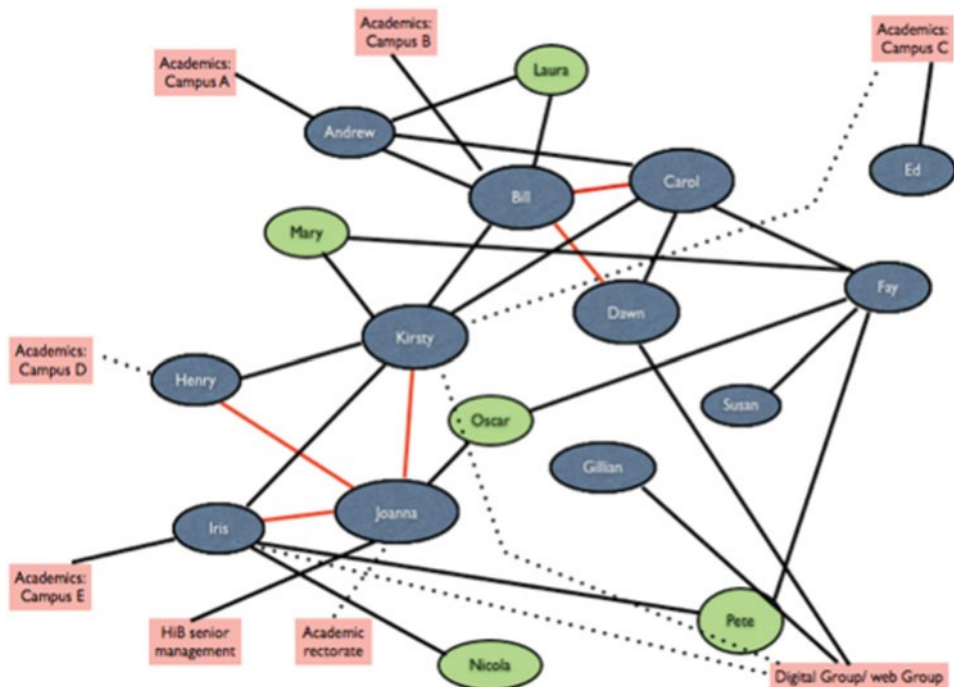

FIGURE 2A All named links, library A.

The blue shading on these sociograms is used to illustrate these categories (see key on Figure 1A). Generally, the employees of library A are more confident of their ability to enact change than those of library B, though here the two members of the small Web and Marketing group are an exception as is the isolated Matthew. Interestingly, Ed in institution A, who is also isolated, is confident about his ability to change his practice and those of others (in his case, associated academics: see the following sociograms). Isolation may therefore also reflect a sense of autonomy and independence. Institution B's management group felt pessimistic about their ability to change practice, which may come to be significant in phase 3 of the project.

The first two sociograms showed only links between interviewees, but we also drew sociograms of all described relationships, including those with non-interviewees within the library (shown in green on Figure 2A and Figure 2B) and other external stakeholders, such as academics, managers, and suppliers (pink boxes). These sociograms best reveal operational proximity, particularly in library A. This library is currently distributed among five different campuses around the city. At each location in A, a librarian had a strong link with an academic on that
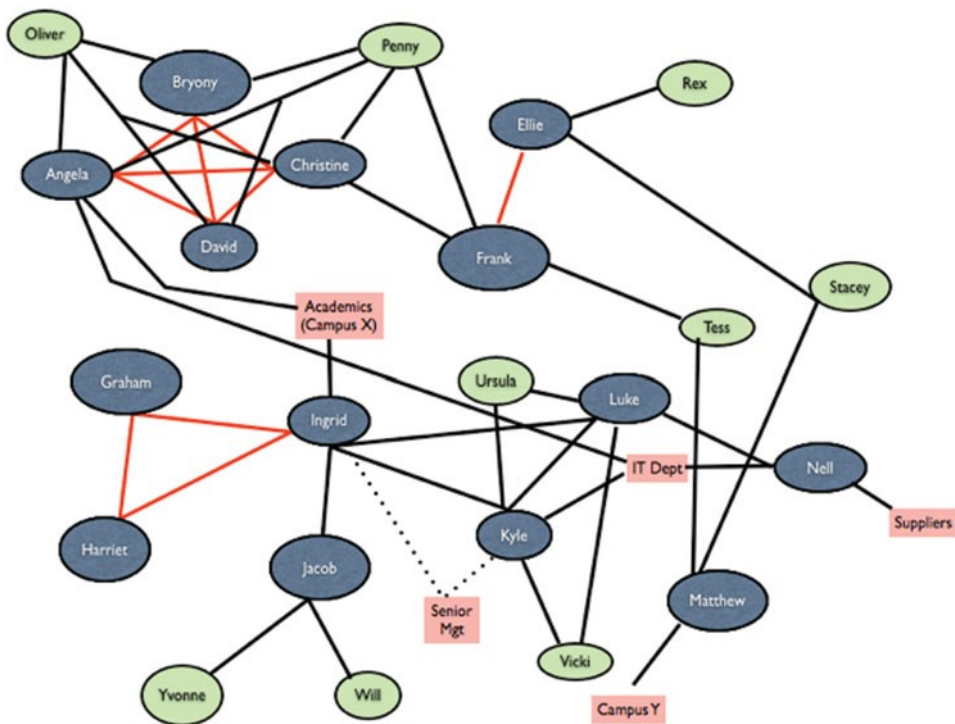

FIGURE 2B All named links, library B.

campus due to operational proximity, including having offices next to each other and sharing tables at lunch (lunch learning being a nod to water cooler learning, mentioned earlier). Our data showed that in each case the link is between a librarian and *one* academic colleague. What then will happen when this institution reorganizes its campuses from five into two, in summer 2014? Will it be possible to retain these links—do physical spaces need creating in the new library which compensate for the loss of the smaller, individual campuses? This is a learning issue for all concerned.

Sociograms are one way of representing resources in a network: "The pattern of components found in a graph—their number and size—can... be taken as an indication of the opportunities and obstacles to communication or the transfer of resources in the associated network" (Scott 2000, 102). UCINET, or similar programs, can analyze these relationships mathematically, and it should be remembered that the sociograms above should not have their interpretation swayed by the proximity of nodes on the page. In the diagrams which follow, nodes have been moved from the patterns presented earlier. The earlier diagrams were Power Point adaptations of the original UCINET diagrams, done in order to add other information (color and shading): but in the remaining diagrams this extra information is not needed, and, therefore, the original UCINET diagrams are used.
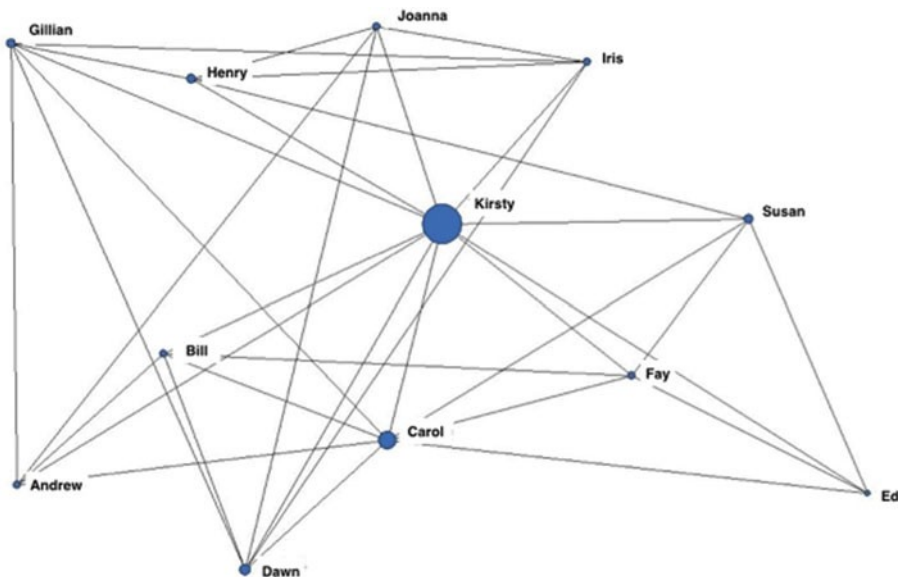

FIGURE 3A Centrality sociogram, library A.

Figure 3A and Figure 3B are representations of the *centrality* of these networks. This applies in two ways; first, "local centrality," where an individual has a large number of connections, and "global centrality," where an individual occupies a position of significance in the network as a whole (Scott 2000, 82). The size of the nodes, generated automatically by UCINET, reflects the relative centrality of each
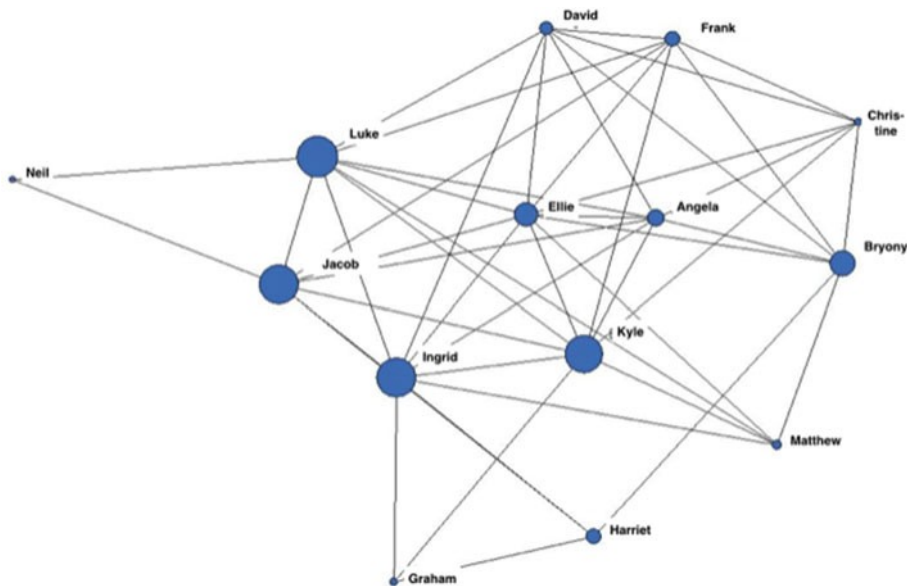

FIGURE 3B Centrality sociogram, library B.

individual. It can be seen that case A has one very central individual, Kirsty, whereas case B has a group playing this central role. Kirsty plays a very central role in library A, and shows once again that she brings together two clusters, a role not clearly filled by anyone in case B. This explains the differences between the earlier diagrams, and the separation of two clusters in case B. Kirsty would be expected to play a key role in disseminating changes in practice, and the insights of AR, across the whole of library A, information exchanges that might turn out to be more difficult in library B.
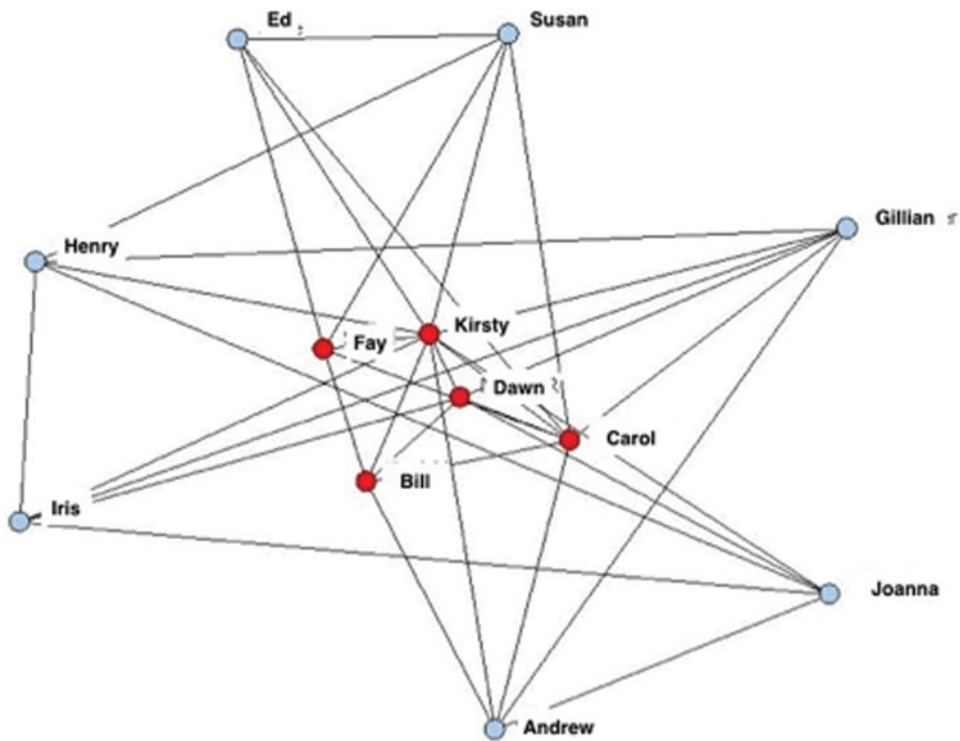
FIGURE 4A Core/periphery structure, library A.

The final pair of sociograms (Figures 4A and 4B) measures the strength of the core/periphery structure in each location. A classic example of a core/periphery structure comes with measurements of journal cross-citations. Articles in what are considered the top journals in any field will cite other top journals; peripheral journals cite the top journals, but not each other. In other words, members of the core interact with members of the core; peripheral members interact with members of the core, but not usually with each other.

Location A has a less well-defined core than location B. More of the periphery is in contact with each other. Relative to the other group this suggests that location B's periphery is disempowered, whereas A is a more distributed authority.

Once the maps are drawn, what then? Scott (2000, 32) makes the point that these illustrations must not lead to a dead end, becoming just a theory, or an attractive pattern. What are the implications of these analyses? How can the identified social network be used as the basis for further study, and not just a set of data points, without application?
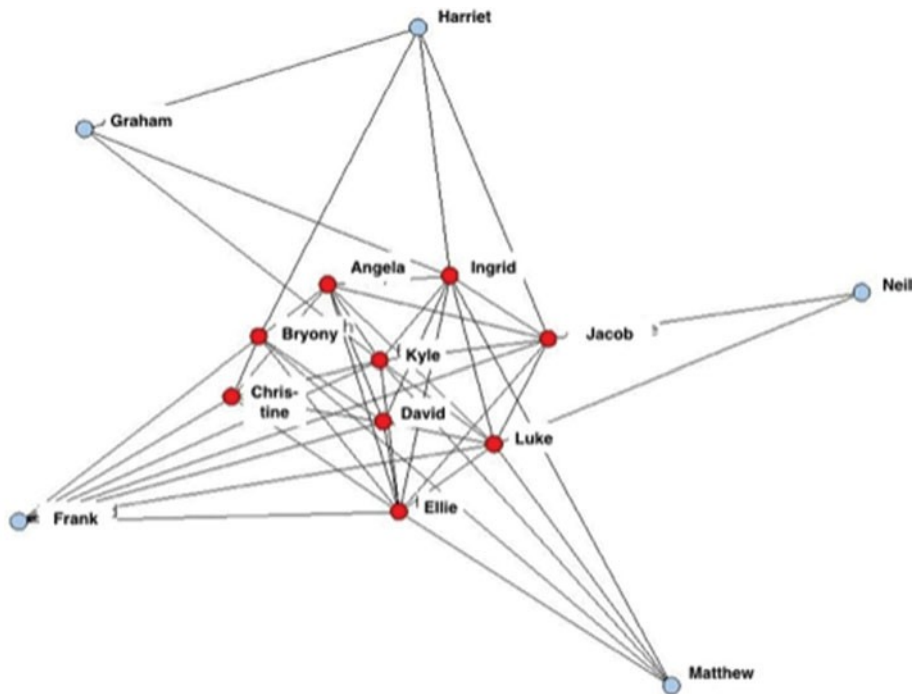
FIGURE 4B Core/periphery structure, library B.

Granovetter's classic work on strong and weak ties (1973) was based specifically around the *acquisition of information* via a social network (Scott 2000, 34–35). Information seeking was seen not as a deliberate or conscious search; rather, individuals were seen as coming into contact with more or less information depending on properties of the networks in which they were positioned: "Individuals did not really compare the rewards and costs attached to different sources of information.... The acquisition of information... de- pends upon, first, the motivation of those with information to pass it on, and, second, the strategic location of a person's contacts in the overall flow of information" (Granovetter 1973, 52).

Thus, these maps suggest the main sources of innovation—changed practice—in each network, and whether, and where, individuals in these networks perceive that resources exist that can be drawn on for AR and the transformation of practice. However, to assess whether these predictions play out in reality, we need a method for observing changes in the information landscape.

Phase 3: Mapping the Information Landscape

Mapping social networks is a way of exploring the environment within which action research takes place, but it is not AR in its own right, although phase 2 of BiE did offer the insights of phase 1 up as data for informal reflection by the participants. It was in phase 3 that the AR elements of the project came more to the forefront.

AR is research embedded *in practice*, and studies that only ask participants to report on practice are not as comprehensive as those that also conduct some kind of observation of practice. Such observations can assess what people actually do in the workplace, and measure its impact, rather than relying only on what they say they do, or what impact they say it had. In their study of operational proximity, Tagliaventi and Mattarelli (2006) studied interactions over 364 hours' observation in a hospital; however, our project did not have the resources to do this even in one of our two locations, particularly not as we wanted to consider changes taking place over a period of 12 months or more. The intensive study of practice Tagliaventi and Mattarelli undertook was not therefore appropriate for BiE. Other types of observation exist, however. For example, Kleinnijenhuis et al. (2011) analyzed the influence of particular actors by observing interactions on a discussion board. These kinds of observations can be extended over time, allowing for the use of longitudinal data to elicit the narrative aspect of mapping, and the recording of change over time, in this case, the evolution of the information landscape.

The third phase of the BiE project uses mapping to observe change in the participants' information landscape. While the technique used does not constitute direct observation of the sort used by Tagliaventi and Mattarelli (2006), it generates data beyond those which can be elicited by interviewing or surveying individuals about their (information) practice. Phase 3 is ongoing at the time of writing (February 2014) and will last one year. Participants at each location will take part in six group sessions, each using the concept mapping tool, Ketso, to map changes in the information landscapes of each library. Ketso (see www.ketso.com) was developed by Tippett, Handley, and Ravetz (2007) as a mapping tool that is physically durable (compared to paper) and allows for all members of a group to contribute to the creation of the concept map, as opposed to insights from a discussion being recorded only by one scribe. The tool uses shapes and colors that have a natural feel, and the different colors of the leaves (see the images in Figure 5A and 5B) can be used for different purposes.

At each session, participants were asked to record:

- The tasks on which they were working at that time (recorded on brown leaves);
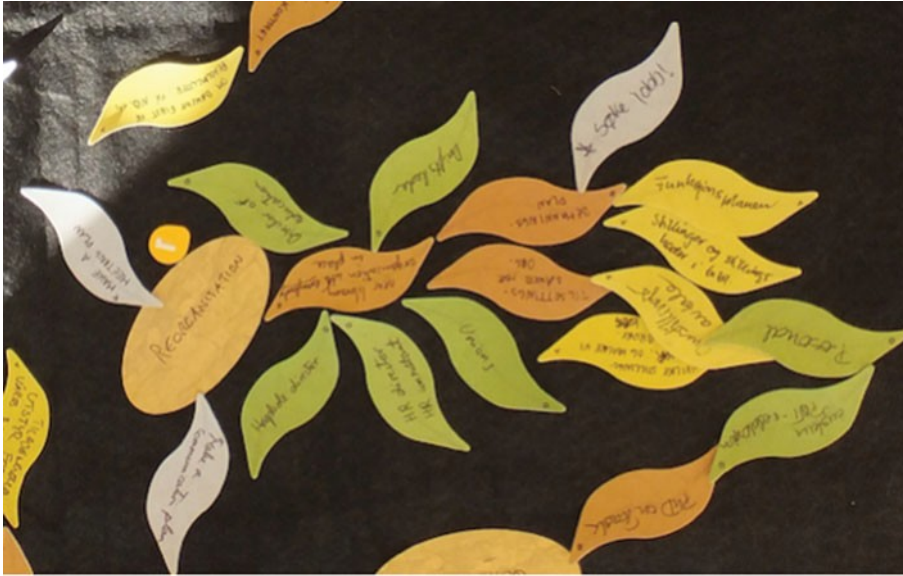- Information they needed in order to complete these tasks (yellow);

FIGURE 5A Reorganization landscape, after meeting 1.

- Where they could acquire this information (green); and
- Barriers and obstacles in the way of acquiring this information (grey).

Three tasks for each group were then given priority indications, and finally, each group recorded actions that needed to be taken before the next session.

FIGURE 5B Reorganization landscape, after meeting 2.

Each subsequent session initially returned to the list of actions outlined at the end of the previous session. The group was asked whether each action had been completed: if so, they were asked who led on the task and who else was involved; if not, they were asked what had prevented or blocked the action. Then, the previous session's map was re-presented to the group, and, returning to the aforementioned list of questions, altered to reflect the updated state of the information landscape (this being one reason why Ketso was used for the mapping, due to its durability and the way the leaves can be easily removed or repositioned).

These data allow broad comparisons to be made between the two sites. At the first meeting, librarians from A listed 20 actions that they perceived as needing to be accomplished, compared to 9 at B. Of the 20 actions at A, 9 had been completed by meeting 2 (which took place two months later); 7 were ongoing; and 4 had not been addressed by that point. Of B's 9 actions, none had been completed, three were ongoing and the remaining six were not being addressed or had been postponed. The group discussion made it clear that the reason for B's relative stagnation over that time was the recruitment of the new library director, due to start in a month's time.

The technique also generates longitudinal data, and shows the impact of practice on the information landscape over time. Figure 5A and Figure 5B are snapshots from library A's concept maps, showing the tasks, information needs, sources, obstacles, and actions that were collected within the broader theme of Reorganization: thus, these were activities related to the imminent merger of campuses.

Without going into detail regarding the content of this portion of the map (what is written on the leaves), it can be seen that two actions that were broadly related to the general reorganization project (visibly connected to the oval on the left of Figure 5A) were completed prior to meeting 2, but the third one (top right) was not. The general impact of the completion of the first two actions was to remove several information needs (yellow leaves) visible on the first image, but not the second. However, these have been replaced by obstacles on the second image. The priority indicator (the small yellow one) has moved from being allocated to the reorganization project as a whole, to the uncompleted third action, but these obstacles need resolving before the necessary information can be found.

The sessions generated this data for analysis by the project team (and its subsequent reporting here), but the data were also instantly available to the participants, allowing them to make collective judgments about where to focus their information practices after the meeting, in order that broader goals could be reached.

CONCLUSIONS

The focus of this article has been on methodology, and how the techniques being exploited in BiE permit cooperative inquiry to take place, stimulating action research and reflection among the academic librarians who were the project participants, via the "instant" data generated by Ketso, while also generating data for analysis by the project team and the recording of the evolution of information landscapes over time.

It is not the intention here to make generalizable conclusions about organizational learning in these locations, principally because the work of the project is still ongoing, and the significant changes being experienced by both libraries (the campus merger in A, and the change of Director at

B) have, at the time of writing, not yet taken place. Nevertheless, BiE has already shown how these methods can be used to assess the impact of the many informal (and, though only occasionally, formal) learning processes that constantly flow through these settings. If AR is seen as fundamental to these processes—and the view of it promoted by writers such as Carr and Kemmis (1986) or Pasmore (2001) suggests that it is as it is the kind of monitoring of their environment that any healthy learning community engages in—then what we have presented here is a methodology for, initially, assessing the impact of AR. However, the research is not a passive process, offering its insights only after the work of data collection and analysis is completed (which in many projects is not until months or years after the fact). The presentation of the data to participants is immediate, with the mapping of the social networks and information landscapes allowing for predictions, interventions, and guidance to take place on the ground. Generally then, the research, an example of cooperative enquiry, assists with the stewarding of the information landscapes at both these academic libraries (Wenger, White, and Smith 2009).

Our general aim, then, has been to show how this entire research process benefits changing libraries in various ways, helping to build an environment that supports action research.

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APPENDIX 1: INTERVIEW PROTOCOL, PHASE 1

- What is your position here and how long have you been here?
- Please provide a brief outline of your role and responsibilities at work.
- How do you think others perceive your role and responsibilities?

- What would you say are the core values which drive your work?
- Are these values written down anywhere, or otherwise formalized?
- Do you discuss these with colleagues? If so, where and how?

- What learning opportunities are available to you at work?

- Have you been able to enact any changes to your own working practice in the last two years?
- Have you been able to enact any changes to the working practice of others in the last two years?
- Has anything blocked a desired change in the last two years?

- What changes do you think will be needed in the next two years, and why?
- Ideally, how would you go about learning about and then implementing these changes?
- With whom would you have to work in order to do this?