The Metaphor of Networks in Learning: Communities, Collaboration and Practice

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ABSTRACT

This paper explores the use of the network metaphor and the way in which it relates to Computer Supported Collaborative Learning (CSCL) and Communities of Practice. The idea of networked learning stresses the interaction of learners, tutors and their resources through networks. The arguments put in this article are firstly that learning technology needs to take account of the wider debate about networks and secondly that research in this field needs to address the theoretical and practical issues raised by advances in the field of networks. A further argument made is that the idea of the network can act as a unifying concept allowing us to bring together apparently disparate elements in the field of e-learning.

Keywords

Networks, networked learning, communities of practice, collaboration, CSCL.

INTRODUCTION

This paper argues that using the metaphor of networks can assist us to conceive of the broad context in which learning and education take place in a society reliant on computer networks. The paper will try to provide some strong indications of how a research programme could be elaborated and some suggestions for practical guidance and applied outcomes arising from the network metaphor. Network analysis provides a useful focus for analyzing the patterns of growth and interaction in a wide range of fields.

The Centre for Studies of Advanced Learning Technology (CSALT) group at Lancaster University has been associated with the following definition of networked learning.

> Networked learning is learning in which information and communication technology (C&IT) is used to promote connections: between one learner and other learners, between learners and tutors; between a learning community and its learning resources.

The key element of this definition is the term connections. The notion of learning emphasized in this definition is a relational view in which learning takes place in relation to others and in relation to an array of resources. Networked learning doesn't privilege the type of relationships between people or between people and resources and in this it differs from two of the most popular approaches to the use of computers and networks in an educational setting CSCL and communities of practice. For CSCL, however defined, the relationship is one of cooperation or collaboration and in terms of communities of practice the relationship is one that implies both the closeness of community and a certain unity of purpose. This paper will argue that networked learning is a more appropriate term to describe the types of relationship emerging in educational settings and within the broader scope of a networked society.

CSCL

Several terms have been used to identify the emergence of new or revised pedagogies related to the introduction of computer technologies in education. Of these perhaps CSCL has proved the most attractive and developed. CSCL has been used as a term in its own right (Koschmann 1996) and as an acronym for both Computer Supported Cooperative and Computer Supported Collaborative Learning. In all of these uses the term has signified a practical interest in computers and group activity and a privileging of social and situated views of learning. Koschmann for example returned to this theme five years later:

> CSCL research has the advantage of studying learning in settings in which learning is observably and accountably embedded in collaborative activity. Our concern, therefore, is with the unfolding process of meaning-making within these settings, not so-called "learning outcomes". It is in this way that CSCL research represents a distinctive paradigm within IT. By this standard, a study that attempted to explicate how learners jointly accomplished some form of new learning would be a case of CSCL research, even if they were working in a setting that did not involve technological augmentation. On the other hand, a study that measured the effects of introducing some sort of CSCL application on learning (defined in traditional ways) would not. (Koschmann 2001)

This approach is a way of seeing, a theoretical lens or paradigm, rather than simply a concern with the practical application of new network and computing technologies. The problem lies in the admission that this paradigm is not specific to the technological setting rather it is a theory of learning in general. The claim made here is that social and situated views of learning whilst compatible with networked learning are not and should not be a pre-condition. The authors of this paper hold social and situated views of learning but we argue that the field can be open to study from other perspectives. Networked learning begins from the setting itself and does not imply any one particular paradigm of learning.

The idea of CSCL, although Tim Koschmann uses it without unpacking the acronym into its parts, implies the computer is the focus of attention. In Networked Learning this focus is displaced from the particular device, the computer, to the non-specific location of the network. The network is non-specific because it does not reside in any particular device or location. It is rather like the idea of the university itself in that you can illustrate the network by pointing to particular elements but the network is a collective term expressing a set of persistent relationships over time and analytically above its component parts. The term CSCL also draws attention to particular kinds of relationship, those of cooperation and collaboration. These terms are not neutral and although they draw on etymological roots that simply indicate working together they suggest a moral imperative for close forms of coordination and cohesion rather than looser relationships. Conflict is identified as a potentially productive part of a learning process, but though some Piagetian influenced proponents of CSCL recognize this it is not a central characteristic of CSCL (see Dillenbourg 1999). A further feature of a network understanding of learning is that it draws attention to the potential strength of weak ties. The network metaphor doesn't privilege the closeness of community rather it serves to encompass all kinds of links and relationships. More generally the form of networked society in which networked learning takes place has been described by Castells as one of 'networked individualism' (1996, 2001) not one of close community.

COMMUNITIES OF PRACTICE AND NETWORKS

Communities of practice are a generalized form of learning practices found in a variety of societies. The idea of Communities of Practice, unlike CSCL was not linked to new technologies in its origins; rather it emerged from anthropological studies that were often in pre-modern social systems such as tailors in Liberia. Communities of practice in their turn rest on the apprenticeship model that Jean Lave generalized in terms of learning as legitimate peripheral participation. Communities of practice involve a process of relatively close engagement in a community with the distinguishing feature being the sharing of practice. Shared practice in turn requires members to have the time and space to collaborate (Lave and Wenger 1991; Wenger 1998). A number of questions arise from the translation of the idea of communities of practice into networked environments. Community as a term is loaded, like the terms cooperation and collaboration with a preference for close ties. Both Wenger (1998) and Brown and Duguid

(2001) note that there are relationships between certain types of network and communities of practice. Wenger notes in a number of footnotes to the main text the work of Wellman and Berkowitz (1988) and suggests that a community is similar to a network composed of strong ties (Wenger 1998 p283). Wenger distinguishes networks from communities of practice in a number of ways.

- Networks deal with relationships and flows communities of practice focus on the practice created in the process rather than on flow of information or relationship. (Wenger p287)

- Communities of practice are concerned with 'what is shared and learned and becomes a source of cohesion'. Networks do not carry the same sense of cohesion. (Wenger 1998 p283)

- Communities of practice are concerned with a history around which impersonal network ties are organized. (Wenger p298)

The key divergence between networks and communities of practice for Wenger lies in the emphasis placed on structural properties and process. Wenger emphasizes process elements and suggests that the key distinguishing element of communities of practice when viewed from a more structural point of view is that they are cohesive, sharing historical processes that are composed of strong ties.

Early sociologists of modern society distinguished, in a variety of ways between pre-modern communities and the modern scientific-rational structures of the city and industry. The classic formulation of this was the contrast between Gemienschaft and Gesellschaft by Tonnies in the 19th Century. Gemeinschaft was close community based on kinship, identity and place whereas Gesellschaft was a rational calculating and contractual form of relationship. Brown and Duguid reference Tonnies and the roots of sociological debates on community, but oddly in the main text they only mention gemeinschaft (Brown and Duguid 2001 p202). This omission is odd because Brown and Duguid are discussing modern business organization. The social forms of late capitalism are not obviously communal in form and in general the process of individualization has continued in the modern period. In a footnote Brown and Duguid note that gemeinschaft and gesselschaft are not temporally successive ways of organizing society or even mutually exclusive but it is clear that the emphasis place on gemeinschaft in their work is an emphasis on types of community most common in pre-modern society and as Fox (2002) has noted such communities only exist in the "interstices" of modern organizations. Communities of practice of the type identified by Lave and Wenger are not the central organizational forms in contemporary social systems they are in many ways marginal, inhabiting the informal regions that survive outside of and often in spite of mainstream relationships. Communities of practice have become popular in modern business and management as a corrective, identifying self-activating units within large organizations that are capable of significant self-management. Communities of practice are not a neutral description of aspects of modern societies they are mobilized by modern business organizations to reduce the administrative load on formal structures and reposition responsibility on informal structures and organization. In a similar way educational use of Communities of practice puts additional responsibilities upon students who are required to develop, monitor and control their own groups and relieves the burden from the formal teaching structure that adopts a more facilitative or moderating role.

Network theory would suggest that the strong notions of community contained in communities of practice might ignore the importance of the 'strength of weak links'. The idea of weak ties has recently been applied in relation to communities of practice (Rosson 2003). Rosson argues that the social nature of Internet use by people who act as weak links, in her terms 'bridges', suggests that the Internet is used by them for maintaining relations and increasing face-to-face interaction. Weak ties are in this view an enabling factor in social activism and the building of 'social capital'. The educational focus in networked learning has often been on strong links and the emphasis on community may have made less visible the many necessary but weak connections that make the network idea so powerful. The nature of networked learning is such that whether the network is used for distance or largely place based learning the participants do not have to be co-present. The student cohort in a networked course may well have weaker ties with each other and with the tutor than might be expected in terms of a community of practice. Student cohorts often do not have a history and may never become cohesive units. For these reasons we argue that a network analysis might be more appropriate.

Another key issue in communities of practice and social practice theories of learning has been knowledge sharing (Osterlund and Carlisle 2003). Osterlund and Carlisle claim that a relational thinking lies at the heart of social

practice theories. They claim that subjects or social groups only develop their properties in relation to other subjects or social groups. In particular "social objects derive their significance from the relations that link them rather than from the intrinsic features of individual elements." (Osterlund and Carlisle 2003 p3). This relational view borders on a network description that privileges the links rather than the properties of individual nodes. The authors go on to claim that what they call practice theory goes beyond other theories by not only looking at the "recursive dynamics of a given relation but places everyday practice as the locus of the production and reproduction of relations." (ibid p3). The issue of knowledge sharing is developed further in relation to the idea of networks of practice below.

Constellations of practice

Etienne Wenger has noted that the intensity of interaction between people distinguishes between a community of practice and a personal network (Wenger 1998 p126). He goes on to note that

> Some configurations are too far removed from the scope of engagement of participants, too broad, too diverse, or too diffuse to be usefully treated as a single community of practice. (Wenger 1998 p126)

Wenger notes this limitation is not one solely of scale, affecting both large and small configurations. To describe this type of broad and diffuse configuration Wenger uses the term constellation, specifically drawing attention to the use of the term grouping stellar objects even though they may not be close to each other. Constellations of practice are used by Wenger to describe relations that link a community of practice with any number of constellations. In part Wenger claims communities of practice define themselves by negotiating their place within a variety of constellations. Constellations of practice in this account are intimately connected with the negotiation of boundaries and interactions among practices. They are engaged in the 'export' of practice, allowing detachment from any specific enterprise. The exported styles and discourses whilst not practices themselves provide resources that can be used in the context of practice.

A particular question that arises from Wenger's analysis is the nature of the geography of place in communities of practice. The claim made is that the introduction of constellations of practice adds notions of locality, proximity and distance to the ideas of boundaries and peripheries. The setting out of these issues indicates the potential importance for networked learning. Issues of locality, proximity and distance are central issues in networked learning but in terms of communities of practice they are issues little explored despite Wenger's careful provision of the constellation idea to accommodate such issues. A related development of communities of practice has been popularised by Brown and Duguid (2001) as networks of practice.

Networks of practice

Brown and Duguid note that the appeal of the term community has tended to obscure the importance of practice. They wonder whether if Lave and Wenger had spoken about cadres or communes of practice this would have been as powerful or as widespread a notion. By practice Brown and Duguid mean "undertaking or engaging fully in a task, job, or profession." (Brown and Duguid 2001 p203). A second question Brown and Duguid raise is in relation to the relationship between communities of practice and other forms of social alignment. They comment that communities of practice can seem indifferent to other forms of social alignment; in particular they can seem a "social monad – a fundamental building block" (Brown and Duguid 2001 p203). This atomic view of communities of practice obscures the social heterogeneous nature of communities of practice and could be thought of as 'communities of communities of practice'. For Brown and Duguid a particular reason for the importance of this issue is that it touches on the question of 'disembedding' and 'reembedding', and that new technologies allowing communication across time and space.

This issue echoes Wenger's concern with the export of repertoires and styles. Central to both accounts is the need for conditions at both ends of an exchange to allow for a flow of information and knowledge and the disembedding or export and reembedding or import of discourses and repertoires originating in one practice to be incorporated in another. This issue, in another tradition referred to as transfer, is central to education and networked learning. It is the difficulty of dealing with this in the classic articulation of communities of practice that suggest the adoption of the metaphor of networks. Brown and Duguid use the term networks to indicate loose epistemic groups and note that most people in such a network will never know, know of, or come across one another. The argument of this paper is that the term should have a more general currency, that networks should cover not only very distant relationships but also relationships that have varying degrees of proximity but do not have the degree of cohesion required for a

community. The use of the term network allows for scalability in analysis as networks can have a nested character. Each node in a network can itself be a network; the atomic nature of the community metaphor can be replaced by a fractal geometry allowing for an infinite repetition of similar but not exact forms in various scales. Finally the network metaphor does not privilege any one particular view of relationships, and this may be especially important for learning.

THE PRACTICAL MANAGEMENT OF NETWORKED LEARNING

There has been a significant focus in research and practical work related to CSCL and networked learning on the role of the moderator or facilitator. As an illustration of the ways in which the network metaphor can be applied to the practical management of networks we explore the role of the animator. For purposes of clarity we have adapted the French language term animateur/animatrice to indicate this type of role within a network. We want to indicate the place of the network animator and how this description might be applied to a role within a network and relate this to the more common terms moderator and facilitator. The paper will try to abstract elements in a network animator's role and from experience in networked organizations suggest necessary and desirable characteristics for successful animation within a networked learning setting. Issues examined will include the need for explicitness about network relations and the degree and type of regulation required within a networked system.

The animator's role can be taken by an individual or distributed across a number of individuals. The animator role can be critical to a networks functioning. The animator role is not a minor function for a network and could be considered an essential component for designed systems that rely on systematic rather than simply organic network development. This would apply to most networked learning courses that rely on the development over time of a dense set of interrelationships between students, students and their tutors and students and the resources that are required for learning. For networks to grow organically members of the network have to give something to others in the network. The essential relationship is reciprocity. This does not mean all persons in a network need to be highly active. It is quite possible that a proper relationship in a network could be providing an interested audience for others. It does mean that members of a network must be self-activating; networks cannot develop if all await the others to begin. Networks are dynamic systems that rely on self-reinforcement, without sustaining activity networks become moribund, the non-animate links and connections may remain, skeleton like, but without activity the flows across the network die out.

Networks develop in a learning context bringing together people from a wide variety of backgrounds. Students bring different backgrounds that can imply hierarchic positions. These can flow from broader cultural influences including reputation, force of personality, expertise, and professional position. Part of an animator's role can be to manage these issues of power in ways that enable the network to function in ways that enhance learning. This might mean identifying those persons or elements in a network that constitute a potential risk and those other elements that positively assist the network. Such a role mirrors the social functions identified for moderators and facilitators but has a distinctly less positive gloss. The network animator may be concerned to inhibit certain features and to mobilize others to act as a counterweight. The animator role may not be taken up by any one individual but it is important that this coordinating activity is taken up somewhere in the network. A further example of the coordinating role is that of integration. Networks are complex systems and different elements in a network will not have an overall view. The production of an overall sense of the network and its activities is an ongoing process and a network may not need to or be able to generate a global view of the network itself. No singular view may develop and networks lend themselves to multiple representations and integration does not mean the imposition of any singular view. The animator role is to try and encourage such integration and the distribution of information across the network. It is also to encourage both process and practice and the reification of network activity into products of one kind or another. Network activity without reification can be highly ephemeral.

CONCLUSIONS

The monad or atomic view of communities of practice as the foundational building block contains within it definite problems when applied to networked learning. The idea of constellations of practice conjures up the image of a series of Venn diagrammes with each community of practice represented by a circle and overlaps of circles indicating the areas in which communities of practice overlap with wider constellations of practice. The network of practice metaphor allows for the linking of much looser groupings but doesn't follow this down to the problem of each community being represented as a monad or basic atomic unit. Network analysis allows for the node in one network to be a part of or an entire other network. Networks are porous by nature, including long weak linkages as well as strong ties. The community of practice metaphor privileges the idea of strong ties and a cohesive view of community. For these reasons we argue that networked learning provides a better metaphor than communities of practice for technologically enhanced learning. We also argue that the term networked learning better captures the setting for learning in a networked society and using computer networks. The term CSCL privileges cooperation and collaboration above other relationships and directs attention to the computer itself and not the network. We argue this is something like a category mistake, as for example when pointing to a campus building and asking if that is the university. The network may be accessed through computers and other devices but it is a complex self-organizing system that cannot be identified as one of its component parts.

Benedict Andersen spoke in terms of imagined communities (1983). He noted that it was highly unusual for all the members of a community to know one another and that it was an act of imagination that allowed members of a community to identify with each other. In education the use of the communities of practice metaphor has led many to imagine communities. Some communities of practice emerge naturally within modern organizations and in education including networked learning environments. They are not the predominant form for networked learning or for modern organization. There is a danger of course that something similar might happen using the network metaphor, that by talking in terms of networked learning we actively constitute them in our practice. We see this as a danger and agree with John Law that it is possible:

> that we are in the process of *uncritically reproducing some kind of dominant ideology*. We are reproducing the ways in which the current orderings of the world like to represent themselves. (Law undated draft para No 1)

As such networked learning could become part of a hegemonic discourse not simply in educational terms but as part of wider debates concerning the nature of social processes, power and culture.

Networks provide a framework for analyzing the new relationships that move beyond simple geography in networks. Andreas Wittel has suggested a move in ethnographic research that takes account of this shift from geographic metaphors.

> Networks are still strongly related to geographical space - like field. Unlike field, a network is an open structure, able to expand almost without limits and highly dynamic. And even more important: A network does not merely consist of a set of nodes but also a set of connections between nodes. As such, networks contain as much movement and flow as they contain residence and localities. (Wittel 2000 paragraph [5])

A final claim made in this paper is that the use of the network metaphor in learning technology helps us to connect ourselves to wider social debates about the networks and helps us to think about the fundamental nature of the network and the patterns of activity associated with it. These debates around the network society (Castells 1996, 2001) and social applications of network analysis in terms of actor network theory (Fox 2002, Law undated) relate to the modeling of networks and descriptions of phenomena in terms of nodes and the links between them. Network analysis is interested in the ways in which transfers can take place across a network, for example whether the network is traversable or not. The importance of this field of study is that it holds out the prospect of developing mathematical ways of describing networks that may prove to be robust across a broad range of phenomena. A number of texts aimed at lay readers, originating in the mathematical and physical science traditions, have begun to examine phenomena from a wide range of areas, including social and biological domains (Barabasi 2002, Buchanan 2002). Our conclusion is that networked learning provides a more persuasive metaphor for learning using modern network technologies than either CSCL or communities of practice.

ACKNOWLEDGMENTS

This paper was written as part of the work conducted for the EU project EQUEL and the work and discussions in SIG 6 in particular.

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