Journal of Universal Computer Science, vol. 13, no. 7 (2007), 1033-1041
submitted: 7/3/07, accepted: 25/7/07, appeared: 28/7/07 © J.UCS

Mapping Academic Collaboration Networks: Perspectives from the First Year of the Reusable Learning Objects CETL

Raquel Morales
(University of Cambridge, United Kingdom
raquel@caret.cam.ac.uk)

Patrick Carmichael
(University of Cambridge, United Kingdom
patrick@caret.cam.ac.uk)

Abstract: The 'Reusable Learning Objects' Centre for Excellence in Teaching and Learning (RLO-CETL) is a five-year project (2005-2010) involving staff from three universities (London Metropolitan, Cambridge University and the University of Nottingham) in a collaborative programme of development, deployment and evaluation of a range of multimedia learning objects that can be stored in repositories, accessed over the Web, and integrated into course delivery. One of the goals of the RLO-CETL is to provide sustainable and reproducible processes that will allow sector-wide collaboration, so as part of the internal formative evaluation of the RLO-CETL, we are concerned to analyse its character, boundaries and evolution, and how this develops in relation to individual and institutional contexts, priorities, structures. In this paper, we present some of the results of 'mapping' tasks in which twenty-eight participants (who included lecturers, tutors, students, multimedia developers, administrators, evaluators and managers) represented and talked about the networks of people with whom they communicated. There are aspects of the maps that indicate how the network of the RLO-CETL interacts and overlaps with institutional and individual networks.

Keywords: Evaluation/methodology, Human Factors, Network communications.
Categories: K.3, K.3.m

1 Introduction

This paper describes how a ‘network mapping’ activity has been used to shed light on the nature and role of academic collaboration within a multi-institutional Centre for Excellence in Teaching and Learning (CETL). This initial exploration is by nature descriptive and does not, for example, analyze particular maps or use detailed analytic frameworks – although we point up the value of some important concepts drawn from various ‘network theories’. In addition, each ‘network mapping’ activity incorporated a focused, semi-structured interview, and we have only drawn on these in order to clarify issues and address questions raised by the ‘maps’ at this stage. The activity we describe here, then, explores individuals’ conceptions of the structure of the CETL network and their perceptions of their role (and the roles of others) within the network.

1.1 The RLO-CETL

The UK's Higher Education Funding Council for England have funded a multi-institutional five year (2005-2010) project involving three universities (London Metropolitan University, Cambridge University and University of Nottingham) to develop, deploy and evaluate electronic, reusable learning objects that will be made available across UK Higher Education through the Centre for Excellence in Teaching and Learning in Reusable Learning Objects (RLO-CETL – www.rlo-cetl.ac.uk). Each of the three institutions undertakes two projects per year, the topics of which are purposely generic in order to facilitate reuse within and across institutions. A number of different roles can be identified within the CETL; in addition to managers and administrators, subject tutors in the three institutions are involved in the identification of areas for RLO development; in developing specifications; in provision of content; and most critically; in the deployment and evaluation of the electronic content within their undergraduate courses. Multimedia developers work from the specifications provided by tutors to develop electronic resources and advice on appropriate technologies, design, accessibility and other issues. Evaluation of the project is essential to ensure its maximum effectiveness and quality and this has prompted the development of the RLO-CETL evaluation strategy. The strategy reflects the overall design of the CETL, in that a series of mini-project evaluations are 'embedded' within a broader evaluation of the CETL as an emerging network; as such two final groups are evaluators in the three institutions and students who provide learner perspectives and contribute to evaluation both generally and of specific RLO's.

The literature on networks is wide and represents a range of different perspectives (see [McCormick 2002] for an overview of the application of different 'network theories' to educational contexts) and we have found one of the more useful characterizations – particularly given our concern with communication between members of the CETL - to be that offered by van Aalst: the systematic establishment and use (management) of internal and external links (communication, interaction, and co-ordination) between people, teams or organisations ("nodes") in order to improve performance. [Van Aalst 2003]

Even this definition is limited as it implies that networks are established and that notions of 'performance' are unproblematic. We, on the other hand, do not know the true nature, size or scope of the network which the RLO-CETL is seeking to foster and sustain; similarly, we do not know how closely it conforms to models such as the 'communities of practice' described by [Lave & Wenger 1991, Wenger 1998]. It may be that other models of sustained collaboration such as 'communities of discourse' [Lave & Wenger 1991], 'learning organizations' [Senge et al. 1999], or 'knowledge innovation networks' [Hakkarainen et al. 2004] are more appropriate lenses through which its activities may be viewed and guided, particularly given the CETL's concern both with technologically-enhanced 'collaboration-at-a-distance' and with innovation rather than preservation of practice. Understanding these issues is necessary in order to accurately describe and assess the nature and benefits of collaborative activity across the CETL. At the same time, this understanding has the potential to inform the building, over the lifetime of the CETL, of replicable, sustainable processes and practices which will allow sector-wide development and gains.

1.2 The Mapping Task

The mapping activity used was based on one developed within the "Learning How to Learn" Project (part of the ESRC's Teaching and Learning Research Programme in order to generate baseline representations of an organization's active network (see [Fox & McCormick 2004, Fox et al. 2005, Carmichael et al. 2006]). The activity was open-ended, with respondents being asked to draw their communications and to represent with whom and how they communicated. It was suggested at the beginning of the activity that it should take about 15 minutes. Participants were encouraged to explain what was foremost in their mind as they compiled their map and this auditory commentary was transcribed for all participants. This commentary provided context and meaning for the maps that were drawn, and provided insights into the significance of the network elements they represented. Participants were not constrained in how they represented the elements of the network, and the questions used to prompt them were concerned with their description of what they were doing, rather than with any explicit or implicit approval or guidance (see [Figure 1] for the schedule used to introduce and support the task).

RLO-CETL Mapping Activity

We would like you to visualise the networks you are involved in and are going to ask you to communicate these through drawing rather than writing.

Whilst you are drawing we would like you to explain verbally what you are doing and we will tape-record these as annotations to the drawing.

Using pictures, and lines to link the pictures to show connections, could you show with whom and how you keep in touch?

If you are unhappy with the idea of pictures, use words in boxes, indeed annotate the drawing as much as you like. There is no 'right' or 'wrong' way of doing this! Many people start by locating themselves at the centre of a personal network, but this is not essential.

The whole task should take about 15 minutes.

Prompts:

Have you have included everyone with whom the organization communicates?

Do the links best represent the way you want to show how communications happen?

Do you communicate with anyone else externally to the RLO-CETL about RLO-CETL issues?

Figure 1: Mapping Activity Schedule and Prompts.

Some of the maps resembled organizational charts, while others employed geographical metaphors; in some cases metaphors were employed and small cartoons, icons and symbols were drawn. Despite this variety, the vast majority of the maps that were drawn were some variety of 'ball and stick' or 'mind map' representation, with 'nodes' (people, places, organizations) connected by 'links' (means of communication or other interactions, co-attendance at events or institutional

structures). In some cases modes of communication (email, phone, face-to-face and others) were represented. This allowed a consistent descriptive framework to be employed across the majority of the maps.

2 The Mapping Activity: Outcomes

Twenty-eight participants were asked to complete the network mapping activity – see [Table 1] for a summary of their distribution. Mean times to complete the task are included as an indication both of the fact that is a relatively quick means of collecting data and of the fact that all participants, regardless of role or institution, were able to engage with the activity to at least the expected level.

Participants (n=28)	Frequency	Mean time on activity (min)
Managers	6	19
Evaluators	1	11
Tutors	10	22
Students	2	16
MM Developers	7	17
Administrators	2	13
Institution A	11	19
Institution B	7	20
Institution C	10	17

Table 1: Summary of Maps Collected by Role and Institution and Mean Time Spent on Activity.

The activity was very well received, no participants declined to take part, and everyone produced a map (examples are included in [Figure 2]). Respondents commented how they appreciated being consulted about their participation on the CETL, and they were largely positive about the mapping task as a useful, reflective task. The openness of the activity allowed the participants to emphasize those issues more relevant to them (while still allowing comparison across cases) and everyone involved was able and willing to express their views and perceptions.

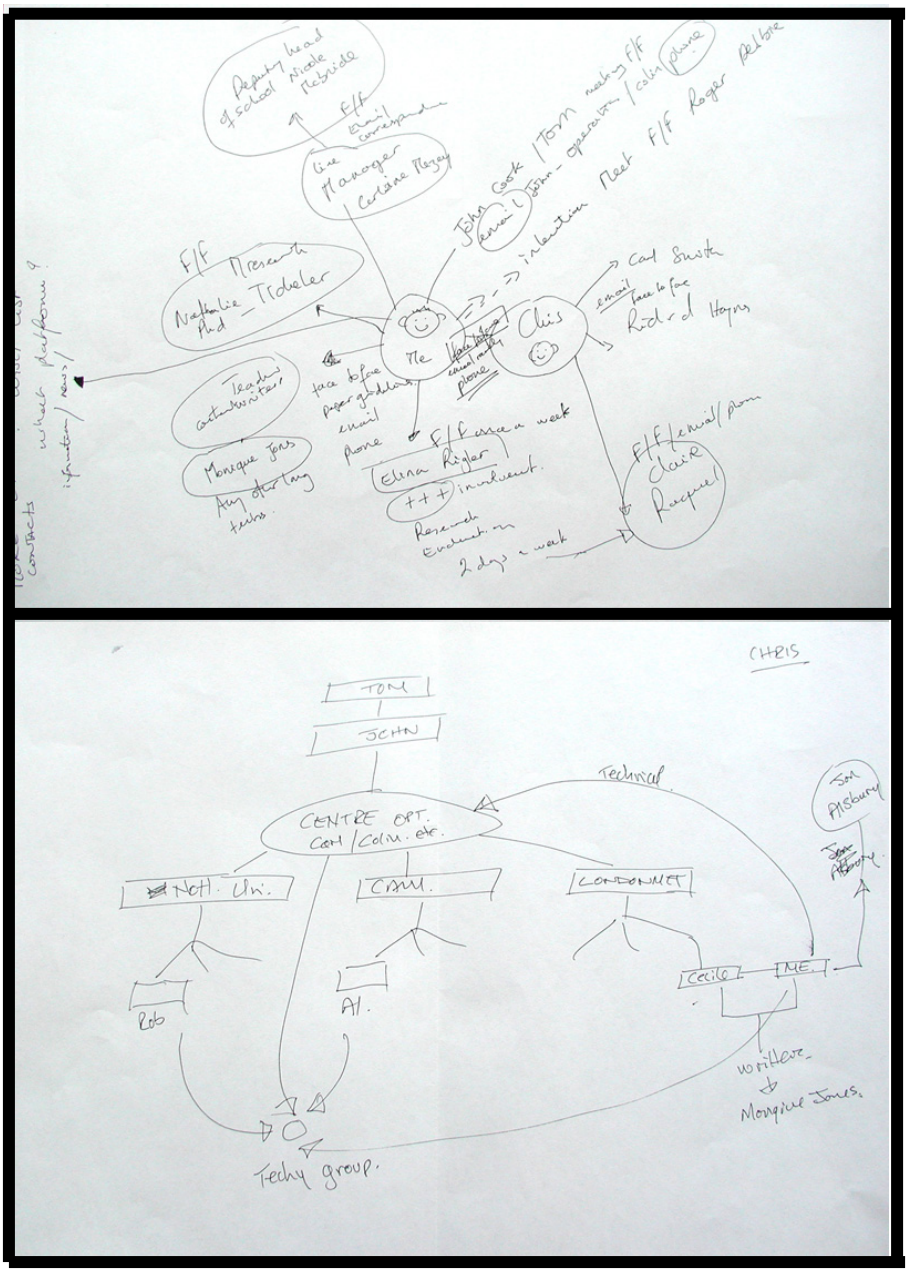

Figure 2: A tutor's map (top) and the map of the MM developer (bottom) who works closely with this tutor.

Initially a purely descriptive frame was utilised (see [Table 2]); as mentioned above, 'nodes' and 'links' were identifiable across all maps. We used types of nodes and links identified by the participants themselves as further sub-categories. We also described the overall structure of the maps and any particular metaphors used in relation to the network as a whole or elements of it.

Nodes	Internal to CETL	Managers Tutors Administrators MM Developers Students Evaluators
	External to CETL	Institutions National Bodies and Organisations International Bodies and Organisations
Links	Face to Face Telephone	
	Electronic	Email Others (MSN, Wiki, Forum)
Structures	Patterns	Hierarchy, Directional Web, Decentralised Radial, Centralised

Table 2: Descriptive framework for initial description of maps and associated data.

3 A Potential Analytical Framework

Given our concern about the lack of firm conceptual basis for the analysis of educational networks, we looked to a broader literature. We identified a number of theoretical frameworks offering a more complete and fruitful approach to analysis of at least some aspects of networking, of which Social Network Analysis (SNA) was the richest and most widely applicable. It appeared to offer a better account than the 'Communities of Practice' [Wenger 1998], particularly given the dispersed nature of the CETL and the fact that the close collaborations characteristic of Communities of Practice (while they may have been occurring within institutions) appeared to be less common across the CETL.

SNA characteristically describes networks by using some kind of proxy measures ranging from the broad and abstract (for example, Milgram's work on friendship, [Milgram 1967]) to more sharply-defined measures such as co-appearance in films [Newman 2001]. All of these approaches and the analysis associated with them, however, are based on view that the whole network can be 'known' and that links are bimodal (they either exist or they do not) or quantifiable. In contrast to the 'complete network' analysis, our maps represented individuals' views of the network links available. Such analyses are referred to as ego-centred perspectives of networks [Wasserman & Faust 1994]. In this approach to network analysis, there is no assumption that individuals have oversight of the entire network, or even that an

entire network exists. While the respondents characteristically located themselves (or their organization) at the centre of their maps, what was evident both from the maps and the accompanying interviews was that these were very specific (and in some cases limited) views of the networks to which they belonged and had access. As is the case in other ego-centred studies, the boundaries of the network being studied only emerged as data were collected [Marsden 2005], and even then were, in some cases, poorly defined. In contrast, whole network approaches have clearly established boundaries ahead of surveys or interviews with selected respondents.

4 Some Emerging Themes from Our Analysis

A first theme is that of Conceptions and Perceptions, which is closely related to the distinction between 'whole-network' and 'ego-centred' perspectives. The maps can be seen as combining the participants' conceptions of the CETL (a whole-network perspective, although perhaps an imperfect one) with their perceptions of the role it plays in their lives (an ego-centred perspective). Some participants – notably those managers involved either in the original establishment of the CETL or who have taken on management and coordination roles subsequently – have the clearest conceptions and tend to represent organizational roles, communication channels and processes in their maps. They also represent the CETL as a 'network of networks' (or perhaps a 'network of communities') linking groups. Other participants' maps are dominated by their perceptions of how the CETL operates on a day to day basis; these are typically less complete maps with fewer nodes and links, and tend to stress their links with individuals. They do, on occasion, reveal previously unknown sources of advice and information upon which individuals draw – exemplifying Marsden's point about the size of the network only becoming known in the course of data collection and analysis.

A second theme is that of Strong and Weak Links. The maps show evidence of both [Granovetters 1973]' classes of link; within institutions and between managers, participants report that there is the regular, two-way and multiply-redundant communication characteristic of strong linkage while for many of the other participants their perception is of limited, single-mode access to information (either through email or from face to face meetings) – in some cases, these were represented by participants on their maps by showing long lines, or dashed or dotted lines, or the nodes at the end of the links were indistinct; at least some of the weak links were external to the CETL. It is important to remember that according to Granovetter, weak links are by no means less valuable than strong links – they just operate differently. This is a different issue from that of how effectively communication systems work within the CETL, which leads to our third theme – 'special' network roles.

5 Next Steps

There are certainly a number of strategic directions which the CETL might take over the coming years and some of these could be informed by thinking about networks. At present, we are particularly interested in the nature of the strong and weak links within the network and the extent to which individuals are beginning to form what

[Nardi et al. 2000] have described as 'intentional networks' of high value links which they nurture and work hard to preserve. We are also interested to discover to what extent the CETL can be sustained as a network in which participants have some localized 'strong links' but a potentially much larger set of 'weak links' on which they are able to draw as and when appropriate; or will there be a 'gravitational' effect in which 'cliques' (not a pejorative term in SNA!) operate largely independently of each other.

A second approach to exploration of links draws once again on the work of [Hakkarainen et al. 2004] and specifically on their use of more structured data collection tools to map networks and establish the nature and strength of links. Using the initial mapping task as a 'name generator' we have surveyed all 28 participants in the original sample using a grid in which they are asked to report on their modes of communication with all the other participants (face-to-face, phone and email) and also the frequency with which this occurs (daily, weekly, monthly, termly or annually). We also asked them to report with what frequency they ask for advice from, or provide advice to, each other participant, so that we can measure the 'advice size' of individuals and networks and, following Hakkarainen et al. characterize any specific patterns or differences in networking activities across the CETL. Analysis of these data and comparisons with those collected from the less structured mapping tasks are now taking place.

We also intend to repeat our mapping tasks over the lifetime of the CETL and to attempt to track the development of its networks. This will allow investigation of the interaction between individual, institutional and CETL networks; and between intentional networks and other, more formal organizational structures and processes. Ultimately the purpose of these activities is formative. Early, anecdotal responses from participants have been very positive and we are interested in exploring the extent to which data collection activities and analytical frameworks we develop become embedded in the organizational repertoire, and the implications (technological, organizational and ethical, amongst others) of reflection on networks and networking.

Acknowledgements

This paper is based on the work of the Centre for Excellence in Teaching and Learning in Reusable Learning Objects (RLO-CETL). This is a five-year development and research project funded from 2005-2010 by the Higher Education Funding Council for England. Prof. Tom Boyle (London Metropolitan University) directs the Project and the Management Group members are John Cook (London Metropolitan), Dawn Leeder, Rob Alton (Cambridge), Heather Wharrad and Richard Windle (Nottingham). Other members of the team and further details available at: http://www.rlo-cetl.ac.uk

RM would like to acknowledge the support of the Eduserv Foundation in funding this work. We also want to thank Kate Cherry for transcribing all commentaries to the mapping exercises and Karen Wells and Alan Leeder for making the electronic versions of the maps.

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