Change in Collaboration over Time: A Specific Case in a Student Work Placement Scenario

Alice Bird

Liverpool John Moores University
a.bird@ljmu.ac.uk

ABSTRACT

The current study investigates how collaboration, mediated by technology, changed as a new community of practice developed. In this case, the community involved work placement students, recruited to support academic staff development in the virtual learning environment at Liverpool John Moores University. The study is based on an analysis of placement student participation in an asynchronous discussion board, responses to an online questionnaire and further information derived from interviews conducted with four of the participants. Some key factors influencing change in collaboration are identified with suggestions made for future research in this area.

Keywords

Collaboration, asynchronous communication, community of practice

INTRODUCTION

Studies in collaborative work and learning supported by networked computers are now widely presented and published, as evidenced by regular scheduling of conferences such as the European Computer Support for Collaborative Learning (CSCL) and the US Computer Supported Cooperative Work (CSCW) series. Within higher educational contexts, (Roberts, 2004) presents a collation of papers demonstrating the diversity of research and practice in computer-supported collaborative learning.

Interest in the potential for networked computers to support collaboration in the workplace predates similar studies in educational environments. (Grudin, 1994) assigns the origins of the CSCW forum to the early 1980s when elements of common interest emerged from diverse groups. In educational environments, adoption of computer-supported collaboration has lagged behind that in the workplace despite evidence from respected theories of learning, such as social constructivism and socially situated learning, that emphasise social aspects of learning.

(Vygotsky, 1978) applies social constructivist theory to demonstrate enhanced individual attainment in situations where learning takes place 'under adult guidance or in collaboration with more capable peers'. In further developing this theory, (Laurillard, 1993) conceptualises a 'conversational framework' applicable to learning in higher educational environments and a model for assessing the role of technology in supporting the framework. (Lave & Wenger, 1991) are credited with developing the concept of socially situated learning within communities of practice. Their definition of a community of practice encompasses members of a *community* with a shared *domain* of interest who learn and improve *practice* through social interaction. Despite the widespread interest in social theories of learning, (Roberts, 2003) advocates increased research activity in online collaborative learning, which he asserts is 'an idea whose time has come'. He cites the main impediment to progress as educational practitioner scepticism but this could be overcome through dissemination of effective practice within subject communities.

The current study represents a case that bridges the educational and workplace divide. The subjects under study were third year undergraduate students employed on a one-year work placement at Liverpool John Moores University (LJMU) to provide local, Faculty-based support for academic staff in the institutional virtual learning environment (VLE). The object of the study was to investigate changes in collaboration as evidenced in the usage of an asynchronous discussion board provided to support them in their mentor role. The changes are analysed within the context of a developing community of practice. Although time-limited and small-scale, the community of practice framework appears to best fit the current case rather than alternative 'virtual communities', as described by (Henri & Pudelko, 2003). (Boud & Middleton, 2003) also highlight limitations of the communities of practice framework within large organizations, where complex informal learning opportunities may impede community development.

The current VLE mentors case resonates with, at least, the early stages of community of practice development proposed by (Wenger et al, 2002). Five key stages are suggested: potential, coalescing, maturing, stewardship and transformation. For the LJMU mentor case, the potential for developing a community of practice emerged through their unique roles and, hence, shared domain of interest. As individuals, they had the potential to learn and improve practice through the establishment of a community. For the current study, the focus is on the coalescing and maturing stages where the community initially comes together and then proceeds to develop. (Wenger et al, ibid) distinguishes the stages with reference to key domain, community and practice issues. For coalescing, the key domain issue is to establish the 'value of sharing knowledge', whilst the community develops 'relationships and sufficient trust to discuss genuinely sticky practice problems' and the key practice issue is 'discovering specifically what knowledge should be shared and how'. For the maturing stage, the key domain issue is defining the community's 'role in the organization and its relationships to other domains', whilst the community must manage its boundary and 'is no longer just a network of professional friends'. During this stage, the key practice issue is 'organizing the community's knowledge and taking stewardship seriously'.

LJMU VLE MENTOR PROJECT BACKGROUND

The VLE mentor project was developed in the context of the LJMU Human Resource Strategy, through its theme of staff development in new ways of working. From institutional audits and surveys, local support at Faculty level had been identified as critical in supporting VLE adoption. Funding for a one-year project, from September 2003 to August 2004, was allocated to the six LJMU Faculties, each developing an individual implementation plan within the remit of the project aims and subject discipline context. All Faculties recruited at least one LJMU work placement student but some also employed part-seconded technical support or academic staff. In total, eight work placement students were recruited as VLE mentors. The majority of mentors were in post by September 2003. After an initial face-to-face induction, a site within the VLE was made available for mentors to post shared resources and to access a self-moderated asynchronous discussion board, with the aim of fostering collaboration.

Within the literature, (Girgensohn & Lee, 2002) report on a case at the IBM TJ Watson Research Center with some similarities to that of the LJMU mentor project. In the IBM case, a 'Portkey site' was implemented for summer interns to enable them 'to exchange helpful information and experiences and to develop social networks – personal and professional'. In both the LJMU mentor and Portkey cases, fostering social interactions was considered essential to integrating of students into short-term work placement environments. There are, however, distinct differences between the two cases, particularly in terms of context, scale and incentives. The Portkey case involved 343 interns employed in a large industrial laboratory, as opposed to the LJMU case with 8 placement students in a higher educational institution, the latter being able to meet and socialise face-to-face as well as virtually. In the Portkey case, cash incentives were implemented as a sociological strategy to encourage collaboration whereas participation, in the LJMU case, was voluntary and participant-led. The latter may be somewhat atypical, with interventions to initiate collaboration generally being required. (Lin et al, 2004), in a case that studies the process of developing a community of school IT coordinators, employ the strategy of using a 'web site monitor to provide abundant useful information to foster sharing'.

The current study focuses on how collaboration, via the discussion board, changed through the coalescence and developing maturation stages of the mentor community and the factors influencing change.

RESEARCH METHODS USED

Both quantitative and qualitative methods of research were applied in the LJMU study. Postings to the discussion board were analysed quantitatively to provide information about participant activity and the nature of the topics being posted throughout the period of investigation. An online questionnaire was implemented to gain insight into mentor perceptions of collaboration via the discussion board and the developing community. The findings from the questionnaire were analysed quantitatively and qualitatively. The responses from the questionnaire were also used for reference during subsequent semi-structured interviews, conducted on a one-to-one basis with four of the work placement students. This helped to elicit further information on change in participant collaborative behaviour during the period of investigation.

CASE STUDY FINDINGS

The findings from each of the three elements of the research are presented within this section. From initial analysis of the discussion board, followed by interpretation of the online questionnaire responses and subsequent interviews, factors influencing the change in collaboration are assimilated.

Findings from the discussion board analysis

The discussion board content was analysed for the period mid-September 2003 to mid-May 2004. The VLE asynchronous tool provided a standard threaded-list format with the ability to include hyperlinks or to attach other items. The contents of the board provided a rich resource for investigation. Limiting the scope of the study to participant activity and nature of discourse over the period of the study was identified as the priority in determining how collaboration changed. Although other non-student VLE mentors had access to the discussion board, none chose to participate actively. However, the reasons for this particular phenomenon are beyond the scope of the current study. Similar participant activity is reflected in the Portkey case where, although representing approximately half the members of the site, the summer interns were responsible for 95% of site usage (Girgensohn & Lee, 2002). From their findings, Girgensohn and Lee conclude 'that social interaction Web sites are effective in sustaining and in fostering social interactions'.

Participant activity in the current study was measured through counts of postings. The total postings to the board varied throughout the period of the study with Christmas and Easter breaks accounting for troughs in January and April 2004. Activity was highest mid-semester, particularly during the second semester with February and March recording the highest numbers of postings. Towards the end of the study period, there appeared to be a general decline in postings. (This is reinforced by the postings, not included in the current study, but made from mid-May to the end of the project in July 2004).

| Sep-03*	Oct-03	Nov-03	Dec-03	Jan-04	Feb-04	Mar-04	Apr-04	May-04
10	31	10	26	11	36	30	3	4

*Two weeks only

Total postings per month

Further analysis of postings shows some variability in levels of participation by individual work placement students. The table below provides information on participant postings and some characteristics such as gender, campus location and whether a student mentor was employed in a Faculty with other mentors. The latter is broken down into those with other student mentors and other non-student mentors. These characteristics were considered potentially relevant in terms of influencing motivation to participate.

Student	Gender	Location	Other student mentors	Other non-student mentors	Postings
A	M	1	No	Yes	60
B	M	2	Yes	Yes	24
C	M	1	Yes	No	5
D	F	2	Yes	Yes	12
E	M	3	No	No	15
F	F	1	Yes	No	10
G	F	2	Yes	No	17
H	F	2	Yes	No	18

Total postings per participant

Most students were located in city centre campuses, labeled 1 or 2. The student most isolated due to location was student E at campus 3, situated four miles outside the city centre. Student E's isolation was further compounded by the fact that he was the sole mentor in the Faculty, having no fellow student or non-student mentors. Student A was the only student mentor in his Faculty but several non-student mentors were also employed. Students C and F were co-located in the same office at campus 1, whilst students G and H shared an office at campus 2. Students B and D were located in the same building but several floors apart.

During the period of the study, the majority of students made contributions in the range of 10 to 20 in total. Student B contributed slightly above this range at 24 postings. Student A was the most prolific poster with a total of 60 (37% of all postings). Student C contributed least with only 5 postings.


Postings per month
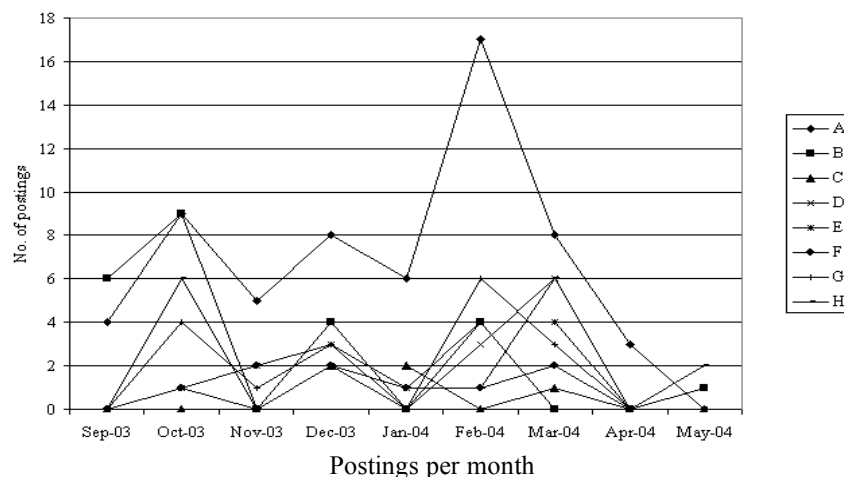
In further analysing the pattern of monthly postings by each participant, some differences in behaviour can be identified. Student A took a lead in postings from the launch of the discussion board and maintained this position throughout the duration of the study. Student B initially exhibited a relatively high level of postings but this declined rapidly after the first six weeks. Over 50% of student B's postings were made during the period mid-September to end October 2003. Other students lagged in levels of participation but by mid-October all students, with the exception of Student C, had made at least one posting. Gender does not appear to play a significant role. The early leaders were both male but the participant with lowest overall contribution, Student C, was also male. The influence of isolation was difficult to assess from counts of postings

In addition to measuring levels of activity, analysis of discussion board content was undertaken to gain information about the nature of discourse as time progressed. This process required discussion threads to be categorised within a classification system. (Curtis and Lawson, 2001) employ a similar approach for deriving evidence of collaborative learning from student contributions to an online discussion area. They developed a system of five 'behaviour categories', and associated of sub-categories, to code postings. The categories included planning, contributing, seeking input, reflection/monitoring and social interaction. Evidence of collaborative learning was gathered from the extent (number of postings) and the 'depth' of contributions. In the current study, the number of postings is relevant but depth of contribution is less significant, the duration of most threads being two days or less. More significant, as a means of analysing change in collaboration, is the nature of discourse being initiated. A system of four discourse categories was developed for this purpose: contributing, querying, other work-related and other social related, each with two or more sub-categories.

Discourse category	Sub-category	No. of threads
Contributing	Providing information about the VLE system Providing information in support of the mentor role	8
Querying	Seeking information or help related to the VLE Seeking information or help related to the mentor role Seeking information or help related to other learning technologies	19
Other work-related	Organising work-related outings or events Other work-related discussions	5
Other social-related	Organising social outings or events Other informal discussion	15

Total number of threads initiated by discourse category

Two main categories of discourse predominated, in terms of numbers of discussion threads initiated. Out of a total of 47 threads, 19 were coded in the 'querying' category and 15 in 'other-social related'. Within the former, 14 discussion threads were in the sub-category, 'seeking information or help related to the VLE'. There was also a relatively high proportion, 7 threads, within the contribution category where participants were 'providing information about the VLE system'. This provides strong evidence of the student mentors using the discussion board to share information and build their collective knowledge about the VLE system. However, there were also examples of students initiating discussion threads to gain a shared understanding of the mentor role. The latter included, an early discussion about 'Blackboard Pros and Cons' and the approach mentors should adopt when initiating discussions with academic staff. Within other-social related, 9 threads were attributable to 'organising social outings or events', such as birthday celebrations.
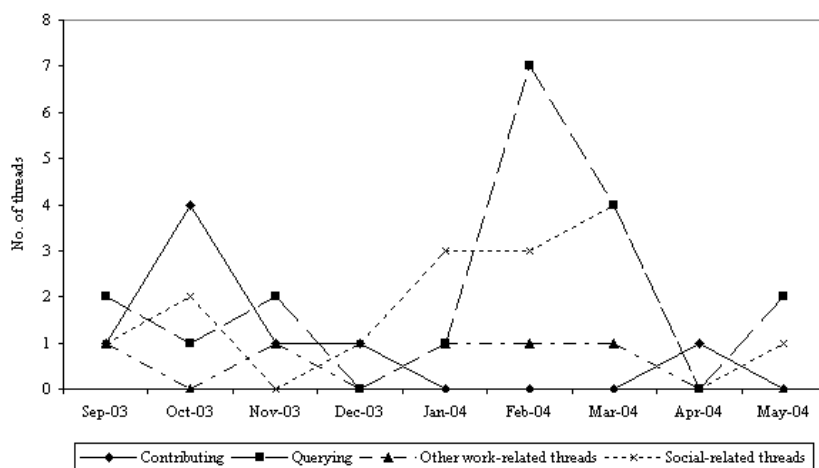
Distribution of discourse categories over time

The discussion threads were further analysed on a monthly basis to show how the types of discourse changed over time. The chart above plots the total for each category being initiated per month. There are two notable trends. The first is the prominence of threads within the contribution category at the start of the discussion board activity during September to November 2003. This was surpassed in the period January to March 2004 by threads in the querying category. This suggests an initial tentative phase in the development of the community with students revealing the extent of their knowledge. Later as they gained confidence in the community and became more involved in their placement roles, they actively sought help on specific topics through the shared discussion area. These trends are consistent with the community mapping out the knowledge base during coalescence and organising this knowledge when progressing to maturation.

Danis et al, (2003), in a further study of the Portkey case focusing on site usage for extracting and providing information, also noted changes in the nature of interactions during the period of summer intern placements. 'Social browsing' afforded through the Portkey site enabled interns initially to gain knowledge about their peers and develop professional and personal relationships. At a later stage, 'the development of a group sense emerged from interaction about more general topics'. This resulted in the reputations and roles of some individuals coming to prominence. Further investigation of the discussion threads in the current study supports these findings. An analysis of participant discussion threads initiation reveals that not only was Student A the most prolific message poster but he also instigated the highest proportion of threads, 45% of all threads. One plausible interpretation is Student A's self-appointment to community coordinator; a role (Wenger et al, 2002) propose is vital in developing a community of practice. 'The community coordinator is a community member who helps the community focus on its domain, maintain relationships, and develop its practice'.

Findings from the online questionnaire

The analyses of discussion board participatory activities and discourse trends suggest the existence of underlying factors influencing change in collaboration. An online questionnaire issued in May 2004 was used as an instrument to probe such influences further. Survey questioning in relation to discussion board collaboration focused on initial motivation to participate, perceptions of usage, perceived changes in motivation over the project period and the contribution of online discussions to developing shared understandings of the VLE system and the mentor role. All eight student mentors completed the questionnaire.

The findings of the survey indicate that the initial motivation to participate in the discussion board for the majority of mentors was to share ideas and interact socially. Student C was initially unaware of the resource until "*told about it after sending an e-mail asking for advice*". All mentors used the discussion board for contributing information, asking or responding to queries and organising work-related or social-related events. Their perceived frequencies of engagement in these types of activity varied. Student A acknowledged his frequent participation in all types, whilst Student E 'often' engaged in asking or responding to queries and in organising work-related events. Student B was the only participant who indicated frequent lurking. When asked to rate the various uses of the discussion board, all participants indicated that 'posting queries' was the most important or second most important activity. There was some variability in the least important activity with four

participants choosing 'organising social events' and three opting for 'gaining experience in using discussion boards'.

When asked whether motivation to use the discussion board had changed over the period of the project, four of the participants admitted to being less motivated, three suggested that their motivations were unchanged whilst one, Student D, became more motivated. The participants were also asked to comment on any change in motivation. The acquisition of knowledge and imminent ending of the project were cited as two factors influencing reduced motivation; *"no one uses the discussion board as much as before partly because we have more knowledge and don't need to ask many queries"* and *"people tend to use it less now we are getting to the end of the placement"*. Student B's response provided some insight into the rapid decline in active participation as evidenced through posting counts. He expressed disillusionment with his fellow mentors as a contributory factor in decreasing motivation to participate. *"It was useful at first but as it is a 'community' service its usefulness is derived by the community usage, that is, it needs an involved community to stay useful and not a lacklustre group of people dedicated to not doing very much"*. This suggests some failure in relationships within the community during coalescence, although Student B's continued passive access to the discussion board indicates some residual value in community membership.

Student B's disillusionment was also apparent when commenting on the contribution of the discussion board to the development of shared understandings of the VLE system and the mentor role. All participants, with the exception of Student B, affirmed this contribution. Student A was particularly positive. *"Definitely, yes, it allowed people to see that everyone else was going through the same problems and allowed us to share the same sense of identity"*.

Findings from mentor interviews

The findings of the online questionnaire provided an indication of some of the factors influencing change in collaboration via the discussion board. The participant responses were used as the basis for semi-structured interviews with four of the students: Students A, B, D and E. Student A was the most enthusiastic and prolific contributor who seemed to have adopted a community coordinator role. Student B appeared to have become disillusioned with the community over time. Student D was the only participant who admitted to becoming more motivated throughout the period of the project. Finally, Student E, being the most isolated of the mentors, appeared to have potentially much to gain from collaboration through the discussion board.

From the initial face-to-face meeting of the group, Student A's gregarious nature provided an early indication of his potential leadership role. He was a computing student who had not used the VLE during his programme of study but was an experienced discussion board user, having participated in an openly-accessible, external forum to post programming queries. During the interview, Student A indicated that he was keen to promote collaboration via the discussion board from the start of the mentor project. *"I always ...want to do something and... nobody else...feels...like... they know what to do. So, I always end up sitting there 'Right, OK, lets post a message' and I always just get on there..."*. Student A also acknowledged shared leadership with Student B in establishing the discussion board as a community tool. *"I think we dragged it along really and I think if it hadn't been for me and* Student B *it would never have been used"*.

Student A had shared some lectures with Student B before the placement and he recounted an incident that may have impacted on their relationship within the mentor community. *"I knew* Student B *because he complained once in a lecture and it was quite funny..."*. This may have led to one intervention by Student A that appears to have triggered Student B's disillusionment with the community. Student A, as a *"joke"*, edited one of Student B's contributions to the discussion board. On reflection, Student A regretted his actions but acknowledged the potential for such situations to arise in a collaborative environment lacking non-verbal communication. Unfortunately, this action seems to have resulted in a breakdown of Student B's trust in the community.

Although Student A maintained a high level of participation for most of the period under study, his motivation to do so was greatly reduced towards the end. He attributed this to a reduced level of mentor support work and also to his relocation to a different workplace environment. During his placement, he had been located initially on his own but was relocated to an environment where he engaged more with others who shared an interest in his work, a phenomenon consistent with the concept of constellations of practice (Wenger, 1998).

The interview with Student B revealed that, like student A, he had engaged in a number of online discussions before the mentor project. He also admitted to being enthusiastic at the initiation of the mentor discussion board. *"Yes, I thought obviously it was going to take the same vein as most technical forums"*. However, he indicated that collaboration through the mentor discussion board failed to meet his expectations from prior experience. Without direct reference to Student A's action, Student B indicated his dissatisfaction in the trivialisation of the

discussion by some mentors. Despite his disillusionment, he admitted to continued access the discussion board throughout his time as a mentor, valuing the "*serious*" content of the discussions.

The impact of Student A's actions on Student B's participation in the mentor community demonstrates the importance of establishing behavioural norms within a collaborative environment. Norms represent behaviours acceptable by a community as opposed to formal rules that are imposed to control conduct. In a further study of the Portkey case, (Danis & Lee, 2005) describe a 'failure event' that subsequently leads to negotiation by a group 'with the process of evolving a set of norms'. Such negotiation is not the evident in the LJMU case, although there were no further practical 'joke' incidents. However, an understanding of the inappropriateness of Student A's actions seems to have promoted moderation in behaviour by the members of the community.

The interviews with Students E and D provided some further insights into change in collaboration. Student E's isolation through physical location did result in his appreciation of the shared support provided through the discussion. However, his lack of contact with the other mentors meant that he exhibited, more than the others, a frustration at the decline in contributions towards the end of the project. Student D indicated that her motivation to participate in the discussion board increased as the community developed. Initially, she had reservations about the value of an online collaborative environment but later appreciated the contribution it made in developing her understanding of the role and providing opportunities to develop knowledge and understanding of the VLE.

DISCUSSION

The current case provides some insight into changes in collaboration mediated by an asynchronous discussion board as a community of practice coalesces and progresses to maturity. Some key factors influencing change through these stages have been identified.

From the earliest stage in community development, (Wenger et al, 2002) advocate the critical role of the community coordinator. The current case supports this proposition, with online collaboration being initiated and sustained by a self-appointed leader whose interventions were crucial to the development and maintenance of the community. However, coalescence of the community is not only dependent on successful coordination but also on developing relationships and trust amongst members. Although the current case offers a micro-level view of a developing community of practice, it does highlight some of the issues that influence successful progress through this stage. In particular, it demonstrates the need to engender value in collaboration, to facilitate integration through professional and personal interactions and to promote the establishment of behavioural norms.

In the development of any new community, valuing collaboration by all potential members should not be automatically assumed. A successful community of practice depends on the nurturing of positive perceptions and experiences through participant collaboration. The current case demonstrates how an appreciation of collaboration developed to the extent that the discussion board became a vital support tool. One factor that promotes value in collaboration is providing opportunities for both professional and personal interactions. In the current case, the self-moderated discussion board enabled participants to share work-related information, query and respond to work-related question and engage in social-related discussions, such as arranging meetings external to work. The change in discourse being initiated reflected development in participant relationships from new community members becoming familiar with each other through to active collaborators supporting each other in their practice. However, the case also demonstrates how failure by the community to establish behavioral norms can lead to at least partial breakdown of the community.

In assimilating the above findings, it should be appreciated that these have been drawn from a small-scale study that has focused on collaboration through an asynchronous discussion board. The scope of the study has not included collaboration through alternative formal and informal interactions. It has also not studied in depth passive participation in the form of lurking on the discussion board. Wider investigation may disclose other factors that influence change in collaboration. The study also reveals the propensity for students to engage in collaboration mediated by technology and may lead to further investigation of factors promoting successful online collaborative learning.

CONCLUSIONS

The current study investigates how collaboration, mediated by technology, changed as a new community of practice developed involving eight work placement students. The study is based on an analysis of work placement student participation in an asynchronous discussion board, responses to an online questionnaire and further information derived from interviews conducted with four of the participants. Key factors identified in

influencing change in collaboration include the development of a community coordinator role, learning to value collaboration, integration through professional and personal interactions and establishment of behavioural norms.

The findings of the study provide a basis for future research not only into successful collaboration in work-based communities of practice but also for students engaged in online collaborative learning.

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