Developing the Communities of Practice, Framework for On-Line Learning

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Abstract: Doctoral research considered whether healthcare students were able to develop characteristics of Communities of Practice when engaged in an interprofessional online module. Using a case study approach the research included two phases. Within phase one a questionnaire was administered to the group of 109 healthcare students. These were analysed to gain information on which to base sampling for the subsequent phase. Phase two employed three strands of data collection; five students completed an online diary, the online interaction of seven students was captured on a discussion board and three students were interviewed. Data were analysed using a form of pattern matching. The results suggested students were able to develop the essential elements of Communities of Practice. This was not uniformly seen however, and particular issues emerged for the online community.

This paper focuses on discussing the contribution of the research to the development of the Communities of Practice framework for online learning. The discussion will review the main findings of the research, showing how these have led to the development of the theory. It offers an augmented framework, in which the elements of mutual engagement, joint enterprise and shared repertoire are enhanced to include those facets necessary to support an online learning community. Finally, it is suggested that the augmented framework may have applicability to other professional groups engaging in online learning and working, with consideration given to how it might support e-based communities.

Keywords: Online learning, communities of practice, higher education, case study research

1. Introduction

The Communities of Practice (CoP) framework (Wenger 1998) was employed as the theoretical underpinning for this doctoral study, which used a case study approach (Yin 1994) to consider whether students of the health care professions might develop online CoP as part of higher education study. This paper considers the theoretical basis of the learning model as a social and situated learning theory, reviewing the main components of community; mutual engagement, joint enterprise and shared repertoire. The application of the framework to online learning (OLL) contexts is considered, along with its use within this study. The discussion presents study findings, proposing an augmented framework that might be employed to support online learning.

2. Research context

This case study was centred in a higher education institution, drawing on a sample of final year nursing (adult, children's and mental health branches), radiography and radiotherapy students based within a faculty of health and social care. The faculty culture supports online learning, evidenced in its learning and teaching strategy, investment in a team of technical and design staff to support e-learning development and a staff development programme including authoring, implementation and supporting e-based delivery. Within the final year undergraduate pre-registration curriculum, an Interprofessional module (IP3) forms a compulsory component for nursing and allied health profession students, studying towards either a diploma (nurses) or honours degree (nurses and allied health professions). With the exception of a face-to-face introductory session, the entire module is supported online within the Blackboard virtual learning environment (VLE). Using a constructivist approach to enquiry-based learning, groups of up to eight student's work with a facilitator to address an initial trigger question (see Hughes et al 2004). Over a period of eight weeks the students engage in online discussions through the discussion board and virtual classroom, submitting individual work online throughout the module and providing peer feedback that contributes to the final module assessment.

3. Theoretical basis

Lave and Wenger (1991) initially espoused learning as a situated activity, employing the phrase, 'Legitimate Peripheral Participation'. Learners were seen to participate in a community of practitioners and are assimilated into the socio-cultural practices of the community, gaining competence through knowledge and skill development acquired from those positioned as masters (Lave and Wenger 1991). This view of learning resurrected a model of apprenticeship and work-related learning, that was developed as a social learning framework to include four components; community, identity, meaning and practice (Wenger 1998). Meaning is described as participation and reification, which is historically and contextually bound, constituting learning from

negotiated experience and participation in the community. Practice, learning as doing, involves participation with the community, with the aim of achieving shared goals. Reification, through the use of objects, shapes experiences and contributes to identity formation, with identity seen as learning as becoming. Community is then referred to as learning as belonging, where the community is the learning context and has three essential components; mutual engagement, joint enterprise and shared repertoire.

The model is also viewed as a situated learning theory as it describes learning in social and situated contexts, especially in the workplace (Fowler and Mayes 1999, Fox 2000, Warhurst 2003). Indeed, Lave and Wenger (1991) articulate a view of situated learning as, 'an integral and inseparable aspect of social practice' (p.31), which is captured in their descriptions of 'Legitimate Peripheral Participation.' Fowler and Mayes (1999) suggest this view of situated learning is social anthropological, where a wide social context is expounded and the CoP emphasises the relationship of the practitioner with members of the CoP, which ultimately shapes the individual's identity. This concurs with the views of Brown and Duguid (2002) who suggest situated learning is 'knowing how to be in practice', rather than 'knowing about practice' (p.138), and thus involves a process of identity development for the newcomer through participation in the practice of the community

4. Theory: Research underpinnings

The development of the theory was based on five studies of apprenticeship discussed by Lave and Wenger (1991). These included midwives in Mexico, Vai and Gola tailors in Liberia, quartermasters in the United States of America (USA), supermarket butchers in the USA and Alcoholics Anonymous (AA). Jordan's (1989) study of Yucatec midwives described family tradition as the basis of learning. Midwifery was part of daily life for young girls, observing and listening to stories from Mothers and Grandmothers until they were able to deliver babies and act as competent midwives themselves. Formal teaching was not central to the learning, but participation was the way of learning the art and science of midwifery. Lave and Wenger (1991) comment on the variation seen in the forms of apprenticeship studied, where the tailors had a formal sponsored relationship with their masters, quartermasters and butchers follow training programmes and the membership of AA developed through demonstrated commitment to the community.

Becoming a member of a CoP involves learner engagement with the social processes of the community and its tools of the trade or artefacts. Developing competence in knowledge and skill is important in identity formation of the newcomer, who becomes part of the reproductive cycle of the CoP. This position seems to support commonality rather than diversity within the CoP, and has led to some criticism of CoP aiming to perpetuate communities (Eraut, 2003), rather than supporting growth and change.

5. Community dimensions

Wenger's (1998) conceptual framework sees practice as central to the community, as it is through practice that relationships are formed and identities are developed. There are three dimensions described as essential to a community (Wenger 1998); mutual engagement, joint enterprise and shared repertoire. This research explored whether such dimensions were evident in an online environment, where the community was composed of students working virtually. Mutual engagement is the basis for relationships necessary to the functioning of the CoP. It involves regular interaction of the members, who negotiate meaning of practice within the community. The practice does not reside in artefacts, though may employ computers or books. This interaction might be through formal meetings or informal exchange, which can enable engagement and act to maintain the community. Within an online community, engagement will require online communication and ongoing maintenance through e-mail, discussion boards and virtual classrooms. Wenger (1998) goes on to suggest communities are not homogenous, but are composed of diverse individuals, yet through working together they will influence each other's functioning within the community. Individuals will create their own identities that function within the community through mutual engagement, a sharing of practice.

The students involved in this study are members of different professional communities, nursing, radiography and radiotherapy, though are expected to work within an interprofessional community, where they make complementary contributions in caring for patients. Mutual engagement will require sharing of their understanding of professional practice and the creation of relationships between the members that can work to the benefit of the community and its patients. It is anticipated that the community would not necessarily live in harmony, but that there can be disagreement and conflict, yet there is concern that if commonality is favoured, this may limit diversity and conflict may be ignored.

Joint enterprise refers to a process that maintains the existence of the CoP. It is not merely about sharing goals, but a negotiated enterprise, involving mutual accountability (Wenger 1998). In an OLL context, this would require students negotiating ways of working towards communally agreed enterprise, within the constraints of an OLL environment. This does not mean all the students must share the same view, but must negotiate their enterprise. Negotiating joint enterprise manifests relations of mutual accountability within the CoP. Working in a mutually accountable way would require a conscious concern about their engagement with OLL. There should be a sense of responsibility as individuals and as a community, with members working to the benefit of the CoP and with concern for themselves and other members. Mutual accountability might be reified by ground rules set by the students at the start of the module, assessment goals to be achieved and limitations of the VLE. Shared repertoire might include developed routines, language, ways of working and stories within the practice of the community, generated through negotiating meaning (Wenger 1998). It is thought to include aspects of participation and reification. Actions and artefacts have histories of interpretation though it is suggested that they do not constrain meaning, but allow negotiation of new meaning and dynamic development through sustained engagement in the community. This aspect of a CoP tends to suggest longevity. Indeed, Fowler and Mayes (1999) feel CoP have a long term and stable perspective to them, which might restrict their use in more transient learning environments. It should be noted however, that research by Rogers (2000) discussed later, was conducted during a three-week online course and suggested the dimensions of a CoP were present.

6. Communities of practice in on-line learning

The development of a community of online learners working collaboratively within a constructivist-learning environment is discussed within the literature (see Palloff and Pratt 1999, Garrison and Anderson 2003), yet not all students seem to confirm the development of such a community of learning. Orey et al (2003) in the USA reports the findings of interviews with participants of an OLL course. Limited by the very small sample of two males and one female, they describe interactions with coaches external to the learning group, engaging with them rather than forming a community of learners with tutors or fellow students.

Earlier ethnographic research by Spitler and Gallivan (1999) also in the USA, employed Lave and Wenger's (1991) 'Legitimate Peripheral Participation,' to consider how knowledge workers learnt their job within a firm of management consultants, also exploring the role of IT in learning. Thirty formal staff interviews and observations recorded evidence of mentorship and the importance of learning on the job, suggesting CoP had a significance influence on knowledge workers within this isolated example. Somekh and Pearson (2000) used Wenger's (1998) framework to analyse a European research project group linked by electronic communication and occasional face-to-face meetings, considering children's representation of information and communication technology (ICT). Presentation of the findings at conference revealed the CoP did not function easily when reliant on electronic communication. Dispersed working confounded the negotiation of joint enterprise; agreed deadlines were frequently missed as they failed to register in people's consciousness. Sharing a work environment would seem to act as a reminder of deadlines, an impetus missing from electronically linked communities. Shared repertoires and histories of the research partners also created tensions in negotiating a shared understanding of the research approach used, action research. This meant mutual engagement was undermined, as negotiated meaning remained illusive.

Rogers (2000), also in the USA, employed a case study methodology in applying the CoP framework to an online educational setting, providing the only previous example of such an application in the current literature. Though the study was limited by recruiting a small sample of 26 teachers and administrators participating in a three-week workshop 'Teachers of English as a Second or Other Language,' it offered an analysis of online dialogue. Rogers completed pattern matching and identified elements of the theory, though offers no independent verification of this analysis, an acknowledged weakness of the study. He confirmed the need for further research, whilst concluding the presence of collaborative working and identified Wenger's concepts of mutual engagement, joint enterprise and shared repertoire in the data. Wegerif (1998) proposed Lave and Wenger's (1991) framework of 'Legitimate Peripheral Participation' could be used to illuminate the relationship seen in a study of 21 Open University students studying online, between social dimensions of learning and success in a teaching and learning course. A constructivist pedagogy underpinned the course, which Wegerif (1998) felt was supported through developing a sense of community in the group of

learners, seeing social processes as imperative to collaborative learning. Millen and Muller (2001) also in the USA, present research with designers and journalists where knowledge sharing in a CoP was situated in virtual and physical worlds. They highlighted the importance of web-masters and discussion-group moderators in nurturing an online CoP. More recently in the United Kingdom (UK), Murray (2003) describes the possibilities of developing online CoP through engagement in formal e-learning or informal environments. He comments on the potential advantages to nurses forming virtual CoP, referencing an earlier PhD (Murray 2002), for exploring practice, information exchange and potential practice development.

7. Research methodology

In order to address the main research question, 'How do the essential characteristics of a Community of Practice develop in higher education online learning environments?' a case study approach (Yin 1994) was adopted. This included two phases, that followed ethical approval gained through the University and faculty ethics committees and piloting of the data collection tools. Firstly, a questionnaire was employed to gain information about the characteristics of the student group (n=109), exploring gender, age, and previous computer use for learning and perceived confidence in use. In so doing it reflected a number of issues related to computer use identified in the literature (Boyle and Wambach 2001, Barrett and Lally 1999). Descriptive analysis of the questionnaire identified frequencies of response and supported the identification of the sample used in the second phase that included three data collection strands. The sample included both males and females, aged between 18 and 49, accessing computers from home, university and other sites. Representing the different branches of nursing, radiography and radiotherapy, they also presented perceived differences in confidence levels in computer use and reported various levels of experience of OLL.

As part of the second phase, seven students were grouped and consented to allow collection and analysis of their discussion board data across the six weeks of the module delivery (327 postings in total). Five students were asked to complete weekly online diaries and three students were interviewed after completion of the module. The data was analysed using a form of pattern-matching (Yin 1994), employing a matrix of categories identified from Wenger's framework (1998), as an approach to data analysis suggested by Miles and Huberman (1994). The

data was analysed by matching verbatim and text data to the categories.

8. Research findings

The data suggests that some students were able to develop elements of mutual engagement, joint enterprise and shared repertoire. Students of the healthcare professions were therefore able to develop the essential characteristics of a CoP in higher education online learning environments, though this was not uniformly seen and a number of issues peculiar to online CoP emerged.

8.1 Mutual engagement

Mutual engagement was facilitated in a number of groups, with formal discussion and social discourse seen. Early engagement is viewed as important to online learning and teaching (Salmon 2004). Online exchange did however hold limitations, and the groups tended to use the virtual classroom to support negotiation and decision-making. Access issues were also evident. These resulted from technical problems as reported in other research (Gillis et al 2000) and a lack of IT skills amongst some students. Those without computer and Internet facilities at home were unable to benefit from the flexibility and convenience that online learning is reported to offer (Martyr 1998, Andrusyszyn et al 1999, Geibert 2000, Atack 2003).

> *'. Me and computers do not mix, having written this for the second time because it crashed on me!!'* (DipHE Adult nurse)

> *'I think I lost nearly two stone walking to Uni, that's the biggest advantage of online learning. HA HA HA.'* (DipHE Adult nurse)

There was evidence that professional and personal identities were defined online, though a lack of physical presence in the learning environment resulted in problems in identity recognition for some. Assumptions were made about the composition of the group and there were claims from those students interviewed, that they had presented themselves differently online than they would in a face-to-face learning environment.

> *'Wow! I would never have guessed that English was not your first language.'*(BSc Radiography)

> *'At the start of a classroom experience I would have been quieter. With this I felt I had to go on at the start and say, "hello, this is me!" and get on with it.'* (BSc Child nurse)

8.2 Joint enterprise

Joint enterprise was again evidenced, though the degree to which this occurred varied, with some students feeling this was not achieved. Ryan et al (1999) found the immediacy of classroom delivery was important in comparisons with web-based delivery. Students in the study missed the immediacy of face-to-face interaction, particularly when the groups were trying to negotiate endeavour.

> *'They used the virtual classroom to discuss the guidelines. It was clear it was going to need a lot of negotiation.'* (BSc Child nurse)

There were mixed accounts of group interactions, with some implying students were too polite, unable to disagree and negotiate, whereas other students reported open disagreement and strong negotiation in their groups. Acceptance of accountability for group endeavours also varied, with some students seeming to avoid commitment to their group, preferring to pursue autonomous working.

> *'. People appear to be extremely polite when speaking over the Internet and I wonder if this is going to interfere with getting down to the nitty gritty of what we actually have to achieve.'* (BSc Radiotherapy)

> *'I do feel that I haven't has much group interaction at all from this module.'* (BSc Adult nurse)

> *'As I mentioned earlier, there only seem to be myself and two others who are pulling our weight!'* (DipHE Mental Health nurse)

Technical issues and skills, as previously seen (Ragoonaden and Bordeleau 2000), may have adversely affected the engagement of students in online learning. It is suggested that differing technological skills affect group collaboration (Ge et al 2000). A lack of trust amongst group members can contribute to difficulties in-group functioning (Wegerif 1998, Murphy et al 2000). Individuals can also be reluctant to engage in online groups (Brown 2001). A perceived lack of time for engagement may also be an inhibiting factor (Conole et al 2002).

8.3 Shared repertoire

It is postulated that OLL environments with a brief existence may not have the longevity required to develop shared repertoire (Fowler and Mayes 1999). Attempts to review this are compounded by the difficulties of accessing evidence of routines, language, and ways of working online. Despite these concerns, a number of students had reached new understandings of interprofessional working and of IT skills, developed through community engagement.

> *'I learnt more about the other professions, especially radiotherapy.'(Dip HE adult nurse)*

Some support for the development of shared repertoire resultant from online group learning is therefore evident. There was evidence of humour, shared discourse and some presentation of shared routines online.

> *'Thanks for saying hi the other day on the video conferencing .my class was wondering what was going on!!!'(Dip HE adult nurse)*

> *in reply :'Ahhh just tell em you're me toy boy'* (BSc Adult nurse)

This was not uniformly developed however; with a number of students claiming autonomous working and learning had dominated their experience.

> *'We didn't discuss a lot in my group and I tended to get on with it.'* (BSc Child nurse)

Autonomous working can be the preference of students working in online groups, which it is suggested can particularly be the case if collaborative elements of online learning are not seen as relevant or focussed on assessment (Ragoonaden and Bordeleau 2000). The findings offer the potential to develop Wenger's (1998) framework, expanding it for use in OLL environments. Aspects of the social learning model and the three essential components of community are being reviewed to include those factors requiring consideration when applying the framework to OLL contexts.

9. Theoretical framework development

Uniquely this research has considered whether students of the healthcare professions could create an online CoP as part of a web-based learning experience. Its focus on the three components of essential for community functioning; mutual engagement, joint enterprise and shared repertoire, have led to the discovery of emergent issues to inform the development of online communities.

9.1 Developing mutual engagement

The student community working in a virtual environment needs to overcome access issues not normally present in a physically located CoP. To support mutual engagement the CoP members required IT skills and resources, both hardware and software, to engage in the virtual community. The study also found students required access to

all components of the VLE, using the virtual classroom for synchronous discussion (real time interactive communication), crucial at times when the members were required to make decisions. On these occasions more 'instant' communication than that offered through asynchronous (not real time) vehicles such as the discussion board or email, was essential. These findings suggest that an online community will need to ensure participants have the technological provision and necessary IT skills to support engagement.

9.2 Developing joint enterprise

The students were able to present and develop individual identities online as part of joint enterprise. Professional identities of the healthcare students were shared and understandings of professional roles were enhanced. However, data also exposed the potential for identities to remain hidden. Examples included the presentation of gender and culture that could remain illusive to fellow community members. Additionally, students confirmed that their presentation online differed from that offered in the face-to-face learning environment, creating different personas. The emergence of different online personas, originally presented by Turkle (1997), suggested alternative identities could be portrayed in an environment where individuals might remain hidden. The interview data in particular suggested students felt communication online was curtailed due to word-processing difficulties. This hampered the openness of communication, resultant in a feeling that they were presenting different personalities online.

There was also evidence of individuals failing to engage in community endeavour, with some students very obviously preferring to work autonomously.

9.3 Developing shared repertoire

Identifying elements of shared repertoire proved problematic in the analysis of the online environment, which lacked the richness that might be observed in a physically located CoP, where presentations of gestures, nuances, routines, stories are manifest. Additionally, IP3 lacked longevity, which seemed to lessen the opportunities for the development of shared understanding. It was clear however, that engagement in the OLL environment supported the development of IT skills amongst many students, with noted development in the use of various components of the VLE. The data also demonstrated IP learning, with a number of students discovering more about other healthcare professions from fellow community members. As the case study is limited to one group, it is difficult to know whether this learning was a feature particular to this group or whether this might be seen in other cohorts of students studying IP3.

9.4 An augmented framework

In developing Wenger's (1998) dimensions of CoP for the online environment due cognisance of the above facets needed consideration. The development and augmentation of the framework provided by Wenger (1998, p.73) is shown in figure 1.
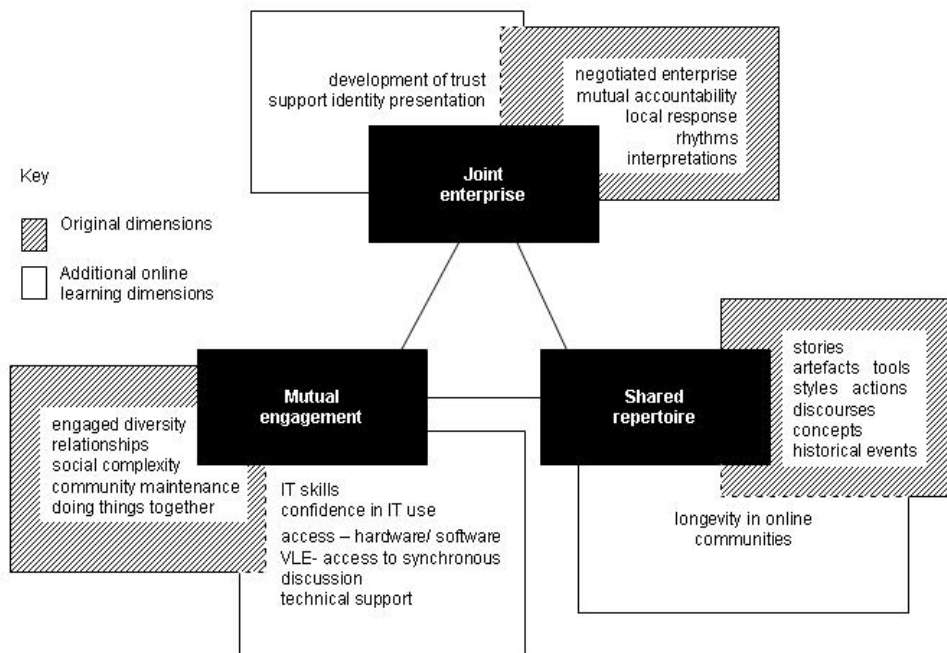

Figure 1: Augmented theoretical framework. Adapted from Wenger 1998:78

It presents the additional facets required of the CoP framework when applied to online environments. The model includes the three main components arranged in a structure that adapts Wenger's (1998) original presentation, with mutual engagement, joint enterprise and shared repertoire being positioned with the key facets related to each outlined in a 'square'. The model has been augmented to include the addition of a second 'square' to include the additional facets required within an online CoP. Mutual engagement includes; IT skills, confidence in IT use, access to computer hardware and software, VLE access and technical support. Joint enterprise sees the development of trust and support of identity presentation as an added facet of online community working, with shared repertoire suggesting longevity of the community is required. The additional 'squares' are attached using interrupted lines to depict the possibility of the CoP continuing to exist in physical environments, not requiring the online facets. The structure also offers scope for the online facets to support physically located contexts as well. For example, development of trust, whilst identified as important to the OLL CoP, is likely to impact on a physically located CoP.

10. Conclusion

The results of this study suggest that nursing, radiography and radiotherapy students learning online were able to demonstrate the development of mutual engagement, joint enterprise and shared repertoire, as elements of Community of Practice. This was not uniform and issues associated with operating in an online community enabled the identification of the additional facets required to support such communities, as presented in the augmented framework. The findings also raise ongoing concerns of interest to e-learning proponents and implementers. These relate to enabling access to the environment and supporting the development of computing skills. Issues of course design are also raised, requiring the linking of activities to assessment processes that necessitate the involvement of all members. Course design should ideally require students to explore each other's histories and values, limiting different persona presentation. Course longevity should also be considered. Despite these issues it is suggested that creating online communities of practice will allow the transcendence of geographical boundaries amongst learners, as seen with this interprofessional group of healthcare students. It has the potential to facilitate nationally and internationally based pursuit of academic endeavour and practice development.

A further publication by this author on this subject can be found at Moule P (2006) E-learning for healthcare students: developing the communities of practice framework. Journal of Advanced Nursing. 54 (3), 370-380.

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