Purpose: A learning community has been developing in a distributed environment amongst the members of the Centre for the Enhancement of Learning and Teaching (CELT) located in the Bathurst, Goulburn and Orange campuses of Charles Sturt University. This group is known by the acronym of GDMOB, with the purpose of the community to facilitate the professional development and learning of its members. To facilitate the learning ICT has been employed to enhance, through an improved sense of community and social presence of the more isolated members of the group, the learning of the members of the community. It is the intent of this paper to explore and identify factors that contribute to the successful implementation and use of ICT to enhance learning and the construction of a sense of community.

Methodology / Approach: The methodology used in this study was that of a case study with a questionnaire that used the reflections of members within the GDMOB and personal reflections of the authors, both of whom are active members of the community. The data was interpreted using an insider’s perspective. The reflections of the members of the community were gained through the execution of an anonymous survey, through free form discussion as a collective group, and through observations of the interactions of the group.

Findings: Three key factors have been identified in this study that contributes to the successful implementation and use of ICT to enhance learning and the construction of a sense of community; communication, culture and purpose.

Research limitations: This research is limited by the small size of the community being investigated, though it is argued that the ideas that emerge can be relevant to larger groups. This aspect needs further investigation.

Originality / Value of paper: The paper reviews an emerging community of practice and provides reflections on the experience of moving from interactions that were purely face-to-face to a distributed and virtual community environment. Keywords: Community of Practice, Information Technology, Sense of Community
Identifying success factors of ICT in developing a learning community: Case Study Charles Sturt University

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Abstract

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Introduction
The intent of this paper is to reflect upon the experience of the GDMOB in developing a community of practice in a distributed environment. This reflective process will particularly consider the impact of the use of ICT in supporting the community. The GDMOB is a group of educational designers located at Charles Sturt University. The name, GDMOB, is a derived acronym from the names of the various campuses where these people are located and are responsible for namely Goulburn, Dubbo, Manly, Orange and Bathurst. The GDMOB has been developing as a community of practice over the last twelve months in response to the need for increased opportunity for professional development, sharing of knowledge across the various campuses and to enhance the performance and job delivery of the educational designers.

This study reports the result of an investigation in 2005 in this community that has employed a qualitative method of investigation using the comments of members of the community from an anonymous survey and the personal reflections of the two authors of this paper, one who was and the other who is currently a member of the community. The results of the investigation have reinforced the previous postulated ideas of the need for open and easily accessible discussion forums and the discrepancy between effective community development using face-to-face methods and virtual computer mediated environments.

We will first review the literature on community and how it relates to the GDMOB before describing the study and its results.
Literature Review

The concept of community is a difficult concept to clearly define despite significant study and reflection in the area (Brook & Oliver, 2005; Brook, 2004). Through their study of neighbourhoods, Chavis, et al (1986) proposed that there are aspects that are identifiable amongst and define communities. These aspects were further isolated and identified by McMillan & Chavis (1986) and McMillan (1996). The identified aspects were said to be (1) spirit, (2) trust, (3) trade or mutual benefit, and (4) art as a preserve of the experiences of the community. Chipuer & Pretty (1999) demonstrated that these aspects and the Sense of Community Index, that emerges from the above work, had applicability to the workplace. In reviewing the GDMOB and its evolution it becomes apparent that a crucial element in its success was the development of these aspects, in particular the necessity to build trust amongst the members of the community.

McMillan (1996) argues that for a community to survive the members of the community must share a security to speak the truth, where truth is defined as the personal realities that shape who we are including our failings. This evolves over time as the members of the group become more comfortable and through risk taking begin to develop belief and trust, which grows to an understanding of the shared benefits of contributing to the group and finally shared values. However, McMillan (1996) urges that this can lead to ‘a spark and a flame’ in the development of a sense of community, and that “this flame will never become a fire unless there exists in the community an authority structure that can sustain the fire”. In the GDMOB the Manager, Educational Design and Educational Technology leads the group. The GDMOB has a flat structure with all the educational designers reporting to this Manager. Although this manager leads the group and provided the ‘initial spark’, the maintenance of the fire came from within the group. Wenger, McDermott & Snyder (2002) put forward a model of a community of practice in which the drivers of the community are located within the core and other members on the outer of the model. The position of the relative members is fluid dependant upon the circumstance that is shaping the community and the knowledge of the members. It is this core that provides the drive for the community and continues the flame to burn. Within the GDMOB this core emerged amongst those that saw the importance of the community in achieving the goals outlined above and it became the responsibility of this core to encourage the participation of the other members within the group.

Vygotsky (1978) argues that a person’s learning could be enhanced through engagement with others. The theory suggested that a person’s knowledge existed within a realm of the known. When they engaged with
others they were able to extend their capability to a new, higher level. The variation between the original and new level was termed the Zone of Proximal Development (ZPD). The essence of this suggestion is that people learn better in social settings and through social interaction. Communities of practice encompass this concept in that they establish an environment where the necessary interactions that improve learning can occur (Wenger, et al, 2002). The interactions within these communities focus around the knowledge sharing of work practices and the enhancement of skills within the members of the community such as the GDMOB. Such interaction, it is argued, can be used as a tool for the improved professional development of the members within the group.

In their discussion of communities of practice, Wenger, et al (2002) argue that the composition of a community is fluid in its make up. At the centre of the community is a core of participants that provide the foundation upon which the community is built and there also exists the drifting peripheral members of the group. In the GDMOB this division also exists; there are active participants and those who are more careful in their participation. Within the community though there is a further division between those members who are considered experts and novices. In the GDMOB the expertise is not necessarily split between the more established and newer members, but rather distributed within this community based on areas of previous experience, both within the CSU context and externally. Through the interaction of the expert and novice and a neo-apprenticeship style learning can occur. The role of expert and novice is not a permanent role of the member, but is fluid dependant upon the situation, context and the experience that the relevant member brings to the discussion. Wenger, et al (2002) goes further to identify three dimensions of a community as a domain (body of knowledge), community (relationships) and practice (professional activity). There is, however, a primary focus upon the ability of the members of the community to socially engage with each other. Within the context of a distributed community, as is the GDMOB, Schweitzer (2003) argues that for this to occur “asynchronous discussion boards should be at the core of a community of practice”. In the reality of the GDMOB this did not prove to be the case for a range of reasons discussed later.

Stuckey and Smith (2004), through their study of several existing communities, argue that there are identifiable features to a successful community of practice, and most importantly the ability to sustain the community. They identify these as;

(1) *leadership*, “communities do not run themselves, regardless of how well the fundamental dynamics of a community may have been set in motion;

(2) *participation*, “sensitively and systematically gathering feedback from members at the centre and periphery is a key activity described by all community leaders”
(3) *distinguishable boundaries*, “maintaining appropriate boundaries is a key leadership task … communities need to be open and closed at the same time”; and

(4) *nourishment and an ability to respond to environmental change*, “both the community and its leaders need resources to sustain the community’s work”, “a community’s ongoing life seems to be a delicate balance between stability and change: if there is too much change, its sense of identity dissipates.”

Brook (2004) and Chavis, et al (1986) propose a further model to explain the interactions of communities, particularly with reference to online communities, known as the ‘Learning Community Development Model’. They conclude that there exist three distinct levels of factors that influence the success of a community; presage, process and product. Relevant to the discussion of this paper is their conclusion of the process factors, which were identified as the reason and context of the communication, and the enabling, supporting and moderating of the communication. They also identify the importance of a leader within the community, but additionally identify the importance of the system in supporting the learning. Within the context of an organisation it is evident that strong leadership and the availability of resources are imperative to the successful development of a community.

Social identity and sense of self is derived for the community to which the individual belongs. This identity influences the response of the individual to the community (Mansour-Cole, 2001). “Identity [and the sense of community] provides a way to explain why individuals might act on behalf of team, and helps predict the direction and persistence of collective behaviours” (Mansour-Cole, 2001:42). In building a community the individual members of the community must make an investment in the work of the community for the community to develop and grow and have meaning (McMillan, 1996; Mansour-Cole, 2001; Gibson & Manuel, 2003). The GDMOB is formally grouped into a community with regards to staff development activities yet interpersonal connections are based on formal and informal needs. This reality is the same whether the community is co-located and physical or distributed and virtual (in this context virtual is used to mean linked by technologies not that the community is somewhat unreal in its nature). The relationships that had been established prior to the group emerging hindered the free flowing sharing of ideas and knowledge necessary in a flourishing community. The hindrance resulted in a difficulty of new members joining, contributing to and gaining meaning from these relationships, and from an overriding comfort for people to only communicate amongst these groups rather than across the community as a whole.
The GDMOB is a distributed community being defined as one in which the participants can not engage readily in face-to-face interaction (Wenger, et al, 2002). Such a community can be dispersed across a large geographical area, which can also create variation within the culture of the various groups within the communities (Gibson & Manuel, 2003). The benefit of distributed and virtual communities of being able to span distance and time makes them important to the ‘shrinking’ global environment, and in the context of the GDMOB, essential. Most members of the GDMOB are located at Bathurst with one educational designer based at Orange and another at Goulburn. The nature of the GDMOB is that it is further distributed having the educational designers located within various schools with the Centre for Enhancing Learning and Teaching, in which the educational designers are employed, being a decentralised organisational structure. As outlined previously, trust amongst the members of a community is vital to the success of the community (McMillan & Chavis, 1986; McMillan, 1996). However, trust formation is challenged when the community becomes distributed and reliant upon computer mediated communication to support community development (Gibson & Manuel, 2003). This challenge emerges as a consequence of the limited ability of computer mediated communication to convey non-verbal cues that have been demonstrated to be important in the interpretation of meaning in communication. The variations and differences amongst community members are exacerbated through the lack of informal interaction, that contributes to trust development through the ongoing observation of other members’ contributions and efforts, and a poor shared understanding as a consequence of the members not sharing the same work environment and culture (Bhappu et al, 2001; Gibson & Manuel, 2003).

For trust to occur there needs to exist a level of risk amongst the members of the community, yet if this risk is too great there is propensity to reduce the level of trust. Within virtual communities the level of risk is heightened due to the inability to constantly monitor the actions of the other members, yet it is important that members of a community permit some risk as it creates opportunity to trust and members can demonstrate their trustworthiness (Gibson & Manuel, 2003). In the formation of trust amongst members of the community Gibson & Manuel, drawing on the research of Spears and Lea, assert that categorization of individuals into groups often resulted in individuals evaluating out-of-the-group members as less honest, reliable and trustworthy than those in their group. This categorization is evident particularly amongst virtual groupings similar to the GDMOB where some members are collocated and separated from other members who are limited to virtual communication and contact. Gibson & Manuel (p63) further highlight that when engaged as a virtual community, “perceptions of risks in terms of information sharing across these cultural [or physical] sub-groups are likely to be exaggerated” which could result in “superoptimal levels of risk perceptions that prohibit trust”.

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Communication builds trust. It, along with trust, is a fundamental to the building of communities, allowing them to grow, change and achieve objectives. Effective communication allows those involved to gather evidence of trustworthiness and to build the trust through continued interaction developing common values and a shared understanding (Gibson and Manuel, 2003). The evolution of a community of practice is reliant upon the effective communication of the members, most easily achieved through face-to-face meetings (Hinds & Weisband, 2003; Raven, 2003; Wenger, et al 2002). Physical proximity makes it easier for people to gather together to work on tasks and hold formal project meetings, but it is the casual conversations and informal discussions that provide the foundational support for these more formal activities and are also what is most difficult to create in a distributed community (Hinds & Weisband, 2003). The GDMOB rely on email and telephone for most of the informal communication while web cameras have recently been introduced for the members at Goulburn and Orange and the Manager to further enhance interaction. When a community resides in proximity to each other shared experiences and communication is an easier goal to achieve, but when a special effort is needed to connect to the community there is an increase in the inertia that the community needs to overcome and there is, according to Wenger, et al (2002) a greater importance for “the community to deliver tangible value for its members”. A distributed community, such as the GDMOB, must work harder to achieve trust amongst members.

Assumptions can not be made that practices and contexts are the same in the different localities, even when there are common terms used, the definition and enacting of these terms may vary between the various localities. In a distributed community, such as the GDMOB, opportunities to develop shared values and assumptions become less easy to achieve and therefore require the implementation of technologies that facilitate the communication that is needed to build a community of practice. Reliance upon mediating technologies, however, not sharing work contexts and not being geographically proximate, inhibit knowledge sharing and the ability for a community with shared understanding to evolve (Hinds & Weisband, 2003). Computer mediated communication thus provides the opportunity for individuals to communicate more effectively in situations where they are separated in both space and time. Within the GDMOB context there is a predominant reliance upon the use of teleconferencing, video-conferencing and email to facilitate the communication across the distributed members, with regular weekly meetings occurring using computer mediated communication technologies and monthly meetings occurring in a face-to-face environment. The weekly meetings, originally, only included members from the Bathurst campus in a face-to-face environment, but have evolved, through the use of technology, to also now include the educational designers located at Goulburn and Orange. However, the use of technology to bridge the
geographical gap can lead to misinterpretation of messages, as a lot of non-verbal cues can be missing form the communication (Gibson and Manuel, 2003). Computer-mediated communication technologies have difficulty, in the most part, to provide the same richness as face to face interactions.

Through the limitation of effective communication in a distributed community is it possible to form a true community of practice? Can the necessary informal interactions be captured by computer mediated communication? The argument is that the creation of a team, although difficult, is possible, but is a team environment equivalent to a community of practice? Raven (2003) argues that teams and communities of practice exist at opposite ends of a continuum, but also that most organisational groups exist somewhere along this continuum and rarely as a pure team or pure community of practice. Dependant upon the situation it is a reasonable argument to make that the group moves between these points to match the group dynamics to the task. The location where most groups exist could well be labelled as a ‘knowledge sharing community’ where experience and intelligence is shared, but without the level of a shared understanding of situations that is defined as necessary for a community of practice and/or where more formalised structures exist that make the group team-like in comparison to the informal nature of a community.

Methodology and Results
The methodology used in this study was that of a case study with a questionnaire that used the reflections of members within the GDMOB and personal reflections of the authors, both of whom are active members of the community. The data was interpreted using an insider’s perspective. The reflections of the members of the community were gained through the execution of an anonymous survey, through free form discussion as a collective group, and through observations of the interactions of the group. Comparison was drawn between these various sources to identify common themes and issues and to paint a more complete picture of the thoughts and opinions relating to ICT use in this community. Of the seven members of the GDMOB responses have been received from all but one, giving a response rate of 85%. The small sample size, however, limits this study to an anecdotal recount of a case study, but the authors would argue that the findings that emerge from this study could have applicability to other situations, but further research and study is required to substantiate this hypothesis.

The survey that was used asked the participants to reflect on their experience of the community of the GDMOB and the value of the monthly face-to-face interactions as well as the technology-mediated weekly sessions. The use of the term technology-mediated is a deliberate variation from computer-mediated as
these interactions used a variety of technologies including, but not exclusively, teleconferencing and videoconferencing. The survey tool employed a Likert scale for the participants to rate the effectiveness of the various technologies used. Participants were also able to make additional comments about each technology. Table I indicates the results. Due to the small sample size an indicator as to the level of response has been used rather than providing quantitative data which may be misleading. The indicators show the strength of response through size and number, where there was no response this is indicated with a dash.

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a At CSU the remote presentation technology refers to software known as ‘Bridgit’ which allows two or more people to share their desktops and simultaneously update a file.

It is inferred from this data that where there is a higher level of personal interaction, or at least the sense of it, then the technology is more readily accepted to be effective. The responses in the ‘Unsure’ column were usually accompanied with the comments on how the person’s use of the technology is emerging and that they need to ‘try it out’ more before concluding its true worth. This unfamiliarity of the use of technology
is evident amongst the GDMOB as previously there was little communication that was not localised. Through the experience of the various technologies people who were initially reluctant to take up the opportunity have overcome the technology barrier and engage with the technology as a useful technology rather than an inhibitor to communication. A more longitudinal study is necessary to measure as to whether this emerging confidence continues.

Meaning-making becomes very important in the use of the technologies and the more a person uses the technology the less concerned they become with the limitations of the technology and the more focused they are able to be with the message being communicated i.e. the technology becomes transparent. One comment in regards to the use of video-conferencing reinforces this;

“as I am getting more used to using the system it becomes easier to identify meaning in the message”.

This reality is also evident in the changing conversations that are occurring amongst the members of the community as they use the technology more often. Early in the process there was significant reluctance towards the use of technology and that it was ‘not productive’ and was ‘time wasting’. As the use of the technology has become more regular and the participants more experienced the early critics have actually become advocates of these technologies.

Another emerging theme from the comments received was on the reliability of the technology. Poor ratings on the scale were often accompanied by comments in relation to the technical limitations and difficulties of the technology. For example;

“in general I find teleconferencing useful, however ... we seem to often get a drop out effect”

“now with clearer visuals and the use of Bridgit it is much better, previously it just emphasised the distance” (video-conferencing)

“Touch typing is not my forte so it leaves me at a disadvantage.” (Online chat)

The technical impediments often prevent the technology from delivering to its maximum. The resulting frustration often resulted in members of the community not wishing to try again and dismissing the technology as useful. This was particularly the case in the early stages of using a new technology rather than after a period of successful use, where users were happier to “forgive and forget”.

The most significant force against the effective nature of a distributed community is the impact of the various cultures within the sites of the community (Raven, 2003). This is particularly evident in the GDMOB where members of the community who are co-located at a larger campus are more readily able to
form a cluster within the community having shared experiences and environments. In comparison the isolated members of the community tend to share more the culture of their location rather than the community. By comparing early comments by members to current expressed feelings it is argued here that emerging from this investigation is a significant relationship between culture and the development of a community.

In the early part of the developing community culture was a hindrance to the formation of a shared understanding, particularly the above identified clustering. “Old-school” cultural ideas also were against the use of technology in bringing about the community and there was not seen a value in the community being present. During this phase formal team-like structures were observed to be crucial in maintaining the ‘life’ of the community. However, as time has progressed, these cultural behaviours have changed to be more embracing of the community. The use of technology has become more efficient and accepted. The technology has gone from an inhibitor to a transparent medium of effective communication. It is hypothesised that as the community continues to evolve that a willingness to change will become more evident and the community will become more self-sufficient and not reliant upon such formalised structures as in the early stage.

The uptake of the technology, and the community as a whole, was also significantly impacted upon by the purpose that it achieved. One surveyed participant commented that;

“if there is no purpose to talking why would we?”

This was also particularly evident in the use of online forums in which early enthusiasm with comments such as;

“it is great that we finally have the opportunity to discuss things via a forum”; being quickly dominated by silence. This trend is evident again recently through a reluctance to engage with online forums as the response time is too slow relative to the need for information. There has been a greater move towards the use of email to gain the same ends as it is quicker and more easily and readily accessible.

Conclusion

Three key factors have been identified in this study that contributes to the successful implementation and use of ICT to enhance learning and the construction of a sense of community. Firstly, technology can play a key role to support community formation in a distributed community only when the technology has become an accepted form of communication and is a transparent means of communicating. This is most
easily achieved where the use of the technology is successful and where there is a higher level of personal interaction, or at least the sense of it, then the technology is more readily accepted to be effective.

Communication is fundamental in the development of trust and the community. Secondly, consideration needs to be given to the influence of culture in the use of technologies in the development of a community. In a distributed environment culture impacts on the ability of the members to develop a shared understanding and sub-groups of the community, based on these cultures can easily emerge. Thirdly, the community must have a purpose and this must be achieved through the technology. There is a need for a correlation between the technology and the aim of the use. Even though the findings of this study are confirmed in the literature, the findings need to be analysed empirically within other distributed communities, with a larger size to that of the GDMOB, to test the generic applicability of the findings.

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