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ABSTRACT

A study examined the characteristics of the learning process when it is facilitated by computer-mediated communication in nonformal learning contexts. In this paper, learning is defined as the transformation of experience through reflection, conceptualization, and action. Such experiential learning often occurs in dialogue with others. "Learning communities" are communities of practice--problem-solving networks that enhance the learning process through aspects of social capital: shared language, shared experiences, self-development, mutual trust, and identification with the community. Over a 1-month period, data from seven e-mail discussion groups in Australia were collected and analyzed. Groups included sheep and beef grazers in remote locations; professional development groups in educational administration, human resource development, and women's health; and two organizations using email to enhance work practice. The asynchronous, virtual environment differed considerably from that of face-to-face interactions, with the virtual environment allowing for multiple discussion topics and varying levels of participation, and demanding different facilitator skills. Challenge was very prevalent in three groups, but the outcomes were quite different, ranging from respect, support, and reflective discussion to personal attacks and miscommunication. The facilitator or moderator has an important role in maintaining a respectful dialogue that enhances understanding and learning. (SV)

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Electronic Learning Communities? Factors that enhance and inhibit learning within email discussion groups

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This paper will summarise research-in-progress into indicators of learning occurring in email discussion groups. The research seeks to investigate how can we maximise the factors that enhance learning and networking using electronic mail and conversely, how we minimise those factors that inhibit learning using this media. Data from a range of email discussion groups form the basis of the research, with focus on email discussion that support informal learning contexts. These include community groups, groups using email for professional development purposes, and within-organisation groups. The paper will compare and contrast what is known about learning in traditional group formats with learning utilising electronic media, thereby providing an analysis of the intersection of conditions that seem to effect the utility of the email discussion group as a forum for learning. The paper will conclude with some recommendations for list owners, moderators or facilitators who may be considering using email discussion to support learning communities in a range of contexts.

1. Introduction

In this rapidly changing world more and more individuals, groups within workplaces and organisations are communicating using electronic means for sharing, learning and teaching across the boundaries imposed by geographical constraints. In trying to make sense of this emerging technological environment some authors highlight its utopian possibilities (e.g., Nestor, 1997; Rheingold, 1994) and others its negative or destructive features (e.g., Shenk, 1997; Stoll, 1995). Given the burgeoning nature of computer-mediated communication in general and usage of electronic mail in particular, it is important to understand the ways in which email communication enhances and inhibits processes of dialogue and thus learning, so that these communicative strategies can be maximised. Therefore, the study for evidence of learning, if it occurs, and how it occurs within this virtual context is extremely important.

The aim of this research was to investigate the characteristics of the learning process when it is facilitated by computer mediated communication in non-formal learning contexts. Non-formal learning in adult and vocational education is becoming increasingly important as continuous learning and improvement processes become recognised as imperative for organisations, professional groups and communities to manage in changing environmental conditions (Owen, 1995; 1996). The use of email discussion groups in both formal and non-formal learning situations will be enhanced if we know and use those features of email discussion groups which facilitate learning.

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1.1 Indicators of Learning

For the purposes of this paper, learning has been defined as the transformation of experience, through reflection, conceptualisation and action (after Kolb, 1984). An experiential learning model is regarded as a strength because it pursues a framework for "examining and strengthening the critical linkages among education, work and personal development" (Kolb, 1984, p. 3). Such learning often occurs in dialogue with others. Hence, the term "community" has been used in this paper to signify the social nature of learning and is used in a broad sense. Community is not used to define a geographical location but rather a "community of practice". Communities of practice refer to the relationships individuals strike up to solve problems. Learning which takes place in communities of practice is enhanced by social capital in the form of networks, commitment (seen as the result of developing trust) and shared values. Kilpatrick et al (1998) suggest five indicators of the quality of the learning processes involved as social capital is developed: shared language, shared experiences, self development, developing trust in others, and identification with the community.

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2 Research Design

A full copy of the report is available from the authors and includes details about the research methods used. Given the lack of space available in this paper, a brief summary of the research procedures will be outlined, with attention given to summarising the key findings. The major research questions included the following:

- What are the similarities and differences between opportunities for learning in physical environments and in virtual environments using electronic mail?
- In what ways are email discussion groups being used for learning?
- What is the nature of communicative process in electronic mail?
- How does this interaction enhance or inhibit learning?

Data were collected from seven groups over a one month period, yielding 41,809 lines of text for analysis. The characteristics of the email discussion groups include: two used by people involved in small business in remote locations (Australian sheep and beef graziers); three groups used by people for professional development purposes (educational administration; human resource development; women's' health); and two organisations using email to enhance work practice (a service provider and a provider of basic utilities). This paper summarises the research undertaken.

2.1 Data Analysis

Three types of data analysis have been performed to date:

1. The entire data set has been searched for key words and phrases to indicate learning.
2. A detailed analysis of one five day sample from the three professional development groups has been coded; and,
3. From each group, three "threads" or specific topics of discussion have been identified and analysed in terms of the processes of dialogue or discussion in evidence.

2.2 Limitations of the Research

Learning is an inherently personal phenomenon. Yet the aim of this research is to look for indicators of learning: that is, evidence of learning processes displayed in written text. However, there is no guarantee that learning has indeed occurred or that what appears in the written text constitutes what a person has learned. Nevertheless, text-based communication does share many features of others forms of communication through which people learn and so, indicators of learning can be identified in the data. Limitations also include the size of the database. Data from seven groups could hardly be generalisable to all usage of email. Nevertheless, there are some conclusions that can be drawn from the analysis of the data set that can inform email list owners, moderators and participants about strategies to enhance the learning that can arise from the electronic discussion.

3 Findings and Implications

Table 1 compares some of the features of physical group learning environments and virtual learning environments in a non-formal context.

'Comparison of Traditional and Virtual Learning Environments

Features	Physical Group	Virtual Group
	Learning Environments	**Learning Environments**
Time and Place	Finite	Infinite
	Synchronous	A synchronous
Forms of communication	Face to face	Virtual
	Spoken	Written
	Continuous and immediate	Space to reflect and refine
	One topic	Multiple topics concurrently
	Memory trace not easily visible	Easily visible (text)
	Requires continuity in concentration	Non- continuous
Role of facilitator	"teacher" plus group	"moderator" plus group
	Can be both direct and indirect,	Public
	therefore finer degrees of intervention.	More visible
Features of communication	Embodied	Disembodied

Asynchronised email discussion has several features which sets it apart from face-to-face interaction. The key distinction between physical group learning environments and virtual group learning environments is that when people meet physically; their communication and learning is embodied, in that it occurs within a particular place and time. In a virtual environment, such communication and learning processes are disembodied, so that features such as time and place no longer shape the interactions. Many of the barriers to participation in traditional classroom and other training settings imposed by time and space do not apply to asynchronised email discussion. People have time to think about their answer. They can polish what they want to say and consult with resources (people and artefacts). There is no problem 'getting a word in' — there is always space for one more contribution. Yet despite this, there are many people who do not contribute and who "lurk" on lists. People can remain unheard in the background and contribute as frequently or infrequently as they wish. In physical learning environments, people can draw on a wider array of communicative strategies, which include non-verbal communication and immediate feedback. In contrast, virtual learning environments are limited to communication via text and do not have access to these other communicative tools. However, the amount of communication can be more varied in a virtual environment compared to a physical one, since "multiple conversations" can occur almost simultaneously. In a physical learning environment, the responsibility for group direction may rest simply with group members or there may be a facilitator involved. In a virtual learning environment, the list moderator can play a facilitative role to some degree in that they can intervene if the conversation gets off track, they can edit a contribution or suggest the conversation needs to move on. This role is somewhat akin to the role of a chairperson in a physical group discussion. Given that a facilitator or chairperson operating in a physical environment has access to a greater number of communicative strategies (as described above), their interaction can be exercised in both direct and indirect ways. By contrast, the group communication process and interventions by the moderator are visible in the text.

3.1 Indicators of Learning within Email Discussion Groups

Searches were undertaken on a range of terms indicating learning associated with experience, reflection, conceptualising and experimenting. A search was also undertaken on the kinds of questions asked in the data as an indicator of inquiry. The results indicated that there seemed to be a lot of inquiry and learning occurring within the email lists. For example, as an indicator of seeking information and inquiry, the database was searched for questions and 88 of 94 (94%) documents contained these. Less questions were asked in the workplace groups than in the professional development groups which indicates that the lists probably serve different purposes. Determining the purpose a list will be one of the first issues that will need to be resolved by anyone thinking about establishing an email group. Is the purpose of the electronic communication to make announcements, to share information, or to problem pose and problem solve?

Yet this broad review also highlighted differences in the indicators of learning activity across groups. For example, what were the nature of these questions being asked, the experiences being shared and the concepts being invoked? Were they addressed to the satisfaction of participants? Were certain stories, reflections, suggestions likely to trigger a greater pooling of ideas and resources in particular contexts? To answer these sorts of questions a more finely tuned qualitative analysis was needed.

3.2 Managing Communication in Computer Mediated Communication

As stated in the introduction, successful learning involves reflection on experience and the transformation of that experience through conceptualisation and action (Kolb, 1984), and that this process occurs in a social context. In the case of email discussion groups, the social context is the communication through textual dialogue with others. Just as the use of computer mediated communication is expanding, so also is its development as an unique form of communication (Halliday, 1993, Spender, 1995, Witmer and Katzmen, online, Voiskounsky, online). To develop a greater understanding of how people interact and communicate in computer mediated communication, it is important to learn more about this new genre, and to ascertain how computer mediated communication might enhance or inhibit the learning process.

In order to answer the research questions "What is the nature of communication in email discussion?" and "How does this communication enhance or inhibit learning?" we decided to look at the three Professional Development groups, which we will call group A, B and C (see Table 2) as

these groups demonstrated the highest incidence of indicators of learning. Five days of discussion and three "threads" or topics per group were analysed in order to learn more about how communication is being mediated and managed in email groups.

There were a number of interesting findings from this analysis, some of which were particular to one or two groups, and others which seemed to be a shared trait among all of the groups. One of the most interesting features which was common to all of the groups was the prevalence of *challenge* present in the interactions among group members. The reason that this feature is so interesting is because of the potential for challenge and a challenging environment to both enhance and inhibit learning, depending on how it is managed. It is generally recognised that challenge and support contribute to a conducive learning environment (Brookfield, 1996; Pogson & Tennant, 1994; Kaye, 1994). A supportive environment is necessary for individuals and group members to feel safe to take risks and to disclose fears and/or concerns to the group. Challenge is also needed for learning, to encourage participants to critically examining and clarify their assumptions, thinking, value systems, attitudes and/or practices (Kaye, 1994).

However, there were two differing outcomes from the challenges which occurred in the discussion groups. Group A exhibited a consistently positive outcome from the challenges that were issued. The features of this group which have been identified as contributing to this outcome include: high moderator involvement; a climate of respect, support and consideration for the other members was maintained; personal attacks were minimal, and those that did occur were either 'snipped' by the moderator or publicly addressed; clarification processes seemed to be successful; and the discussion or thread seemed to progress and develop. However, when people were challenged in groups B and C there were a number of factors which contributed to an increase in dissonance among group members and to the lack of progress and positive development. The challenges seemed to result from individual misunderstandings and misinterpretations of a previous post, which in turn lead to conflict, tension, dissonance and personal attacks. The participants of Groups B and C spent more time restating and reproducing their own positions and opinions on an issue, rather than discussing the introduced topic and the contributions of the other members. It would seem that the challenges and dissonance which occurred within these groups had an inhibiting effect on both the discussion and the groups processes, rather than a constructive result. The differences between the outcomes can be noted in Table 2:

Difference between Group Challenges	
Group A	**Groups B and C**
Climate of respect and trust is maintained.	Climate is volatile which creates tension.
No personal attacks	Frequent personal attacks
Discussion develops and progresses	Discussion becomes stagnant
Moderator involved	Moderator not involved

Table 2: Summary of difference between outcomes from discussion group challenges

In the data, evidence of misinterpretation, and the difficulties of making oneself understood and clarifying meaning, were extensive. The differing reactions to this can be seen in the previous discussion and comparison between group A and groups B and C. A number of arguments emerged and continued among list members as they attempted to make clear the meaning of their previous posts and discussions, attempting to clarify and correct the various interpretations presented by other list subscribers. Such misunderstanding can create frustration, irritation, anger and tension between members of the list and seem to be the catalyst in a number of 'flames' (a message which includes aggression). The incidences of negative challenge followed a pattern of misinterpretation among members of groups B and C. The initial misinterpretation which occurred was conveyed to the original speaker as a criticism of their ideas and often was perceived often as a personal attack. The following clarification tended to be defensive and included other issues. As a result, the interactions became more personal, the disagreements began to involve other participants, and the discussion of the original topic became stagnant (see Table 3). It is important to note that the tensions and conflicts which started between individuals often crossed over into other threads and involved more participants. It would seem that these arguments were neither isolated to one topic nor to a small number of members, but moved and involved a number people.

The Pattern of Negative Challenge and Misinterpretation

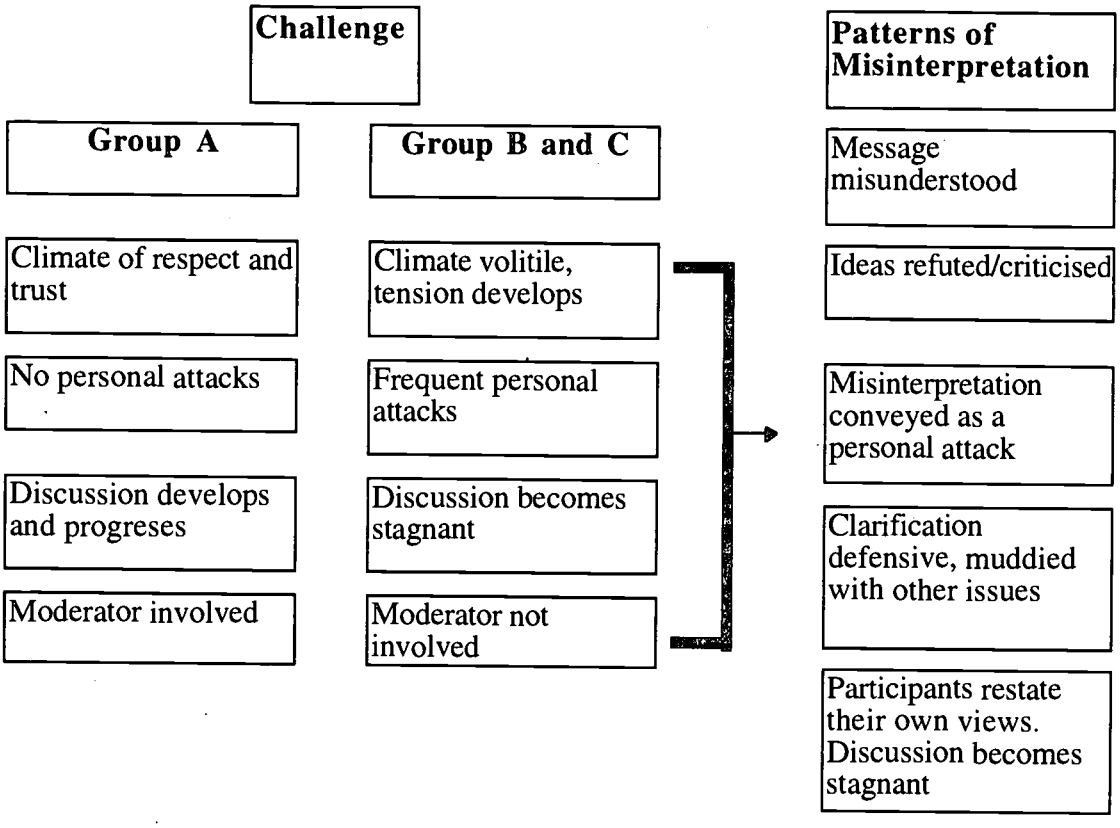

Table 3: Summary of the challenge process in relation to misinterpretation.

However, it should be reiterated that dissonance and conflict among groups and individuals does not always have an inhibiting effect upon learning and productive discussion. As noted earlier, learning can involve the contestation of ideas, a process which is often linked with the feelings and the emotions of the learner. Such a situation will produce dissonance and tension among individuals as they reflect and critically examine their own values, assumptions, thinking and ideas. Similarly, disagreements can be beneficial in group development as people to learn to work with others and as a group. Through reflection and discussion of such dissonance, group members can learn how to operate their group processes more effectively.

The tensions which exist within these forms of computer mediated communication are similar to those which occur when any form of interaction, in particular written communication, is subject to 'decoding'. However, it should be noted that electronic communication is, in many ways, different to conventional written language. It is more visual and possibly more expressive through the use of "emoticons", that is, graphic icons, graphic accents and/or 'smilies'. These are symbols which are developed from conventional keyboard marks (see Table 4). Other features of computer mediated communication include words written in capital letters to emulate shouting or emphasis; the creation and adoption of unusual spellings; extensive and multiple use of punctuation, especially exclamation and question marks; the expression of 'action' by putting words inside < > or * *; abbreviations, and acronyms. The development, acceptance and usage of characteristics, such as the creation and use of symbols, indicate that over time this form of textual dialogue might become recognised as a new genre of communication (Halliday, 1993, Spender, 1995, Jones, 1995, Witmer & Katzman, online).

Table of the Graphic Accents found in Data	
:-((Very sad	:-)) Extra smilie
:-(Sad	8-) Intelligent/wearing glasses
;-) Winking - "just joking"	:-{ "Oops" - slightly serious
=-o "Oooooooo" - surprised	:-} "Oops" - humorous
:-)> Sticking your tongue out	:-p Sticking your tongue out
:o) Clowning around	:-<> A kiss
:-) Smilie	:-Q Smoking a cigarette
(_o^o_) Smart ass	(..) Embarrassed/shy - looking through your hands
_o \o_ __| \ / |__ o_ o/ \o/ |-__/ __/o \o | o/ o/__ /\ /| | / > > / \ (\ /o\ /) | (\ / | < \ / \	

Table 4: Summary of Graphic Accents

Another interesting point to note, with reference to groups B and C and the communication which occurred within these groups, is that group B participants were mostly male and group C had a predominantly female membership. While the levels of challenge, conflict and dissonance appear to be comparable in both groups, there was more evidence of self-effacement, and the use of conciliatory and encouraging comments in the female group (see Table 5). Some examples of the kinds of conciliatory comments which formed part of the communication in group C included: "my two cents", "warmly", "fondly" "best wishes", "thanks for your time", "I really appreciate your time" "just my humble opinion", "peace", "thanks for reading this if you made it this far".

Number of Conciliatory Comments			
Discussion Group	**Number of Messages**	**Number of Threads**	**No. of Conciliatory Comments**
Group B (mainly Male)	176 Messages	27 Threads	45 Comments (in 25% of messages)
Group C (mainly Female)	193 Messages	33 Threads	85 Comments (in 44% of messages)
Difference	17 Messages	6 Threads	40 Comments

Table 5: Summary of Male/Female conciliatory comments

It will be interesting to explore in further research what the overall male/female ratio is in the groups which exhibit these sorts of characteristics, and how this might influence the levels of male/female participation.

Conclusion: "Lessons" from the Ether

The findings outlined in this paper support the following conclusions and provide "lessons" for those interested in enhancing continuous and ongoing learning using email as a form of computer-supported communication. They include:

(1) Group based email communication serves different purposes. It is important for those planning to establish email lists to consider the purposes the list is to serve. Is it to provide information and to play a role similar to a bulletin board? Is it to encourage discussion and problem solving?

Is it to support an emerging community of practice? The purpose of the list will have implications for the ways in which the list may need to be moderated.

(2) People use lists for different purposes. There was some evidence, from the private emails received in support of the research project from group members, that a lot of people observe and monitor the email discussion without participating. While many might be happy to remain silent members, it is important to consider ways in which the structure of the email list may limit opportunities for participation. For example, many discussion group are multi-threaded, and if members receive their email posts in one digest form, it can be hard to monitor all of the different conversations and reply to them before the topic has moved off in a another direction. In all seven groups, the level of group participation in the discussion recorded for one month aver aged nine percent of total group membership. Examining reasons for differing levels of participation and developing strategies for enhancing participation is an area that requires further investigation.

In contrast to silent group members, are those who treat the email forum as a "stage" for their own purposes and needs. There were a few people who seemed to revel in their capacity to inflame a situation, create disruption and/or to take the discussion off on a tangent suited to their own ends. Responses included taunts, put downs and antagonistic comments. In many of these emails, a gendered discussion also seemed apparent, with a number of put downs directed from men toward women as a result of a challenge made by a woman contributor. Contributions made by women were also often ignored and deflected. Group members and the moderator have a role to play here in making sure the dialogue occurs in a climate which respects all participants.

(3) When dialogue involves issues of genuine importance to people, there is a capacity for the discussion to become heated, particularly when it involves a clash of values. List moderators and members need to consider the level of intervention that may be required to bring a conversation to a close or to remind group members of the protocols of productive dialogue. In one list, the moderator played a facilitative role in a reasonably unobtrusive way, by regularly posting the "guidelines for participation" to the list. This seemed to work as a reminder to list members of the public nature of the virtual space in which they were operating and thus as a means of providing focus on the purposes of the list. The moderator's level of intervention and ways in which potentially inflammatory situations are managed can also provide a role model for list members. A rich area for future research would include examining the similarities and differences between the roles of a moderator and an group facilitator; identifying the educative strategies email moderators could bring to their role.

(4) As a means of attempting to resolve potential points of misunderstanding, group members could monitor the degree of message complexity in their own posts. Is the purpose of the message to seek clarification of someone else's post? To provide clarification of an earlier contribution ? To support, refute or expand on an idea? It seemed that there was a greater incidence of misunderstanding when all of these aspects were combined into one message, without first ensuring that the receiver has interpreted the message as it was intended.

These conclusions are presented as a means of attempting to identify strategies which can enhance email communication to support continuous learning and development. Computer-mediated communication presents some wonderful opportunities to support and transform the way we work, live and communicate with others. However, it also has the capacity to simply transfer a range of inequalities and dysfunctional communication approaches that can inhibit learning and development in this social context. Attending to the ways in which learning is part of the email communication process is important so that processes supporting and enhancing electronic communication as a medium for learning can be effectively established and supported. We hope that these tentative findings will be of use to list moderators, educators, community developers, professional development facilitators, workplace trainers and organisational leaders.

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