Learning links online: Establishing constructivist and collaborative learning environments

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Introduction

The Internet and the World Wide Web have made it possible to establish a new type of learning environment in which learners can collaborate with fellow students to construct a meaningful and powerful learning experience. It is through student ownership of the learning environment that really effective learning occurs and this paper will describe courses that have been established to provide such experiences. It will also describe strategies for effective teaching within constructivist and collaborative online environments.

This paper addresses the issues surrounding the implementation of online environments that enhance and facilitate learning, particularly from a constructivist or collaborative perspective. I have applied the findings of a research study into collaborative learning through computer mediated communication to a later course I developed to implement the findings and which I then researched. I will discuss the issues that have arisen from such an implementation. The paper initially describes the theoretical perspectives of my view of learning online, then provides a rationale for this approach to online teaching and learning through a brief review of the literature about experiences and advantages of this environment. Practices and strategies for effective online environments are described and the issues and problems that arise from learning in this way are raised.

Theoretical context

My research developed within an interpretive framework from the perspective that knowledge is subjective and socially constructed. Computer Mediated Communication (CMC) was viewed as a facility for learner interaction and my perspectives about learning and knowledge construction were developed from a constructivist and social constructivist viewpoint. The social nature of cognition as theorised by Vygotsky (1978) and developed through neo-Vygotskian research (Forman & McPhail, 1993) was seen as influential to a person’s construction of knowledge. The provision of dialogue within a community of learners was of major importance to the way the studies were designed. Knowledge construction was perceived as a dialectic process in which individuals test their constructed views on others and negotiate their ideas.

Duffy, Lowyck and Jonassen (1993), in describing the importance of the context to meaning and understanding, also stressed the social aspect of constructivism of people constructing knowledge 'socially through collaboration and discussion' (p. 1) which results in a shared meaning and understanding. Knuth and Cunningham (1993), describing tools which facilitate constructivist learning, focused on dialogue as an important knowledge construction process' (p. 170). Jonassen's (1999) model of Constructivist Learning Environments (CLE's), explains how technology can enable collaboration and social construction of knowledge. CLE's engage students in investigation of a problem, critique related cases and review information resources. Learners develop needed skills and collaborate with others, using the social support of the group to learn effectively. Jonassen, Previsch, Christy & Stavrulaki (1999) claim that 'the key to meaningful learning is ownership of the problem or learning goal' (p. 52), some component of which the learners must define. In these studies, students defined the issues for discussion, found and shared the
resources, then socially constructed their ideas in online discussion. These activities were developed by the group with teacher guidance and scaffolding.

My constructivist concepts about knowing which underlie the research include:

- learners construct their own meaning, their own unique view of knowledge;
- learners are active, not passive, they do not just absorb knowledge from an expert teacher but actively create their own understanding;
- learning is interactive with a need for social interaction so that the learner can explain understandings and receive feedback, to clarify meaning and reach a group consensus.

Such a philosophy and related strategies for implementation take consideration of Vygotsky's (1978) concept of "zones of proximal development" premised on the theory that the group will contribute more to the learner's understanding than he or she is capable of constructing individually. In an online environment the social conversation of the group, facilitated by the electronic medium of computer-mediated communication, can provide the learner with a context and stimulus for thought construction and learning.

**Collaborative learning online**

The potential in the online environment for collaborative learning and mutual support among students was identified early in its history during the late 1980s and early 1990s. Help and feedback can be easily available to students remote from the campus through the use of computer-mediated communication. Students can raise questions and receive replies and suggestions from other students as well as tutors. They can clarify details and use each other as consultants and resources which in Boston's (1993) study produced higher quality projects than those submitted by on-campus students. Kaye (1992) defined collaborative learning as "the acquisition by individuals of knowledge, skills or attitudes occurring as the result of group interaction" with "individual learning as a result of the group process", (p. 4). Learning collaboratively implies peer exchange, a democratic interaction amongst equals who take on different roles (like facilitator, resource person etc) according to the needs of the group and it involves synergy, assuming that the whole is greater than the individual parts. For success it required active and planned involvement within a context of shared goals, interests and commitments. As a medium for collaborative learning, computer conferencing is appropriate because it provides the opportunity for "reflective and thoughtful analysis and review of earlier contributions" (Kaye, 1992, p. 17) rather than is the case in a face-to-face seminar where a contribution may be missed forever.

Recent Canadian analysis of online teaching structures (Campos, Laferriere & Harasim, 2001) reported a move to collaborative activities through online integration especially with teachers more experienced in online teaching and learning. Other studies of online use also reported advantageous collaborative attributes (Stacey, 1999, Rogers, 2000, Curtis & Lawson, 2001, Baskin, 2001) as well as consideration of the teacher and student roles in establishing a collaborative and constructivist environment.

**Research into collaborative learning in an online environment**

**Study 1**

My first research study was an investigation of the collaborative learning process of three groups of postgraduate students learning at a distance from both their Australian university campus and often from each other. The study investigated the experiences of 30 students over two semesters of their Masters of Business Administration (MBA) course, focusing particularly on their use of group communication through the electronic system as they studied the subject of Business Economics. Their fortnightly tutorial task required a negotiated group response via online interaction. The use of computer mediated communication was researched as it was used in small group electronic conferencing as a means of facilitating the groups' social construction of knowledge.

The research was undertaken as an ethnographic study, and the context of the group formation and development and the process of their collaboration were described through multiple research perspectives. I
investigated the groups' ongoing processes of communication and interaction, through observing, recording and analysing the text of the electronic communication and through analysis of its content and the system usage pattern of the participants. The learning processes they experienced using this medium were described through the students' reflections during pre study and post study interviews and through my analysis of electronic observation of their communication.

Results of Study 1

The students' process of learning was achieved through collaboration and the attributes of the social construction of knowledge which emerged through collaborative learning via CMC were through:

- the sharing of the diverse perspectives of the group members.
- their clarification of ideas via group communication.
- the feedback to a learner's ideas provided by other group members.
- the process of seeking group solutions for problems.
- participants practising the new language of the knowledge community in discussion with other group members before using this language in the whole group or in the new knowledge community.
- the power of the process of group discussion either mediated by communications media or by through face-to-face contact.
- the sharing of resources within the group.

The collaborative behaviours of an effective learning environment also provided socio-affective support that motivated learners. Collaborating together motivated students to study effectively and to seek to continue the group collaboration over the continuing program. I found that an effective online environment such as this provided the students with the benefits of reduced isolation as they posted supportive comments and shared personal anecdotes and information providing a network of social interaction that underlay the mutual respect and trust needed for a successful collaborative group process. This type of communication seemed to give the students the friendship and sense of belonging that helped to motivate them to apply themselves to their study when they were finding it hard to manage, particularly because of the conditions of studying at a distance.

However there were many issues and challenges with the changes and technical hurdles of the electronic environment, often due to the early stage in Internet development which meant all students were new to the environment and had a minimal localised technical support. On the positive side, the problems group members encountered in using CMC did provide a common ground as their groups were formed. Technical hints were often shared, with the students who were more technically capable helping the others. The humour and informality of reply in solving these technical problems collaboratively set the tone of the group's interaction as well as providing the group with a purpose for interaction and discussion, an important aspect in groups' forming relationships.

Study 2

Building on the results of the previous study I developed a Masters level course about the theory and practice of e-learning which responded to the growing interest in teaching in an online medium. In the course, students were required to share resources they had researched and evaluated through searching the World Wide Web, to moderate discussions about issues of online learning, and to work in collaborative groups for an assessed task that required their researching the theory and process of collaborative learning online.

The study investigated twenty postgraduate students (4 male, 16 female), most aged between 40 and 50 years, and working full time who were all studying off campus and were geographically distributed over every state of Australia and in New Zealand, the United Kingdom, Korea, Fiji and Vietnam (3 students deferred over the course of the semester for reasons external to the study).

The study researched: 1) how computer conferencing was used in teaching and learning as a dynamic environment for sharing ideas and constructing knowledge, 2) how students learned collaboratively in an
Data were gathered electronically using qualitative methods:

1. By gathering students' perceptions and reflections on the effect the conferencing process had on their learning. These were gathered through a series of questions posted online which could be responded through the group conference or by private email to the researcher.

2. Archiving and analysing the computer conference interaction. A period of the first four weeks of semester was analysed as well as two later periods (weeks 7 and 12) when small group conferences had been developed. This analysis used a categorisation that labeled units of meaning within each message for its primary purpose and content into:
   - cognitive/ content: detailed discussion and commentary on the course content
   - system content (relating to learning the software, or access issues) and administrative messages.
   - social content using the multiscale Social Presence categories developed by Rourke, Anderson, Garrison and Archer (1999) for defining and measuring social presence in a computer conference. The three categories are interactive responses, affective responses expressing emotion, feeling and mood which are expressed by emoticons, humour and self disclosure, and cohesive responses which are group responses which build a cohesive group environment.

3. Quantitative data were collected through analysis of the frequency and type of messages which occurred on the conferences as well as through analysis of final student results for the units.

Results of Study 2

1. From student response to online questions:
   Overall the majority of participants found that conferencing was a positive experience. They thought that conferencing partially overcame the disadvantage of distance education in not being able to discuss things with others and that in their busy lives there was an advantage in the flexibility of access and times of study.

   Students were appreciative of the required interaction as a way of making them engage more actively with the content of the course. It enabled them to construct their own understanding of the course content with feedback from other participants to assist that construction.

   The different perspectives provided by the different students was particularly seen as an advantage to their learning as it took them out of their own more limited view of the subject (often with difficulty). They reported that the other participants challenged their ideas and provided new thinking.

   They described how the group communication in the developing online community provided a motivation for learning and how they enjoyed the interaction which reduced their usual isolation in distance learning. They had a sense of community, particularly in the sharing of resources.

   They did identify the increased time spent on the subject as a disadvantage though this was an element that the students usually saw as a choice and as a self-management issue.

   Some students complained that they chose to work at a distance as they preferred their independence and the ability to work at their own pace and did not learn well in groups.

2. From conference analysis:
   Tasks designed for online discussion generated online interaction with a cognitive focus.

   Content analyses pointed to the role and importance of the conferences for social interaction and administrative sharing as well as for a cognitive focus.
The small collaborative group environment meant that students could establish small group relationships in a more informal space and this was conducive to social presence comments included in most content messages whatever their complexity.

Cognitive content also rose over several weeks, reflecting the cognitive focus and purpose of the discussions, but this was accompanied by a continued high level of social presence factors.

3. From quantitative analysis:
Frequency analysis showed that the required online involvement generated high frequency of messaging (the total group generated 1281 online messages), initially with a high teacher response requirement. Small collaborative groups devolved interaction and was more manageable for both students and teachers.

A few students elected to work independently on their assessment but students working in collaborative groups produced higher quality assessment tasks than those working individually.

Conclusion
In both studies, students had the choice to define their own issues and content for discussion and to socially construct their own understandings in the online collaborative environment. As one student commented "...it provided me with the opportunity to construct my own knowledge (and) understanding within my own context. Meant I had to revisit readings, interpret what others were saying in the group, respond, evaluate. "

The development of small groups who worked collaboratively was an important component of the constructivist approach where "learning revolves around learners' conversations about what they are learning, not teacher interpretations" (Jonassen, 1999, p229). An environment independent of teacher directed learning yet with the overall facilitation and structuring by the teacher, gave students greater ownership of their learning and freedom to construct their own understandings in a social context.

References


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