Handbook of Distance Learning for Real–Time and Asynchronous Information Technology Education

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Chapter IX
Chatting to Learn:
A Case Study on Student Experiences of Online Moderated Synchronous Discussions in Virtual Tutorials

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ABSTRACT
As most research on educational computer-mediated communication (CMC) interaction has focused on the asynchronous mode, less is known about the impact of the synchronous CMC mode on online learning processes. This chapter presents a qualitative case study of a distant course exemplifying the innovative instructional application of online synchronous (chat) interaction in virtual tutorials. While chat interaction has primarily been researched for its effectiveness in supporting social-emotional aspects of learning, this chapter reports survey findings on its impact on facilitating participation in collaborative group learning processes and enhancing understanding of course content from a sociocultural constructivist perspective. The results reveal factors that affected both student perception and use of participation opportunities in chat tutorials, and understanding of course content. The findings present implications for the pedagogical design of online synchronous collaborative-constructivist learning activities that enhance understanding of course content through dialogic participation in the learning process.

INTRODUCTION
In distance education, online interaction between learning parties is largely facilitated by computer-mediated communication (CMC) technologies. Most research on educational CMC interaction has focused on the asynchronous mode which is widely held to offer learners greater convenience as well as extended time for participation and reflection. However, less is known about the impact of the
synchronous CMC mode on the online learning process which stem largely from the underutilization of the real-time mode in the design of most distance courses. This chapter presents a qualitative case study of an online undergraduate course that exemplifies the innovative instructional application of online synchronous (chat) interaction in virtual tutorials. While chat interaction has primarily been researched for its effectiveness in supporting social-emotional aspects of learning, this chapter reports survey findings covering its impact on facilitating participation in collaborative group learning processes and enhancing understanding of course content from a sociocultural constructivist perspective. The implications of the findings are discussed and recommendations are made regarding the pedagogical design of online synchronous collaborative-constructivist learning activities. Finally, several possible areas for future research are suggested.

BACKGROUND

Interaction and the Online Learning Process

From a sociocultural constructivist perspective of learning (Vygotsky, 1962), dialogic interactions between members of a learning community are crucial for supporting meaning negotiation that leads to knowledge construction. In online educational contexts, as students and tutors share individual understandings of concepts, intellectual growth is supported by the availability of scaffolding or guidance from the learning parties with interaction mediated by language and various CMC technologies such as e-mail, discussion forums, and chat rooms.

Synchronous and asynchronous CMC technologies offer different capabilities for facilitating interaction in online learning environments (Ngwenya, Annand, & Wang, 2004). The asynchronous CMC mode supports delayed-time dialogue with interactions largely manifested as text-based contributions which could be composed, sent, and accessed without time and proximity constraints. However, the synchronous CMC mode requires communicating parties to be “present” at the same time for the dialogue to occur through services and applications such as voice over IP, desktop video conferencing, and Internet relay chat. Online synchronous (chat) interactions are primarily manifested as textual messages, composed and sent by parties who are simultaneously logged in chat rooms. Rather than having the facility to order messages in topical or temporal order, as in the case of asynchronous discussion threads, chat messages appear chronologically on screen with preceding exchanges scrolling up and then off each party’s computer screen at a speed corresponding to the pace of the overall conversation (Werry, 1996), offering a potentially permanent record of the proceedings, which is generally not retrievable unless deliberately saved by the user.

Research on Quality of Online Educational Interaction

In higher education, the quality of online asynchronous interaction has been extensively examined from a constructivist approach for indications of sustained reflection associated with knowledge building (Garrison, Anderson, & Archer, 2001). The asynchronous mode is assumed to support extended reflection (Harasim, Hiltz, Teles, & Turoff, 1995) and provide the time needed for learners to move beyond information sharing to reach higher level integration and resolution phases of the critical thinking process where shared information is synthesized and new knowledge created (Garrison, Anderson, & Archer, 2000). A number of studies have analyzed the quality of online asynchronous discussions for the presence of cognitive and/or social-emotional dimensions considered necessary to develop student critical thinking and collaborative skills (e.g., Booth & Hulten, 2004; De Laat & Lally, 2004; Garrison,
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In contrast, there is sparser research on the quality of online synchronous interaction in higher education. Researchers have observed that chat has only recently been used for instructional purposes (Murphy & Collins, 1997). This could be due to perceptions such as “promoting active asynchronous discussion is the best way to support interactivity in the online course” (Palloff & Pratt, 2003, pp. 24-25) and that chat is useful primarily for building social relations in distant learning groups (Lapadat, 2002). Additionally, the synchronicity and conversational characteristics (Kortti, 1999) of chat interaction have led to unfavourable comparisons with asynchronous CMC on aspects of time constraint for extended reflection on learning, the availability of participation opportunities due to competition for the “speaking” floor (Meyer, 2003), and additional skills (i.e., typing, language fluency) required of tutors and learners for managing or coping with chat interaction and its discourse (Dykes & Schwier, 2003; Warschauer, 1996).

However, other studies have contended that the sense of immediacy afforded by real-time interaction reduces transactional distance (Moore & Kearsley, 1996) between distant learners and enhances social-emotional aspects of collaborative learning and work group processes (Chou, 2002; Mercer, 2003; Schwier & Balbar, 2002; Sudweeks & Simoff, 2000). The capability of the synchronous mode to “contract” time could make it particularly appropriate for instructional activities that require interactivity, spontaneity, and fast decision making (Murphy & Collins, 1997). Additionally, the conversational characteristics of chat discourse reflect face-to-face classroom exchanges that are familiar to learners and faculty, hence facilitating the transfer of formal patterns of behaviour acquired in physical classrooms to virtual learning environments (Crook & Light, 2002). Furthermore, the largely text-based chat medium is assumed to filter out visual and social cues (Kiesler, Siegel, & McGuire, 1984), encourage greater self-disclosure that builds ties which bind online communities (Haythornthwaite, Kazmer, Robins, & Shoemaker, 2000), and enable learners to have (or perceive to have) equal opportunities for contributing to discussions.

Online Learning Experiences and Participation in Educational Interaction

Studies on student perceptions of distance learning experiences have generally yielded mixed findings. Current course management systems, supported by better synchronous and asynchronous technologies, are held to offer high quality interaction and enable a wide range of teaching approaches to enhance learning. The networked learning model for higher education proposed by Harasim et al. (1995) would move students from physical learning situations to globally connected learning communities, offer interactive instructional activities, support opportunities for communication between all parties in the learning process, and ultimately lead to “improvements in cognition and social interaction” (p. 273). On the contrary, Hara and Kling’s (1999) study on student experiences with a Web-based course revealed frustrations over the nature of online asynchronous interactions (lack of timely feedback and visual cues), management of communication (unclear task instructions), and technical problems that could impede learning and have significant impact when students eventually give up on the formal content of the course.

However, a number of studies reported learner satisfaction with factors associated with CMC supported interaction such as convenience and availability of scaffolding or guidance from instructors/peers (McLoughlin & Luca, 1999; Thomas, Jones, Packham, & Miller, 2004). Other studies found evidence of pedagogical benefits in terms of CMC-facilitated collaborative knowledge
construction and critical thinking development in online learning groups (Armitt, Slack, Green, & Beer, 2002; Newman, Johnson, Cochrane, & Webb, 1997).

Regarding online synchronous learning experiences, several studies suggested that student perceptions could be affected by the extent to which the chat learning activities are integrated into the course design, namely, framed within formal instructional objectives, schedules, and assessment (Cox, Carr, & Hall, 2004; Pilkington, Bennett, & Vaughan, 2000; Spencer & Hiltz, 2003). Given the sociocultural constructivist view that learning is constituted in the interaction, a particularly crucial aspect of student experiences of knowledge-building processes would be the availability of opportunities to participate in learning conversations.

The literature highlights several main factors, summarized below, that could affect student perceptions of participation opportunities in educational chat interaction:

- The text-based chat CMC medium, which displays rapid speed of discussion (Dykes & Schwier, 2003) and multiple concurrent discussion threads that could impact on interactional coherence and discussion focus in the absence of visual turn-taking cues (Herring, 1999; Pilkington & Walker, 2004);
- The activity characteristics, which include mandated participation in assessed instructional activities (Sudweeks & Simoff, 2000), tutor facilitation style (Cox et al., 2004; Kneser, Pilkington, & Treasure-Jones, 2001), and student moderation style (Chou, 2002); and
- The participant characteristics, which encompass English language proficiency (Warschauer, 1996), prior experience with the chat medium and its linguistic conventions (Murphy & Collins, 1997), and gender (Chou, 2002).

Essentially, studies on synchronous CMC interaction have largely focused on its effectiveness in enhancing social-emotional aspects of collaborative learning and work group processes while its role in supporting knowledge construction or greater understanding of course content through dialogic participation remains unclear. Such a situation highlights the need to further current understanding on the impact of chat interaction in facilitating online learning processes for a more pedagogically effective integration of the synchronous CMC technology into course designs, as well as to justify current and future provisions of such services. The next section describes a hybrid undergraduate course which exemplifies the innovative instructional application of chat interaction in collaborative group learning and formed the case context for this study.

THE CASE

The case is an undergraduate unit of study (organizational informatics) offered by the School of Information Technology at Murdoch University (Perth, Western Australia). This section describes the pedagogical framework of the unit, its virtual learning environment, the case participants, and conduct of the online tutorial instructional event.

About Organizational Informatics

The unit of study was originally a postgraduate course available from Sydney University in 1998. In 1999, it was modified and trialled as a third-year undergraduate unit at Murdoch University. Currently, the organizational informatics (OI) unit, which focuses on computer-mediated work processes, is available in the second semester (13 weeks) of each academic year to third-year Murdoch students.

The OI unit aims to develop skills associated with “organizational aspects of the design and
development of information systems” (Sudweeks, 2004, p. 90), including skills in critical assessment and management of issues related to knowledge building organizations by facilitating knowledge construction through reflection. The unit adopts a hybrid/blended course delivery design that offers face-to-face lectures and online synchronous (chat) tutorials to internal and external students who, respectively, undergo the course on campus and via a distance learning mode.

The two main learning activities in the OI unit are a collaborative group project and chat tutorial discussions. Earlier studies by the co-author examined the collaborative group project in terms of the following areas: student satisfaction with the collaborative work process (Sudweeks, 2003a) and patterns in group communication, group dynamics, and student perceptions of online learning in general and the group project task in particular (Sudweeks, 2003b). Of greater relevance to this chapter is the chat tutorial activity which was utilized as a case in several studies. For instance, Sudweeks (2004) examined changes in computer-mediated group processes over time, focusing on developmental and leadership characteristics of asynchronous and synchronous computer-mediated groups, of which the chat tutorials in the unit constituted the case for the synchronous computer-mediated group. Sudweeks and Simoff (2000) studied the chat tutorial activity for its effect on student motivation and participation, while Sudweeks and Simoff (2005) examined emergent leaders in collaborative virtual groups.

In 2005, the unit assessment components (Table 1) included a group project involving the collaborative planning and presentation of a proposal for a major event, and reflective journals that incorporated critiques on set-readings and reflections on tutorial discussions. As this chapter focuses on interaction situated in the chat tutorials, three areas of assessment, namely, reflective journals, tutorial presentations, and discussion participation, that complement and support the tutorial activity are described below.

Reflective journals are student critiques of set-readings that are expected to include “reactions to the articles for each topic, and how they relate to the lectures, other topics and other material” (Sudweeks, 2005, p. 4). The main pedagogical objective of this assessment/learning task is to enable students to experience “critically reviewing and recording … thoughts about the readings for the unit, as well as from a variety of other sources” (Sudweeks, 2005, p. 4). Hence, in each journal (about 500 words in length), the student is expected to review the reading and pose at least one question related to the issue(s) in the reading for further discussion during the chat tutorial. Students are required to submit a journal each week to the tutorial group’s private bulletin board prior to the tutorial session to enable group members to read each other’s critiques and the scheduled student presenter to collate questions and/or issues to raise during the discussion.

In the 13-week semester, compulsory one-hour chat tutorials are held weekly (Weeks 2-13) with the final session in Week 13 reserved for online presentations of the group projects. The tutorials are conducted in a seminar style, moderated by one or two student presenters in WebCT chat rooms and facilitated by the tutor. Tutorial presentations by scheduled student presenters are assessed ac-

<table>
<thead>
<tr>
<th>Assessment Components</th>
<th>Component weight</th>
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<tbody>
<tr>
<td>1. Research essay (individual)</td>
<td>(15%)</td>
</tr>
<tr>
<td>2. Proposal for a major event (group)</td>
<td>(15%)</td>
</tr>
<tr>
<td>3. Reflective journals (individual)</td>
<td>(20%)</td>
</tr>
<tr>
<td>4. Tutorial presentation (individual)</td>
<td>(10%)</td>
</tr>
<tr>
<td>5. Discussion participation (individual)</td>
<td>(5%)</td>
</tr>
<tr>
<td>6. Examination (individual)</td>
<td>(35%)</td>
</tr>
</tbody>
</table>
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cording to the following criteria: provision of “a clear [brief] summary, identification of key issues, knowledge of the topic, expressions of opinions on the topic(s), efforts to stimulate discussion, and management of the group discussion” (Sudweeks, 2005, p. 5).

To ensure active involvement during tutorials, discussion participation is assessed by the tutor and peers based on the level and quality of participation, participant effort, and sense of responsibility. Students are required to submit a peer assessment form to the tutor via e-mail at the end of the semester.

Essentially, the online synchronous interaction involving critical discussion during chat tutorials is framed by formal learning objectives, schedules, and assessment. Hence, the OI unit constitutes a single, particularly information rich case (Patton, 2002; Yin, 1994) from which one could potentially learn most (Stake, 1995) regarding the impact of chat interaction in facilitating online learning processes.

The Virtual Learning Environment

The main learning resources for the OI unit are a print resource materials reader (336 pages) and electronic resources (including electronic copies of all articles from the resource materials reader as well as links to relevant Web sites) available from the unit home page (Figure 1) which is hosted on WebCT. WebCT is a commercial learning management system adopted by Murdoch University as its university-wide virtual learning environment (VLE).

Online learning resources for the unit were initially organized into three categories: materials for learning tasks, learning resources, and learning supports (Sudweeks, 2003a). According to Sudweeks (2003b), due to the need to “encourage more social cooperative learning” (p. 175), a new collaborative online group project (which involves the development of a proposal for a major event) was introduced in 2002 which prompted modifications to the VLE design to reflect the additional learner support necessary for facilitating online communication and group work. The structure of the VLE was therefore extended to four categories: resources for communication, resources, learner support, and assessment (Figure 2).

Since then, the unit coordinator has further refined the range of learning resources available from the unit Web site. A possible interpretation of the VLE structure in 2005 is presented in Figure

Figure 1. 2005 Organizational Informatics home page
3. It should be noted that the VLE elements are not assigned to mutually exclusive categories and that in actual practice, some elements perform overlapping functions. For instance, the calendar could be a communication tool for conveying noteworthy events and an administration tool for organizing public and/or private diary entries. Similarly, the tutor contact details/photo could function as an administration element or a supporting resource element for establishing social presence of the online instructor.

From this perspective, the VLE for the OI unit is organized into three main components: communication, unit materials, and administration. The communication component includes synchronous and asynchronous communication tools such as WebCT chat (Figure 4), bulletin boards, private e-mail, and a common calendar.
The administrative component supports course organization services such as self-enrolment in tutorial groups through the online tutorial signup system (OTSS), the distribution of grades, access to lecture/tutorial schedules, and other unit administrative documents.

The unit materials component is retained as “the hub of the site” (Sudweeks, 2003b, p. 174) and had expanded significantly since its representation in Figure 2. The component consists of three subcategories of learning materials: content materials, support resources, and assessment resources. Content materials and support resources provide access to main and secondary instructional materials such as iLecture (streamed audio files), lecture notes, and links to external sites. The assessment subcategory provides access to assignment resources such as project requirements and peer assessment forms.

The OI Unit Pedagogical Framework

The pedagogical framework of the OI unit is based on the social constructivist view of learning (Vygotsky, 1962) as “a cycle of interpretation, evaluation and reflection of content evolving into individual and shared knowledge” (Sudweeks & Simoff, 2000, Section 3). In congruence with the unit’s constructivist basis, instructional strategies emphasize “collaboration, personal autonomy, generativity, reflectivity, active engagement, personal relevance, and pluralism” (Sudweeks, 2004, p. 83). Hence, main learning activities, namely, the collaborative group project and chat tutorial discussions, are designed to facilitate students’ construction of knowledge through participation and reflection.

Reflecting the networked learning model (Harasim et al., 1995) that also underlies the OI instructional design, there is significant use of the VLE as “a digital educational environment” (Sudweeks, 2004, p. 92) where students could access an extensive range of resources for their educational needs and the management of learning processes. The VLE also provides online spaces where communities of learners could gather in synchronous and asynchronous environments such as chat rooms and bulletin boards, hence reducing the transactional distance (Moore & Kearsley, 1996) usually perceived by students in distance courses. Moreover, there is extensive use of CMC to not only support interaction during chat tutorials and the group work processes for the collaborative team project, but also to facilitate unit administration or assessment, such as electronic submission of coursework to the tutor via e-mail or posting of journals to the bulletin board.

The Online Synchronous Tutorial

In 2005, there were four tutorial groups with 9 to 15 students in each group. All groups underwent equivalent learning activities and two of the four available tutorial groups (i.e., G1 and G4, in Table 2) were selected for a comparative study covering the impact of chat interaction on their collaborative learning processes.

The chat tutorials are designed to introduce students, in an active and experiential way, to the theory and practice of computer-mediated work processes which are directly relevant to the course topics (Table 3). The weekly one-hour tutorials are conducted in a seminar style, with a tutor-facilitator and one or two student presenters moderating the discussion in WebCT chat rooms.
The presenter role is rotated among all the students in each tutorial group.

In more detail, for tutorial sessions with two presenters (Figure 5), each presenter moderates a half-hour discussion slot based on the critique of one reading and adopts the participant role when not presenting. Before the tutorial, each presenter prepares brief critiques on at least two of the week’s readings before the tutorial and discusses both critiques during the tutorial. The sole presenter moderates the discussion for the entire session based on critiques of two readings.

During the tutorial, the presenter starts the discussion by highlighting main issues in the selected reading based on the presenter’s critical evaluation of the article. The presenter is expected to moderate the discussion by “posing pertinent questions that bring out the main issues of the articles, stimulating discussions and encouraging participation by all members” (Sudweeks, 2003c, section 3). The tutor is present as a facilitator throughout the session and evaluates the presenter’s performance as well as the extent of participation by other students in the discussion. The other students are expected to participate...
actively during discussions and evaluate the presenter as part of peer assessment of participation with the aid of archived discussion logs. In the peer assessment form, students are required to evaluate each other’s level and quality of participation, effort, and sense of responsibility displayed in discussions (excluding academic and language abilities) on a seven-point rating scale from 0 to 5.

Preparation for tutorial activity is supported by online resources that include the following: reflective journal which states the requirements for the critique; ecoms guidelines which highlights CMC conventions and netiquette; and guidelines for
tutorial presenters which states the responsibilities of the presenter and provides presenters with strategies for managing discussions and enhancing interaction, as well as technical instructions on procedures for communicating textual information via the synchronous CMC medium.

Essentially, the constructivist pedagogical framework of the OI unit is reflected in the tutorial activity which involves critical review of readings, dialogic exchange of multiple perspectives, and student reflection on learning with the aid of archived tutorial logs. Additionally, the tutorials also function as supportive virtual learning environments which reflect the community of inquiry (COI) model (Garrison et al., 2000) conceived as comprising three mutually interacting and reinforcing elements of cognitive, social, and teaching presences supported in online instructional environments by CMC technologies.

The presence and interactions between these three elements in the COI model are considered “crucial prerequisites for a successful higher education experience” (Garrison et al., 2000, p. 2). The cognitive presence reflects the intellectual climate of the learning environment with the instructional objectives justifying its existence to the participants. The perception of an open or unthreatening social climate facilitates the knowledge sharing process necessary to sustain cognitive presence while the teaching presence structures and mediates all the components (Anderson, Rourke, Garrison, & Archer, 2001; Garrison, 2003). As student presenters moderate by drawing less confident members into discussions, supporting views of others, and keeping discussions relevant under the guidance of the tutor-facilitator, they would be involved in establishing teaching presence in the online learning environment. Moreover, as student participants share individual knowledge and negotiate new understandings during dialogic interaction, they would essentially be engaged in providing social and cognitive support to each other.

RESULTS AND DISCUSSION

This section reports and discusses a subset of findings, drawn from a wider study (Lim, 2006), focusing specifically on the impact of chat interaction during the virtual tutorials on facilitating participation in the collaborative learning process and enhancing understanding of course content. At the end of the semester in November 2005, a Web survey was administered to 23 student respondents from both tutorial groups with return rates of 93% (G1) and 89% (G4). While the whole survey by Lim (2006) covered different aspects of the online learning experience, this chapter presents a subset of findings on student perceptions of (a) availability and exercise of participation opportunities and (b) factors that motivated/inhibited participation and affected understanding of course content during tutorial discussions. These aspects of the online collaborative learning process are assumed to be empirically observable through examining participant self-reflections on learning experiences in chat tutorials.

A self-administered, nonanonymous Web questionnaire, comprising closed and open-ended questions, was created with Remark Web Survey (Principia Products, 2005) software which also supports data retrieval and processing. Responses to closed questions were precoded by the survey software, hence minimal data processing was necessary before the application of descriptive statistical analysis. Data from open-ended questions were postcoded using categories that emerged from interpretive content analysis of the responses. The units of analysis for the survey data are the tutorial group and individual participants. Quotes from the survey responses are used here in tandem with extracts from transcripts of chat tutorial discussions to elaborate on some of the survey results, thus providing “rich” descriptions that add to the credibility of findings by qualitative research standards (Denzin & Lincoln, 2000).
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Perception of Participation Opportunities

Results in Table 4 show that participation opportunities in discussions were perceived to be present and exercised by most respondents, with greater agreement found in G4. Since there were contrary experiences reported in both groups, possible factors affecting participation were further explored. The results are presented and discussed below.

Factors that Motivated and Inhibited Participation

Respondents were asked five sets of questions covering a range of factors motivating and inhibiting participation. Sets 1 to 4 were closed questions that examined factors located from the literature: roles, facilitation style, assessment, and turn-taking behaviour. Set 5 comprised open-ended questions that captured other factors stated by respondents as affecting participation during discussions. Even though both groups underwent equivalent learning activities, given the different group profile (Table 2), it was not unexpected that certain factors were found to motivate participation within one group more than another.

Essentially, responses to the five sets of questions showed that participation in G4 was largely encouraged by the following factors:

- **The presenter role**, in which all aspects of online communication and management of discussion were regarded as effective;
- **The tutor facilitation style**, which supported the presenter in the management and stimulation of discussion;
- **Tutor assessment of participation**, which encouraged more activity; and
- **Turn-taking behaviour**, which indicated greater tendencies towards making early and additional contributions to discussions.

However, participation in G1 was mainly motivated by

- **The presenter facilitation style**, which stimulated participation and ensured relevance of discussion; and
- **Tutor and peer assessment** of participation.

In other words, while G1 participation was largely motivated by peer-related factors (facilitation, assessment), G4 participation was mainly encouraged by tutor-related factors (facilitation, assessment) with the greater ease reported in the presenter role attributable to the level of tutor support received by G4 respondents in the online communication and management of discussions. Lim (2006) found different extents of learning support to be provided by the two tutors. Overall, Rachel (G1) was minimally involved in guiding the learning process, whereas Fay (G4) displayed greater efforts to scaffold interactions by clarify-

<table>
<thead>
<tr>
<th>I had plenty of opportunities to participate in the discussion</th>
<th>G1</th>
<th>G4</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>SA</em></td>
<td>3 (23.1%)</td>
<td>3 (37.5%)</td>
</tr>
<tr>
<td>A*</td>
<td>8 (61.5%)</td>
<td>5 (62.5%)</td>
</tr>
<tr>
<td>D*</td>
<td>2 (15.4%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>SD*</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>UJ*</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I was able to make best use of the opportunities available for participation</th>
<th>G1</th>
<th>G4</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>SA</em></td>
<td>4 (30.8%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>A*</td>
<td>7 (53.8%)</td>
<td>7 (87.5%)</td>
</tr>
<tr>
<td>D*</td>
<td>1 (7.7%)</td>
<td>1 (12.5%)</td>
</tr>
<tr>
<td>SD*</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>UJ*</td>
<td>1 (7.7%)</td>
<td>0 (0.0%)</td>
</tr>
</tbody>
</table>

*SA = strongly agree; A = agree; D = disagree; SD = strongly disagree; UJ = unable to judge
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ing content issues, sharing information, and managing discussions. The more intense involvement by the G4 tutor could be due to Fay’s additional role as unit coordinator with the accompanying implication that she had a higher stake in ensuring the success of the learning process.

Regarding *turn-taking behaviour*, while G4 respondents were less likely to refrain from making early and additional contributions to discussions, G1 reported a greater tendency to avoid making additional contributions when others had expressed similar ideas, preferring to let discussions develop before joining in. Although such turn-taking behaviours by G1 conform to the rules of “orderly talk” (Sacks, Schegloff, & Jefferson, 1974) that add to discourse coherence, the avoidance of opportunities to participate implies a reduced involvement in the learning process, which could undermine the unit’s pedagogical assumption that active participation in the dialogic sharing of individual understandings supports knowledge building.

**Common Factors Affecting Participation and Understanding of Content**

Given the sociocultural constructivist view adopted in this study, that learning is constituted in the interaction, factors common to both groups that affect participation and understanding of course content during the chat tutorials are therefore of particular interest. A deeper awareness of their combinatory effect could serve to guide the pedagogical design of collaborative-constructivist group learning activities that considers the impact of the CMC mode on facilitating learning conversations from which participants could appropriate (Rogoff, 1990) the resulting shared understandings.

Respondents were asked the following set of open-ended questions in the survey:

Q.6: Were there other factors that encouraged or motivated you to contribute to tutorial discussions in this unit?

Q.7: Were there other factors that discouraged or inhibited you from contributing to tutorial discussions in this unit?

Q.11: What were the 1 or 2 specific things in the online tutorials that affected your understanding of the course topics?

The common factors that emerged from responses to these questions were the synchronous CMC medium, the presenter, and quality of online interaction. Findings on these factors, which positively and negatively affected (I) participation opportunities and (II) understanding of course content, are discussed below.

(I) Impact of Factors on Participation Opportunities

Regarding the impact on availability and use of participation opportunities, the synchronous CMC medium was found to encourage expression of views and provide a novel learning experience that generated greater collaborative efforts. However, it also presented difficulties for complete expression of thought attributed to the rapid speed and reduced nonverbal cues characteristic of the text-based chat medium.

*The main factor i think that because it was not face-to-face i felt abit more at ease at putting forward my opinions. The tutorial being online really did help. Gave me more confidence.* [Scott]

*At times I found that I had a lot of things to say, but by the time I had thought of how to word my comments appropriately and typed them, the discussion had moved on. This is similar to what would happen in face-to-face communications, but seemed to either occur more often, or become more noticeable when it happened.* [Jack]
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The presenters’ different abilities in facilitating, stimulating participation and ensuring relevance of discussion were found to both motivate and inhibit participation. While participation was encouraged when “tutorial presenters throw questions” [Diane], difficulties were experienced when “the presenter asks questions which are totally irrelevant to the topic” [Wendy].

Although the quality of online interaction was reported to motivate contribution to discussion when reflecting the presence and acceptance of different perspectives, participation was inhibited when there was dominance of discussion by certain parties that compounded the difficulties of turn-allocation and ensuring the visibility of own contributions in an online environment.

*Well I guess what encouraged me... was that everyone in the tutorial group was open and accepting of other ideas and feelings. They were all willing to listen.* [Robin]

*Sometimes I feel that by contributing during a persons presentation of the tutorial, that it will either be overseen, or disrupt the flow of the presentation.* [Colin]

(II) Impact of Factors on Understanding of Course Content

Concerning the impact of these three factors on understanding of course content, some respondents stated that the synchronous CMC medium had a positive impact on their understanding of course content by reducing inhibitions leading to greater willingness to discuss issues and exchange ideas.

*Everyone could discuss issues without being shy. Hence a lot of ideas could be exchanged.* [Diane]

*Just recently there was a tutorial where many of the participants didn’t understand the topic very well. after several explanations from both the presenter and the supervisor, I think everyone, including myself, understood the topic better. In a classroom, this may not have been as easy, as the presenter may not have been so forward in their ‘teachings’. [Jack]*

However, other respondents maintained that the chat medium led to superficial discussions and added to difficulties in comprehending messages attributed to the speed and reduced nonverbal cues characteristic of the text-based medium.

*... lack of elaborate discussion and ability to express physical and facial communication.* [James]

*... harder to understand how someone expresses words in text ...[Ian]*

While a respondent noted that the presenter’s moderation skill (“[t]he way the topics were explained by the people presenting” [Eric]), enhanced understanding of course content and difficult concepts, another respondent stated that understanding of the topics was affected when “the presenter is focusing on a topic too specific within the readings” [Wendy] thus failing to develop discussion threads beyond the immediate issues in the set-readings.

The quality of online interaction was held to have enhanced learning when it enabled:

- sharing of real-life examples and work experiences;
- exchange of different perspectives or interpretations of the set-readings; and
- active engagement reflected by the presence of questions and responses that clarified meanings of concepts or issues.

*Differing interpretations of the weekly readings, and also the work experiences and perspectives tutorial members brough to the discussion.* [Pete]
People’s opinions on the related readings. As we did critiques we gave our point of view on the readings, then in the tutorials, you got to see what other people thought and at times it went against what the readings were about. [Scott]

That we as a group discussed the readings themes, points etc... I sometimes found I didn’t understand some things... but was able to after the chat tutorial ... [Robin]

Essentially, survey responses on the quality of online interaction indicate student appreciation of the different perspectives shared as part of the learning process. There was also awareness of the significance of active engagement as the presence of questions and responses, which led to self-reflection or reconsideration of individual understandings during the construction of learning conversations. These student self-reflections on the impact of these factors on understanding of course content were corroborated by exchanges from the transcripts of chat tutorial discussions shown below. In Example 1, during a discussion on using soft system methodology to improve information organization in the workplace, Evan shared a case drawn from his work experience where the lack of a proper documentation system led to adverse financial results in a company.

In Example 2, the topic of national culture as defined by Hofstede’s model initially generated debate on its applicability to Internet culture. The main discussion thread was then extended by the different interpretations exchanged by Jason, Derek, and Sam on adaptation strategies of business organizations and the societies in which they are located.

Example 3 illustrates active engagement by participants with the extended exchange of questions and responses that clarified meaning. In a discussion on group decision support systems (GDSS), questions were posed by Robin, Lim, and Pete for clarifications on the definition of a GDSS. The extended responses from the online

**Example 1. Sharing of work experiences in abridged exchange**

Evan>> you would surprise the number of big projects I have had to fix up after people have just thought they would give it a go
Fay>> can you give us an example evan?
Evan>> Cant mention names but a large confectionary company recently upgraded their infrastructure with no project plan and
Evan>> the result was have to restore the Windows Infrastructure and start from scratch, end up costing them about $20K
Evan>> more than it should have
Robin>> wow... just shows you how much having a project plan can be on a big project

**Example 2. Different interpretations of readings in abridged exchange**

Diane>> Internet culture itself differs in different orgs
Wendy>> actually i wud c Internet as having a very general culture :S
Jason>> difference is a part of live..whether it be in culture or character so an organisation has to embrace that learn on working with it...
Alvin>> yeah, i agree
Derek>> But to flip that, societies that refuse to adapt their culture to that of the multinational organisations can often find themselves passed over by the organisations
Sam>> ya but normaly the company will adapt to the culture of the country.....or else they have no business
Rachel>> good point sam
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Example 3. Active engagement with questions and responses that clarified meaning in abridged exchange

<table>
<thead>
<tr>
<th>User</th>
<th>Message</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jack</td>
<td>Question from Jack: Is there any Practical DGSS, either real or conceptual, which would actually do what it would be required to do: support the group decision making process? This ties back to Hwee's question - has anyone used a GDSS?</td>
<td></td>
</tr>
<tr>
<td>Evan</td>
<td>Not in a formal way</td>
<td></td>
</tr>
<tr>
<td>Fay</td>
<td>i've used a system that had a model similar to a nominal group technique</td>
<td></td>
</tr>
<tr>
<td>Robin</td>
<td>could you give an example of when you used it fay</td>
<td></td>
</tr>
<tr>
<td>Fay</td>
<td>we separated into co-located groups and each group brainstorm ideas on a feasibility study of the division of arts</td>
<td></td>
</tr>
<tr>
<td>Fay</td>
<td>and then we all looked at the ideas and evaluated them</td>
<td></td>
</tr>
<tr>
<td>Fay</td>
<td>the advantage being that everything was then recorded</td>
<td></td>
</tr>
<tr>
<td>Lim</td>
<td>so is GDSS a decision making methodology or is it a software system? I'm confused</td>
<td></td>
</tr>
<tr>
<td>Robin</td>
<td>yes so am i</td>
<td></td>
</tr>
<tr>
<td>Eric</td>
<td>From the example it looks like it can be both</td>
<td></td>
</tr>
<tr>
<td>Fay</td>
<td>both lim</td>
<td></td>
</tr>
<tr>
<td>Pete</td>
<td>So its a methodology which can have varying levels of software support?</td>
<td></td>
</tr>
<tr>
<td>Fay</td>
<td>here’s what i said before - basically a gds contains groupware + dss capabilities + telecommunications</td>
<td></td>
</tr>
<tr>
<td>Lim</td>
<td>but that definition emphasizes the technical features</td>
<td></td>
</tr>
<tr>
<td>Fay</td>
<td>but it is also a decision methodology usually of brainstorming, analysis and evaluation</td>
<td></td>
</tr>
<tr>
<td>Pete</td>
<td>I think the Bannon article emphasises the CMC but not the DSS</td>
<td></td>
</tr>
<tr>
<td>Lim</td>
<td>ok, now its clearer</td>
<td></td>
</tr>
<tr>
<td>Robin</td>
<td>yes i can understand it easier now</td>
<td></td>
</tr>
</tbody>
</table>

Example 4. Absence of clarification on meanings in abridged exchange

<table>
<thead>
<tr>
<th>User</th>
<th>Message</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alan</td>
<td>So how do these differ from soft systems methodology?</td>
<td></td>
</tr>
<tr>
<td>Rachel</td>
<td>anyone?</td>
<td></td>
</tr>
<tr>
<td>Diane</td>
<td>in soft systems....our PW affects our ideas....and our ideas affect our PW? 2 way?</td>
<td></td>
</tr>
<tr>
<td>Tony</td>
<td>what differs from what alan</td>
<td></td>
</tr>
</tbody>
</table>

tutor (Fay) and contributions from other students (Eric, Evan) helped to enhance understanding of the concept.

However, it is acknowledged that the sheer quantity of information shared could prove daunting for cognitive processing during the rapid chat discussions. One respondent said, “misinterpretation and understanding the interpretation differently from the topic” [Tony] could occur during discussions. Hence, the presence of diverse and/or contradictory messages may not necessarily further understanding when they are not clarified or followed up during the discussion (Example 4).

Overall, the results established that chat interaction facilitated participation in collaborative group learning process as most respondents reported the availability and use of opportunities to contribute to tutorial discussions. Possible factors affecting participation were further explored and roles, facilitation style, assessment, and turn-taking behaviour were expectedly found to motivate participation within one group more than another given the different group profiles. Of greater interest was the impact of factors that are common to both groups. The common factors of the synchronous CMC medium, moderation skill of presenters, and quality of online interaction were found to have both positively and negatively affected participation and understanding of course content.

CONCLUSION AND RECOMMENDATIONS

In conclusion, this chapter presented a qualitative case-based study examining real-time instruction
in higher education. Specifically, this chapter introduced a distance undergraduate course which exemplifies the rare yet innovative instructional application of moderated online synchronous interaction in virtual tutorials. Findings were presented and discussed regarding student experiences of chat interaction in virtual tutorials, focusing on the impact of the real-time CMC medium on participation and understanding of course content. Given the sociocultural constructivist view on learning, that interaction supports meaning negotiation that builds new knowledge, the availability of opportunities to participate is therefore considered essential to the learning process. Findings of different perceptions of the availability and exercise of participation opportunities during chat tutorials prompted further analyses which identified factors that affected participation in both tutorial groups. In addition, student perceptions of the extent to which the chat tutorial experience enhanced their understanding of content were found to be mixed. Three main factors common to both groups—*the synchronous CMC medium; the presenter; and quality of online interaction*—were found to both positively and negatively affect participation in discussions and understanding of course content.

The constructivist assumptions of this study locate it at the paradigmatic level within the qualitative research framework. Hence, the research process reflects an interpretive approach involving the study of phenomena in their natural settings in order to illuminate and gain greater understanding of the online learning processes of a single informative case. Such knowledge gained from the interpretive analysis of participant self-reports corroborated by the chat transcript data are not claimed to be generalizable to wider populations. However, implications drawn from the findings regarding the pedagogical design of online synchronous collaborative learning activities may be extrapolated, in the form of recommendations, to similar contexts “in the sense of pointing out lessons learned and potential applications to future efforts” (Patton, 2002, p. 584).

From the research reported in this chapter, there are specific recommendations for the pedagogical design of online collaborative learning activities. Since the three common factors transcend differences in groups and do not exclusively exert a positive or negative impact, it is recommended that the combinatory effect of these factors be considered in designing effective online collaborative-constructivist group learning activities that encourage participation and minimize potential sources of frustration over the nature of chat interaction that may impede learning. More broadly, it is recommended that the design of learning environments should encompass physical and virtual instructional contexts, as in the case of the OI unit, to avoid reliance on any one mode which could needlessly limit the range of interactions permitted in distance educational programs. The hybrid course delivery design adopted by the OI unit enables educational interaction to be experienced via face-to-face lectures and online instructional contexts (chat tutorial room, bulletin board) facilitated by synchronous and asynchronous CMC technologies. The totality of the OI unit learning environment therefore supports participation in the sharing of individual understandings through a range of communication channels and contribution by learners at various levels of intensity.

These recommendations will be of interest to researchers concerned with the use of technology for online learning, higher education professionals responsible for the design and delivery of distance learning programmes, as well as promoters of educational technology who may benefit from a greater understanding of the role of synchronous CMC medium in supporting the learning process.

**FUTURE RESEARCH DIRECTIONS**

In its areas of inquiry, this study is essentially cross-disciplinary since it involves education, information and communication technology.
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(ICT), and educational technology, hence presenting several potential areas for future research in these fields.

The single-case study approach adopted by this study enabled an in-depth investigation of one particularly informative case (the OI unit) and a comparison of the impact of chat interaction on the online learning process of two tutorial groups (i.e., G1 and G4) within the case. Although unique cases are, by definition, not easily available, there is scope for further research. Future studies could adopt a methodological design that encompasses all the tutorial groups available in the OI unit. Alternatively, the OI unit could be investigated in comparison to other units offering similar, albeit not identical, CMC facilitated learning contexts and experiences.

Given the hybrid or blended course delivery design of the OI unit, one tutorial group could be examined in greater depth in terms of the relationship between learning processes that are supported by the entire range of face-to-face, online asynchronous and synchronous instructional environments afforded by the OI unit. Additionally, the students could be surveyed at different intervals of the course, rather than once at the end of the semester, to investigate finer changes in their perceptions of learning experiences over an extended period of time. Such research efforts could yield valuable insights on the appropriate incorporation of the various CMC technologies in supporting online educational processes. Moreover, the findings could provide timely feedback to online tutors regarding the effective management of instructional events.

Finally, this study has mainly presented findings from the analysis of survey data on student perceptions of online learning experiences. While self-reports of experiences offer one perspective on the phenomena, further insight could be gained from the analyst’s interpretation of interactions from the transcripts of chat tutorial discussions. Further research effort in analyzing the synchronous computer-mediated discourse present in the archived discussion logs could enable triangulation of methods and data that provides a more holistic and richer account of the construction of learning conversations.

REFERENCES


De Laat, M., & Lally, V. (2004). Complexity, theory and praxis: Researching collaborative learning and tutoring processes in networked...


**ADDITIONAL READING**


