Interaction, Facilitation, and Deep Learning in Cross-Cultural Chat: A Case Study

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Abstract

This case study evaluates the potential of synchronous chat for deep learning in the context of a distance education program between two universities in different cultural contexts, with a focus on interaction and facilitation. Three rubrics—functional moves, social construction of knowledge, and teaching presence—were applied in a longitudinal content analysis of chat sessions between four adult learners in Azerbaijan and their two facilitators in the U.S. The findings reveal that although the quality of the interaction was limited by the nature of the task, language difficulties, and differing cultural expectations about instruction, conceptual negotiative activity increased over time. In conjunction with previous research on constructivist learning, these results support the view that synchronous chat can facilitate deep learning, but also suggest that the cost may outweigh the benefits, especially when language and cultural barriers must be overcome.

Keywords: chat, collaboration, culture, discourse, distance education, facilitation, functional moves, interaction, language, learning, social construction of knowledge, teaching presence

Introduction

Advocates of the constructivist approach to learning regard both synchronous and asynchronous computer-mediated communication (CMC) as important tools for learning, in that they facilitate interaction and thus the negotiation of meaning believed to be necessary for the construction of knowledge (Driscoll, 2000). Existing research associates asynchronous discussions, in particular, with deep and critical learning (e.g., Kanuka & Garrison, 2004). Deep learning—in contrast to shallow, "rote" learning—entails seeking understanding by relating new information to existing knowledge and experience and by critically evaluating concepts (e.g., Beattie, Collins, & Mcinnes, 1997), and it requires higher levels of cognition (cf. Bloom, 1956). There is considerable controversy, however, regarding the potential of synchronous CMC—commonly known as "chat"—to enrich online courses cognitively (Herring & Nix, 1997; Ko, 1996).

Chat is most often designated as a tool for enhancing social interaction (Herring & Nix, 1997) and instilling a sense of community among learners (Im & Lee, 2003/2004;

Kirk, 2000; Wang & Newlin, 2001) in online environments. It has also been claimed to be appropriate for discussing technical and logistical aspects of a course (Branon & Essex, 2001). However, other studies show that chat interactions seldom lead to successful negotiation of meaning (Bober & Dennen, 2001) or discussion of complex issues (Teng & Taveras, 2004-2005). For these reasons, instructors are often discouraged from depending on chat to enhance the cognitive aspect of an online course.

Like other modes of CMC, chat is also subject to certain technical limitations. Internet disconnections and system overload resulting in the disappearance of messages are cases in point (Teng & Taveras, 2004-2005). In addition, many students lack the skills and speed needed for typing efficiently (Branon & Essex, 2001; Teng & Taveras, 2004-2005). This, in turn, impacts participation; better typists often dominate chat discussion (Bober & Dennen, 2001; Teng & Taveras, 2004-2005). Chats can be hard to follow; it is often difficult to see the relationship between different messages, especially if there is more than one discussion thread taking place (Bober & Dennen, 2001; Gonzales & de Montes, 2001; Harmon & Jones, 2001; Herring, 1999). An increase in the number of participants makes following discussions even more difficult (Bober & Dennen, 2001; Branon & Essex, 2001; Ingram, Hathorn, & Evans, 2000). "Chat sessions frequently result in overlooked comments as well as comments indicating that the reader was unsure of a previous remark's context" (Bober & Dennen, 2001, p. 245). In cross-cultural chats, limited language proficiency can further impede communication (Harrison & Toyoda, 2002).

At the same time, chat has the considerable advantage of immediacy, a characteristic associated with the dynamic interaction necessary for the negotiation and synthesis of ideas (cf. Lobel, Neubauer, & Swedburg, 2005). This characteristic has led to a renewed interest in this synchronous mode of communication. Studies have found that chat can afford more spontaneous and equal participation and can facilitate asking questions and providing feedback (Chou, 2001; Davidson-Shivers, Muilenburg, & Tanner, 2001). Armitt, Slack, Green, and Beer (2002) found that quality synchronous discussions are possible, and that chat provides a complementary, more dynamic form of reflection than that enabled by asynchronous discussions. Levin, He, and Robbins (2006) reported that pre-service teachers demonstrated more critical reflective thinking in synchronous discussions than they did in asynchronous forums. Mercer (2003, n.p.) explains that chat "significantly contributes to developing more authentic group collaboration and knowledge building." Similarly, Paulus (2003) found that advanced stages of knowledge construction were evident in chat to a greater extent than in asynchronous forums or email.

The present study evaluates the usefulness of synchronous chat for deep, conceptual learning in the context of a cross-cultural distance certification/training program. Three rubrics—functional moves, social construction of knowledge, and teaching presence—were applied in a longitudinal content analysis of chat sessions involving four adult learners in Azerbaijan and their two facilitators in the U.S. The findings reveal that although the quality of the interaction was limited by the nature of the task, language difficulties, and differing cultural expectations about instruction, conceptual negotiative activity making use of higher-level cognitive skills increased over time. In conjunction with previous research on constructivist learning, these results support the view that synchronous chat can facilitate deep learning. At the same time, they suggest that the cost may outweigh the benefits, especially when language and cultural barriers are present.

Background

Two theoretical models guided the present study: social constructivism and teaching presence. These are described below, followed by a discussion of issues in cross-cultural distance education, with a focus on Azerbaijan.

Social Construction of Knowledge

Social constructivism portrays learning as essentially social in nature, and therefore regards interaction is an integral condition for learning (Driscoll, 2000). By interaction, social constructivists do not mean communication "as a message sent by one person and received by another" (Driscoll, 2000, p. 386), but rather a process of sharing perspectives and negotiating meaning that leads to the construction of knowledge. According to constructivists, people learn through their attempts to make sense of their experiences, and constantly restructure and test their mental structures when faced with ideas that contradict those structures. Interaction makes that possible.

Much earlier, the father of social constructivism, Vygotsky (1978), wrote about the importance of social processes in helping learners bridge the gap between the known and unknown, which he called the Zone of Proximal Development. He believed that engaging in problem solving activities under adult guidance or more capable peers made that possible. Interaction with more advanced learners or a facilitator would thus be a pedagogically sound strategy for learning. Vygotsky also suggested that human action is mediated by semiotics (Palinscar, 1998). Semiotic systems, according to Vygotsky (1981), are tools and signs such as language, writing, diagrams, mnemonic techniques, etc.; these facilitate the construction of knowledge. CMC entails the use of both language and writing, and thus should facilitate the knowledge construction process.

Knowledge Construction Framework

The Interaction Analysis Model (IAM) by Gunawardena, Lowe, & Anderson (1997), more commonly known as the knowledge construction framework, is a widely-used analytical framework among educational researchers interested in examining the negotiation of meaning and construction of knowledge in online environments at the group level. The framework divides the construction of knowledge process into five phases: (1) sharing and comparing of information, (2) discovery and exploration of dissonance, (3) negotiation of meaning/co-construction of knowledge, (4) testing and modification of proposed construction, and (5) agreement statement/applications of new constructed meaning. Gunawardena et al. (1997) define interactivity in CMC discussion as "the entire gestalt formed by the online communications among the participants … [who act] in relation to each other and in a manner which reflects each others' presence and influence" (p. 407).

Online Facilitation

Facilitating online learning is thought to be substantially different from teaching traditional face-to-face classes (e.g., Moore & Kearsley, 2005). All practitioners of online teaching emphasize the importance of interaction for quality teaching (e.g., Kearsley, 2000). Practitioners do not agree, however, on what the online teacher should be: a "guide by the side" (e.g., Salmon, 2000) or a subject matter expert (e.g., Anderson, Rourke, Garrison, & Archer, 2001), for example. According to Duffy (2002), a teacher needs to model the kinds of questions to ask, encourage learners to reflect on what they are learning, and encourage

critical thinking and challenging mental structures. In addition to facilitating inquiry, Anderson et al. (2001) emphasize the importance of the instructor as a source of knowledge and guidance.

Despite these differing perspectives, surprisingly little research has been done to explore teaching online. Sheingold (2005) comments that "there is a dearth in research on what facilitators do in varied online learning environments or how facilitation contributes to interaction and learning" (p. 3). Yet given that the quality of facilitation is highly correlated to the quality of experience students have online (e.g., Sims & Bovard, 2004), research is clearly needed to evaluate different pedagogical approaches to facilitation.

Teaching Presence Framework

A recent framework that could lead to theoretically-informed research on online facilitation is that of Anderson et al. (2001), which is based on the community of inquiry model (Garrison, Anderson, & Archer, 2000). Anderson et al. suggest that effective online "discourse must also be guided toward higher levels of learning through reflective participation as well as by challenging assumptions and diagnosing misconceptions" (p. 3). The person to make sure that happens, according to these authors, is the online facilitator, who has to maintain teaching presence.

Anderson et al. (2001) define teaching presence as "the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes" (p. 6). They classify teaching presence into three elements: design and organization, facilitating discourse, and direct instruction. According to Anderson et al., a strong teaching presence is important to allow collaborative knowledge construction to occur in communicatively lean environments, such as most forms of CMC.

Culture and Language in Online Instruction

Knowledge construction as conceived by social constructionists takes place in social and cultural contexts, and is mediated by language. A number of researchers have argued for the importance of considering culture and language when designing for and facilitating learning by international students in online environments (e.g., Guy 1991; Morse, 2003; Patsula, 2000; St. Amant, 2005; Usun, 2004).

Students taking online courses in a foreign language are often at a disadvantage, especially if these courses involve online discussion and collaboration (Bates, 1999). In the absence of visual cues and gestures, mastery of the language, in terms of fluency and accuracy, is even more important to ensure successful communication. Students' native language (and culture) also influences their perceptions of appropriate communication (Varner & Beamer, 2001). However, according to Bates (1999), the willingness of students of different ethnicities to take part in online forums varies dramatically, and is often not related to their proficiency in the foreign language.

Differences in culture impact expectations about teaching and learning (Bodycott & Walker, 2000; Usun, 2004), especially as regards the role of the teacher. Students from cultures where the teacher is regarded as the fountain of knowledge would hesitate to doubt, let alone challenge, a teacher's opinion (Bates, 1999; Bodycott & Walker, 2000). Students from such cultures may not value their own opinions or may be reluctant to share

their ideas voluntarily (Bates, 1999). They are also more likely to reject the role of teacher as facilitator (Usun, 2004). Power relations also influence students' interactions with one another. These factors can result in environments that inhibit free information exchange and critical thinking (Bodycott & Walker, 2000).

The Learning Culture of Azerbaijan

The students in the present study were located in Azerbaijan. The authors were not able to find literature that examines cultural perceptions of learning in Azerbaijan, specifically. However, Morse (2003) argues that ethnicity rather than nationality is the primary indicator of cultural background. Triandis (cited in Morse, 2003) defines ethnicity as "people who have culture, language, history and traditions in common" (p. 41). According to Akpinar and Merkert (2000), the ex-Soviet states of Azerbaijan, Turkmenistan, Uzbekistan, and Kazakhstan share the Turkish culture. It is thus likely that some of the characteristics of Turkish culture would be reflected in the learning styles and expectations of students from Azerbaijan.

Patsula (2000) argues that the Turkish culture is characterized by close interpersonal relationships, while independence and self-reliance are downplayed. Patronage and the oral tradition seem to play an important role in the impact of Turkish culture on distance learning (Murphy, 1991). Patronage encourages people to manifest obedience and respect for superiors and authority. As noted by Usun (2004), learners belonging to these cultures may be disadvantaged in unstructured environments.

Gunawardena (1996), drawing on Hofstede's (1986) cultural dimensions, explains that the Turkish culture manifests a high degree of power distance, a high intolerance to ambiguity, and tends to be collectivist in nature. According to Hofstede (1986), a culture with high power distance is typically teacher-centered. Teachers are regarded as the source of wisdom and knowledge and are supposed to guide the way; they are usually not challenged. Intolerance for ambiguity implies a preference for structured learning situations. Collectivist cultures adhere to tradition. Adults are reluctant to accept student roles; students will only speak when addressed, and will do so more readily in small groups. Preserving the face of both students and teachers is very important. Such cultures may also emphasize maintaining social harmony in learning situations.

Goals of this Study

The effectiveness of chat as a tool to enhance interaction and cognitively deep learning is widely debated in existing research. This is partially due to a dearth of in-depth rigorous studies that neutrally examine the potential of online chat. This case study evaluates the usefulness of synchronous chat for deep, conceptual learning in the context of a distance education program between two universities in different cultural contexts. Unlike in most other studies, the chat examined in this study was designed to be the primary communication tool for learning-oriented interaction between students and instructors. The goal of this study is to investigate the factors that influence the quantity and quality of interaction, such as facilitation style, language, and culture. More generally, the study aims to contribute to the emerging body of research on the cross-cultural uses of computer-mediated communication in distance education.

Research Questions

The following research questions are addressed in this study:

1. To what extent is participation in the cross-cultural educational chat balanced among students and between students and facilitators?

2. To what extent are chat messages conceptually focused, as opposed to fulfilling social or other functions?

3. Do students' conceptual utterances advance through phases of knowledge construction over time?

4. What kinds of teaching presence do the course facilitators manifest during the chat with the Azerbaijani students?

Methodology

Data

The data analyzed in this case study are logs of synchronous text chat sessions that took place among four adult learners in Azerbaijan and their two facilitators in the U.S. The chats were the main activity in a three-year initiative to train the learners in how to assist faculty in their home institutions in adapting face-to-face courses to online instruction. All four learners have college degrees (one has a Ph.D.), and several are educational administrators in Azerbaijan; three are male and one is female. The facilitators were international doctoral students studying instructional technology in the U.S.; both are female. The group was thus culturally diverse and relatively free of traditional status hierarchies based on age, gender, or western/non-western nationality (e.g., the older male was not in a structurally powerful position, and although the project was based in the U.S., none of the participants were U.S. citizens).

The general educational philosophy of the faculty at the U.S. university supervising this project was constructivist. Their aim was to train the learners through collaborative learning and problem-solving activities. Moreover, it was the goal of the project to train the Azerbaijan team to advocate and design online instruction that was learner-centered and inquiry-based in approach. To set the stage for the cross-cultural intervention, an American team of instructors visited the Azerbaijan team in June of the first year. The Azerbaijan team (hereafter referred to as the students) then received online instruction from September to May via weekly chats and came to the U.S. for further training for several weeks during the summer each year for the three years of the project (2003-2006).

The system used for the chat sessions was Oncourse, a learning management system that facilitates online teaching and communication, both synchronous and asynchronous. For this study, four chat sessions were analyzed from the second year of the project, after the participants had gotten to know one another and become comfortable using the chat system. The four sessions took place in November and December of 2004 and in January and February of 2005. Each session lasted one hour and averaged about 3,200 words, for a total of about 12,800 words of analyzed text. All communication took place in English.

Because the goal of the study was to conduct an in-depth, holistic investigation, a case study methodology was utilized. Yin (2003) indicates that the case study is the preferred inquiry method to examine "a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (p. 13). This approach allowed the researchers to investigate a complex real-life intervention using a variety of evidence types and perspectives.

The most common criticism of case studies is that the results do not lend themselves to statistical generalizations. However, Yin (2003) argues that the purpose of cases studies is not statistical generalization (generalizing to populations) but rather analytic generalization (developing theory) (see also Bassey, 1999; Eisenhardt, 1989). Even though the sample size in the present study is small, the authors believe this study is important in that it enables important questions about chat and cross-cultural groups to be raised that, in turn, may lead to further meaningful research in subsequent studies.

Analytical Methods

This study triangulates the results of content analysis based on three rubrics, each of which has been used in previous research on CMC in learning contexts. The first rubric divides messages into *functional moves* (Herring, 1996), defined by Paulus (2003), as "the function or purpose served by a particular part of a message" (p. 37). Following Paulus (2003), the functional moves in this rubric are 1) social, 2) conceptual, 3) logistical, and 4) technical (see Appendix A). The second rubric is based on Gunawardena et al.'s (1997) interaction analysis model for measuring *knowledge construction* in computer-mediated communication. The rubric involves five phases: 1) sharing/comparing information, 2) discovery and exploration of dissonance, 3) negotiation of meaning/co-construction of knowledge, 4) testing and modification of proposed synthesis or co-construction, and 5) agreement statement(s)/application of newly constructed meaning (see Appendix B). The third rubric is a modified version of the *teaching presence* framework of Anderson et al. (2001), and has three basic categories: 1) instructional design and organization, 2) facilitating discourse, and 3) direct instruction (see Appendix C).

The three rubrics were adapted for empirical analysis by employing computer-mediated discourse analysis (CMDA), an approach to discourse analysis tailored to online communication (Herring, 2004). In keeping with the coding-and-counting approach to CMDA described in Herring (2004), the elements of each rubric were first operationally defined, and the rubrics were transformed into three coding schemes. (See the Appendices for examples of chat data coded according to each scheme.)

Two of the rubrics used in the analysis proved challenging to employ in their original formats. In the case of the social construction of knowledge rubric, it was necessary to refine the operationalization of some of the categories several times (Phases I and III were especially difficult to differentiate) in order to reach acceptable inter-rater agreement levels. A new category, Phase 0, was added to account for conceptual background content found in the data that was not otherwise included in the rubric. Similarly, when applying the teaching presence rubric, it was necessary to create a new category (role playing) and several new indicators, and considerable effort was invested in operationalizing the indicators described by Anderson et al. (2001). Both authors coded all of the data, and the schemes were iteratively refined until better than 80% agreement was

reached on each. Code frequencies were then counted and calculated overall, over time, and by participant role (student and facilitator).

From CMDA, the notion of participation analysis was also borrowed (Herring, 2004). Participation in the chat sessions was analyzed by quantifying number and length of messages sent by each participant, distinguishing between student and facilitator roles. The goal in so doing was to determine how equally or unequally people contributed to the chat, both in terms of the ratio of student to facilitator messages and variation across individual students. Because of the small number of individuals analyzed (N=6), the results of the quantitative analysis are presented as descriptive statistics.

In keeping with the intention of the project to support constructivist, collaborative knowledge construction, the following hypotheses were advanced:

H1: Participation in the chat sessions will be relatively balanced across students and between students and facilitators.

H2: The chat sessions will contain a preponderance of conceptual functional moves as compared to other functional move types.

H3: The chat sessions will exhibit evidence of at least the first three phases of social construction of knowledge, with a shift towards higher phases over time.

H4: The facilitators will manifest a collaborative teaching presence involving mostly facilitation of discourse.

These hypotheses are consistent with the findings of Paulus (2003) for chat in small groups of learners in the U.S. The Azerbaijan students come from a culture with a hierarchical educational philosophy, however, and their proficiency in English at the time of this study was limited (see also Malopinsky, Duffy, & Osman, in review.) Therefore, it was further hypothesized that:

H5: Linguistic and cultural differences between the students and the designers and facilitators of the project will present obstacles to the full realization of Hypotheses 1-4.

Results

Participation

The first question to be addressed is whether participation in the chats was balanced, since this provides a basis for understanding all of the other dynamics in the sessions. Despite the relative lack of status hierarchy among the participants, and the generally equalizing effect of chat observed in prior studies, participation in the chat sessions was unbalanced overall. The lead facilitator, "Olga," contributed nearly as many words as the four students combined (an average of 55%). The contributions of the second facilitator, "Magda," constituted only about 6% on average. Nor did the learners participate equally. S4 and S3 contributed an average of 4% and 7% of the words to the discussions, while S1 and S2 contributed 13% and 15%, respectively. It should be noted that S4 was twice as old as the other participants in the group and the most highly educated, whereas all the other learners were similar in age. S1 was the only female student in the group.

A comparison of the earlier sessions with the later sessions revealed evidence of change in participation over time (see Figure 1). Notably, the ratio of facilitator to student discourse decreased: In the first session, the lead facilitator's contributions comprised 63% of all messages, as compared to 47% for the session analyzed four months later. The participation of the second facilitator remained stable over time, while the amount of student contribution increased.

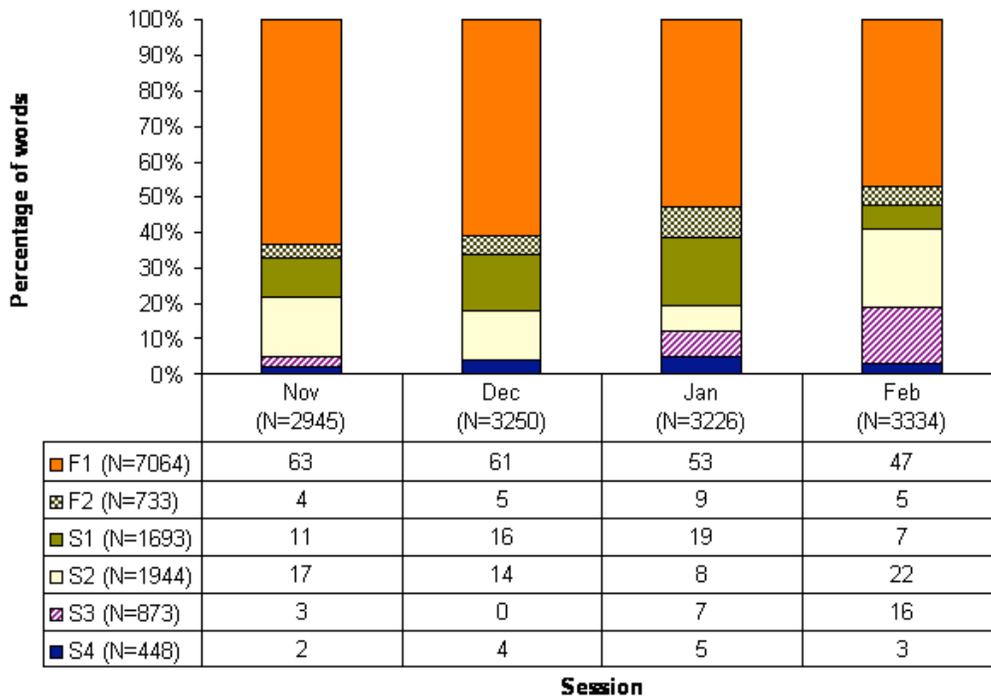|	Nov (N=2945)	Dec (N=3250)	Jan (N=3226)	Feb (N=3334)
F1 (N=7064)	63	61	53	47
F2 (N=733)	4	5	9	5
S1 (N=1693)	11	16	19	7
S2 (N=1944)	17	14	8	22
S3 (N=873)	3	0	7	16
S4 (N=448)	2	4	5	3

Figure 1. Student and facilitator participation over time

All students except S4 were active for at least one session; S4 maintained a low level of activity in all sessions. Individual student participation varied from session to session; in particular, S2 and S3 showed a spurt of activity in the fourth session. Student participation was most evenly distributed in the third session.

Functional Moves

The functional move analysis aimed to determine what kinds of activities the chat participants were engaged in. Since the primary aim for conducting these chats, according to the instructional designers, was that of conceptual development, most of the chats were expected to be conceptual in nature. Consistent with the second hypothesis, nearly half (49%) of all messages were conceptual, focusing on the understanding of design concepts and learner-centered educational pedagogies. (See Appendix A for examples of messages representing each move type.)

Many social (27%) and logistical messages (22%) were also sent. Social messages mostly consisted of greetings and small talk at the beginning of each session and in response to a newcomer joining the chat. Logistical messages concerned organizational aspects such as the submission and revision of assignments and the organization of a pilot

study that was part of the students' training. In contrast, technical messages (e.g., regarding access to the Internet or the efficient use of Oncourse) were rare (cf. Paulus, 2003), presumably because the participants were already familiar with the online course management system after using it for one full year.

The use of functional moves varies by role. The students contributed proportionately more social moves, whereas the facilitators contributed more logistical and conceptual moves, as shown in Figure 2. However, a shift in the distribution of functional moves is evident over time, such that the proportions of social moves by students and facilitators balance out by the fourth session, as do the proportions of conceptual and logistical moves by students and facilitators. Overall, there is an increase in conceptual moves and a decrease in social and logistical moves over time.
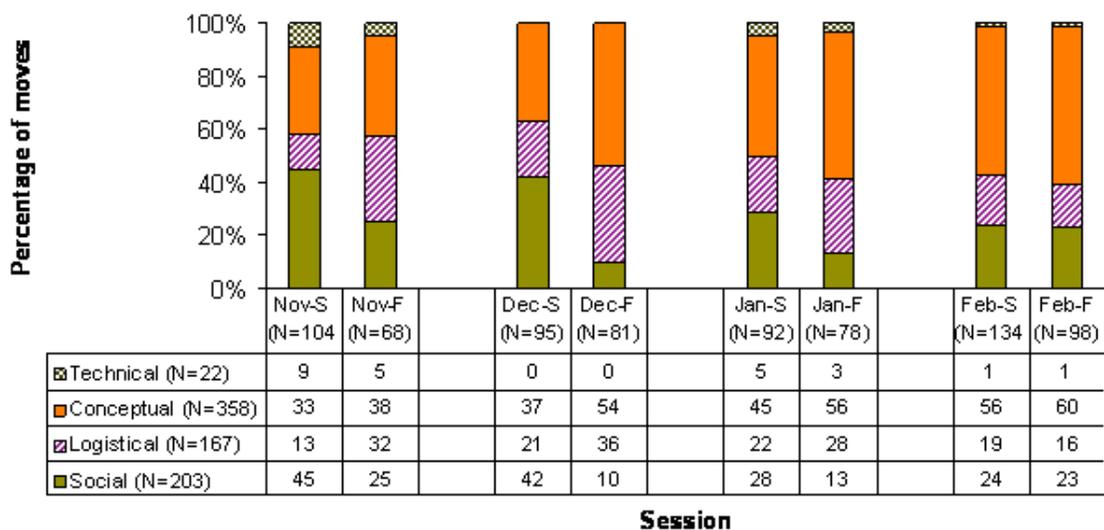

	Nov-S (N=104)	Nov-F (N=68)		Dec-S (N=95)	Dec-F (N=81)		Jan-S (N=92)	Jan-F (N=78)		Feb-S (N=134)	Feb-F (N=98)
⊠ Technical (N=22)	9	5		0	0		5	3		1	1
■ Conceptual (N=358)	33	38		37	54		45	56		56	60
▨ Logistical (N=167)	13	32		21	36		22	28		19	16
■ Social (N=203)	45	25		42	10		28	13		24	23

Figure 2. Percentages of student and facilitator functional moves over time

Social Construction of Knowledge

The social construction of knowledge coding scheme was applied to the conceptual messages identified in the functional move analysis, to assess if the participants were collaborating to construct new understandings. Overall, most conceptual messages were coded as Phase I (46%) and Phase III (32%) according to Gunawardena et al.'s (1997) rubric, followed by Phase II (18%) (identification of dissonance). No messages were coded at Phase IV, and only a few were coded at Phase V (1%), most of them summaries by Olga. In addition, 3% of messages were coded as Phase 0, a code introduced by the researchers to account for messages that provided background information necessary for progression to Phase I (see Appendix B for examples of messages representing each phase).

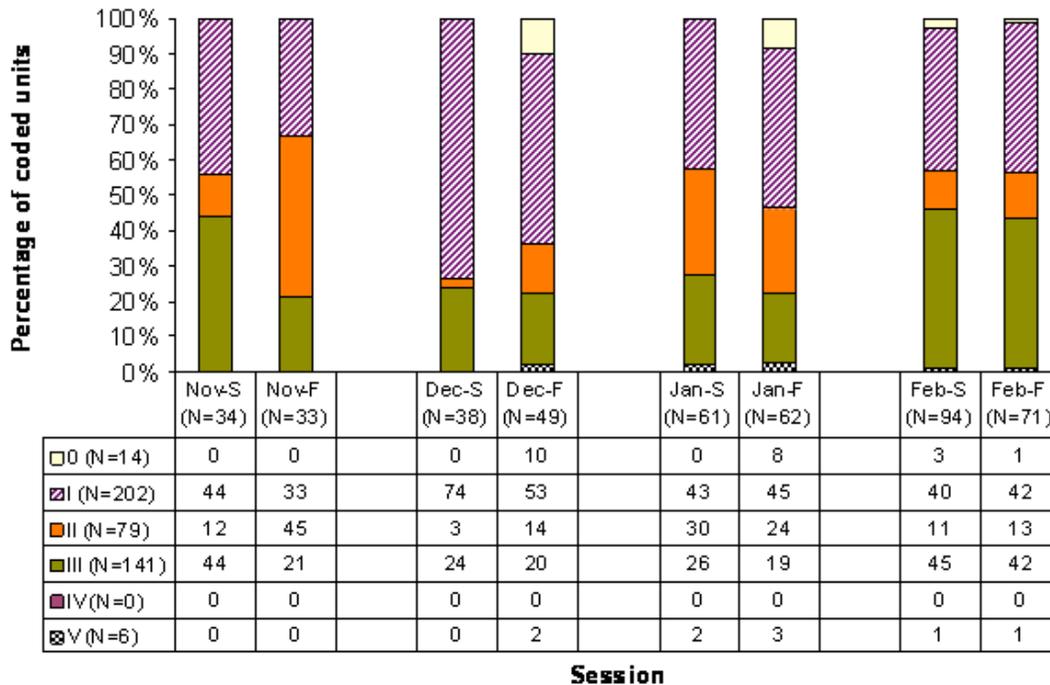|	Nov-S (N=34)	Nov-F (N=33)		Dec-S (N=38)	Dec-F (N=49)		Jan-S (N=61)	Jan-F (N=62)		Feb-S (N=94)	Feb-F (N=71)
0 (N=14)	0	0		0	10		0	8		3	1
I (N=202)	44	33		74	53		43	45		40	42
II (N=79)	12	45		3	14		30	24		11	13
III (N=141)	44	21		24	20		26	19		45	42
IV (N=0)	0	0		0	0		0	0		0	0
V (N=6)	0	0		0	2		2	3		1	1

Figure 3. Percentages of student and facilitator knowledge construction phases over time

Although the phases themselves occur with different frequencies, and the overall distribution of each phase does not change much from session to session, a trend is evident whereby the proportions of student and facilitator moves become balanced over time (see Figure 3). Whereas in the first two sessions the facilitators were responsible for most of the Phase II moves (most of them feedback aiming at identifying student misconceptions), the learners produced more such moves over time in contesting the facilitators' views. Conversely, whereas the learners initially produced more Phase III moves (in accommodating to the facilitators' positions), the facilitators became more accommodating of the learners' views over time. Thus, although no clear progression emerged over time in number of moves of each phase, a progression towards increasing balance and negotiation of concepts among participants was evident.

Teaching Presence

The teaching presence analysis focused exclusively on the contributions of the facilitators, asking to what extent these were consistent with an inquiry approach to instruction. As noted above, the two facilitators participated at very different rates, and in somewhat different manners. However, both facilitators primarily gave direct instruction (DI), and discourse facilitation (DF) was infrequent, especially in the first two sessions (see Figure 4). (For examples of these categories, see Appendix C.)
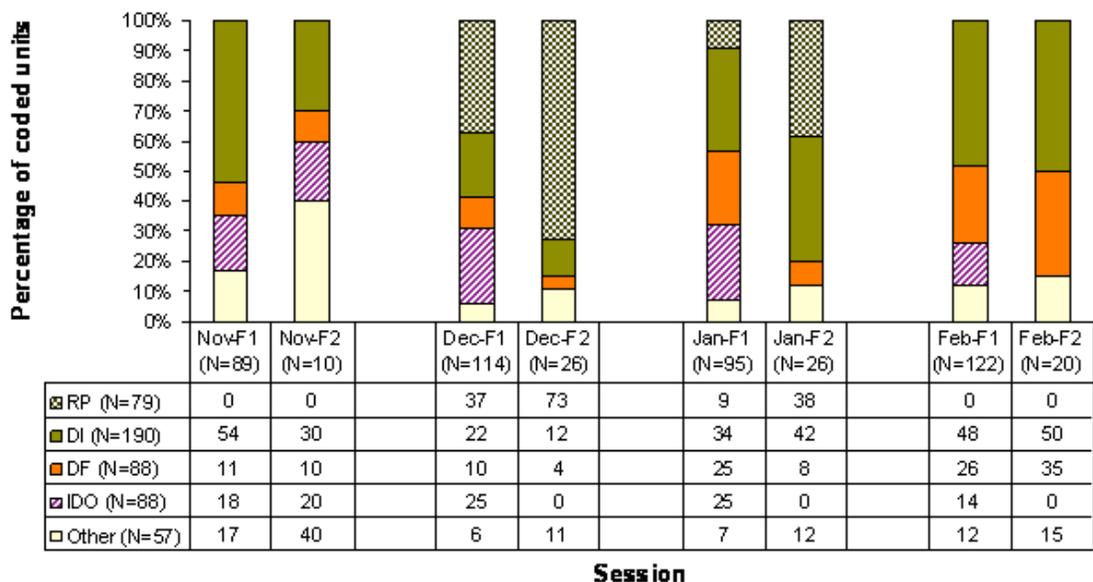
	Nov-F1 (N=89)	Nov-F2 (N=10)		Dec-F1 (N=114)	Dec-F2 (N=26)		Jan-F1 (N=95)	Jan-F2 (N=26)		Feb-F1 (N=122)	Feb-F2 (N=20)
RP (N=79)	0	0		37	73		9	38		0	0
DI (N=190)	54	30		22	12		34	42		48	50
DF (N=88)	11	10		10	4		25	8		26	35
IDO (N=88)	18	20		25	0		25	0		14	0
Other (N=57)	17	40		6	11		7	12		12	15

Figure 4. Percentages of teaching presence categories for both facilitators

Over time, however, discourse facilitation increased: In particular, the facilitators sent more messages prompting and focusing discussion and acknowledging student contributions. Moreover, while the facilitators continued to provide direct instruction, this decreasingly involved identifying learner misconceptions and presenting content in a top-down manner, instead increasingly taking the form of asking questions and confirming learner understandings in an interactive manner. These patterns are shown in Figures 5a and 5b. (The numbers in these figures are percentages of all teaching presence moves.)
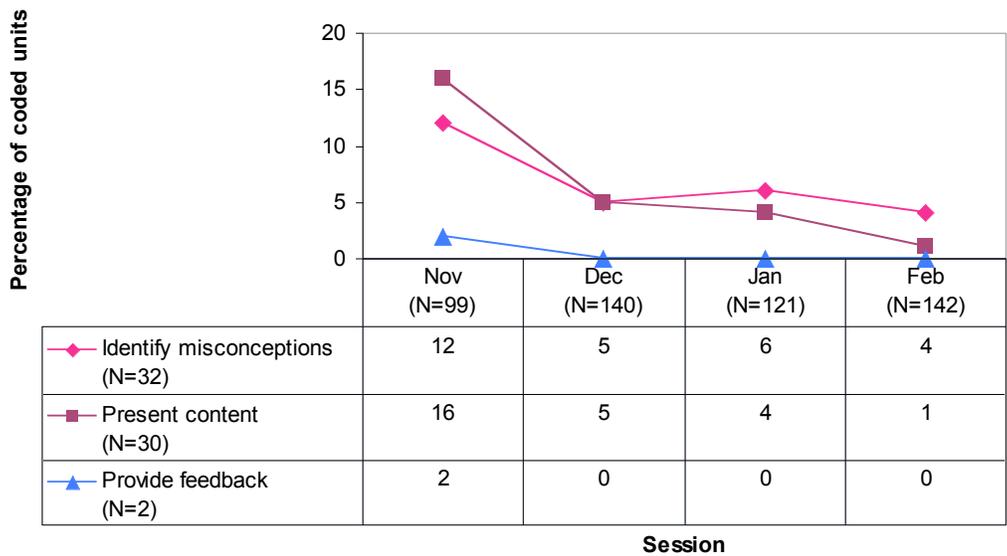

	Nov (N=99)	Dec (N=140)	Jan (N=121)	Feb (N=142)
Identify misconceptions (N=32)	12	5	6	4
Present content (N=30)	16	5	4	1
Provide feedback (N=2)	2	0	0	0

Figure 5a. Direct instruction indicators that demonstrate non-interactive instruction

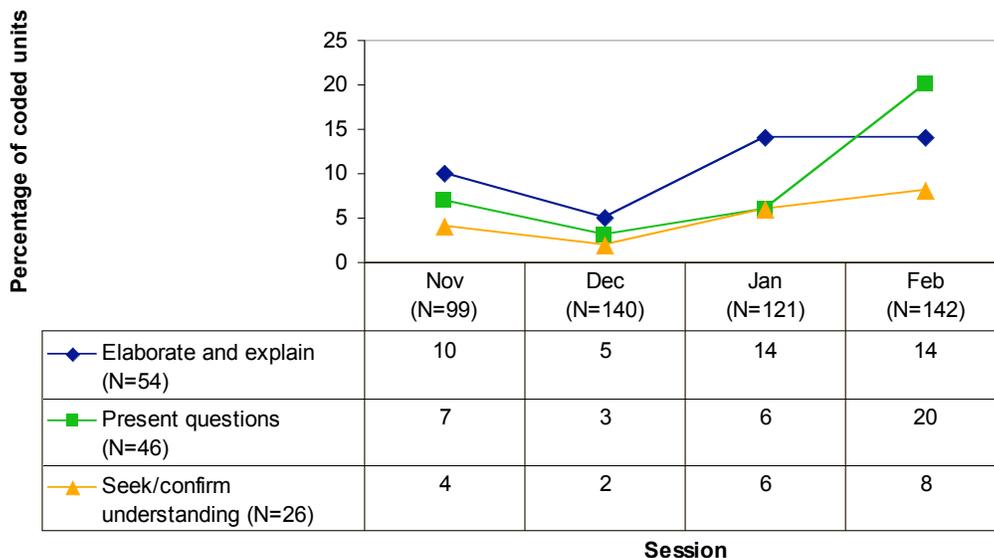| Session	Nov (N=99)	Dec (N=140)	Jan (N=121)	Feb (N=142)
◆ Elaborate and explain (N=54)	10	5	14	14
■ Present questions (N=46)	7	3	6	20
▲ Seek/confirm understanding (N=26)	4	2	6	8

Figure 5b. Direct instruction indicators that demonstrate interactive instruction

Figures 5a and 5b show that the category "direct instruction" exhibits two distinct patterns: Top-down behaviors (Figure 5a) decrease over time, and interactive behaviors (Figure 5b) increase over time. This calls into question the theoretical coherence of the category itself, and suggests that "direct instruction" might better be conceptualized as two different kinds of behavior in future research employing Anderson et al.'s (2001) framework.

After direct instruction, the second most frequent category of teaching presence was in the form of role play (RP) messages, although these occurred only in the second and third sessions. Role play was an instructional strategy that was introduced to model the kind of behavior that students were encouraged to produce, and was thus an indirect form of instruction. The instructional design and organization (IDO) category included establishing time parameters and network etiquette, as well as discussing the organization and design of the course. The "Other" category under teaching presence included messages expressing apologies, reprimand, warning, or teacher expectations. Neither IDO nor Other showed a clear pattern of variation over time.

The role of the second facilitator was to act as a support for the main facilitator. For example, Magda would occasionally respond to some of the questions students asked if Olga was targeted with too many questions in a short period of time. On other occasions, Magda would prompt or encourage students to answer Olga's questions. The clearest distinct role for the second facilitator emerged during role play, however. Then, the second facilitator interacted and negotiated meaning with the first facilitator, enacting the role of the ideal student.

Discussion

Many of the hypotheses were not supported for the chat sessions overall, suggesting that the chat format did not meet the overall constructivist goals of the project very well. At the same time, trends emerged from the analysis that support the spirit of the hypotheses, in the sense that each hypothesized behavior increased over time. These trends suggest that

synchronous chat can facilitate collaborative learning to some extent. These findings are discussed below in relation to each hypothesis.

Contrary to H1, participation in the chat sessions was not balanced across students or between students and facilitators; rather, the facilitators—especially F1—contributed most of the messages in each session. This result would not necessarily be considered problematic by Anderson et al. (2001), who believe in the role of the teacher as the provider of knowledge. Constructivists, in contrast, might see the high rate of contribution by facilitators as an indication of minimized opportunities for active student learning. However, participation became more balanced over time, as the lead facilitator contributed proportionately less and the students contributed proportionately more. Student participation also balanced out somewhat, with one previously quiet student (S3) becoming more active in the last session.

The chat sessions contained nearly twice as many conceptual functional moves (49%) as any other functional move type, and thus H2 is supported. In Paulus's (2003) study, students spent just under 35% of their chat time on conceptual moves, which makes the results of the present study seem quite positive. The frequencies of social moves and logistical moves were also fairly high. In this course, chats were the main forum for interaction, including interaction to socialize and ask logistical questions, and it is thus not surprising that a substantial percentage of messages had non-conceptual functions. Still, 25% of the moves were social in nature, compared to 17% in Paulus's U.S. study. These were produced mainly by the students, and included greetings as well as moves that showed support and encouragement of other participants. Kanuka and Garrison (2004) note the importance of the social aspect in distance education; yet excessive socializing can distract from learning. Interestingly, social moves decreased, while conceptual moves increased over the four chat sessions, providing stronger support for this hypothesis over time.

H3 predicted that the chat sessions would exhibit evidence of at least the first three phases of social construction of knowledge as described by Gunawardena et al. (1997), and this was the case. Phases I and III were predominant among the conceptual functional moves coded for knowledge construction. However, phases IV and V were essentially lacking, and there was no shift toward higher phases over time, contrary to H3. Several interpretations of this negative result suggest themselves. The first is that the failure of students and facilitators to reach higher levels of knowledge construction is a limitation of synchronous chat (Bober & Dennen, 2001; Herring & Nix, 1997; Teng & Taveras, 2004-2005). It is also possible that it reflects negatively on the usefulness of the Gunawardena et al. (1997) model, which has been criticized for being difficult to operationalize and implement (e.g., Kanuka & Anderson, 1998). Alternatively, and relatedly, the emergence of the higher knowledge construction phases and the likelihood that they progress from lower to higher in a linear pattern might depend on the nature of the task, with the Gunawardena et al. model assuming a particular task type (e.g., self-contained debate) that does not fit with the activities for the Azerbaijan chat sessions.

The latter would seem to be the case in the present study. For each unit, the students were assigned a design task. Chat was used either to discuss important concepts related to the design document or to provide students with feedback on a previously submitted document, but not to complete the design task. Later phases of the knowledge

construction cycle would thus be expected to manifest themselves outside of the chat context.

Nonetheless, the phases of knowledge construction model proved revealing in this study, in that differences in the frequency of each phase manifested by students in comparison to facilitators showed a trend over time toward mutual accommodation, and thus provided partial support for the negotiative spirit of the model. In the earlier sessions, the facilitators critiqued the students' previous work and the students accommodated to the facilitators by agreeing with everything they said, even if they did not seem to understand it fully. In the third session, however, there was a perceptible change in the students' behavior—they challenged the ideas of the facilitators more and agreed relatively less— and by the fourth session both students and facilitators were challenging and accommodating to each other at the same rate, suggesting that an equilibrium had been reached.

The fourth hypothesis, that facilitators would manifest a collaborative teaching presence involving mostly facilitation of discourse, was also not supported. Rather, direct instruction dominated the chat sessions. Constructivists might regard such chat as deficient in interaction, because it has too much instructor input. Alternatively, it could be regarded as a scaffolded environment in which the learner benefits from the teacher's expertise (Anderson et al., 2001). In addition to asking many questions to prompt discussion, the facilitators presented learners with substantial information for guidance in the four sessions analyzed here. At the same time, both facilitators increased their levels of discourse facilitation over time, approximating the spirit of the hypothesis more closely in the last session than in the first three.

 The increase in interactive patterns is consistent with the trends in each of the other measures discussed above: According to each measure, there was change over time in the direction of more equal participation, more focus on cognitive activity, more collaborative negotiation, and a less "top-down" facilitation style—all characteristics of a constructivist learning environment. This evolution took place, despite evident cultural and linguistic barriers, at a point in the project when chat was the primary means of communication.

There are several possible reasons for the observed changes. The first is time: The four chat sessions took place over 16 weeks, during which time the students' familiarity with the chat protocols and their self-confidence in their knowledge and language ability presumably increased. Second, and contributing to the first reason, the Azerbaijani students spent six weeks at the U.S. university during the summer between the first and second years of the project, which helped the participants to become better acquainted and facilitated student awareness of U.S. culture and approaches to education; this could have paved the way for continued evolution during the second year. Finally, and most immediately, the role-play activities that took place in the second and third sessions analyzed in this study could have helped by modeling a more collaborative, negotiative style of interaction that the students then imitated in the later sessions. It seems likely that all three factors contributed to some extent to the observed changes.

Overall, however, the predicted constructivist facilitation and interaction patterns were not strongly present in the chats. An important reason for this appears to be cultural differences between the students and the designers and facilitators of the project

(hypothesis 5). Arguably, participation could not be balanced because of hierarchical power distance expectations on the part of the students. Age and qualifications contribute to distance between people in a country where power distance (Hofstede, 1986) is high, as is the case in Azerbaijan. Power distance was evident among the students. The least active chat participant, S4, was the manager of the other team members offline in Azerbaijan, in addition to being older and more highly educated. He seemed to feel that it would have been inappropriate for him to interact with the other students in the chats. Power relations could also explain why the students contributed substantially less than their facilitators. If the students regarded the facilitators as the experts on the topic being discussed, they could have believed that they should be listening rather than contributing to the discussion. This is highly plausible if we recall that education in Azerbaijan is still very much a teacher-centered system, in which the teacher plays the role of "sage on the stage," consistent with the observations of Hofstede (1986) for high power distance cultures.

This dynamic was exacerbated by the students' language difficulties. One student (S4) was at an upper-intermediate level in English, one was at a lower-intermediate level, and two had only rudimentary English at the start of this project. Even in the chats analyzed in this study, which took place in the second year, there were many messages that the authors had difficulty understanding due to errors in spelling, grammar, and word choice. Given the students' limited English, and the pressure of producing text in real time in synchronous chat, it was easier for the students to let the facilitators do most of the "talking." In face-to-face interviews with the Azerbaijani students conducted by the first author in the third year of the project, the students all commented on the difficulties they had had in understanding and being understood in the chat sessions.

The students' comprehension difficulty led the facilitators to communicate more clearly and simply. The first facilitator, in particular, sometimes employed simplified grammar and other features of "foreigner talk" (Ferguson, 1981) in the chats. It may also have led the facilitators to adopt a more top-down teaching style than they otherwise would have used, in order to present and explain the course materials unambiguously. In personal communication with the authors, F1 commented that the amount of chat she contributed was not typical of her teaching style. Because of the unresponsiveness of the students to prompting, she felt that leading the discussion was the only way to keep it going. The students' limited language abilities, according to F1, slowed down interaction and required extra scaffolding.

These comments are supported by the fact that, rather than perceiving her as dominating, the students appreciated Olga's facilitation style, including its top-down characteristics. One student commented explicitly in the interviews, "Based on my experience as a teacher, I think the facilitation was very good. She [Olga] introduced the topic, she decided who should participate and when. She ruled the situation. I think she is working [sic] excellent."

Finally, culture may have shaped the functional move results. The Azerbaijan culture emphasizes interpersonal relations, and the social aspect of interactions cannot be ignored, even if the main purpose of the interaction is not social in nature. This was reflected in the large difference between the students and facilitators in number of social moves. The learners in this study seemed to be highly concerned with the social aspects of the interaction, as evidenced in their use of greetings and frequent expressions of support

for each other's and the facilitators' contributions. These behaviors are consistent with the observation of Hofstede (1986) that the positive face of interlocutors is important in collectivist cultures such as Azerbaijan.

Nonetheless, if a face-oriented, teacher-dominated, top-down instructional style that met the expectations of the Azerbaijani students characterized the chat sessions overall, it remains the case that the sessions evolved to be more interactive, egalitarian, and constructivist in their pedagogy over time. In addition to the enabling factors discussed above, the efforts of the facilitators and project designers to create a constructivist environment played an important role. Interacting via chat in and of itself does not necessarily lead to greater collaboration, negotiation, or equality of participation over time. The project was designed to instantiate constructivist principles, and the facilitators guided the students in that spirit in every chat session, even if their efforts to overcome the Azerbaijani students' difficulties in comprehension and expression sometimes led to instructor-dominated behaviors. Without this sustained guidance, the constructivist outcomes that were observed almost certainly would not have come about.

Conclusions

Previous research on computer-mediated communication in education has largely confined the use of chat to social functions; there have been few in-depth studies that empirically examine the potential of online chat to support knowledge construction. The current study investigated this issue by examining chat in a cross-cultural context in which this synchronous form was used as a primary tool for learning-oriented interaction. The findings of this study lend empirical support to studies that suggest the cognitive potential of synchronous discussion to support deep learning (e.g., Curtis, 2004; Kirk, 2000; Phillips, 2005). Compared to asynchronous CMC, in chat the energy level in intellectual collaboration can be maintained, which can foster more dynamic and potentially creative exchanges. In the present study, chat supported a progressive increase in collaborative learning activity. Its social aspect was also an advantage, especially for the Azerbaijani students.

These findings have implications for instructional design. If online chat is suitable for cognitive development, then incorporating this technique in distance learning could address motivational and affective concerns commonly associated with asynchronous discussion—the tool currently acknowledged as enabling critical thinking and in-depth interaction in online environments—either as a complement to asynchronous discussion, or as the main channel of communication, as in the present study. The present study suggests that chat may be especially appropriate for dynamic tasks such as asking and answering questions and for group discussion after concepts have initially been introduced.

However, caution is recommended when designing cross-cultural online learning experiences, especially when language issues are involved. In the project analyzed here, the facilitators and project leaders ended up concluding that chat might not have been the best medium to use. It takes longer to explain concepts and to develop comfortable online relationships than does face-to-face instruction (cf. Walther, 1992); it is costly in terms of instructor effort (albeit cheaper than bringing students to the U.S.); and it may require considerable shared background about the subject matter and shared understandings born of familiarity, including cultural assumptions, in order to succeed. Moreover, the outcomes

of the students' work in this case (course designs) did not meet the project leaders' expectations. Finally, it is unclear whether the students will transfer what they learned, given, in addition, the institutional barriers they are likely to encounter in implementing the designs in their own cultural context. If possible, therefore, it may be better not to rely on chat as the primary medium of interaction.

Finally, this study identified factors of special significance in cross-cultural educational chat, including language issues and differing cultural expectations about how the roles of "teacher" and "learner" should be performed. As such, the findings help advance knowledge about the effects of a specific technology on cross-cultural understanding, which is an important prerequisite to collaborative learning.

Limitations and Directions for Future Research

Alongside its positive contributions, several limitations of this study should be noted. First, consistent with the case study approach, only one cultural group of learners was studied. Further research is needed that systematically examines the use of chat across different cultural contexts, in a variety of collaborative learning activities. Moreover, the number of learners and facilitators was small. With a larger number of participants, the inferential statistics could be conducted that would be necessary to make generalizations.

Relatedly, the study only examined four months out of a three-year intervention. The second year sample was chosen because during the first year, the students had severe language problems, and the third year involved different activities—the students were starting to facilitate other faculty in Azerbaijan (in their native language, Azeri), rather than engaging in student-facilitator interactions. It would be interesting in future research to examine whether the trends observed in this study extended in either direction of the four-month period sampled, in order to determine whether the increase in constructivist activity documented here was part of an ongoing trend or whether it was a localized effect.

Finally, it was beyond the scope of this study to evaluate learning outcomes directly. Future research into the potential of synchronous chat for conceptual learning should focus on the relationship between teaching presence (and the constructivist approach in general) and learning outcomes. While different theoretical camps advocate different approaches to facilitation, instructional designers and facilitators find themselves at a loss for practical guidance. It is vital to address this issue in order to determine the extent to which constructivist pedagogy results in learning that is actually, rather than only theoretically, deep.

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Appendix A: Functional move coding scheme and examples

Main category	Sub-category	Indicators	Examples
Non-conceptual	**Logistics**	Address the completion of the task itself	Only two people completed the activity
		Establish deadlines	we have had to do all activity by last friday
		Decide which group member will do which part of the task	OK, I try post my design reflection on the individual dropes tomorrow.
		Exchange documents for feedback	I try post my design reflection on the individual dropes tomorrow.
		Refer to or report on edits made to the drafts that do not concern the ideas or content of the task, such as structure, citations, and writing style	Post your Word drafts of course activities in your Drop boxes, and update the course so we ca see the changes.
	Social	Exchanges such as greetings, closings, and small talk	Hello everyone!!! unfortunatly we will not able to celebrate Independent Day
		Polite behaviors such as thank, compliment	See you next week, have a nice day
		Encouragement and support for members of groups	Good question
		Apologies	I am sorry for being late.
		Face-threatening statements – chastisement	Also, one little suggestion: please let all try to make greetings and farewells a bit shorter if someone needs to leave earlier, please send me a private message, otherwise we spend 20% of our time saying hello and good-bye.
		Agreement that does not add information	I absolutely agree with you! OK, [F1].
	Technical	Concern the functionality and use of the communication tools	we had problem with connection
Conceptual		Address the conceptual understanding of the content of the current task being completed by the team	Proposed resources is very important for students because additional readings give to students opportunities for individual independent work.
		Discuss which of several options provided in the task to choose	We should urgently invite them in new environment and let them to feel it - LEARNING by DOING - they ([Name of Instituition] faculty) will like it
		Seek to understand the task itself	Last chat we decide that we have prepared own materials , but dont use book material
		Attach drafts of the task for review by the group.	we have had to do all activity by last friday, in order to be able to review them and post by 15 November
		Review content and provide feedback	i see fisrt mistake: we have 2 same pages for welcome

Appendix B: Social construction of knowledge coding scheme and examples*

Phase	Examples
0: Providing background information	We spent some time in our previous chats discussing the importance of scaffolding our students as they become familiar with the learning challenge ("problem", and try to solve it by working on the activities you are developing for them.
I: Sharing/comparing information	we have to find teacher from states universities
II: Discovery and exploration of dissonance or inconsistencies among ideas, concepts or statements	[F1], yes I read this tasks and I have question. You say that we must prepare at least 5 resources. But if for my unit and activity I don't supose include 5 resources for readings. it turns out that it will be empty and additional work.
III: Negotiation of meaning/ co-construction of knowledge	Let's first talk about the role of resources in your activities. Please try not to focus on the formality of the task (5 resources), but why do we need resources in our activities. I am asking you all.
IV: Testing and modification of proposed synthesis or co-construction	(No messages were coded for phase IV)
V: Agreement statement(s)/ application of newly constructed meaning	All rihgt, we established that resources would be more beneficial for your students if they are not separated from your content of activity, but integrated in it, and help them to actually solve the problem.

*Messages that are not conceptual in nature have been removed from the excerpt.

Appendix C: Teaching presence coding scheme and examples

Category	Indicators	Examples
Instructional Design and Organization	Design methods	You will work in groups for this assignment. Each one will have a different role
	Establish timeline	Please do not forget to submit post-session research to [Name], and review schedule document TODAY
	Utilize medium effectively	I'd like you all to open your feedback in a separate window so you would know what I am talkinng about. It is in Reviewed folder under group spaces in IN TOUCH
	Establish netiquette	Also, one little suggestion: please let all try to make greetings and farewells a bit shorter if someone needs to leave earlier, please send me a private message
	Organize work	All the documents must be uploaded in Group design Tasks folder
Facilitating Discourse	Acknowledge student contributions	Good point, they do not need to have solid background on problem-based instruction.
	Set climate for learning	oh, I am not about obedience let's rather talk about how we understand the concept of the "problem"
	Draw in participants, Focus the discussion	What would be your response to this question? Please ALL Guys, can we focus on the topic we are discussing now- resources and then move to other problems.
	Initiate/close discussion	let me get started on some of the course development aspects.
	Meta-discourse	we are discussing a new course development schedule

Direct Instruction	Elaborate and explain	Try to find people form different universities, if possible. In [Name of institution], we have [name], [name], and [name], who might be interested as they worked with us before
	Identify misconceptions	please try to distinguish the learning prodcut - the strategy proposal, from the formal testing of the course - these are completely different things.
	Present background	Let's put ourselves into our students' shoes. I need to solve a problem, and come up with my own teaching strategy.
	Present content	The assessment we are using here is not traditional assessment in the terms of testing. We do not care about grades.
	Present questions	what type of resources (any addtional materials that are not the part of your conversation with the student) can be used to support their solving the problem?
	Provide feedback	your instructions, especially in activities, are very short - you need to provide more support, more scaffolding, more information for them.
	Seek/Confirm understanding	It is not about us justifying their involvement in this course, it is about THEM talking WHY it is important to reflect on their teaching approach and think of the new strategy wen preparing to work online.
Role Play		exactly, Olga, resources are part of the activity. They are often an integral part, and not additional and supplementary.
Other	Apology	sorry for misspelling
	Comment on technical problems	please work with me on my questions, then we will figure out your technical problem - thank you.
	Prompt action	post your design reflection
	Reprimand	It's a pity that only 2 people provided feedback
	Self-correction	I mean "do they need"
	Set expectation/warn	next week I would expect all of you to be in the place with the same connection
	Discuss travel logistics	Are you guys all OK for the trip to [Name of city] between July 10 and August 20
	report on progress	I reviewed your feedback to our draft
	N/A	and it's rainign in [Name of city] today - I guess the winter is over