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Convergent and Divergent Computer-Mediated Communication Tasks in an English for Academic Purposes Course

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Abstract

This article describes the implementation of technology-mediated tasks in an English for academic purposes (EAP) curriculum at a Japanese university. The course addressed the needs of English majors at the school by enabling more efficient completion of academic work, including essay writing. One way that technology supported this goal was through tasks conducted via a chat module integrated into the Moodle course management system (http://moodle.org/). A classroom-based study was designed to evaluate the potential of convergent and divergent tasks to promote the development of second language competence through computer-mediated communication (CMC). During class, dyads completed two tasks via chat. Building on past research in face-to-face settings, quantitative and qualitative analyses of the discourse were conducted. Results are discussed in terms of the similarities and differences between these findings in CMC situations and those of the aforementioned research carried out in face-to-face settings. Implications for second language pedagogy, as well as methodological limitations, are discussed in the conclusion.

Introduction

The appearance of educational tools alternately called learning management systems, virtual learning environments, or course management systems in university settings has led to interest in ways these systems can be used to serve and extend the goals of foreign language programs. In such contexts, tasks have been viewed as useful for guiding various elements of language program development, including needs analysis, task selection and sequencing, materials development, teaching, assessment, and program evaluation (Norris, 2009), because they help to stimulate learners' linguistic development while approximating authentic language use (for book-length treatments, see, e.g., Ellis, 2003; Reinders & Thomas, 2010; Samuda & Bygate, 2008; Van den

Branden, Bygate, & Norris, 2009; Willis & Willis, 2007). However, when communicative tasks are employed in technology-mediated learning environments, results may be both similar to face-to-face settings and different from them in important ways. Therefore, studies that attempt to relocate tasks within the expanding context of tools provided by course management systems, (e.g., text-based chat) are needed.

For over a decade, text-based chat has been cited as beneficial in terms of enhancing a broad range of outcomes related to second language (L2) learning, from interactive competence (Chun, 1995) to morphosyntactic development (Salaberry, 2000) to cross-modality transfer (Payne & Whitney, 2002). These outcomes are not always defined linguistically, either, as research has demonstrated the potential of text-based chat to equalize classroom participation (Warschauer, 1996), enhance willingness to communicate (Freiermuth & Jarrell, 2006), and reduce learner anxiety (Satar & Özdener, 2008). To date, however, published reports focusing on the use of chat in EFL settings are scarce, although a recent study by Zeng and Takatsuka (2009) found that EFL learners in China performing collaborative tasks through Moodle's chat function assisted each other in attending to form. The present study seeks to contribute to this literature by investigating the linguistic outcomes of convergent and divergent tasks performed by EFL learners during text-based (non-video) chatting.

This paper will first review the literature on task-based computer-mediated communication (CMC) in a written mode, then describe how CMC tasks were integrated into the curriculum in an English for Academic Purposes (EAP) course in Japan. Next, a classroom investigation of Japanese EFL learners' language production in two tasks differing in goal orientation (convergent vs. divergent), carried out using chat will be presented. Data from learner-learner interaction during the chat sessions were analyzed to show how certain discourse characteristics accompanying these tasks in face-to-face settings can also be observed in computer-mediated communication. Excerpts from the chat logs support the claim that task-based interaction in CMC can lead to widely acknowledged conditions for second language learning. The article will then conclude with some comments on the interrelationship between the existing body of knowledge on tasks in face-to-face contexts and the burgeoning literature related to the study of task-based language teaching and technology.

Task-based Computer-mediated Communication

Some authors have taken an overtly interactionist stance, emphasizing the role of conversationally modified discourse in learner development, when discussing the theoretical potential of CMC tasks to establish the necessary conditions for L2 learning (Chapelle, 1997, 2001; Doughty & Long, 2003), while others have instead stressed cognitive processes that are held by interactionists to be crucial to the success of these conditions, such as focus on form (Skehan, 2003). Moreover, empirical research adopting this interactionist framework to examine second language learners' synchronous or real-time text-based CMC in different pedagogic task conditions has yielded results that help link theory and practice when adopting CMC technology.

Several studies have looked at text-based CMC from the perspective of the model developed by Varonis and Gass (1985) to investigate L2 speakers' conversational interaction. For example, Pellettieri (2000) illustrated the role of conversational interaction in CMC in L2 grammatical development, reporting on a study in which undergraduate Spanish learners in the U.S. completed communication tasks using a chat program. Negotiation routines in the study consisted of problematic lexical, morphosyntactic, and content *triggers*, *indicators* (or *signals*) including clarification requests, comprehension checks, and echo questions, *responses* such as repetition, paraphrase, or elaboration, and *reactions to the response*, which Pellettieri speculated may be more important in chat sessions than in face-to-face contexts. The author described how learners negotiated meaning, achieved mutual comprehension, and modified their production, and concluded that task design may have an impact on the potential of negotiation in CMC to contribute to L2 development.

Next, two reports of text-based chatting have investigated Pica, Kanagy, and Falodun's (1993) claim that jigsaw and information-gap tasks, in which interaction is required, goals are convergent, and there is a single outcome, afford greater opportunities for negotiation. Blake (2000) focused on the amount of negotiation in different task types in two studies of English-speaking learners of Spanish at a U.S. university. Participants used a synchronous chat program to carry out several tasks based on Pica et al.'s typology, including one- and two-way information gap, jigsaw, and decision-making tasks. Blake's analysis of the data, which again revealed patterns of negotiation typical of the Varonis and Gass (1985) model of learner discourse, demonstrated that 93% of the negotiation routines in the first study and 78% in the second study occurred during jigsaw tasks. The author concluded that jigsaw tasks provide optimal conditions for second language learning, "with the CMC medium being no exception" (p. 133).

Smith's (2003) study of dyadic interaction among intensive English learners provides further evidence upon which to evaluate the tasks in Pica et al.'s typology, comparing interaction in jigsaw and decision-making tasks carried out via chat. While sharing a convergent goal orientation, jigsaw and decision-making tasks differ in terms of interaction requirements (+ and – required, respectively) and outcome options (1 and 1+). Importantly, both tasks in this study were seeded with target lexical items. Smith expanded the Varonis and Gass (1985) model by adding two subcategories of reactions to responses to his analysis of the negotiation routines. The results appeared to contradict Pica et al.'s expectation, revealing that learners negotiated a mean of 23% of the turns in the jigsaw task and 44% in the decision-making task. However, while there were more than three times as many negotiation sequences stemming from target lexical items in the decision-making task, the jigsaw task outnumbered the decision-making in terms of non-target lexical, discourse, and content triggers, suggesting that seeding tasks with target vocabulary may have an impact on interactional outcomes.

More recent task-based CMC studies adopting an interactionist orientation include Smith's (2005) study on learner uptake in jigsaw and decision-making tasks, Alahmadi's (2007) report on EFL learners' use of negotiation during information-gap and decision-

making tasks, and Lee's (2008) examination of self-repair in jigsaw, spot-the-difference, and open-ended tasks. Relevant to the tasks used in this study, Lee's tasks exhibited the contrast between convergent (jigsaw, spot-the-difference) and divergent (open-ended) goal orientations. Interestingly, she found a higher percentage of self-repair in the divergent task in her study.

The research described above indicates that CMC can be a successful means of engaging learners in modified interaction and that tasks with a two-way interaction requirement, a shared (or convergent) goal orientation, and a limited number of outcomes tend to promote more frequent negotiation of meaning. In addition, options such as requiring a post-task and seeding task input with target lexical items may facilitate negotiation.

It should be pointed out, however, that interaction is by no means the only perspective from which tasks in text-based CMC have been studied. Other studies have shifted the focus of research from negotiation to attention to language form (Lai & Zhao, 2006; Shekary & Tahririan, 2006; for review see Ortega, 2009). Furthermore, research on task-based CMC is now broadening to consider more carefully how technology itself may enhance or constrain learning processes during task performances (Hampel, 2006). Within CMC research that employs a task-based perspective, researchers have also investigated the effects of synchronous versus asynchronous modality (Sotillo, 2000; Stockwell, 2010), as well as proficiency level (Collentine, 2009, 2010) on the linguistic output of L2 learners.

The present work adopts a perspective that seeks to account for the influence of task characteristics on negotiation of meaning and language production (defined in terms of syntactic complexity) in a virtual environment. Within this domain, few studies have attempted to uncover the nature of L2 learner discourse taking place when task conditions in text-based CMC involve convergent and divergent goal orientations. Although, as noted above, much previous CMC research has focused on convergent tasks, Lamy (2007) suggested that less convergent task designs support exploration and reflection during online conversation. Therefore, additional research on the contribution that convergent and divergent tasks in CMC make, in terms of both quality and quantity of learner production, may provide curriculum developers with a more informed basis for decisions about integrating tasks and technology.

Classroom Context

The classroom-based investigation presented below was conducted at a private university located in Tokyo, enrolling approximately 2,000 students each year, with the majority entering the College of Liberal Arts. In 2004, the English department at the school requested that the university's English Language Program develop a course enabling students to complete academic work required in their English department classes more effectively, specifying as learner needs the ability to read a novel and write an essay. Consequently, the EAP course was developed. EAP Reading and Writing were required courses for English majors at the school, many of whom expressed interest in

studying abroad in English-speaking countries, working as translators, or becoming English teachers.

Curriculum, Materials, and Teacher Roles

To illustrate how tasks can be linked explicitly to the curriculum, the approach to task design described here follows steps outlined by Long and Norris (2000). As mentioned in the preceding paragraph, English department professors at the university provided the initial target task specifications: writing an academic essay and reading a full-length novel. In addition to becoming part of the assessment criteria in the EAP courses, these informed curriculum development in the following way. More abstract task-types related to both target tasks include acquiring knowledge of the vocabulary and discourse structures found in academic texts and proceduralizing this knowledge so that texts can be understood and produced rapidly. Thus, pedagogic tasks to support these task-types were developed. Pedagogic tasks used in the course included jigsaw, decision-making, and opinion exchange tasks (Pica et al.,1993). Although task-essentialness (Loschky & Bley-Vroman, 1993) has been found to yield larger learning effects in empirical studies (Keck, Iberri-Shea, Tracy-Ventura, & Wa-Mbaleka, 2006), in order to ensure naturalness and target a wider range of structures, tasks were designed to make academic vocabulary and discourse useful, following Skehan's (1998) principles for implementing task-based instruction. To perform these tasks, students used a chat program available through Moodle 1.6, upon which a university-wide course management system (CMS) called OBIRIN e-Learning was based (http://elearning.obirin.ac.jp/moodle/). Chat was selected for the following reasons: (a) as noted above, CMC has been shown to be an effective means of encouraging negotiation, which can lead to lexical acquisition (de la Fuente, 2003); (b) text-based CMC has potential for helping learners improve their writing, due to the greater formality and complexity of learner discourse found in chatting (Warschauer, 1996); and, (c) the medium may also be an effective context for the development of oral proficiency, since psycholinguistic processes such as message generation and lexical access underlie both oral and electronic discussion (Payne & Whitney, 2002).

According to Richards and Rodgers (2001), teacher roles in task-based instruction consist of selecting and sequencing tasks, preparing learners, and raising consciousness of the language of the task. Since the CMC tasks were initiated after students had brainstormed essays on topics thematically linked to the content of the tasks, they had adequate time to develop opinions, structure arguments, and formulate chunks of written language useful for performance. This is in line with proposals that advocate sequencing tasks according to task complexity (e.g., +/- planning time) rather than task conditions (e.g., convergent vs. divergent goal orientations). In fact, Robinson argues that task complexity variables are "the *sole* basis of pedagogic task sequencing" (2007, p. 22). To prepare students for the tasks, the teacher explained that they would be using text-based chat to communicate with one another, generating interest in the task by asking how many students had chatted in their L1 and L2 before.

Additional teacher roles, relevant to the discussion of technology here, included creating multimedia task input, grouping learners for the chat sessions, and facilitating ongoing discourse. The Moodle CMS supports all three of these processes. Task input and instructions were posted in HTML format on the website, and Moodle's grouping function used to match learners so that they were equally familiar with each other and seated in different parts of the room, lending authenticity to the use of chat. Further, using Moodle enabled the instructor to join any of the chats in order to provide technical assistance, confirm that students understood the task, and informally assess the ongoing discussions. In learning environments where CMS tools are combined with task-based instruction, managing these processes is a crucial element of the teacher's role.

The Classroom Study

Rationale

Seldom have researchers compared the linguistic dimensions of language production under different task conditions in CMC, despite such comparisons being an area of major interest in face-to-face studies (Ellis, 2005; Housen & Kuiken, 2009; Skehan, 1998). Because computer-mediated discourse is "sensitive to a variety of technical and situational factors" (Herring, 2003, p. 613), claims about the nature of learner language production in different tasks based on face-to-face studies need to be closely evaluated before pedagogically sound decisions about implementing tasks in computer-mediated learning environments can be made. Therefore, based on Duff's (1986) investigation of interlanguage production in a face-to-face setting, this classroom study aimed to provide insight into the following research questions:

1. Do the number of words and turns learners produce during text-based chatting differ across convergent and divergent tasks?
2. Does the degree of syntactic complexity found in learners' chat messages differ across convergent and divergent tasks?
3. Do the type and number of questions that learners employ while communicating via text-based chat differ across convergent and divergent tasks?
4. How does task-based CMC provide opportunities for L2 development?

Participants

The participants in this study, whose native language was Japanese, were female second-year English majors (N = 19) enrolled in the EAP course described above. They had been placed into the higher of two levels in the course based on their scores on the TOEIC® Bridge Institutional Program test (M = 159, SD = 8.1). Most reported having used chat software prior to the study and all participants had completed a computer literacy course during their first year of college. Due to variable class attendance, 13 participants completed both tasks, while six others completed only one.

Procedures

In terms of Pica et al.'s (1993) classification, the convergent task used here was a decision-making task requiring students to work collaboratively to select two candidates to accept into their university based on four fictitious applicant profiles which listed the candidates' reasons for wishing to attend college and provided a brief description of each reason. Both students had access to all four profiles. The content was designed to cater to the motivation and interests of participants and depicted candidates whose reasons for wanting to attend the school and biographical information differed. This task was linked thematically to an essay on the topic of "Reasons for attending college".

The divergent task, on the other hand, was an opinion exchange task in which participants were asked to debate the value of salary relative to job satisfaction. Task instructions requiring them to support one side of the argument, and to refute their partner's counterarguments, were provided based on the instructions in Duff (1986), however students could request a change if they did not feel they could effectively perform the task role assigned to them. The debate task was similar in theme to an essay assignment on the topic, "Money and happiness".

The two tasks were conducted during the first 20 minutes of class in a networked computer classroom at a five-week interval, during the course of a 14-week semester. Participants were assigned to eight dyads using Moodle's group function and were paired so that they alternated partners between tasks. These pairs completed the tasks by typing messages into a field at the bottom of the chat window. The setting enabled them to seek clarification of the instructions or task input by either typing messages to their partner or asking the instructor for assistance verbally. Although both types of interaction occurred, the present study addressed only the former. Data were collected from chat logs for the divergent and convergent tasks. Students were informed through an on-screen message and a verbal explanation by the instructor that (a) the chat logs would be used in classroom research aiming to improve instruction, (b) confidentiality would be maintained were any students' written messages reported, and (c) they could withdraw from the study without penalty at any time by contacting the instructor.

Analysis

Learner production and interaction in this study were analyzed following procedures detailed in Ellis and Barkhuizen (2005). Based on the chat logs retrieved through Moodle, descriptive counts of words, turns, clauses per c-unit, and several categories of interaction were prepared. First, the author averaged the number of words and turns to examine quantitative differences between the two task conditions. Word counts included fillers and interjections but not emoticon use. Misspellings such as 'every thing' and abbreviations such as 'LOL' were counted as one word, as were characters indicating a specific word (e.g., an ampersand for the word 'and'). Following Smith (2003), turn boundaries were demarcated by transfer of the floor, in order to account for the disrupted turn adjacency found in text-based chat, in which a user can segment

his or her message into several vertically arranged lines of text constituting a single turn. The average number of words in all turns by each participant (WPT) was then calculated, added, and divided by the number of participants performing the task to generate an average number of words per turn. Next, the degree of syntactic complexity in the discourse was measured by calculating the average number of clauses per communication unit (CPC), defined as a main clause and associated subordinate clauses, allowing for elliptical answers to questions (Chaudron, 1988, p. 45).

To identify differences in the quality of language produced in the discussions, two raters, who had completed Master's degrees in TESOL, independently coded approximately 40% of the question routines in the data, according to seven question types from Duff's (1986) face-to-face study. The first round of coding resulted in 53% agreement using the following categories: comprehension check, clarification request, confirmation check, collaboration check, referential question, expressive question, and rhetorical question. Due to the low percentage of agreement, the categories included in the analysis were then reduced to comprehension check, clarification request, confirmation check, and referential question. Upon further discussion and additional coding, inter-rater reliability reached 92%. The remaining data were then coded by one rater.

Results and Discussion

In this section, the findings of the study will be presented and discussed in light of previous research. Returning to the above research questions, the study found that there were differences in the amount and kind of language that second language learners produced in convergent and divergent task conditions in CMC.

Words and Turns

Concerning the first two research questions, as Table 1 shows, the total number of turns in the convergent task (146) was 30% higher than in the divergent task (112). Next, the finding that there were 18% more words in the divergent task seems to suggest that differences in modes of communication need to be considered when implementing CMC tasks, as this pattern of increased lexical production was not found in Duff's study. However, this finding may have resulted from the fact that by the time the divergent task was performed, participants had become more accustomed to typing, due to weekly writing sessions in the computer classroom.

Syntactic Complexity

Means for both words per turn and clauses per c-unit were greater in the divergent condition (12.83 and 1.78, respectively) than in the convergent condition (8.39 and 1.39, respectively). These results are not surprising, since the language produced by ESL learners during convergent and divergent tasks has been shown to vary significantly, and in the same direction, on these or similar measures in face-to-face settings (Duff, 1986). The following examples of learner production illustrate the difference in syntactic complexity across the convergent (1a) and divergent (1b) tasks.

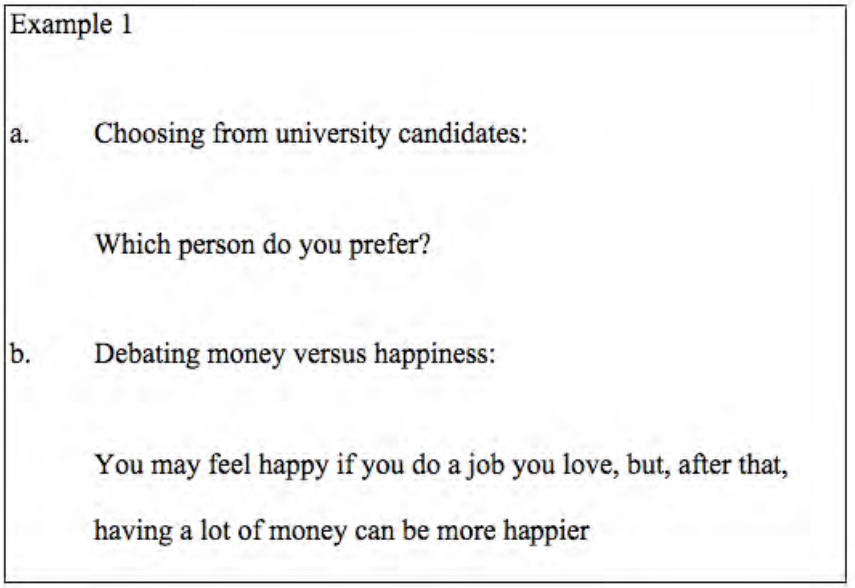

Figure 1. Example 1

Although this may demonstrate the generalizability of task effects across face-to-face and chat settings, once again, it is important to keep in mind that the five-week interval between the two tasks may also have had some influence on learner production.

Table 1. ***Quantitative measures of learner production in convergent and divergent CMC tasks***

		Total	**Mean**	**SD**
Words	Convergent	1141.00	71.31	25.96
	Divergent	1352.00	84.50	25.84
Turns	Convergent	146.00	9.13	3.63
	Divergent	112.00	7.00	1.86
WPT	Convergent	134.19	8.39	2.74
	Divergent	205.34	12.83	4.67
CPC	Convergent	22.21	1.39	.27
	Divergent	28.51	1.78	.37

Type and Number of Questions

With regard to the third research question, the number of referential questions asked in the convergent task (51) was more than three times the number in the divergent task (14). For each task condition, the average number of referential questions,

comprehension checks, clarification requests, and confirmation checks produced is reported in Table 2.

Table 2. ***Question types in convergent and divergent CMC tasks***

		Total	**Mean**	**SD**
Referential	Convergent	51.00	3.19	2.01
	Divergent	14.00	.88	.89
Comprehension check	Convergent	2.00	.13	.50
	Divergent	1.00	.06	.25
Clarification request	Convergent	1.00	.06	.25
	Divergent	2.00	.13	.34
Confirmation check	Convergent	1.00	.06	.25

The concept of task-related variation may help account for the prevalence of questions in convergent tasks and of longer and more syntactically complex turns in divergent tasks. In brief, researchers interested in variation in L2 learner production have sought to document and classify relationships between task characteristics and the use of certain language forms, to advance L2 acquisition theory (Tarone & Parrish, 1988; Pienemann, 1998) and to explore how such variation can benefit instruction (Loschky & Bley-Vroman, 1993; Ortega, 2007). In their seminal paper, Loschky and Bley-Vroman proposed that the relationship between particular grammatical structures and the particular meanings tasks require learners to understand or convey could be characterized by naturalness, utility, or essentialness, suggesting that task designers consider these distinctions. Yet, at the same time, Loschky and Bley-Vroman recognized a serious drawback to task-essentialness, namely, the difficulty of creating tasks that guarantee learners will need to employ certain grammatical features in production. Although not strict requirements, interrogatives in convergent tasks and subordination in divergent tasks can be considered highly useful to task completion, assuming that learners are able to apply their knowledge of these features during performance.

Another result of this study that is generally consistent with Duff's (1986) findings is that neither goal orientation seems to engender a greater amount of negotiation of meaning. Even though Duff had predicted that convergent tasks would contain more comprehension checks, clarification requests, and confirmation checks than divergent tasks, the difference was significant only for confirmation checks in her study. It is worth pointing out that confirmation checks may be redundant in text-based forms of CMC because learners can simply reread their interlocutors' contributions to seek confirmation for their understanding of a particular message, as the display contains all

messages from a given chat session. Moreover, the fact that neither decision-making nor opinion exchange tasks strictly require information exchange for completion may help explain the low incidence of negotiation in this study. That is, in contrast to tasks such as jigsaw, it would have been possible for one participant to supply the majority of decisions or opinions without substantial contributions from her partner.

Opportunities for L2 development

Putting aside the issue of how often negotiation occurs, and turning to research question four, task-based CMC makes it possible for learners to interact in ways that are important to L2 development by providing opportunities for comprehensible input, modified output, and negative input (Pica, 1994). Several examples from the chat logs support this claim. In Example 2, S2 indicates that she does not understand by requesting clarification of the word 'enthusiasm' during the divergent task, and then shows that she understands S1's response in her reaction:

Example 2:

S1: if you have a job you don't like, you might quit and no enthusiam to work S1: it is no fun in your life.

S2: What does enthusiam mean?

S1: this means you have no interesting for working

S2: I see, thank you.

Figure 2. Example 2

Zeng and Takatsuka's (2009) investigation of EFL learners chatting in Moodle used individualized posttests to show that high accuracy rates for both lexical and morphosyntactic code features were associated with exchanges like this one. While attention seems to be primarily focused on lexical meaning in this example, exchanges more likely to induce a focus on grammatical form appear below. We can see how CMC serves the function of providing opportunities for modified output in Example 3, where S3 and S4 are working on the convergent task. The source of S4's failure to understand S3's message may be related to the meaning of 'talk', since they are chatting, not talking, or perhaps the lack of the preposition 'about'. Note that when S4 follows her clarification request with a second message containing the verb 'to choose', it prompts S3 to modify

her production and continue the discussion. Following this cue also provides her with an opportunity to practice forming the past tense:

Example 3

S3: Ok. Which one do we talk?

S4: sorry what do you mean??

S4: then which two people do you choose?

S3: Well...I chose Kumi and Miyuki. And you?

Figure 3. Example 3

In the final example, a third condition of interaction held to be important to second language acquisition, feedback, is demonstrated. Here, S5 and S6 are exchanging opinions in the divergent task:

Example 4

S5: If you don't have much money, you can't go university.

S6: but why do you go to the univercity? Just get money?

Figure 4. Example 4

S6 first recasts S5's utterance ('go university') in a more target-like manner, even though she misspells 'university'. S5's ability to restructure her grammatical knowledge based on this implicit negative feedback may rely on cognitive comparison, during which a learner's output "must be compared with the relevant data available from the contingent utterances of their more competent interlocutors" (Doughty, 2001, p. 225). Although communicating through chat may arguably reduce the burden on memory resources necessary for cognitive comparison, as the example shows, judging a partner's language to be more competent is no simple matter, since S6 omits the same form ('to') where its usage is different (i.e., 'just get money'). Clearly, the circumstances under which learners compare their own output with that of their peers is an important area for more research, since it is features of interaction such as those described in the preceding examples that are fundamental to the effectiveness of task-based instruction.

Conclusion

This research provided additional support for the notion that certain effects of tasks in face-to-face settings also occur in CMC settings and illustrated that it is possible for learners to engage in meaningful interaction that can contribute to their language development in this context. Differences across the two tasks were reported in terms of the number of words and turns, the degree of syntactic complexity, and, the amount and type of questions elicited. An increase in the number of turns was observed in the convergent task. Along with this, learners formulated more questions in the convergent task and buttressed arguments through greater use of subordinate and conditional clauses in the divergent task (see Example 1). Although negotiation in terms of comprehension checks, clarification requests, and confirmation checks was minimal, the results indicated that, in addition to the practice afforded by these tasks, there were opportunities for comprehensible input, modified output, and peer feedback in both tasks.

The evidence that tasks of varying goal orientations shaped L2 discourse in CMC suggests that adopting different tasks for different purposes is a feasible instructional strategy in computer-mediated contexts, albeit one that needs to be applied with an awareness of when and how technology will enhance pedagogy. As Collentine (2010) suggests, "when attempting to delineate the tasks that affect language learning, materials designers and practitioners would do well to include open-ended, opinion-exchange tasks using SCMC" (p. 125). Furthermore, as described above, implementation benefited from using Moodle to provide multimedia task input, as well as to group and monitor learners. A better understanding of these factors will ultimately contribute to teachers' ability to successfully implement technology-supported, task-based instruction in EAP curricula, where goals may include enhancing both electronic literacy and linguistic competence.

Regarding the methodology used in this study, future research on task-related variation in CMC should employ counterbalanced treatments while also addressing the distinction between task conditions and complexity variables (Robinson, 2007), since it is not possible, on the basis of the task designs described above, to discern whether task conditions, or factors such as reasoning demands, led to the increase in syntactic complexity observed in learners' performance during the divergent task. In addition, future studies employing linguistic analyses of task-based performance in CMC will need to evolve beyond measures designed for face-to-face settings to gain an appreciation of the complex outcomes we may anticipate in virtual environments. A recent, insightful example of a modality-specific analysis can be found in research on text chat that examines covert and overt layers of learner production (Smith, 2008; Smith & Sauro, 2009; Sauro & Smith, 2010).

In Japan, and elsewhere, the appearance of course management tools that foster online collaboration has given rise to sustained interest in their role in language education. Some might assert that the introduction of Moodle and other such systems need not

entail a radical departure from established task-based practice, since tasks have been shown to guide instruction in a diverse range of face-to-face contexts. Nevertheless, classroom research exploring ways to combine tasks and technology can lend insight into the applicability of existing findings to computer-mediated environments and identify gaps in existing knowledge about how online environments and modes of communication impact L2 discourse. Teacher-researchers are thus certain to raise additional questions in the future about how course management systems can support task-based language teaching.

About the Author

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References

Alahmadi, B. (2007). The viability of computer-assisted classroom discussion (CACD) as a facilitator of communicative interaction. *The JALT CALL Journal, 3*(3) 3–32.

Blake, R. (2000). Computer mediated communication: A window on L2 Spanish interlanguage. *Language Learning & Technology, 4*(1), 120–136.

Chapelle, C. (1997). CALL in the year 2000: Still in search of research paradigms? *Language Learning & Technology, 1*(1), 19–43.

Chapelle, C. (2001). *Computer applications in second language acquisition: Foundations for teaching, testing and research*. New York, NY: Cambridge University Press.

Chaudron, C. (1988). *Second language classrooms: Research on teaching and learning*. New York, NY: Cambridge University Press.

Chun, D. M. (1994). Using computer networking to facilitate the acquisition of interactive competence. *System, 22*(1), 17–31.

Collentine, K. (2009). Learner use of holistic language units in multimodal, task-based synchronous computer-mediated communication. *Language Learning & Technology, 13*(2), 68–87.

Collentine, K. (2010). Measuring complexity in task-based synchronous computer-mediated communication. In M. Thomas & H. Reinders (Eds.), *Task-based language learning and teaching with technology* (pp. 105–128). London, UK: Continuum.

De la Fuente, M. J. (2003). Is SLA interactionist theory relevant to CALL? A study on the effects of computer-mediated interaction in L2 vocabulary acquisition. *Computer Assisted Language Learning, 16*(1), 47–81.

Doughty, C. (2001). Cognitive underpinnings of focus on form. In P. Robinson (Ed.), *Cognition and second language instruction* (pp. 206–257). New York, NY: Cambridge University Press.

Doughty, C. J., & Long, M. H. (2001). Optimal psycholinguistic environments for distance foreign language learning. *Language Learning & Technology, 7*(3), 50–80.

Duff, P. A. (1986). Another look at interlanguage talk: Taking task to task. In R. R. Day (Ed.), *Talking to learn: Conversation in second language acquisition* (pp. 147–181). Rowley, MA: Newbury House.

Ellis, R. (2003). *Task-based language learning and teaching*. Oxford, UK: Oxford University Press.

Ellis, R. (Ed.). (2005). *Planning and task performance in a second language*. Amsterdam, Netherlands: John Benjamins.

Ellis, R., & Barkhuizen, G. (2005). *Analyzing learner language*. Oxford, UK: Oxford University Press.

Freiermuth, M., & Jarrell, D. (2006). Willingness to communicate: Can online chat help? *International Journal of Applied Linguistics, 16*(2), 35–47.

Hampel, R. (2006). Rethinking task design for the digital age: A framework for language teaching and learning in a synchronous online environment. *ReCALL, 18*(1), 105–121.

Herring, S. (2003). Computer-mediated discourse. In D. Schiffrin, D. Tannen & H. E. Hamilton (Eds.), *The handbook of discourse analysis* (pp. 612–634). Malden, MA: Blackwell.

Housen, A., & Kuiken, F. (2009). Complexity, accuracy, and fluency in second language acquisition. *Applied Linguistics, 30*(4), 461–473.

Keck, C. M., Iberri-Shea, G., Tracy-Ventura, N., & Wa-Mbaleka, S. (2006). Investigating the empirical link between task-based interaction and acquisition: A meta-analysis. In J. M. Norris & L. Ortega (Eds.), *Synthesizing research on language learning and teaching* (pp. 91–131). Amsterdam, Netherlands: John Benjamins.

Lai, C., & Zhao, Y. (2006). Noticing and text-based chat. *Language Learning & Technology, 10*(3), 102–120.

Lamy, M.-N. (2007). Interactive task design: Metachat and the whole learner. In M. P. García-Mayo (Ed.), *Investigating tasks in formal language learning* (pp. 242–264). Clevedon, UK: Multilingual Matters.

Lee, L. (2008). Focus-on-form through collaborative scaffolding in expert-to-novice online interaction. *Language Learning & Technology, 12*(3), 53–72.

Long, M. H., & Norris, J. M. (2000). Task-based teaching and assessment. In M. Byram (Ed.), *Routledge encyclopedia of language teaching and learning* (pp. 597–603). London, UK: Routledge.

Loschky, L., & Bley-Vroman, R. (1990). Creating structure-based communication tasks for second language development. *University of Hawai'i Working Papers in ESL, 9*, 161–212.

Norris, J. (2009). Task-based teaching and testing. In M. H. Long & C. J. Doughty (Eds.), *The handbook of language teaching* (pp. 574–594). Malden, MA: Blackwell.

Ortega, L. (2007). Meaningful L2 practice in foreign language classrooms: A cognitive-interactionist SLA perspective. In R. M. Dekeyser (Ed.), *Practice in a second language: Perspectives from applied linguistics and cognitive psychology* (pp. 180–207). New York, NY: Cambridge University Press.

Ortega, L. (2009). Interaction and attention to form in L2 text-based computer-mediated communication. In A. Mackey & C. Polio (Eds.), *Multiple perspectives on interaction in SLA: Research in honor of Susan M. Gass* (pp. 226–253). New York, NY: Routledge.

Payne, J. S., & Whitney, P. J. (2002). Developing L2 oral proficiency through synchronous CMC: Output, working memory, and interlanguage development. *CALICO Journal, 20*(1), 7–32.

Pellettieri, J. (2000). Negotiation in cyberspace: The role of chatting in the development of grammatical competence. In M. Warschauer & R. Kern (Eds.), *Network-based language teaching: Concepts and practice* (pp. 59–86). New York, NY: Cambridge University Press.

Pica, T. (1994). Research on negotiation: What does it reveal about second-language learning conditions, processes, and outcomes? *Language Learning, 44*(3), 493–527.

Pica, T., Kanagy, R., & Falodun, J. (1993). Choosing and using communication tasks for second language instruction and research. In S. Crookes & S. M. Gass (Eds.), *Tasks and language learning: Integrating theory and practice* (pp. 9–34). Clevedon, UK: Multilingual Matters.

Pienemann, M. (1998). *Language processing and second language development: Processability theory.* Amsterdam, Netherlands: John Benjamins.

Richards, J. C., & Rodgers, T. S. (2001). *Approaches and methods in language teaching* (2nd ed.). New York, NY: Cambridge University Press.

Robinson, P. (2007). Criteria for classifying and sequencing pedagogic tasks. In M. P. García Mayo (Ed.), *Investigating tasks in formal language learning* (pp. 7–26). Clevedon, UK: Multilingual Matters.

Salaberry, R. (2000). L2 morphosyntactic development in text-based computer communication. *Computer Assisted Language Learning, 13*(1), 5-27.

Samuda, V., & Bygate, M. (2008). *Tasks in second language learning*. Hampshire, UK: Palgrave Macmillan.

Satar, H. M., & Özdener, N. (2008). The effects of synchronous CMC on speaking proficiency and anxiety: Text versus voice chat. *Modern Language Journal, 92*(4), 595–613.

Sauro, S., & Smith, B. (2010). Investigating L2 performance in text chat. *Applied Linguistics, 31*(4), 554–577.

Shekary, M., & Tahririan, M. H. (2006). Negotiation of meaning and noticing in text-based online chat. *Modern Language Journal, 90*(4), 557–573.

Skehan, P. (1998). *A cognitive approach to language learning.* Oxford, UK: Oxford University Press.

Skehan, P. (2003). Focus on form, tasks, and technology. *Computer Assisted Language Learning, 16*(5), 391–411.

Smith, B. (2003). Computer-mediated negotiated interaction: An expanded model. *The Modern Language Journal, 87*(1), 38–57.

Smith, B. (2005). The relationship between negotiated interaction, learner uptake, and lexical acquisition in task-based computer-mediated communication. *TESOL Quarterly, 39*(1), 33–58.

Smith, B. (2008). Methodological hurdles in capturing CMC data: The case of the missing self-repair. *Language Learning & Technology, 12*(1), 85–103.

Smith, B., & Sauro, S. (2009). Interruptions in chat. *Computer Assisted Language Learning*, *22*(3), 229–247.

Sotillo, S. M. (2000). Discourse functions and syntactic complexity in synchronous and asynchronous communication. *Language Learning & Technology, 4*(1), 82–119.

Stockwell, G. (2010). Effects of multimodality in computer-mediated communication tasks. In M. Thomas & H. Reinders (Eds.), *Task-based language learning and teaching with technology* (pp. 83–104). London, UK: Continuum.

Tarone, E., & Parrish, B. (1988). Task-related variation in interlanguage: The case of articles. *Language Learning, 38*(1), 21–44.

Thomas, M., & Reinders, H. (Eds.). (2010). *Task-based learning and teaching with technology*. London, UK: Continuum.

Van den Branden, K., Bygate, M., & Norris, J. (Eds.). (2009). *Task-based language teaching: A reader*. Amsterdam, Netherlands: John Benjamins.

Varonis, E. M., & Gass, S. (1985). Non-native/Non-native conversations: A model for negotiation of meaning. *Applied Linguistics, 6*(1), 71–90.

Warschauer, M. (1996). Comparing face-to-face and electronic discussion in the second language classroom. *CALICO Journal, 13*(2/3), 7–26.

Willis, D., & Willis, J. (2007). *Doing task-based teaching*. Oxford, UK: Oxford University Press.

Zeng, G., & Takatsuka, S. (2009). Text-based peer-peer collaborative dialogue in a computer-mediated learning environment in the EFL context. *System, 37(3), 434–446.*