

Constraints and Affordances of a Collaborative Online Tool in Language Teacher Education

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This paper presents data from a 2010 empirical study exploring one of the recent synchronous online writing tools for collaboration (Google Wave), to investigate how interaction took place and what the benefits and challenges were. Participants included 17 graduate students in TESOL/Applied Linguistics at a private American graduate institution on the East Coast and 13 MA TEFL students at a university in Taiwan. This exploratory case study draws on action research, and the author's status was that of participant observer or teacher-researcher. Data triangulation involved gathering information through a combination of different instruments, i.e., pre-course needs analyses, post-project questionnaires, and computer-mediated communication (CMC) data. With this mixed-method approach, the researcher attempted to get multiple viewpoints and to gain a more in-depth understanding of the phenomenon under investigation. Findings indicated that the real-time writing tool has potential for interaction and collaboration (e.g., writing projects) due to its unique editing functions but that major technological difficulties were hard to overcome and called for extensive learner training.

Keywords: computer-mediated communication, web 2.0, telecollaboration, interaction, language teacher education, Google Wave

BACKGROUND

This article is informed by a socio-cultural approach to computer-mediated communication (CMC) (Warschauer, 1997; see also Lantolf, 2000; Lantolf & Thorne, 2006). According to Warschauer (1997), the “acquisition of literate skills involves not only conversation, but also analysis, reflection, cross-cultural interpretation, collaborative problem-solving and critical thinking. Successful use of the Internet in the foreign language classroom generally involves well-planned projects demanding critical, collaborative inquiry” (n.p.). In this study, the activities for participants were

collaborative, experiential, goal-oriented, and carried out via the meditational means of CMC and, more specifically, via a synchronous online writing tool (e.g., Google Wave), in order to engage with counterparts overseas.

The term *CMC modes* was first coined by Murray (1988) to include asynchronous CMC (ACMC) such as discussion forums and email, and then later expanded to *socio-technical modes* by (Herring, 2002) to also include the social and cultural practices that have arisen out of the tools' uses. The potential for using ACMC (e.g., email, discussion forums, wikis, blogs) for reflective writing and writing for an authentic audience in foreign language instruction is well established (Egbert & Hanson-Smith, 2007; Reinhardt & Thorne, 2007; Richardson, 2006; Warschauer, 1996). Moreover, CMC-based interaction may result in increased motivation (LeLoup & Ponterio, 2003), language fluency (Kern, 1995), and pragmatic knowledge (Belz, 2007; Belz & Vyatkina, 2005).

While there have been a growing number of studies on newer Web 2.0 tools such as blogs and wikis (Boulos, Maramba & Wheeler, 2006; Fuchs, 2010; Kessler, 2009), there seems to be little empirical evidence on new collaborative online tools such as Google Wave (Sadler, 2007; for a review of Web 2.0 tools, see Sykes, Oskoz, & Thorne, 2008). Google Wave is a synchronous online writing tool that started in October 2009. It is "a new web application for real-time communication and collaboration" (<http://wave.google.com/about.html>) and functions as both a synchronous computer-mediated communication tool (SCMC) and asynchronous computer-mediated communication tool. The tool still exists in that registered users can create waves (which function similar to discussion threads); however, maintenance of the tool was officially discontinued in August 2010 (Jackson, 2010; Swan, 2010). Nonetheless, the insights gained through this study still provide important findings for real-time online writing tools.

One notable review investigates Google Wave and discusses how effective it is as an online collaboration tool for intracampus and intercampus collaboration (Ovadia, 2010). The author lists the chat as a benefit because it "records and archives conversations, providing users with a transcript of conversations within a wave, even conversations for which the user was not present" (Ovadia, 2010, p. 160). Another advantage is "its ability to search other users' public waves. This gives Wave users the ability to find and join specific projects and conversations they might not otherwise be aware of" (Ovadia, 2010, p. 161). Moreover, a Calico Wave set out to explore how Google Wave could be used for language learning and whether it could potentially replace other course management systems such as Blackboard (Godwin-Jones, 2010).

One goal of this study is to contribute to the growing body of research with focus on cross-institutional teacher education and telecollaboration (e.g., Arnold & Ducate, 2006; Arnold, Ducate, & Lomicka, 2007; Arnold, Ducate, Lomicka, & Lord, 2005; Fuchs, 2003, 2006; Lord & Lomicka, 2007, 2008; Müller-Hartmann, 2005; Scherff & Paulus, 2006; Shaughnessy, Purves, & Jackson, 2008). The potential of CMC to foster intercultural learning is generally seen as the main attraction of telecollaborative exchanges (e.g., Belz, 2002, 2003; Belz & Thorne, 2005; Chung, Graves, Wesche & Barfurth, 2005; Furstenberg, Levet, English & Maillet, 2001; Müller-Hartmann, 2000; O'Dowd, 2003; Sayers, 1991).

Telecollaboration has originally been defined as the "institutionalized, electronically mediated intercultural communication under the guidance of a languacultural expert (i.e., teacher) for the purposes of foreign language learning and the development of intercultural competence" (Belz, 2003, p. 2). Going beyond this definition, the term telecollaboration 2.0 now encompasses multilingual, multimodal, and collaborative

contexts where participants engage in wikis, Skype, virtual worlds, or gaming (Guth & Helm, 2010).

This study also seeks to advance preservice language teachers' professional literacy by modeling "innovative uses of technology" (Willis, 2001, p. 309; see also Hubbard & Levy, 2006). One rationale for using Web 2.0 tools such as Google Wave, Ning, and Skype is to train pre-service teachers in tools that are a) freely available for them and b) to model for them how they can use these tools with their own ESL/EFL students. Ning, which was created in 2005, is an online platform popular among educators and organizations. Similar to Facebook, Ning offers asynchronous tools such as discussion forums, blogs, user profiles, comment walls, and synchronous chat and a space for audio/video that also allows for comments. Ning was free until July 2010. Participants in the U.S. knew that Ning was going to introduce three plans not free of charge as the announcement was made in spring 2010 while the course was still in session. Skype is a free downloadable software that started in 2003 and offers "[f]ree voice and video calls, instant messaging, unlimited file sharing" (<http://www.skype.com/intl/en-us/home>; see also Godwin-Jones, 2005). Skype has also been used in language teaching to develop online tutors' competence through reflective analysis in cross-institutional settings (Develotte, Guichon, Kern, 2008).

In brief, little research has been done on the potential of Google Wave as a collaborative online writing tool in language teacher education. However, if language teachers are asked to stay abreast of new tools that can potentially benefit language teaching, they need to be exposed to these tools in their teacher education seminars. Moreover, analyzing the tools should not be limited to the traditional classroom walls but take place in a cross-institutional and cross-cultural environment where participants explore these tools with their geographically distant counterparts.

RESEARCH QUESTIONS

The goals of this study were a) to provide pre-service teachers in different countries and teaching contexts (in the U.S. and in Taiwan) the opportunity to discuss various aspects of language teaching and technology with one another by interacting and collaborating via CMC; b) to offer online interaction and task co-construction aiming at the development of a common understanding of computer technology facilitated by various social networking applications and a synchronous online writing tool; c) to apply a model learning approach (Willis, 2001) to integrate technology tools and web 2.0 applications in (language) learning settings. The study set out to answer the following four research questions:

1. How useful do participants consider the synchronous online writing tool for language and intercultural learning?
2. What are the benefits and challenges of using a synchronous online writing tool for interactive and collaborative purposes?
3. What other technology tools would participants use in their own teaching and why?
4. What kinds of interactions take place via the synchronous online writing tool and what are the implications for language teaching?

In the next section, the author describes the participants, the context, the technology tools, the nature of the tasks and online exchanges in greater detail. The researcher then outlines the methodological approach.

METHOD

PARTICIPANTS

Participants were not randomly selected but included two courses consisting of 17 pre-service teachers at a private American graduate institution on the East Coast, and 13 MA TEFL students at a university in Taiwan. The U.S. participants were enrolled in the elective course “Internet and Language Teaching” in Spring 2010, and the students in Taiwan were enrolled in an elective called “Multimedia Language Teaching, Learning, and Material Design.” Of the 17 U.S. participants, 14 students were master degree candidates in the TESOL/Applied Linguistics program, and three students were graduate students enrolled in other programs who were not studying to be English teachers but teachers in other content areas interested in learning more about the technology tools (e.g., Communication, Computing, and Technology in Education).

TECHNOLOGY TOOLS

In this study, the following technology tools were used: Ning, Skype, and Google Wave. Ning was used as a course management tool and served as the primary class platform for the students in the U.S. The features in Ning are similar to those of Facebook and include discussion forums, blogs, chats, group spaces, and comment walls. Since most students were familiar with Facebook, the teacher did not have to do much learner training.

Skype is an online videoconferencing and chat tool that has been around for a number of years and was used for the two live videoconferencing sessions between the class in the U.S. and in Taiwan.

Google Wave, the synchronous online writing tool allows for ACMC and SCMC and combines functions similar to email, discussion boards, chat, instant messaging, and file sharing, lent itself for the cross-institutional exchanges. Posts on this synchronous online writing tool are called ‘blips’ (see Figure 1. below). Each blip (or post) shows the name(s) of the author(s) and/or collaborators and the date. This blip function in Google Wave is similar to discussion forums or email posts, but the difference is that the names of blip authors or editors get listed alongside one another and the date shown is usually the latest edit or contribution. It is thus not clear who wrote or edited what. The synchronous online writing tool also incorporates features of email and instant messaging: “If a group member of a Wave creates a new addition to the Wave or edits an existing resource, this will immediately appear in real time in the Wave display of all members of that group, including, amazingly, what is being typed letter by letter” (Godwin-Jones, 2010, p. 13). Although Godwin-Jones (2010) cautions that the tool is still in the beta version and that it might be too early to tell whether it had “transformative” power, the potential of the tool seems obvious: “At a minimum, its advanced features demonstrate in a dramatic way the high degree of interactivity and collaboration becoming possible on the Web” (p. 13).

Moreover, one can upload and share documents and revert back to previous versions through a change log (Godwin-Jones, 2010). This function seems to resemble a wiki or a shared document platform like Google Docs. There are also additional gadgets and extensions such as video conferencing and Google Maps, which can be added to any Wave. The drawback is that adding these results in a major system lag, which was a main concern in this study as will be shown in the Results and Discussion section.

At the same time, the fact that blips can overlap (see Data Excerpt 1) or be disrupted (see Data Excerpt 2) can be both a constraint and an affordance. Anyone invited to a

wave can edit blips. Blips are fluid because participants can click within anybody else's blip at any point to edit. This is similar to a wiki function (e.g., Godwin-Jones, 2010) in which changes can be made by anyone at any point. Yet, the difference is that there is no revision history in the synchronous online writing tool. Although there is a Playback function, which allows one to see the entire history of the wave, it does not function like the revision history in the wiki. The only thing that gets listed is the name of the person who edited or contributed to a blip alongside the other authors' names. Thus, it is not clear who wrote what or when, or how one can distinguish people's edits from original blips – unless one uses the Playback function to reconstruct the entire wave step by step. The Playback function only allows replaying the entire wave in chronological order, not individual blips or edits, i.e., if one wants to look at a specific blip on a certain date (or an edit within a specific blip). The function seems vastly different from the revision history of a wiki or a blog. This poses intriguing questions for interaction and collaboration on the synchronous online writing tool and for analysis of the CMC data and will also be discussed in greater detail in the Results and Discussion section. All data were kept in their original forms and all names are pseudonyms. Excerpts primarily include the U.S. participants unless indicated otherwise.

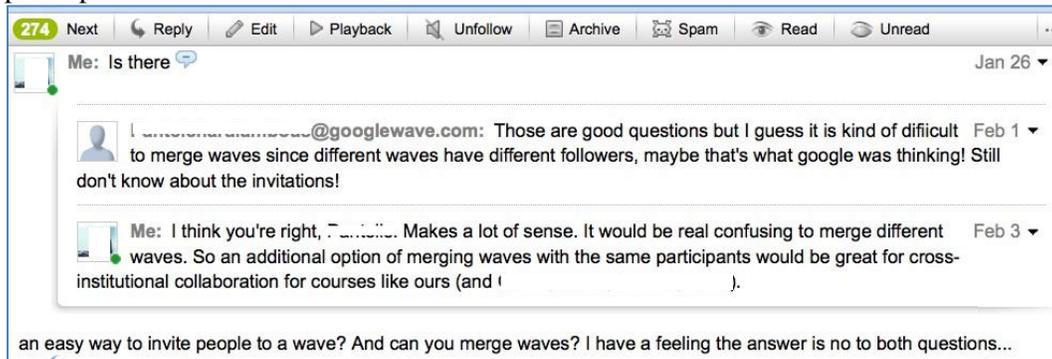


Figure 1. Interrupted Non-Real Time Blip (“Me” = the teacher-researcher, Pavlos)

Figure 1 above shows the complexity of the interaction on the synchronous online writing tool. For instance, the teacher-researcher (“Me”) started the original blip on January 26, 2010 (see date in the upper right-hand corner of the blip) asking the following: “Is there an easy way to invite people to a wave? And can you merge waves? I have a feeling the answer is no to both questions...” Pavlos replied within the blip on February 1, 2010. The teacher-researcher then replied to Pavlos’ answer by inserting her response right where his blip ended on February 3, 2010. This resulted in the original blip to get torn apart. This resulted in the blip getting broken down into many different parts but all from the same conversation: “Is there [...]” and then there is first Pavlos answer and then the teacher-researcher’s answer to Pavlos before the original blip continues “an easy way to invite people to a wave? And can you merge waves? I have a feeling the answer is no to both questions...”

As Data Excerpt 1 of January 24, 2010, below shows, edits in blips can overlap.

Data Excerpt 1: Overlapping Blip (Teacher-Researcher, Kang)

- 1 Jan 24
- 2 Me:
- 3 So try to click on my message and edit it... :)
- 4
- 5 Jan 25
- 6 Kang@googlewave.com and me:
- 7 [like this?](#) YEP! :) I just added the color and underline to what Kang had typed.

In the blip above, “Me” (the teacher-researcher) tries to teach Kang how to edit a blip (line 3: “So try to click on my message and edit it... :)” Kang then gets into the teacher-researcher’s blip and types “like this?” in blue bold print (line 7). The teacher-researcher’s reply continues seamlessly in the same line with her adding “YEP! :) I just added the color and underline to what Kang had typed.” This excerpt is another example of overlapping edits in an original blip. The teacher-researcher remembers exactly what she typed and what Kang typed. Otherwise, it would be extremely difficult to tease apart the different edits. There is no way of knowing - especially when it comes to blips with multiple authors - unless authors are asked to comment retrospectively on what they did or unless one reconstructs the entire Wave from scratch.

The following excerpt shows an interrupted blip, i.e., an incidental example of how someone can type in someone else’s blip. Here, Suzanne and Ellen are discussing cultural topics (“honoring the dead”).

Data Excerpt 2: Interrupted Real-Time Blip (Suzanne, Ellen)

- 1 May 3
- 2 Suzanne@googlewave.com and Ellen:
- 3 My mum is from Ireland and there is a lot of emphasis on the funeral and
- 4 especially after the funeral, the wake. That's where traditionally Hello~
- 5 am I on your way?Yes!
- 6 May 3
- 7 Ellen:
- 8 I didn't mean that.... to be honest with you... no hard feelings~~~

In lines 3-4, Suzanne is sharing how her mother’s home country Ireland keeps up the tradition of honoring the dead when, suddenly, Ellen starts to type into Suzanne’s blip: “That’s where traditionally Hello~ am I on your way?” Here, Ellen’s blip starts with “Hello” in the middle of what Suzanne was typing in her original blip. The word “way” is most likely a typo and supposed to read “wave” based on how the conversation continues. Suzanne replies “Yes!” right away and her answer does not even show a space between Ellen’s final word “way” (line 5). This exchange results in Ellen’s question being embedded into Suzanne’s narrative and answer. Ellen then creates a new blip and apologizes for having gotten into Suzanne’s blip: “I didn’t mean that.... no hard feelings~~~” (line 8).

Data Excerpt 3 of May 12, 2010, below shows an example of what the “edit-within-a-blip” looks like in the Google Wave chat. The chat function is similar to other chats in that it shows participants’ names or pseudonyms and the SCMC turns. Unlike the synchronous online writing tool’s blips, however, the chat cannot be edited afterwards. Once participants leave the chat, the chat cannot be modified.

Data Excerpt 3: Google Wave Chat (Teacher-Researcher, Elena)

- 1 May 12
- 2 Me:
- 3 hi there
- 4 May 12
- 5 Elena and me:
- 6 Hi i see you this is what you think....
- 7 May 12
- 8 Me:
- 9 I see you too

While line 3 is clearly a greeting, line 6 seems to be an ambiguous message: “Hi i see you this is what you think...” What had happened was that Elena (the teacher-researcher’s TA) wrote the first part (“Hi I see you”) when both Elena and the teacher-researcher were trying out the video conferencing gadget and when Elena realized she could see the teacher-researcher on the screen. Then the teacher-researcher clicked on Elena’s original message and added in a joking way “this is what *you* think...” [emphasis not in original]. In brief, the synchronous online writing tool has both synchronous and asynchronous abilities. Authors’ names and edit dates are automatically inserted into the blip. Anyone can post anything on the wave and edit other’s blips at any time. Additionally, anyone can interrupt another blip while the other person is still typing. The next section outlines the collaborative exchanges and tasks through which participants explored the benefits and challenges of the online writing tool.

PROCEDURES OF THE STUDY

This study was an IRB approved research project following the approved human subjects’ protocol at the U.S. institution. Throughout the spring 2010 class, students participated in several collaborations, which included both 17 U.S. participants and 13 Taiwanese participants, i.e., a total of 30, and collaborations among the 17 US participants only. The 30 participants in both locations engaged in two synchronous class chat sessions using the audio/video functions of Skype where they were partnered up with one to two cross-institutional counterpart(s). The working language was English. In small groups, students first explored the usefulness of several Web 2.0 tools (e.g., Ning, Google Wave, and Skype) with their counterparts in Taiwan. Then U.S. students designed technology-based tasks for ESL or EFL learners focusing on reading, writing, speaking, listening, grammar, vocabulary, or a combination thereof. Each group presented their technology-based task to their classmates at the end of the semester and provided peer feedback for one other group.

COLLABORATIVE EXCHANGES AND TASKS

Between March 1st and March 8th the U.S. participants participated in a discussion on Google Wave regarding how this tool related to other synchronous computer-mediated communication (SCMC) and asynchronous computer-mediated communication (ACMC) tools and what advantages (Interaction/Collaboration) and disadvantages (e.g., Interface, Technology, Learner Training) came with this tool (see Data Excerpt 3 of March 1 below).

Between April 1, 2010, and April 8, 2010 students in the U.S. posted two questions for discussion via the synchronous online writing tool in preparation for the first Skype meeting with their Taiwanese partners on April 12. The questions were based on three joint readings. One reading was Hofstede’s seminal 1986 article on high-context versus low-context cultures and the implications for teaching and learning. The second and third articles (Shih & Cifuentes, 2003; Niehoff, Turnley, Yen & Sheu, 2001) had been chosen because they both dealt specifically with cross-cultural communications between Americans and Taiwanese and classroom implications.

On April 12, 2010, student teachers in the U.S. were put into small groups to talk over Skype with their counterparts in Taiwan. Both classes were in a computer room, and the session took place at 8pm EST with small groups clustering around one workstation and talking to their partner group overseas.

On April 26, 2010, a second more open-ended Skype session took place. Participants were given several different topics to discuss. For instance, they could either discuss the

technology tools or different cultural norms in general, or a couple of articles on CMC and language play that all participants had read (Belz & Reinhardt, 2004; Vandergriff & Fuchs, 2009; Warner, 2009). For instance, some groups were discussing issues such as authorship/ownership and plagiarism on the synchronous online writing tool (see Excerpt 7 below). Others continued their discussion where they had left off from the April 12 Skype session. After the second Skype session, U.S. participants were asked to debrief via the synchronous online writing tool by posting two responses based on their experiences with the Taiwanese students. One response was based on the in-class Skype experience with the students in Taiwan, and one response was based on what others had said on the synchronous online writing tool with regard to the class experience.

The following section describes how these online exchanges were collected and analyzed in addition to other data collection instruments such as needs analyses and post-course questionnaires.

DATA COLLECTION AND ANALYSIS

This exploratory case study draws on action research (e.g., Nunan & Bailey, 2009; Richards, 2003). Van Lier, (2003) states that although “the classroom activities described cannot be *generalized*, it is likely that some of the best things that happen in these classrooms can be *particularized* as part of pedagogically sound curricula in other settings” (p. 57; italics in original).

Action research is a small-scale, systematic, and repetitive data collection process that involves little interference in classroom processes (Nunan & Bailey, 2009). Case studies are longitudinal, include multiple perspectives, and are bounded instances that are either of physical (e.g., a classroom), or of temporal nature (Nunan & Bailey, 2009). According to the authors, the phenomenon in the case study “is studied in context, focusing on observation, description, inference and interpretation, all important facts of ethnographic and practitioner research” (p. 162). The author’s status was that of researcher, teacher of the course in the U.S., and study co-designer in collaboration with the teacher educator in Taiwan, i.e., her role was that of participant observer (e.g., Denzin, 1989).

Data triangulation (e.g., Strauss & Corbin, 1998) involved gathering information through a combination of different instruments, i.e., through pre-course needs analyses, post-course questionnaires, and CMC data. With this mixed-method approach, the researcher attempted to get multiple viewpoints and gain a more in-depth understanding of the phenomenon under investigation (e.g., Ortega & Zyzik, 2008).

The needs analysis was administered to the US students at the beginning of the term through an online survey. Students answered seven open-ended questions about their prior technology experience in teaching and/or learning, the tools they would like to focus on, and what kind of settings they would like to teach in upon graduating. The purpose of the second part was to elicit information about participants’ self-rated proficiency with Web 2.0 tools and included a total of 17 Likert-scale items (1 = insufficient, 2 = satisfactory, 3 = good, 4 = very good): 14 for ACMC proficiency (e.g., Wiki), three for SCMC (e.g., Skype), and one for an SCMC/ACMC (Google Wave). The final part included three open-ended questions asking participants about any SCMC/ACMC tools they may have used with their learners, the benefits/challenges of any prior group work experience, and their prior cross-cultural experiences. Needs analysis questionnaires were not anonymous and were shared with the class to assist group formation for the final technology-based project.

All participants in the U.S. and Taiwan also filled out a post-course questionnaire at the end of the course where they reflected on the tools used and on their collaborative

exchanges. This questionnaire was administered anonymously through an online survey and consisted of eleven open-ended questions about learning experience and benefits and challenges through the cross-institutional discussions, e.g., interaction on Skype, room for improvement, and the benefits of the cross-institutional interaction for participants' final projects, and any additional comments regarding the tools covered in class.

For the analysis of the open-ended questions, two trained coders developed codes and categories as they emerged from the data without trying to force them into categories already outlined in the existing literature. First, the two coders did open coding (i.e., line-by-line or applied to sentences, paragraphs, or the entire answers) and then categorized the codes by grouping them around phenomena in the data that were related to the research questions: How useful do participants consider the synchronous online writing tool for language and intercultural learning? What are the benefits and challenges of using the synchronous online writing tool for collaborative purposes? What other technology tools would participants use in their own teaching and why? What kinds of interaction take place via Google Wave, and what are the implications for language teaching?

Next, the coders linked such categories to *in vivo* codes, i.e., to abstract codes taken from the subjects (Strauss & Corbin, 1998). For instance, the *in vivo* codes "Good way to collaborate on writing projects" and "For collaborative work, a good option" were subsumed in the category *Collaboration/Interaction*. Moreover, "small space to show lots of words" and "length of wave limited" were included in the category *Interface*.

RESULTS AND DISCUSSION

In this section, results are presented and discussed in light of the four research questions.

Research question 1: How useful do participants consider the synchronous online writing tool for language and intercultural learning?

The results below show how participants in the U.S. self-rated their proficiency in Google Wave in the pre-course needs analysis questionnaire.

In the needs analysis, U.S. participants (N=17) ranked their proficiency with Web 2.0 tools such as Google Wave, Skype, and Ning on a 4-point Likert Scale (1 = insufficient, 2 = satisfactory, 3 = good, 4 = very good). Perhaps not surprisingly, Google Wave ranked rather low with a mean score between "insufficient" and "satisfactory." This may have been due to the novelty of the tool. At the end of the collaboration, all participants in the U.S. and Taiwan (N=30) rated the tools' usefulness for teaching in the form of an anonymous questionnaire. Google Wave ranked third (after Ning and Skype).

Table 1. *Proficiency in the Synchronous Online Writing Tool (Google Wave) and Usefulness of the Tool*

Measure	Proficiency (N=17)	Usefulness (N=30)
Mean	1.53	2.95
Standard Deviation	0.717430054	0.669043382

Research question 2: What are the benefits and challenges of using a synchronous online writing tool for interactive and collaborative purposes?

Although there were 30 participants in the study, 21 students responded to the post-course questionnaire, and not every student commented on the tool's benefits and/or challenges. Participants found more challenges than benefits for using the synchronous

online writing tool for collaborative purposes, i.e., eleven students listed ten benefits versus 17 types of challenges (some of which were mentioned by more than one student). A number of benefits are listed and grouped under 1) *Interaction/Collaboration* and 2) *Interface* in Appendix A.

Participants see the potential of the tool for collaborative writing, peer feedback, learner communication and discussion, real-time chat, learner engagement in “really immediate interaction,” the combination of ACMC/SCMC tools, and the ability to correct messages and to see others typing. In addition to the categories 1) *Interaction/Collaboration* and 2) *Interface*, two more categories emerged for the challenges, namely 3) *Technology* and 4) *Learner Training* as shown below.

The fact that the synchronous online writing tool is still in the beta version also had a major impact on participants’ replies: Five students mentioned the “major lag” and the “unstable” application. Other disadvantages were related to the layout (“confusing”) and the system was generally found to be “slow” and “disorganized.”

In ACMC studies, ‘lag time’ is referred to as ‘message lag time’ or the delay between the point when the person receives the message (such as via email) and the point when the reply to the message gets through to the original sender (e.g., Fuchs, 2006; Sadler, 2007). However, in this study, the lag was caused by the system slowing down the real-time interactions. This lag was due primarily to the size of the application and the videoconferencing gadget.

Participants also thought the message organization system was not user-friendly and that the limited number of blips was a primary constraint of the tool as well. In brief, most challenges were related to the technical nature of the system and the amount of training that was involved in order to navigate the system. Only one participant commented on how interaction might or might not take place on the synchronous online writing tool. The student found it “hard to predict that real interaction would appear within the context. Students a lot of times just post questions, but do not engage themselves in the dialogue.” As shall be seen below, the complexity of using this synchronous online writing tool also became evident in the local discussions among the U.S. students and in the cross-institutional exchanges with their Taiwanese partners.

Research question 3: What other technology tools would participants use in their own teaching and why?

Of the tools covered in the course, six participants said they would use the synchronous online writing tool in class for intercultural projects (see Appendix A). With regard to the purpose, benefits, and challenges of the tool, students only listed advantages such as interaction and collaboration but no challenges.

Interestingly, participants listed reasons for not using Skype and Ning for intercultural learning but they only mentioned advantages for why they would use Google Wave for intercultural projects (purpose/benefits & challenges). In contrast to the question about benefits and challenges of Google Wave (where participants listed more challenges than benefits), here, participants provided more benefits when asked about the potential of the tool for ICC.

With regard to the question of what other technology tools participants would use in their own teaching and why, two students listed Google Wave again and provided the following reasons, which are along the lines of 1) *Interaction/Collaboration* above (students can immediately communicate at the same time; students could discuss their project online and have other Google stuff together on wave).

Data Excerpt 4 (Appendix B) underlines the benefits and challenges listed above. For instance, both Pavlos and Fahmida point out that they like that Google Wave combines both SCMC and ACMC (lines 3-5; 19), which supports the *Interface* benefits listed by several participants in the post-course questionnaire. Moreover, with regard to *Interaction*

and *Collaboration*, Pavlos stresses the potential of Google Wave for writing tasks: “The different functions that a wave have may facilitate the learner while carrying out a writing task. If you see the buttons above a student can google search without writing something or add attachments which may enrich the final outcome” (lines 6-9). Fahmida elaborates on the potential of the synchronous online writing tool for writing: “However, it still has potential for ELT. For instance, having a map open on the screen, the collaborative writing option available, one can devise a task out of only these two options” (lines 21-23).

Other advantages with regard to *Interaction/Collaboration* include the video-conferencing (e.g., Develotte, Guichon, Kern, 2008; Yanguas, 2010) and discussion functions and the potential for using Google Wave for telecollaboration. Learners can “discuss with other users even the ones that live thousands of miles away, it can be used in language classroom where language learner students can interact with the native speaker of that language. For example, Spanish language learner in the States can meet regularly with English language” (Ellen, lines 38-45).

By the same token, the user-unfriendliness of the synchronous online writing tool (*Interface*) and the extensive training required for both teachers and learners (*Learner Training*) were considered major drawbacks (Pavlos, lines 11-16; Damaris, lines 28-29). Fahmida thinks that using all the gadgets would further slow down the system (lines 20-21) (*Technology*). With regard to learner training, Damaris suggests tutorials on Youtube for how to use the synchronous online writing tool.

Another aspect was that the synchronous online writing tool “is not organized” (*Interface*). Although “it is great that every interaction that happened in the wave is saved, but it is everywhere.” Ellen thus suggests having a title page where users can easily find the specific topic in order to solve this issue (Ellen 47-50).

Research question 4: What kinds of interactions take place via the synchronous online writing tool and what are the implications for language teaching?

Data Excerpt 5 below provides a closer look at the actual interactions on the synchronous online writing tool. The following exchange happened on March 8, 2010, when the students in the U.S. were asked to conduct a remote-location real-time conversation on the Ning chat. Yet, as a result of a technical difficulty on Ning, students attempted to use the synchronous online writing tool. Some students logged in from home, others from the campus’ computer lab.

Data Excerpt 5: Google Wave (Jean, Kang)

1 Mar 8
 2 Jean:
 3 [...] The lag is bad. Enjoyed watching you type, thoguh, Kang.
 4 March 8
 5 Kang@googlewave.com
 6 i feel as if i were stuck in a jam or something...gosh...google wave is making
 me
 7 illiterate that i cannot spell...

Here, Jean and Kang agree that the lag in the synchronous online writing tool is of serious concern: “The lag is bad” (line 3) and “i feel as if I were stuck in a jam or something [...] google wave is making me illiterate that i cannot spell” (lines 6-7). This highlights a *Technology* issue also voiced in the post-course questionnaire by several participants. Interestingly, unlike in other studies (e.g., Belz, 2003; Fuchs, 2006; Sadler, 2007) challenges such as participants’ typing speed for the synchronous collaboration did

not seem to be an issue. Kang and Jean simply appeared annoyed that the technical lag was slowing their typing down and leaving them feel “illiterate.”

Data Excerpt 6 (Appendix C) was part of an asynchronous debriefing at the beginning of April. Participants in both Taiwan and the U.S. examined their experiences so far with the synchronous online writing tool, i.e., what they thought about its strengths and weaknesses or limitations.

Technology and *Interface* issues such as the “typing lag” and the “lack of organization and search capability within a wave” are mentioned by Bruno (lines 3-14). Georgina also mentions that she finds the synchronous online writing tool somewhat confusing and that she dislikes the way posts are organized (lines 41-42; see also Pin, lines 52-54). Although Pavlos likes the ACMC function of the synchronous online writing tool, he does not consider the SCMC function user-friendly (lines 46-49).

Fahmida, on the other hand, mentions the potential of the synchronous online writing tool for *Interaction/Collaboration* (lines 17-23): “I have experienced the collaborative writing aspect of GW with my friends and we appreciated the way it allowed us to brainstorm, draft, and work together on a document, without losing our trails of thought, then revising it and saving it right here, and all of this while sitting comfortably at home :)” (lines 19-23).

Suzanne raises a new concern. She feels that being able to edit other people’s post would constitute a “violation of freedom of speech” (line 31). Pin reiterates this concern: “However I would be a bit cautious to edit others' posts because that would be violating the right to freedom of speech and somehow hurt others' feelings, which might not be recommendable for intercultural communication unless a common code was established first-hand” (lines 55-59). Interestingly, Pin uses very similar wording (“violating the right to freedom of speech,” lines 56-57) as Suzanne (“violation of freedom of speech,” line 31). Along similar lines, as becomes evident in the excerpt below, Fahmida questions the author/ownership of blips and expresses reservations in terms of plagiarism as is shown in the next excerpt.

Data Excerpt 7: Google Wave (Fahmida)

- 1 Apr 10
- 2 Fahmida:
- 3 Hey I just deleted a whole chunk of Pavlos' comment WHILE he was typing it,
- 4 hehehe. Shh, don't tell him :) ...
- 5 However, on a serious note, I was trying to see what happens if and when a
- 6 blip or parts of it is deleted by some one else. Would it be shown somewhere?
- 7 would it be highlighted, or would the writer get an update of sorts, or
- 8 whatever, but it seems that nothing happens! There goes the whole plagiarism
- 9 / ownership issue! Pavlos I think didn't know what happened, because he
- 10 started a completely new blip. So if multiple people are online and one deletes
- 11 the other's blip, what happens then? how would we know who did it? I would
- 12 like to know what others think on this and what their experience with this
- 13 particular issue on GW says.

Here, Fahmida takes the authorship/ownership issue a step further by bringing in plagiarism. “There goes the whole plagiarism / ownership issue! / Pavlos I think didn't

know what happened, because he started a completely new blip. So if multiple people are online and one deletes the other's blip, what happens then? how would we know who did it?" (lines 8-11).

In brief, in addition to the benefits and challenges of the synchronous online writing tool listed above (*Interaction/Collaboration, Interface*), two interesting themes emerge from Data Excerpt 7:

1. The issue of authorship/ownership/plagiarism in Google Wave where everyone can edit any blip at any time;
2. The number of blips in-between other blips (lines 7 and 24).

Different tools highlight the issue of authorship/ownership more or less prominently, and the question is where Google Wave would fit. Unlike for blogs, where authorship and ownership are of primary importance as they started out as one-to-many communication tools, for wikis, "the quality of the collectively produced product is more important than owning the idea or the code" (Richardson 2006, p. 63; Boulos, Maramba & Wheeler, 2006). Moreover, in Google Wave and in the wiki, the authors and their edits are not easily detectable. One has to consult first the revision history in the wiki or reconstruct a wave through the Playback function. In this study, it took 2:20 minutes for Google Wave to load the 1428 blips and edits. When hitting the 'play' button, the wave gets reconstructed chronologically and shows step by step what happened on each blip and message. For instance, "You added Bruno" or "You edited this message" or "Jean deleted this message." There is a skip button but it is not easy to skip and to actually know what message the replay button will be skipping to. Plus, the wave tends to crash during the playback operation. In sum, the playback function may lend itself to a smaller wave for reconstructing who edited what and when, but this function does not seem feasible for larger waves.

As for the in-between blips, there are 13 blip posts in-between the first April 9 post by Bruno and the second April 9 post by Bruno. These in-between blips range in date from April 5 to April 12 (line 7). Additionally, there are 12 messages in-between Fahmida's April 7 blip and Suzanne's April 8 blip. The in-between blips range in date from April 8-11 (line 24). Nonetheless, one blip post does not necessarily equal one post but could be an in-between edit. Not until one goes back to the Playback function and reconstructs each edit step-by-step does it become clear when Fahmida wrote her reply. On the actual wave, the next blip is Jean and Kang's March 8 exchange about the lag in the synchronous online writing tool (see Data Excerpt 4: Google Wave - Jean, Kang).

In summary, for research question 1, the majority of student teachers ranked Google Wave third (after Ning and Skype) with regard to the question of how useful participants considered the synchronous online writing tool for language and intercultural learning.

Research question 2 analyzed how participants perceived the benefits and challenges of using a synchronous online writing tool for interactive and collaborative purposes. Benefits included the potential of the tool for collaborative writing, peer feedback, learner communication and discussion, real-time chat, learner engagement in "really immediate interaction," the combination of ACMC/SCMC tools, and the ability to correct messages and to see others typing. In terms of challenges, some students mentioned the "major lag" and the "unstable" application. Other disadvantages were related to the layout ("confusing") and the "slow" and "disorganized" system. Participants also thought the message organization system was not user-friendly and that the limited number of blips was a primary constraint of the tool as well. They also believed that the technical nature of the system required a great deal of learner training.

Research question 3 explored what other tools students could imagine using for intercultural learning. Most participants thought that Google Wave had great potential for ICC (in contrast to Skype or Ning). The main reasons for using Google Wave included

the fact that students can immediately communicate at the same time and that students could discuss their project online.

Lastly, research question 4 shows two themes that emerged from the CMC data. First, authorship, ownership, and plagiarism in Google Wave can be issues since everyone can edit any blip at any time. Second, the number of blips that can occur in-between blips poses a challenge for a retrospective analysis of the blips—the consequences of which for future research will be fleshed out in the next section.

CONCLUSION AND IMPLICATIONS

While the potential of Web 2.0 tools such as wikis and blogs have been documented in the literature, little is known about the potential of the collaborative online writing tool Google Wave, which combines both synchronous and asynchronous modes in a unique way. This exploratory study attempted to fill the gap by analyzing the cross-institutional interactions and reflections of pre-service teachers in the U.S. and in Taiwan, with regard to the benefits and challenges of using Google Wave for collaborative purposes. While the number of participants was low (N=30), this study can and does add to the ongoing discussion regarding the use of online collaboration tools. The study, because of the low number, does not provide conclusive recommendations, but thoughts for further research.

Results indicate that although pre-service teachers realized the potential of the tool for real-time online collaboration, the underdeveloped beta-version of the tool had a major negative impact on the *Interface, Technology, and Learner Training* (e.g., system lag, not user-friendly, confusing). This then has an impact on how much time would need to be dedicated to learner training for both teachers and students.

By the same token, participants considered the synchronous online writing tool useful for language and (intercultural) learning and mentioned *Interaction/Collaboration* advantages (e.g., one tool for both APMC and SCMC, collaborative writing, real-time editing) for using the tool. This seems to be in contrast with the fact that the challenges outweighed the benefits by far when pre-service teachers were asked to list both.

With regard to the kinds of interactions that took place via Google Wave and the implications for language teaching, the teacher-researcher found it striking that interactions cannot be easily tracked. In the synchronous online writing tool, anyone can go back and edit at any point. Thus, it is hard to tell afterward what happened. Not only can one edit previous blips but one can also edit within someone else's blip. In a sense, one can interrupt somebody else's blip (e.g., Suzanne and Ellen in Data Excerpt 2), which raises the issue of authorship/ownership (see also Fahmida in Data Excerpt 7).

The real question however seems to be whether editing functions should be looked at as affordances or constraints of the medium. The implications for reconstructing interaction and collaboration in the synchronous online writing tool are major. According to Godwin-Jones (2010), “[b]ecause the history of the Wave is maintained in all its detail, it also works as a rich collaborative environment, like a blog or wiki” (p. 13). However, reconstructing a wave does not seem as easy as clicking on the revision history button in a wiki or reading through a blog.

While this poses a main challenge for the researcher (e.g., Fuchs, 2010), the classroom teacher could take advantage of this technological phenomenon and ask participants to reconstruct their interactions together in class. This would be a meaningful and relevant micro-interaction analysis because students as researchers would be dealing with their own written products. The reconstructed interactions could then be verified through the Playback function.

The main focus of the article was to analyze the constraints and affordances of this new tool and limited to looking at participants' interactions in a more general sense. But

since one of the goals of the study was for participants to share insights from their unique cultural and institutional perspectives and to explore the potential of different tools for ICC in language teaching and learning, it would be beneficial to explore how the two groups with different cultural backgrounds interacted in this new tool Google Wave. Thus, a microanalysis of participants' "communicative patterns," "behavior habituations," and "social interactions" could be conducted and then supplemented with information obtained from participants' needs analyses, i.e., their cultural and linguistic backgrounds, technology and teaching expertise, as well as their prior cross-cultural experiences.

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APPENDIX A

Post-Course Questionnaire: Benefits of Using the Synchronous Online Writing Tool (Google Wave) for Collaborative Purposes (N=21)

1) Interaction/Collaboration

- Provides a space for students to communicate with each other (2)
- Good way to collaborate on writing projects
- Able to correct messages, ability to see others typing is interesting
- Ability to post and respond to questions, convenient space to discuss
- For collaborative work, a good option as it allows students to discuss their work by creating a new wave of their own and the replies could be indented to follow a particular thread
- Makes reading replies easier
- Combines several tools into one
- Interesting tool for students to engage in a really immediate interaction
- Real time chat

2) Interface

- All messages can be saved, reviewed at any time
- SCMC and APMC tools all integrated into one, no need for using separate features

Post-Course Questionnaire: Challenges of Using the Synchronous Online Writing Tool (Google Wave) for Collaborative Purposes (N=21)

1) Interaction/Collaboration

- Hard to predict that real interaction would appear within the context
- Students a lot of times just post questions, but do not engage themselves in the dialogue

2) Interface

- Confusing layout
- Confusing and slow, as a new tool, a lot to work out
- A bit disorganized
- Hard to follow other people's posts
- Length of wave limited, get lost in numerous blips.
- Not enough gadgets or templates, not enough user-level differentiation
- Small space to show lots of words
- The way messages are recorded is not at all user-friendly
- Should maximize the number of blips and make the environment more user-friendly

3) Technology

- Major lag (3)
- Unstable nature of Google Wave (3)
- Too many people signed in on same network can crash the network
- Small glitches still occur
- Still in test period

4) Learner Training

- Students have to be coached on how to use it

Post-Course Questionnaire: Tools for Intercultural Projects (Purpose/Benefits & Challenges) (N=21)

1) Interaction/Collaboration

- Like students can interact synchronously and they can retrieve the previous information easily
- SCMC
- Great tool for online collaborative projects
- Easy and free for learner to manipulate

2) Interface

- More immediate and convenient function

APPENDIX B

Data Excerpt 4: Google Wave (Pavlos, Fahmida, Damaris)

- 1 Mar 1
- 2 Pavlos@googlewave.com:
- 3 An advantage of google wave would be that it can combine so many tools in
- 4 one environment and give the opportunity for APMC and SCMC under one
- 5 place. This also happens with Ning yet the gadgets that google wave offers p
- 6 rovide more opportunities. Also, the different functions that a wave have may
- 7 facilitate the learner while carrying out a writing task. If you see the buttons
- 8 above a student can google search without writing something or add
- 9 attachments which may enrich the final outcome.

- 10
11 However, google wave for me has not yet completely acquired a user friendly
12 environment. The teacher has to go through extensive exploration for this tool
13 to completely understand it. Just imagine how difficult this might be for the
14 student. Having to figure out how everything works is not that convenient
15 while using a teaching tool. You want an efficient tool which assists learning
16 adequately.
- 17 Apr 7
18 Fahmida:
19 I agree with you, Pavlos, GW provides a lot of opportunities for ACMC & SCMC.
20 Since, it's in Beta version, a teacher cannot use all of the gadgets
21 simultaneously as it would add to it being 'slow'. However, it still has potential
22 for ELT. For instance, having a map open on the screen, the collaborative
23 writing option available, one can devise a task out of only these two options.
- 24 Mar 21
25 Damaris@googlewave.com:
26 Before students utilize Google Wave, there should definitely be some sort of
27 instructional demo to watch (either from Google or independently made and
28 posted on YouTube), because as Pavlos mentions above, it certainly is time
29 consuming for students to figure this tool out on their own.
- 30 Mar 22
31 Damaris@googlewave.com:
32 I just now noticed a previous post from *[the class professor]* that mentions a
33 Google Wave demo video that is already on YouTube... good to know! Thank
34 you!
- 35 Mar 1
36 Ellen:
37 1. Honestly, I am still exploring this Google wave, so I do not know much about
38 it. However, based on the experience so far, Google wave is similar to video-
39 conferencing, where people from different places communicate and discuss,
40 except the fact that they cannot see face expression, gestures and etc. Since
41 Google wave saves the discussions that are occurring in the wave and let users
42 to discuss with other users even the ones that live thousands of miles away, it
43 can be used in language classroom where language learner students can
44 interact with the native speaker of that language. For example, Spanish
45 language learner in the States can meet regularly with English language
46 learner in Mexico to discuss about the culture, language and etc.
47 2. The disadvantage of Google wave that I notice was the way that it is not
48 organized. It is great that every interaction that happened in the wave is
49 saved, but it is everywhere. If there is a title page where users can easily find
50 the specific topic, it would be great.

APPENDIX C

Data Excerpt 6: Google Wave (Bruno, Fahmida, Georgina, Pavlos, Pin)

1 Apr 9

2 Bruno:

3 The technical issues, especially the typing lag, have been the most annoying
4 for us as well. This may be one reason why many of my classmates have been
5 reluctant or unable to use GW. My group's final project is to present GW as a
6 language teaching tool, so this discussion is of special interest to me.

7 *[13 messages in-between ranging from April 5-12]*

8 Apr 9

9 Bruno:

10 The lack of organization and search capability within a wave has also been our
11 main complaint. Try using the keyboard shortcut by pressing the space bar to
12 go to the next unread blip. We have also found that keeping each wave topic-
13 specific or task- specific will help keep the waves shorter and easier to
14 navigate.

15 Apr 7

16 Fahmida:

17 Hi P. and J. *[two Taiwanese students]*, I like your comment on being able to
18 "work together" with other people on GW. That's one of the strengths of GW -
19 to be able to collaborate! I have experienced the collaborative writing aspect
20 of GW with my friends and we appreciated the way it allowed us to
21 brainstorm, draft, and work together on a document, without losing our trails
22 of thought, then revising it and saving it right here, and all of this while sitting
23 comfortably at home :)

24 *[12 messages in-between ranging from April 8-11]*

25 Apr 8

26 Suzanne@googlewave.com:

27 I agree with my classmate Fahmida about the easy-to-use collaborative nature
28 of the Google Wave. However, I am also in agreement with F.'s [a Taiwanese
29 student's] concern about being able to edit others posts. Surely for
30 project/brainstorming work that would be acceptable, but for personal posts I
31 do believe it is somewhat of a violation of freedom of speech!

32 Apr 8

33 Ellen:

34 I honestly still have difficulty with this GW, so it is really hard to find any
35 strength of this tool.=/ In order to improve this tool, it is crucial to find the
36 better ways to organize posts. It took me quiet a while to find the questions.
37 However, this tool itself seems interesting! ^- ^

38 Apr 9

39 Georgina@googlewave.com:

40 I agree with Ellen about having difficulty with this GW. This is the first time I
41 am using this GW and so far it's a little confusing to me. Also I don't really like
42 the way the posts are organized here. It took me a while to find questions and
43 posts here. However, I think it could be used well for collaborative work.

44 Apr 10

45 Pavlos@googlewave.com:

46 I would say that google wave serves great as an ACMC tool where a teacher
47 can carry out language tasks and organize his/her units on different waves.
48 However it does not automatically support SCMC and still needs to acquire a

49 user-friendly environment.
50 Apr 10
51 Pin@googlewave.com:
52 GW , like anything new, is quite exciting. However, it is very hard to follow and
53 reply to a topic (especially when we have to scroll down with a slow
54 computer). The strength that I could see is the levels of topics/questions and
55 how we can reply to any post way back. However I would be a bit cautious to
56 edit others' posts because that would be violating the right to freedom of
57 speech and somehow hurt others' feelings, which might not be
58 recommendable for intercultural communication
59 unless a common code was established first-hand.