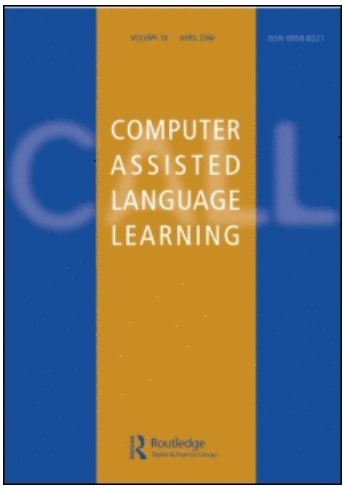

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Sustainability of E-mail Interactions Between Native Speakers and Nonnative Speakers

Glenn Stockwell and Mike Levy
Kumato Gakuen University, Griffith University

ABSTRACT

Recent research into e-mail has not only suggested that it can be a powerful motivator for interaction for language learners, but has also begun to link e-mail interactions between native and nonnative speakers to increases in L2 proficiency (Aitsiselmi, 1999; Floréz-Estrada, 1995; Ioanniou-Georgiou, 1999; Stockwell and Harrington, 2001). In addition, some research has advocated that L2 learners should reach a certain number of e-mail interactions in order for benefits to accrue (Lamy and Goodfellow, 1999; Stockwell, 2000). Despite this apparent need for sustainability of e-mail interactions, the current literature has neglected to determine what features of these NS-NNS e-mail interactions are associated with the longer interaction sequences. Thus, in this study, we investigated 48 learners of Japanese involved in e-mail interactions with native speakers to determine what factors contributed to sustaining interactions. The e-mails are analyzed in terms of the relationship between sustainability and learner proficiency, computing experience, in-country experience, ratio of interlocutors and the content and topics of the e-mail interactions. Further, sustainability is considered in relation to a characterization of the online profiles of the participants. The paper closes with some suggestions for teaching.

1. INTRODUCTION

One of the most frequent uses of e-mail in second language learning is for establishing 'key-pal' relationships between language learners and native speakers in the target language or country. Studies into e-mail in L2 classrooms have linked them to increased motivation (Soh and Soon, 1991; Gray and Stockwell, 1998; Warschauer, 1995a), reduction in anxiety of learners (Beauvois, 1995; Kinginger, 1994; Warschauer, 1995b), increased participation (Aitsiselmi, 1999; Kelm, 1992; Kern, 1995), and construction of knowledge (Leahy, 1999).

Correspondence: Glenn Stockwell, Associate Professor, Faculty of Economics, Kumamoto Gakuen University, 2-5-1 Oe, Kumamoto City, Kyushu, Japan 862-8680. Tel.: +81 96 364 8294 (Direct); +81 96 364 5161 (Switch board); Fax: +81 96 372 0702 (Research Tower); E-mail: gstock@kumagaku.ac.jp

Though e-mail exchanges have been used in the second language classroom increasingly in recent years by language teachers and learners, there is still little or no clear picture of the relationship between e-mail use and L2 acquisition (Kitade, 2000, p. 146; Leh, 1997, p. 189). Studies into interactions between native speakers (NS) and nonnative speakers (NNS) have suggested that these interactions are beneficial for acquisition of a language (e.g. Stoller et al., 1995), but while there is much enthusiasm about e-mail interactions with NS reflected in the literature (Chapman, 1997; Nelson and Oliver, 1999; Saita, Harrison and Inman, 1998; Trenchs, 1996; Warschauer, 1996), empirical evidence linking the sustained use of e-mail with learning gains is scarce (Salaberry, 2000; Warschauer, 1997).

The view that longer interaction periods are desirable in e-mail exchanges is strengthening as empirical support for this view is gathered (Lamy and Goodfellow, 1999; Stockwell and Harrington, 2001). For example, Stockwell (2000) showed that advanced level learners of Japanese involved in e-mail interactions with NS only demonstrated increases in second language proficiency after a certain number of messages had been reached. This study also showed that many learners who failed to attain this threshold level showed little or no improvement, and yet others demonstrated decreases in proficiency in their output.

While studies such as these have suggested the need for sustained e-mail interaction periods, there has been conflicting evidence on why social exchanges via e-mail cease prematurely. One of the problems cited by several researchers has been that learners tend to use this medium of communication more substantially in the early stages and reduce their usage as the initial excitement wears off (Tella, 1991, 1992; Warschauer, 1995a). In contrast, in a study of students of Spanish in the United States paired with NS in Mexico, Leh (1997) showed that one quarter of learners continued electronic mail communication with their partners as much as one year after the project had finished. It is not clear what particular factors were instrumental in enabling these longer term e-mail collaborations to be so successful.

The question of exactly what factors facilitate sustainability during online interactions remains largely unexplored. While no study has so far focussed primarily on investigating the sustainability of interactions, Lamy and Goodfellow (1999) did consider sustainability of threads of topics during online discussions. In their study, they specifically examine the factors caused the threads to end. Of the 32 messages they found which ended specific threads, only 21 did not invite any reply from the other members of the discussion group. Some of the reasons that they offer for the lack of sustainability of the

remaining 11 messages were a lack of explicitness of the invitation, discourse mishaps and syntactic errors. They suggest that it is important for participants in an e-mail discussion to make invitations to respond sufficiently explicit for other participants to see clearly that an invitation has been made. Whereas Lamy and Goodfellow looked at online discussions with multiple participants, in this study, we focus upon e-mail interactions, which are generally between two participants.

One primary difference between online discussions and e-mail interactions is that online discussions generally revolve around a single idea in an interaction, whereas messages produced in paired e-mail interactions will often include several different ideas within a single message (Chun, 1994; Condon and Cech, 1996; Wilkins, 1991). With e-mail interactions where 2 students are engaging in social talk, the discussion continually evolves and moves forward from one idea to the next according the the interests of the participants. There is a need to investigate the e-mail interactions holistically to determine the range of factors which may or may not be effective in helping learners to sustain their interactions.

2. METHOD

In this study, we sought to answer two main questions. Firstly, we wished to determine whether or not there was an actual relationship between the number and length of e-mail interactions and L2 proficiency gains. Secondly, we wanted to try and identify what factors are helpful in sustaining these interactions.

2.1. Subjects

The present study utilizes the data collected from interactions between advanced level learners of Japanese at an Australian university, and native speakers at a Japanese university.[1] The study was carried out over two 5-week periods in consecutive years. It was held only in the second semester of both years because the timing of both semesters, which left a limited overlap period for students in both Australia and Japan to participate in the exchange. A total of 18 students were enrolled in the first cohort and 30 students were enrolled in the second. The two cohorts combined to give a total of 48 students in the study. All students had English as their native language except for 3–1 Korean, and 2 Taiwanese. The students consisted of 37 females and 11 males, and

[1] This study is based on data collected as a part of the first author's Ph.D. research.

student ages ranged between 18 and 24 years. All students had used a computer before; however 12 of the students did not have experience with e-mail, and 17 students were unfamiliar with Japanese word-processing. Of the 48 students involved in the study, only 12 had extensive in-country experience, and none of the students had formally studied at a university in Japan. The student details are given in Appendix A.

The language of all exchanges was Japanese, and both the Japanese and Australian students were asked that they try to maintain at least 4–5 exchanges per week with their partners over the 5-week period. A different topic was assigned each week as follows:

Week 1 Self introductions – student life in your country.
Week 2 Perceptions of ourselves and others.
Week 3 Dining out – where, how often, who pays, etc.
Week 4 Relaxation and leisure.
Week 5 Dating and socializing.

The topics were chosen initially by the two class teachers, one in Japan and one in Australia, with the needs and likely interests of the respective students very much in mind. It was thought that the topics would be easy to talk about, in the first instance, and then, later, would lend themselves to further exploration according to the students' particular shared interests. In all cases, the students were aware that the researcher had access to all incoming and outgoing mail messages, and agreed to their use for research purposes.

2.2. Procedure

Through the use of Netscape Mail, it was possible to consistently record the date, time and length of all incoming and outgoing messages. After all of the messages were collected at the end of the interaction periods, they were sorted and coded for analysis. Each of the Australian students was assigned a number from 01 through to 48, and all of the messages were coded with a number, comprising this student number, followed by the year, month, day and time of sending the message.

There was a large variety in the numbers of messages produced by all of the participants in the study (see Appendix B), and this was especially evident between the first cohort and the second cohort. Some learners produced a large number of messages (e.g., student 42 wrote 30 messages), whereas others wrote very few (e.g., students 15 and 16 did not write any messages, and students 25 and 28 wrote only one each).

2.3. Categorising Subjects

Inspection of the interactions revealed that while the number of messages sent by each NNS ranged between 0 and 30, the messages were sent relatively consistently by each interlocutor, with each NNS sending approximately the same number of messages each week. That is to say, if a NNS sent 15 messages, they sent approximately 3 messages per week, if they sent 10 messages, they sent approximately 2 messages per week, and if they sent 5 messages, it meant that they usually sent only 1 message per week. In most cases the NS also responded consistently to the NNS e-mail messages, but there were those NS who failed to respond more than once or twice. Based on these observations, the subjects were divided into four different categories: 'insufficient interaction', 'low-interaction', 'mid-interaction' and 'high-interaction'.

The 'insufficient interaction' included those students who wrote less than 5 messages during the interaction period (including those who failed to write any messages at all). Because this study is concerned with the proficiency of the NNS through interactions with the NS, if the NS responded twice or less times, regardless of the number of messages sent by the NNS, the students were also considered as having insufficient interaction, and were categorised as such, as shown in Table 1. If students wrote between 5 and 9 messages, and there were 3 or more responses by the NS, they were categorised as 'low-interaction'. They were categorised as 'mid-interaction' if students wrote between 10 and 14 messages, and as 'high-interaction' if they wrote 15 or more messages; in both cases there needed to be 3 or more responses from the NS for the interactions to be counted.

The numbers of the Japanese students were not the same as the numbers of students in Australia in either cohort. There were 19 Japanese students and 18 Australian students in the first cohort, and 15 Japanese students and 30 Australian students in the second. The differences in student numbers were

Table 1. Description of Categories of Students for E-mail Messages.

Category	No. of messages	No. of students
Insufficient interaction	4 or less*	14
Low-interaction	5–9	9
Mid-interaction	10–14	5
High-interaction	15 or more	20

Note. *Cases where NS have produced 2 or less messages have also been included in the insufficient interaction category.

not anticipated. Because student numbers were relatively even in the first cohort (i.e., 19:18), it was expected that similar proportions would also enrol in the second cohort. The e-mail exchange was organised (including incorporation into the curriculum of both subjects) before enrolments in either subject were finalised, meaning that the exchange had to be run despite the uneven numbers. As a result of the smaller number of Australian students in the first cohort, one student in Japan interacted with the researcher, but these data were not recorded. In the second semester, as there were double the number of Australian students compared with Japanese students, each Japanese student interacted with two Australian students.

2.4. Analysis

The data were analysed to determine what factors contributed to the sustainability of the e-mail interactions. Second language proficiency was measured for vocabulary, syntax, pragmatic and overall development through native speaking judgements of the output, and text-feature measures.[2] In the present study, the percentage of error-free T-unit (or minimal terminal unit) has been used as a measure of the development of syntactic proficiency. Stockwell and Harrington (2001) showed that the percentage of error-free T-unit was a reliable measure of syntactic development, and closely correlated with other measures of L2 proficiency including NS rating, and ISLPR measures. As described earlier, Stockwell (2001) showed that L2 proficiency of the learners demonstrated a sharp drop from the 1st to the 5th message, followed by a steady increase across most of the L2 proficiency measures until the end of the interaction period (see Stockwell (2000) and Stockwell and Harrington (2001) for a discussion). As a result, the proficiency was measured from the 5th message until the final message produced by each learner to determine the net proficiency gains or losses demonstrated from the low-point until the end of the interaction period. The results of the T-unit measures were correlated with the number of messages and the number of lines produced to determine the relationship between the number of interactions and L2 proficiency.

Next, the data were examined to determine the factors which may have played a role sustaining the interactions. Specifically, we investigated the data for proficiency, computing experience, in-country experience, the ratio of NS to NNS, and finally the content and topic. Each of these factors was compared

[2] See Stockwell (2000) and Stockwell and Harrington (2001) for a full description of the result of the L2 development analysis.

individually with the number of e-mail interactions to determine which did or did not appear to have an effect on sustainability.

3. RESULTS AND DISCUSSION

3.1. Effect of Sustained Interaction on Proficiency

Table 2 shows the difference in proficiency as measured by error-free T-unit measures, and the number of messages produced from the 5th message to the end of the interaction period for each NNS.

Table 2. Comparison of the Number of Messages Produced by Each NNS and the Increase in Proficiency.

	L2 proficiency (% error-free T-Unit)			
Subject	5th Message	Last Message	Difference	No. of messages
3	64.0	71.7	7.7	11
4	92.4	95.5	3.1	10
5	58.9	64.4	5.5	6
7	56.4	84.3	28.0	11
8	78.5	85.2	6.7	11
12	52.6	60.8	8.2	8
19	76.5	81.2	4.7	5
21	69.4	77.8	8.4	10
22	95.0	85.9	−9.1	11
23	82.6	97.0	14.4	12
26	75.7	83.4	7.7	7
31	74.5	82.4	7.9	12
35	77.5	76.3	−1.2	11
36	66.0	74.6	8.6	12
37	68.9	81.2	12.3	14
38	63.1	81.6	18.5	14
39	69.8	79.3	9.5	12
41	64.0	65.2	1.2	10
42	84.2	99.4	15.2	25
43	53.3	55.2	1.9	7
44	56.4	75.4	19.0	10
45	68.7	83.4	14.7	11
46	65.7	77.9	12.2	12
47	65.7	85.6	19.9	16
48	70.7	84.1	13.4	14

The differences in L2 proficiency exhibited in the output of the learners ranged from an increase of 28.0% to a decrease of 9.1% across the interaction period. However, if the extremities are excluded, this range is 19.0% to a decrease of 1.2%. This difference was then correlated with the change in proficiency to give a value of $r = .55$ ($p = .001$). From this, it was evident that there was a significant relationship between the number of messages and the increase in second language proficiency. The results were analysed in terms of the factors which may play a role in contributing to the sustainability of the e-mail interactions.

3.2. Factors Contributing to Sustainability

The data were analysed according to second language proficiency, computing experience, in-country experience, ratio of interlocutors and the content of the e-mail interactions. An analysis of each of these categories may be seen below.

3.2.1. Proficiency

The general proficiency of the students appeared to be a contributing factor in sustaining the e-mail interactions. The high-interaction category consisted of more higher-proficiency students when compared with the other categories, with more than half of the students in the category (55%) graded as Distinction or High Distinction. Neither the mid- nor the low-interaction categories had any High Distinction students, with the majority of students grouped around the Credit level. The insufficient interaction category had the widest spread of students, ranging from Fail through to High Distinction. A breakdown of the grades in each of the interaction categories is shown in Table 3.

Observation of the grade point average (GPA) for each category was revealing, with the GPAs of the high-, mid-, low- and insufficient categories at 5.75

Table 3. Breakdown of Grades in Each Interaction Category.

	Grade (% of category)				
Interaction Category	Fail (3)	Pass (4)	Credit (5)	Distinction (6)	High Distinction (7)
High			45.0	35.0	20.0
Mid			80.0	20.0	
Low		33.3	22.2	44.4	
Insufficient	14.3	35.7	14.3	28.6	7.1

Table 4. Computing Experience for Each of the Interaction Categories.

Interaction category	Computing experience (% of category)			
	Neither e-mail or wordprocessing	E-mail only	Wordprocessing only	Both e-mail and wordprocessing
High	15.0	15.0	0.0	70.0
Mid	0	40.0	0.0	60.0
Low	22.2	11.1	0.0	66.7
Insufficient	42.9	0.0	0.0	57.1

($SD = 0.79$), 5.20 ($SD = 0.45$), 5.11 ($SD = 0.93$) and 4.79 ($SD = 1.25$) respectively. This indicates that lower proficiency students generally produce fewer interactions.

3.2.2. Computing Experience

While all of the second language learners had computing experience, they had mixed experience in using e-mail and Japanese wordprocessing (see Appendix A).

The small numbers in each of the categories (particularly the mid- and low-interaction categories) make generalisation difficult, but Table 4 shows that the students in the high-interaction category tended to have more computing experience than those in the other categories. Conversely, the students in the insufficient interaction category had significantly more students without either e-mail or wordprocessing experience than the other categories.

3.2.3. In-country Experience

The relationship between in-country experience and sustainability of the e-mail interactions was not clear, and to some degree even showed an inverse relationship. The number of students with in-country experience was generally quite low. Only 20% of students in the high-interaction category and the mid-interaction category had spent time in Japan, compared with 33.3% and 28.6% in the low-interaction and insufficient interaction categories, respectively. This indicates that students without in-country experience had a tendency to produce more messages than those with this experience.

Table 5. The Number of E-mail Messages by NS for the Second Cohort.

	NNS 1		NNS 2		
NS name	Subject number	Messages	Subject number	Messages	Total
A	17	8	23	11	19
B	25	1	27	1	2
C	5	4	24	3	7
D	8	7	10	5	12
E	13	2	26	5	7
F	7	7	12	4	11
G	15	0	20	5	5
H	2	6	21	8	14
I	1	3	4	10	13
J	11	2	18	2	4
K	3	6	22	10	16
L	6	2	30	2	4
M	9	0	28	6	6
N	14	3	19	1	4
O	16	0	29	1	1

Note. Mean number of messages sent to each NNS by NS (*M*, *SD*) is 4.2, 3.17.
Mean number of messages sent to both NNSs by NS (*M*, *SD*) is 8.3, 5.46.

3.2.4. Ratio of NS to NNS

The differences in numbers of students in the different cohorts meant that the one-on-one ratio of the Japanese to Australian students from the first cohort was not maintained in the second cohort. Because there were 30 Australian students and 15 Japanese students in the second cohort, each Japanese student was required to pair up with two Australian students. Table 5 shows each of the Japanese students with their two Australian partners, the number of messages sent to each partner, and the total number of messages written by the Japanese students.

As Table 5 shows, each of the Japanese NS wrote a mean of $M = 4.2$ messages ($SD = 3.17$) to each of the nonnative students, although the high standard deviation shows that there were large differences in this value. While some NS failed to write to any NNS at all (although in many cases this was caused by the NNS failing to write as well), others wrote as many as 11 messages to one NNS. In general, when combining both of the NNS, the NS wrote a mean of $M = 8.3$ messages ($SD = 5.46$) overall, but this also varied largely between the NS. The number of messages sent to each NNS in the

Table 6. The Number of E-mail Messages by NS for the Frst Cohort.

	NNS 1	
NS partner	Subject number	Messages
P	32	5
Q	45	15
R	40	7
S	38	18
T	36	15
U	* Researcher	–
V	31	12
W	39	19
X	42	30
Y	47	18
Z	43	11
AA	41	19
AB	37	20
AC	44	17
AD	48	17
AE	35	16
AF	34	5
AG	46	20
AH	33	7
M		15.1
SD		6.36

Note. *Not included in the study.

second cohort was considerably less than that sent to each NNS in the first cohort, as shown in Table 6.

In the first cohort, there were comparable numbers of native and NNS, so each NS was required to be paired up with only one NNS (excluding the one NS who was paired with the researcher). Table 6 shows that the mean number of messages sent to each NNS was $M = 15.1$ ($SD = 6.36$), but this also varied quite a lot from person to person. When comparing the number of messages sent to each NNS in the first cohort to that of the second cohort, it is clear that the NS in the first cohort sent nearly four times as many messages to each NNS, and nearly twice as many messages overall.

3.2.5. Topic

Participants predominantly followed the assigned topics outlined for the study on a week-by-week basis. The time spent on each of the topics varied from pair to pair. Further, many of the pairs moved quickly through the assigned

Table 7. Percentage of Interactions Outside of Fixed Topic.

	Percentage of interactions outside of fixed topic			
	High	Mid	Low	Insufficient
Mean	65.33	45.97	12.82	2.51
SD	9.86	3.44	2.90	1.02

topics to areas of particular interest to one or other of the participants. In some cases, the topics of the interactions veered quite significantly away from the assigned topics, and messages sometimes included reference to the environment and other social issues such as religion and homosexuality before reverting back to the topic of the particular week.

Many of the messages made reference to the weather patterns in the respective countries, and both native and NNS often enquired about the change in seasons in their partners' countries. In addition, a number of the participants discussed various life events which happened during the course of the interactions, such as birthdays, visits to parents or family outings. There was no particular pattern to the occurrence of such side-topics, and they occurred spontaneously at various points during the interaction period.

While the set topics of the interactions appeared to allow for the interactions to be sustained to a certain degree, it was the side topics which appeared to contribute more to longer interaction sequences. Typically, the students in the insufficient and low-interaction categories stayed very closely to the set topics; however, there was a far greater variety from the students in the mid- and high-interaction categories. The degree to which learners strayed from the fixed topics is given in Table 7.

As Table 7 shows, the students in the high-interaction category showed a much higher tendency to deal with topics outside the fixed topics than those in the other categories. In addition, those learners who discussed a smaller range of topics were less likely to sustain their e-mail interactions.

The topics covered in the interactions often reflected the backgrounds of the students and their NS partners. For example, the most prolific writer, student 42, although a very good student, indicated that she was not confident with writing e-mail messages before the interaction period started. She began, as the other students did, with a self introduction in the first message, and indicated that she had spent 12 months in Osaka. Her NS partner responded that her grandmother lived in Osaka, and that she traveled there often. The subsequent messages, while encompassing the set topics, often described their

experiences in Osaka. There were other similar examples. Another dyad consisted of a Korean student paired up with her NS interlocutor. The content of their messages often contained references to similarities in culture and lifestyles in Korea and Japan, such as formalities followed when dining out or dating, or university entrance examination procedures.

In other dyads, interactions increased in frequency when common topics became apparent. For example, one lower proficiency learner had difficulty in producing messages over the 2 weeks of the interaction period, and the messages written were often short and closely followed the topics. At the end of the second week, it was found that there was a shared interest in Nintendo, and later messages often contained reference to games they either owned or had seen. A final example was between a female NNS and a male NS, whose early interactions also closely followed the topics. The NNS had a high level of proficiency, and wrote consistently through the first 4 weeks of the interaction period. During the fifth week, when the topic of dating and socialising came up, it appeared that neither person was involved in any relationship. The interactions for the final week increased dramatically in frequency as they made plans for meeting in Japan at the end of the year, and they discussed different places that they would go to while they were there.

4. A TAXONOMY OF ONLINE PROFILES

From the study, it is possible, tentatively, to develop a taxonomy of what we might term 'online profiles'. These categories broadly represent the character traits or profiles exhibited by the participants in the e-mail interactions. In this taxonomy the NNS are separated from NS because of the differing circumstances or hurdles faced by each group. For example, obviously the NNS is going to be concerned primarily with the language, the NS might not be as motivated as the NNS because – in this study at least – they are conversing in their own language. Members of both groups might face particular problems with the technology. The main discussion here focuses on NNS; however, before continuing, it is helpful to say a few words concerning the character of the NS involved in this study.

Many of the NS appeared to be busy with other concerns outside the e-mail project. For example, there were those that were often ill, or had personal issues (often mentioned in the e-mail interactions as an excuse for late messages) that delayed their message writing. Some of these NS, though

they produced few messages, were often produced. They contained reference to many topics within a single message to compensate for their irregularity in sending them.

Here we focus on the NNS and the online learner profiles that they exhibit. They may be categorised as follows:

4.1. The Low-motivation Student

There were a number of students who did not get involved in the project from the outset, and who only produced messages when directly prompted by the teachers. They then usually only produced short messages that stayed very close to the topics, and often failed to respond to questions posed to them by the NS.

4.2. The Daunted Student

Among the NNS, there were also those students who voiced their concerns before embarking on the project, often stating that they were nervous about communicating with NS in Japanese for fear of making mistakes in their language, or not being able to understand the messages produced by the NS. Some of these students remained daunted by the messages throughout the interaction period, and often failed to respond to messages produced by the NS. Other students who were nervous in the early stages were able to overcome their fears, and continued to sustain long interaction sequences.

4.3. The Struggling Student

There were NNS with relatively low language proficiency, who often had difficulty in producing and reading messages. Unlike the above categories, these students worked within their capabilities, and produced a number of shorter messages. As a result, despite not possessing the language skills (or in some cases computer skills) of some of their counterparts, they continued to interact throughout the interaction period, often discussing a range of different topics both within and outside the set range.

4.4. The Technophobic Student

These NNS were less concerned with their Japanese skills than with the technology. They had little or no experience in writing e-mails or in Japanese wordprocessing, hence were worried about communicating with the NS through the e-mail medium. As with the daunted students, some of these students were able to overcome this fear and have productive interaction periods, while others gradually ceased to write messages.

4.5. The Inconsistent or Slow Responder

Some of the NNS were not consistent with their e-mail writing despite not having any particular difficulties with the language or with the technology. These students were often enrolled in double-degree programs (meaning that they had higher study workloads), or were busy with outside commitments such as part-time jobs or family.

4.6. The Ideal High Performer

These NNS were usually the most productive message writers. They were generally of a higher language proficiency and had high levels of motivation, not needing prompting by the teachers to respond consistently. The variety of topics covered in their interactions was broad, and they often asked their NS interlocutor a range of questions about their study and personal situations.

5. DYAD DYNAMICS

In contrast to the individual on-line characterisations just described, it was also evident that there were patterns in the dynamics of the interactions judged as a whole, that is as a complete series of interactions between one NNS and one NS. These patterns depended upon the nature of the interactions between the two participants as a whole. It therefore characterised features of the pair rather than the individual. In the same way that two individuals seek common ground in face-to-face meetings – with lesser or greater success – so did individuals meeting and interacting online. Furthermore, there are aspects that are apparent in this study that go beyond the purely instrumental goal of requiring two learners to communicate for the purposes of language learning or for an assessment requirement. Such aspects concern the ways in which any two people communicating for the first time move beyond the set topic and, over a series of interactions, explore mutual interests and then sustain and develop their relationship. Some of these aspects are presented here.

5.1. Dyads with Nothing in Common

There were instances when the two participants in the dyad had little to discuss with each other outside the fixed topics. While in some cases one speaker or the other attempted to move off the topic to ask about some aspect outside the topics, these attempts were often met with a lack of interest in the topic raised.

Most of the messages produced were congenial, and generally there were no real difficulties in compatibility between the interlocutors beyond a lack of areas of interest outside the fixed topics.

5.2. The Mismatched Dyad

This type of dyad contrasts with the above category in that the differences between the two interlocutors were often much larger than those above. They were categorised by what might be termed as 'personality clashes', where there was such a complete lack of common ground between the participants that sustained interaction between them was virtually impossible. In some cases, this type of mismatched dyad resulted in one or both of the interlocutors requesting a change of partner.

5.3. 'Let's Stick to the Topics' Dyads

Some of the dyads appeared to stay very close to the fixed topics, with almost no reference to anything outside the topics. While in some cases, this was simply a natural circumstance of the interactions (i.e., neither participant initiated any topics outside the fixed ones), there were cases when attempts to move off the topic were met with a non-response, or a suggestion that they stay only on the assigned topics.

5.4. Dyads With Lots in Common

When the interlocutors had a lot in common with one another, they were far more likely to sustain their interactions. Often the participants came across a common point of interest by chance (such as the Nintendo example earlier), and in other cases one participant made a conscious effort to ask about the background of the other in order to find such common points. When the interlocutors found their common points of interest, much of the subsequent interaction centred around or made reference to this common point (or points), and this also helped to sustain the interactions.

5.5. Developing Friendships

As an extension to the above category, there were cases where the interlocutors found that they had a lot in common with one another, and the main topic of the interactions was not the assigned topics but rather their own private areas of interest. While the participants often made passing reference to the assigned topics, they quickly moved to their own topics, and discussed these at length. Some of these dyads made plans to meet one another in person

after their studies were completed, and offers were made to stay at one another's homes.

5.6. Improving Sustainability of E-mail Interactions

It is clear from the results of this study that the opportunities for language learning will be increased if the e-mail collaboration is sustained and that a high frequency of e-mail interactions is encouraged. In conventional classroom-based learning, of course, the teacher will often use techniques such as pair work or group work to facilitate interaction and under these circumstances a relatively low level of proficiency, or poor motivation will, of course, affect success. But if we limit the discussion here to online interactions in particular, what preparation, training, strategies or techniques might be helpful for students about to engage in such work? (In fact it may be that this language work, in its turn, will be valuable also in the face-to-face classroom situation also.)

In the context of online interaction specifically, this study indicates that two aspects or factors are especially important: coming to terms with the technology itself; and initiating, managing and sustaining an interaction and a topic online.

Clearly, the students need to be properly introduced to the technology they are going to use. Time needs to be allocated before the NNS-NS collaboration officially begins to ensure that students are comfortable with the technology, in this case writing e-mails or using a Japanese wordprocessor. Technophobia is a very real fear for some students and an introduction that is appropriately staged and managed is essential.

Initiating, managing and sustaining an interaction online can be a real challenge for students, especially if no common interests are immediately forthcoming (see Mak & Yeung, 1999). A project-based orientation can provide a framework at a macro level (see Debski, 2000) as can tasks or topics at a micro level. However, whatever the framework or guidelines provided, ideally, after some initial input from the teacher, this study shows there is great value in giving students the opportunity and the requisite language skills to seek out their own areas of common interest with their counterparts. While one cannot mandate topics of mutual interest, the teacher can help the students acquire some of the socio-pragmatic and socio-cultural skills associated with opening online conversations, seeking out areas of common interest and maintaining the online interaction. We can perhaps draw upon work in discourse or conversation analysis, especially in the field of pragmatics such as McCarthy (1991). For example raising learner's awareness

of '... how conversational openings and closings are effected, how topics enter and disappear, and how speakers engage in strategic acts of politeness, face-preservation and so on' McCarthy (1991, p. 24) would be most helpful in successful online interactions. The whole area of seeking out common ground in initiating and sustaining an online conversation needs to be introduced. These strategies and techniques can be practised beforehand in the classroom using activities that involve role-play, perhaps, and the real life knowledge and interests of students.

It is important to remain acutely aware, however, as Lamy and Goodfellow (1999, p. 54) observe, that there may well be special strategies that are particularly relevant in the online as opposed to the face-to-face context, such as the need for 'more explicit verbal (and iconic) interactional triggers than ... oral conversation, where intonation and body-language play a big part in sustaining the interaction.' So, these kinds of strategies will need to be introduced as well.

New constructs for language learning may emerge which are specific to online as opposed to face-to-face interactional activity. For example, again in the study by Lamy and Goodfellow (1999, p. 45), they introduce the notion of 'contingency for on-line learning', what van Lier calls 'contingent interaction' (van Lier, 1996, pp. 175–178). In this study, we are suggesting that the construct 'sustainability' is a key determining factor in the success of online interactions. These potentially new constructs, drawn from work on online interactions, need to accompany those more established constructs such as 'negotiation of meaning', 'authentic audience', 'authentic tasks', and so forth. Furthermore, these established terms may need to be revisited in the online context because they largely emanate from face-to-face contexts. In planning research in the future, constructs from online and face-to-face interactions may need to be operationalised.

6. CONCLUSION

This study sought to determine whether or not a relationship existed between the number of e-mail interactions and L2 proficiency development, and to identify what factors are efficacious in sustaining these interactions. The results suggested that those learners who produced higher numbers of messages were more likely to demonstrate improvements in the L2 output, providing some empirical evidence that learners do indeed appear to benefit

from sustained e-mail interaction with NS. Further, the study identified that there were a number of factors which appeared to have an effect on sustaining these interactions. For example, learners of higher language proficiency were more likely to be more prolific e-mail writers than those with a lower proficiency.

The topic of the e-mails appeared to be a strong contributing factor to sustainability of the interactions. Most especially, when dyads stayed close to the assigned topics, they seemed less likely to produce as many messages as those who moved from the original topics into their own areas of interest. These areas of interest could not be predicted in advance either by the teacher or the student. They are the natural result of the search for commonality between two people who are seeking to communicate. In the same way that students need strategies to initiate and maintain face-to-face interactions, which have their own particular dynamic, students will also need strategies for the on-line interactional environment.

REFERENCES

Aitsiselmi, F. (1999). Second language acquisition through e-mail interaction. *ReCALL*, *11*, 4–11.

Beauvois, M.H. (1995). E-talk: Attitudes and motivation in computer-assisted classroom discussion. *Computers and the Humanities*, *28*, 177–190.

Chapman, D. (1997). A comparison of oral and e-mail discourse in Japanese as a second language. *On-CALL*, *11*, 31–39.

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

Condon, S.L. & Cech, C.G. (1996). Functional comparisons of face-to-face and computer-mediated decision making interactions. In S.C. Herring (Ed.), *Computer-mediated communication: Linguistic, social and cross-cultural perspectives* (pp. 65–80). Amsterdam: John Benjamins Publishing Co.

Debski, R. (Ed). (2000). *Computer Assisted Language Learning. Special issue: Project-oriented CALL: Implementation and evaluation.* Lisse: Swets & Zeitlinger.

Florez-Estrada, N. (1995). *Some effects of native–nonnative communication via computer e-mail interaction on the development of foreign writing proficiency,* Unpublished doctoral dissertation, Graduate Faculty of Arts and Sciences, University of Pittsburgh.

Gray, R., & Stockwell, G.R. (1998). Using computer-mediated communication for language and culture acquisition. *On-CALL*, *12*, 2–9.

Ioannou-Georgiou, S. (1999). Synchronous computer mediated communication. Chat and Moo: Where do we stand? In K. Cameron (Ed.), *CALL and the learning community* (pp. 195–208). Exeter: Elm Bank Publications.

Kelm, O.R. (1992). The use of synchronous computer networks in second language instruction: A preliminary report. *Foreign Language Annals*, *25*, 441–464.

Kern, R. (1995). Restructuring classroom interaction with networked computers: Effects on quantity and characteristics of language production. *Modern Language Journal*, *79*, 457–476.

Kinginger, C. (1994). Locating contingency in e-mail. *Georgetown University Round Table on Languages and Linguistics* (pp. 211–218).

Kitade, K. (2000). Learners discourse and SLA theories in CMC: Collaborative interaction in Internet chat. *Computer Assisted Language Learning*, *13*, 143–166.

Lamy, M.N., & Goodfellow, R. (1999). 'Reflective conversation' in the virtual classroom. *Language Learning and Technology*, *2*, 43–61

Leahy, C. (1999). E-mail as a learning tool: Construction of knowledge on-line. In K. Cameron (Ed.), *CALL and the learning community* (pp. 291–300). Exeter: Elm Bank Publications.

Leh, S.C.A. (1997). Electronic mail in foreign language learning: communication and culture. *Proceedings of the National Convention of the Association of Educational Communications and Technology, Alburquerque*. (Vol. 19, pp. 189–200).

Mak, L., & Yeung, S. (1999). Investigating features of an international e-mail community. In K. Cameron (Ed.), *CALL and the learning community* (pp. 315–336). Exeter: Elm Bank Publications.

McCarthy, M. (1991). *Discourse analysis for language teachers*. Cambridge: Cambridge University Press.

Nelson, T., & Oliver, W. (1999). Murder on the Internet. *CALICO Journal*, *17*, 101–114.

Saita, I., Harrison, R., & Inman, D. (1998). Learner proficiency and learning tasks in e-mail in Japanese. In K. Cameron (Ed.), *Multimedia CALL: Theory and practice* (pp. 221–228). Exeter: Elm Bank Publications.

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

Soh, B.L., & Soon, Y.P. (1991). English by e-mail: Creating a global classroom via the medium of computer technology. *ELT Journal*, *45*, 287–292.

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

Stockwell, G.R. (2000). *An analysis of e-mail based interactions between native speakers and advanced level nonnative speakers of Japanese*. Unpublished doctoral dissertation, Centre for Language Teaching and Research, University of Queensland.

Stockwell, G.R., & Harrington, M.W. (2001). *Incidental development of L2 proficiency in NS-NNS e-mail interactions*. Technical report, Centre for Language Teaching and Research, University of Queensland.

Stoller, F.L., Hodges, R., & Kimbrough, J. (1995). Examining the value of conversation partner programs. *Applied Language Learning*, *6*, 1–12.

Tella, S. (1991). *Introducing international communications networks and electronic mail into foreign language classrooms: A case study into Finnish senior secondary schools* (Res. Rep. No. 95), Helsinki: Department of Teacher Education, University of Helsinki.

Tella, S. (1992). *Talking shop via e-mail: A thematic and linguistic analysis of electronic mail communication* (Res. Rep. No. 99), Helsinki: Department of Teacher Education, University of Helsinki.

Trenchs, M. (1996). Writing strategies in a second language: Three case studies of learners using electronic mail. *The Canadian Modern Language Review*, *52*, 464 – 491.

van Lier, L. (1996). *Interaction in the language curriculum: Awareness, autonomy and authenticity*. London: Longman.

Warschauer, M. (1995a). *Virtual connections*. Hawai'i: University of Hawai'i at Manoa, Second Language Teaching and Curriculum Centre.

Warschauer, M. (1995b). *Computer-mediated collaborative learning: Theory and practice*. Hawaii: University of Hawaii at Manoa, Second Language Teaching and Curriculum Centre.

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

Warschauer, M. (1997). Computer-mediated collaborative learning: Theory and practice. *The Modern Language Journal*, *81*, 470–481.

Wilkins, H. (1991). Computer talk: Long-distance conversations by computer. *Written Communication*, *8*, 56–78.

APPENDIX A

Student Background Data.

Student	Native language	Gender	Age	In-country experience	E-mail experience	Jap World experience	ACJ grade
1998	**Cohort (2NNS: 1NS)**						
1	English	M	24	12 months	N	N	HD
2	English	F	19	nil	Y	N	C
3	English	F	18	nil	Y	N	C
4	English	F	20	12 months	Y	Y	D
5	Taiwanese	M	19	nil	Y	Y	C
6	English	M	20	nil	N	N	P
7	English	F	19	nil	Y	Y	C
8	English	F	21	nil	Y	Y	C
9	English	M	20	nil	Y	Y	F
10	English	F	20	nil	N	N	P
11	English	M	19	12 months	Y	Y	D
12	English	F	20	nil	Y	N	C
13	English	F	19	nil	N	N	D
14	English	M	20	nil	Y	Y	D
15	English	M	18	nil	Y	Y	P
16	English	F	23	nil	N	N	F
17	English	F	21	11 months	Y	Y	D
18	English	M	19	12 months	Y	Y	D
19	English	F	19	nil	Y	Y	D
20	English	F	23	12 months	N	N	D
21	English	F	21	nil	Y	Y	D
22	English	F	24	nil	N	N	HD
23	English	F	18	12 months	Y	Y	HD
24	English	F	20	nil	Y	Y	P
25	English	F	22	nil	Y	Y	P

APPENDIX A. (*CONTINUED*)

Student	Native language	Gender	Age	In-country experience	E-mail experience	Jap World experience	ACJ grade
26	English	F	20	nil	Y	N	C
27	English	F	19	nil	Y	Y	C
28	English	M	20	nil	Y	Y	C
29	English	F	19	nil	N	N	P
30	Taiwanese	F	23	12 months	Y	Y	C
1998	**Cohort (2NNS: 1NS)**						
31	English	F	20	nil	Y	Y	HD
32	English	F	24	12 months	N	N	D
33	English	F	19	nil	N	Y	P
34	English	F	19	12 months	Y	Y	C
35	English	F	20	nil	Y	Y	D
36	English	F	20	nil	N	N	D
37	English	F	21	nil	Y	Y	D
38	English	M	21	nil	Y	N	C
39	English	F	19	nil	Y	Y	C
40	English	M	24	nil	Y	Y	P
41	English	F	21	nil	Y	Y	D
42	English	F	19	12 months	N	N	HD
43	Korean	F	23	nil	Y	Y	C
44	English	F	22	nil	Y	Y	C
45	English	F	20	nil	Y	Y	C
46	English	F	19	nil	N	N	D
47	English	F	23	12 months	Y	Y	C
48	English	F	21	nil	Y	Y	C

Note. Insufficient, Low Mid High.

APPENDIX B

The Number of E-mail Messages and Lines for the 1998 Cohort.

	Messages			Lines		
Subject	NNS	NS	Difference	NNS	NS	Difference
1	4	3	−1	54	70	+16
2	6	6	0	98	182	+84
3	15	6	−9	130	123	−7
4	15	10	−5	188	274	+86
5	11	4	−7	149	96	−53
6	5	2	−3	54	19	−35
7	15	7	−8	153	143	−10
8	16	7	−9	124	57	−67
9	1	0	−1	6	0	−6
10	4	5	+1	63	39	−24
11	6	2	−4	117	60	−57
12	13	4	−9	90	66	−24
13	4	2	−2	59	24	−35
14	7	3	−4	164	52	−112
15	0	0	0	0	0	0
16	0	0	0	0	0	0
17	9	8	−1	141	182	+41
18	18	2	−16	204	41	−163
19	10	1	−9	99	12	−87
20	7	5	−2	94	68	−26
21	15	8	−7	132	199	+67
22	16	10	−6	245	252	+7
23	17	11	−6	322	284	−38
24	7	3	−3	56	47	−9
25	1	1	0	11	8	−3
26	12	5	−7	112	73	−39
27	3	1	−2	35	14	−21
28	8	6	−2	63	42	−21
29	1	1	0	9	12	+3
30	8	2	−6	72	17	−55
$\sum$	254	125	−129	3044	2456	−892
M	8.5	4.2		101.5	81.9	
SD	5.64	3.17		75.09	84.39	

APPENDIX B. (*CONTINUED*)

The Number of E-mail Messages and Lines for the 1997 Cohort.

	Messages			Lines		
Subject	NNS	NS	Difference	NNS	NS	Difference
31	17	12	−5	206	207	+1
32	5	5	0	75	134	+59
33	5	7	+2	84	185	+101
34	6	5	−1	80	79	−1
35	16	16	0	179	135	−44
36	17	15	−2	243	255	+12
37	19	20	+1	276	376	+100
38	19	18	−1	265	229	−36
39	17	19	+2	283	378	+95
40	9	7	−2	78	99	+21
41	16	19	+3	252	306	+54
42	30	30	0	590	709	+119
43	12	11	−1	145	179	+34
44	16	17	+1	247	378	+131
45	16	15	−1	248	316	+68
46	21	20	−1	406	690	+284
47	17	18	+1	136	239	+103
48	19	17	−2	206	251	+45
$\sum$	277	271	−6	3999	5145	+1146
M	15.4	15.1		222.2	285.8	
SD	6.19	6.36		127.8	176.19	