An Exploratory Study of E-mail Application on FL Writing Performance

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This study focused on examining the overall effect of using email on the improvement of writing performance in aspects of syntactic complexity, grammatical accuracy and lexical density, as well as investigating the relation between the number of email exchanges and writing performance. Subjects in this study were 40 non-traditional EFL students enrolled in an intermediate reading class at a university in Taiwan. By applying qualitative and quantitative research methods, the major finding demonstrates that students made improvements on syntactic complexity and grammatical accuracy. An increase in lexical density, however, was not observed in this study. Another finding suggests that exchanging email messages with their peers at least four times might have a greater overall improvement on their writing performance. Findings from students’ self-reports reveal that the email approach was a positive strategy that helped improve students’ foreign language learning and attitudes towards English. Instructional implications for designing an effective email task to enhance foreign language writing development and attitudes are also presented.

Introduction

With the rapid development of technologies, computers have been playing an increasingly important role in foreign language learning and teaching in recent years (Kupelian, 2001; Warschauer & Healey, 1998). Generally speaking, computer-mediated communication (CMC) demonstrates a number of features in the enhancement of foreign/second language learning, such as more language functions (Wang, 1998), greater levels of participation (González-Bueno, 1998), and more motivation and interest (Skinner & Austin, 1999). Among the various forms of CMC in language

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teaching, electronic mail (email) has been so far the most popular and useful tool for foreign language teaching and learning (Chaffee-Sorace, 1999; Levy, 1997). Hoffman (1994) maintained the efficiency of email, which provides immediate feedback and allows students to discuss and communicate directly and cheaply with key pals around the world. In other words, email may replace less communicative situations with more genuine and immediate interactions involving real people (Beauvois, 1994; Hackett, 1996; Silvia, Meagher, Valenzuela, & Crenshaw, 1996; Wang, 1998).

The studies mentioned above have analysed the functions and the content/context of written language produced via email, and coincided in judging these features as beneficial. They also suggested incorporating email into foreign language classrooms. However, research regarding the applicability of email writing within the EFL context in Taiwan is scarce (Liaw, 1998; Li, 2000). The present study, therefore, investigated the efficacy of integrating the email approach with respect to the improvement of the students’ writing performance. More specifically, this study examined the effects of email application on non-traditional students’ learning outcomes in Taiwan. Non-traditional students in Taiwan are older and have more social and working experiences than traditional students. They also have undergone different learning processes; therefore, it is essential to use various teaching strategies to arouse their learning motivation and literacy performance (Liang & Lai, 2003). It is assumed that non-traditional students have positive learning attitudes towards online collaborative learning, since most of them have jobs during the daytime; it is almost impossible for them to have face-to-face discussions on subject matters after classes in the late evening. It was also hypothesised that the non-traditional students might significantly enhance their writing performance if assisted by learning email because there was not enough time for in-class discussions to get peer feedback. It is expected that the research results can help educators and classroom teachers to better understand the impact of the email application on the non-traditional students’ learning effect, and to plan more effectively their classroom practices.

In developing and implementing email tasks, a number of questions have to be addressed: How should FL teachers make best use of new online opportunities to maximise language learning while also helping students to develop computer-based communication and writing skills? What strategies for communicating and networking should students be taught? What kinds of online projects could be collaboratively carried out to accomplish the expected results? How could teachers encourage non-traditional students to use online communication and present their ideas effectively beyond the confinements of the class? To address these questions, the use of electronic mail in second/foreign language classrooms regarding the types of email exchanges is discussed.

**Literature Review**

**Synchronous Communication**

Computer-mediated communication (CMC) exploring the feature of synchronous communication is one of the most discussed topics in foreign language instruction
(Liu, Moore, Graham, & Lee, 2003; Warschauer & Healey, 1998). Synchronous communication is a tool that allows users “to have real-time written conversations and was originally developed to teach English composition and literature to native speakers of English” (Liu et al., 2003, p. 253). Its usage has been expanded to second language instruction. According to Liu et al., this type of CMC has become important in part because it enables students to have meaningful and authentic conversations with others in the target language; it can also save the language output, so students can reflect on what they or others say. Thus, learners have an opportunity to monitor their own language production and learn from others’ language usage.

Asynchronous Communication

Another form of CMC, asynchronous email exchange, has been described as “magnifying the power and immediacy of the written word and as such represents authentic communication with a delay which allows students time to think and compose a message” (Kupelian, 2001, p. 1). According to Kupelian, this delay reduces anxiety that students may otherwise feel if using other forms of communication, such as face-to-face encounters or conversations by telephone. Hoffman (1996), too, stated that the “anonymous quality of network communication can be face-saving as well, relieving learners of the inhibitions associated with face-to-face communication and allowing them to express themselves more freely” (p. 55). Cononelos and Oliva (1993) reported that employing email to connect students in an Italian class with native speakers helped to facilitate discussions on cultural issues. Asynchronous discussions via email can enhance communicative language skills, which could result in the fruitful exchange of ideas (Hellebrandt, 1999; Shetzer & Warschauer, 2000). The recent literature seems to be exploring how access to authentic materials and real people can cultivate social relationships within or across classrooms, resulting in collaborative, meaningful human interactions created in cyberspace (Liu et al., 2003).

Positive Effects of Asynchronous Email Exchange

Apart from the advantage reducing student anxiety, numerous studies have demonstrated that email is the most useful tool employed in class to improve students’ writing skills over and above their listening, speaking, and reading skills. Leppanen and Kalaja (1995) conducted a study in which students’ peer feedback to their written work given via email was compared with a tutor’s feedback given with pen on paper. Results showed that students gave each other a great deal of feedback of different kinds and demonstrated a great sense of responsibility. In a collaborative learning environment, students generated more comments on each other’s writing than the tutor could provide. Sotillo (1997) used email for native speakers to provide corrective feedback to ESL students on their writing. Results revealed that ESL students benefited from different types of corrective feedback offered by native
speakers, and some proficient ESL learners even incorporated more than 70% of the native speakers’ corrective feedback into their revised written work.

Despite the effective use of email for corrective feedback, a systematic investigation on the impact of electronic media on FL writing regarding linguistic characteristics is scarce. Among the few empirical endeavors, Li (2000) examined the linguistic characteristics of 132 emails of ESL students in tasks that differed in terms of purpose, audience interaction, and task structure. Statistical results showed that in email tasks involving audience interaction, students tended to produce syntactically and lexically more complex texts. However, an interesting trade-off effect was observed between the linguistic complexity and grammatical accuracy in the students’ email writing. González-Bueno and Pérez (2000) conducted an experiment that observed the effects of dialogue journaling through electronic mail on the language produced by learners of Spanish as a second language, and compared them with the paper-and-pencil version. The authors analysed statistically the quality (i.e., grammatical accuracy and appropriate use of vocabulary) and quantity (i.e., language productivity) of the discourse generated via both the electronic and the traditional (i.e., paper-and-pencil) medium. It was found that the electronic version of dialogue journals had a significantly positive effect on the amount of words generated by the students. However, it did not seem to pose any significant advantage over the paper-and-pencil version with regard to lexical and grammatical accuracy. Warschauer’s (1995) study compared face-to-face discussions and electronic discussions and found that students used language which was lexically and syntactically more formal and complex in electronic discussions than they were in face-to-face discussions, thus demonstrating another possible advantage of computer-mediated communication. However, opposite results were found by Kern’s (1995) study which showed that students produced a higher proportion of simple sentences than complex ones during the InterChange session.

Though there has not been convincing experimental evidence on the use of computer technology to improve language skills in all areas, the majority of the studies indicate positive attitudes of students toward technology use (Beauvois, 1994; Liu et al., 2003; Warschauer, 1996). For instance, Ritter (1993) reported that 92% of the students preferred learning new vocabulary using a computer-based program because they considered it fun. Furthermore, students’ anxiety levels were reported to be lower when they used the technology; when their anxiety levels were lowered, students became more active participants in the learning process. According to Liu et al. (2003), “positive affective states (i.e., enjoyment, anxiety) can provide additional incentive for students to learn. A positive emotional state could help increase student enthusiasm for a subject matter” (p. 263). Communication via email allows students more freedom of expression (Beauvois, 1994). According to Kroonenberg (1995), an additional benefit of the online discussion is that students who were usually timid about participating in class became more active participants. Since students usually generated more content electronically than with traditional pen-and-pencil methods, shy students often tended to express their opinions more openly without fear. This can give students self-confidence and eventually improve their writing ability (Belisle, 2002).
Negative Effects of Email Application

However, working with email is not without problems. Students participating in Oliva and Pollastrani’s (1995) study expressed a preference for face-to-face classroom discussions over working at computers. Jor and Mak (1994) described two email projects involving university students from Hong Kong and other countries, pointing out that without a firm commitment and well-planned activities, the use of email was likely to be unsuccessful. Another issue which appears to threaten the success of email in the FL classroom is the problem of peers’ non-response (Kupelian, 2001). Non-response may have a profound negative effect on students’ motivation to participate in the email activity.

Purpose of Study

Access to email applications offers a number of advantages to enhance language learning, such as encouraging L2 writing development through increased engagement, confidence and responsibility (Strasma & Foster, 1992); providing more writing practice (DiMatteo, 1991); receiving immediate feedback from the teacher outside the classroom (Wang, 1998); creating an authentic purpose and audience for writing (Silvia et al., 1996); increasing motivational benefits (Van Handle & Corl, 1998), and producing a greater amount of words as well as of student-initiated interactions (González-Bueno, 1998). Though the beneficial aspects of email for FL learning are apparent, it is important to look into the linguistic characteristics of students’ email writing, and examine the relation between the number of email exchanges and the students’ writing performance, so as to effectively integrate such an approach into the EFL curriculum. To produce empirical support on this issue, this study investigated the effect of email activities within the reading and writing curriculum on students who studied English as a foreign language (EFL). In particular, this study focused on examining the non-traditional learners’ overall effect of using email on the improvement of linguistic characteristics of their writing performance in the aspects of syntactic complexity, grammatical accuracy and lexical density. It also investigated the differences between the number of email exchanges and the students’ writing performance. To elicit the non-traditional students’ affective reactions to the email approach, a semi-standardised questionnaire from the students’ personal feedback was surveyed. The following research questions were specifically addressed in this study:

1. What are the overall effects for non-traditional students of using electronic mail on the improvement of syntactic complexity, grammatical accuracy and lexical density?
2. Is there a significant difference between the number of email exchanges and writing performance?
3. What are the non-traditional students’ attitudes toward email exchanges in EFL writing?
By assessing the value of email collaborative learning, it is expected that positive attitudes and effects of using email to enhance the non-traditional students’ writing performance can be observed. Such a network-mediated collaborative EFL learning environment can also provide English educators with innovative ways to enhance the non-traditional students’ reading and writing abilities, typing skills, related computer knowledge, as well as learning motivation.

Methodology

Subjects

Subjects in this study were 40 non-traditional freshmen enrolled in an intermediate reading class at a university in Taiwan. The subjects included 19 males and 21 females ranging from 23- to 50-years-of-age, with a mean age of 32. A pre-research questionnaire was administered during the first week of the class to gather information about the subjects’ backgrounds. Results from the questionnaire showed that 83% of the subjects had jobs during the daytime and all of them had experienced formal instruction in English for an average of 6.4 years by the time they enrolled at the university. In their self-assessment, 40% of the subjects ranked their reading ability in English as fair, writing ability in English as fair (43%) and their typing ability as good (30%). Sixty-five per cent of the subjects reported having used word processing previously, and most of them (75%) had used email for personal communication purposes. Eighty-six per cent of the subjects stated that it was their first experience of joining an electronic discussion for formal, academic purposes. Overall, apart from a very few exceptions, this group of subjects had a basic level of computer skills and knowledge, so requiring them to write via email did not cause any problems.

Learning Contexts

A process-oriented reading instruction was implemented in a reading course at the institution where the present study was conducted. The class met three hours a week in the evening as the partial fulfillment of the requirement for the BA degree. The primary purpose of this course was to enhance reading abilities by introducing a variety of reading skills such as getting main ideas, understanding the context and its structure, understanding details, making inferences, etc, needed to succeed in their academic studies and in their jobs. In the class, the subjects had to read texts (Kim & Hartmann, 1996) containing various topics, such as education, city life, business, jobs, lifestyles around the world, global trade, medicine, language and communication, etc. Subsequently, the subjects were encouraged to share their ideas through discussions in class. However, some students, especially the shy and lower-proficiency ones, did not have equal opportunities to express their opinions due to the limitation of time and courage, nor did they dare to ask their teacher if they understood the text correctly. To facilitate a sharing process outside the class and help less able students increase the amount of comprehension and communication
with other students, the subjects were told to participate in the email project as part of the course requirement; they were informed that the specific goal of the activity was to provide an avenue for them to gain greater comprehension of various reading materials via peer electronic communication by a writing task.

Procedure

In this study, the efficacy of email application was evaluated on the basis of the pre- and post-writing tasks. First, a class mailing list was set up in the first week. Subjects had to choose a peer to whom they would summarise and post their opinions and comments in writing on the articles assigned by the instructor, who was also the researcher. Second, subjects were required to individually read the assigned articles without any formal instruction in advance; then they had to write down two paragraphs as summaries including personal comments before and after writing them. The purpose of this was to assess the subjects’ reading comprehension for the assigned articles by summarising the reading materials in written form. The original plan of the study was to assign three different articles to the subjects. However, after completing the first task with an article on “Global trade”, most subjects complained to the instructor that they did not have sufficient time to join the email project since most of them had jobs during the daytime. As a result, only one task had been completed.

After completing the writing task outside class, they sent it to their peers via email, so the subjects could read each other’s writing online and exchange their views on better understanding and grammar at the same time. All peer interactions, from discussing the article to writing the last draft and anything between, was done electronically. Finally, subjects were requested to hand in their writing tasks including copies of all their correspondences to the instructor electronically at least one day ahead of the next class meeting. Subjects were not only graded on the last product, but also on the process of writing and how well they followed the instructions.

Measurement Instruments and Data Analyses

To evaluate syntactic complexity, grammatical accuracy, and lexical density, various measures were carried out in the following based on Li’s (2000) study to compare the differences of the subjects’ writing performance after doing the email task.

Syntactic complexity measures. Wordsmith Tools (Scott, 1996), a computerised text analysis program, was used to perform a complexity analysis. Wordsmith Tools is an integrated package of text analysis programs designed to examine how words behave in texts. In the present study, one of the major programs of Wordsmith Tools was used—i.e., Concord. The Concord program was used to search for number of total words, of subordinate and coordinate clauses, of number of subordinate and coordinate clauses per 1,000 words, of the overall sentence complexity, and of the vocabulary complexity.
Grammatical accuracy measures. For the analysis of grammatical accuracy, the computerised text analysis program, Grammatik of Word Perfect 10.0 was used. This program does not only indicate grammatical errors, but also improper usage related to style and mechanics, e.g., colloquialism, capitalisation, number style, spelling, punctuation errors, etc. In this study, the number of grammatical errors and Flesch–Kincaid grade level were considered and calculated.

Lexical density measures. Another computerised program of Wordsmith Tools, Wordlist, was employed. Wordlist was used for the lexical analysis in terms of lexical density because this program provides statistics of type/token ratio.

Survey. A semi-standardised survey (see Appendix) consisting of five major questions was used based on González-Bueno and Pérez's (2000) design to request participants’ perceptions on the effectiveness of, and attitudes toward, the email approach. Using an open-ended follow-up format, subjects were asked about the following:

- What aspects of the email approach interested them.
- Whether the email approach helped them with their English writing.
- Whether their attitudes toward English improved.
- When they usually wrote their assignment.
- Where they usually wrote their assignment.

The percentage was calculated by the technique of frequency.

Results

Quantitative Analysis

Given the focus of the study on writing performance with the three linguistic characteristics, the general approach to the quantitative analysis was to perform a $t$-test technique for each variable to compare the mean differences between the original text (before doing the email task) and the final text (after doing the email task). Research Question 1—on the overall effect of using electronic mail on the improvement of syntactic complexity, grammatical accuracy, and lexical density—yielded the following results:

(a) With regard to syntactic complexity, only the sentence complexity indicated a significant difference at the 0.05 level ($F(-2.494) = .017$). As shown in Table 1, however, the mean scores for the final text were all higher than those of the original text in the aspects of: number of total words, number of subordinate and coordinate clauses, number of subordinate and coordinate clauses per 1,000 words, and vocabulary complexity.

(b) With regard to grammatical accuracy (regarding the number of grammatical errors), the differences between the original and final texts were not statistically
significant. Nevertheless, it is important to mention that subjects made fewer grammatical errors in the final text (mean = 55.83) than in the original text (mean = 59.68), and the Flesch–Kincaid grade level of the final text (mean = 9.29) was higher than that of the original text (mean = 8.80).

(c) With regard to lexical density, no significant differences were found between the texts in the means of type/token ratios. As indicated in Table 1, analysis of the descriptive statistics showed that the type/token ratio of the original text (mean = 52.84) was higher than that of the final text (mean = 51.49). Such findings demonstrated a decrease in using richer vocabulary after doing the email task.

To assess the effect of the email approach on the writing performance in the above-mentioned aspects, the overall results indicated that the only statistically significant difference was for the variable of sentence complexity. Nevertheless, the mean scores of all the variables on syntactic complexity and grammatical accuracy for the final text were higher than those for the original text, except for that on lexical density. In other words, there is a predicted tendency to show that the subjects improved their writing in the aspects of syntactic complexity and grammatical accuracy after doing the email task.

Research Question 2 inquired on the impact of, and difference between, the number of email exchanges and their writing performance. It was hypothesised that high frequency in exchanging the email assignment for corrective feedback positively influenced the performance in English writing. Because the three linguistic characteristics of writing performance (i.e., syntactic complexity, grammatical accuracy and lexical density) were measured by different numbers of variables, it
did not seem appropriate to include all variables in the statistical test. As a result, variables of sentence complexity, the number of grammatical errors and the type/token ratio were chosen to represent the three characteristics of writing performance. Due to the small number of subjects exchanging email messages for more than four times (see Table 2), this study only considered the writing performance of those subjects who fell within the one-to-four time range of email exchanges.

The descriptive statistics regarding the mean scores of the original- and final-text are shown in Table 3. The results indicated that for those subjects who exchanged email messages only once, the mean difference of each variable for both

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<tr>
<th>Table 2. Frequency of email exchanges</th>
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<tr>
<td><strong>Number of email exchanges</strong></td>
</tr>
<tr>
<td>1</td>
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<td>2</td>
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<td>3</td>
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<td>4</td>
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<td>5</td>
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<td>6</td>
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<td>9</td>
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<td>10</td>
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<table>
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<tr>
<th>Table 3. Results of the descriptive data and t-test analysis on email exchanges</th>
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<tbody>
<tr>
<td><strong>Number of email exchanges</strong></td>
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<tr>
<td>--------------------------------</td>
</tr>
<tr>
<td><strong>Once:</strong></td>
</tr>
<tr>
<td>Sentence complexity</td>
</tr>
<tr>
<td>Grammatical errors</td>
</tr>
<tr>
<td>Type/token ratio</td>
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<tr>
<td><strong>Twice:</strong></td>
</tr>
<tr>
<td>Sentence complexity</td>
</tr>
<tr>
<td>Grammatical errors</td>
</tr>
<tr>
<td>Type/token ratio</td>
</tr>
<tr>
<td><strong>Three times:</strong></td>
</tr>
<tr>
<td>Sentence complexity</td>
</tr>
<tr>
<td>Grammatical errors</td>
</tr>
<tr>
<td>Type/token ratio</td>
</tr>
<tr>
<td><strong>Four times:</strong></td>
</tr>
<tr>
<td>Sentence complexity</td>
</tr>
<tr>
<td>Grammatical errors</td>
</tr>
<tr>
<td>Type/token ratio</td>
</tr>
</tbody>
</table>

*Note: *Significant at $p < .05.$
measurements were not significant at the 0.05 probability level. However, the final text showed a greater improvement on the variables of the number of grammatical errors and the type/token ratio than the original text.

For those subjects who exchanged email messages twice, the results indicated that a significant difference was found on the variable of sentence complexity \( F(-2.398) = .032, p < .05 \). However, the improvement decreased on the variables of the number of grammatical errors and type/token ratio. With regard to three email exchanges, the improvement for the variable of sentence complexity was not significant. It is interesting to note that as subjects increased syntactic complexity, they tended to decrease grammatical accuracy and lexical density, and vice versa.

With regard to four email exchanges, it is obvious that the subjects had a greater overall improvement for each variable, whereas no significant differences were found among them. The result suggested that exchanging email messages with their peer at least four times might have a greater overall improvement on their writing performance in the aspects of syntactic complexity, grammatical accuracy, and lexical density. Such result broadly supported the hypothesis; that is, the more times the subjects exchanged their email writing task for their peer’s feedback and corrections, the better the writing performance they may have.

**Qualitative Analysis**

To elicit the subjects’ perceptions of the impact of email exchanges on their writing performance, a short semi-standardised questionnaire with five survey questions (see Appendix) was used. The questionnaire results are presented in Table 4. With regard to the aspects of interest for the email approach, the answers yielded a great variety. Most subjects considered that by doing the email task, they had more practice in writing (41.7%), more social interaction and communication with their peers (47.2%), more vocabulary to learn (41.7%), and more self-monitoring (55.6%). One participant stated: “Since I can discuss; receive feedback; learn grammar and vocabulary; and get more information from my peer, I consider this way of learning more fun and authentic”.

However, 13.9% disliked the email activity because they felt such a task took too much time since most of them had jobs in the daytime. Poor typing skills, unfamiliarity with the computer, and non-availability of computers were other complaints.

In response to Survey Question 2 “Has the method of email dialogue journaling helped you with your English writing?”, 40% and 42.5%, respectively, of the subjects answered “a little” and “yes”. Most subjects stated that since they could respond and write in the target language with real people, such email task provided them with an opportunity to monitor their own language production and learn from others’ language usage. Only 5% of the subjects stated “no”. Some claimed that they could not accept their peers’ criticism because they did not regard them as qualified enough to point out errors or suggest corrections. A few of them were concerned that their corrections reflected their inability to express themselves well in the English language.
With regard to the Survey Question 3 “Has your attitude toward English improved?” the majority (60%) of the subjects indicated that their attitudes have improved. They also pushed themselves harder to read the texts earlier, which also improved their reading comprehension. Just 2.5% of the subjects answered that their attitudes worsened. One stated: “My peer’s English is poor, so I can’t get useful feedback because I don’t trust my peer’s suggestions; it will negatively influence my writing.”

Besides, some subjects complained that when exchanging information with each other, it really took too much time to get the peer’s latest messages, or even receive no message at all. Therefore, they claimed that such assignments should be done by handwriting instead of computer email writing since the end-result would be the

### Table 4. Frequency of perceptions on email approach

<table>
<thead>
<tr>
<th>aspect of interesting (multiple-choices):</th>
<th>Frequency (N)</th>
<th>Per cent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>More practices</td>
<td>15</td>
<td>41.7</td>
</tr>
<tr>
<td>Communication</td>
<td>17</td>
<td>47.2</td>
</tr>
<tr>
<td>Peer correction</td>
<td>9</td>
<td>25.0</td>
</tr>
<tr>
<td>Fun</td>
<td>5</td>
<td>13.9</td>
</tr>
<tr>
<td>More knowledge/learning</td>
<td>8</td>
<td>22.2</td>
</tr>
<tr>
<td>Low anxiety</td>
<td>5</td>
<td>13.9</td>
</tr>
<tr>
<td>New/more vocabulary</td>
<td>15</td>
<td>41.7</td>
</tr>
<tr>
<td>More/correct grammar</td>
<td>10</td>
<td>27.8</td>
</tr>
<tr>
<td>Self-monitoring</td>
<td>20</td>
<td>55.6</td>
</tr>
<tr>
<td>Spelling</td>
<td>12</td>
<td>33.3</td>
</tr>
<tr>
<td>Technology/Computer skills</td>
<td>5</td>
<td>13.9</td>
</tr>
<tr>
<td>More complex sentences</td>
<td>8</td>
<td>22.2</td>
</tr>
<tr>
<td>Others</td>
<td>5</td>
<td>13.9</td>
</tr>
</tbody>
</table>

**Help with English writing:**

<table>
<thead>
<tr>
<th>help with English writing:</th>
<th>Frequency (N)</th>
<th>Per cent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>2</td>
<td>5.0</td>
</tr>
<tr>
<td>A little</td>
<td>16</td>
<td>40.0</td>
</tr>
<tr>
<td>Yes</td>
<td>17</td>
<td>42.5</td>
</tr>
<tr>
<td>Very much</td>
<td>1</td>
<td>2.5</td>
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**Attitudes toward English:**

<table>
<thead>
<tr>
<th>Attitudes toward English:</th>
<th>Frequency (N)</th>
<th>Per cent (%)</th>
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<tbody>
<tr>
<td>Improved</td>
<td>24</td>
<td>60.0</td>
</tr>
<tr>
<td>The same</td>
<td>11</td>
<td>27.5</td>
</tr>
<tr>
<td>Worsened</td>
<td>1</td>
<td>2.5</td>
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**Time of writing assignment:**

<table>
<thead>
<tr>
<th>Time of writing assignment:</th>
<th>Frequency (N)</th>
<th>Per cent (%)</th>
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<tbody>
<tr>
<td>In the evening</td>
<td>13</td>
<td>32.5</td>
</tr>
<tr>
<td>On weekdays</td>
<td>9</td>
<td>22.5</td>
</tr>
<tr>
<td>On weekends</td>
<td>14</td>
<td>35.0</td>
</tr>
</tbody>
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**Place of writing assignment:**

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<thead>
<tr>
<th>Place of writing assignment:</th>
<th>Frequency (N)</th>
<th>Per cent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>On campus</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>At home</td>
<td>27</td>
<td>67.5</td>
</tr>
<tr>
<td>At work</td>
<td>9</td>
<td>22.5</td>
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same. One participant stated: “Since I spend too much time in waiting for my peer’s returned messages and learning how to use computers, I wonder whether I can get the same effect without doing the email project”.

With regard to Survey Question 4 “When did you usually write your assignment?”, 32.5% of the subjects replied “in the evening”, 22.5% “on weekdays” and 35% “on weekends”. With regard to Survey Question 5 “Where did you usually write your assignment?”, 67.5% of the subjects answered “at home”, 22.5% “at work” and 0% “on campus”.

Discussion

This study focuses on examining the non-traditional EFL students’ overall effect of using an electronic medium for the improvement of some linguistic characteristics of their writing performance. It also investigates the differences between the number of email exchanges and the writing performance, and the students’ affective reactions to the email approach. The evidence provided by the study can answer the original research questions.

Research Question 1: What is the overall effect of using electronic mail on the improvement of syntactic complexity, grammatical accuracy, and lexical density?

The overall findings indicate that students made improvements on syntactic complexity and grammatical accuracy, and a significant difference was particularly found in sentence complexity. These improvements were brought about by the communicative and corrective nature of the email activity. However, an increase in lexical density (the type/token ratio) was not observed in this study. It seems that interaction with peers helps the students to generate a more syntactically complex and grammatically accurate written language but, at the same time, the lexical density suffers. It is interesting to note that a reduction in lexical density in the study occurred because students ventured to use more corrective feedback on complicated sentence structures and grammatical accuracy; at the same time, they decreased monitoring while using a richer vocabulary. Such findings do not gain support from the previous researches which found that while interaction with a peer seems to lead to more complex sentence structures and richer vocabulary, there is, however, a higher frequency of grammatical errors in the texts (González-Bueno, 1998; Li, 2000).

Research Question 2: Is there a significant difference between the number of email exchanges and writing performance?

With regard to the peer communication via email only once, students showed a slightly greater improvement in both grammatical accuracy and lexical density. It is assumed that for many students, time pressure was a major reason that they paid less attention to the syntactic complexity of their writing. With more opportunities in correcting each other’s email messages, students might venture to use more
complicated grammatical structures. It is interesting to note that as students paid more attention to syntactic complexity, they tended to decrease grammatical accuracy and lexical density, and vice versa. It is suggested that exchanging the email messages with their partners at least four times has a greater overall improvement on their writing performance.

Research Question 3: What are the non-traditional students’ attitudes toward email exchanges in English writing?

It is important to mention the students’ perceptions of the email approach which may help to assess its worth. Most non-traditional students reported that they enjoyed the email activity because it provided more practices in writing, communication, and facilitated vocabulary learning, self-monitoring, etc.

With regard to the second and third survey questions, the majority (82.5%) of the subjects believed that their English writing has improved with this experiment. In spite of the quantitative analysis showing that lexical density did not improve, some students felt that they further developed their writing skills in terms of vocabulary. Most subjects maintained positive attitudes toward the email application; some students pointed out that since they could discuss, receive feedback, learn grammar and vocabulary, and get more information from their peers, they had more fun in foreign language learning. However, few subjects kept negative attitudes about participating in the email activity. The major reason is that they did not have sufficient time to do the task after class; instead, they preferred face-to-face discussions and did the peer corrections in class.

It is also important to mention that most subjects wrote their assignment on weekends and in the evenings. It seems that they did not have much time to do this task due to their jobs. Sixty-eight per cent of the subjects typed their assignment at home; no one did it on campus, a circumstance indicating that the email approach did allow students to initiate communication with each other beyond the confines of the class (Warschauer, 1997).

Conclusion

This study demonstrates that the nature of the email application may promote written accuracy and sentence complexity, but not necessarily lexical density. Even though the research results do not support the previous hypothesis favoring the use of email task on the improvement of lexical density, most students believe that it is a positive strategy that helps improve their foreign language learning and attitudes toward English, as reflected by the positive responses to the survey. Although few students wonder whether the effect would be the same without doing the email approach, according to the research results, students should communicate with their peers for corrective feedback at least four times to reach an overall greater effect on their writing performance. If students correct their peers’ assignment in class under time pressure, we may assume that they cannot concentrate very well in providing
suggestive feedback within a limited amount of time; as a result, no significant effect of the pen-and-paper medium could be expected. Since most non-traditional students in Taiwan have jobs during daytime, the application of electronic mail in EFL writing is indeed a useful tool to facilitate discussions beyond the confines of the classroom.

In sum, the analyses conducted here reveal that the electronic medium can enhance the linguistic characteristics of syntactic complexity and grammatical accuracy. Many students reported that they also improved their computer skills properly, and enjoyed learning by peer teaching in a low-anxiety environment, which made learning fun and authentic. Even though we cannot provide an accurate picture of EFL writing enhancement via electronic application, it is important to stress that integrating electronic media into the EFL classroom is an innovation to open up, rather than narrow down, non-traditional students’ options in the traditional language learning classroom. Such new electronic communicative activities can modify the traditional classroom activities and enrich the EFL learning experience in a more authentic way.

**Limitations**

Although the findings of the study are largely positive, several limitations should be noted here. First, the subjects of this study were 40 non-traditional EFL students who had jobs during daytime. The findings are limited to subjects with a profile similar to those participating in this email project. In interpreting the results, we should also bear in mind that the subjects’ previous academic backgrounds and ages were varied, which might have affected their writing performance. Second, since the subjects only worked on one task, the limited time and writing assignment for doing the email project was probably not enough to allow for significant improvement. Third, findings of the study reveal that exchanging email messages with their partners at least four times might have a greater overall improvement on the students’ writing performance; however, it is hard to assess whether or not non-electronic writing can also improve in this way with further revisions and feedback. To obtain a more complete picture of the effect of electronic mail on FL writing performance, a control group (paper-and-pencil group) and an experimental group (electronic group) should be designed properly to analyse their performance differences. In future research, it is suggested that the experiment with two groups should be carried out involving more than one task. Consideration of individual learner differences such as attitude, gender, previous academic background, and how such variables may affect the use of email approach could lead to a future research in foreign language classes.

**Instructional Implications**

At present, the focus is not on whether to accept computer technology. Rather, research is now centered on how to integrate technology more effectively into the learning and teaching of languages in order to enhance EFL learning (Liu et al.,
2003). To enhance students’ participation and positive experience of using CMC in their EFL learning, minority students’ perceptions cannot be ignored. First of all, students complain that some peers’ English is too poor to give any comments, so most students may not have the confidence in trusting the suggestions of peers. Although it is not wise to generalise from a one-shot study, its results may give a direction for teachers who would like to use electronic correction in FL writing classes. That is, if most students feel such practice is not useful, its use should be reduced. Instead, corrections by teachers should be considered appropriate for frequent use in class.

As to the problem of non- or late responses, it is easy to see that this may have a profound effect in decreasing students’ motivation to participate in this kind of activity. What appears to be crucial is teacher attitudes as much as the attitudes of students. Teachers should insist on the importance of integrating such an email approach into the ongoing coursework as a requirement of completing the assignment. In addition, teachers should also be responsible for monitoring the students’ performance on the tasks and ensuring that the tasks are completed in a way that their objectives and goals are met, resulting in the fruitful exchange of ideas by asynchronous discussion. Besides, teachers and students should work collaboratively to look at the problems and successes that arise as they try to implement their own goals related to technology-enhanced learning and teaching.

The analyses conducted in this study are by all means exploratory. It is hoped that the research results can help classroom teachers better understand the impact of the email application in EFL learning and more effectively plan their classroom practices.

References


**Appendix**

This is the survey to evaluate your attitudes toward email exchanges in English writing.

1. What aspects of the method of email dialogue journaling interested you? (Can be multiple choices)
   - More practices
   - Communication
   - Peer correction
   - Fun
   - More knowledge/learning
   - Low anxiety
   - New/more vocabulary
   - More/correct grammar
   - Self-monitoring
   - Spelling
   - Technology
   - More complex Sentences
   - Others ___________________

2. Has the method of email dialogue journaling helped you with your English writing?
   - No
   - A little
   - Yes
   - Very much
   Why/why not? ______________________________________________________

3. Has your attitudes toward English improved?
   - Improved
   - The same
   - Worsened
   Why/why not? ______________________________________________________

4. When did you usually write your assignment?
   - In the evening
   - On weekdays
   - On weekends
   Why? _______________________________________________________________

5. Where did you usually write your assignment?
   - On campus
   - At home
   - At work
   Why? _______________________________________________________________