Interactional Analysis in On/Off-blended Learning for a Pre-Service English Education Course Using FIAC

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On/Off-blended learning becomes readily accessible as more on-line contents are introduced into the classroom learning. This study investigates the effects on classroom (on-class) interactions by comparing different conditions of blended learning: blended learning (on-class plus on-line with or without computer-mediated communication (CMC)) and on-class only. To do this, the study first looks into literature discussing increasing interactions: on-line contents condition, on-class grouping condition and CMC. A pre-service English education content site satisfying the conditional profile for increased interaction is provided to experimental groups of students along with CMC. The experiment was conducted in double cycles of treatment (on-class plus) and non-treatment (on-class only), and analyzed types of on-class interaction using Flanders Interaction Analysis Categories (FIAC). The findings in the comparison of blended learning (on-class plus on-line with or without CMC) and on-class only learning are: direct influence, content-related talk in particular in teacher talk is significantly reduced, initiation in students’ talk is greatly increased, and non-task-related behavior is significantly reduced.

I. INTRODUCTION

Lately English learning context has increasingly been mediated by technology which enables people to be networked beyond the physical constraints of time and space. Also, technology-supported materials for language learning are abundant in and beyond language classrooms. For example, English textbooks are accompanied by a set of teacher’s and students’ CD-ROM containing multimedia resources authenticating text book dialogues and activities by introducing native speaker’s pronunciation and interactional situations visually. Also these materials are being updated via their on-line companion sites. This technological mediation of language instruction requires a close look at both how technology can support classroom learning and how classroom learning can support the
on-line self-directed learning.

On/Off-blended learning contents become increasingly important as both on-line contents and technology enhanced classrooms are available for teachers and learners to integrate into their learning. Three phases of awareness development have been shown in the technology-based English learning (Kim, 2002, 2003): The first phase was that English learning using ICT (Information and Communications Technology) occurred in such a way that ICT was used to support off-line on-class English learning. The second phase was that web-based self-directed learning sites became widely available to support on-line off-class English learning. The third phase moves toward the integration of on/off-line contents to support both on-class and off-class English learning. It is time to consider both on/off-line conditions and on/off-class conditions for a successful on/off-blended English learning. One step further, successful learning contents must contain elements and components to promote on/off-line interactions and on/off-class interactions in English.

The purpose of this study is to explore a successful blending combination of on/off-line contents in a technology-based EFL context. To this end, the paper will cover properties of on-line contents to foster on-class interaction and the roles of Computer Mediated Communication (CMC) to enrich on-class interaction. In what follows, the study will look into previous studies describing interactions across different types of contents and draw characteristics of contents that enhance inter-personal interaction. It will also look at CMC studies and describe the roles in influencing on-class interaction. Based on the discussions in the literature, an experiment is designed in double non-treatment (on-class only) and treatment (blending of on-class and on-line with or without CMC) cycle to explore how these differences create their respective influence on on-class interactions.

II. LITERATURE REVIEW

Interaction in English is the means and ends of teaching and learning English. Promoting interaction is an essential process of teaching any language for communication. In second language acquisition the focus has been gradually shifted from communicative language teaching to interaction (Long, 1981; Long & Porter, 1985; Chaudron, 1983). The functional interests of ‘communication for’ in language learning have extended over to ‘communication with’ and dynamic interactions of communication participants. Active involvements in meaning negotiation assist in making language input more comprehensible, and thus enrich the intake due to the increase of negotiated comprehensible quality language input.

The parallel studies in motherese (Wells et al., 1979), teacherese (Gaies, 1979; Henzl, 1979) and foreigner-talk (Ferguson, 1971; Long, 1981; Arthur, 1980) show that these languages are characterized by a lower mean length of utterance, various kinds of syntactic...
simplification, modifications in the pronunciation of certain sounds, voice pitch and intonation, a high frequency of certain language functions and also frequent use of topic incorporation devices such as repetitions and expansions compared to the languages spoken among native speakers. These properties of motherese, teacherese and foreigner-talk are the outcome of adaptive processes through meaning negotiation between mother and child, teacher and students, native speaker and foreigner rather than a part of the people’s linguistic competence prescriptively fine-tuned (Krashen, 1981). Ellis (1988) suggests that one of the main contributions of the Bristol Language Development Study has been to recast the study of motherese in a more interactive framework using an adaptation of Halliday’s (1980) model of discourse. Another resurfacing study is in the language related episode analysis where learners talk about their own languages they produced to exchange feedbacks and correct their languages (Swain & Lapkin, 2001).

One well-known traditional classroom interaction study is found in Fillmore (1982). She has conducted a longitudinal study of 60 children in four different composition of English-speaking children (ESC) plus non-English-speaking children (NESC) mix in open organization, ESC plus NESC mix in teacher-directed organization, a high proportion of NESC in open organization and a high proportion of NESC in teacher-directed organization. She reported that teacher-directed organization worked successfully with a high proportion of NESC but open organization failed, and conversely open organization succeeded with ESC plus NESC mix but teacher-directed organization failed.

In a technology-mediated classroom there are more variants to these rather simplified classroom interactions such as technological proficiency, software contents and activity in addition to traditional grouping factors such as language proficiency, teacher-centered vs student-centered, accuracy/fluency focus, sizes and types of group. Also, technology extends communication over the physical boundaries of traditional classrooms and enables students to engage in macro-level peer interaction in addition to the traditional micro-level classroom peer interaction. The presumption of person-to-person in the very definition of interaction in classroom studies cannot be sustained as software becomes intelligent in providing tailored feedback and dynamically linked follow-up materials to users.

In a technology-mediated context the interaction between users and contents is also important and the investigation on such will provide an important basis for contents design. Also, technology can mediate to enforce English-only-communication in peer interaction over chatting and bulletin board activities which is very problematic to do it in off-line activities.

In this section, the properties of successful conditions for successful blended learning are discussed in the areas of contents types for on-class use, types of CMC and their effects in English learning, and off-line, on-class grouping when a technology-mediated contents are introduced into the class.
1. Contents and Activities

The content properties of successful blended learning are problem-based, open-ended and cooperative. Language learning software contents can be differentiated by the following elements: contents, function and activities. Contents can be looked into from different aspects such as technological orientation, but for our purpose, they will be classified into instructional, story-based and problem-based contents according to their pedagogic orientation. Function of language learning contents can be understood as linguistic genre it deals with such as transactional and expressive language. This won’t be included in our discussion due to the lack of studies related to this issue despite its importance in contents design area. Classification of activities follows the traditional classification: cooperative, individualistic and competitive.

Choi (2002) reported that differences in types of contents and activities played important roles in children’s interaction. She used a story-based software (individualistic), phonics software (competitive) and problem-based software (cooperative), and designed a study of children’s working with computer in pairs on the given software activities. Her findings are: quantity of talk over three types of software is not of significance, but the problem-solving software records the highest number of words per turn followed by the story-based software. The repetition of the same language is the highest with the phonics software followed by the story-based software. This reveals that problem-based/cooperative contents promote quality verbal interaction more than instructional/competitive contents.

The findings are consistent with Young (1988) in that open-ended programs engage users more in negotiating the outcome of the activity and thus encourage them to interact actively.

The findings are also consistent with Johnson and Johnson (1990) in which they reviewed over 300 studies conducted over the past 90 years that compared learner performance in cooperative, individualistic, and competitive learning situations. Johnson and Johnson concluded that generally achievement was higher in cooperative situations than in competitive or individualistic ones, and that cooperative efforts resulted in more frequent use of higher-level reasoning strategies, more frequent process gain, and higher performance on subsequent tests taken individually (group-to-individual transfer) than did competitive or individualistic efforts.

2. Computer-mediated Communication (CMC)

The CMC properties of successful blended learning are to make multiple modes of communication available. Also, they have to be closely connected with the on-class tasks
students are doing. The development of technology is surprisingly fast particularly in the area of communication. Computer becomes increasingly important in functioning as a medium of person-to-person communication. CMC is usually divided into being synchronous (both parties log on at the same time) and asynchronous (two parties don’t have to log on at the same time): written chatting, voice chatting, e-conferencing (synchronous CMCs); written email, voice email, user group, group mailing, written bulletin board system (BBS), voice BBS (asynchronous CMCs).

These communication tools can be regrouped according to their main interaction types in Paulson (1995): one-on-one interaction (email, chatting), one-to-many interaction (BBS, user group, mailing list) and many-to-many interaction (e-conferencing). Though they become increasingly verbal, most CMC tools are still based on written communication. So are many CMC studies concerning the improvement of written skills of English via written interaction among the users. However, a few studies (Han, 2002, 2003; Kim, 2003) investigated the effects of CMC as oral communication tools. Han (2002) investigated on the differences of linguistic complexities of the interactional output between via written BBS and via voice BBS. She analyzed the interactional output in terms of complexity measured by a number of words and T-unit, number of words per T-unit and complexity of clauses. No significant differences were found due to the nature of BBS being asynchronous in that both voice and written BBS provide students with ample opportunities to rehearse and correct their messages for their linguistic errors before their click to post.

Han (2003) concerned about the comparison of synchronous and asynchronous interaction and another comparison of oral English and written English in chatting. She found that users tend to speak shorter utterances usually less than 10 words in one turn, hardly any complex clauses, frequent occurrences of incomplete and/or ungrammatical sentences and active interaction in synchronous activities compared to asynchronous activities. Also, she suggested that voice interaction in case of synchronous mode shows frequent pauses, repetition, hesitating and discourse fillers to process information as commonly witnessed in regular face-to-face interaction.

Kim (2003) conducted an experiment for two groups for one group of elementary and one group of secondary school English speakers interacting with English teachers overseas using voice email system. The results show that the proficiency in terms of volume of T-unit, word count and content word analysis has increased substantially, and the accuracy of participants’ language in terms of pronunciation, grammar and vocabulary has gained significant improvement with some exception of middle school student group on grammar. The English grammar of middle school students has shown more errors than at the beginning, and this, however, cannot be regarded as a degradation of their grammar after the experiment. It’s more likely caused by the fact that their utterances become longer and
complex later in the experiment than before.

Other studies are also found in the area of technology-mediated classroom interactions. Bump (1990) found that the use of LAN with computer-assisted class discussion (CACD) software promoted cooperation among students and between students and the teacher, decentralized the instructor’s role, and thus increased students’ participation. The study also found that the use of CACD enhanced the context of honest communication, and improved student’s thinking skills and creativity. Kern (1995) found that students had more turns, produced more sentences, and used more varied discourse functions when they were in an interchange session. Chun (1998) also mentioned that the written competence gained from CACD could gradually be transferred to the students’ speaking competence as well.

3. Grouping

The grouping property of successful blended learning is not homogeneous grouping, but heterogeneous grouping where cooperative on-class tasks are more easily done. Also, this will make peer learning supportive via CMC. A fair amount of attention has been given to the issue of grouping to increase learner’s interaction. Webb (1984a), Yueh and Alessi (1988) and Kagan (1986) cite cooperative grouping as beneficial to learning. In cooperative grouping, students work in small groups on tasks that are structured so that all students share in the responsibility for completing the task. Cooperative grouping provides multiple opportunities for students to engage in active practice of language and content. To make a cooperative grouping, grouping needs to be small and heterogeneous. There are several ways to group students heterogeneously, and teachers will want to employ different methods depending on the activity. For example, it may be essential for a particular activity that fluent readers be evenly distributed, while other activities might require a balanced distribution of students with artistic abilities. When the technology is mediated in the EFL classroom, the technological skill should be added to the existing criteria for cooperative grouping. Gender is also found to play an interesting role in technology-mediated activities.

Working in small groups allows students to interact with each other with or without computers. Hawkins et al. (1982) showed that the students tended to interact more about their work and did so in a cooperative way when they were working with the computer than when they were doing other classroom activities. Gender-related studies in cooperative small grouping are found in Lockheed and Hall (1976) and Webb (1984b). While females and males in same-gender groups are equally involved in the interaction process, especially in task-related interactions, males tend to dominate the interaction process in mixed-gender groups. Webb (1984b) found that in mixed-gender groups the female and male students had considerably different experiences in regard to specific
categories of interaction.

Lee (1995) conducted an experiment of small groups doing cooperative computer-based problem-solving task. Four gender-stratified small groups (same gender, majority-female, equal distribution, majority-male) were asked to make group decisions during the course of their actions in solving a set of problems that was video-taped. She recorded interactions in small groups: task-related interaction and procedure-related interaction. In case of task-related interaction the male students were active in giving task-related helps in equal-ratio and majority male groups, and female students were more likely to give helps in the same gender and majority female groups. Female students were a lot more interactive in asking questions and receiving helps from their group members in all groups except majority-male groups. In case of procedure-related interaction the male students were more likely to receive procedure-related helps from their group members in majority-female or majority-male groups, but the opposite pattern emerged for same-gender and equal-ratio groups. There were no statistically significant differences of giving procedure-related helps between males and females.

Kim and Kwon (2004) were to determine the most effective method of forming small heterogeneous groups for middle school English classes using information and communication technology (ICT). Two experimental classes composed of 73 middle school 2nd graders were given task-based English learning activities using ICT for 12 weeks. Throughout the 12-week period, two types of grouping models were applied to the students: small groups based on the equal distribution of English proficiency and small groups based on the balanced distribution of ICT skill standard for student (ISSS). The study discovered the small group based on the ISSS showed significantly better interactional results in the affective, cognitive and information-using areas. The ISSS could be used as an additional criterion in forming small groups for technology-mediated English classrooms.

III. METHOD

Theoretical conditions for successful on/off-line blended learning are drawn in the three conditions: cooperative open-ended learning condition, CMC condition using both synchronous and asynchronous tools, and on-class heterogeneous grouping condition according to technological skills. The literature review indicates that injecting contents and CMC tools satisfying these three conditions will enhance the inter-personal interaction for related on-class behavior and their task-related behaviors.
1. Sites and Subjects

The study selected one such on-line site satisfying the profile drawn from the literature review: open-ended contents assisting small group cooperation. The site was originally developed to facilitate the communication between trainers and trainees consisting of elementary school English teachers, and among trainees themselves who went through the six months intensive training course in K University. The final month of the program included that trainees spent one month at an American university getting the language and content training.

With cooperative works between teachers and trainees, the site has grown into a mass of training contents using various cooperative open-ended tasks useful to the future elementary school English teachers. The site consisted of theoretical orientation, do-it-together with teachers and do-it-together in a small group for each topic item. The site contains listening, speaking, reading and writing, and teaching methodology, second language development, language assessment and teaching English using technology.

For example, an excerpt from Community Language Learning (CLL) was stated as follows:

…typical CLL activities or items: the conversation circle, transcription, the human computer, card games and the reflection session are examined in relation to security. As was mentioned earlier, in a conversation circle, the form of the circle itself provides security. It enhances the sense of community and also facilitates conversation. Learners in the first stage have only to listen to and repeat what the counselor says. They are free from their stress about not knowing what to say in the target language. This activity allows learners to talk about whatever they want to by saying it first in their own language and then repeating after the counselor in the target language. In other words, learners create their own materials. Therefore, this activity makes learners feel not only belonging but also responsibility. Thus, anxiety is reduced and motivation to speak the target language is stimulated…

This reading will be followed by two or three discussion topics, and when CMC is available, students are encouraged to post any questions or interesting discussions.

For computer-mediated communication, the study designated a bulletin board system including synchronous chatting room for on-line off-class communication. At the beginning of the experimental period for CMC it was announced to the students that they would use the site for off-class communication and sharing ideas. The site was access-limited only to those who were taking the course and belonged to the experimental period using CMC.
2. Design and Hypotheses

The study was designed to observe what differences in teacher and students interaction were made in on-class learning tasks (1) between on-class only and on-class plus on-line; (2) between on-class only and on-class plus on-line with CMC. Subjects were two sophomore classes of K university in Chungbuk: Class A consisted of 40 students (32 female, 8 male) and class B of 42 students (37 female, 5 male). Students were taking theory of elementary English education as a part of their course work. The training contents explained above were used for on-line contents. Both synchronous (chatting) and asynchronous (BBS) communication was used for CMC activities.

The experimental design was no treatment/treatment/no treatment/re-treatment to find out what sort of changes the students undergo in varying conditions.

Period A: Off-line/On-class (G) where (G) refers to an experimental group.
Students watch and learn teacher’s lecture plus practice teaching on the day’s topic (learn with teacher), and prepare for cooperative group teaching about the topic (learn from peers). They make a group presentation about the teaching topic (teach in groups).

Period B: On-line contents/On-class (G)
Students read on-line contents of teaching topic and related materials posted on the site. For on-class, they go through the same cycle of learn with teacher, learn from peers and teach in groups.

Period C: Off-line/On-class (G)
Same as Period A.

Period D: On-line contents and CMC/On-class (G)
In addition to activities in Period B, students engage in CMC feedbacks for the teaching topic and report them back to the class.

This design was taken to eliminate extraneous variables such as inter-group difference and teacher difference. More importantly, it was to find out the cause and effect relationship between treatment and the consequences, and also whether or not the modified learning behavior would be sustained even after the learning conditions went back to the original condition.

Three hours a week for three weeks were allocated for each period and a total of 12 weeks was spent in the experiment. The last class was video-taped on the last week of each period and analyzed by two trained observers using the scheme to be explained in table 1.
The treatment cycle was differentiated for two classes to eliminate the sequence variant as follows:

Class A: Period A-Period B-Period C-Period D
Class B: Period D-Period C-Period B-Period A

As noted, the experimental sequence for Class A is no treatment, treatment, no treatment and re-treatment; and for Class B is treatment, no treatment, re-treatment and no treatment. This design is purely to eliminate the treatment sequence variant. Thus, independent t-test will be performed against the results of two groups to confirm whether or not the sequence variant plays a part in the experiment.

Using FIAC (table 1) to compare the consequences for the above mentioned experimental variants, the following two hypotheses for each major category in FIAC were drawn for the study:

Teacher Talk
(1) Period D (on-line, off-class (CMC), on-class) will show more indirect influence in the teacher talk than Period B (on-line on-class).
(2) Period B (on-line on-class) will show more indirect influence in the teacher talk than Period A or C (on-class only).

Students’ Talk
(1) Period D (on-line, off-class (CMC), on-class) will show more students’ initiation in the class than Period B (on-line on-class).
(2) Period B (on-line on-class) will show more students’ initiation in the class than Period A or C (on-class only).

Silent Behavior
(1) Period D (on-line, off-class (CMC), on-class) will show more task-related behaviors in the class than Period B (on-line on-class).
(2) Period B (on-line on-class) will show more task-related behaviors in the class than Period A or C (on-class only).

3. Data Analysis Tool

Task analysis and interaction analysis were done using Flanders Interaction Analysis Categories (FIAC). The FIAC consists of 10 categories of communication that are further divided into three major categories: teacher talk, student talk, and silence or confusion. The
teacher talk is composed of seven categories that are classified as either direct or indirect. The students’ talk consists of two categories: Responding and Initiating. The silence behavior consists of a single category of silence or confusion. The categories are modified to find out whether a teacher or students speak in English (e) or Korean (k), whether a teacher or students talk or behaves as a whole class (w), a group (g), or an individual (i). Two added features provide information on the code switching between the target language and the mother tongue and lesson configurations. This idea is relevant to Allwright (1988)’s criticism on the original FIAC. He points out that there are two missing gaps in the system in relation to language teaching. They are: (a) whether a response that occurred in student talk was given by an individual or by a group, and (b) whether teacher talk or student talk occurred in the target language or the individual’s mother tongue.

The last category ‘Silence or confusion’ is divided into two subcategories: task-oriented silence and non-task-oriented silence. Nonverbal gestures were not taken into account in the original form of the FIAC because Flanders believed that the verbal communication were consistent with nonverbal interaction. In language classroom, however, nonverbal gestures are considered as one significant part of classroom communication, particularly, in TPR setting. Silence in the interaction during which a piece of audio-visual equipment, e.g., a tape recorder, CD-rom, etc, is being used to communicate, also should be taken into account.

**TABLE 1**
Flanders Interaction Analysis Categories (FIAC)

<table>
<thead>
<tr>
<th>Teacher Talk</th>
<th>1 e/k w/g/i Accepting feelings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Accepting and clarifying the feeling tone of students in a non-threatening manner. Feelings may be positive or negative. Predicting or recalling feelings are included.</td>
</tr>
<tr>
<td>Indirect Influence</td>
<td>2 e/k w/g/i Praising or encouraging</td>
</tr>
<tr>
<td></td>
<td>Praising or encouraging student action or behavior. Jokes that release tension, but not at the expense of another individual; nodding head, saying &quot;um hum?&quot; or “go on” are included.</td>
</tr>
<tr>
<td></td>
<td>3 e/k w/g/i Accepting or using ideas of students</td>
</tr>
<tr>
<td></td>
<td>Clarifying, building, or developing ideas suggested by a student. As more of the teacher’s own ideas come into play, shift to Category 5.</td>
</tr>
<tr>
<td></td>
<td>4 e/k w/g/i Asking questions</td>
</tr>
<tr>
<td></td>
<td>Asking a question about content or procedure with the intent that a student answers.</td>
</tr>
<tr>
<td>Direct Influence</td>
<td>5 e/k w/g/i Content-related talk</td>
</tr>
<tr>
<td></td>
<td>Giving information, facts, opinions about content; expressing the teacher’s own ideas, explaining content in detail</td>
</tr>
<tr>
<td></td>
<td>6 e/k w/g/i Procedural talk</td>
</tr>
<tr>
<td></td>
<td>Giving directions, commands, or orders relevant to procedure</td>
</tr>
</tbody>
</table>
7 e/k w/g/i Disciplinary talk
Making statements intended to change student behavior from unacceptable to acceptable pattern; asking students to pay attention, telling them not to make a noise.

8 e/k w/g/i Responding
Talk by students in response to teacher. Teacher initiates the contact or solicits students’ statement. Students give a response to the teacher’s question, usually a predictable answer.

9 e/k w/g/i Initiating
Talk by students, which they initiate. Student initiates a response that is unpredictable or creative in content.

0 t/n Silence
Task-oriented silence: Silence for listening to a tape, reading or writing something, and nonverbal gestures for task-related communication.
Non-task-oriented silence: silence out of context and silence indicating students’ thoughts wondering away from their tasks in hands.

* e: English  k: Korean  w: whole class  g: group  i: individual  t: task-oriented silence  n: non-task-oriented silence

4. Data Collection

The final class of each cycle was video-taped and segmented into three second interval according to the convention recommend in FIAC. The interactions on the video tape are analyzed by two trained experts, and their frequencies for each category are tabulated onto the categories. The FIAC records made by two observers were discussed with the researcher when there’s a disagreement in allocating certain classroom behavior to a category. The frequency was translated into percentage for each smaller interaction category as shown in table 3.

IV. RESULTS AND DISCUSSION

The on-class teaching interaction showed that teacher used English for the entire experimental period. Students used English most of the time in their group presentations, but occasionally some students used Korean for individual questions. The teacher talk was dominantly directed to the whole group but students’ talk was dominantly directed to their group or a group member.

To find out influence of sequence variant, the observed frequency was divided by the number of participants and transformed into value of mean, and the t-value of two differing sequence groups was compared for its statistical significance. The results in sequence variants were not significantly different as shown in Table 2.
### TABLE 2
**Comparison of Differing Sequence Group**

<table>
<thead>
<tr>
<th>Categories</th>
<th>Period</th>
<th>Class A (n=40)</th>
<th>Class B (n=42)</th>
<th>t-value</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Teacher Talk</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indirect Influence</td>
<td>A</td>
<td>0.52</td>
<td>0.61</td>
<td>-0.25</td>
<td>0.18</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>1.84</td>
<td>2.04</td>
<td>-0.43</td>
<td>0.14</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>0.61</td>
<td>0.52</td>
<td>0.26</td>
<td>0.19</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>1.91</td>
<td>1.79</td>
<td>0.42</td>
<td>0.14</td>
</tr>
<tr>
<td>Direct Influence</td>
<td>A</td>
<td>1.80</td>
<td>1.78</td>
<td>0.34</td>
<td>0.23</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>1.20</td>
<td>1.11</td>
<td>0.42</td>
<td>0.13</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>1.61</td>
<td>1.87</td>
<td>-0.18</td>
<td>0.20</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>1.01</td>
<td>1.36</td>
<td>-0.21</td>
<td>0.11</td>
</tr>
<tr>
<td><strong>Student Talk</strong></td>
<td>A</td>
<td>0.32</td>
<td>0.44</td>
<td>-0.18</td>
<td>0.19</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>0.66</td>
<td>0.62</td>
<td>0.08</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>0.48</td>
<td>0.43</td>
<td>0.06</td>
<td>0.11</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>0.79</td>
<td>0.56</td>
<td>0.17</td>
<td>0.18</td>
</tr>
<tr>
<td><strong>Silent Behavior</strong></td>
<td>A</td>
<td>1.49</td>
<td>1.79</td>
<td>-0.17</td>
<td>0.13</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>1.55</td>
<td>1.51</td>
<td>0.23</td>
<td>0.17</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>1.61</td>
<td>1.32</td>
<td>0.14</td>
<td>0.14</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>1.64</td>
<td>1.43</td>
<td>0.15</td>
<td>0.09</td>
</tr>
</tbody>
</table>

Table 2 shows that there’s no significant statistical difference caused by differing sequential application, and thus the reversed application for class B will be added to the frequency of class A for each period and each category. The total result gained from two classes of each period for each category will be used for the result and discussion (Table 3).

### TABLE 3
**Percentage of Period and Category**

<table>
<thead>
<tr>
<th>Categories</th>
<th>Period A</th>
<th>Percentage for each period</th>
<th>Period B</th>
<th>Percentage for each period</th>
<th>Period C</th>
<th>Percentage for each period</th>
<th>Period D</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Teacher Talk</strong></td>
<td></td>
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1. Teacher Talk

Teacher indirect influence is the sum of 1-4 categories divided by the sum of the whole teacher talk and transformed into percentage. They are 28.69% for period A, 39.36% for period B, 30.12 for period C and 44.27% for period D. The result shows that periods A and C are in their proximity, and periods B and D are together, and yet period D is close to 5% higher than period B. Hypothesis (1) is upheld to be true.

The 5% difference between period B and period D was caused by the combination of small factors as slight increase of category 2, praising and encouraging, and category 3, accepting or using ideas of students, and slight further decrease of category 5 and category 6, procedural talk. CMC was instrumental for students to formulate ideas and collaborate finishing the product, and thus their products invoked more instances of teacher’s praising student’s CMC comments and questions, and expanding teacher talk from student’s responses. Also, the same line of tendency created less direct talk in categories 5 and 6 as students are able to provide complete group products and understand the procedure of task better by participating in CMC activities.

At first glance, it appears to satisfy the predictions made in hypothesis (2) as well, such case as category 3 accepting or using students’ ideas being higher in period B than periods A and C. However, looking at the data more carefully, the different percentage figures in indirect teacher talk ratio were not caused mainly by the increase of indirect influence. It was rather caused mostly by the reduction of direct influence in the teacher talk particularly a sharp decrease in category 5, content-related talk. Thus, hypothesis (2) in teacher talk need to be modified in such a way that “more indirect influence” should be rephrased as “less direct influence.”

It was sometimes found in periods A and C that teacher explained new concepts and methods to the whole class in such a way of giving information, facts, opinions or expressing the teacher’s own ideas to elaborate. This sometimes continued for 15 minutes straight without any interference of any other type of teacher talk. However, such a case was never found in periods B and D, and instead students often initiated their talk among the group members as exemplified below:

(referring to the on-line CLL contents)
Student A: CLL is not possible in Korean classroom.
Student B: I think CLL agrees to the objectives of elementary English education.
Student C: Emotionally maybe. In method, translation is not a good way to teach English.
……
This interaction clearly shows that discussion related to the on-line contents among the
small group members is a lot more thought out than without on-line contents reading. Students ask questions more frequently to the teacher individually when they had on-line contents than when they had not. This was major differences observed between periods A/C and periods B/D.

2. Students’ Talk

Students’ talk analysis shows that category 8, students’ responding talk, doesn’t show much difference, but category 9, students’ initiating talk, contrasts sharply between non-treatment periods A (3.25%) and C (4.07%) with treatment periods B (18.23%) and D (17.69%). It is noticed that students not taking any initiatives in on-class only period change their verbal interactions dramatically by becoming more aggressive in initiating group talk and asking questions to the teacher and other students. The on-line contents provide a basis to make students feel at ease with doing cooperative work in a group of students. Even if the same cooperative works are given to the students in on-class only sessions, the classroom environments make them feel that cooperative works are pedagogic and thus lead the work become artificial and soliciting the participation. However, the same cooperative work presented on-line facilitates students to become more involved not only among students but also between students and teacher.

It confirmed the prediction on students’ initiation in hypothesis 2. However, period D does not show any more increased students’ initiating talk than period B contrary to the proposition in hypothesis 1. Thus hypothesis (1) in students’ talk failed to be upheld, and hypothesis (2) is found to be true.

The tendency was also noticed that when students’ initiation talk has increased, the ratio between students’ talk and teacher’s talk is generally reduced. This doesn’t mean that teacher talks less for the treatment period since the teacher talk is maintained about the same amount of percentage as in 49.21% for period A (non-treatment), 50.48% for period B (treatment), 50.95% for period C (non-treatment) and 48.34% for period D (treatment). It means that students initiate more talks, and it reduces the ratio between students’ talk and teacher talk in which the detailed figures are 12.65%:49.21% for period A, 28.97%:50.48% for period B, 17.32%:50.95% for period C and 25.97%:48.34% for period D. In simple figure terms, for the non-treatment period the experimental group talks one fourth of teacher talk in period A to one third of teacher talk in period C while for the treatment period the same group talks more than or around half of teacher talk as shown in periods B and D.
3. Silent Behavior

Silent behavior is classified into two categories: task-related and non-task-related. Looking at figures of task-related behavior across different periods, task-related percentages are approximately the same in periods A, B and C with exception of period D. Increased task-related behavior in hypothesis (1) is true in that treatment period D including CMC shows more task-related behavior than treatment period B, but the prediction made in hypothesis (2) are found to be otherwise since the percentage figure in period B is close in proximity with periods A and C. However, if we look at the reduction of non-task related behavior and their proportion between categories 0t and 0n, period B is much higher in task-related behavior (0t) proportionally compared with non-task-related behavior (0n), and period D clearly shows the same higher proportion in task-related behavior than in non-task-related behavior in sharp contrast with periods A and C. Thus, the statements in both hypotheses are better stated with the modification from “increased task-related behavior” to “increased proportion of task-related behavior for the entire silent behavior” in treatment period.

The reasons why non-task-related behaviors are reduced can be found that students in the period of on-line and on-class cooperative work tend to be more focused on the task generating initiating and negotiating the teaching topic along with frequent task-related silent behaviors. Intra-group talk among students and task-related silent behaviors are dramatically improved in parallel during the treatment period in which on-line tasks require focused efforts made cooperatively by the members in the group.

V. CONCLUSION

The interaction studies in technology-mediated EFL context offer important basic principles in designing on-line contents for language learning. They are:

1. The contents must include open-ended problem-solving cooperative tasks.
2. The format of contents to be used in classrooms must contain elements to afford heterogeneous small group activities.
3. The supportive infrastructure for users must incorporate multiple forms of bidirectional communication.

Based on these criteria, a related on-line contents site to the theory and practices of English education was selected and injected to the experiment. When the on-line contents conditions were met, the on-line contents should help promote on-class interaction by
reducing teacher’s direct talk and increasing both students’ initiation and task-related silent behaviors. Also, CMC is also supposed to promote further interaction increase, but the experiment was inconclusive in such a way that it promotes teacher’s indirect influence and task-related silent behaviors, but not students’ talk. It may lead to a different result if CMC modes are more versatile than the current written communication in chatting and BBS.

Bearing these elements in mind, the successful conditions for on/off-line blended learning are factored into contents design, formative design and design of supportive infrastructure (Kim, 2002). The contents design will include the selection of contents (nature of contents, coverage, quantity and quality of language, available resources) and the activities to support the learning of contents (information transfer, identification of problems and information leading to solution, meaning negotiation, information evaluation and development). The formative design is reflected in the organization and presentation scheme of contents: non-sequential open-ended organization, clear task presentation, effective use of multimedia resources and teacher/computer-mediated presentation. The supportive infrastructure for users must include feedback system and user interface: feedback by both programmed software and other students or teacher, and various modes of CMC for peer interaction and students-teacher interaction.

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Applicable levels: secondary and tertiary
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