11. Helping Students Learn in EMI Courses Using Reciprocal Teaching: A Case Study of a Taiwan University

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ABSTRACT
Offering English-medium-instruction (EMI) courses in universities and colleges has gradually become a national policy in Taiwan. However, many students struggle in EMI courses. One possible reason is that Taiwanese students do not have sufficient English competent to understand academic text and academic lecture in English. Reciprocal teaching (RT) has been considered an effective way to increase students’ reading comprehension in many elementary and junior high school language classrooms. Yet, few studies have been done at tertiary level students. Thus, this small-scale pilot study was conducted to examine whether there was an effect of reciprocal teaching on students’ academic performance. A class of 62 students enrolling in Educational Psychology was taught first in a traditional lecturing style (about 2 months) and later in RT (about 2 months). Data will be collected at 4 time periods including 2 in-class quizzes and 2 achievement tests. Results of one-way repeated ANOVA showed that there was a significant difference on students’ test score before and after the intervention. This suggests that the RT technique may help Taiwanese students comprehend academic text and further help them learn in EMI courses.

Keyword: English-medium instruction (EMI), reciprocal teaching, EFL, higher education

Introduction
The trend of globalization is spreading throughout the world, and Taiwan is certainly no exception. In this regard, the Ministry of Education (MOE) in Taiwan has started to encourage universities and colleges to expand the percentage of English Medium Instruction (EMI) lectures to allow students to gain both specialized knowledge and enhanced English ability. In other words, students can learn the main subjects of their academic field while practicing their English (Kim, Son, & Sohn, 2009). While using English as medium of instruction in higher education in Taiwan seems to be a promising plan, the effectiveness of current EMI lectures has been brought into question. There are several important factors related to the successful implementation of EMI classes, including suitable learning materials, appropriately trained instructions, a perceived need for English as a medium of instruction, a threshold level of learner proficiency in the medium language, and a supportive language environment in the larger societal context (Gu, 2004; Hu, 2002).

My personal experience with EMI has not been satisfying. I have been teaching an EMI course, Educational Psychology, in a teacher-training program for more than 5 years. Every year, my students complain about not being able to understand the course content. “Using Chinese, please!” is a common suggestion I get from the end-of-course feedback of my students. Because students have difficulties understanding the content of the textbook or the lecture in EMI, their performance in quizzes or examinations is usually poor. These difficulties are not limited to students with low English proficiency. Even though English proficiency plays a crucial role in students’ academic achievements in EMI classes, students with high language proficiency can also undergo the same difficulties. This is because academic English is a different genre from daily-used English. Many students may perform well in regular English courses but still suffer greatly in English-only academic courses. Researchers (Li & Munby, 1996; Nambiar, 2005) make it clear that there is a distinction between English for everyday purposes and for academic purposes. Moreover, the ability to read and understand academic text is highly correlated with academic success (Doolittle, et al., 2006; Hart and Speece, 1998; Lewis, 2000; Nakatani, 2005). If students can understand the assigned English reading texts, it will further help them understand English-only lectures.

Unfortunately, many Taiwanese undergraduate students do not acquire good reading strategies to help them comprehend reading texts. Given that the explicit teaching of reading comprehension strategies has been demonstrated to be effective in enhancing learning and performance (Bulter & Winne, 1995; Hattie, Briggs, & Purdie, 1996), the question arises, “What comprehension strategies
can be effectively employed in the college classroom?" One answer to this question is reciprocal teaching ("RT"). Therefore, I conducted this action research to evaluate the effect of reciprocal teaching on my students’ academic performance.

Related Literature

Studies about the Effectiveness of Reciprocal Teaching

Many studies have been conducted to test RT’s effectiveness. These studies have included at-risk reader, remedial readers, and good, average, and poor comprehenders, and their ages have ranged from 7 years of age to older adults (e.g., Brown, 1997; Hart & Speece, 1998; Rosenshine & Meister, 1994; Takala, 2007). Hart and Speece (1998), for example, conducted an experimental study to investigate the effects of RT on 50 postsecondary students at risk for academic failure. The RT group performed significantly better than the comparison group on reading comprehension and strategy acquisition. Rahmani and Sada (n.d.) investigated students’ reading comprehension on narrative text through RT technique. Using a classroom action research on 32 sixth graders, they found that students’ reading comprehension on narrative text did improve after the implementation of RT technique, especially in finding the main idea and moral value. Takala (2007) incorporated RT in mainstream and special classes of fourth and sixth graders. The results showed that students’ reading comprehension in both types of classes was promoted by RT. In Allen’s (2003) study, the reciprocal teaching instruction was taught to the students for a period of two weeks prior to the reading activities. Feedback was given to the students on a daily basis. The study found positive changes in the students’ abilities to generate questions, answer questions, and summarize information. Finally, Hashey and Connors (2003) stated that the instructors found improvements in students’ confidence and success, in their recognizing and use of strategies, and in their enjoyment of literature after they employed RT in their classroom. This study concluded, most of the students agreed that reciprocal teaching helps them understand the book more and facilitates their reading comprehension. Although results differ according to the kinds of measures used to evaluate instructional effectiveness, using RT has been found to consistently increase students’ reading comprehension.

Many RT studies have been done in Taiwan. Lin (2005), for example, explored effects of reciprocal teaching of reading comprehension on 4 fourth-grade elementary students in a resource classroom. The results showed that the method of reciprocal teaching could improve reading comprehension of the tested students. The students, moreover, enjoyed the dialogue mode in this teaching mode. Ho and Lee (2003) investigated the effects of reciprocal teaching on 3 fourth-grade elementary at-risk readers. She found that students had better understanding of certain comprehension questions which were challenging to them before she used the reciprocal teaching method. In addition, students’ overall Chinese reading comprehension improved. Additionally, Lin and Chou (2004) used the reciprocal teaching method on 3 junior-high school students with reading difficulties. She compared students’ understanding of narrative and exploratory texts. The results were consistent with previous studies showing that students’ reading comprehension on both types of writings increased.

Studies about Reciprocal Teaching Procedure

According to Slater and Horstman (2002), reciprocal teaching (RT) helps students prevent cognitive failure during reading. Palincsar and Brown (1984) mentioned that reciprocal teaching is an instructional procedure in which students learn to improve their reading comprehension through “scaffolded instruction” of comprehension-fostering and comprehension-monitoring strategies. These strategies are predicting, clarifying, questioning, and summarizing. In the prediction phase of reciprocal teaching, readers combine their own background knowledge with what they have understood from the text. In the questioning phase, readers ask some questions to monitor and assess their understanding of the text. In clarifying phase, the identification and clarification of unclear, difficult, or unfamiliar aspects of a text are discussed. In summarizing phase, the important information, themes, and ideas in the text are integrated into a clear and concise statement that communicates the total meaning of the text (Ghorbani, Gangeraj, & Alavi, 2013).

Some educators and teachers modify their practice of RT in accordance with their teaching contexts. Hacker and Tenent (2002), for example, reported how elementary school teachers modified
the practice of RT while keeping three essential elements of RT—strategy use, dialogue, and scaffolded instruction. Some teachers, in this report, added whole-class discussion due to the low quality of group dialogue. In addition, two strategies, questioning and summarization, are the most observed, but clarifying is often omitted. Prediction was reported by the teachers as an awkward strategy when the students read expository texts. In these cases, the students would often pass over prediction and go directly to questioning. Finally, some teachers had their students write their questions, answers, and summaries. By adding writing as an addition to RT, teachers were able to help students focus on deeper rather than superficial understanding of the text. In Doolittle et al.’s (2006) article, each author, in turn, delineated how he or she used reciprocal teaching in his or her academic classroom in different academic fields, including psychology, history, and literacy, as well as provided some suggestions to put theory into practice. For example, one author, Doolittle, used RT on training students to read scholarly articles. He suggested making explicit connections between the new section of the text and students’ previously learned knowledge (p.109). Another author, Hicks, helped students summarize the historical article by asking some basic questions. Moreover, he provided the source analysis chart to help students move through the RT process (p.110). Finally, Young reported using RT to help students put theory into practice. Specifically speaking, RT was viewed as a process via which students generated meaning of a specific text and made their own connections with the world.

**Significance of the study and research question**

Even though many studies have been conducted and proved that reciprocal teaching is an effective method to improve students’ reading comprehension, most of the studies targeted their participants at elementary or high school students. In addition, studies in Taiwan have concerned the reading outcome in students’ first language, Chinese, rather than in a foreign language such as English. Finally, the majority of the studies have been conducted mainly in language classrooms. The method of RT has hardly been implemented in teaching academic courses in an English-medium environment at the higher education level. The current article focused on the implementation of reciprocal teaching in a higher education setting. The research question addressed to guide the study is:

> Is there a significant difference in students’ academic performance before and after the implementation of the reciprocal teaching technique?

**Method**

**Site, participants, and design**

This study was conducted at a language university in Southern Taiwan. The intervention, RT approach, was implemented in a three-credit academic course, educational psychology. This course is required for all students from the TESOL (Teaching English to Speakers of Other Languages) department. Due to the policies of the department, all courses offered by the department must be taught in English. In addition, this course is offered in the second semester each academic year. In other words, students enrolling in this course have taken at least two English-medium instruction (EMI) courses in the first semester.

Sixty-two (10 male and 52 female) students enrolling this course participated in this study. The mean age of the students was 19.5 years. There were two sections of this course. Before the midterm (week 9), a traditional lecture style was the main teaching method. After the midterm, starting from week 10, the RT approach was implemented. The duration of traditional method was 8 weeks, the same as that of the RT intervention. A total of six chapters were taught in one semester.

The RT approach used in this study was modified based on suggestions from previous studies due to time constraints. The procedure of RT implementation was as follows:

1. **Questioning:** Before starting a new chapter, the instructor intentionally divided one chapter into several sections. For each section, the instructor posed some pre-reading questions (usually 6-10) on the online class-discussion board. Students had to find the answers from the textbook and then write them down before they came into the class. The pre-view questions included the identification of information and ideas that are central and important enough to warrant further consideration (Doolittle et al., 2006, p.107).
These questions served as a summary guideline to lead students into the new chapter.

(2) Summarizing: When students came into the class, they were first asked to share their answers with their group members (4-6 people). When one student shared, other students can add or comment on the answers as needed. As mentioned before, the preview questions were designed as a summary guideline; therefore, this sharing process was viewed as a summarizing process. After the group discussion, the instructor summarized the reading section to make sure that students’ understanding was accurate.

(3) Clarifying: After the whole-class summary, the instructor moved on to identify sections of the text where clarification was needed. The students were free to ask questions to clarify unclear concepts. During the clarifying process, the instructor sometimes would show related videos to make some difficult concepts understandable.

(4) Integrating: Once students understood the reading section, the instructor would integrate the current section of text with the preceding sections or with students’ previous knowledge or daily experiences.

The reciprocal teaching was used again for the following section of the chapter, starting with the instructor posting questions as the first step of the procedure.

Data Collection and Analysis

Students’ academic performance was measured using their 2-time quiz scores and their midterm and final exam scores. Even though the chapters for midterm and final exams were different, the difficulty of the theories was similar based on the instructor’s past experiences.

A one-way repeated measures analysis of variance was conducted to compare scores among students with achievement test at 4 time periods with time 1 and time 2 prior to the intervention and time 3 and time 4 after the intervention. The 2-time attitude questionnaires were computed using the paired t-test.

Results

This case study investigated the effects of RT instruction on a class of 62 students. A one-way repeated ANOVA was implemented for determining significant differences between the students’ academic performance before and after the RT intervention. Two test scores were collected before and after the intervention. Table 1 shows the means and standard deviations of test scores at the four time periods. Students’ test scores at Time 1 and Time 2 were 45 out of 100 points in average. After the intervention of RT, the test scores seemed to increase to 47 at Time 3 and further to 52 at Time 4.

<table>
<thead>
<tr>
<th>Time</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time1</td>
<td>45.45</td>
<td>14.31</td>
</tr>
<tr>
<td>Time2</td>
<td>44.55</td>
<td>15.66</td>
</tr>
<tr>
<td>Time3</td>
<td>46.79</td>
<td>17.10</td>
</tr>
<tr>
<td>Time4</td>
<td>52.19</td>
<td>17.49</td>
</tr>
</tbody>
</table>

A one-way repeated measures analysis of variance was conducted to compare scores among students with achievement test at 4 time periods with time 1 and time 2 prior to intervention and time 3 and time 4 after intervention. Mauchly’s test (Table 2) indicated that the assumption of sphericity had been violated, $x^2(5) = 16.22, p = .006$. 
Mauchly's Test of Sphericity

<table>
<thead>
<tr>
<th>Within Subjects Effect</th>
<th>Mauchly's Approx. Chi-Square df Sig.</th>
<th>Epsilon(a)</th>
<th>Greenhouse-Geisser</th>
<th>Huynh-Feldt</th>
<th>Lower-bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>.76</td>
<td>16.22</td>
<td>5</td>
<td>.006</td>
<td>.848</td>
</tr>
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</table>

Two ways were used to compensate for this assumption violation. The first one is to use multivariate statistics. As seen in Table 3, all 4 multivariate tests suggested to reject the null hypothesis ($p < .05$). This indicated that there was a change in test scores across the 4 different time periods. The second approach was to correct degrees of freedom were using Greenhouse-Geisser estimates of sphericity ($\varepsilon = .85$) (Table 4). The results showed that there was a significant effect of students’ test scores on different periods, $F (2.5, 155.18) = 4.67$, $p = .006$. These results suggested that students’ learning achievement improved significantly from the beginning to the end of the semester.

Bonferroni pairwise comparisons then were used to compare each pair of time points and whether the differences between them were significant. Table 5 showed that there were significant differences between test times between test 1 and test 4 ($p = .004$) and between test 2 and test 4 ($p = .045$). The results suggest that students’ achievement scores significantly increase over time.

Multivariate Tests

<table>
<thead>
<tr>
<th>Effect</th>
<th>Value</th>
<th>$F$</th>
<th>Hypothesis df</th>
<th>Error df</th>
<th>Sig.</th>
<th>Partial Eta Squared</th>
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<td>.18</td>
<td>4.41(a)</td>
<td>3</td>
<td>59</td>
<td>.007</td>
<td>.18</td>
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<tr>
<td>Wilks' Lambda</td>
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<td>4.41(a)</td>
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<tr>
<td>Hotelling's Trace</td>
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<td>3</td>
<td>59</td>
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<td>.18</td>
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<tr>
<td>Roy's Largest Root</td>
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<td>4.41(a)</td>
<td>3</td>
<td>59</td>
<td>.007</td>
<td>.18</td>
</tr>
</tbody>
</table>

a Exact statistic
b Design: Intercept Within Subjects Design: Time

Tests of Within-Subjects Effects

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
<th>Partial Eta Squared</th>
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<td></td>
<td>Greenhouse-Geisser</td>
<td>2181.34</td>
<td>2.54</td>
<td>857.45</td>
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<td></td>
<td>Huynh-Feldt</td>
<td>2181.34</td>
<td>2.66</td>
<td>818.82</td>
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<tr>
<td></td>
<td>Lower-bound</td>
<td>2181.34</td>
<td>1</td>
<td>2181.34</td>
<td>4.662</td>
</tr>
<tr>
<td>Error(TIME)</td>
<td>Sphericity Assumed</td>
<td>28544.42</td>
<td>183</td>
<td>155.98</td>
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<tr>
<td></td>
<td>Greenhouse-Geisser</td>
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<tr>
<td></td>
<td>Lower-bound</td>
<td>28544.42</td>
<td>61</td>
<td>467.94</td>
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</table>
Table 5
Pairwise Comparisons

<table>
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<tr>
<th>(I) TIME</th>
<th>(J) TIME</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.(a)</th>
<th>95% Confidence Interval for Difference(a)</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
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<tr>
<td>1</td>
<td>2</td>
<td>.90</td>
<td>2.21</td>
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<tr>
<td>3</td>
<td>4</td>
<td>-1.34</td>
<td>1.93</td>
<td>1.00</td>
<td>-6.61</td>
<td>3.93</td>
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<tr>
<td>2</td>
<td>1</td>
<td>-6.74(*)</td>
<td>1.86</td>
<td>.004</td>
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<td>3</td>
<td>4</td>
<td>-7.65(*)</td>
<td>2.77</td>
<td>.045</td>
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<tr>
<td>4</td>
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<td>6.74(*)</td>
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<td>2</td>
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<td>-1.02</td>
<td>11.83</td>
<td></td>
</tr>
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</table>

Based on estimated marginal means
* The mean difference is significant at the .05 level.
a Adjustment for multiple comparisons: Bonferroni.

Figure 1 shows the plot of test scores at each time point. The results of the plot also supported the statistic results. The test scores after the intervention of RT increased gradually. The score of Time 4 increase most dramatically.

Fig. 1
Plot of the 4-time test scores.

Discussion and Conclusion

This study investigated the effects of RT intervention on the academic learning outcome of EFL university students. Although the size of the data is small, the results seem to be promising. The results show that after the students learned through RT instruction, their academic performance improved. Even though the students’ scores at Time 3 did not significantly differ from the scores at Time 1 or Time 2, their final scores at Time 4 were significantly higher than those taken before the RT instruction. The finding indicates that students’ academic performance can be effectively promoted through RT instruction, which is in accordant with the findings of previous studies conducted among young learners (Takala, 2007) and in language classrooms (Ho & Lee, 2003; Lin, 2005).
Prior research has shown that RT can be suitable as remediate technique to help learners with reading problems (Marston et al., 1995; Schmidt, Rozendal, & Greenman, 2002; Slater & Horstman, 2002). Although the purpose of this study is also to solve students’ English reading problem, the main innovation of this teacher-inquiry study is that the RT has been carried out as part of normal teaching for undergraduate students in the academic field. Through the four components of RT, students are provided more chances to be exposed to the text content than through a traditional lecture type of instruction. The questioning requires the students to preview the reading text. During the summarizing and clarifying processes, students can check and confirm their understanding through discussing with one another and instructor’s lecture. The students then apply what they have learned to real-life examples or compare new knowledge with their prior knowledge in the integration process. As a result, the students in general revisit the reading texts at least three times before they move on to the next section.

In this modified version of RT, the instructor is the initiator and the facilitator. Because of the time constraints, the students have not been trained to develop these reading strategies and become autonomous learners. More research is needed on students’ academic achievement if they are equipped with these reading strategies as well as on the application of these reading strategies in other academic EMI courses. In addition, only one class of students participated in this study. A comparison group is highly recommended for further investigation.

References


