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The Effects of Sharing Selection, Organization, Association, and Regulation (SOAR) Study Note on Learners' Reading Comprehension and Reading Anxiety

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Abstract

The SOAR study method following the reading steps of selection, organization, association, and regulation is an effective strategy of note-taking based on Mayer's (1996) SOI study strategy following the reading steps of selection, organization, and integration as well as several studies emphasized the act of sharing such structured notes and its effects on English reading comprehension. This study thus investigated the effects of sharing SOAR study notes in a computer-assisted language learning environment on English reading comprehension and English reading anxiety. Thirty-nine Grade 8 students from two classes of a junior high school in Taiwan participated in SOAR note-making activity after reading an English material online. One class with 22 students was randomly assigned to the control group, which was not allowed to share or read their peers' notes after making their notes, and another class with 17 students was assigned to the experimental group, which was permitted to read their peers' notes and revise their own notes after the note-making activity. Analytical results show that the students in the experimental group who shared the notes significantly outperformed those in the control group who did not share their notes in English reading comprehension. Also, students with field-independent cognitive style or with low prior knowledge who shared the notes with their peers made more progress in English reading comprehension than those with field-independent cognitive style or with low prior knowledge who did not share the notes with their peers. In addition, students with field-independent cognitive style who shared the notes with their peers had significantly lower anxiety than those with field-independent cognitive style who did not share any notes. This study confirmed that sharing the SOAR study note provides benefits in promoting EFL learners' reading comprehension and reducing reading anxiety.

Keywords: SOAR Method; Note Sharing; Reading Comprehension; Reading Anxiety; Cognitive Style

1. Introduction

Reading is an important skill to knowledge acquisition, and reading comprehension is to think and respond to what you read (Tierney & Readence, 2005), but it is not an easy task, especially for the learners who study English as a foreign language (EFL). Many studies claimed that effective reading strategies enable EFL students to perform well in reading comprehension (Grabe, 1991; Hatami & Asl, 2017; Kern, 1997; Knight, Padron, & Waxman, 1985; Tierney & Readence, 2005). Good readers can monitor their understanding of the reading text, while making use of different reading strategies such

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as predicting, activating prior knowledge, summarizing during reading, question generating, and clarifying during the reading process (Okkinga et al., 2018). However, most EFL students are not familiar with those reading strategies. Without the instruction of reading strategies, they cannot perform a reading task, catch the main ideas or infer something from the reading material well because they are overtrained in the way of explaining vocabulary, grammar, or sentence patterns to gain the linguistic knowledge of a language.

There are many reading strategies to help EFL students read well, like top-down processing (Goodman, 1970), semantic mapping, ETR (experience, text, relationship) method (Carell, Pharis, & Liberto, 1989) or SOAR (selection, organization, association, and regulation) study method (Kiewra, 2005). In foreign language learning contexts, EFL students who use reading strategies more often can perform better than those without making use of reading strategies (Carell et al., 1989; Devine, 1988). Note-taking is one of the reading strategies for effective reading. Note-taking is a practice of recording information captured from another source. By taking notes, the writer records the essence of the information, freeing their mind from having to recall everything (Makany, Kemp, & Dror, 2009). According to Mahdavi and Azimi (2012), Iranian EFL students who used note-taking outperform those who used underlining strategy or without any strategies in reading comprehensibility. In Yang and Lin's study (2015), online collaborative note-taking strategies have positive effects on EFL students' basic literacy development, which contains reading and writing skills. Based on the benefits of note-taking strategy in reading for EFL students, the present study utilized the SOAR method as a note-taking strategy in a computer-assisted language learning environment to examine its effects on promoting English reading comprehension because it has been confirmed as an effective strategy of note-taking in promoting reading comprehension (Chen, 2017; Kiewra, 2005; Jairam & Kiewra, 2009, 2010).

Furthermore, several previous studies (Faust & Paulson, 1998; Landay, 1999; Miyake & Masukawa, 2000) emphasized the act of sharing notes and its effects on English reading comprehension. These previous research indicated the positive effects of sharing a note on promoting learning performance; however, the research that focused on emphasizing the effects of sharing SOAR study notes on English reading comprehension of EFL students has not been investigated yet, and most of their research subjects were college or graduate students rather than junior high school students. Therefore, the present study studied the effects of sharing SOAR study notes on EFL reading comprehension of junior high school students. Also, reading anxiety has strong relations with reading comprehension performance (Ganschow & Sparks, 1996; Horwitz, Horwitz, & Cope, 1986; Rowe, 1991; Sellers, 2000). Thus, it is a valuable research issue that examines whether EFL students' reading comprehension performance will be affected by reading anxiety caused by sharing SOAR notes.

Moreover, Oxford (1990) argued that language cognitive styles and strategies are the most important factors that influence foreign language learning performance. Because the students frequently made use of reading strategies based on their cognitive styles (Dunkel, 1988), teachers

should take their different cognitive styles into account to design the reading activities to meet their needs. Field-independent individuals are analytic, independent, and socially insensitive and prefer to work alone, while field-dependent individuals tend to be holistic, dependent, and socially aware and are more easily affected by the environment than field-independent individuals (Witkin & Goodenough, 1977). Therefore, this study also confirmed whether SOAR note-sharing is a practical strategy for field-dependent or field-independent cognitive style students in promoting their English reading comprehension performance and lowering reading anxiety. Additionally, several studies (Chen, Chen, & Horng, 2019; Chen, Wang, & Lin, 2019) indicated that computer-supported learning systems generally provide more benefits in terms of promoting learning performance for the learners with low prior knowledge in comparison with the learners with high prior knowledge. Thus, the differences in English reading comprehension and reading anxiety between students with different levels of prior knowledge are also examined in this study. Overall, the purpose of this study is to expand the previous studies' results on the SOAR method which has been proved as an effective reading strategy in promoting reading comprehension to further examine whether sharing the SOAR study notes provides benefits in promoting EFL junior high school learners' reading comprehension performance and decreasing their reading anxiety. That is, this study aims to examine the following research questions:

1. Is there a statistically significant difference between the learners in the experimental group and the control group respectively sharing and not sharing SOAR notes in a computer-assisted language learning environment with their peers to support English reading in reading comprehension and reading anxiety?
2. Is there a statistically significant difference between the learners with different cognitive styles in the experimental group and control group respectively sharing and not sharing SOAR notes with their peers in a computer-assisted language learning environment to support English reading in reading comprehension and reading anxiety?
3. Is there a statistically significant difference between the learners with different prior knowledge in the experimental group and control group respectively sharing and not sharing SOAR notes with their peers in a computer-assisted language learning environment to support English reading in reading comprehension and reading anxiety?

2. Literature Review

2.1 SOAR method used as a note-taking strategy for language learning

There have been several previous studies proving that the SOAR method based on the human information processing theory is an effective reading and note-taking strategy in promoting reading comprehension (Chen, 2017; Jairam & Kiewra, 2009, 2010; Kiewra, 2005). For example, Kiewra (2005) indicated that the SOAR method is an effective strategy of note-taking based on Mayer's (1996) SOI (i.e., selection, organization, and integration) study. The acronym SOAR stands for selection, organization, association, and regulation. Students who use the SOAR method are instructed as follows. First,

they pick up the information in the select stage. Next, they organize the information they selected into the graphic order or matrix frame. Then, they associate the new information internally or externally which can help them put the new information into long-term memory. Finally, they self-test by summarizing or proposing questions to make sure their comprehension. According to Kiewra (2005), the SOAR method can prevent students from using weak or redundant reading strategies, such as highlighting without awareness, organizing information into lists, recopying or rereading. In Jairam and Kiewra's study (2009, 2010), it was found that college students performed better in computer-based reading comprehension when they employed a complete SOAR method than those who only utilized partial SOAR strategy. A recent study by Chen (2017) indicated that utilizing a note-taking strategy with the SOAR method is helpful to pupil's Chinese reading comprehension. This study adopted SOAR as a note-taking strategy due to its excellence in promoting reading comprehension.

2.2 Effects of sharing note-taking on reading comprehension and reading anxiety

According to Faust and Paulson (1998), sharing notes can help learners who have poor note-taking skills promote their reading comprehension. In Landay's study (1999), students can get different perspectives and fill the gap they missed in a class by viewing others' notes through the Notepal system on PDA. Through the Reflective Collaboration Note (ReCoNote) system, students can review others' notes and make linking or annotations between their own notes to others' notes, which are related to their learning subjects (Miyake & Masukawa, 2000). The study pointed out that sharing notes helps the students learn actively and well organize what they learn. Fitton, McIlraith, and Wood (2018) presented a meta-analysis to examine how shared book reading affects the English language and literacy skills of young children learning EFL. Their results revealed an overall significant, positive effect of shared reading on English learners' outcomes. Due to the benefits of note sharing, co-editing system (Kam et al., 2005; O'Neill, 2005), such as Livenote and Slides2wiki, has also a sharing function so that users in the same group can make and share notes, and users also have the right to revise their peers' notes. Furthermore, Miura (2017) implemented a web-based notes sharing system that can immediately update upon students' notes drawing by using streaming digital pens and WebSocket technologies to encourage collaborative learning with peers.

Many studies indicated that reading anxiety can be a predictor of reading comprehension performance (Matsuda & Gobel, 2004; Sellers, 2000). Sellers's study (2000) confirmed that EFL students with low reading anxiety tend to perform much better in reading comprehension than those with high reading anxiety. Moreover, it is a valuable research issue of finding out the way that can achieve the goal of improving EFL students' reading comprehension performance through decreasing reading anxiety. Chen, Wang, Chen, and Wu's study (2016) employed a C4.5 decision tree, a widely used data mining technique, to develop a personalized reading anxiety prediction model (PRAPM) based on individual learners' reading annotation behavior in a collaborative digital reading annotation system (CDRAS) that

could identify the key factors that cause reading anxiety so that instructors can apply reading strategies to effectively reduce reading anxiety of learners while reading English articles for promoting reading performance. Based on the above literature review, this study thus examined whether sharing the SOAR study notes provides benefits in promoting EFL junior high school learners' reading comprehension performance and decreasing their reading anxiety or not.

3. Research Methodology

3.1 Research framework

This study aims to investigate the effects of the learners in the experimental and control groups respectively sharing and not sharing SOAR notes with their peers on English reading comprehension and reading anxiety in a digital reading environment. Additionally, the differences in English reading comprehension and reading anxiety between the learners with different levels of prior knowledge and different cognitive styles in the experimental and control groups respectively sharing and not sharing SOAR notes with their peers were also studied. The research framework of the present study is shown in Figure 1. The independent variable, dependent variables, and background variables are respectively shown in this figure. Based on the scores of the research participants that got from the reading comprehension test before they read the learning material *Bees* chosen from the Programme for International Student Assessment (PISA), the students were categorized as the high prior knowledge group with their scores higher than the average score and the low prior knowledge group with their scores lower than average score. Converting prior knowledge into the categorical variable aims to examine whether there are statistically significant differences between the learners with different prior knowledge in both the groups in reading comprehension and reading anxiety.

3.2 Research design

The quasi-experimental design was used in the present study. Research participants were from two classes at the same junior high school in Northern Taiwan. One class was assigned as

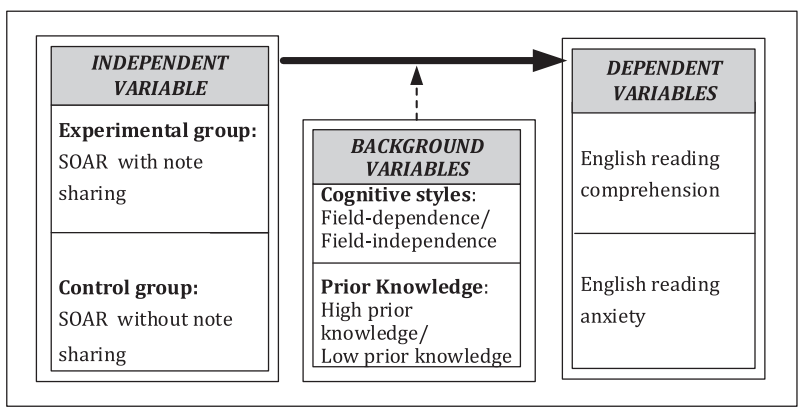

Figure 1. The Research Framework of this Study

the experimental group using SOAR with note sharing while the other one was assigned as the control group using SOAR without note sharing. Both groups learned the SOAR method and made notes of an English article, *Bees*. Students in the experimental group shared notes with their peers and made revisions of their own notes using an online SOAR note-taking system. In the control group, students used the system to make their notes without sharing them with their peers. To avoid that some students in the experimental group copied the answers of their peers due to knowing which one of their peers is good at English, this study directed them that the correct method of sharing SOAR note with their peers should be to refer to some contents from peers as well as reorganized and revised their notes during the note sharing time, not copied their peers' answers to get a better score. An English reading comprehension test corresponding to the learning article was developed by PISA and was administered to both groups before and after the experiment. Besides, a questionnaire survey was also used to investigate students' English reading anxiety after note-taking and sharing activities.

3.3 Research participants

A total of 39 Grade 8 students aged from 13 to 14 were recruited from two classes of a public junior high school in Northern Taiwan, to participate in this study. There were 11 boys and 11 girls in the control group; 10 boys and 7 girls in the experimental group. The research participants had four English courses per week. One class with 17 students was randomly assigned to the experimental group sharing their SOAR study notes with their peers for English reading and the remaining class with 22 students was randomly assigned to the control group not sharing their SOAR study notes with their peers for English reading. They are all native Mandarin speakers as well as had learned English for about 8 years. They had enough English proficiency to understand the articles "Bees" and "Table Manners" chosen from PISA.

As shown in Table 1, 39 research participants were divided into field-dependence (FD) and field-independence (FI) learners based on the Group Embedded Figure Test (GEFT) of the Chinese version adapted by Wu (1987). The learners in both groups were categorized as FD if their GEFT scores are less than the average, whereas the learners were categorized as FI if their GEFT scores are higher or the same as the average. In the present study, there were 9 FI and 8 FD learners in the experimental group; there were 9 FI and 13 FD learners in the control group. As shown in Table 1, 39 research participants were divided into the high prior knowledge group or low prior knowledge group based on the pre-test scores of the English reading comprehension test. The research participants were categorized as the group of high prior knowledge if their pre-test scores are higher than the average; whereas the research participants were categorized as the group of low prior knowledge if their pre-test scores are lower than the average. In the present study, there were 7 learners with high prior knowledge and 10 learners with low prior knowledge in the experimental group; 11 learners with high prior knowledge and 11 learners with low prior knowledge in the control group.

Before the experiment was performed, an independent samples *t*-test was used to analyze

Table 1. The Number of Different Cognitive Styles and Prior Knowledge Learners

Group	Number of learners	FI	FD	High prior knowledge	Low prior knowledge
Experimental group	17	9	8	7	10
Control group	22	9	13	11	11
Total	39	18	21	18	21

the differences of initial English reading ability between the control and experimental groups based on the pre-test score of English reading comprehension. Table 2 shows the results. Analytical results show that there was no significant difference in English reading ability between the experimental and control groups (t = .785, p = .438 > .05). The result confirms that both groups have the same prior knowledge of English reading comprehension.

3.4 Research instruments

3.4.1 SOAR note-taking system in the Moodle system

The note functions in the present study were designed based on the SOAR method (Keiwra, 2005) in the Moodle, which is an open-source and free online learning management system used by many educational institutions. This study used the functions of Wiki provided by Moodle to implement the four steps of the SOAR method note. Learners can use their school ID numbers as the accounts and passwords to log in to the system. The reading text will be displayed on the right side of the screen after clicking on the reading material *Bees*. After entering reading material *Bees*, the four steps of the SOAR method note, that is, select, organize, associate, and regulate, will be displayed on the left side of the screen (Figure 2).

After clicking on "Select," the question of selection of the SOAR method will be illustrated below the reading text. And the students have to press "Create new page" before they answer the question (Figure 3).

The student's answer can be filled in the "Select Wiki" column, and then press the button "Save" to save their answers (Figure 4).

The other steps of the SOAR method note are the same as the steps of "Select". But different from the control group students, the experimental group students will share their notes with their peers after finishing their notes in each step of the SOAR method. The proposed system provides the dropdown list of the school numbers for the experimental group students so that they can read others' notes according to the school numbers after they click on the "View" button (Figure 5).

3.4.2 SOAR method note taking design

According to the reading material *Bees,* the present study designed the SOAR method note-taking framework as follows.

I. Select: In the "Select" stage, students select the main ideas or keywords from the reading material, and then copy and paste what they chose in the column.

II. Organize: In the "Organize" stage, to help the students organize the main ideas or keywords that they pasted in the column, the note-taking

Table 2. Analysis of the Differences in English Reading Ability on the Pre-test Score of English Reading Comprehension

Item of analysis	*N*	*M*	*SD*	*t*	*p* (Two-tailed)
Pre-test					
Experimental group	17	19.47	8.163	.785	.438
Control group	22	17.36	8.432		

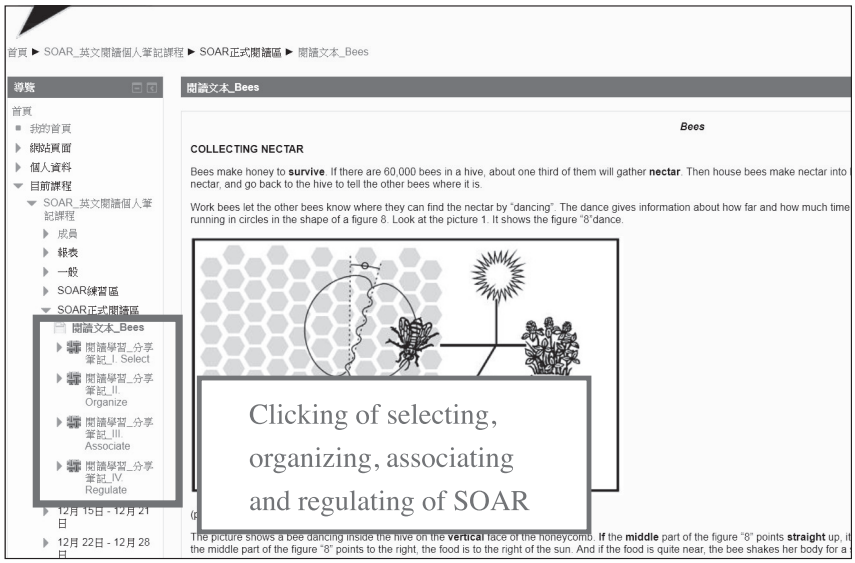

Figure 2. The Page of Linking to Four Steps of SOAR

frameworks were designed as matrices. In the matrices, the students can write down the subtitles and categorize the main points about the subtitles. For example, the students can add the subtitles as "work bees" and "house bees," and categorize the main points into the "work bees" column or "house bees" column.

III. Associate: In the "Associate" stage, to help the students build connections among new information from the reading material *Bees* and associate new ideas with previous knowledge they have already had, the note-taking frameworks were designed into two parts as follows.

In the reading material Bees*, work bees and house bees have different jobs, and they cooperate with each other to make honey. Can you think of other animals or human beings that they also work together with their partners like bees? Please write them down. You can answer in Chinese or English.*

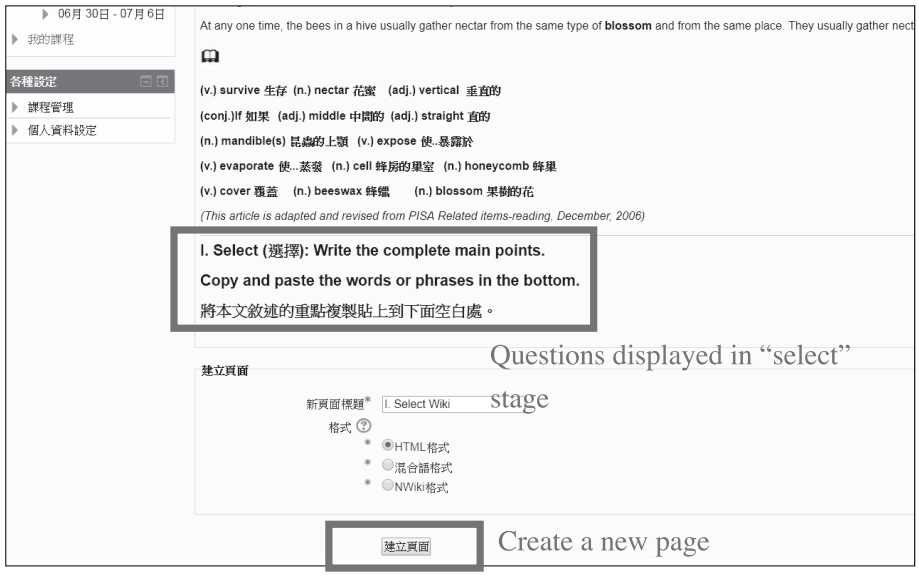

Figure 3. The Page of Entering the Step of "Select"

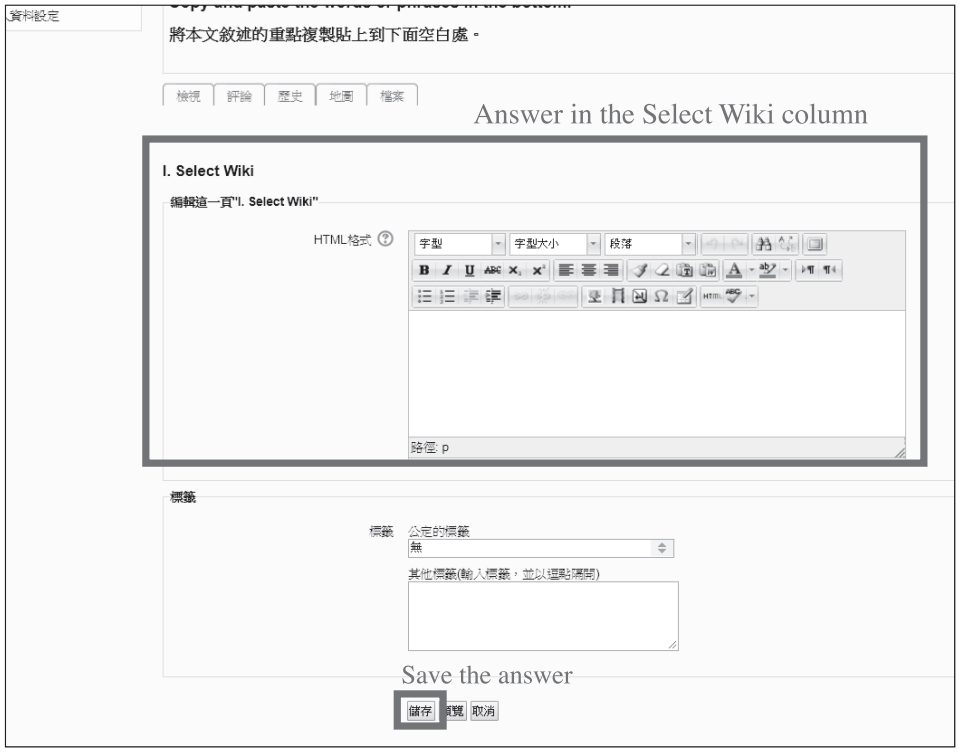

Figure 4. The Page of Answering Column after Creating a New Page

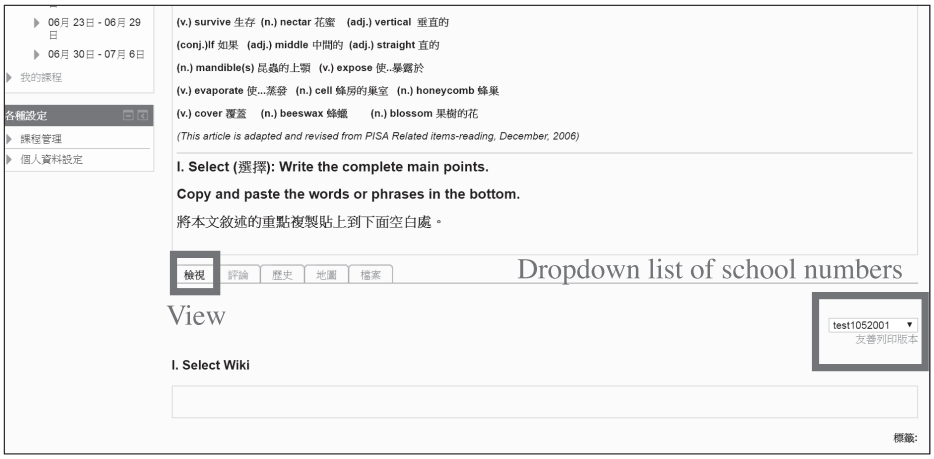

Figure 5. The Page of Dropdown List of School Numbers for Experimental Group to View Peers' Notes

The bees cannot speak a language, but they can communicate through dancing or shaking their abdomens to tell other bees where the food is. Can you think of some behaviors or signals that animals or human beings use to exchange information or send a message? You can answer in Chinese or English.

IV. Regulate: In the last stage "Regulate", the students were asked to raise some questions about the reading material *Bees* to test themselves for ensuring the students' reading comprehension. They can answer in Chinese or English. Example: *What is house bees' work?*

3.4.3 English reading article and comprehension test

In this study, the reading material entitled "*Bees*" was one of the selected reading materials from the Programme for International Student Assessment (PISA), December 2006. The reading comprehension test was designed according to the reading material *Bees*. The main reasons for selecting this reading material are its level of difficulty was matched with the targeted learners' English levels and the theme could raise the targeted learners' reading interests. It contains 10 multiple choice questions and 5 short answer questions. The full marks of the reading comprehension test are 100 points. The scores of the multiple-choice and short answer are 50 points, respectively. The test was designed by the study based on the research subjects' English levels, revised by two experienced English teachers, one biography teacher and a professor according to the revision of Bloom's taxonomy of educational objectives (Anderson & Krathwohl, 2001). The items of the pre-test and post-test are the same, but the items and answer sets are put in different orders to avoid the memory effect. To confirm whether the test items of the reading comprehension test are suitable for assessing students' abilities of reading comprehension, a total of 25 Grade 8 students who came from the

same public junior high school in Northern Taiwan like the two groups and did not participate in the instruction experiment were invited to conduct a pilot study to assess the item difficulty and discrimination of each test item. The estimation of item difficulty and discrimination by classic testing theory reveals that the average difficulty of test items in the reading comprehension test sheet is moderate, and discrimination of each test item is satisfactory.

3.4.4 Group Embedded Figure Test (GEFT)

The present study adopted the Group Embedded Figure Test (GEFT) which was translated into Chinese and adapted by Wu (1987) from the GEFT originally proposed by Witkin, Oltman, Raskin, and Karp (1971) to divide all the research participants into field-dependence (FD) and field-independence (FI) learners. Generally speaking, respondents who are over 10 years old are qualified to take the GEFT. The test provides 8 simple geometric shapes. Respondents are asked to identify these simple figures from complex figures given in the test. The GEFT is administered in three phases. Each phase provides different geometric shapes and the respondents have to find out those specified simple shapes hidden in the complicated figures. The difficulty of the test task increases with phases. The scores are given in terms of accuracy and the speed of response. The higher scores the respondents get, the more tendency to FI they will be. The scale's reliability by the Spearman–Brown prophecy formula is 0.82.

3.4.5 Foreign Language Reading Anxiety Scale (FLRAS)

Foreign Language Reading Anxiety Scale, which was designed by Saito, Garza, and Horwitz (1999) was adapted and translated into Chinese (Sas, 2002) to investigate students' reading anxiety in the present study. It contains 20 items and its internal consistency reliability is Cronbach's alpha = 0.85, N = 383. The factor analysis results show that the scale involves three reading anxiety facets: 9 items for grammar and vocabulary anxiety, 9 items for reading confidence anxiety, and 2 items for culture gap anxiety. The items are rated along a 5-point Likert scale. Students have to answer each item from 1 to 5, with 1 = strongly disagree, 2 = disagree, 3 = disagree and agree are equal, 4 = agree, and 5 = strongly agree. The higher the scores that the students get, the higher the English reading anxiety they have.

3.5 Experimental procedure

The experimental procedure is shown in Figure 6. The experiment was performed in two days. On day 1, the learners in the control and experimental groups took 15 minutes to complete the GEFT. After finishing the test, there would be a 30-minute SOAR teaching section instructed by the researcher. The learners in both groups learned the operation of the note-taking system and the SOAR method. A reading material, *Table Manners*, chosen from PISA was provided for learners to practice the four note-taking steps of the SOAR method.

On Day 2, there would be a pre-test of reading comprehension of reading material *Bees* selected from PISA 2006 for both groups' learners. After finishing the pre-test, both groups' learners started to perform a screen-based reading with reading material *Bees* for 20 minutes. In this stage, they could use an online dictionary or translation resources to understand the reading material. After

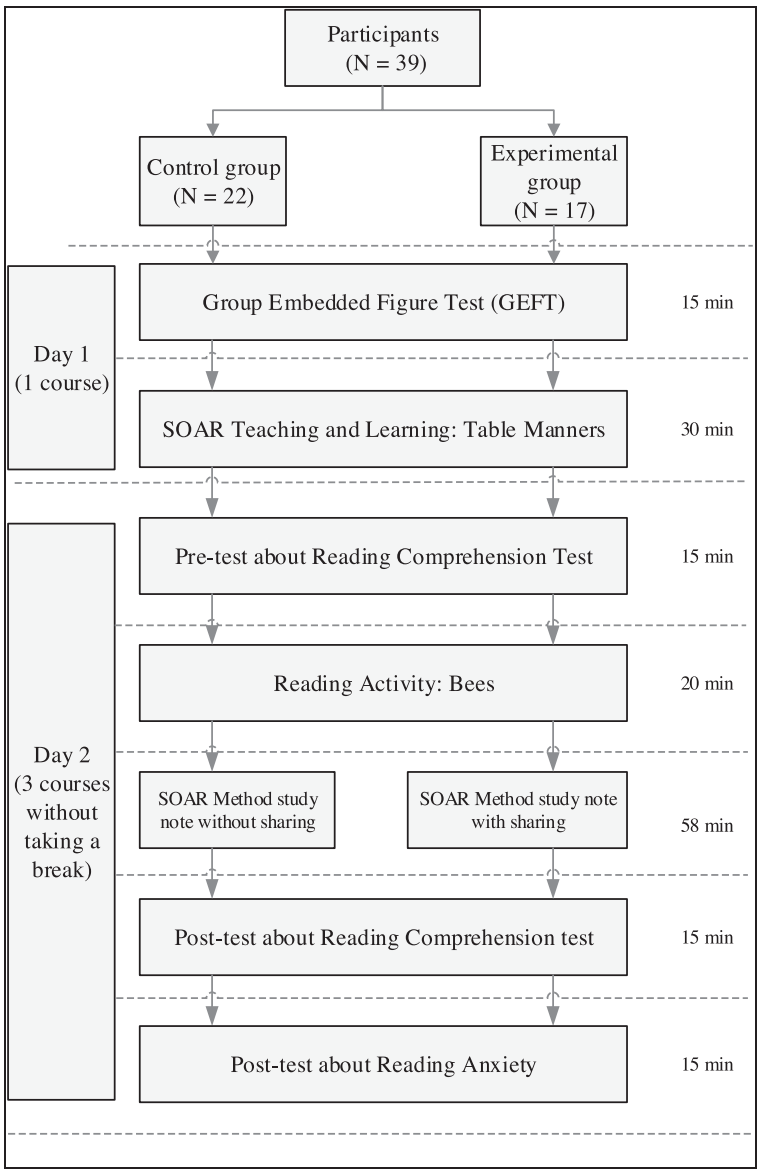

Figure 6. The Procedures of the Instruction Experiment

reading the reading material *Bees* for 20 minutes, the control group learners would make a note through the SOAR method for 58 minutes, but they could not share or browse other peers' notes. The experimental group learners would make a note and share and read other peers' notes in each stage. After the SOAR study note was finished, both groups' learners would take the post-test of

the FLRAS and reading comprehension. Aside from the quasi-experiment, a semi-structured interview was conducted in the present study to gain qualitative information. In the interview, both control and experimental group students were asked how they think and feel about doing and sharing the SOAR method note for around 15 minutes.

Figure 7 shows the detailed processes of the SOAR method study note with sharing or without sharing after reading activity. The note-taking time was designed as follows. "Selection" and "organization" stages were respectively designed with 5-minute activity, whereas "association" and "regulation" were respectively designed with 8-minute activity. There would be 8 minutes

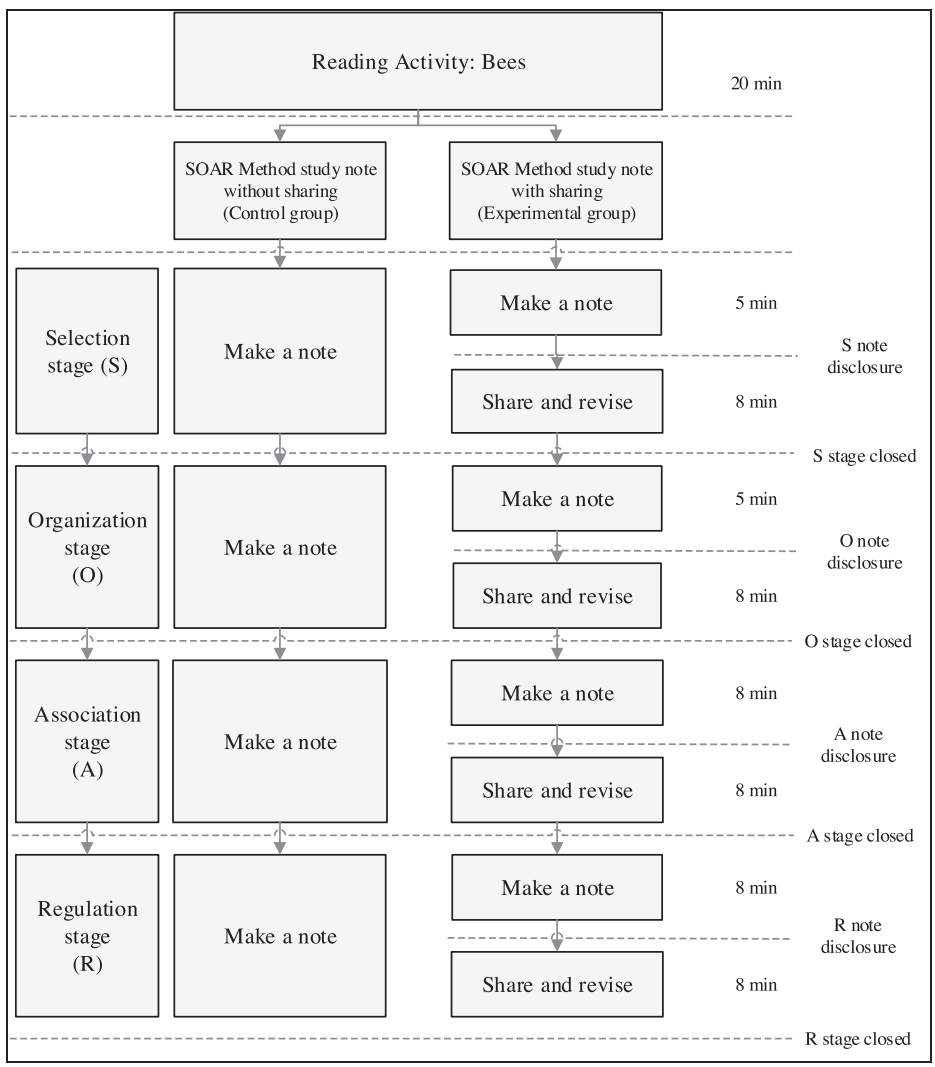

Figure 7. The Detailed Processes of SOAR after Reading Activity

for learners in the experimental group to share what they wrote or revised their notes after each learning stage. They could read their peers' notes on the screen by clicking on the school numbers of the dropdown list. Then copied the notes they need, and pasted them in their notes. They could also revise and reorganize the notes copied from peers. In contrast, the learners in the control group were not allowed to share or browse other peers' notes. They took note through the SOAR method for a total of 58 minutes. "Selection" and "organization" stages were respectively designed with 13-minute activity, whereas "association" and "regulation" were designed with 16-minute activity.

3.6 Interview procedures

As this study mainly focused on examining the effects of sharing SOAR study notes in a computer-assisted language learning environment on English reading comprehension and English reading anxiety, semi-structured interviews were conducted for all the learners in the experimental and control groups to complement the shortages of quantitative analysis. Before performing the interview, the interviewees in the control group were invited to experience sharing the SOAR study notes with their peers that they had not been distributed in the instruction experiment. With the flexibility inherent in a semi-structured interview, the interviewer reused or repurposed questions to obtain in-depth information on the perspectives and personal experiences of each interviewee. The interview questions contained the difference in English reading comprehension between sharing and not sharing SOAR study notes, and whether reading an English article with sharing or not sharing SOAR study notes will promote reading comprehension and decrease reading anxiety, and so on. Moreover, this study analyzed the transcripts collected from the interviewees to determine the presence of certain words, themes, or concepts within some transcripts. To analyze the transcripts, the transcripts were coded into manageable code categories for analysis and interpretation used to support the shortage of quantitative analysis between the two groups.

4. Research Findings

4.1 Results on reading comprehension and reading anxiety

4.1.1 Results on reading comprehension between both groups

Based on the pre-test and post-test of English reading comprehension, the paired samples *t*-test

Table 3. Paired Samples *t*-Test of Reading Comprehension Performance

Group	*N*	*M*	*SD*	*t*	*p* (Two-tailed)
Experimental group					
Pre-test	17	19.47	8.163	-11.298	.000
Post-test	17	71.00	17.263		
Control group					
Pre-test	22	17.36	8.432	-8.799	.000
Post-test	22	47.41	17.639		

was used to analyze the differences in English reading comprehension in the experimental group. As shown in Table 3, there was a significant difference between pre-test and post-test of English comprehension performance in the experimental group (t = -11.298, p = .000 < .05). In other words, the English reading comprehension performance of learners in the experimental group was significantly promoted after they shared the SOAR method note with their peers. As shown in Table 3, there was a significant difference between pre-test and post-test of English comprehension performance in the control group (t = -8.799, p = .000 < .05). In other words, the English reading comprehension performance of learners in the control group was also significantly promoted after they finished the SOAR method note without sharing with their peers.

To analyze the differences in English reading comprehension performance between the experimental group and the control group, one-way ANCOVA was used by using learners' pre-test scores of the English reading comprehension test as the covariate. Before performing the analysis of one-way ANCOVA, the test of the homogeneity of regression coefficients and the homogeneity of the variance within groups were examined. The result did not violate the homogeneity of regression coefficients (F = 1.165, p = .288 > .05). Also, the variance within groups was homogeneous (F = .000, p = .988 > .05), so one-way ANCOVA can be conducted. As shown in Table 4, the average post-test score of learners in the experimental group (M = 70.39) is higher than that in the control group (M = 47.87), and there was a significant difference between the experimental and control groups in reading comprehension (F = 16.496, p = .000 < .05) under excluding the covariate.

To understand why note sharing can provide benefits in promoting reading comprehension performance, this study selected an example of the "Select" stage shown in Figure 8. In this case, one student with low prior knowledge in the experimental group read peers' notes, then referred to some contents from peers as well as reorganized and revised his SOAR notes during the note sharing time (see the text which is circled). The note sharing process helped this student catch more main concepts and he got 86 points in the post-test of English reading comprehension.

4.1.2 Results on reading anxiety between both groups

Based on the FLRAS (Saito, Garza, & Horwitz, 1999), the independent samples t-test was used to analyze the differences in English reading anxiety between the experimental and control groups. As shown in Table 5, there was no significant difference in English reading anxiety between the experimental group who shared

Table 4. Analysis of the Differences in English Reading Comprehension Performance

	Experimental group (N = 17)		Control group (N = 22)			
Item	*M*	*SD*	*M*	*SD*	*F*	*p*
Pre-test	19.47	8.163	17.36	8.432	16.496	.000
Post-test [a]	70.39 [a]	17.263	47.87 [a]	17.369		

Note. Post-test [a] = modified average.

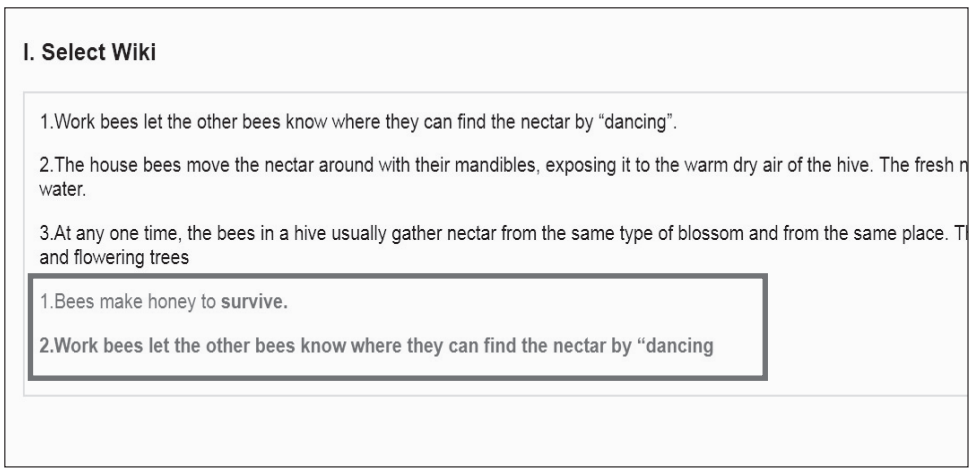

Figure 8. The Experimental Group Student's Note-taking of Reading Material *Bees* in the Stage of "Select"

Table 5. Analysis of the Differences in English Reading Anxiety

Item	Experimental group (N = 17)		Control group (N = 22)			
Anxiety	*M*	*SD*	*M*	*SD*	*t*	*p*
Total	2.88	.476	3.22	.662	-1.781	.083
AA	2.82	.713	3.17	.906	1.283	.208
AB	2.89	.457	2.77	.428	.851	.400
AC	2.79	.730	2.97	.587	-.869	.391

Note. AA = grammar and vocabulary anxiety; AB = reading confidence anxiety; AC = cultural gap anxiety.

SOAR study notes with their peers and the control group who did not share SOAR notes with their peers (t = -1.781, p = .083 > .05).

4.2 Results on reading comprehension and reading anxiety between the learners with FD and FI cognitive styles

4.2.1 Results on reading comprehension between the learners with FD and FI cognitive styles

In the present study, the paired samples t-test of reading comprehension pre-test and post-test was used to analyze the differences in English reading comprehension performance between FD and FI learners of both groups. As shown in Table 6, there was a significant difference between pre-test and post-test for FD and FI learners in the experimental group who shared SOAR study notes with their peers (t = -10.299, p = .000 < .05; t = -6.116, p =

Table 6. Analysis of the Differences in English Reading Comprehension Performance of FD and FI Learners in the Experimental Group

Experimental group	*M*	*SD*	*t*	*p*
FD				
Pre-test	17.13	7.453	-10.299	.000
Post-test	65.50	21.173		
FI				
Pre-test	21.56	8.618	-6.116	.000
Post-test	75.89	12.108		

Table 7. Analysis of the Differences in English Reading Comprehension Performance of FD and FI Learners in the Control Group

Control group	*M*	*SD*	*t*	*p*
FD				
Pre-test	17.92	8.930	-7.647	.000
Post-test	49.85	18.133		
FI				
Pre-test	16.56	8.110	-4.588	.002
Post-test	43.89	16.586		

.000 < .05). That is, sharing the SOAR study note is beneficial to both FD and FI learners in English reading comprehension.

As shown in Table 7, FD (t = -7.647, p = .000 < .05) and FI (t = -4.588, p = .002 < .05) learners in the control group who did not share SOAR study note with their peers both had significantly improvement on English reading comprehension performance.

To analyze the differences in English reading comprehension performance between FD and FI learners of both groups, one-way ANCOVA was used by using learners' pre-test scores of the English reading comprehension test as the covariate. Before the analysis of one-way ANCOVA, the test of the homogeneity of regression coefficients and the homogeneity of the variance within FD and FI learners were examined. The result did not violate the homogeneity of regression coefficients (F = .995, p = .333 > .05; F = .153, p = .701 > .05) and variance within FD and FI learners was homogeneous (F = .702, p = .413 > .05; F = .750, p = .399 > .05), so one-way ANCOVA was proceeded. The result was shown in Table 8.

Analytical results show that the post-test scores of FD learners in the experimental group (M = 65.905) are higher than those FD learners in the control group (M = 49.597), and the ANCOVA

Table 8. Analysis of the Differences in English Reading Comprehension Performance between FD/FI Learners

Item	Experimental group		Control group		*F*	*p*
	M	*SD*	*M*	*SD*		
FD	(*N* = 8)		(*N* = 13)			
Pre-test	17.13	7.453	17.92	8.930	3.828	.066
Post-test[a]	65.905[a]	6.555	49.597[a]	5.141		
FI	(*N* = 9)		(*N* = 9)			
Pre-test	21.56	8.618	16.56	8.110	18.795	.001
Post-test[b]	75.962[b]	5.122	43.816[b]	5.122		

Note. Post-test [a] = modified average; Post-test [b] = modified average.

results showed no significant difference (F = 3.828, p = .066 > .05) between these two groups. Therefore, sharing study notes has no significant effects on FD learners. However, the post-test scores of FI learners in the experimental group (M = 75.962) are higher than those FI learners in the control group (M = 43.816), and the ANCOVA results showed a significant difference (F = 18.795, p = .001 < .05) between these two groups. Therefore, for FI learners, there were significant benefits in promoting reading comprehension performance when sharing the SOAR study note was applied.

4.2.2 Results on reading anxiety between the FD and FI learners of both groups

Based on the FLRAS (Saito et al., 1999), the independent samples t-test was used to analyze the differences in English reading anxiety between the FD and FI learners of both groups. As shown in Table 9, there was a significant difference of English reading anxiety (Total) between the FI learners of both groups (t = -2.863, p = .011 < .05) and also there was a significant difference in grammar and vocabulary anxiety (AA) between the FI learners of both groups (t = -2.574, p = .020 < .05). The average score of English reading anxiety (M = 2.75) and grammar and vocabulary anxiety (2.64) of FI learners in the experimental group were lower than those in the control group (M = 3.45; 3.56). However, there was no significant difference in English reading anxiety (Total) between the FD learners of both groups (t = -.113, p = .911 > .05).

4.3 Results on reading comprehension and reading anxiety between the high and low prior knowledge learners

4.3.1 Results on reading comprehension between the high and low prior knowledge learners of both groups

In the present study, the paired samples t-test of reading comprehension pre-test and post-test was used to analyze whether the significant differences in English reading comprehension performance existed between the high prior knowledge and the low prior knowledge learners

Table 9. Analysis of the Differences in English Reading Anxiety between FD and FI Learners of Both Groups

	Experimental group		Control group			
Anxiety	*M*	*SD*	*M*	*SD*	*t*	*p*
FD	(*N* = 8)		(*N* = 13)			
Total	3.03	.403	3.06	.729	-.113	.911
AA	3.03	.676	2.90	.911	.368	.717
AB	2.98	.269	2.69	.480	1.802	.008
AC	3.00	.654	2.96	.557	.144	.887
FI	(*N* = 9)		(*N* = 9)			
Total	2.75	.519	3.45	.517	-2.863	.011
AA	2.64	.733	3.56	.785	-2.574	.020
AB	2.81	.581	2.88	.333	-.348	.732
AC	2.61	.781	3.00	.661	-1.139	.271

Note. AA = grammar and vocabulary anxiety; AB = reading confidence anxiety; AC = cultural gap anxiety.

Table 10. Analysis of the Differences in English Reading Comprehension Performance of High and Low Prior Knowledge Learners in the Experimental Group

Experimental group	*M*	*SD*	*t*	*p*
Low prior knowledge (*N* = 10)				
Pre-test	13.60	3.438	-15.663	.000
Post-test	71.40	11.811		
High prior knowledge (*N* = 7)				
Pre-test	27.86	4.525	-4.678	.003
Post-test	70.43	24.131		

of both groups. As shown in Table 10, there were significant differences between pre-test and post-test for low and high prior knowledge learners in the experimental group who shared SOAR study note with their peers (t = -15.663, p = .000 < .05; t = -4.678, p = .003 < .05).

Similarly, the paired samples t-test of reading comprehension pre-test and post-test was used to analyze whether the differences in English reading comprehension performance existed between the high prior knowledge and the low prior knowledge learners in the control group who did not share SOAR study note with their peers. As shown

Table 11. Analysis of the Differences in English Reading Comprehension Performance of High and Low Prior Knowledge Learners in the Control Group

Control group	*M*	*SD*	*t*	*p*
Low prior knowledge (*N* = 11)				
Pre-test	10.45	4.435	-5.973	.000
Post-test	41.64	16.250		
High prior knowledge (*N* = 11)				
Pre-test	24.27	4.962	-6.240	.000
Post-test	53.18	17.209		

in Table 11, there were significant differences between pre-test and post-test for low and high prior knowledge learners in the control group who did not share SOAR study notes with their peers (t = -5.973, p = .000 < .05; t = -6.240, p = .000 < .05). Also, the post-test average scores of low (M = 41.64) and high (M = 53.18) prior knowledge learners in the control group are higher than the pre-test average scores.

To analyze the differences in English reading comprehension performance between high prior knowledge and low prior knowledge learners of both groups who shared and did not share SOAR study notes with their peers, one-way ANCOVA was used by using learners' pre-test scores of the English reading comprehension test as the covariate. Before the analysis of one-way ANCOVA, the test of the homogeneity of regression coefficients and the homogeneity of the variance within groups were examined. The analytical results of low prior knowledge learners (F = .384, p = .544 > .05) and high prior knowledge learners (F = .269, p = .612 > .05) did not violate the homogeneity of regression coefficients. Also, the variance within low prior knowledge learners (F = .355, p = .559 > .05) and high prior knowledge learners (F = 1.810, p = .197 > .05) was homogeneous, so one-way ANCOVA could be conducted. The result was shown in Table 12.

The ANCOVA results showed that there was a significant difference (F = 18.297, p = .000 < .05) between the low prior knowledge learners in the experimental group and the low prior knowledge learners in the control group. The post-test scores of low prior knowledge learners in the experimental group (M = 71.425) who shared the SOAR note with their peers are higher than those low prior knowledge learners in the control group (M = 41.614) without sharing notes, but the ANCOVA results showed no significant differences (F = 1.496, p = .240 > .05) between the high prior knowledge learners in the experimental group and high prior knowledge learners in the control group.

4.3.2 Results on reading anxiety between the high and low prior knowledge learners of both groups

Based on the FLRAS (Saito et al., 1999), the independent samples t-test was used to analyze the differences of English reading anxiety between the high prior knowledge and the low prior knowledge

Table 12. Analysis of the Differences in English Reading Comprehension Performance between Low/High Prior Knowledge Learners in the Experimental Group and Control Group

	Experimental group		Control group			
	M	*SD*	*M*	*SD*	*F*	*p*
Low prior knowledge	(*N* = 10)		(*N* = 11)			
Pre-test	13.60	3.438	10.45	4.435	18.297	.000
Post-test[a]	71.425[a]	4.865	41.614[a]	4.622		
High prior knowledge	(*N* = 7)		(*N* = 11)			
Pre-test	27.86	4.525	24.27	4.962	1.496	.240
Post-test[b]	67.503[b]	7.761	55.044[b]	6.097		

Note. Post-test[a] = modified average; Post-test[b] = modified average.

Table 13. Analysis of the Differences in English Reading Anxiety Between the Low Prior Knowledge Learners and the High Prior Knowledge Learners of Both Groups

	Experimental group		Control group			
Anxiety	*M*	*SD*	*M*	*SD*	*t*	*p*
Low prior knowledge	(*N* = 10)		(*N* = 11)			
Total	2.94	.411	3.30	.596	-1.593	.128
AA	2.84	.613	3.13	.848	-.909	.375
AB	2.99	.490	2.72	.467	1.257	.224
AC	2.85	.818	3.04	.723	-.581	.568
High prior knowledge	(*N* = 7)		(*N* = 11)			
Total	2.81	.584	3.15	.744	-1.021	.322
AA	2.81	.891	3.20	1.00	-.849	.408
AB	2.75	.399	2.81	.404	-.314	.785
AC	2.71	.636	2.90	.436	-.774	.450

Note. AA = grammar and vocabulary anxiety; AB = reading confidence anxiety; AC = cultural gap anxiety.

learners of both groups. As shown in Table 13, there were no significant differences in English reading anxiety between the low prior knowledge learners of both groups (t = -1.593, p = .128 > .05). Also, there were no significant differences in English reading anxiety between the high prior knowledge learners of both (t = -1.021, p = .322 > .05).

4.4 Interview results

To investigate the effects of sharing SOAR notes with peers on English reading comprehension and English reading anxiety, 22 students of the control group and 17 students of the experimental group were interviewed. According to the interview results, 34 students agreed with the positive effects of note sharing, including 17 students of the experimental group who shared their notes and 17 students of the control group who did not share their notes with their peers in the experiment. The other students had no comments. Interestingly, even though the students in the control group did not share their notes with their peers, most of them thought that note sharing could help them promote reading comprehension. All of the students in the experimental group agreed that note sharing had positive effects on promoting English reading comprehension because they could understand more different viewpoints, fill the thinking gap, and correct the errors or mistakes which affect them to comprehend the reading material through sharing SOAR note with their peers.

A total of 9 students in the control group agreed that sharing notes could lower their English reading anxiety, even though they were not allowed to share their notes during the experiment. A total of 8 students in the experimental group agreed that sharing notes could lower their English reading anxiety. However, 4 students from both groups had negative comments on sharing SOAR study notes on English reading anxiety. The other students had no comments. In conclusion, nearly half of the students agreed that sharing SOAR notes lowered their English reading anxiety. They expressed that sharing SOAR notes could let them feel less nervous, and feel relaxed when they read others' viewpoints. And one student thought that sharing SOAR notes decreased his reading anxiety because he tended to share something he had acquired with peers. However, some students denied the positive effects of sharing SOAR notes on reducing their reading anxiety because they felt nervous and uneasy when they shared SOAR notes.

5. Discussion

As a result of the study, there was a significant difference in English reading comprehension between learners who shared and did not share their SOAR notes with their peers. The students who shared their SOAR notes with peers had better performance in English reading comprehension than those who not shared their SOAR notes with peers. The result echoes the social constructivism, indicating that students would learn much more and better when they construct their knowledge through the process of sharing experiences or discussion rather than working alone (Vygotsky, 1978). Moreover, the result is consistent with the study of Fitton et al. (2018), which is a meta-analysis to examine how shared book reading affects the English language and literacy skills of young children learning EFL. Their study indicated that there is an overall significant, positive effect of shared reading on English learners' outcomes. Also, based on the results of the interview, all of the students who shared the note with their peers agreed that note sharing had positive effects on promoting English reading comprehension. The results are consistent with Faust and Paulson's study (1998), indicating that working in pairs to read others' notes can

help poor note-takers fill the knowledge gaps. Particularly, some of the students in the interview expressed that sharing notes can help them write something they missed from the reading material.

Many field-dependent-independent studies (Chen, Chen, & Yang, 2019; Chen, Tan, & Lo, 2016; Kheirzadeh & Kassaian, 2011) provide inconsistent results to foreign language learning performance. For example, Chen, Tan, and Lo (2016) presented a digital pen and paper interaction platform (DPPIP) in which digital pen technologies were integrated with printed textbooks and the Moodle course management system, to support the repeated reading strategy to improve English-language reading fluency. Their results confirm that this DPPIP helped learners with field-independent and field-dependent cognitive styles improve their oral reading fluency. Chen, Chen, and Yang (2019) presented an English vocabulary learning app with a self-regulated learning mechanism (EVLAPP-SRLM) to help learners improve their self-regulated learning abilities, learning performance, and motivation in a mobile learning context. Their study demonstrated that the proposed EVLAPP-SRLM improves the learning performance and motivation of field-dependent learners more than those of field-independent learners. In contrast, Kheirzadeh and Kassaian (2011) found no significant difference in the performance of field-dependent and field-independent learners in general language listening comprehension. As a result of the study, there was a significant difference in English reading comprehension between field-independent (FI) learners who shared and did not share their SOAR note with their peers; however, there was no significant difference in English reading comprehension between field-dependent (FD) learners who shared and did not share the note. Generally speaking, field-dependent (FD) people are social-oriented (Witkin & Goodenough, 1977), and fond of having natural and face-to-face communication (Brown, 2000). In the present study, although FD learners were allowed to read others' notes, they had no chance to discuss with their peers in the instruction experiment of this study. That is, they need to work independently to finish their notes. Without discussing with their peers, probably they could not organize the new concept well from their peers to their notes, thus reducing the effects of sharing notes with their peers. In contrast, FI learners who are less social-oriented, having attention to details and being good at organizing, could integrate their peers' viewpoints to their own notes even without having any discussion.

Analytical results show that there was a significant difference in English reading comprehension between the learners of low prior knowledge groups who shared and did not share their notes with their peers. According to Lucassen, Muilwijk, Noordzij, and Schraagen (2013), high prior knowledge learners are proficient at connecting the new information to the background knowledge they have already had, and figuring out its reliability, whereas learners with low prior knowledge are not good at finding out the key ideas when they do the online text reading. Therefore, the learners of the low prior knowledge group needed to read others' notes as a scaffolding, to help them catch the key ideas of the reading material, but the learners of the high prior knowledge group could still work well without any note sharing. According to the results of the

interview, ten students with low prior knowledge who shared the notes with their peers indicated that they comprehended the reading material more easily because they could get others' ideas, find the key points, and write something they missed from their peers' notes. In sum, sharing the notes is beneficial for the learners who have low prior knowledge in English reading comprehension.

As a result of the study, FI learners who shared the note had lower reading anxiety than those without sharing any notes, especially in the facet of grammar and vocabulary anxiety. As a result of the interview, indeed, four FI learners in the experimental group indicated that they felt relaxed and less nervous when they shared and read their peer's notes. However, there were no significant differences between the learners who shared and did not share the SOAR study notes with their peers in English reading anxiety or the learners of high prior knowledge group and low prior knowledge group who shared and did not share the SOAR study notes with their peers in English reading anxiety. In conclusion, for FI learners, sharing notes with their peers could help them decrease English reading anxiety.

Due to the time and funding factors, the present study has its limitations which need to be addressed. First, the experimental subjects were limited to Grade 8 students from two classes at one junior high school in Northern Taiwan. Therefore, whether or not the research results of the study can be transferred readily to students who have different ages or academic levels needs to be further studied. Moreover, the purpose of this study is to investigate the effects of sharing SOAR notes on reading comprehension and reading anxiety. Therefore, whether the research results of sharing SOAR notes can be transferred readily to other note-taking strategies needs to be further studied. Finally, only a total of 39 Grade 8 students were randomly recruited from a junior high school in Northern Taiwan to participate in the instruction experiment due to the difficulty of recruiting research participants. This leads to a small size sample, thus influencing the reliability of statistical inference.

6. Conclusions and Future Works

This work examined the effects of sharing or not sharing the SOAR method note with peers on English reading comprehension and English reading anxiety. Analytical results show that sharing SOAR method notes contributed to promoting English reading comprehension in comparison with not sharing SOAR method notes. Particularly, this study found that English reading comprehension of field-independent learners can be significantly promoted through the process of sharing the SOAR method note, but field-dependent learners have not been found. Moreover, English reading comprehension of learners with low knowledge can be significantly promoted through sharing the SOAR method note, but learners with high knowledge have not been found. Besides, for the field-independent learners, English reading anxiety can be significantly decreased due to the process of sharing SOAR method notes, especially, but not for the field-dependent learners. This study confirmed that sharing learners' SOAR method notes with their peers is a good way to promote learners' English

reading comprehension performance, particularly for learners with field-independent cognitive style and low knowledge level, as well as to decrease field-independent learners' English reading anxiety. The results can help English teachers plan effective personalized instruction while using SOAR method notes to support English reading activities.

However, the sample size of the research subjects is small. This may affect the reliability of research results. Future research could increase the number of research subjects to increase the reliability of the instruction experiment. Moreover, it seems that the two-day instruction experiment is too short in the present study. Future research can extend the 2-day instruction experiment into a semester or even longer period to investigate the effects of sharing the SOAR method notes with peers in English reading comprehension and reading anxiety. To do so, the analytical results can be more valuable and reliable. Also, the present study did not investigate how the learners created their SOAR notes through the process of note sharing but only focused on collecting and analyzing the note data. If sharing the SOAR method notes is an effective learning strategy (Faust & Paulson, 1998; Landay, 1999), why did some learners still get low grades on the post-test? What did they do during the note sharing time? Did they not copy others' notes or did they not remember what they wrote? That is, investigating what the learners wrote during sharing the SOAR notes to determine the effectiveness of note sharing should be considered in future research.

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分享選擇、組織、關聯與調整之結構化閱讀筆記對於學習者的閱讀理解及閱讀焦慮影響

The Effects of Sharing Selection, Organization, Association, and Regulation (SOAR) Study Note on Learners' Reading Comprehension and Reading Anxiety

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摘　要

依循選擇（selection）、組織（organization）、關聯（association）和調整（regulation）閱讀步驟的SOAR閱讀方法已被證明是一種有效的筆記策略，許多研究提出分享此類結構化筆記的模式及其對於英語閱讀理解的可能影響。因此，本研究探討在電腦輔助語言學習環境中分享SOAR閱讀筆記，對於英語閱讀理解和閱讀焦慮的影響。本研究隨機選取一班22名8年級學生為不允許完成SOAR筆記後分享或閱讀同儕筆記的對照組；另一班有17名8年級學生為可以分享或閱讀同儕的筆記，並在記筆記活動後修改自己的SOAR筆記的實驗組。結果顯示分享SOAR筆記有助於提昇閱讀理解成效，特別是場地獨立認知風格或先備知識較低學生。再則，分享SOAR筆記有助於降低場地獨立認知風格學生閱讀焦慮。

關鍵字：SOAR筆記方法、筆記分享、閱讀理解、閱讀焦慮、認知風格

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