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# Examining the Effects of Raising Text Structure Awareness in Computer-Based Instruction Through Moviemaker and Mind Mapping Software on EFL learners' Reading Comprehension

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**ABSTRACT**

Effective teaching of reading comprehension has been a great concern for language teachers, leading to the emergence of strategies in developing students' reading skill. This study examined the effects of raising text structure awareness (TSA) through face-to-face and computer-based reading instruction (CBI) on students' reading comprehension. The participants included 87 undergraduate students of Humanities from Guilan, Iran who were at the upper-intermediate level concerning their foreign language proficiency and took part in the pretest and the posttest of reading comprehension that were taken from sample IELTS. They were randomly assigned into one control and two experimental groups. The first experimental group received instruction on text structure within face-to-face classes (TSA) and the second experimental group worked through computer-based instruction (TSA+CBI) while the control group benefited from their routine conventional reading activities. The results of the one-way ANCOVA indicated that the second experimental group that received instruction on text structure awareness through CBI outperformed the first experimental group that simply practiced text structure awareness in face-to-face classes and the control group. In addition, the difference between the two treatment groups was statistically significant. The results verified the effectiveness of text structure awareness in improving the students' reading comprehension in TSA+CBI groups. Language teachers can benefit from providing students with text structure awareness and facilitating their reading comprehension through applying technology.

***Keywords:*** Awareness-Raising, EFL Learners, Computer-Based Instruction, Reading Comprehension, Text Structure

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## 1. Introduction

Several factors are involved in slow progress in reading development. For example, Iranian' EFL learners' problem in comprehension of reading texts may be due to the disruption of the Persian (Beheshti, 2015), lack of adequate training in real life (Morshedian et al., 2016), poor motivation for reading (Kharaghani et al., 2016), and the incompetence to take the responsibility (Rajaei et al., 2020). Based on Weiner's (1979) attribution theory, these factors can be classified into two types; namely, internal and external factors. Learners' low language proficiency or inadequate prior information are considered internal factors, while the external factors are related to their learning contexts, such as the reading resources and the teacher. Initial information, motivation, and learners' basic language skills are considered internal factors. Examples of external factors include graphic organizers and textual context. This study aimed to focus on both internal and external factors to develop the learners' reading comprehension. In so doing, the study looks at the effects of providing learners with sufficient background knowledge and awareness (internal factor) in terms of the textual context of the reading materials (external factor) on the development of learners' reading comprehension. A relationship can be established between the external and internal factors in the attribution theory. For example, concerning reading comprehension, the selection of the reading resources affects learners' reading comprehension. The inclusion of authentic reading materials as an external factor strengthens the learners' learning motivation that can be considered as an internal factor and thus these two improve the learners' reading strategy awareness (Astri & Wahab, 2018).

Assuming the significant role of reading resources it is important to discriminate different types of reading materials. Reading supplies are different concerning their organization of the ideas and form and are classified into two main types—narrative and expository texts. In Iranian university contexts, the reading materials are mostly selected from the expository texts and reading strategies are taught within teaching expository texts (Akhondi et al., 2011). Multiple structural patterns are used in expository texts. They are description, enumeration, causation, sequence structure, problem and solution, and comparison and contrast (Hall et al., 2005). Therefore, this study focused on text structure awareness of the expository types of texts to see the effects on reading comprehension development. To this end, issues of learners' background knowledge in terms of text structure awareness as the internal factor and selection of the expository texts as the external factor are the two main concerns of the present study.

The main purpose behind focusing on text structure was to activate

students' prior knowledge. Previous research findings indicate that successful readers go through a series of processes that assist them in better comprehending of texts. They think about the information they already have about a new topic. In other words, they activate their prior knowledge about a subject matter. Besides, they are competent in interpreting, combining ideas, and drawing inferences from the text. That is, they do inferential reasoning. They also use strategies and do self-regulation for their reading practices consciously. The prior knowledge incorporates prior knowledge of the topic (Martinez & Cristina, 2013; Priebe et al., 2011) and prior knowledge of the text structure (Theriault et al., 2019). The present study focused on two of the above processes in reading comprehension; namely, "activating students' prior knowledge" through windows moviemaker and "inferential reasoning" through mind-mapping software. It was assumed that the more relevant prior knowledge the students possess and the more inferential reasoning they apply to what they are reading, the more they will be able to comprehend a text that connects with their previous content schema.

In this study, the association between the internal and the external factors that affect reading comprehension was established through implementing two computer programs, namely mind mapping and moviemaker. Providing language learners with comprehension strategies through computers can be effective in fostering their reading comprehension (Klapwijk, 2015). Despite the growing use of computers in reading comprehension courses at the university level, little has been done about the uses of computers in activating students' prior knowledge and their inference making. Thus, this study is of paramount importance, primarily in Iranian EFL situation, in terms of promoting the current literature on teaching reading comprehension through making a combination between external and internal factors that are involved in reading comprehension via computers.

This study, intended to examine the possible effects of computer-based text structure strategies instruction on EFL learners' reading comprehension and make a comparison between the interactive web-based learning environments with the traditional face-to-face reading classes regarding the text structure instruction. Hence, the following research question is addressed in the current study:

> Is there any statistically significant difference between the effects of raising text structure awareness in face-to-face language classes and through computer-based instruction (CBI) on Iranian EFL students' reading comprehension?

## 2. Literature Review

### 2.1. Text Structure Instruction

Some EFL learners find reading comprehension a challenge since they may infer the meaning of the words in isolation, but they often encounter problems when the words are combined into a meaningful idea (McNamara, 2007). Identifying different structural patterns of texts is one of the main processes of reading and encouraging reading comprehension strategies through text structure instruction can effectively develop reading comprehension, more specifically in the case of expository texts (Akhondi et al., 2011; Hebert et al., 2016; Williams, 2018). The reading materials for Iranian university students usually follow these five patterns in reading comprehension courses. Therefore, since each type of expository texts serves different purposes and has specific features, discriminating the differences among these patterns is essential for better reading comprehension (Ray & Meyer, 2011). The description pattern explains the main idea by representing a mental picture of settings, objects, or surroundings and provides signal words for comprehension (Flemming, 2014). The sequence pattern gives information on the topic by arranging information in the order that they happened and the details support the main idea (Chomchaiya, 2014). The comparison and contrast pattern shows the differences and the similarities between elements of a text. Cause and effect expository texts give information about the relationship between events by describing the causes or effects of the events. In addition, problem and solution expository texts explore a problem and suggest a solution by giving information about the problem (Pilonieta, 2011).

Given that expository texts have different information organizations with the purpose they serve, text structure instruction seems vital. The literature shows three main issues that are related to the benefits of instruction of text structures. The first one is the effective function of text structure instruction on learners' understanding of rhetorical textual patterns (Ferdosipour & Delavar, 2011). Second, concerns with the effects of text structure knowledge on activating background information (Cervetti & Wright, 2020), and the third issue is related to building learners' confidence in reading (Leger, 2012).

Some criteria are used in assessing the quality of text structure instruction; namely, selection of sufficient reading strategies for instruction, the structure, and format of the reading material used for the instruction, and the choosing expository texts that generate situations for working on comprehension strategies (Jones et al., 2016). Effective strategies such as clue words (Meyer et al., 2012), and graphic organizers (Jiang, 2012) can be applied by the teachers in text structure instruction.

## 2.2. Computer-Based Instruction (CBI)

Now that there are adequate pieces of evidence to support the effects of text structure instruction in developing readers' comprehension, this part will focus on the adoption of CBI in language education, more specifically in text structure instruction. Online education is classified into two main methods including asynchronous such as email and blogs and synchronous computer-mediated communications such as Skype conversations. In recent years, in Iranian universities, both synchronous and asynchronous modes are being used for different purposes. Concerning the asynchronous mode, learners make use of email or the Web and for the synchronous mode, online communication takes place in real- time with other students or the teacher. Iranian university students frequently make use of synchronous web-based communications such as video conferencing, instant messaging, and online chatting. Computers serve important goals in this respect. They help learners to learn in authentic situations and aid the learning process (Kang, 1999) and allow for better preparation for education (Yazdanpanah et al., 2010). CBI reduces learner anxiety and frustration and eliminates negative emotions (Nasution et al., 2019), and increases learners' enjoyment (Wang & Wang, 2014). In addition, computers take into account individual differences and learning styles. Matching the learners' learning style with the teaching design improves learning achievement (Fenrich, 2006). In the Iranian university context, CBI helps learners review the learning materials at their own pace and improve their autonomy (Salehi & Farajnezhad, 2021). Computers also provide immediate feedback for the learners' errors (Fenrich, 2006). Computers can also improve learners' overall language skills and help them acquire new knowledge (Kale & Goh, 2014; Yunus & Suliman, 2014). They provide a setting in which the focus is on learners and make the process of language teaching more interactive (Alsied & Pathan, 2013).

Previous empirical studies related to the application of computers have shown that interactive computer software, computer-assisted programs, online instruction, and online dictionaries have been used widely to teach reading comprehension (Houselog, 2019). Liu et al. (2010) evaluated the effects of concept mapping through employing computers on EFL learners' reading comprehension. They found that computer-based concept mapping improved learners' application of different reading strategies.

Hebert et al., (2016) explored the effects of teaching text structure on expository reading comprehension and concluded that text structure instruction strengthens reading comprehension of expository texts. Al-Jarf (2021) found that mind mapping was advantageous in improving reading comprehension. Overall, the literature indicates that CBI of reading significantly gives better results in terms of EFL learners' reading skills when

compared to the traditional educational reading methods (Sadeghi & Soltanian, 2012).

## 3. Method

### 3.1. Participants

The participants of the main study were 87 undergraduate students of a university in Guilan Iran, majoring in the fields of Humanities including Sociology, Social Relations, and Financial Management that were selected based on OPT results out of 106 participants. Due to the limits in the available sample, they were selected from various disciplines in the humanities. Their age range was 18 to 27. They were randomly assigned into two experimental groups receiving TSA instruction and teaching reading comprehension through the integration of text structure awareness and CBI (TSA + CBI), and one control group, that received conventional reading comprehension instruction.

### 3.2. Materials and Instruments

#### *3.2.1. Oxford Quick Placement Test (QPT)*

QPT was administered to 106 university students to select upper-intermediate students in terms of their general foreign language proficiency. The test included vocabulary, reading, and grammar exercises in multiple-choice format with 60 items. Table 1 shows the results of QPT.

**Table 1**
*Results of QPT*

| | | |
|---|---|---|
| N | Valid | 106 |
| Mean | | 39.85 |
| Median | | 40.00 |
| Std. Deviation | | 6.66 |
| Range | | 33.00 |
| Minimum | | 22.00 |
| Maximum | | 55.00 |

The mean of the QPT came to (M= 39.85) with a standard deviation of (SD= 6.66). Eighty-seven students whose score fell within the range of upper-intermediate (i.e., 37-47), based on QPT criteria, were selected as the main sample for the present study, and were assigned randomly into three groups.

#### *3.2.2. Pretest and Posttest*

The pretest and the posttest were taken from IELTS reading comprehension samples tests. It took about 45 minutes to answer the tests. Due to time constraints in test administration, the pretest simply included two passages. The first passage titled “air rage” included 12 items. Eight items

required the respondents to match headings to the paragraphs and four items were in the form of True, False, or Not Given. The topic for the second passage was "wind power." This passage had two items in the form of multiple-choice, five fill-in blanks, and five matching items. One point was assigned for each test item and the total score for the pretest was 24 points. The posttest also included two reading passages. The first passage titled "The Container Trade" consisted of six multiple-choice items and six sentence completion items. The topic for the second passage was "Australia and the Great War, 1914 – 1918." This passage had seven short sentence completion items and five Yes, No, Not given items. Similar to the pretest, one point was assigned for each item and the maximum possible score for the posttest was 24 points. The internal consistency within the items of the tests was measured through running Cronbach's Alpha to the results of the tests in a pilot study with 10 EFL learners. The estimated values of Cronbach Alpha for the tests were $\alpha_{QPT}$ =.86; $\alpha_{pretest}$= .77; and $\alpha_{posttest}$=.81, respectively, that were considered satisfactory and higher than the least value required (i.e., α= .70) as suggested by Cohen et al. (2007). Two experts in TEFL confirmed the content validity of the tests in terms of the quality of the items on the test.

### *3.2.3. Windows Movie Maker 2021 Version 9.8.2*

The Windows Movie Maker (WMM) is free software that is manufactured by Microsoft Windows. It allows users to produce personal video and slide shows with titles, passages, effects, music, and can also include narration (Microsoft, 2014). The WMM is a computer-based application that actively involves learners in their learning process and encourages them to take responsibility for their learning and develop into autonomous learners (Ting, 2013).

When it comes to the application of WMM into educational settings, Microsoft (2009) suggested teachers employ WMM to make their lesson plans more fascinating to keep learners engaged in learning. WMM can be useful in reading classes, too. According to Brown (1989), for intensive reading language learners need to consider grammatical patterns, discourse markers, and other surface structure information for realizing literal meaning, implications, and rhetorical connections. Thus, using technologies such as moviemaker can be used to draw readers' attention towards language structure in relation to the lexicon, grammatical rules, meaning, and sentence connection. This application enables students to make their stories in a storyboard pane. Therefore, students can promote their reading and writing skills when they try to make a story (Sarica & Usluel, 2016).

The application of moviemakers into reading classes can also be discussed in terms of "story grammars" that are a kind of thinking tool which have the potential to develop learners' understanding of texts and their ability

to read stories (Liu et al., 2014). When students are asked to make movies based on reading texts, they try to build several rules that can produce an organization for the story. This helps teachers by providing them with a whole organization for teaching text structure awareness.

This software was used for the second experimental group that benefited from the computer-based programs for raising text structure awareness. It has a friendly environment that videos and images can be joined to generate attractive videos. In addition, subtitles and credits can be added along with narrations. It has been developed in 64 languages. One of the advantages of windows moviemaker is that the working Mode is offline meaning that users do not need an internet connection to use it after installing. This software can be operated in systems Win XP, Vista, 7, 8, 10, and 11.

### *3.2.4. X-Mind 8 Pro 2018*

Technological development has contributed to the utilization of new technical equipment. Mind-mapping software is used to help language learners comprehend the texts (Davis, 2011). Mind mapping software helps learners grasp the organizational arrangement of a text, determine the type of the text structure, and locate signaling devices (Al-Jarf, 2021). According to Buzan (2006), mind mapping uses both sides of the brain making them work together
and thus expanding memory retention. It is performed by showing systematic structures through a spatial image that the individual learner generates. This software is considered an effective tool in the educational environment as it gives a visual representation of the main parts of a whole and their connection and as a result enables a full comprehension of the texts (Jiang & Grabe, 2007). More specifically, this software is appropriate for expository texts that are currently worked on in reading comprehension courses at the university level in Iran. According to Jiang and Grabe (2007), expository texts have patterns such as description, definition, sequence, procedure, cause-effect, classification, comparison-contrast, and problem-solution. Thus, mind-mapping software can be applied to place the emphasis on text structures and help to promote reading comprehension. It can be used to develop insights, take notes, stimulate ideas, and enhance memory (Buzan, 2006).

Mind mapping software can be a guide for learners for the text structure and thus facilitates the attainment in their reading comprehension skills through strengthening their comprehension of the texts (Davies, 2011). In this regard, Grabe (2009) emphasizes explicit teaching of text structure and argues that students should know that texts have rhetorical structures that organize information in a passage.

Mind mapping activities require learners to make a relationship between their prior knowledge and new information. This involves learners in their learning process. Therefore, students can be assisted to develop mind maps and at the same time make use of their knowledge of text structures to improve their reading comprehension.

X-Mind 8 Pro (2018) is a very effective sophisticated mind map application that helps users to support their ideas. It is free and has a very well- organized and user-friendly interface that enables users to manage and save each brainstorming as a different workbook. Users can also use it to generate interactive presentations (Nair & Farei, 2017). Like the previous application, this free software was only used for the second experimental group.

### 3.3. Procedure

First, the participants were selected through the administration of QPT and were randomly assigned into three groups. There were two experimental groups, namely, TSA and TSA+CBI, and one control group. They were informed concerning the objectives of the study, and their informed consent was obtained. For each group, ten 2-hour sessions of reading instruction were implemented.

The students in the TSA group (N= 29) underwent text structure instruction in a face-to-face classroom setting inspired by the strategies mentioned by Roehling et al. (2017). In the first two sessions after the pretest administration, the participants were provided with different types of expository texts. In the third session, signal words that were commonly used in the expository texts were practiced. The students carried out the related tasks of identifying signal words with the help of the teacher and cooperatively worked on the selected texts. Then in the fourth session, part of the instruction focused on teaching how to draw graphic organizers for a given text structure and sufficient instruction was presented regarding how to ask guiding questions of the organization of the communication in the text. Guiding questions were used as teaching complements for deepening the students' understanding of text structure and encouraging collaboration among them. For every text structure, two or three guiding questions were formulated. For each text, the students worked in groups by asking guiding questions to reach the appropriate and target text structure. In the fifth and sixth sessions, they were taught and practiced to use the final strategy that was, summarizing the text. The students were encouraged to make a summary of the text they had worked on, which could assist their comprehension process more. From this point, every two sessions, one expository text structure was thoroughly practiced in the class in addition to homework assignments, requiring the students to apply the strategies and

receive the teacher's feedback for the next class.

The second experimental group (TSA+CBI) comprised 27 students who received instruction on text structure through using two computer programs, namely, mind mapping software and windows moviemaker. Two sessions were devoted to helping the participants how to use these applications in the reading classroom. Then, the teacher used Mind mapping software and focused on teaching signal words that appeared in the reading passages to signal the text structure. Mind mapping software helped students to monitor the lines of argumentation and detect signal words that might denote the underlying concept of the reading text. The teacher encouraged the learners to draw mind maps to help them comprehend the organizing arrangement of the reading passages by locating key ideas, distinguishing the structure type, and finding signal words. The teacher also provided instruction on how to identify the clue words and asked the students to draw mind maps for the main words. Then, the teacher worked on graphic organizers. For this purpose, Mind mapping was used as a type of graphic organizer. The students were asked to draw maps. They wrote central ideas and linked them to the related minor ideas. The students wrote a word for the topic of the reading text at the center of the mind-mapping screen. Next, they started to read the text and added the main branches for each subtopic. They drew sub-branches when they found important details that were closely related to a specific topic. In this way, they made a general picture of the ideas in the passage. The following mind map is an example of words that signal chronology in a reading text.

**Figure 1**

*Sample Mind Map for Words That Signal Chronology*


Guiding questions were also offered for each text structure to stimulate discussion on text structure and enhance textual awareness- raising. The teacher provided the students with instruction on how to summarize the texts with different tones of writing about their structures so that they could

consolidate the main information in the text. To this end, the students prepared video narratives based on the texts through Windows Moviemaker that typically lasted between 2 to 10 minutes. The students were instructed how to plan and organize the elements of the video narrative in relation to putting images, text, coherence, music, and the tone of the voice. They read the texts on screens and then converted them into a short video-narrative while the focus was highlighting the structure of the text. These narratives could be saved and shared by the students.

The platform for conducting the reading tasks was Skype through which learners took part in online collaboration of doing the identification, selection, organization, and summarizing exercises. The teacher provided online and offline supports to facilitate the use of applications. In addition, the teacher- generated WhatsApp group to communicate with the students during conducting the study.

The students in the control group (N = 31) were given three common stages of reading comprehension as a pre-reading, while reading, and post-reading. In the stage that was pre-reading phase, warm-up exercises were practiced in the classroom to activate the participants' background knowledge. Then, the teacher in the while-reading part encouraged students to go through the text and study what they had previously discussed to get a general image of the text. Finally, in the post-reading stage, the students concentrated on comprehension questions in groups to demonstrate their comprehension and maneuver on their knowledge of the topic by asking more reflection questions by the teacher to extent classroom interactions.

Before the study, the three groups were given a pretest to measure their initial reading comprehension. Furthermore, after the accomplishment of the treatment, the three groups sat for the posttest. The three groups' performance in the posttest was compared to inspect the possible differences in terms of reading comprehension scores. Moreover, within- group performance was assessed for the three groups to measure the possible progress from the pretest to the posttest.

### 3.4. Data Analysis

In order to investigate the comparative effects of the two TSA and TSA + CBI, initially, the mean scores of the students' reading comprehension were analyzed descriptively. The reading test scores were fed into the Statistical Package for the Social Sciences (SPSS, Version 24). Then, one-way ANCOVA was run to provide an answer to the research question.

## 4. Results and Discussion

### 4.1. Results

First, the main assumptions of ANCOVA were examined. It was established that the covariate (i.e., pretest) was measured before introducing the treatment. Therefore, the scores on the covariate were not affected by the intervention. The internal consistency for the reading tests was estimated by calculating Cronbach alpha to make certain that there was no error in measuring the covariate. In addition, a well-validated scale was used to measure the pretest of reading comprehension. Besides, a linear association was found between the dependent variable and the covariates. The following Scatterplots supported the linearity between the covariate and the dependent variable.

With respect to the Homogeneity of regression slopes, it was noticed that the association between the covariate and the dependent variable for each of the three groups was equal. Furthermore, it was established that the groups were selected randomly and the samples were independent. It was evaluated by examining the design of the study. The assumption of normality was examined by running the Shapiro-Wilk test (See Table 2).

**Figure 2**

*Scatter Plot for the Covariate and the Dependent Variable*

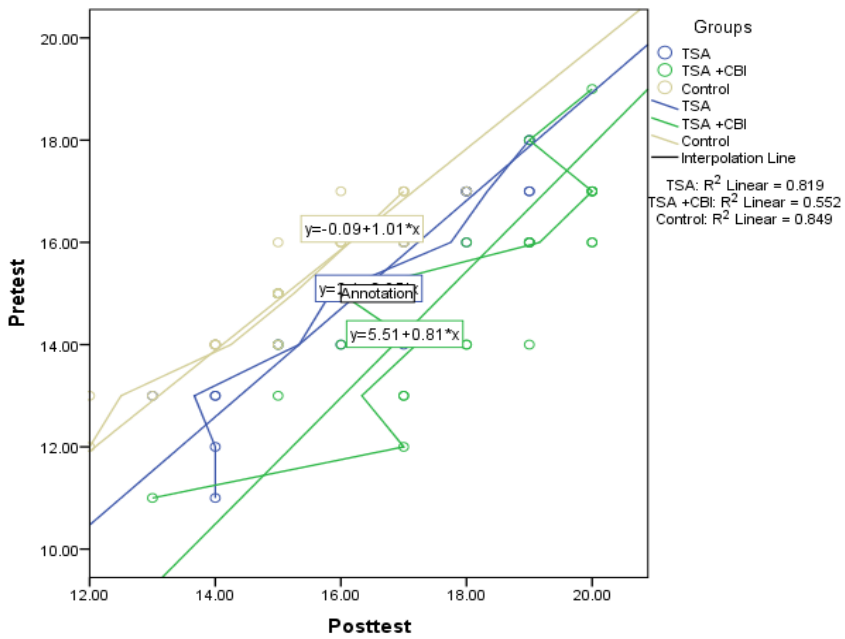


**Table 2**

*Shapiro-Wilks Test for the Reading Comprehension Test Scores*

| | Groups | Shapiro-Wilk | | |
|---|---|---|---|---|
| | | Statistic | *df* | Sig. |
| Pretest | TSA | .955 | 29 | .249 |
| | TSA +CBI | .976 | 27 | .770 |
| | Control | .931 | 31 | .045 |
| Posttest | TSA | .922 | 29 | .035 |
| | TSA +CBI | .902 | 27 | .015 |
| | Control | .944 | 31 | .107 |

Tabachnick and Fidell (2007) stated that the conventional alpha levels of ($\alpha$ = .01 and $\alpha$ = .001) are typically used to interpret the normality assumption. It was concluded that the scores were normally distributed. Consequently, the assumption of normality was met. The homogeneity of variance was assessed by Levene's F Test through which the equality of the variances of the distributions across the three groups was examined (See Table 3).

**Table 3**

*Homogeneity of Variances Test for the Reading Comprehension Scores*

| | Levene Statistic | *df1* | *df2* | *Sig.* |
|---|---|---|---|---|
| Pretest | 1.68 | 2 | 84 | .191 |
| Posttest | 3.05 | 2 | 84 | .052 |

Since the Sig. values were greater than alpha of .05 (p> .05), it was inferred that the three groups' variances were homogeneous. After establishing the main assumptions of the One-Way ANCOVA test, descriptive statistics were computed to summarize the pretest and the posttest scores (See Table 4).

**Table 4**

*Group Statistics for the Reading Comprehension Scores of the Three Groups*

| | | N | Mean | Std. Deviation |
|---|---|---|---|---|
| Pretest | TSA | 29 | 15.10 | 1.77 |
| | TSA +CBI | 27 | 15.11 | 1.84 |
| | Control | 31 | 15.06 | 1.31 |
| | Total | 87 | 15.09 | 1.63 |
| Posttest | TSA | 29 | 16.37 | 1.85 |
| | TSA +CBI | 27 | 17.74 | 2.01 |
| | Control | 31 | 15.19 | 1.44 |
| | Total | 87 | 16.37 | 2.04 |

With regard to the pretest, the first experimental group slightly performed better than the control group. Moreover, the second experimental

group gave slightly better results than the control group. When it comes to the posttest, the control group's mean score was 1.18 points smaller than the mean of the first experimental group and 2.55 points smaller than the second experimental group. Tests of Between-Subjects Effects were run to examine the homogeneity of regression slopes (See Table 5).

**Table 5**
*Tests of Between-Subjects Effects*

| Source | Type III Sum of Squares | *df* | Mean Square | *F* | *Sig.* |
|---|---|---|---|---|---|
| Corrected Model | 284.40[a] | 5 | 56.88 | 62.19 | .000 |
| Groups | 4.87 | 2 | 2.43 | 2.66 | .076 |
| Pretest | 183.34 | 1 | 183.34 | 200.46 | .000 |
| Groups * Pretest | 1.57 | 2 | .78 | .85 | .427 |
| Error | 74.08 | 81 | .91 | | |
| Total | 23699.00 | 87 | | | |
| Corrected Total | 358.48 | 86 | | | |

a. R Squared = .793 (Adjusted R Squared = .781)

The probability value was .427. The significance level of the interaction was greater than .05, thus the assumption of homogeneity of regression slopes was also established. One-way ANCOVA was used to examine the effect of the treatment on TSA as well as TSA + CBI while controlling for pre-test scores (See Table 6).

*Table 6*
*ANCOVA Test for the Reading Comprehension Test Scores (Pretest and Posttest)*

| Source | Type III Sum of Squares | *df* | Mean Square | *F* | *Sig.* | Partial Eta Squared |
|---|---|---|---|---|---|---|
| Corrected Model | 282.82[a] | 3 | 94.27 | 103.43 | .00 | .78 |
| Posttest | 189.19 | 1 | 189.19 | 207.56 | .00 | .71 |
| Groups | 90.53 | 2 | 45.26 | 49.66 | .00 | .54 |
| Error | 75.65 | 83 | .91 | | | |
| Total | 23699.00 | 87 | | | | |
| Corrected Total | 358.48 | 86 | | | | |

a. R Squared = .789 (Adjusted R Squared = .781)

There was a statistically significant difference among the groups on posttest, $F$ (2, 83) = 49.66, $p$ = .00, partial eta squared = .54. Based on Cohen's (1988) guideline, the effect size was strong. Using the Scheffe test, multiple comparisons were made to show which pairs differed significantly (See Table 7).

**Table 7**

*Scheffe Test for Multiple Comparisons (Posttest)*

| (I) Groups | (J) Groups | Mean Difference (I-J) | *Sig.* | 95% Confidence Interval | |
|---|---|---|---|---|---|
| | | | | Lower Bound | Upper Bound |
| TSA | TSA +CBI | -1.36* | .00 | -1.88 | -.83 |
| | Control | 1.18* | .00 | .67 | 1.69 |
| TSA | TSA | 1.36* | .00 | .83 | 1.88 |
| +CBI | Control | 2.54* | .00 | 2.02 | 3.06 |
| Control | TSA | -1.18* | .00 | -1.69 | -.67 |
| | TSA +CBI | -2.54* | .00 | -3.06 | -2.02 |

*. The mean difference is significant at the 0.05 level.

The results of the Scheffe test for the posttest revealed that in the second administration of the reading comprehension test, the mean score of the control group was lower than the means reported by the two experimental groups. The highest mean difference was between the second experimental group and the control group (Mean difference = 2.54). In addition, the difference between the two experimental groups was statistically significant (mean difference= 1.36; $p \leq .05$). Consequently, the findings suggested that a statistically significant difference was found between the effects of raising text structure awareness in a face-to-face class and through the CBI on Iranian EFL students' reading comprehension. Figure 3 depicts the means of the groups for the pretest and the posttest of reading comprehension.

## 4.2. Discussion

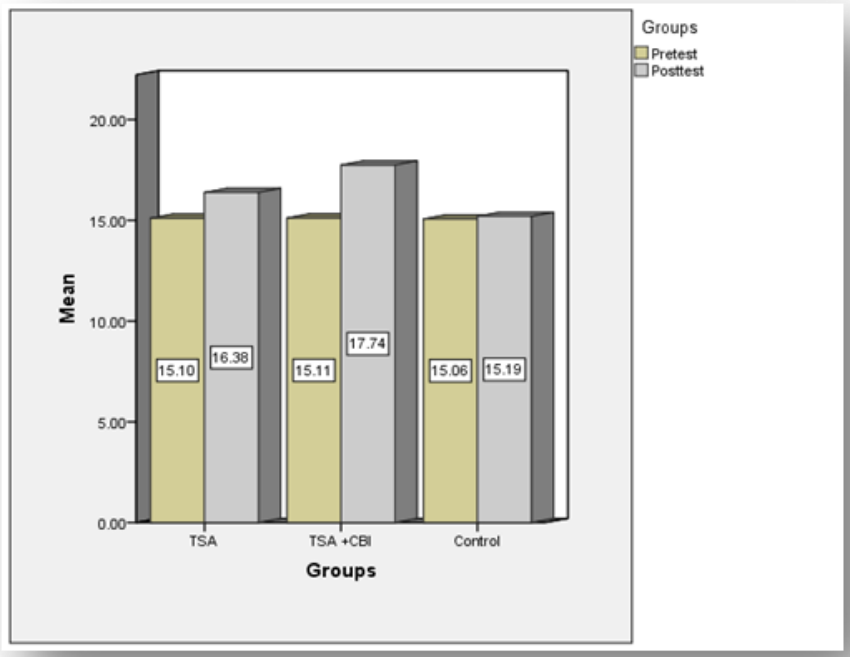
The results of the statistical analysis showed that there were statistically significant differences between the control and the experimental groups in the posttest. Moreover, the mean difference between the first and the second experimental groups was statistically significant in the posttest of reading comprehension. Consequently, it was found that the effects of raising text structure awareness in the face-to-face language classes and raising text structure awareness through CBI on Iranian EFL students' reading comprehension were statistically different.

CBI of text structures using mind mapping software and windows moviemaker provided supportive functions for developing EFL learners' reading comprehension. Similar to the findings of other researches (Akhondi et al., 2011; Hebert et al., 2016; Jones, 2016) it was found that successful readers seemed to draw upon their knowledge of the text structures. This confirms the findings of the earlier researches on the use of CBI for teaching reading skill (Chen, 2011). Results showed that when students had the skill to identify text structure, their reading comprehension was developed in a more facilitative way. Similarly, text structure instruction through computer software in the platform of Skype resulted in students' success in reading

comprehension. This was in line with the previous studies that claimed modern technology could support strategy-based reading instruction (Liu et al., 2010). The output from the statistical analyses demonstrated that the students' reading comprehension in the two experimental groups improved after accomplishment of the study. This suggests that well-designed instruction whether implemented in face-to-face class or CBI removes the learning barriers and develops their language learning.

**Figure 3**

*Means of the Three Groups for the Reading Comprehension (Pretest and Posttest)*




The findings of the study are in agreement with Ghorbani et al. (2019) and Roehling et al. (2017) who concluded that teaching students to use signal words in summarizing the text could be quite helpful in doing the reading tasks with less difficultly as they are aware of text structure. Students' practices of drawing graphic organizers led to their success in carrying out reading tasks and comprehending the text more easily as supported by studies (e.g. Meyer et al., 2012). As argued by Hebert et al. (2016), to enhance students' familiarity with text structure, they are taught to ask guiding questions regarding the structure and organization of the text, which fosters more learners' communication and reading comprehension improvement, as proved in this study. Providing students with an awareness of text structure

explicitly has also been acknowledged by Schwartz et al. (2017), stating that there are some cases in which explicit awareness-raising of students has to be done to avoid misunderstanding of the signal words, particularly in more difficult texts.

The results proved that CBI in reading comprehension could be productive to enhance the learners' efficiency by involving them in an interactive learning environment. Besides, when the textual information is given through the spatial graphic by mind mapping software, it is likely to improve comprehension and results in the employment of a greater number of strategies (Suzuki et al., 2008). The second experimental group that received CBI did better than the control group as well as the first experimental group and it seemed that mind-mapping software prompted a higher incidence of inferential reasoning and thus led to better text structure awareness-raising. Finally, yet importantly, CBI enabled students to carry out the reading comprehension tasks with having many options to manipulate the task and easily share it with their peers and receive peer feedback as well (Habib et al., 2019). Windows moviemaker gave readers rich background knowledge of different features of the text structure such signal words, specific words recognition, and so forth when they were preparing video narratives.

## 5. Conclusion and Implications

The analysis of the pretest and the posttest showed the students' significant improvement in reading comprehension through TSA + CBI. It is concluded that having the skills and strategies to comprehend printed information through using computer programs is likely to play a significant role in the students' reading comprehension achievement. The point is that awareness- raising nature of the text structure instruction is very important as it facilitates the students' comprehension by attending to the signal words and understanding the organization of ideas within the text. This study showed that it is possible to use computer programs such as mind mapping and moviemaker to give language learners more strategic choices and chances for reading authentic materials and help them implement practical strategies to improve their reading comprehension.

Teachers can rely on TSA integrated with CBI as an effective strategy to trigger students' creativity in tracking the signal words affecting the structure of the text. Raising learners' awareness of text structure through CBI can result in more peer interactions through asking guiding questions to figure out the most appropriate signal word that fits the semantic aspect of the text. In addition, when students are practicing summarizing the text while making videos through the windows moviemaker, they are engaged in a cooperative learning environment to use the correct signal words in conveying the meaning. They discuss the structure of the texts to determine

the appropriate structure type.

The study provided initial insights into the use of computers in reading classes. The implication is for teachers to draw on attribution theory in reading comprehension courses. They need to consider both the external factors such as text structure as well as the internal factors such as activating learners' prior knowledge for helping them make appropriate inferences regarding the information in the text through applying technology. In addition, the findings shed light on a series of related questions for future explorations into the nature of computer-based reading comprehension instruction. Nevertheless, the study suffers from some limitations. Computer-based instruction needs equipment and facilities that are currently limited in many universities. It also requires trained teachers to train students on using the text structure strategy through computer programs. The study took place in a university that technical support was managed, the teacher possessed the technical knowledge about using computer programs for teaching reading, and two sessions were held for the students to improve their familiarity in terms of working with moviemaker and x-mind software. However, a short instruction on how to integrate technology into the classroom is not sufficient to improve teachers and students' computer literacy and prepare them for the complexities of reading through computers. Accordingly, CBI may not be effective for all students in the same way. In other words, implementing CBI requires that the participants have the necessary knowledge and skill to use computers. Furthermore, the data for this study was merely quantitative. More qualitative data, such as observations and interviews can be conducted to understand other positive features of CBI in foreign language teaching. Finally, yet importantly, future studies may explore factors relating to individual differences in CBI such as the students' learning styles or gender.

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