

Results

Upon analysis of the data collected from pre and post tests, The mean deviation score increased from 4.33 on the pre-test to 5.67 on the post-test, indicating an improvement in reading comprehension. The average growth when participants utilized concept mapping was 1.33 with some participants showing growth up to 3 points.

A histogram was used to display the frequency distribution of scores for the post-test among 15 participants with a mean of 5.67 and a standard deviation of 2.02. The histogram showed a roughly bell-shaped distribution, with the majority of participants receiving scores close to the mean. The histogram provided a visual representation of the distribution of scores and allowed for the identification of any patterns or outliers.

As a test of the hypothesis that the use of concept mapping before reading and after reading will improve reading comprehension an paired t test was conducted. The mean deviation score increased from 4.33 (SD=1.98) on the pre test to 5.67 (SD=2.02) on the post test. The difference between the two means is statistically significant $t(14) = -4, p < .001$ (see table 1.1), The fact that the probability of obtaining such a difference by chance is very low (less than 1 in 1000) means that the results of the test comparing the pre-test and post-test scores are statistically significant. Therefore, it can be concluded that the use of concept mapping before and after reading is an effective strategy to improve reading comprehension. This is supported by the evidence against the null hypothesis, which can be rejected.

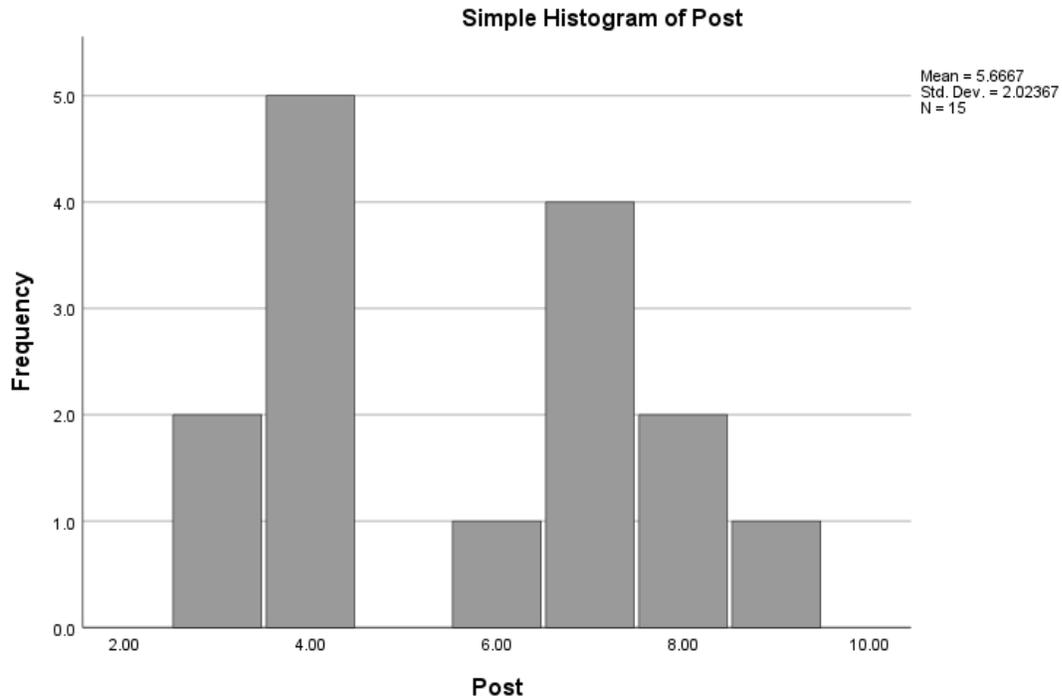


Figure 1.1. Histogram for frequency of scores for the **post test** for 15 participants

Table 1.2. Individual *t*-Test Results

		Paired Samples Statistics			
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre	4.3333	15	1.98806	.51331
	Post	5.6667	15	2.02367	.52251

Conclusions

Based on the data and research, it can be concluded that the use of concept mapping before and after reading is an effective strategy to improve reading comprehension for adult English language learners. The results of the paired *t*-test conducted on pre-test and post-test scores indicate a statistically significant increase in mean deviation score, providing evidence in support of the hypothesis.

Chang, Sung, and Chen (2002) also found that concept mapping can enhance text comprehension and summarization. Similarly, the study by Kalanzadeh, Maleki, and

Raz (2014) found that the use of concept maps improved reading comprehension among EFL learners. Phan (2017) also reported positive effects of concept mapping on EFL students' reading comprehension.

However, it is worth noting that the data presented in the study adds to the existing literature by providing evidence specifically for the use of concept mapping in improving reading comprehension for adult ESL learners. The study conducted by Burt, Peyton, and Van Duzer (2005) examined how adult ESL reading instruction should differ from ABE reading instruction, but did not focus specifically on the use of concept mapping. Therefore, the data presented in the current study extends the existing literature by providing evidence for the effectiveness of concept mapping in the context of adult ESL reading instruction.

The findings of this research are important for both educators and adult ESL learners. For educators, the results suggest that the use of concept mapping as an instructional tool before and after reading can be an effective strategy for improving adult ESL learners' reading comprehension. This finding can help inform the design of future instructional approaches and interventions that aim to improve the reading skills of adult ESL learners.

Moreover, the use of concept maps can help educators identify areas where learners may be struggling with reading comprehension, such as identifying main ideas, understanding the relationships between ideas, or identifying key vocabulary terms. This can inform targeted instruction to address these areas of difficulty and improve learners' overall reading proficiency.

For adult ESL learners, the use of concept maps can provide a visual tool to help them organize and categorize the information they are learning. This can make the reading process less overwhelming and help learners to more effectively engage with and retain information. By improving their reading comprehension, learners may also feel more confident in their language abilities and be better equipped to navigate academic or workplace settings that require strong reading skills.

While this study provides evidence for the effectiveness of concept mapping in improving reading comprehension in adult ESL learners, further research could be conducted to extend these results. One potential topic of study could be to investigate the long-term effects of concept mapping on reading comprehension. This study only measured immediate post-test scores, so it would be interesting to see if the effects of concept mapping are sustained over a longer period of time.

Future research could also explore the effects of different types of visual organizers on reading comprehension in adult ESL learners. This study specifically focused on concept mapping, but there are other visual organizers, such as graphic organizers and mind maps, that could also be effective in improving reading comprehension.

Another area for future research could be to investigate the effectiveness of concept mapping on reading comprehension in different contexts. This study was conducted in a classroom setting, but it would be interesting to see if concept mapping is equally effective in other settings, such as independent study or online learning environments.

In summary, the present study provides further evidence for the effectiveness of concept mapping as a strategy to improve reading comprehension in adult English language learners. These findings are consistent with previous research by Chang, Sung, and Chen (2002), Kalanzadeh, Maleki, and Raz (2014), and Phan (2017), and are supported by the recommendation of Burt, Peyton, and Van Duzer (2005) to incorporate visual organizers such as concept maps in adult ESL reading instruction.

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