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The Impact of Semantic Mapping on Reading Comprehension Among Moroccan EFL Students

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Abstract

Research indicates a relationship between vocabulary complexity and reading comprehension skills of EFL learners. Expanding vocabulary can improve comprehension, but increasing the number of words may not be enough. Direct vocabulary instruction is less effective than semantic mapping techniques, which involve creating interconnected maps of vocabulary terms to activate readers' existing background knowledge. This study investigates the efficacy of semantic mapping as a pre-reading strategy for improving reading comprehension of cultural texts among beginner EFL learners in Morocco. A quasi-experimental research design was used, with experimental and control groups assigned according to the Macmillan's Language Hub placement test. The experimental group was taught through semantic mapping and the control group received direct vocabulary teaching. The experiment lasted for eight sessions, with a pre-test and post-test administered along with individual interviews. Data were analyzed using SPSS and subjected to a repeated measures ANOVA. Results indicate that semantic mapping yielded significant improvements at the inferential level of reading comprehension, but no significant effects were observed at the literal level. Research implications and future directions are discussed.

1. INTRODUCTION

The goal of learning a second language (L2) is to develop the ability to read and comprehend written material. This ability relies on acquiring a range of interconnected strategies and skills, encompassing orthographic, cognitive, and metacognitive aspects, collectively referred to as L2 reading or reading comprehension (Grabe & Stoller, 2021). According to Yu and Zhang (2022), reading comprehension is an interactive process that involves indirect communication between the reader and the text. When readers are involved in a reading activity, they draw upon their understanding of the world, including their background knowledge on the subject, to enhance their comprehension and interpretation of the author's intended message. It is important to note that text comprehension is influenced by knowledge derived from the text itself and knowledge of the world (Kabha & Abdalaziz, 2023). Therefore, multiple factors, believed to enhance reading comprehension performance, contribute to the comprehension process (Catts, 2022).

Extensive research has focused on the relationship between vocabulary knowledge and reading comprehension, and multiple studies have emphasized the strong correlation between the two factors (Nation, 2009; Perfetti & Hart, 2002). The importance of pre-teaching vocabulary cannot be overstated as it plays a vital role in facilitating text comprehension. Before engaging in a text, students need to learn the necessary words and concepts (Grabe, 2014; Kuo & Anderson, 2010). While various factors contribute to reading comprehension, vocabulary knowledge remains a crucial determinant for accurately understanding and interpreting a text (Duke & Cartwright, 2021; Elleman & Oslund, 2019). Research has convincingly demonstrated that attempting to comprehend a text without the required vocabulary knowledge is a daunting task, if not an impossible one (Zhang & Zhang, 2022).

The process of vocabulary instruction is not a straightforward one, and various approaches have been proposed. Research has examined the impact of direct vocabulary teaching as well as the teaching of vocabulary strategies (Graves & Watts-Taffe, 2002; Hu et al., 2022; McKeown & Beck, 2004; McQuillan, 2019). In direct vocabulary teaching, teachers introduce and explain the meanings and definitions of important words before students engage in reading. This method has been shown to improve reading comprehension by providing students with a solid vocabulary foundation (Ariffin, 2021; Biancarosa & Snow, 2006; Nagy & Herman, 1987). On the other hand, vocabulary strategy instruction does not involve explicitly teaching vocabulary itself but focuses on teaching strategies related to vocabulary learning, such as semantic mapping. These strategies enable students to actively learn the required vocabulary during the pre-reading stage. This approach encourages greater engagement and critical

thinking and has been proven effective in developing students' vocabulary knowledge and comprehension skills, particularly in terms of connecting new vocabulary with prior knowledge (Beck & McKeown, 2007; Ghalebi et al., 2020; Hiebert & Kamil, 2005).

Text comprehension relies on the reader's capacity to grasp the intended meaning embedded within it (Gernsbacher, 1990; McCarthy & McNamara, 2021). This ability is influenced by a range of essential prerequisites that allow the reader to decipher the text on both linguistic and paralinguistic levels (Anderson, 1983). However, when the text contains cultural references, comprehension becomes dependent on the reader's existing vocabulary and background knowledge (McCuaig, 2023). What distinguishes the comprehension of culturally rich texts from that of regular texts is the presence of unfamiliar vocabulary intertwined with concepts derived from the target language's culture (Cai, 2013). Despite an increasing interest in understanding the comprehension of cultural material, comprehensive studies focusing on this aspect within the Moroccan context are lacking. Currently, limited research has been conducted to thoroughly explore and comprehend the specific dynamics of how L2 learners in Morocco comprehend cultural texts. Therefore, it is crucial to fill this gap by establishing a foundational understanding of the current situation in Morocco regarding the comprehension of cultural texts among L2 learners.

The primary objective of this study is to examine how the semantic mapping strategy can enhance the reading comprehension skills of A1-level EFL learners when involved in reading cultural texts. Specifically, the study aims to compare the effectiveness of two approaches: traditional word-meaning instruction, which involves pre-teaching vocabulary, and the utilization of the semantic mapping strategy for vocabulary instruction. While conventional vocabulary instruction focuses on teaching word meanings and concepts, this research focuses on evaluating the effectiveness of the semantic mapping strategy in improving reading comprehension. Importantly, the study does not aim to assess the overall reading comprehension abilities of Moroccan EFL learners. Instead, it specifically investigates the impact of the semantic mapping strategy on the literal and inferential levels of comprehension. The rationale behind this investigation is to explore how the independent variable affects learners' ability to recall and retrieve information (literal comprehension) and their capacity to make inferences (inferential level). Existing literature suggests that these two levels of comprehension are closely associated with vocabulary knowledge rather than higher levels of comprehension (Kärbla et al., 2021; Smith, 2010; Johnson & Lee, 2015).

This research paper has three main objectives. Firstly, it aims to examine the role of the semantic mapping strategy in enhancing reading comprehension by comparing its effectiveness with conventional word meaning instruction. Secondly, the study seeks to track the impact of

the independent variable and understand its cognitive trajectory. This involves investigating how the independent variable may affect the literal and inferential levels of comprehension, exploring whether one level is influenced more than the other. These assumptions provide the foundation for the current study. Lastly, the research aims to explore students' perceptions of the use and usefulness of the semantic mapping strategy through unstructured interviews. In short, the paper aims to provide potential answers to the following research questions:

RQ 1: To what extent does the utilization of the semantic mapping strategy impact the ability of EFL learners to comprehend cultural texts during the process of reading?

RQ 2: Which level of comprehension - literal or inferential - is more significantly influenced by the utilization of the semantic mapping reading strategy during the process of comprehending cultural texts?

RQ 3: What are students' perceptions of the use of the semantic mapping strategy?

1. LITERATURE REVIEW

2.1 READING COMPREHENSION

2.2.1 THE MULTIFACETED NATURE OF READING COMPREHENSION

Reading comprehension is a multifaceted construct that can be understood as both a process and an outcome. The process of reading comprehension entails the development of linguistic skills and the acquisition of knowledge through the act of reading and comprehending diverse textual materials (Nagy & Anderson, 2017). This developmental process can enhance readers' vocabulary repertoire and deepen their understanding of the world, particularly when reading culturally-loaded texts (Graesser et al., 2018).

Conversely, reading comprehension can also be viewed as a dynamic outcome that emerges when readers integrate their cognitive abilities and knowledge to comprehend the intended meaning of a text. It can be considered a "point of arrival" that requires the fulfillment of several prerequisites (Kendeou et al., 2019). For instance, readers must possess sufficient background knowledge, relevant vocabulary, and specific reading strategies and skills to effectively comprehend the text. Moreover, reading comprehension necessitates the integration of bottom-up processes (e.g., word recognition, syntax, and semantics) and top-down processes (e.g., schema activation and inference generation) that enable readers to comprehend the text's meaning (Perfetti & Stafura, 2014).

Scholars have also noted that reading comprehension is a complex and interactive process that involves the interaction between the reader and the text, as well as the reader's sociocultural and individual factors. The reader's prior knowledge, experiences, interests, motivation, and cognitive processes influence his/her relationship to the text and ultimately impact

comprehension (Alexander & Jetton, 2021). Furthermore, the text's genre, complexity, coherence, and purpose play a significant role in shaping the reader's comprehension processes (Gernsbacher & Varner, 2018).

In summary, reading comprehension is a multifaceted construct that encompasses both a developmental process and an emergent outcome. To comprehend a text effectively, readers must have the necessary linguistic skills, knowledge, and strategies, as well as the ability to integrate bottom-up and top-down processes. Ultimately, reading comprehension is a complex and interactive process that involves the interplay between the reader and the text, as well as the reader's sociocultural and individual factors (Cain & Oakhill, 2019).

2.1.2. MODELS OF READING COMPREHENSION

When it comes to reading comprehension models, theory and research have identified three crucial models of reading: (1) the bottom-up model, (2) the top-down model, and (3) the interactive model.

In the bottom-up model of reading comprehension, the understanding of a text is constructed based on its surface-level features. As noted by Gough (1985), the identification of individual words plays a fundamental role in this process. This view posits that readers must rely on their ability to recognize the lexical content of a text to reconstruct its meaning. As such, any prior knowledge or assumptions about the topic or content are deemed irrelevant, as the success of comprehension hinges solely on the identification of words.

The top-down model suggests that readers initiate the comprehension process by using their prior knowledge and relevant vocabulary before delving into the actual text (Kintsch, 1988). Rather than starting with individual text units, readers begin with broader units that incorporate background knowledge, forming a framework for understanding subsequent content (Thibadeau et al., 1980). This approach aligns with recent cognitive psychology research, which reveals that readers actively infer and predict while reading (Kuperberg, 2020). According to the top-down model, readers construct meaning by integrating prior knowledge with the text, resulting in a more profound and meaningful comprehension (Goodman, 1967).

The interactive model of reading comprehension is the latest iteration that recognizes the interplay between text-based and knowledge-based processes. This approach posits that comprehension is an active engagement between the reader's background knowledge and the text to achieve a deep and meaningful understanding of the author's message. This model acknowledges that comprehension is dynamic, contextual, and influenced by various factors. It offers a more holistic and nuanced understanding of reading comprehension that can aid in developing effective strategies for teaching and assessment. In this regard, several research

papers have examined this model's working mechanisms, theoretical underpinnings, and its empirical implementations (Hu & Zhang, 2022; Kostons et al., 2021).

2.1.3. COGNITIVE TAXONOMY OF READING COMPREHENSION

Examining reading comprehension solely through the assessment of test items included in general reading comprehension tests is inadequate for fully comprehending the nature of the construct. Hence, the cognitive dimension of the reading comprehension construct should be acknowledged. One approach to analyzing the construct is illustrated in the revised version of Bloom's taxonomy of learning objectives, which divides the construct into three levels of comprehension (literal, inferential, and evaluative) based on the cognitive demands of each level of items imposed on the learner. This three-level guide, also known as the three levels of reading comprehension, was first proposed by Herber (1970), and subsequently expanded by Vacca and Vacca (1999).

At the literal level of comprehension, readers are required to retrieve and recall explicitly stated information from the text (Cooter & Flynt, 1996; Vacca & Vacca, 1999). This level of comprehension necessitates a word-by-word analysis of the text to understand the intended meaning. For instance, readers must be able to understand the meaning of unfamiliar words or phrases, recognize the sequence of events, and identify the main ideas and supporting details within the text.

At the inferential level of comprehension, readers merge explicit information from the text with their background knowledge to make inferences (Cooter & Flynt, 1996; Vacca & Vacca, 1999). This deeper comprehension level entails understanding implicit meanings, such as predicting outcomes, drawing conclusions, and recognizing cause-and-effect relationships. However, it is worth noting that the boundary between literal and inferential comprehension is often blurred, as these levels interact and overlap (Perfetti, Landi, & Oakhill, 2005).

Finally, the evaluative level of comprehension is the highest level proposed, as it requires readers to draw extensively on their ability to read between the lines to identify relationships among information and understand the author's intended meaning.

Although there exist textbooks and studies related to the three levels of comprehension in classrooms (Cooter & Flynt, 1996; Vacca & Vacca, 1999), the literature on the application of these levels in the field of L2 acquisition and teaching in Morocco is scarce. Thus, this study seeks to examine the feasibility of applying these levels in the context of EFL in Morocco.

2.2. VOCABULARY PRE-TEACHING, SEMANTIC MAPPING, AND READING COMPREHENSION

Numerous research studies have been carried out to examine the effectiveness of pre-reading activities in improving and facilitating learners' reading comprehension, with a significant

portion of the studies supporting their positive impact. To further enhance learners' reading comprehension abilities, educators often employ various pre-reading activities, including semantic mapping, which is a vocabulary strategy used to pre-teach vocabulary. These pre-reading activities have been tested on different cultural contexts and texts through various experiments. The subsequent literary works serve as a mere handful of illustrations for, first, the effectiveness of the semantic mapping strategy and, second, the pre-teaching vocabulary effect in reading comprehension on a general basis.

The effectiveness of utilizing semantic mapping as a pre-teaching technique has not been thoroughly examined in either individual works or comparative studies that aim to compare it to other pre-teaching methods. For instance, a study conducted by Thuy and Yen (2018) sought to investigate the usefulness of the semantic mapping strategy and questioning as pre-reading activities and determine if one treatment is significantly more effective than the other. The study was carried out on a population of high school students, using a quasi-research design with two treatment groups: the semantic mapping group and the questioning group. The results of the study revealed that both groups demonstrated a noteworthy enhancement in their Reading Proficiency Test scores. However, the semantic mapping group performed significantly better than the questioning group. This indicates that pre-reading activities can be helpful in building new schemata or activating existing ones. Additionally, the study shows that not all pre-reading activities are equally effective, with the semantic mapping strategy proving to be more effective than the questioning method.

In a similar vein, Oudjedane and Benhamlaoui (2021) conducted a quasi-comparative study in which they examined the efficiency of pre-reading activities through a focus on semantic mapping and vocabulary pre-teaching among Algerian middle school learners. The intervention lasted for two weeks, two sessions per week, involving a reading comprehension pre-test and post-test. It was observed that the participants showed significant improvement in their post-test scores following the implementation of the two pre-reading activities. The effect size, as measured by the eta square statistic, was rather large, indicating a substantial impact on the outcome ($\eta^2 = .25$). Furthermore, when comparing the outcomes of the two pre-reading activities, it was observed that the group receiving semantic mapping had significantly better performance compared to the group receiving vocabulary pre-teaching, with a mean difference of = .50000. The results show that direct vocabulary taught through pictures is less significant than semantic mapping which involves the active cognitive participation of the reader.

In another study, Supramaniam and Zainal (2014) examined the effectiveness of semantic mapping on reading comprehension among EFL secondary school students in Malaysia. The researcher implied an only-experimental group design in which the 10 participants were all

assigned to the experimental group, with no control group. The semantic exposure treatment was carried out for two weeks during which a pre-test and post-test were administered. The researchers used a Reading Comprehension Test (RCT) without semantic mapping and an RCT with semantic mapping along with interviews to investigate learners' perceptions of the use of the semantic mapping strategy. Using statistical analysis, the results showed that the mean scores of the learners were higher in Test 2 (posttest) than in Test 1(pretest), indicating a significant improvement in reading comprehension following the implementation of the semantic mapping strategy. Furthermore, qualitative analysis of the interview data indicated that students reported greater enjoyment and improved learning outcomes when the semantic mapping strategy was used.

Very recently, Sinambela et al., (2023) examined the impact of mind mapping and semantic mapping on the reading comprehension of eleventh-grade high schoolers. The study utilized a quasi-experimental design with three groups: two experimental groups were assigned to the mind mapping and semantic mapping strategies, respectively, while the third group received conventional teaching methods as a control condition. The author utilized a reading test consisting of a pre-test and a post-test as the primary data collection instrument. Conducting an ANOVA test, the results indicated that the probability value was greater than the alpha level ($P = 0.52 > 0.05$) and that the F count value was greater than the F table value (F count = 7.65 > F table = 2). These findings suggest that there was a statistically significant effect on students' reading comprehension achievement, leading to the acceptance of the alternative hypothesis (Ha) and the rejection of the null hypothesis (Ho). Consequently, it can be concluded that both Mind Mapping and Semantic Mapping strategies had a significant impact on improving students' reading comprehension in narrative text.

Based on the literature reviewed in this paper, it can be posited that pre-reading activities play a fundamental role in the process of reading comprehension. Among these activities, the semantic mapping strategy has been found to be an effective approach for activating readers' schema through cognitive mapping, as demonstrated in the reviewed studies. However, the existing literature on this topic is limited to the comprehension of regular texts, with no empirical evidence available on the use of semantic mapping for the comprehension of cultural texts. Therefore, the present study is potentially significant in terms of investigating the effectiveness of semantic mapping for the comprehension of cultural texts. Additionally, it is noteworthy that the reading comprehension measures used in the reviewed studies were generally broad and lacked a clear delineation of the potential effects. Hence, the division of reading comprehension performance into literal and inferential levels holds considerable importance.

2.3. MOROCCAN STUDIES ON THE ROLE OF SEMANTIC MAPPING IN READING COMPREHENSION

The current body of literature regarding pre-reading strategies and their influence on reading comprehension is considerably limited, and (to the best of our knowledge) no previous investigations have explored the impact of semantic mapping on reading comprehension of cultural texts in Morocco. In fact, only a small number of studies have been conducted to examine the relationship between pre-reading strategies and reading comprehension more broadly (Madaoui, 2013; Khartite, 2021).

The topic of cultural schema and the comprehension of cultural reading material has already been presented in the Moroccan context. Charaf (2020) investigated the effect of cultural knowledge on EFL learners' listening comprehension among Moroccan third-year university students. The study was conducted to see if the absence or the presence of cultural schema is crucial on tests of recall protocol, comprehension Questions in the form of open-ended questions, and a feedback questionnaire. Results showed that learners receiving prior instruction in the cultural schema activation performed better than those receiving no cultural background knowledge. This indicates that listening skills are affected by prior instruction involving different pre-listening activities.

On a descriptive level, the article "Implications of Schema Theory on Teaching EFL and ESL Reading Comprehension: The Role of Pre-Reading Activities" by Khartite (2021) explores the implications of Schema Theory on the teaching of reading comprehension in English as a Foreign Language (EFL) and English as a Second Language (ESL) students. The author focuses on the role of pre-reading activities, such as activating schema and building background knowledge, in enhancing reading comprehension. The article provides an overview of Schema Theory and its relevance to reading comprehension, as well as practical implications for teaching pre-reading strategies to EFL and ESL learners. However, no empirical studies have been conducted on the role of semantic mapping in reading comprehension. Therefore, the Moroccan literature on the role of pre-reading activities and vocabulary teaching in reading comprehension dimensions needs further studies that fill this knowledge gap. The current paper will mainly address this knowledge gap in the Moroccan literature on pre-reading activities and reading comprehension.

2. METHODOLOGY

3.1 RESEARCH DESIGN

The investigation at hand employed a quasi-experimental research design. Although participants were assigned to two A1 groups, the placement test administered did not align with our research objectives, as it primarily assessed learners' general English knowledge rather than

their reading comprehension performance. The lack of randomization led to the adaptation of the current study into a quasi-research design, enabling manipulation of the independent variable (semantic mapping)

3.2. POPULATION, SAMPLING, AND SETTING

In this study, we recruited 27 students who were learning English as a foreign language (EFL) at a language center in Casablanca, Morocco. The participants had achieved an A1 proficiency level according to the Common European Framework of Reference for Languages (CEFR) based on their scores on the Language Hub Placement Test (a test that measures proficiency levels from beginner to advanced). The total EFL student population at this language center underwent this placement test. The students who scored between 1-6 items were assigned to the A1 level. The finalized group of A1 students was divided into two groups: an experimental group (N=15) and a control group (N=12).

Table 1: Participants' division

Groups	Males	Females	Total
Experimental group	**9**	**6**	**N= 15**
Control group	**7**	**5**	**N=12**

The sampling technique employed in the present study was convenience sampling. This approach involved selecting two A1 groups from the available pool of A1 groups at the language center. The decision to use convenience sampling is reflected in the practicality and accessibility of the participants, as the experimental and control groups were formed based on the participants readily available for the study.

3.3. DATA COLLECTION

3.3.1. THE MULTIPLE-CHOICE READING COMPREHENSION TEST (MCRCT)

The primary instrument employed to collect data in this present study was the Multiple-Choice Reading Comprehension Test (MCRCT). This test format necessitates that the reader peruses a given passage and subsequently answers questions by selecting the most appropriate option among various alternatives. The MCRCT was selected for use in this study because of its simplicity in terms of administration, coding, and analysis. Nevertheless, it is noteworthy that an examination of students' performance on multiple-choice reading comprehension assessments at the item level can provide valuable insights for instructional purposes that cannot be obtained by merely evaluating a student's overall or global comprehension score. This assertion is corroborated by previous research studies by Alonzo et al., (2009) and other researchers.

The present Multi-Component Reading Comprehension Test (MCRCT) has been formulated based on the three-level comprehension framework proposed by Basaraba et al., (2013) and Kärbla et al., (2020). This framework builds upon Bloom's Taxonomy, a hierarchical structure of cognitive skills used for defining learning objectives. The three-level approach suggests that reading comprehension is comprised of three levels: literal, inferential, and evaluative. In the current study, we focused solely on the literal and inferential levels, as we investigate readers' recall ability and their capacity to make connections between different pieces of information.

The MCRCT was partitioned into two segments: the first segment consisted of questions at the literal level that pertain to explicit statements in the text, while the second segment consisted of questions at the inferential level. Each segment consisted of 15 question items, and in total, there were 30 items. The questions at the literal level were designed to assess the reader's capacity to recall information from the text that was presented explicitly. For example, the sample question included below evaluates the reader's ability to retrieve and recall information provided explicitly in the text.

- What is the Macy's Thanksgiving Day Parade known for? (Literal)
    a) Its large balloons and colorful floats
    b) Its historical reenactments
    c) Its patriotic songs and speeches
    d) Its delicious food and desserts

Literal reading comprehension relies on the reader's capacity to retrieve explicit information from the text. As exemplified in the previous example, the answer can be obtained directly from the text because the information is presented explicitly. For instance, the statement that Macy's Thanksgiving Day Parade is renowned for its large balloons and colorful floats is stated without any ambiguity in the text, and readers can readily retrieve this information.

Regarding inferential reading comprehension, readers must engage in a cognitive process of generating and making inferences based on implicit information that is embedded within the text. As demonstrated in the subsequent example, inferential-level questions require the reader to move beyond the surface-level or literal understanding of the text. To answer the question provided, readers must utilize additional background knowledge and infer meaning based on the implicit information presented within the text, thereby reaching a more sophisticated or inferential level of comprehension.

- Why is Thanksgiving a popular time for tourism? (Inferential)
    a. Because of the long weekend
    b. Because of the festive atmosphere
    c. Because of the historical significance of the holiday

d. All the above

3.3.2. RETROSPECTIVE INDIVIDUAL INTERVIEWS (UNSTRUCTURED)

To gain a more comprehensive understanding of how the experimental group utilized the semantic mapping strategy, we conducted one-on-one unstructured interviews. These interviews were designed to be more open-ended, giving participants the freedom to describe their experiences in their own words. Due to time constraints and limited availability, we selected six participants out of the 15 students in the experimental group to undergo these individual interviews. Each interview lasted for approximately 10 minutes. Through these interviews, we aimed to obtain deeper insights into students' thought processes, attitudes, and experiences with the semantic mapping strategy.

3.4. READING MATERIAL

The reading material utilized in this study consisted of a series of written passages, each addressing various aspects of cultural topics related to English-speaking societies, including but not limited to Thanksgiving, American Independence Day, and other cultural facets pertaining to either British or American cultures. The chosen reading materials were selected based on their correspondence to the texts students are typically exposed to in their school curricula, as per the Prepare1 Second Edition. The selection process was guided by several key criteria, including text length, difficulty level, thematic content, and relevance to the learning objectives. One of the foremost criteria was the language proficiency level, which was set at an A1 level, thereby ensuring that the selected reading materials would be accessible and comprehensible to the targeted learners.

3.5. THE TREATMENT

The treatment discussed in this paper is the semantic mapping strategy, which involves creating visual representations of the relationships between words and concepts before reading the text. Readers are encouraged to reorganize the text according to a hierarchy of concepts, starting from general to specific, to improve their understanding of the content.

For instance, when reading about Thanksgiving, one can apply semantic mapping by identifying the main idea and related concepts such as the historical origin of the holiday, its modern-day celebration, traditional foods and activities, and the social significance of the holiday. By visualizing the relationships between these concepts, readers can gain a deeper understanding of the text.

Readers can create a semantic map that includes the main idea, such as the history and traditions of the holiday, as well as related concepts such as the origin of the holiday, traditional foods and activities, and the social significance of the holiday. They can then organize these concepts

in a hierarchy, starting with the general concept of Thanksgiving and moving to more specific concepts such as the types of food served during the holiday.

3.6. PRE-TEST AND POST-TEST

To assess the effectiveness of the semantic mapping strategy, the MCRCT was utilized as both a pre-test and post-test. The pre-test and post-test have been methodically designed to eliminate the possibility of the test itself impacting the results as an extraneous variable. The passages utilized in both tests were approximately 200 words in length, as it has been determined that longer texts may impede the text processing capabilities of readers at the A1 level. Additionally, the structure, question sections, phrasing, and language level have been carefully matched between both tests. This rigorous design ensured that the MCRCT pre-test and post-test were effectively measuring the developmental trajectory of the treatment under examination.

3.7. PROCEDURES

In the initial phase, both the experimental and control groups were subjected to a pre-test, which entailed a 70-minute assessment period wherein the students were required to choose the most appropriate answer from among four options for each question. The subject matter of the pre-test was centered around the Thanksgiving celebration. Following previous discussions between the teacher and students, it was deduced that learners were unacquainted with culturally imbued texts, thus precluding the likelihood of possessing any antecedent lexicon pertaining to such topics.

During the subsequent stage, the experimental group was subjected to a treatment that incorporates the semantic mapping strategy. In the initial session following the pre-test, the experimental group was instructed on the methodology of semantic mapping and the proper utilization thereof. The students then applied this strategy prior to engaging with each reading material, functioning as a schema activation strategy with the objective of establishing cultural concepts prior to the reading task. Conversely, the control group was instructed using the pre-teach vocabulary technique, which constitutes the traditional approach entailing the direct teaching of word meaning without relying on critical thinking skills or reader involvement in the reading comprehension process. Through this means, we ensured that the control group is being subjected to a distinct vocabulary pre-teaching approach.

The intervention period lasted for four weeks, during which the experimental group was engaged in two sessions per week. In each of these sessions, the experimental group was exposed to a text that explored an L2 cultural aspect, and subsequently, responded to reading comprehension queries of varying cognitive levels. Conversely, the control group was given the same cultural texts, albeit without the implementation of the semantic mapping strategy.

The instructor diligently monitored attendance, taking note of students who have missed two sessions, thereby exempting them from this study and omitting their data from the final sampling. Lastly, the post-test was executed in identical conditions to those of the pre-test, immediately after the treatment period.

3.8. DATA ANALYSIS

Since we have an experimental group and a control group, and two dependent variables (literal and inferential comprehension), a **repeated measures ANOVA** was used to assess the effectiveness of the treatment (i.e., the utilization of the semantic mapping strategy) on both dependent variables.

A two-way between-groups ANOVA allows us to test the main effects of two independent variables (treatment and group) on two dependent variables (literal comprehension and inferential comprehension). **The repeated measures ANOVA** was used to determine if there was a significant difference in mean scores between the two groups (experimental and control) on both dependent variables, and whether the use of the semantic mapping strategy had a significant effect on both dependent variables. In addition, all statistical analyses were performed in SPSS (version 22).

3. FINDINGS

4.1. QUANTITATIVE DATA

To address the first two research questions posed in this study, we conducted a repeated measures analysis of variance (ANOVA) to examine the potential answers. This statistical analysis allowed us to compare and analyze the data collected from participants across multiple measurement points. By utilizing the repeated measures ANOVA, we were able to explore the effects of the semantic mapping strategy on the ability of EFL learners to comprehend cultural texts and determine the influence of this strategy on different levels of comprehension. The subsequent sections of this paper present and discuss the results derived from this analytical approach.

Section 1: Repeated Measures Factor: Effect of Semantic Mapping (Pretest General Score and Post-Test General Score)

Between-Subjects factor: Groups (Treatment & Conventional)

Table 2: Within Subjects Effects

	Sum of Squares	**df**	**Mean Square**	**F**	**p**
Effect of Semantic Mapping	53.2	1	53.24	7.46	0.012

Table 2: Within Subjects Effects

	Sum of Squares	df	Mean Square	F	p
Effect of Semantic Mapping ✻ Group_type	16.0	1	16.01	2.24	0.147
Residual	171.3	24	7.14		

Note. Type 3 Sums of Squares

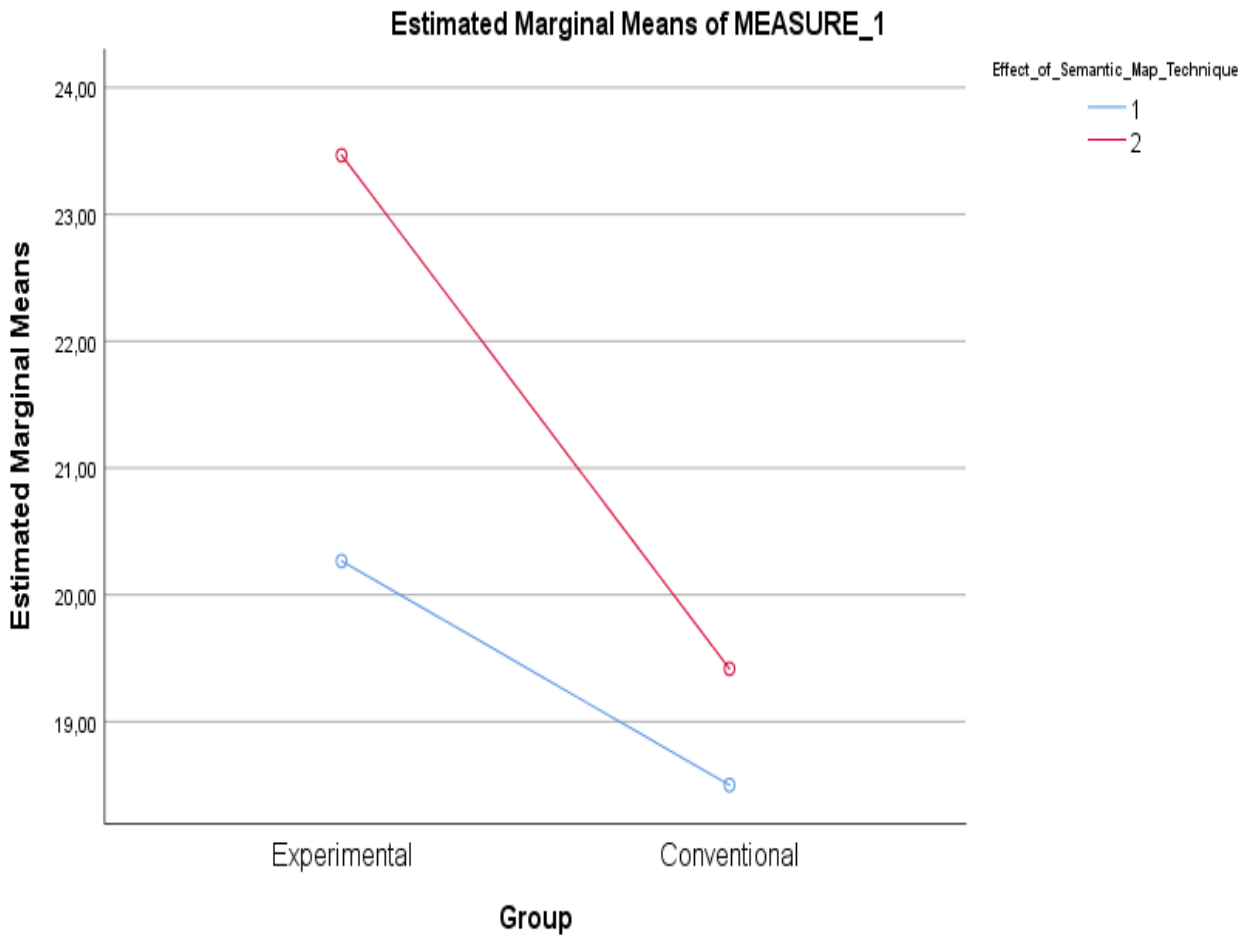
Table 3: Between Subjects Effects

	Sum of Squares	df	Mean Square	F	p
Group_type	109	1	108.6	1.84	0.188
Residual	1417	24	59.0		

Note. Type 3 Sums of Squares

Upon analyzing the overall scores, a statistically significant difference was observed between the pretest and post-test results (F (1, 1) = 7.46, p = .01), indicating a notable change in performance following the treatment. However, it is important to note that the effect of the treatment on the post-test results did not reach statistical significance (F (1, 1) = 2.24, p = .1). These results suggest that factors other than the treatment might have influenced the observed difference in scores. While the pretest-post-test comparison demonstrates a meaningful impact of the treatment, the lack of statistical significance in the post-test results highlights the need for further exploration to understand the full range of factors contributing to the outcomes.

Graph 1: Estimated Marginal Means



Following descriptive statistical analysis, an exploration of the estimated marginal means depicted in the graph above offers valuable insights into the impact of the utilization of the semantic mapping strategy on the ability of EFL learners to comprehend cultural texts during the reading process.

The observed improvement in test scores for both the experimental and control groups after the treatment suggests that there was a positive effect on the participants' comprehension abilities. Notably, the experimental group, which received instruction on the semantic mapping strategy, demonstrated superior performance compared to the control group.

Section 2: Repeated Measures Factor: Effect of Semantic Mapping (Pretest Literal RC Score and Post Literal RC Score)

Between-Subjects factor: Groups (Treatment & Conventional)

Table 4: Within Subjects Effects

	Sum of Squares	df	Mean Square	F	p
Effect of Semantic Mapping	39.04	1	39.04	6.780	0.016
Effect of Semantic Mapping ✻ Group_type	2.12	1	2.12	0.368	0.550
Residual	138.19	24	5.76		

Note. Type 3 Sums of Squares

Table 5: Between Subjects Effects

	Sum of Squares	df	Mean Square	F	p
Group_type	64.7	1	64.7	5.01	0.035
Residual	310.2	24	12.9		

Note. Type 3 Sums of Squares

An examination of literal reading comprehension scores revealed a statistically significant difference between the pre-test and post-test results ($F(1, 1) = 6.78$, $p = .01$). This indicates a notable change in literal reading comprehension performance following the treatment. The results suggest that the utilization of the semantic mapping strategy had a positive impact on participants' literal reading comprehension abilities.

However, it is important to note that the observed statistical significance cannot be solely attributed to the treatment, as indicated by the statistical test ($F(1, 1) = 0.37$, $p = .5$). This suggests that factors other than the treatment may have influenced the post-test results. Additional analyses or considerations are necessary to identify these factors and gain a more comprehensive understanding of their influence on the observed outcomes.

This analysis highlights the significant improvement in participants' literal reading comprehension scores following the treatment. However, further exploration is required to determine the specific factors contributing to the observed changes. Future studies could investigate contextual factors, participant characteristics, or other instructional elements to better understand the complex nature of literal reading comprehension and its relationship with the utilization of the semantic mapping strategy.

Section 3: Repeated Measures Factor: Effect of Semantic Mapping (Pretest Inferential RC Score and Post-Test Inferential RC Score)

Between-Subjects factor: Groups (Treatment & Conventional)

Table 6: Within Subjects Effects

	Sum of Squares	df	Mean Square	F	p
Effect of Semantic Mapping	306.4	1	306.38	67.74	< .001
Effect of Semantic Mapping ✻ Group_type	37.5	1	37.45	8.28	0.008
Residual	108.5	24	4.52		

Note. Type 3 Sums of Squares

Table 7: Between Subjects Effects

	Sum of Squares	df	Mean Square	F	p
Group_type	11.4	1	11.4	0.945	0.341
Residual	290.3	24	12.1		

Note. Type 3 Sums of Squares

An analysis of the results pertaining to inferential reading comprehension revealed significant results when comparing pre-and post-test scores ($F (1, 1) = 67.74$, $p < .01$). This suggests a substantial difference in inferential reading comprehension performance following the intervention. The observed statistical significance underscores the impact of the intervention in enhancing participants' abilities to draw conclusions and make inferences from the text.

Furthermore, even when considering both the treatment and conventional groups together, a statistically significant difference was still evident in inferential reading comprehension between the pre-and post-tests ($F (1, 1) = 8.28$, $p < .01$). This suggests that the intervention had a notable effect on improving participants' inferential reading comprehension skills, even when compared to the conventional approach.

These results highlight the effectiveness of the intervention in enhancing participants' inferential reading comprehension abilities. The statistically significant results between the pre-and post-tests emphasize the positive impact of the semantic mapping on participants' capacity to go beyond surface-level understanding and engage in deeper analysis and interpretation of the text.

The comparison with the conventional group further strengthens the evidence of the intervention's effectiveness in fostering inferential reading comprehension. The statistically significant difference between the two groups highlights, moreover, the added benefit of the intervention approach over the conventional approach in promoting inferential reading comprehension skills.

In sum, these results contribute to our understanding of the impact of semantic mapping on enhancing inferential reading comprehension abilities. They underscore the value of incorporating specific strategies, such as the one employed in the intervention, to improve students' inferential reading comprehension skills and facilitate their ability to extract meaning and make inferences from the text.

4.2. QUALITATIVE DATA

The unstructured interviews with the selected students revealed several valuable insights into learners' perceptions of the use and usefulness of the semantic mapping strategy as a pre-reading activity. The interviews with the students were all generated through a primary instruction that asks the students to give their reflections on the use of semantic mapping (Describe in detail your experience with the semantic mapping highlighting its usefulness or unusefulness). The following are some of the students' answers and reflections during the interview.

1. **Student A:** "I liked using semantic mapping because it helped me see how different ideas were related. I could understand how everything fits together, and it made it easier for me to connect different information."

Student A found the semantic mapping strategy to be useful because it helped him see how different concepts and ideas were related to each other. By using semantic mapping, he was able to gain a better understanding of the larger context and connect different pieces of information together.

2. **Student B:** "To tell the truth, I didn't really think semantic mapping was helpful. It seemed like something extra we had to do before reading the real material. I like to just start reading and figure things out as I go."

Student B did not find the semantic mapping strategy to be very useful. They felt that it was an unnecessary step that took away from the actual reading material. They preferred to dive right into the reading and figure things out as they went along.

3. **Student C:** "At first, I was a little unsure about semantic mapping. But after I got used to it, I found it helpful. It helped me organize my thoughts and get a better idea of the main ideas before I started reading."

Student C initially had some difficulty with the semantic mapping strategy, but after practicing it, they found it to be helpful. By using semantic mapping, they were able to organize their thoughts and get a better sense of the main ideas before they started reading.

4. **Student D:** "I liked using semantic mapping before reading. It helped me find the main ideas and how they were connected, which made it easier for me to understand the reading material later."

Student D found the semantic mapping strategy to be useful. They enjoyed using it as a pre-reading activity and found that it helped them identify key concepts and their relationships. By doing this, they were able to better understand the reading material when they encountered it later.

5. **Student E:** "Semantic mapping was very useful for me. I have a hard time organizing my thoughts and ideas, so the pictures of the ideas and how they are connected helped me see the whole thing and remember the information better."

Student E found the semantic mapping strategy to be useful. They struggled with organizing their thoughts and ideas, so the visual representation of the concepts and their connections helped them understand the big picture and remember the information more effectively.

6. **Student F:** "I didn't think semantic mapping was very useful at first, but when I looked back over the material later, I realized that it had helped me understand the reading better. It gave me a way to remember things, and I was able to remember the main ideas more easily."

Student F was initially unsure about the usefulness of the semantic mapping strategy, but after reviewing the material, they realized that it had helped them understand the reading better. The framework provided by the semantic map helped them recall the main ideas and make connections between different pieces of information.

By scrutinizing the interviewees' responses to the primary inquiry, we may derive significant knowledge pertaining to their perceptions of the semantic mapping methodology's efficacy as a preliminary reading procedure. Although some students encountered initial challenges in assimilating the technique, they eventually succeeded in pinpointing the crux of the matter, establishing interconnections between notions and circumstances through the application of conceptual linking, decoding the cultural underpinnings of specific terms, and, ultimately, comprehending the text at a more profound inferential level.

5. DISCUSSION

5.1. THE EFFECT OF THE SEMANTIC MS ON RC OF CULTURAL TEXTS (GENERAL EFFECT, RQ1)

In the present study, descriptive and inferential statistics were used to evaluate the effectiveness of the semantic mapping strategy as a pre-reading activity. Descriptive statistics revealed that the post-test scores had improved, indicating a marginal development in the students' reading comprehension. Meanwhile, inferential statistics showed a statistically significant difference between the pretest and posttest scores, with a significant F-value of 7.46 and a p-value of .01. However, despite the improvement in the post-test scores of both the experimental and control groups, the effect of the treatment on the results of the post-test was not statistically significant, as evidenced by a non-significant F-value of 2.24 and a p-value of .1. It is possible that the increase in scores in the experimental group may be attributed to factors other than the semantic mapping strategy, such as the short intervention period or students' pre-existing knowledge of the material.

These findings are consistent with previous studies on the effectiveness of pre-reading activities in enhancing reading comprehension. Thuy and Yen (2018) found that pre-reading activities, including semantic mapping, were effective in improving students' reading comprehension skills. Oudjedane and Benhamlaoui (2021) similarly found that pre-reading activities, such as activating prior knowledge and predicting content, improved students' reading comprehension abilities.

On the other hand, Supramaniam and Zainal (2014) and Sinambela et al. (2023) reported mixed results on the effectiveness of pre-reading activities in improving reading comprehension. In line with these studies, we suggest that the effectiveness of pre-reading activities may depend on various factors, such as the nature of the reading material and students' prior knowledge and motivation.

Overall, while the current study found a marginal development in reading comprehension using semantic mapping as a pre-reading activity, further research is needed to fully understand the factors that contribute to the effectiveness of such strategies. Additionally, future studies may consider extending the intervention period to fully assess the impact of pre-reading activities on reading comprehension.

5.2. THE PATHWAY OF THE EFFECT: LITERAL OR INFERENTIAL (RQ2)?

The study's results demonstrate that the implementation of the Semantic Map technique has a statistically significant impact on inferential reading comprehension while showing no significant effect on literal reading comprehension. These findings suggest that the Semantic Map technique is more effective in improving higher-order cognitive skills, such as making inferences and drawing conclusions, rather than merely comprehending the surface-level meaning of the text. Furthermore, the results reveal that the Semantic Map technique has a more considerable effect on inferential aspects of reading comprehension rather than literal

aspects. This underscores the necessity of integrating the Semantic Map technique into instructional approaches, especially for enhancing higher-level reading comprehension skills.

The statistical significance was found at the level of inferential comprehension, affirming that semantic mapping supports the generation of references and enhances higher-order skills more than literal comprehension. Thus, students' ability to retrieve information from the text is not contingent on the use of semantic mapping. Conversely, semantic mapping has been demonstrated to improve readers' capacity to draw inferences at the inferential level of reading comprehension.

5.3. STUDENTS' PERCEPTIONS OF THE SEMANTIC MAPPING (RQ3)

Exploration of students' perceptions of semantic mapping revealed that most students found the technique to be very effective. In fact, the usefulness of the technique was manifested in its role in helping students make connections between different parts of the text and contribute to the inferential comprehension of the cultural material. The findings of the interviews support the quantitative data results in that the effect of the treatment was observed and validated at the inferential level.

6. CONCLUSIONS AND IMPLICATIONS

This study examined the effectiveness of the Semantic Map technique as a pre-reading activity in improving reading comprehension of cultural texts. The results suggest that the use of semantic mapping led to a marginal development in reading comprehension, as evidenced by the improvement in post-test scores. However, the effect of the treatment on the results of the post-test was not statistically significant, indicating that other factors may have contributed to the improvement, such as the short intervention period or students' pre-existing knowledge of the material.

Moreover, the study found that the Semantic Map technique had a significant impact on inferential reading comprehension but not on literal comprehension. This implies that the technique is more effective in improving higher-order thinking skills, such as making inferences and drawing conclusions, rather than simply understanding the surface-level meaning of the text. Therefore, incorporating the Semantic Map technique into instructional practices may enhance higher-level reading comprehension skills.

Therefore, it is recommended that educators incorporate the Semantic Map technique as a pre-reading activity to enhance students' inferential reading comprehension. However, educators should also consider the nature of the reading material and students' prior knowledge and motivation when selecting appropriate pre-reading activities. Additionally, future research may focus on the implementation of the Semantic Map technique in different contexts and with diverse populations to assess its effectiveness more comprehensively.

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