REVISTA KRONOS

The effect of the PQ4R strategy on EFL learners' reading comprehension at a middle high school in Cuenca, Ecuador

William Chuquiguanga | iD Universidad Nacional de Educación, UNAE (Ecuador)

ABSTRACT This research paper aims to investigate the impact of the PQ4R reading strategy on the reading comprehension abilities of tenth-grade EFL students. The study involved thirty-two middle high school students and used a quantitative experimental approach with a pre-experimental design that involved a one-group pre-test-post-test design. The students were administered a Cambridge A2 reading test as a pretest and post-test. A pretest was conducted before administering the PQ4R reading strategy, and a post-test was conducted after the intervention to evaluate the strategy's effectiveness and measure the learners' progress. The results were analyzed using descriptive and inferential statistics. The pretest results showed a low English reading performance among the participants, but after the intervention, the post-test results revealed a significant improvement in their reading skills. The t-test for paired samples showed a significant difference between the mean scores of the pretest and post-test. Cohen's d effect size value indicated a large effect of the PQ4R strategy on learners' reading comprehension. These findings demonstrate the potential benefits of incorporating practical language teaching methods, such as the PQ4R strategy, into EFL classes to enhance language acquisition and comprehension in a foreign language context.

KEY WORDS English learning, PQ4R reading strategy, students' reading comprehension.

El efecto de la estrategia PQ4R en la comprensión lectora de los estudiantes de inglés como lengua extranjera en una escuela secundaria en Cuenca, Ecuador

RESUMEN Este trabajo de investigación tiene como objetivo establecer el impacto de la estrategia de lectura PQ4R en las habilidades de comprensión de lectura de los estudiantes de EFL de décimo grado. El estudio involucró a treinta y dos estudiantes de secundaria y utilizó un enfoque experimental cuantitativo con un diseño preexperimental que involucró un diseño de prueba previa y posterior de un grupo. A los estudiantes se les administró una prueba de lectura Cambridge A2 como prueba previa y posterior. Se realizó una prueba previa antes de administrar la estrategia de lectura PQ4R y una prueba posterior después de la intervención para evaluar la eficacia de la estrategia y medir el progreso de los alumnos. Los resultados se analizaron mediante estadística descriptiva e inferencial. Los resultados de la prueba preliminar mostraron un bajo rendimiento de lectura en inglés entre los participantes, pero después de la intervención, los resultados de la prueba posterior revelaron una mejora significativa en sus habilidades de lectura. La prueba t para muestras pareadas mostró una diferencia significativa entre las puntuaciones medias del pretest y del postest. Además, el valor del tamaño del efecto d de Cohen indicó un gran efecto de la estrategia PQ4R en la comprensión lectora de los alumnos. Estos hallazgos demuestran los beneficios potenciales de incorporar métodos prácticos de enseñanza de idiomas, como la estrategia PQ4R, en las clases de EFL para mejorar la adquisición y comprensión del idioma en un contexto de idioma extranjero.

PALABRAS CLAVE Aprendizaje de inglés, estrategia de lectura PQ4R, comprensión lectora de los estudiantes.

INTRODUCTION

Learners must become proficient in reading comprehension to learn English as a foreign language (EFL) effectively. Several studies, including those by Saeedi *et al.* (2016), Brooks *et al.* (2021), and Ruipérez (2022), have emphasized the importance of this skill. This particular skill equips learners with the means to access and assimilate vital information and knowledge, expand their lexicon and language skills, apply acquired abilities, attain academic success, and foster a culture of continuous learning and self-improvement.

Learning a new language can be difficult, particularly for students learning English as a foreign language. According to Mickan *et al.* (2023), learning a foreign language and a new language can have different meanings depending on the context. However, based on the search results, learning a «foreign language» refers to a language that is not native to the speaker and is typically learned in a classroom setting. In contrast, learning a «new language» refers to any language being learned for the first time, regardless of whether it is native or foreign. Learning a new or foreign language involves acquiring new language skills, such as vocabulary, grammar, pronunciation, and cultural understanding. This often requires formal instruction, practice, and exposure to the language through reading, listening, speaking, and writing.

At the middle high school level, the EFL Ecuadorian curriculum (2016) emphasizes the importance of active strategies and collaborative group work to allow learners to construct their learning rather than relying solely on direct instruction. The curriculum highlights the need for EFL teachers to apply active strategies in reading classes to enhance comprehension since students are expected to understand the main points in short, straightforward texts on familiar topics and recognize shared vocabulary items between their first language (L1) and English (L2). However, despite the support for using the most updated teaching approaches and methodologies in the EFL Ecuadorian curriculum, Ecuadorian EFL teachers mainly focus on using a structural approach (Burgin & Daniel, 2017; Álvarez & Ha, 2022).

Álvarez and Ha (2022) point out that Ecuadorian EFL teachers still design their curriculum by focusing more on teaching vocabulary words and grammar structures. The use of this structural approach leaves apart the utilization of current and innovative teaching methods, approaches, and strategies. This limited use of active and innovative strategies when reading could explain why learners' English reading comprehension remains minimal. For this reason, the need to improve the current reading skill level by implementing active and innovative learning strategies is increasingly widespread. In line with these challenges, teachers require an effective strategy to allow students to comprehend what they read and enjoy their learning process.

One effective strategy teachers can implement to improve the learning process is the PQ4R strategy. According to Dakhiel and Al sulami (2021), the PQ4R strategy introduced by Thomas E. L. and Robinson H. A. in their book «Improving Reading in Every Class: A Sourcebook for Teachers» in 1972 is an effective method for enhancing reading abilities. The acronym PQ4R stands for Preview, Question, Read, Reflect, Recite, and Review. This strategy improves learners' understanding, enhances their reading skills, helps them understand and remember what they read, and stimulates their prior knowledge. By applying the PQ4R strategy, students can understand and retain information more effectively.

Furthermore, according to Fitriani and Suhardi (2019), the PQ4R strategy combines previewing, questioning, reading, reciting, reflecting, and revising the reading material. The preview step involves previewing the text to activate prior knowledge and establish an overview of the content through scanning headings, subheadings, and visual aids. Learners generate their own questions during the question step, which enhances their comprehension and focus. In the reading step, learners read the text aiming to answer their questions and comprehend the material in-depth while taking notes. The reflecting step involves attempting to understand the reading material by making connections to already familiar concepts.

The reciting step involves learners summarizing the text's main points in their own words, reinforcing their understanding and retention. The reviewing step implicates revisiting the material to consolidate learning and transfer the knowledge to long-term memory.

PREVIOUS STUDIES

Many studies have explored how effective the PQ4R strategy is in enhancing reading comprehension. For instance, Al-Qawabeh *et al.* (2018) conducted a study to determine the effectiveness of the PQ4R strategy in teaching reading comprehension to ninth-grade Arabic students in Jordan. A survey and an achievement test for reading comprehension were used with 104 male and female students randomly selected into two experimental and two control groups. The study found that using the PQ4R strategy led to notable improvements in the experimental group, especially for female students. Therefore, the study recommended incorporating the PQ4R strategy into EFL classes as it is valuable to enhance reading comprehension.

Similarly, a classroom action research study by Zuriah (2020) aimed at improving the reading comprehension achievement of 11th-grade students at SMAN 19 Palembang using the PQ4R strategy. The study was conducted in three cycles of classroom action research to assess both effectiveness and student perception toward the PQ4R strategy. Based on the results, it was found that utilizing the PQ4R reading strategy resulted in a significant improvement in the students' reading comprehension ability. In addition, it was inferred that learners had positive perceptions toward the implemented strategy.

Likewise, another study was carried out by Dakhiel and Al sulami (2021) to assess the efficacy of the PQ4R strategy in enhancing the reading comprehension abilities of students in the second-intermediate grade. The study employed a quasi-experimental design and divided students into an experimental (using PQ4R) and a control (using the traditional method) group. The findings indicated that implementing the PQ4R strategy can positively impact students' reading comprehension. As a result, the researcher recommended using this strategy to improve EFL students' reading comprehension skills.

Previous studies show that using the PQ4R strategy can significantly enhance reading comprehension. The literature indicates that by previewing, questioning, reading, reflecting, reciting, and reviewing texts, learners can enhance their comprehension and vocabulary acquisition, leading to remarkable success in their language learning journey.

JUSTIFICATION

Students often struggle with understanding and retaining the vast amount of information presented in class due to their limited vocabulary, lack of background knowledge, and inadequate reading strategies, as reported by Burgin & Daniel (2017), Nanda & Azmy (2020), and Hezam *et al.* (2022). To overcome these obstacles, teachers and students must adopt effective study strategies that facilitate information processing and retention. However, according to Alvarez and Ha (2022), Ecuadorian EFL teachers prioritize teaching vocabulary words and grammar structures when designing their curriculum. Teachers must implement an effective strategy for students to comprehend what they read and enjoy the learning process. One effective strategy teachers can implement to improve the learning process is the PQ4R strategy.

Despite the proven effectiveness of the PQ4R strategy in various EFL contexts, further research is needed in Ecuador to determine its impact on the English reading comprehension of Ecuadorian learners. In order to fill the knowledge gap and contribute to the

existing literature, the present pre-experimental research study was conducted using the PQ4R strategy as an intervention in reading classes. Therefore, this research paper aims to answer the following research question: What is the effect of applying the PQ4R strategy on the tenth-grade EFL learners' reading comprehension at a middle high school in Cuenca, Ecuador? In addition, the study proposed the null and alternative hypotheses as follows:

H_N = the PQ4R strategy does not affect tenth-grade learners' reading comprehension skills.

H_A = the PQ4R strategy does affect tenth-grade learners' reading comprehension skills.

METHOD

This study seeks to evaluate the effectiveness of the PQ4R strategy in enhancing the reading comprehension skills of middle-high school EFL learners. The researcher employed a quantitative experimental method and utilized a pre-experimental design to determine the impact of the PQ4R strategy on EFL students' reading comprehension achievement. Thyer (2012) states that pre-experimental designs concentrate on analyzing a single group of individuals who have undergone a particular social work intervention, which is the main focus of the study and are identified as the treatment group.

As only one tenth-grade classroom was available during the morning session at the high school where the study was conducted, the researcher designated this class as the treatment group. Therefore, a one-group pretest-posttest design was employed to gather and analyze data since no control group was available for comparison. According to Thyer (2012), Fernández and Baptista (2013), and Creswell (2013), this design involves assessing participants on two separate occasions, the initial assessment (pretest) and the subsequent evaluation conducted after undergoing treatment (post-test). Ultimately, the post-test results were compared to the pretest outcomes to identify any changes.

PARTICIPANTS

This research was conducted at a public high school in Cuenca, Ecuador, in the academic year 2022-2023. Thirty-two tenth-grade students aged 15-16 participated in the present pre-experimental research study. A contextualization journal determined that all participants were homogeneous in terms of ethnicity, native language, exposure to English, and educational and cultural background.

INSTRUMENTS

The primary research tool used in the study was a reading test administered before and after the intervention to measure students' reading comprehension. Specifically, a Cambridge A2 reading test (KET reading test), consisting of parts one to five, was used as both the pretest and post-test. The researcher chose the KET reading test since this standardized exam reflects real-life language skills and the understanding of specific information, such as getting the main message and idea from text and correctly using vocabulary words. Finally, students were evaluated using the same criteria as the international exam.

PROCEDURE

Before the pre-experimental study began, a pre-reading test was applied to the participants. This first test aimed to measure the initial ability of students. Then, during eight weeks and three hours of English instruction each week, the EFL instructor utilized lesson plans guided by the PQ4R strategy. These lesson plans incorporated pre-, while, and post-reading discussions and exercises focusing on enhancing reading comprehension abilities, such as predicting text content, skimming and scanning for answers, reading for detail, summarizing main points, identifying the meaning of the text, and making inferences. Lastly, at the end of the study, another reading test was administered to the control and experimental group. This test served as a means of measuring the students' progress and provided valuable data for further analysis and interpretation.

DATA ANALYSIS

The researcher analyzed and interpreted the pre- and post-reading comprehension test data using the Statistical Package for Social Sciences (SPSS) and Minitab software. First, descriptive statistics such as mean scores, minimum and maximum scores, and standard deviations of the pre and post-test were used to determine the effects of the PQ4R strategy on reading comprehension. Second, the researcher conducted an inferential analysis that included a t-student test for paired samples to determine any significant differences between the pretest and post-test mean scores. The decisions were made with a significance of 5% $(p < 0.05)$. Lastly, to quantify the effectiveness of using the PQ4R strategy, the effect size of the difference between the pre and post-test scores was calculated and reported using the effect size «d» suggested by Cohen (1992). The effect size was then interpreted based on the guidelines by Fernández and Baptista (2013), where a 0.20 value indicates a small effect, 0.50 shows a medium effect size, and 0.80 represents a large effect.

RESULTS

This study aimed to investigate the effect of using the PQ4R strategy on reading comprehension among EFL students. In addition, the study aimed to test the alternative hypothesis, which states that the use of the PQ4R strategy does affect reading comprehension. Conversely, the null hypothesis was proposed to test if the PQ4R strategy does not affect learners' reading comprehension skills.

PRETEST AND POSTTEST RESULTS

Before implementing the PQ4R strategy, the pretest was administered to determine and measure the initial learners' reading performance. As shown in Figure 1, all participants' pretest results showed a mean score of 5.25 (out of 10) with a standard deviation of 0.92. In addition, the pretest results indicated that the minimum score was 3.50 and the maximum score was 7.0. All this indicated that the group was in similar reading conditions; in other words, they had low English reading performance before implementing the PQ4R strategy (see Figure 1).

Figure 1. Overall results of the pretest
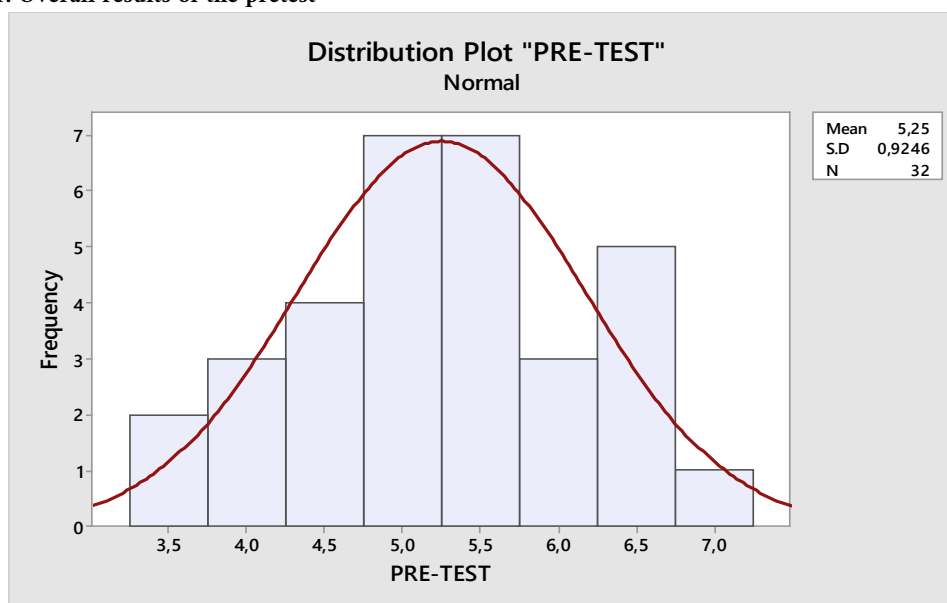
Note. Mean, Standard Deviation, Minimum, and Maximum scores for the pretest.

On the other hand, the post-test was taken a week after the end of applying the PQ4R strategy, and it was taken to measure to what extent learners improved their reading comprehension ability. The post-test results showed that the experimental group's mean was 7.25 (out of 10), with a standard deviation of 1.00. Moreover, the results showed a minimum score of 5.50 and a maximum score equal to 9.0, as shown in figure following (see Figure 2).

Before conducting inferential statistical analysis, it is important to assess the normality and homogeneity of the data. The data must meet specific criteria, such as autonomy of subjects, paired measurements from the same individual, and adherence to a normal distribution. These criteria are especially important for smaller sample sizes. Parametric tests can only be used when the data fulfills these prerequisites.

For these previous reasons, two tests were conducted before analyzing the data to compare the initial situation to the final situation. The first test was the Anderson-Darling normality test, which determined whether the data was normally distributed. The second test, Levene's test, was used to determine if the data was homogenous.

NORMALITY TEST

Table 1 displays the Anderson-Darling normality test results, which aimed to determine if the scores were normally distributed. All p-values ($p > 0.05$) were above the level of significance ($p = 0.05$), indicating that the pretest and post-test scores are normally distributed. Therefore, it would be appropriate to perform any parametric test to determine if there is a significant difference between the mean scores (see Table 1).

HOMOGENEITY TEST

In Levene's test, the p-value ($p > 0.05$) is greater than the selected level of significance ($p = 0.05$), as shown in Table 2. Thus, it demonstrates that the data variances are statistically equal, and any parametric test can be performed (see Table 2).

Table 1. Normality test of Anderson-Darling

GROUP	VARIABLE	N	MEAN	SD	TEST STATISTIC	P-VALUE
Tenth-grade	Pretest	32	5.25	0.92	0.51	0.186
	Post-test		7.25	1.00	0.47	0.232

Note. All p-values (p > 0.05) demonstrate that the data were normally distributed.

Table 2. Levene test for equality

GROUP	VARIABLE	N	S.D.	VARIANCE	LEVENE STATISTIC	DF 1	DF 2	P-VALUE
Tenth-grade	Pretest	32	0.92	0.85	0.19	1	64	0.664
	Posttest		1.00	1.0				

Note. P-value (p > 0.05) demonstrated that the data are statistically equal.

Figure 2. Overall results of post-test
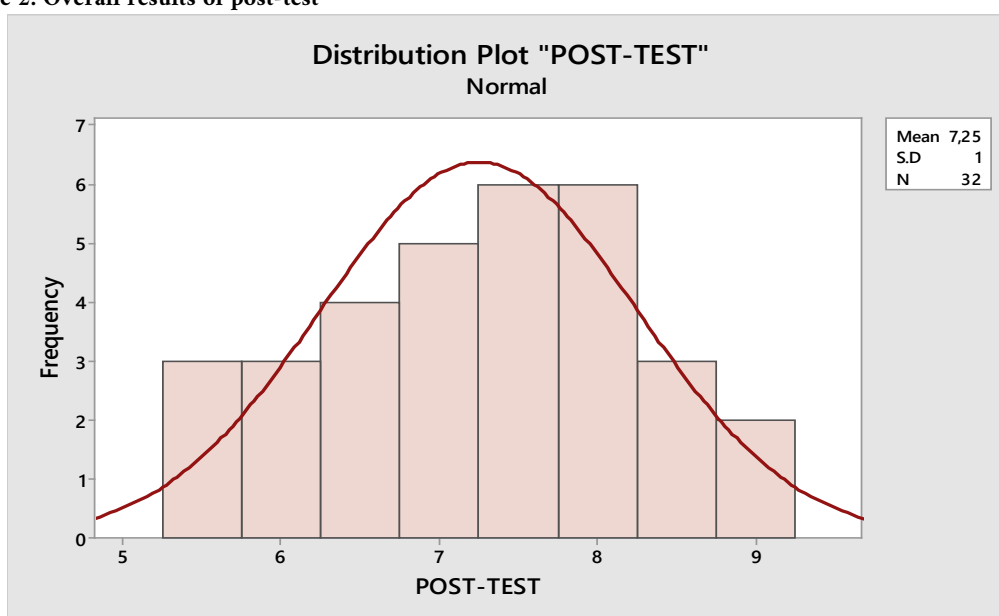
Note. Mean, Standard Deviation, Minimum, and Maximum scores for the pretest.

After knowing that the data is normally distributed and homogenous, the researcher analyzed the data by using parametric tests. Since a t-test determines whether or not the difference between the means of samples is significant (Creswell, 2013; Fernández & Baptista, 2013), one t-test for paired samples was performed. The t-test for paired samples was conducted to determine how far each group performed from the pretest and post-test and to state whether there was any significant difference between them.

PAIRED SAMPLE T-TEST

The effectiveness of the PQ4R strategy in improving English reading comprehension among EFL learners was evaluated using a paired sample t-test. On the one hand, the pretest results demonstrated that the group had a mean of 5.25 (out of 10) with a standard deviation of

0.92. On the other hand, the post-test results showed a mean of 7.25 (out of 10) with a standard deviation of 1.00, as seen in Figure 3. The difference between the means of the pretest and post-test was 2 points, which means that learners of this group had an improvement of 20% in their English reading comprehension (see Figure 3).

The data in Table 3 displays a noticeable difference in the mean scores between the pretest and post-test. Specifically, the mean score of the post-test (7.25) is higher than the mean score of the pretest (5.25). Additionally, the t-test value is -23.81, and the p-value is 0.000, with a level of significance (α) of 0.05. These results indicate that the p-value is smaller than the level of significance (α). These results indicate a noteworthy contrast in the mean scores before and after the PQ4R strategy was implemented by the researcher (see Table 3).

COHEN'S D VALUE

The previous results provide evidence of an improvement in scores in all participants. There was an increase of 2 points between the pretest and post-test scores. Therefore, to determine the effect size of using the PQ4R strategy on learners' reading comprehension, Cohen's d was calculated. The effect size was calculated through the equations below.

$$Cohen's\ d = \frac{M_2 - M_1}{SD_{pooled}}$$

M1 and M2 stand for the mean of groups 1 (pretest) and 2 (post-test). SD pooled stands for pooled standard deviation. The SD pooled was calculated using the equation below.

$$SD_{pooled} = \sqrt{\frac{(N_1 - 1)SD1^2 + (N_2 - 1)SD2^2}{N_1 + N_2 - 2}}$$

N1 and N2 stand for the size of groups 1 (pretest) and 2 (post-test), while SD1 and SD2 stand for the standard deviation of groups 1 (pretest) and 2 (post-test), respectively. Finally, the criteria for interpreting Cohen's «d» effect size was as follows: 0.20 is considered a small effect, 0.50 is a medium effect size, and 0.80 is considered a large effect size (Creswell, 2013; Fernández & Baptista, 2013). Thus, the results revealed an effect size of 2.08, interpreted as a considerable effect size of the PQ4R strategy on learners' reading comprehension (see Table 4).

In addition, Figure 4 shows the strength of using the PQ4R strategy on the total score of the reading test, where the value of Cohen's d was greater than 0.80, which means that the use of the PQ4R strategy in improving students' reading comprehension has a considerable effect size. It was responsible for 20% of the improvement of the learners' reading comprehension skills (see Figure 4).

DISCUSSION

The present study revealed positive outcomes regarding middle-high school students' reading comprehension skills. Implementing the PQ4R strategy led to a noteworthy enhancement in the English reading abilities of the EFL students. This fact was evident from the variation in the mean scores before and after the application of the strategy, which was statistically significant at a 0.05 significance level. The results were analyzed and discussed in light of
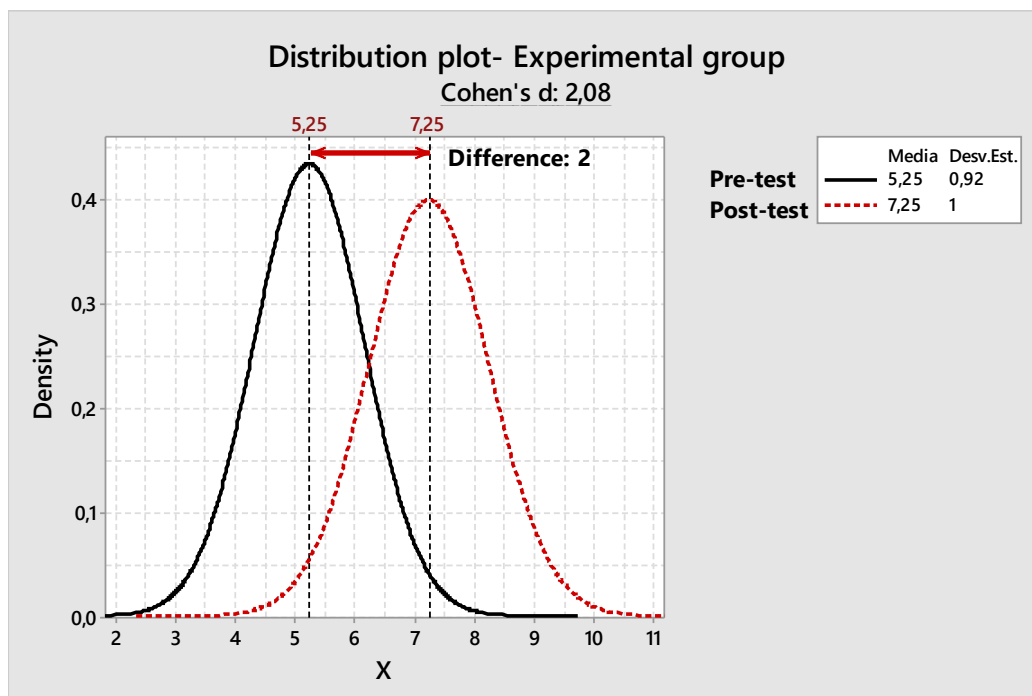
Table 4. Cohen's d value

VARIABLE	VALUE	SD	COHEN'S D	INTERPRETATION
N1	**32**			
M1	**5.25**			
SD1	**0.92**		**2.08**	*Large effect*
N2	**32**			
M2	**7.25**			
SD2	**1.0**			

Figure 3. Difference between the means of the pretest and post-test
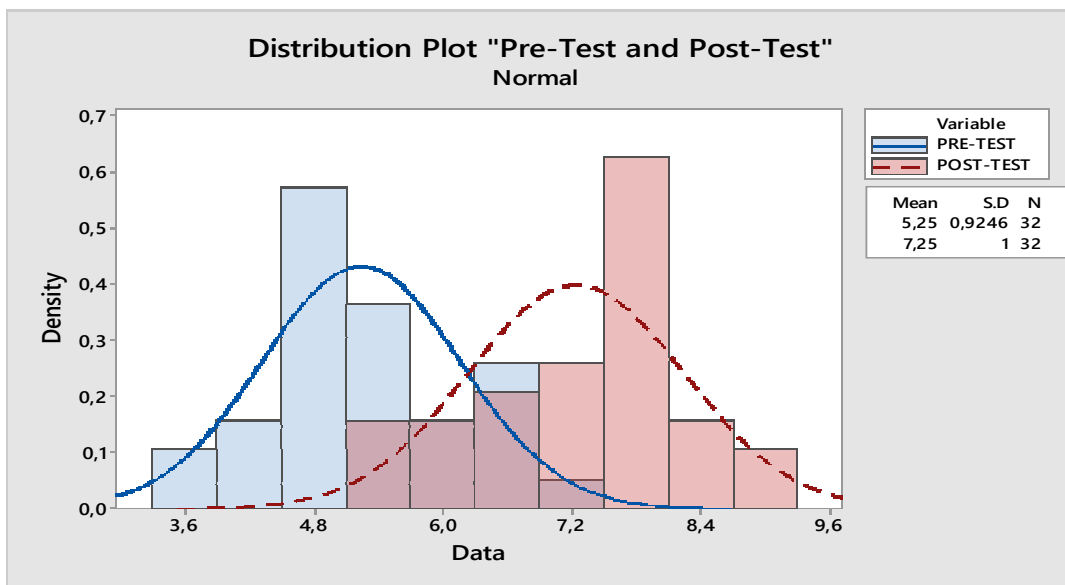
Note. The difference between the means of the pretest and post-test was 2 points.

Figure 4. The effect size of the PQ4R strategy

Note. Two points of difference between the mean scores indicate a large effect size of the PQ4R strategy

the main research question. The main research question aimed to determine whether the PQ4R strategy improves Ecuadorian middle-high school learners' English reading comprehension skills in the academic year 2022/2023.

The results showed that students in the tenth grade who were taught using the PQ4R strategy enhanced their English reading comprehension abilities. After the PQ4R strategy was introduced as a teaching-learning strategy in reading classes, there was a significant positive score difference between the pretest and post-test results. This finding is consistent with the results of Rahmadia and Fatimah (2020), which showed that the PQ4R learning model had more influence on reading comprehension than the conventional learning model (lecture method). Alike/Similarly, Khusniyah (2018) found that the PQ4R strategy significantly improved EFL learners' reading ability since this strategy fosters a range of skills, including active participation, critical thinking, higher-order thinking, motivation, reading comprehension, and vocabulary acquisition.

Using the PQ4R strategy was beneficial for Ecuadorian EFL students to improve their reading comprehension. This teaching-learning strategy promoted higher-order thinking skills and critical thinking abilities, encouraging students to reflect on the content they read and express it in their own words. Additionally, the strategy prompted students to actively participate in the reading process by previewing, questioning, and reflecting on the text. Previewing the text allowed students to acquire new vocabulary before reading, while the strategy's structured approach helped students read and learn more effectively.

In addition, the present study showed that utilizing the PQ4R technique led to positive outcomes in English reading comprehension. In this regard, studies by Agustiani (2019) and Amaya and Salinas (2021) demonstrated that learners can enhance their English reading proficiency through the PQ4R strategy. This enhancement is due to increased student engagement and a better understanding of the material, resulting in improved scores. Using the PQ4R method as a teaching strategy, students' English reading comprehension and proficiency can be promoted. The present study's findings indicate that introducing the PQ4R strategy in EFL classes will benefit Ecuadorian middle-high school students by improving their reading abilities.

CONCLUSIONS

The present study conducted during the academic year 2022/2023 sought to demonstrate the effectiveness of implementing the PQ4R strategy in improving the reading comprehension skills of middle-high school students. The descriptive results revealed a significant improvement in the mean score of students, from 5.25 (out of 10) in the pretest to 7.25 (out of 10) in the post-test. These results signify the positive impact of the PQ4R strategy on middle-high school students' reading ability.

Furthermore, the inferential results support the effectiveness of the PQ4R strategy in enhancing reading comprehension skills. Cohen's d value of 2.08 indicated a large effect size, and the paired sample t-test yielded a p-value of 0.00, which is less than the level of significance of $\alpha = 0.05$. Based on these findings, it can be concluded that teaching students using the PQ4R strategy successfully improves their English reading comprehension abilities.

The PQ4R reading strategy is not commonly used in Ecuador, where recent studies have shown that other metacognitive strategies such as SQ3R, Question-Generation, Collaborative Strategic Reading (CSR), Look, Think and Predict, Guided Retelling, Response Journal, and Thinking Along with Strategy are effective in enhancing reading comprehension for EFL learners at both high school and university levels. Thus, the findings in the present research study demonstrated that by previewing, questioning, reading, reflecting,

reciting, and reviewing texts, middle high school EFL learners can also enhance their reading comprehension abilities.

In summary, the findings in the present pre-experimental research study demonstrated that the PQ4R strategy can enhance the reading comprehension skills of EFL learners in Ecuador. Teachers can provide a better learning experience to students by using the PQ4R strategy since it helps students improve their reading comprehension, vocabulary, critical thinking skills, and ability to learn independently. Using this strategy, students can achieve greater success in their personal and professional lives by better understanding, analyzing, and engaging with English texts.

RECOMMENDATIONS

The PQ4R reading strategy yielded positive outcomes, but it is important to consider certain recommendations to improve the technique's effectiveness for future research studies. One limitation of the study was the lack of a control group, as there was no other tenth-grade classroom available for comparison during the morning session at the high school. Therefore, it is highly recommended that future researchers include a control group with similar characteristics to ensure the replication of the study and comparison of outcomes. Additionally, it is recommended that researchers pilot their instruments, such as the reading test, with participants before implementing them to improve the accuracy of future studies. Adapting and editing study material to fit the specific context of each study can also lead to more reliable results. Lastly, due to dropouts and schedule changes, the study had a smaller sample size than intended (32 instead of 40). Therefore, it is recommended that future studies have a larger sample size to increase the accuracy and reliability of results.

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