The Use of Jigsaw Cooperative Learning Strategy to Enhance English Reading Comprehension for Higher Vocational College Students in Sichuan Province, China

Yang Yu and Prasong Saihong
Mahasarakham University, Thailand
Corresponding Author, E-mail: 434596411@qq.com

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Abstract

This study aimed to enhance English reading comprehension among upper vocational college students using the Jigsaw Cooperative Learning technique and to evaluate their reading comprehension before and after the intervention. The research involved 60 first-year non-English major students from Sichuan Vocational College of Health and Rehabilitation, selected through stratified random sampling and evenly divided into experimental and control groups. Research instruments included pre-tests, post-tests based on the College English Test Band 4 (CET-4), and lesson plans designed for an eight-week intervention. Data were analyzed using independent-sample t-tests and paired-sample t-tests to assess performance differences between and within groups.

The results demonstrated that students in the experimental group achieved significant improvements in English reading comprehension, with post-test scores notably higher than their pre-test scores and those of the control group ($p < 0.001$). The findings confirm that the Jigsaw Cooperative Learning model is more effective than traditional teaching methods, particularly in improving vocabulary, extensive reading, and intensive reading skills. In conclusion, this study highlights the transformative potential of the Jigsaw strategy in vocational education, emphasizing its applicability as an effective teaching method to enhance reading comprehension and overall language learning outcomes.

Keywords: Jigsaw; Cooperative Learning Strategy; English Reading Comprehension; Sichuan Province

Introduction

With the deepening of globalization, the importance of English as an international common language has become more and more prominent in the field of vocational education. Along with the development of society, the requirements for English proficiency of higher vocational students are also increasing. Improving English reading comprehension, as a core skill, is essential not only for acquiring language knowledge but also for enhancing overall language proficiency (Yang, 2020; Wei, 2020; Xiangyu, 2023).

Higher Vocational Education: English Curriculum Standards (2021 Edition) outlines the basic requirements for vocational college students in English reading. These include the ability to understand the main content, extract key information, distinguish between facts and opinions, and make simple inferences. Furthermore, students are expected to recognize the structure and logical connections within texts (Kalbfleisch et al., 2021; Munsod-Fernandez, 2021; Safitri et al., 2022).

However, vocational students often face significant challenges in meeting these requirements, including inadequate foundational knowledge, limited vocabulary, and a lack of mastery in complex grammar and sentence structures. These deficiencies hinder their ability to perform well in reading tasks, particularly in standardized exams like the Upgrade from Junior College Student to University Student Exam (Kalbfleisch et al., 2021; Santillan & Daenos, 2020; Rahim et al., 2018). Compounding this issue is the reliance on traditional, teacher-centered instructional methods, which fail to foster active engagement or collaborative problem-solving. Addressing these challenges requires innovative teaching strategies, such as the Jigsaw Cooperative Learning model, to fill these gaps and improve reading comprehension. This research seeks to investigate whether the Jigsaw strategy can effectively enhance English reading comprehension and provide a viable alternative to traditional methods in vocational education.

Traditional English reading instruction in vocational colleges predominantly adopts a teacher-centered approach, where lessons focus on vocabulary explanations and text translation. While this method ensures information delivery, it often results in passive learning with minimal student engagement. Consequently, this rigid instructional style limits classroom interaction, fails to develop essential reading skills, and leaves students ill-prepared to tackle complex texts (Gutiérrez-González et al., 2023; Al-Haddad et al., 2024).

In contrast, cooperative learning, a constructivist-based teaching approach, emphasizes active engagement and collaboration. The Jigsaw strategy, a widely recognized cooperative learning method, divides learning materials into sections, requiring students to specialize in one area and share their expertise with peers. This approach fosters deep comprehension and collaborative problem-solving (Suganya et al., 2020; Omokorede et al., 2021; Ismail, 2020). Previous research has demonstrated the success of the Jigsaw strategy in improving reading comprehension, particularly in general education contexts (Rahmi et al., 2024). However, its application in vocational education remains limited, despite the potential alignment of its collaborative elements with the needs of vocational students.

This study seeks to address this gap by investigating the effectiveness of the Jigsaw strategy in improving English reading comprehension among vocational college students. Specifically, it aims to determine whether the strategy enhances key reading components, such as vocabulary comprehension, extensive reading, and intensive reading. The findings are expected to provide valuable insights for English educators in vocational settings and contribute to the broader discourse on improving English education in a globalized world.

Research Objectives

1. To enhance English reading comprehension of higher vocational college students by using Jigsaw in Cooperative Learning.

2. To compare English reading comprehension of students in the experimental class (EC) before and after using Jigsaw in Cooperative Learning.

Literary Review

Cooperative Learning

Cooperative learning is a teaching method that emphasizes collaboration, communication, and shared responsibility among students to achieve learning objectives. It is rooted in constructivist educational theory and has been explored by scholars like Professor Slavin (1995), Dr. Sharan (1990), and Marr (1997). Professor Slavin defines cooperative learning as a method where students are accountable for their own learning and for their peers' learning. Rewards are based on collective performance, fostering a sense of interdependence. This cooperative dynamic extends beyond peer interactions to teacher-student engagement, creating an inclusive and interactive learning environment. Dr. Sharan emphasizes the importance of social interaction in the learning process. In the Chinese educational context, Marr (1997) highlights the use of heterogeneous learning groups as the fundamental structure of cooperative learning. Success is evaluated based on group achievements, aligning with the collaborative nature of the method. The essential characteristics of cooperative learning include collaboration, role differentiation, and accountability. This structured collaboration ensures that each student contributes meaningfully to the group's success, fostering a sense of responsibility and engagement. Cooperative learning encourages interaction between students and teachers, creating a dynamic environment for ideas exchange and guidance.

Jigsaw Strategy

The Jigsaw strategy, introduced by Elliot Aronson in the 1970s, is a cooperative learning method that divides learning content into sections, with each student mastering a specific part and sharing their expertise with their group. This approach encourages deep engagement and comprehensive understanding through discussion and peer teaching. The strategy has evolved through four generations, each improving on the previous model to enhance engagement, interaction, and content comprehension. The Jigsaw strategy positions students as active participants and teachers, with the instructor acting as a facilitator. This approach cultivates students into "experts" on specific sections of the material, enhancing their grasp of the content. It is particularly effective for language learning, improving vocabulary and grammatical mastery. The strategy is well-suited for handling complex reading materials, promoting active engagement, deep understanding, and collaborative learning (Ambe, 2007).

English Reading Comprehension

English reading comprehension is a complex cognitive process that involves interaction between the reader and the text. It involves not only interpreting the surface meaning of the text but also using the reader's background knowledge to make deeper understandings and inferences. Reading comprehension is multilevel and multifaceted, involving extracting and integrating information from a text and making connections between old and new information. According to the Higher Vocational Education: English Curriculum Standards (2021 Edition) and Syllabus for College English Test—Band Four (CET-4) (2016 revised edition), reading comprehension involves students accurately understanding main ideas, detailed information, inferred content, and language structures. It comprises three key components: vocabulary comprehension, extensive reading comprehension, and intensive reading comprehension. Vocabulary comprehension is the foundation of English reading and directly affects students' understanding of the text's overall meaning. Extensive reading comprehension involves skimming and scanning to extract information from a passage, while

intensive reading comprehension involves deep analysis of the text, including understanding the main idea and important details (Bishop et al., 2006; Gilakjani & Sabouri, 2016).

Studies on Jigsaw in English Reading Comprehension

Jigsaw is a resource that facilitates students in enhancing their English reading comprehension via task assignments and collaborative efforts. It allocates distinct vocabulary to each learner, enabling them to attain a more profound comprehension of the language's meaning and application through collaborative learning. This strategy promotes flexible use of vocabulary and enhances long-term retention and practical use of new vocabulary. Jigsaw is adaptable across different educational contexts and helps students overcome difficulties during the reading process. The division-of-labor model allows students to focus on their respective parts, then form an in-depth understanding of the whole article through group discussion and information sharing. This approach encourages critical thinking and helps students grasp the text's core ideas and logical structure more comprehensively. Thamban, (2020) study confirmed the effectiveness of Jigsaw II in enhancing freshmen's English reading comprehension, especially in comprehending main ideas and making inferential judgments. Jigsaw's task assignment model encourages students to analyze the structure of the text more deeply during intensive reading, especially complex logical relationships and implicit information.

Theoretical Basis

1. Constructivist Theory

The constructivist theory, proposed by Swiss psychologist Jean Piaget, suggests that knowledge is formed through active construction as learners interact with their environment. Jigsaw, a cooperative learning strategy, is closely linked to this theory, as it divides learning content into different parts, allowing students to become experts in specific sections. This process involves in-depth learning and knowledge transfer, promoting comprehensive understanding and analysis of complex texts through group work and knowledge sharing. The "divide-collaborate-share" model allows students to focus on specific parts of the content, deepening their sense of responsibility and understanding of the text as a whole (Parker, 1992).

2. Cooperative Learning Theory

Jigsaw is a cooperative learning theory that involves students working in groups with varying English proficiency levels to share reading materials and form positive interdependence. This approach enhances students' understanding of reading material and their roles within both individual and group tasks through peer communication and discussion. The effective division of roles and clear communication among group members allow students to integrate their understanding and insights, ultimately achieving the team's reading objectives. This process transitions students from passive recipients of knowledge to active explorers of reading content, fostering a mutual support system focused on collective progress (Guthrie & Davis, 2003; Lapp et al., 2023).

Research Methodology

This study adopts a quantitative research method, primarily by analyzing the pre-test and post-test scores of the experimental class and the differences in pre- and post-tests between the experimental and control classes, to evaluate the effectiveness of Jigsaw in Cooperative Learning on enhancing English reading comprehension among higher vocational students. The research method is as follows.

1. Population and sample groups

The population of this study consists of 1,640 first-year non-English major students at Sichuan Vocational College of Health and Rehabilitation. The sample group for this study first-year non-English major students from Sichuan Vocational College of Health and Rehabilitation. A stratified random sampling method was used based on the English final exam scores from the previous semester. 60 students were selected to participate in the experiment and were divided into an experimental class and a control class, with 30 students in each. The experimental class was taught using the Jigsaw strategy, while the control class followed the traditional teaching method.

**2. Research tools** include 1) English Reading Comprehension Pre-Test and Post-Test

The reading comprehension pre-test and post-test are selected from the reading comprehension section of the College English Test Band 4 (CET-4), a large-scale standardized test sponsored by the Ministry of Education of the People's Republic of China. The items included in the test have gone through a rigorous process of design and review, ensuring a high degree of reliability and validity. This allows for a comprehensive assessment of students' reading comprehension.

The reading comprehension pre- and post-tests comprise three question types, amounting to a total of 248.5 points. The first of these is the Banked Cloze (35.5 points), which consists of 10 sub-questions, each of which is worth 3.55 points. Students are required to fill in the gaps in the article by selecting 10 of the 15 vocabulary words provided, based on their comprehension of the article's content. The Matching Section (71 points) comprises an article and 10 sub-questions, each worth 7.1 points. The article is accompanied by 10 sentences, each corresponding to a question, and students are required to identify the passage that corresponds to the information in each sentence. Reading in Depth (142 points): it consists of two articles and 10 sub-questions of 14.2 points each. Each article is followed by five questions, and students are required to choose the best answer from four options based on the content of the article. 2) Lesson Plans To better implement this study, the lesson plans were designed based on the Higher Vocational Education: English Curriculum Standards (2021 Edition), in combination with the research objectives and tailored to the students' actual conditions. In this study, the lesson plans consist of eight topics. Each class lasts 80 minutes, with pre-reading, while-reading, and post-reading sections.

3. Data collection includes collecting data for this study included English reading comprehension pre- and post-tests. All data was entered into a computer by the technical staff and supervised by the three experts to ensure the accuracy of data processing and the rigor of the research process. To protect the personal privacy of students, data was processed anonymously to ensure that no personal information was disclosed. All pre- and post-test papers were organized and archived for safekeeping.

4. Data analysis includes data analysis divided into 1) Before the experiment, independent samples t-tests were used to compare the pretest scores of the experimental and control classes to help the researcher understand whether there were significant differences between the two classes in English reading comprehension. After the experiment, an independent samples t-test was conducted to compare the post-test scores of the experimental and control classes, while a paired samples t-test was applied to compare the pre- and post-test scores within the control class, aiming to verify whether the Jigsaw strategy was more effective than the traditional teaching method in enhancing students' English reading comprehension. Additionally, a paired samples t-test was used on the pre and post-test scores of the experimental class to further verify whether the Jigsaw strategy enhanced the English reading comprehension of the students.

Conceptual Framework
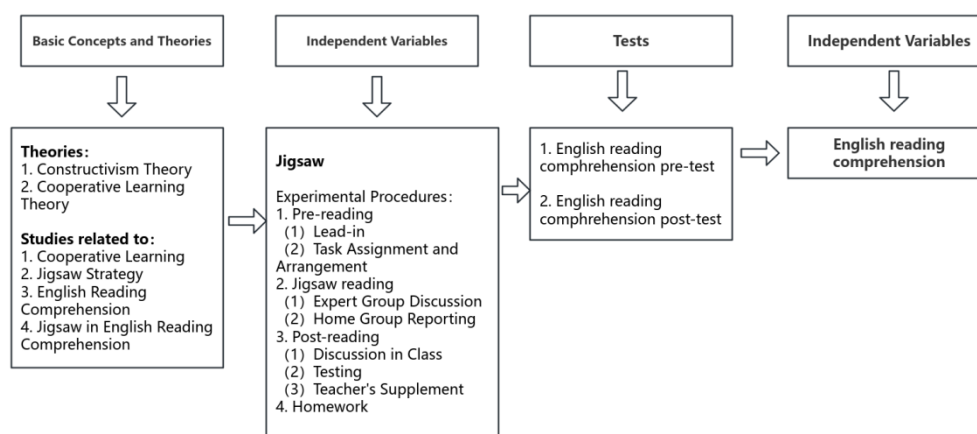
Figure 1: Conceptual Framework

Research Results

Research on the effectiveness of the Jigsaw Cooperative Learning strategy in improving English reading comprehension among vocational college students in Sichuan Vocational College of Health and Rehabilitation, the People's Republic of China, yielded significant findings. The researcher can classify the results as follows:

1. To enhance English reading comprehension of higher vocational college students by using Jigsaw in Cooperative Learning.

Before the experiment, both the experimental and control classes took a reading comprehension pre-test to determine whether there was a significant difference in English reading comprehension between the two classes. The following Table 1 shows the results of the independent samples t-test for the pre-test in the EC and CC.

Table 1: Independent Samples T-Test of Pre-test for the CC and EC

		Full Score	M	SD	Cohen's d	Sig.				
							t		df	
						Two-Sided p	Equal variances assumed	Equal variances not assumed	Equal variances assumed	Equal variances not assumed
Pre-test	CC	248.5	129.22	21.74	0.08	0.75	0.32	0.32	58.00	58.00
	EC		127.46	21.59						

Table 1 presents the mean, standard deviation, Cohen's d, and p-value for the two classes prior to the experiment. The mean scores of the experimental and control classes in the pre-test were 127.46 and 129.22, respectively, with standard deviations of 21.59 and 21.74. The Cohen's d value was 0.08, indicating a negligible difference between the two groups. The t-value of 0.32 and the corresponding p-value of 0.75 (p > 0.05) confirm that the score differences between the two classes were not statistically significant. These results suggest that the English reading comprehension levels of the experimental and control classes were comparable, with a mean difference of only 1.77 points and similar standard deviations. This comparability ensures a reliable baseline for subsequent post-test analysis, providing a solid foundation for evaluating the effects of the intervention.

Table 2: Independent Samples T-Test of Post-test for the CC and EC

		Full Score	M	SD	Cohen's d	Sig.				
							t		df	
						Two-Sided p	Equal variances assumed	Equal variances not assumed	Equal variances assumed	Equal variances not assumed
Post-test	CC	248.5	140.11	24.29	-1.80	0.000	-6.99	-6.98	58.00	56.27
	EC		180.46	20.34						

After the eight-week experiment, students in both the experimental and control classes completed a reading comprehension post-test. An independent samples t-test was conducted to assess whether there was a significant difference in reading comprehension between the two classes. As shown in Table 2, the mean score of the control class was 140.11 with a standard deviation of 24.29, while the mean score of the experimental class was 180.46 with a standard deviation of 20.34. The experimental class outperformed the control class significantly. The Cohen's d value of -1.80 indicates a large effect size, reflecting the substantial advantage of the experimental class. The t-test result yielded a t-value of -6.98 and a p-value of 0.000, well below the significance threshold of 0.05. These results confirm that the Jigsaw Cooperative Learning strategy is significantly more effective than traditional teaching methods in improving students' English reading comprehension.

2. To compare English reading comprehension of students in the experimental class before and after using Jigsaw in Cooperative Learning

Table 3: Paired Samples T-Test of Three Sections in Pre-test and Post-test for the EC

	Full Score	M	SD	Correlation	Cohen's d	Sig.	Paired T-test		
						Two-Sided p	SD	t	df
Pre-Banked Cloze	35.5	16.92	4.91	0.87	-2.99	0.000	2.46	-16.37	29
Post-Banked Cloze		24.26	4.38						
Pre-Matching	71	35.74	7.57	0.75	-3.80	0.000	5.17	-20.82	29
Post-Matching		55.38	7.08						
Pre-Reading in Depth	142	74.79	15.35	0.94	-4.84	0.000	5.38	-26.49	29
Post-Reading in Depth		100.82	14.13						

As shown in Table 3, the mean score of the experimental class in the Banked Cloze section increased from 16.92 (standard deviation = 4.91) in the pre-test to 24.26 (standard deviation = 4.38) in the post-test. This increase indicates that scores became more concentrated, with a reduction in individual differences. A paired samples t-test revealed that the difference between the pre-test and post-test scores was statistically significant, with a t-value of -16.37, a degree of freedom of 29, and a p-value of less than 0.001. The correlation coefficient between the pre-test and post-test scores was 0.87, reflecting a strong positive relationship between the two sets of scores. Furthermore, the effect size (Cohen's d) was -2.99, indicating a substantial improvement in performance in the Banked Cloze section.

In the Matching section, the mean score in the pre-test was 35.74 (standard deviation = 7.57), which increased to 55.38 (standard deviation = 7.08) after the eight-week instructional intervention. This improvement reflects significant progress in the Matching section and a slight reduction in individual differences, as evidenced by the decrease in standard deviation. A paired samples t-test revealed a statistically significant difference between the pre-test and post-test scores (t-value = -20.82, degree of freedom = 29, p-value < 0.001). The correlation coefficient between the two tests was 0.75, indicating a moderate positive relationship. Furthermore, the effect size (Cohen's d) was -3.80, underscoring the substantial improvement in performance between the pre-test and post-test.

The data indicates that students in the experimental class made significant progress in the Reading in Depth section in the post-test. The mean score increased from 74.79 (standard deviation = 15.35) in the pre-test to 100.82 (standard deviation = 14.13) in the post-test, demonstrating notable improvement. A paired samples t-test revealed a highly statistically significant difference, with a t-value of -26.49, a degree of freedom of 29, and a two-tailed p-value of less than 0.001, which is well below the 0.05 significance threshold. Additionally, the correlation coefficient between the pre-test and post-test scores was 0.94, indicating a strong positive relationship. The effect size (Cohen's d) was -4.84, reflecting a substantial improvement in the Reading in Depth scores between the pre-test and post-test.

Discussions

The primary aim of this study was to explore whether Jigsaw in Cooperative Learning could enhance the English reading comprehension of higher vocational college students. The findings validate the effectiveness of the Jigsaw strategy through a comparative analysis between the experimental and control groups, as well as an examination of the experimental group's progress before and after the intervention.

1. To enhance English reading comprehension of higher vocational college students by using Jigsaw in Cooperative Learning

Enhancing English Reading Comprehension Through Jigsaw

The results demonstrate that the experimental class achieved significantly greater improvements in reading comprehension than the control class, affirming the superiority of the Jigsaw strategy over traditional teaching methods. Unlike traditional teacher-centered instruction, which often fosters passive learning and limited engagement (Thamban, 2020), the Jigsaw approach promotes active participation and collaboration. Students take responsibility for specific content, share it with peers, and engage in meaningful discussions, enhancing both individual and group understanding. This cooperative model aligns with Aronson (2002) principles of cooperative learning, where peer interaction and shared responsibility deepen comprehension through dialogue and collaboration.

The division of tasks within the Jigsaw strategy encourages students to engage deeply with the material, fostering responsibility and active engagement. In contrast, traditional methods often rely on teacher explanations, limiting opportunities for independent problem-solving and peer interaction. The findings are consistent with previous research. For instance, Baneng (2019) found that students using Jigsaw performed significantly better in reading comprehension compared to those taught traditionally. Similarly, Aprilia et al. (2024) reported notable improvements in reading test scores among students taught using Jigsaw, with experimental groups consistently outperforming control groups. Elsayed (2023) further

confirmed that Jigsaw is statistically superior to traditional methods in improving comprehension skills.

2. To Compare English Reading Comprehension of Students in the Experimental Class Before and After Using Jigsaw in Cooperative Learning

The findings of this study indicate that the implementation of the Jigsaw strategy significantly improved English reading comprehension among students in the experimental class. These improvements were observed across three critical dimensions: vocabulary comprehension, extensive reading comprehension, and intensive reading comprehension. This section discusses these dimensions in detail, supported by relevant theoretical perspectives and prior studies.

Vocabulary Comprehension

The Jigsaw strategy significantly enhanced students' vocabulary comprehension by requiring them to deeply engage with the vocabulary in the reading materials. Each student was assigned a specific section of the text, compelling them to thoroughly understand key vocabulary and communicate their understanding to group members. This approach aligns with Vygotsky's sociocultural theory, which emphasizes the importance of social interaction in constructing knowledge. Through collaborative discussions, students repeatedly encountered and used the vocabulary, which helped reinforce their understanding and retention.

Unlike traditional vocabulary instruction, which often relies on rote memorization and isolated word lists, the Jigsaw strategy integrates vocabulary learning into meaningful tasks. Students not only needed to comprehend their assigned sections but also assisted their peers in mastering other parts of the material. This dynamic aligns with the concept of positive interdependence in cooperative learning theory, where the success of each group member contributes to the overall group outcome. Rais & Sulistyawati (204) found similar results, showing that students trained with the Jigsaw strategy were better able to infer the meanings of unfamiliar words. Hidayati & Rohayati (2017) also observed that the Jigsaw method improved both vocabulary comprehension and the ability to predict word meanings. Additionally, studies by Pariati (2018) and Aprilia et al. (2024) confirmed that this collaborative approach provides students with multiple opportunities to encounter and actively use vocabulary, expanding their vocabulary knowledge significantly.

Extensive Reading Comprehension

Extensive reading comprehension, which involves extracting main ideas and scanning for specific information, also showed substantial improvement in the experimental class. The Jigsaw strategy required students to work on specific sections of the text independently before sharing their insights with group members. This process helped students develop skimming and scanning skills, which are crucial for extensive reading. By summarizing and communicating key points within a limited timeframe, students practiced identifying main ideas and synthesizing information efficiently.

The collaborative discussions encouraged students to critically evaluate their understanding, which further enhanced their ability to locate specific details in the text. This finding aligns with Chang & Benson (2020) study, which demonstrated that peer questioning in cooperative learning promotes critical engagement with reading materials. Similarly, Handayani et al., (2022) found that Jigsaw group discussions deepened students' understanding of text structures and improved their ability to extract key information. This study reinforces those conclusions, as students in the experimental class showed significant progress in

extensive reading tasks after the intervention. Mansur (2019) also observed that students using the Jigsaw strategy demonstrated stronger reading performance, as they systematically articulated their understanding of texts during group discussions.

Intensive Reading Comprehension

The most notable improvement was observed in intensive reading comprehension, which involves a detailed analysis of text and the ability to infer meanings and relationships. The Jigsaw strategy facilitated this by breaking down complex texts into smaller, manageable sections, reducing cognitive load for individual students. Each group member focused deeply on their assigned portion, analyzing details, and then collaborated with peers to build a comprehensive understanding of the entire text. This interactive process mirrors the construction-integration model by Gamino et al. (2014), which posits that text comprehension is achieved through repeated processing and integration of information.

The group discussions provided a platform for students to ask questions, clarify doubts, and verify their interpretations. This peer-to-peer interaction not only improved comprehension but also enhanced students' analytical skills. Aprilia et al. (2024) found that the Jigsaw strategy encourages students to teach their peers, which reinforces their understanding and retention of the material. The responsibility of explaining their sections to others motivated students to work harder in understanding the details, ensuring the accuracy of the information they conveyed. Hind & Astuti (2024) highlighted similar findings, showing that the Jigsaw strategy promotes deeper comprehension of complex texts, particularly in tasks involving inferential reasoning, word meaning guessing, and logical analysis.

The effectiveness of the Jigsaw strategy in intensive reading was further supported by Handayani et al (2022) study, which confirmed that the interaction between "Home Groups" and "Expert Groups" in the Jigsaw framework significantly enhances reading comprehension. The study revealed that students were better able to identify headings, main ideas, and supporting details, demonstrating improved ability to analyze and synthesize information.

Implications for Vocabulary, Extensive, and Intensive Reading

Overall, the significant progress observed in the experimental class across all three dimensions highlights the Jigsaw strategy's ability to address the challenges of traditional teaching methods. Traditional approaches often isolate vocabulary instruction, limit engagement in reading activities, and rely on teacher-led explanations, which restrict students' opportunities to develop independent reading skills. In contrast, the Jigsaw strategy actively involves students in the learning process, creating a dynamic and collaborative environment where they can acquire and apply knowledge effectively.

Broader Implications and Future Research

The findings of this study underscore the value of the Jigsaw strategy in promoting collaborative learning and improving reading comprehension. While this study focused on higher vocational college students, the results suggest broader applicability across various educational levels and contexts. Future research could explore the long-term impact of the Jigsaw strategy, particularly its ability to sustain improvements in reading skills over time. Additionally, combining quantitative and qualitative methods could provide deeper insights into students' learning experiences and motivation during Jigsaw activities.

Limitations

This study on the Jigsaw strategy in higher education has several limitations related to its scope, duration, and methodological approach. First, the study's small sample, drawn from a single vocational college, limits the generalizability of the findings. While the results provide valuable insights for this specific context, they may not represent other higher education institutions or more diverse student populations.

Second, the eight-week experimental period restricts the ability to evaluate the long-term impact of the Jigsaw strategy on students' reading comprehension and overall learning outcomes. While the findings suggest the strategy is effective in the short term, it remains unclear how it influences skills, retention, and engagement over extended periods. Future research should include longitudinal observations to assess the lasting effects of the Jigsaw strategy across different stages of learning.

Third, the study primarily relied on quantitative methods, which objectively measured improvements in reading comprehension but did not explore non-cognitive factors such as students' motivation, attitudes, or engagement. Incorporating qualitative methods, such as interviews, focus groups, and classroom observations, could provide a more nuanced understanding of how the Jigsaw strategy impacts both cognitive and affective aspects of learning.

Lastly, the study focused on the Jigsaw strategy's impact in isolation, without accounting for other classroom factors such as teacher facilitation styles, peer dynamics, or available resources. These elements are integral to the learning environment and may influence the effectiveness of the strategy. Future research should consider these variables to provide a more comprehensive understanding of how the Jigsaw strategy performs in diverse classroom conditions and teaching cont
exts.

Conclusion

This study aimed to investigate the effectiveness of the Jigsaw Cooperative Learning strategy in improving English reading comprehension among vocational college students. Through rigorous quantitative analysis, the findings demonstrate the significant advantages of this teaching method over traditional approaches. The results highlight not only the overall improvement in students' reading comprehension but also the specific areas where the Jigsaw strategy has had the most impact.

First, the study confirms that the Jigsaw strategy is significantly more effective than traditional teaching methods in enhancing English reading comprehension. Students in the experimental class achieved a post-test mean score of 180.46, compared to 140.11 in the control class. While both groups showed improvement, the experimental class displayed a notably higher level of progress, reflecting the Jigsaw strategy's ability to foster deeper engagement and understanding. This finding validates the first research objective, which sought to compare the effectiveness of the Jigsaw strategy with traditional methods.

Second, the study reveals significant improvements across three key dimensions of reading comprehension: vocabulary comprehension, extensive reading, and intensive reading. In the Banked Cloze section, the experimental class's mean score increased by 7.34 points, accompanied by a decrease in standard deviation, indicating both improved vocabulary mastery and reduced variability in individual performance. In the Matching section, students

demonstrated substantial progress in extensive reading, with a mean gain of nearly 20 points, reflecting enhanced abilities to skim, scan, and extract key information. The most remarkable improvement was observed in the Reading in Depth section, where the experimental class achieved a mean score increase of 26 points, showcasing significant growth in intensive reading skills, including detailed analysis and inferential reasoning.

These results underline the transformative potential of the Jigsaw strategy. By encouraging active participation, collaborative learning, and structured peer interaction, this approach fosters an engaging learning environment where students take ownership of their education. The strategy's emphasis on role differentiation and group accountability not only enhances comprehension but also builds students' confidence and motivation. Unlike traditional methods, which often rely on passive learning and teacher-led instruction, the Jigsaw strategy empowers students to actively construct knowledge through meaningful collaboration.

The findings of this study have important implications for educators and policymakers. They highlight the versatility and effectiveness of the Jigsaw strategy in addressing various dimensions of reading comprehension, making it a valuable tool for improving English education in vocational settings. However, the study also acknowledges certain limitations, including its relatively short duration and narrow scope, which limit the generalizability of the findings. Future research should explore the long-term impacts of the Jigsaw strategy and expand its application to different educational contexts. Additionally, integrating qualitative methods could provide deeper insights into the motivational and emotional aspects of cooperative learning, offering a more holistic understanding of its benefits.

In conclusion, this study provides compelling evidence of the Jigsaw strategy's effectiveness in enhancing English reading comprehension among vocational students. By promoting active engagement, collaboration, and critical thinking, the Jigsaw strategy offers a powerful alternative to traditional teaching methods. As educational institutions seek innovative ways to improve student outcomes, this research underscores the potential of cooperative learning as a transformative approach to teaching and learning.

Suggestion
Suggestions for use
1. Divide reading materials into manageable sections and assign specific parts to each student.

2. Provide structured guidance on group roles, tasks, and expectations.

3. Tailor reading materials to students' language proficiency levels, striking a balance between challenge and accessibility.

4. Promote participation in group discussions through rotating roles and conducting periodic peer assessments.

5. Employ diverse assessment tools such as quizzes, peer evaluations, and group presentations.

6. Provide targeted training in its implementation, including adapting to online or hybrid learning environments.

7. Provide continuous feedback to reinforce learning outcomes and address challenges.

Suggestions for next research

1. Explore the Jigsaw strategy in Cooperative Learning across various higher vocational colleges, regions, and majors.

2. Focus on longer-duration experiments to assess the sustainability of the Jigsaw strategy's impact on students' English reading comprehension, learning performance, and study habits.

3. Use mixed methods research to offer a comprehensive understanding of the Jigsaw strategy.

4. Explore the Jigsaw strategy's potential in improving other English language skills like writing, speaking, and listening.

5. Investigate teachers' experiences and challenges in implementing the Jigsaw strategy.

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