THE EFFECT OF CLAIM-EVIDENCE-REASONING (CER) ON STUDENTS' WRITING SKILLS

Dio Anindio, Yuyun Hendrety
Universitas Tridinanti
dioanindio@gmail.com, yuyun_hendrety@univ-tridinanti.ac.id

ABSTRACT: CER is used to guide students in constructing well-organized writing by presenting a claim, providing supporting evidence, and explaining the logical reasoning that links the evidence to the claim. The purposes of the research were (1) to find out whether or not there was any significant improvement in the eleventh graders' writing skill achievement by using the CER technique and (2) to find out whether or not there was any significant difference in the eleventh graders' writing skill achievement between students who were taught using CER and those who were not. This study used a quasi-experimental pretest–posttest non-equivalent group design. The samples were selected through purposive sampling, involving 34 students in the experimental group and 33 students in the control group. Data were collected using writing tests. The data were analyzed using a paired-samples t-test and an independent-samples t-test. The results of the paired-samples t-test showed that the obtained t-value (15.354) was higher than the t-table value (2.0322), indicating a significant improvement in students' writing skill achievement. The independent-samples t-test revealed that the obtained t-value (5.826) was higher than the t-table value (1.995), indicating a significant difference between the two groups. It could be concluded that the implementation of the CER technique was effective in enhancing students' writing skill achievement. Other findings revealed that there was a significant difference in students' writing skills between students who were taught using the CER technique and those who were not.

Keywords: *writing skill, achievement, CER technique*

PENGARUH METODE KLAIM-BUKTI-ALASAN (CER) TERHADAP KETERAMPILAN MENULIS SISWA

ABSTRAK: CER digunakan untuk membantu siswa membuat tulisan yang terstruktur dengan baik melalui penegasan klaim, penyediaan bukti pendukung, dan penjelasan alasan logis yang menghubungkan bukti dengan klaim. Tujuan penelitian ini adalah (1) mengetahui apakah terdapat peningkatan signifikan dalam pencapaian keterampilan menulis siswa kelas sebelas ketika menggunakan teknik CER, dan (2) mengetahui apakah terdapat perbedaan signifikan antara siswa yang diajarkan menggunakan CER dan siswa yang tidak. Penelitian ini memakai desain eksperimental kuasi pretest–posttest dengan kelompok yang tidak setara. Sampel dipilih secara purposif, terdiri dari 34 siswa pada kelompok eksperimen dan 33 siswa pada kelompok kontrol. Data dikumpulkan melalui tes menulis. Analisis data dilakukan dengan uji t berpasangan dan uji t independen. Hasil uji t berpasangan menunjukkan nilai t yang didapat (15,354) lebih tinggi daripada nilai t tabel (2,0322), menandakan peningkatan signifikan dalam pencapaian keterampilan menulis siswa. Uji t independen mengungkapkan nilai t yang didapat (5,826) lebih tinggi daripada nilai t tabel (1,995), menunjukkan perbedaan signifikan antara kedua kelompok. Dapat disimpulkan bahwa penerapan teknik CER efektif dalam meningkatkan pencapaian keterampilan menulis siswa. Temuan lain menunjukkan

adanya perbedaan signifikan dalam keterampilan menulis antara siswa yang diajarkan menggunakan teknik CER dan yang tidak.

Kata Kunci: *keterampilan menulis, pencapaian, teknik CER*

INTRODUCTION

English, as a global language, plays a significant role in various aspects of life, including education, business, and international communication. The ability to communicate effectively in English is considered essential for students to compete in a globalized world. As stated by Crystal (2003), English functions not only as a means of communication but also as a gateway to knowledge, technology, and broader opportunities. In the educational context, English is regarded as a core subject that students need to master for academic and professional success. However, despite its importance, many students still experience difficulties in expressing their ideas through written language.

Writing is recognized as a complex and cognitively demanding skill. Students often encounter challenges due to the high cognitive load involved in planning, organizing ideas, translating thoughts into written form, and revising their work (Graham & Harris, 2005). In line with this, Harmer (2004) emphasized that writing is not a single-step activity but rather a recursive process involving planning, drafting, revising, and editing. Furthermore, Manchón (2009) described second language writing as a complex problem-solving activity, as learners are required to simultaneously manage grammar, vocabulary, and discourse conventions. Similarly, Hyland (2003) highlighted that writing is often considered the most difficult language skill because it requires the ability to produce coherent and meaningful texts without immediate feedback from the reader.

In addition, writing is viewed as a cyclical and cognitively intensive process involving planning, drafting, and editing (Bereiter & Scardamalia, 2016). Learners need not only linguistic competence but also awareness of cultural and rhetorical conventions (Renandya, 2002). These complexities make writing particularly challenging in academic settings, where clarity, coherence, and accuracy are essential. According to Cottrell (2013), academic writing encompasses various text types, each requiring specific competencies. In this study, narrative writing was selected as the focus. The reason for choosing narrative writing was that it enabled students to develop both creativity and logical organization of ideas.

Narrative text, as defined by Anderson M (2003), refers to a type of text that presents a sequence of events to tell a story, either fictional or non-fictional. It also serves to entertain and engage readers while conveying moral or cultural messages (Dirgeyasa, 2016). However, students often face difficulties in composing narrative texts, particularly in organizing ideas and delivering meaningful messages. Writing achievement itself refers to the measurable level of students' writing proficiency, including aspects such as grammar, vocabulary, organization, and coherence (Graham & Perin, 2007). Therefore, effective instructional strategies are needed to support students in improving their writing skills.

To address these challenges, the CER (Claim, Evidence, Reasoning) technique is implemented as an instructional approach. Originally developed in science education by McNeill and Krajcik (2011), CER provides a structured framework for constructing logical and coherent arguments. In this study, the CER technique was implemented in narrative writing, where students were guided to formulate a clear claim, support it with relevant evidence, and explain the reasoning connecting the evidence to the claim. This technique enabled students not only to retell stories but also to analyze and convey deeper meanings in a structured manner.

Previous studies have indicated that the Claim–Evidence–Reasoning (CER)

technique was effective in improving students' reasoning and writing skills. Zohar and Nemet (2002) found that argument-based instruction enhanced students' ability to construct logical arguments, while Sampson et al. (2011) reported that CER supported the development of coherent written responses. However, most of these studies have focused on argumentative or scientific writing contexts, and limited attention has been given to its application in narrative writing. In narrative writing, students are required not only to express ideas but also to organize them logically and coherently. In this regard, the CER technique may support students in structuring their ideas and developing more coherent narratives. Based on preliminary observations and interviews with English teachers at SMA Negeri 11 Palembang, many eleventh-grade students experienced difficulties in organizing their ideas and constructing well-structured narrative texts. Their writing performance was often below the expected standard, indicating the need for an effective teaching strategy.

Therefore, this study aimed to investigate the effectiveness of the CER technique in improving students' narrative writing skills, particularly in terms of organization and coherence. It was expected that the implementation of this technique would help students produce more organized, coherent, and meaningful writing.

METHODOLOGY

1. Research Design

This study employed a quantitative approach using a quasi-experimental design. This design involved pre-test and post-test measurements, as well as experimental and control groups, without random assignment of classes (Creswell, 2012). The research involved two classes as samples: the experimental group was given treatment using the CER technique, while the control group was taught using a conventional or lecture-based method. The research design can be illustrated in Figure 1.

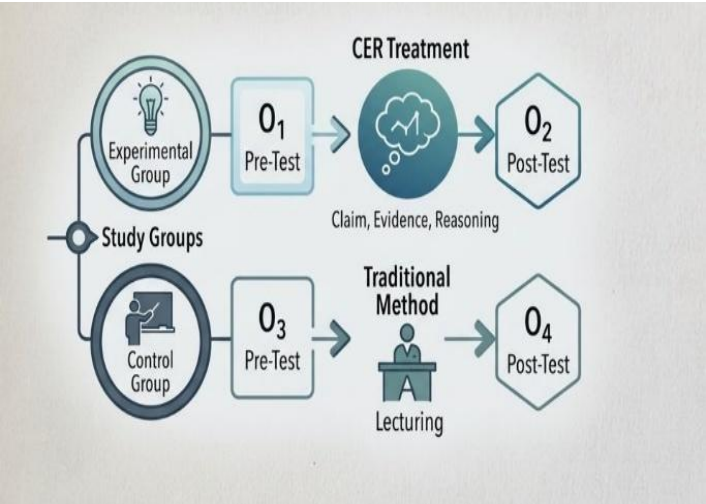


Figure 1. Research Design

2. Research Participants

The population of this study consisted of all the eleventh-grade students at SMA Negeri 11 Palembang in the 2025/2026 academic year. Purposive sampling was

employed to determine the research sample. Two classes, XI.10 and XI.12, were selected as the sample. These classes were then assigned to two groups: the experimental and the control groups. Class XI.10 was designated as the experimental group, while class XI.12 served as the control group.

3. Technique for Collecting Data

A writing test was administered to collect data on students' writing skills, consisting of a pre-test and a post-test. In both tests, students were required to write a narrative text entitled "The Legend of Kemaro Island," with a minimum of 100 words completed within 50 minutes. The instrument was established for content validity through expert judgment, involving two validators to ensure its appropriateness.

4. Technique for Collecting Data

After doing the tests, the students' writings were assessed by two independent raters using a rubric adapted from Brown (2004), and the scores were classified using percentage-based criteria. To ensure scoring consistency, inter-rater reliability was calculated using the Pearson Product–Moment correlation coefficient. The results showed reliability coefficients of 0.86 (pre-test) and 0.80 (post-test) for the experimental group and 0.74 (pre-test) and 0.71 (post-test) for the control group, indicating a high level of reliability.

5. Technique for Analyzing Data

The collected data were analyzed using t-tests to determine whether there were statistically significant differences between students' mean scores. According to Field (2018), a t-test is used to examine differences between the means of two sets of scores. In this study, two types of t-tests were employed: paired-samples t-test and independent-samples t-test**.** The paired-samples t-test was used to compare students' pre-test and post-test scores within the same group. According to Pallant (2020), the paired-sample t-test was used to compare mean scores obtained from the same participants on two different occasions. In this study, it was employed to compare students' pre-test and post-test scores in the experimental and control groups to determine whether their writing achievement improved significantly. A p-value below 0.05 indicated a statistically significant difference, and the null hypothesis (H_0) was rejected. The independent-samples t-test was used to compare the mean scores of the experimental and control groups. According to Field (2018), the independent-samples t-test was used to examine whether the mean scores of two independent groups differed significantly. In this study, it was employed to compare the post-test scores of the experimental and control groups to determine whether a significant difference existed in students' writing achievement after the instructional process. A p-value below 0.05 indicated a statistically significant difference, and the null hypothesis (H_0) was rejected.

FINDINGS AND DISCUSSION

1. Normality Test

Before conducting hypothesis testing, prerequisite tests were performed to determine whether the data met the assumptions of parametric statistical analysis. The normality test was conducted to examine whether the data were normally distributed. In this study, the Kolmogorov-Smirnov test was used to assess the normality of the data. The complete results of the normality test for the pre-test and post-test data for both

groups are presented in the table below.

Table 1. The results of the normality test

	Experimental		Control	
	Pre test	Post test	Pre test	Post test
Kolmogorov-Smirnov	0,104	0,115	0.182	0,167
Asymp. Sig(2-tailed)	0,200	0,200	0,107	0,119

The decision criterion was that data were considered normally distributed when the Asymp. Sig. (2-tailed) value exceeded the significance level of 0.05. Based on Table 13, the experimental group obtained significance values of 0.200 for both the pre-test and post-test, while the control group obtained values of 0.107 for the pre-test and 0.119 for the post-test. Since all significance values exceeded 0.05, the data met the assumption of normality. Therefore, parametric statistical tests, including the t-test, were considered appropriate for hypothesis testing.

2. Homogeneity Test

After the normality of the data had been established, a homogeneity of variance test was conducted to determine whether the post-test score variances of the experimental and control groups were statistically equivalent. This assumption was essential to ensure the appropriateness of the subsequent Independent Samples t-test. Levene's Test for Equality of Variances was employed to assess the homogeneity of variance between the two groups. The results of this test were presented in the table below.

Table 2. The results of data homogeneity

Variable	Levene Statistic	df1	df2	Sig. (2-tailed)
Post-test (Experimental and Control Group)	2,263	1	65	0,137

Based on the statistical analysis presented in the table above, the Levene Statistic was 2.263, with a significance value of 0.137. Since the significance value exceeded the predetermined significance level of 0.05 (0.137 > 0.05), the null hypothesis of equal variances was not rejected. Therefore, the students' post-test writing scores in the experimental and control groups were considered to have homogeneous variances. In conclusion, the homogeneity of variance assumption was satisfied. Together with the fulfillment of the normality assumption, this result supported the appropriateness of conducting an Independent Samples t-test to examine the research hypothesis.

3. Descriptive Analysis Results of the Students' Writing Skill

In the experimental group, which comprised 34 students (N = 34), the pre-test results indicated a mean score of 46.84 with a standard deviation of 9.005, as presented in Table 3. The minimum score was 29, while the maximum score reached 69, as shown in Table 3. Following the intervention, the post-test results demonstrated a notable improvement, as the mean score increased to 69.96 with a standard deviation of 8.593,

as indicated in Table 3. Moreover, the score range also increased, with the lowest score obtained being 53 and the highest score being 88, as presented in Table 3.

In the control group, consisting of 33 students (N = 33), the pre-test mean score was 36.57 with a standard deviation of 8.184, as shown in Table 3. The lowest score obtained was 28, whereas the highest score was 60, as indicated in Table 3. After undergoing the conventional learning process, the post-test results revealed an increase in the mean score to 55.53, accompanied by a higher standard deviation of 11.516, as presented in Table 3. The minimum score improved to 39, while the maximum score increased to 84, as shown in Table 3. Overall, these descriptive findings indicated that both groups experienced an improvement in their mean scores from the pre-test to the post-test, as presented in Table 3 below.

Table 3. The summary of the descriptive analysis results

		Minimum	Maximum	Mean	Std. Deviation	N
Experimental	Pre-test	29	69	46.84	9.005	34
	Post-Test	53	88	69.96	8.593	34
Control	Pre-Test	28	60	36.57	8.184	33
	Post-Test	39	84	55.53	11.516	33

4. Frequency Analysis Results

In the pre-test, 20 students (58.8%) were categorized as "Low" and 10 students (29.4%) as "Poor," indicating that 88.24% of the students were below the “Enough” category. Only 4 students (11.8%) reached the “Enough” level, while none were classified as “Good” or “Excellent.” Following the intervention, the post-test results showed a substantial improvement. No students remained in the “Poor” category, and only 2 students (5.9%) were in the “Low” category. In contrast, most students shifted to higher categories, with 17 students (50.0%) in the “Enough” category, 14 students (41.2%) in the “Good” category, and 1 student (2.9%) achieving the “Excellent” category. The summary of students’ writing skills in the experimental group is presented in Table 3 below.

Table 4. The results of percentage analysis

Score	Category	Pre-Test		Post-Test	
		Frequency	Percentage	Frequency	Percentage
0-40	Poor	10	29.4%	0	0.0%
41-55	Low	20	58.8%	2	5.9%
56-70	Enough	4	11.8%	17	50.0%
71-85	Good	0	0.0%	14	41,2%
86-10	Excellent	0	0,0%	1	2,9%
total		34	100%	34	100%

Meanwhile, at the pre-test stage, the data showed that most students in the control group were in the lowest categories, with 25 out of 33 students (75.8%) classified as “Poor” and 7 students (21.2%) as “Low.” Only 1 student (3.0%) reached a higher category. After the conventional learning process, the post-test results indicated some improvement and greater variation in scores. The number of students in the

"Poor" category decreased to 2 (6.1%), while those in the "Low" category increased to 18 (54.5%). Additionally, 9 students (27.3%) reached the "Enough" category, and 4 students (12.1%) were in the "Good" category, although none achieved the "Excellent" level. Overall, despite some improvement, the majority of students (60.6%) remained in the "Poor" and "Low" categories. The summary of the students' writing skills for the control group is presented in Table 5.

Table 5. The results of percentage analysis

Score	Category	Pre-Test		Post-Test	
		Frequency	Percentage	Frequency	Percentage
0-40	Poor	25	75,8%	2	6.1%
41-55	Low	7	21,2%	18	54.5%
56-70	Enough	1	3,0%	9	27.3%
71-85	Good	0	0,00%	4	12.1%
86-10	Excellent	0	0,00%	0	0.0%
total		33	100%	33	100%

5. Paired Sample T-Test Result

The obtained significance value (Sig. 2-tailed) was 0.000. Based on the criterion that if Sig. (2-tailed) < 0.05, Ho1 would be rejected and Ha1 accepted, the result (0.000 < 0.05) indicated that the null hypothesis (H01) was rejected and the alternative hypothesis (Ha1) was accepted. Therefore, it was concluded that there was a statistically significant improvement in students' writing skill achievement in the experimental group after the implementation of the CER technique.

Table 6. Paired-sample t-test result

Group		Mean Difference	t-obtained	df	Sig.(2-tailed)
Experimental	Pre-test & Post-test	23,125	15,354	33	0.000

6. Independent Sample T-Test Result

The results of the independent samples t-test showed that Levene's Test had a significance value of 0.117 (> 0.05), indicating that the data were homogeneous. The independent-samples t-test revealed a t-value of 5.807 (df = 65) with a significance value of 0.000. Since 0.000 < 0.05, H02 was rejected and Ha2 was accepted. Thus, there was a statistically significant difference between the two groups, with the experimental group achieving a higher post-test mean (69.96) than the control group (55.53), indicating the effectiveness of the CER technique in the eleventh-grade students of SMA Negeri 11 Palembang.

Table 7. The results of the independent-samples t-test

Groups	F	Sig.	t- obtained	df	Sig. (2-tailed)
Post-test Experimental & Control Group	2,528	,117	5,807	65	0,000

Discussion

The findings of this study indicate that the implementation of the Claim–Evidence–Reasoning (CER) technique significantly improved students' writing skills. This is evidenced by the results of the paired-samples *t*-test, which showed a statistically significant difference between pre-test and post-test scores in the experimental group. In addition, the independent-samples *t*-test revealed a significant difference between the experimental and control groups, with the experimental group achieving higher post-test scores. One possible explanation for this improvement is that the CER framework provides a structured approach that helps students organize their ideas more clearly. This finding is consistent with Graham & Perin (2007), who emphasized that structured writing instruction supports students' writing development. Similarly, Sampson and Walker (2011) highlighted that CER promotes coherence and logical organization in students' writing.

The first hypothesis, which proposed a significant improvement in the eleventh-grade students' writing achievement at SMA Negeri 11 Palembang following the implementation of the CER technique, was supported by the paired-samples t-test results. The improvement was also reflected in the descriptive findings, which showed that students' scores increased from the lower achievement categories in the pre-test to higher categories in the post-test. This finding suggested that the CER technique provided a structured framework for students to organize and develop their ideas in writing. Graham and Perin (2007) emphasized the importance of explicit writing instruction and structured strategies in improving students' writing quality. In this study, the claim component encouraged students to formulate their main ideas, the evidence component guided them in selecting relevant information from the narrative, and the reasoning component helped them explain how the evidence supported their claims. These stages may have helped students produce more organized and coherent written responses. However, the improvement in scores alone did not establish which specific component of the CER technique contributed most to students' progress.

The second hypothesis concerned the difference in writing achievement between the experimental and control groups after the instructional period. The independent-samples t-test was used to determine whether the difference between the groups' post-test mean scores was statistically significant. The descriptive findings also indicated differences in students' achievement categories. Students in the experimental group generally achieved higher categories, whereas the control group showed a different distribution of performance levels. These findings suggested that the two instructional approaches may have supported students' writing development differently. The CER technique provided explicit stages for developing claims, selecting evidence, and explaining reasoning, whereas the control group received conventional instruction without the same structured framework. Nevertheless, the effectiveness of the CER technique needed to be evaluated through the statistical comparison between the two groups rather than the improvement observed in the experimental group alone, particularly because students in the control group also demonstrated progress.

The findings were consistent with the emphasis on structured writing instruction discussed by Graham and Perin (2007), who highlighted the value of explicit strategies in supporting students' writing development. Furthermore, the CER framework may have encouraged students to analyze narrative information and support their interpretations with relevant evidence. This process was relevant to narrative writing, in which students needed to understand story events and develop ideas supported by

details from the text. Although the CER technique is commonly associated with scientific explanations and argumentation, its application in this study suggested that its structured approach may also support the organization and coherence of narrative writing. However, differences in students' initial abilities and learning experiences may also have influenced their performance. Therefore, the findings supported the potential use of the CER technique as an approach to writing instruction, although further research is needed to examine its application across different student populations and text types.

However, it is important to note that the CER technique is traditionally associated with argumentative or scientific writing. In this study, it was applied to narrative writing, which focuses more on storytelling elements. Despite this difference, the results suggest that CER may still contribute to improving students' ability to organize ideas, although its effectiveness might vary depending on the text type.

In addition, several limitations should be considered. The duration of the treatment may have influenced the results, and the use of intact classes without random assignment may limit the generalizability of the findings. Therefore, future research is recommended to explore the application of CER in different writing contexts and with longer instructional periods.

CONCLUSION

Based on the findings of this study, it can be concluded that the implementation of the Claim–Evidence–Reasoning (CER) technique had a statistically significant effect on students' writing skills among eleventh-grade students at SMA Negeri 11 Palembang. The results of the paired-samples *t*-test demonstrated a significant improvement in students' writing performance following the treatment, while the independent-samples *t*-test revealed a significant difference between the experimental and control groups. Furthermore, students who were taught using the CER technique outperformed those who received conventional instruction, indicating that the structured framework of CER contributed to better organization and coherence in students' narrative writing. Therefore, the CER technique can be considered an effective instructional approach for enhancing students' writing skills, particularly in supporting the development of more organized and coherent written texts.

REFERENCES

Anderson, M. (2003). *Text Types in English 2*. Macmillan Education Australia.

Bereiter, C., & Scardamalia, M. (2016). *The Psychology of Written Composition*. Routledge

Brown, H. D. (2004). *Language assessment principle and classroom practice*. United States of America: Pearson Education, Inc.

Cottrell, S. (2013). The Study Skills Handbook (4th ed.). Palgrave Macmillan.

Creswell, John W. (2012). *Educational Research: Planning, conducting, and evaluating quantitative and qualitative research.* Boston: Pearson Education, Inc.

Crystal, D. (2003). *English as a Global Language* (2nd ed.). Cambridge University Press.

Dirgeyasa, I. W. (2016). *College academic writing*. Kencana.

Field, A. (2018). *Discovering Statistics Using IBM SPSS Statistics* (5th ed.). SAGE Publications.

Graham, S., & Harris, K. R. (2005). Improving the writing performance of young struggling writers: theoretical and programmatic research from the centre on accelerating student learning. *The Journal of Special Education, 39*(1), 19-33. https://doi.org/10.1177/00224669050390010301.

Graham, S., & Perin, D. (2007). *Writing Next: Effective Strategies to Improve Writing of Adolescents in Middle and High Schools: A Report to Carnegie Corporation of New York.* Alliance for Excellent Education.

Harmer, J. (2004). *How to Teach Writing*. Pearson Education.

Hyland, K. (2003). *Second Language Writing*. Cambridge University Press.

Manchón, R. M. (2009). Writing in Foreign Language Contexts: Learning, Teaching, and Research. Multilingual Matters.

McNeill, K. L., & Krajcik, J. S. (2011). *Supporting Grade 5-8 Students in Constructing Explanations in Science: The Claim, Evidence, and Reasoning Framework for Talk and Writing*. Pearson.

Pallant, J. (2020). SPSS survival manual: *A Step-By-Step Guide To Data Analysis Using IBM SPSS (7th Ed.).* Routledge.

Richards, J. C., & Renandya, W. A. (Eds.). (2002). *Methodology in language teaching: An anthology of current practice*. Cambridge University Press.

Sampson, V., Grooms, J., & Walker, J. P. (2011). *Argument-Driven Inquiry as a Way to Help Students Learn How to Participate in Scientific Argumentation and Craft Written Arguments: An Exploratory Study*. *Science Education, 95*(2), 217-257. https://doi.org/10.1002/sce.20421.

Zohar, A., & Nemet, F. (2002). Fostering students' knowledge and argumentation skills through dilemmas in human genetics. *Journal of Research in Science Teaching*, 39(1), 35–62.