

# Research on the Comparison of Critical Thinking and Logical Expression Skills Before and After Debate Participation

Xiaochao Yao\*

Hainan Vocational University of Science and Technology, Haikou 571126, Hainan Province, China

\*Corresponding author: Xiaochao Yao, mamalin8483@163.com

**Copyright:** © 2024 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

**Abstract:** With the advancement of globalization, university students need not only to master English language skills but also to develop critical thinking and logical expression skills, both of which are crucial for academic and professional success. As an interactive and structured learning activity, English debates provide an effective platform for enhancing these cognitive and linguistic skills. This study investigates the impact of English debates on students' critical thinking and logical expression skills by analyzing pre- and post-debate assessments, survey data, and in-depth interviews with debate participants. The results indicate significant improvements in critical thinking skills, including argumentation logic, rebuttal techniques, and problem awareness. Students also demonstrated notable progress in organizing and expressing complex ideas logically in English. These findings offer valuable insights for English teaching in higher education, suggesting that debates can serve as an effective pedagogical tool for fostering both language and cognitive development in university students.

**Keywords:** Debate; Critical thinking; Logical expression; English language teaching; Empirical study; Higher education

**Online publication:** November 27, 2024

## 1. Introduction

Critical thinking and logical expression skills are essential components of 21st-century education. Critical thinking requires individuals to analyze, critically reflect upon, and evaluate information to draw sound conclusions. Meanwhile, logical expression focuses on how to clearly and coherently communicate complex ideas in various contexts. In the context of globalization, English, as a major international language of communication, demands that students not only possess basic language skills but also engage in logical thinking and interactive dialogue within an English-speaking environment.

English debates, with their high levels of interaction, argumentation, and real-time response requirements, have become an important tool for developing students' critical thinking and logical expression skills. During a debate, students are required to analyze issues quickly, construct logical arguments, and

respond to rebuttals. This process not only strengthens their language skills but also enhances the logical structure of their thinking. This study aims to empirically examine the role of English debates in promoting critical thinking and logical expression among university students, offering a new perspective and practical support for English teaching in higher education.

## **2. Literature review**

In recent years, there has been growing interest in the impact of debate activities on students' cognitive and linguistic skills. Kim and Park, through an empirical study, found that students who participated in debates showed significant improvement in critical thinking, especially in the areas of argument structure and reasoning skills. Debating not only serves as a tool for linguistic exchange but also fosters students' ability to analyze and reason critically <sup>[1]</sup>. Similarly, Li demonstrated that in English as a Foreign Language (EFL) contexts, debates effectively enhance both students' language and thinking abilities, particularly in the areas of reasoning and rebuttal skills <sup>[2]</sup>.

Toulmin's model of argumentation provides a theoretical framework for logical reasoning in debates, highlighting the relationships between claims, grounds, warrants, and rebuttals <sup>[3]</sup>. Johnson and Johnson pointed out that debates effectively improve students' logical expression skills in public discussions, especially in their thinking agility and strategic responses to challenging issues <sup>[4]</sup>. Smith and Harris explored how debates in cross-cultural settings enhance students' cognitive abilities, particularly in the organization and articulation of complex ideas when tackling international issues <sup>[5]</sup>.

Although existing studies indicate positive impacts of debates on students' abilities, most of them focus on theoretical discussions with limited empirical evidence. Therefore, this study will employ a combination of quantitative and qualitative methods to analyze the pre- and post-debate performance of students and examine how participation in debates enhances their critical thinking and logical expression skills.

## **3. Research methodology**

### **3.1. Participants**

The participants in this study were 30 English major students from a university in China, including 15 males and 15 females, aged between 19 and 22. All students had similar English proficiency, as demonstrated by standardized tests such as CET-4 or above, ensuring they possessed sufficient language skills to engage in debates. Additionally, none of the participants had prior debate experience to avoid potential bias in the results due to previous exposure to debate.

### **3.2. Research design**

This study employed a pre-test and post-test experimental design. At the beginning of the study, baseline tests were conducted to assess students' critical thinking and logical expression skills. Critical thinking was evaluated using the Watson-Glaser Critical Thinking Appraisal (WGCT), while logical expression was assessed using a custom-designed logical expression scale. The students then participated in debate training over 16 weeks, with weekly sessions lasting two hours. Debate topics covered a wide range of issues, including social, cultural, and political discussions.

At the end of the study, a post-test was conducted, and the data were analyzed using SPSS software to perform paired sample *t*-tests, determining whether significant improvements in students' critical thinking

and logical expression skills occurred. In addition, semi-structured interviews were conducted to gain insights into the students' subjective experiences of participating in debates.

### 3.3. Data analysis

The data analysis included both quantitative and qualitative components. Quantitative data from critical thinking and logical expression tests were analyzed, using *t*-tests to measure the differences between pre- and post-debate performance. Qualitative data from interview records were analyzed through inductive methods to further understand students' experiences in the development of their cognitive and linguistic skills during debates.

## 4. Results

### 4.1. Improvements in critical thinking

The analysis of the pre- and post-tests showed significant improvements in students' critical thinking skills after participating in debates. According to the WGCT results, the students' average score increased from 67.5 to 82.3 points, with a *t*-test result of  $P < 0.01$ , indicating a statistically significant improvement (**Figure 1**). Specific areas of improvement included:

- (1) Problem analysis skills: Students became faster and more adept at analyzing debate topics, and identifying core issues and points of contention.
- (2) Evidence evaluation skills: Students demonstrated a more rational and critical approach to evaluating arguments, showing improved discernment between valid and invalid evidence.
- (3) Reasoning skills: Debate participation led to a significant enhancement in students' logical reasoning skills, enabling them to clearly present cause-and-effect relationships in their arguments.

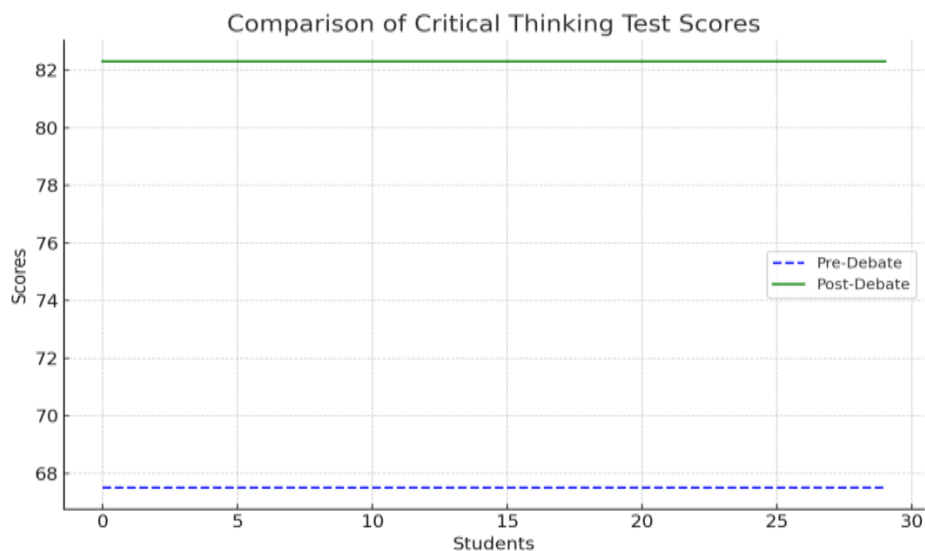


Figure 1. Comparison of critical thinking test scores

### 4.2. Improvements in logical expression

In terms of logical expression, the pre- and post-test results showed substantial improvements. Students demonstrated significant progress in areas such as “argument organization,” “linguistic coherence,” “logical

reasoning,” and “rebuttal techniques.” The study found that after participating in debates, students were more adept at structuring their arguments logically and coherently, and they became more confident and sophisticated in using language to rebut their opponents. **Table 1** presents a detailed comparison of changes in logical expression skills.

**Table 1.** Comparison of logical expression skills

| Category              | Pre-debate mean score | Post-debate mean score | <i>t</i> | <i>P</i> |
|-----------------------|-----------------------|------------------------|----------|----------|
| Argument organization | 3.5                   | 4.2                    | 3.45     | 0.001    |
| Linguistic coherence  | 3.7                   | 4.5                    | 4.12     | 0        |
| Logical reasoning     | 3.4                   | 4.1                    | 3.78     | 0.002    |
| Rebuttal techniques   | 3.2                   | 4.0                    | 3.89     | 0.001    |

Debate training not only improved students’ fluency in logical expression but also enhanced their ability to respond quickly and construct new arguments effectively during rebuttal sessions.

### 4.3. Student feedback and perceptions

In-depth interviews with 15 students provided further insights into their subjective experiences with debates. Most students reported that debate participation improved not only their critical thinking but also their logical expression in real-life English contexts. Many students highlighted the impromptu rebuttal sessions as particularly challenging yet rewarding, as they required quick thinking and immediate construction of arguments. The following are excerpts from some of the students’ feedback: “The debate taught me how to present my opinions more logically, especially when responding to rebuttals, I could identify logical fallacies quickly.” “After participating in debates, I feel more confident about expressing complex ideas in English, which I used to struggle with.”

## 5. Discussion

The results of this study align with existing literature, indicating that debate participation significantly enhances students’ critical thinking and logical expression skills. Debates encourage deep analysis of issues and train students to think critically and from multiple perspectives. Additionally, the impromptu nature of rebuttals in debates provides students with opportunities to organize their thoughts and language under pressure, thereby improving their cognitive flexibility and logical organization.

This study is unique in its use of both quantitative and qualitative methods to analyze the pre- and post-debate performance of students, demonstrating that debates significantly impact not only linguistic abilities but also logical reasoning and critical thinking. However, some students mentioned in the interviews that, at times, language barriers made it difficult to fully express their thoughts. This suggests that future research should explore how to balance linguistic input with cognitive output during debate training to maximize learning outcomes.

## 6. Conclusion

This study provides empirical evidence of the positive effects of English debates on university students’

critical thinking and logical expression skills. The findings suggest that debates offer students a platform to improve both their English language proficiency and their ability to think and argue logically. In future English teaching practices, debates can be utilized as an effective pedagogical tool to help students develop these essential skills, facilitating both language acquisition and cognitive development. These insights contribute to the ongoing discussion of pedagogical reforms in higher education and suggest that debate-based learning activities should be integrated into English curricula to enhance students' critical thinking and logical expression skills.

By combining both language learning and critical cognitive skill development, debate-based education allows students to grow holistically, preparing them for the demands of both academic research and professional environments. Future research could explore other teaching strategies that complement debates, such as role-playing or problem-solving tasks, to further refine and maximize the benefits of interactive language learning activities.

## Disclosure statement

The author declares no conflict of interest.

## References

- [1] Kim Y, Park J, 2020, The Effect of Debate Activities on Critical Thinking Skills: A Study of University Students in South Korea. *Journal of Education and Learning*, 9(3): 45–52.
- [2] Li H, 2021, Enhancing Critical Thinking Skills Through Debate: A Quasi-Experimental Study in an EFL Context. *International Journal of English Language Teaching*, 8(2): 87–99.
- [3] Toulmin SE, 2019, *The Uses of Argument (Updated Edition)*, Cambridge University Press, Cambridge.
- [4] Johnson DW, Johnson RT, 2022, Critical Thinking Through Structured Debate in Higher Education. *Journal of Higher Education Research*, 12(1): 134–150.
- [5] Smith J, Harris P, 2023, Enhancing Logical Expression Through Interactive Debate: An Empirical Study. *Applied Linguistics and Language Education*, 15(2): 213–227.

### Publisher's note

Bio-Byword Scientific Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.