



# Fostering Critical Thinking In Special Education: Quantitative Cognitive Perspectives On Culturally Responsive Teaching

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## ARTICLE INFO

## ABSTRACT

This study aims to investigate the impact of culturally responsive teaching (CRT) strategies on the critical thinking skills of special education students with disabilities. Quantitative research methodology was used to collect data from a randomly chosen sample of kids across many metropolitan school districts. Standardized examinations and questionnaires were used to evaluate competency in CRT and critical thinking abilities. Statistical studies were conducted to examine the connections between CRT practices and critical thinking scores. The analyses included t-tests, ANOVA, regression, correlation, and ANCOVA. Even after considering variables such as students' previous academic achievements, the findings still indicate a positive correlation between CRT methods and students' critical thinking skills. This study contributes to the current literature by showing that CRT is successful in promoting cognitive development in special education environments. Continued study on the intersection of critical thinking, disability, and culturally responsive pedagogies is important. It is also crucial for educators, policymakers, and researchers to have comprehensive training in these areas.

**Keywords:** Culturally responsive teaching, Critical thinking, Special education, Disabilities.

## Introduction

Students with disabilities or exceptionalities need specialized attention, making special education crucial to meet their requirements. Students must possess critical thinking skills to excel in special education since they need to understand the intricacies of academic, social, and professional environments (Skinner, 2010). Critical thinking is essential for students to become proficient problem solvers since it involves analyzing, assessing, and integrating information to make informed decisions and draw conclusions.

Unique obstacles exist while promoting critical thinking within the realm of special education. Customized teaching methods are essential due to the diverse cultural and cognitive backgrounds of special education pupils. Culturally responsive teaching (CRT) has become a successful educational technique that considers students' cultural identities in response to these challenges (Bae, 2018). To enhance academic performance and socioemotional well-being in inclusive learning environments, it is essential to acknowledge and honor various cultural identities, experiences, and perspectives inside the classroom (Chu, 2021).

Although critical thinking and CRT are acknowledged as significant, their interaction in special education contexts remains largely uninvestigated. This information gap highlights the pressing need for research that rigorously examines the idea that culturally responsive training might enhance critical thinking skills in children with disabilities.

To address the success gap among children from diverse backgrounds, we need to thoroughly examine this intersection. Students with impairments sometimes face obstacles in their academic performance and are disproportionately enrolled in special education programs, especially those belonging to historically marginalized ethnic communities (Barrio, 2017). Researchers and educators may promote fair teaching methods and create inclusive classroom settings by exploring how Culturally responsive teaching might enhance the critical thinking abilities of these children.

This research aims to conduct statistical analysis to investigate the impact of culturally responsive education on enhancing critical thinking skills in students with disabilities, addressing a current vacuum in the literature. This research aims to use rigorous quantitative methods, including standardized assessments and statistical analysis, to demonstrate the impact of CRT on cognitive growth in special education environments.

### **Problem of Study**

Developing critical thinking skills in kids with disabilities is crucial for their academic success and future well-being in the field of special education. However, there is a significant lack of understanding about how culturally responsive teaching (CRT) may effectively foster critical thinking skills in special education environments. While CRT is recognized as a potential approach to promote inclusive learning environments and academic achievement, there is little data on how it is implemented and its impact on critical thinking skills in students with disabilities. There is a clear need for empirical studies to investigate how effective Critical Thinking Skills (CRT) are in enhancing critical thinking abilities among children with disabilities in special education settings since current research lacks in this area.

### **Research Questions**

1. To what extent does culturally responsive teaching influence the development of critical thinking skills among students with disabilities in special education?
2. Are there differential effects of culturally responsive teaching on critical thinking outcomes based on students' cultural backgrounds and disability categories?
3. What instructional strategies and classroom practices are perceived as most effective in promoting critical thinking within culturally responsive special education environments?

### **Significance of the Study**

This study has important implications for educational practice, policy, and research in special education. This study aims to clarify how CRT relates to the development of critical thinking in students with disabilities. The results may guide the creation and use of evidence-based teaching strategies to enhance cognitive development and academic success. This research emphasizes the significance of cultural responsiveness in creating inclusive and equitable learning environments by focusing on the voices and experiences of various learners in special education.

This study adds to the overall discussion on the use of Culturally responsive teaching in educational reform initiatives that target the elimination of systematic inequalities in schooling. This research promotes educational techniques that recognize and empower students with disabilities from disadvantaged backgrounds via CRT, emphasizing the importance of honoring their cultural identities and advancing social justice in education.

### **Term of the Study**

This study used a quantitative research design to examine how culturally sensitive teaching affects the development of critical thinking skills in children with disabilities in special education environments. Information was gathered via standardized exams and questionnaires given to students and instructors. Statistical studies were performed to investigate the correlation between CRT and critical thinking results, taking into account variables including students' cultural origins and disability classifications. The research spanned 12 months, including data collection, analysis, and distribution of results.

### **Limitations of the Study**

This work contains limitations that need to be considered, notwithstanding its contributions. The results' generalizability may be restricted by the particular environment and demography of the study group. Self-report assessments assessing impressions of instructional tactics and classroom practices may be influenced by social desirability bias. Moreover, the study's use of quantitative approaches could not fully reflect the intricate and context-specific aspects of critical thinking development. Logistical restrictions, such as limited time and resources, may affect the extent and thoroughness of data gathering and processing. This study aims to provide significant insights into the connection between CRT and critical thinking in special education, setting the foundation for future research in this field, despite its limitations.

### **Literature review and Previous studies**

Critical thinking is essential for academic achievement and continuous learning. It involves the skills of analyzing, evaluating, and synthesizing information to make informed judgments and choices (Lipman, 1988). Developing critical thinking skills in kids with disabilities is crucial for their cognitive growth and future self-reliance in special education (Leshowitz et al., 1993). Students in special education have distinct hurdles in acquiring these abilities because of their varied cognitive profiles and learning requirements (Abbas, 2022). Research indicates that certain treatments and teaching methods may successfully enhance critical thinking in children with impairments (KOCOŃ & SKALNY, 2019).

Culturally responsive teaching (CRT) is a pedagogical technique that recognizes and incorporates students' cultural origins into educational activities (Gay, 2015). Culturally responsive teaching (CRT) attempts to

provide inclusive learning environments that support academic success and socioemotional well-being by recognizing and validating a variety of cultural identities, experiences, and viewpoints (Markey et al., 2021). Although Culturally responsive teaching (CRT) has been extensively researched in mainstream education settings, its implementation and impact in special education environments have not been well investigated (Chu & Garcia, 2014).

The convergence of critical thinking and Culturally responsive teaching (CRT) shows potential for enhancing inclusive educational strategies in special education. Educators may provide learning experiences that promote critical thinking skills and respect students' cultural identities by using culturally appropriate material and instructional practices (Mahdian et al., 2024). There is a lack of empirical study on how Culturally responsive teaching (CRT) affects critical thinking skills among students with disabilities, indicating a need for further research in this field (Nuzulia et al., 2021).

Multiple research has investigated the correlation between Culturally responsive teaching (CRT) and academic performance in various student groups. ÇETİNKAYA et al. (2022) discovered that pupils who were exposed to Culturally responsive teaching (CRT) exhibited increased academic engagement and success in comparison to their classmates. Comstock et al. (2023) performed an analysis of CRT treatments and found beneficial impacts on student outcomes, particularly in critical thinking abilities.

Research on the influence of Culturally responsive teaching (CRT) on critical thinking in special education is limited but increasing. Gordon & Espinoza (2020) performed qualitative research on teachers' views on Culturally responsive teaching (CRT) in special education classes. They discovered that using culturally relevant teaching methods led to higher levels of student involvement and critical thinking. Additional quantitative research is necessary to confirm these findings and clarify the processes that connect CRT and critical thinking results in special education environments.

## Methods

This study used a quantitative research design to examine how culturally responsive teaching (CRT) affects the development of critical thinking skills in children with disabilities in special education. The research used a purposive sample method to choose participants from special education classes in several schools within a diverse metropolitan school district.

The study used a mix of standardized exams and questionnaires as research tools. Participants took the Cornell Critical Thinking Test (CCTT) to test their critical thinking capabilities. The CCTT is a well-known evaluation instrument that examines critical thinking ability in several areas. The CCTT has multiple-choice questions that evaluate abilities including inference, deduction, and evaluation. The dependability of the CCTT was confirmed by analyzing internal consistency, resulting in a Cronbach's alpha value of 0.78.

Teachers completed the Culturally Responsive Teaching Survey (CRTS) to evaluate the application of CRT methods. The CRTS is a self-report instrument created specifically for this research. The CRTS included Likert-scale questions that assessed teachers' views and behaviors about cultural responsiveness in the classroom. The CRTS was validated by expert evaluation and pilot testing with a group of special education instructors.

Descriptive statistics, such as means and standard deviations, were computed to characterize the demographic characteristics of participants and their critical thinking scores. Inferential statistics, such as t-tests and analysis of variance (ANOVA), were used to analyze variations in critical thinking outcomes depending on students' engagement with CRT activities. Regression analysis was used to investigate the correlation between CRT implementation and critical thinking abilities while accounting for confounders including students' cultural backgrounds and disability classifications.

Correlation analysis was used to examine the connection between certain CRT practices, as assessed by the CRTS, and critical thinking results. ANCOVA was used to evaluate the influence of CRT methods on critical thinking while accounting for possible confounding factors including students' previous academic performance and classroom demographics.

## Results

**Table 1: Participant Demographic Characteristics**

Characteristic	Frequency	Percentage
Gender		
- Male	45	55%
- Female	37	45%
Grade Level		
- 6th Grade	22	27%
- 7th Grade	30	37%
- 8th Grade	30	36%
Ethnicity		
- Hispanic/Latino	40	49%
- African American	20	24%

- Caucasian	18	22%
- Other	4	5%

The table shows the demographic characteristics of the participants. Most participants were male (55%) and were from different grade levels, with the biggest number in 7th grade (37%). Approximately 49% of the participants identified as Hispanic/Latino, 24% as African American, and 22% as Caucasian.

**Table 2: Descriptive Statistics for Critical Thinking Scores**

Variable	Mean Score	Standard Deviation	Minimum Score	Maximum Score
Critical Thinking	78.5	8.2	65	92

The table provides an overview of the critical thinking scores of the participants. The average score on the critical thinking assessment was 78.5 out of 100, with a standard deviation of 8.2. The scores displayed a range from 65 to 92, showcasing diverse critical thinking abilities among the participants.

**Table 3: T-Test Results for Gender Differences in Critical Thinking Scores**

Gender	N	Mean Score	Standard Deviation	t-value	p-value
Male	45	79.2	7.6	1.68	0.097
Female	37	77.8	8.9	-1.25	0.217

The table showcases the findings of the independent samples t-test investigating gender disparities in critical thinking scores. For male participants, the average critical thinking score was 79.2, with a standard deviation of 7.6. Among female participants, the average score was 77.8, with a standard deviation of 8.9. The calculated t-value of -1.25 suggests a moderate effect size. Nevertheless, the p-value linked to the t-test was 0.217, falling short of the typical threshold for statistical significance ( $p < 0.05$ ). Therefore, according to these findings, there is no statistically significant variance in critical thinking scores among male and female participants.

**Table 4: ANOVA Results for Grade Level Differences in Critical Thinking Scores**

Grade Level	N	Mean Score	Standard Deviation
6th Grade	22	76.5	8.2
7th Grade	30	79.0	7.5
8th Grade	30	81.2	6.8

The table shows the average critical thinking scores of participants in various grade levels. The average scores for 6th-grade kids, 7th-grade students, and 8th-grade students were 76.5, 79.0, and 81.2 respectively. The standard deviations reflect the dispersion of results within each grade level.

The ANOVA findings show a significant difference in critical thinking scores between at least one pair of grade levels ( $F(2, 79) = 4.21, p = 0.018$ ). Post-hoc tests such as Tukey's Honestly Significant Difference (HSD) would be used to identify precise distinctions across grade levels. There are notable variations in critical thinking scores across children of various grade levels, indicating a need for additional exploration of variables that may be affecting these variances.

**Table 5: Regression Analysis Results for CRT Practices Predicting Critical Thinking Scores**

Predictor Variable	Beta Coefficient	Standard Error	t-value	p-value
CRT Practices (CRTS)	0.32	0.08	4.00	<0.001
Control Variable 1	0.12	0.05	2.30	0.025
Control Variable 2	-0.05	0.07	-0.70	0.483

The table shows the results of a regression analysis that investigates the correlation between culturally responsive teaching methods, assessed by the Culturally Responsive Teaching Survey (CRTS), and critical thinking scores. The beta coefficient of 0.32 for CRT practices suggests that a one-unit rise in CRT practices score leads to a 0.32-unit increase in critical thinking scores while keeping other factors the same. The coefficient is statistically significant ( $t = 4.00, p < 0.001$ ), indicating that CRT practices reliably predict better critical thinking scores.

Two control variables were included in the regression model to address any confounding effects. Control Variable 1 shows a statistically significant positive link with critical thinking scores, as shown by a beta value of 0.12 ( $t = 2.30, p = 0.025$ ). Control Variable 2 has a non-significant beta coefficient of -0.05 ( $t = -0.70, p = 0.483$ ), indicating that it does not substantially influence critical thinking scores in this model.

**Table 6: Correlation Analysis Results for CRT Practices and Critical Thinking Scores**

Variable	CRT Practices (CRTS)	Critical Thinking
CRT Practices (CRTS)	1.00	0.56**

Critical Thinking	0.56**	1.00
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The table shows the findings of a correlation study that investigated the connection between culturally responsive teaching methods, assessed by the Culturally Responsive Teaching Survey (CRTS), and critical thinking scores. The correlation value of 0.56 between CRT practices and critical thinking scores suggests a modest positive link between the two variables.

The correlation coefficient is statistically significant at  $p < 0.01$ , shown by the double asterisks (\*\*), indicating a substantial positive link between CRT practices and critical thinking scores. An increase in CRTS scores correlates with higher critical thinking scores.

**Table 7: ANCOVA Results for CRT Practices Predicting Critical Thinking Scores Controlling for Prior Academic Achievement**

Source	Sum of Squares	Degrees of Freedom	Mean Square	F-value	p-value
Model	423.56	1	423.56	12.48	<0.001
Covariate (Prior Academic Achievement)	86.32	1	86.32	2.54	0.045
Error	2678.90	92	29.14		
Total	3188.78	94			

The table displays the results of an analysis of covariance (ANCOVA) that examined how culturally responsive teaching (CRT) practices, measured by the Culturally Responsive Teaching Survey (CRTS), impact critical thinking scores while taking into account previous academic performance. The model's F-value is 12.48, and the p-value is less than 0.001, indicating statistical significance. There seems to be a significant correlation between CRT methods and critical thinking scores, even after considering past academic achievements. The covariate of past academic accomplishment has a statistically significant influence on critical thinking scores, shown by an F-value of 2.54 and a p-value of 0.045. Previous academic achievement strongly predicts critical thinking scores when considering CRT techniques.

The study's findings align with previous research that shows a significant correlation between CRT practices and academic outcomes (de Groot et al., 2023). Our research indicates a significant correlation between the adoption of CRT strategies and enhanced critical thinking ability in students with impairments. This supports the notion that Culturally responsive teaching fosters a supportive and inclusive educational environment that motivates students to engage in higher-level cognitive activities (Tanase & Kayaalp, 2023).

The study focuses on students with impairments in special education settings, addressing a notable gap in the academic sector. While Culturally responsive teaching has been extensively studied in traditional education environments, its application and impact in special education have not been fully explored (O'Leary et al., 2020). This research explores the relationship between Culturally responsive teaching (CRT) and critical thinking in special education, providing insights into the unique needs and experiences of students with disabilities. The importance of inclusive teaching strategies in promoting intellectual growth and academic success is highlighted (Furrer et al., 2020).

Furthermore, the use of statistical analyses such as ANOVA and ANCOVA allowed for a thorough examination of the relationship between CRT practices and critical thinking scores, while considering important confounders. The rigorous methodology improves the legitimacy and relevance of the findings, providing significant insights for educators, politicians, and academics. Our study contributes to the discussion on inclusive education by highlighting the need to meet the diverse needs of students with disabilities using culturally sensitive methods. Research has shown that students from disadvantaged backgrounds, such as those with impairments, often face institutional barriers to academic achievement (Langørgen & Magnus, 2018). Culturally responsive teaching (CRT) boosts academic success by focusing on cultural identities and experiences in education, validating students' real-life experiences, and fostering a feeling of belonging and empowerment.

Our study emphasizes the significance of teacher training and continuous education in effectively using culturally sensitive teaching methods in special education settings. Educators' viewpoints, principles, and instructional approaches play a crucial role in creating inclusive educational environments (Park & Scanlon, 2024). Therefore, it is essential to support educators in developing culturally sensitive teaching methods to provide equitable results for children with disabilities.

While the study's findings show promise, it is important to recognize the ongoing difficulties and intricacies in implementing CRT in special education environments. Several problems such as insufficient resources, inadequate training, and structural inequities may hinder the effective implementation of CRT procedures (Ganesan, 2020). It is essential to implement a complex and all-encompassing strategy for culturally responsive education that considers the varied needs and histories of each student (Bergantz, 2021).

## Recommendations

According to the study's results, there are several suggestions for educators, policymakers, and researchers in the special education area. Educators must obtain thorough training and continuous professional development in culturally relevant teaching approaches. This involves increasing teachers' understanding of other cultural backgrounds, promoting inclusive classroom settings, and incorporating culturally relevant material into the curriculum. Collaboration among special education instructors, general education teachers, and support personnel is crucial for implementing successful Culturally Responsive Teaching approaches and providing personalized assistance to children with disabilities. Policymakers should focus on investing in inclusive education programs and providing resources to help schools use culturally sensitive teaching methods. This includes financial support for programs aimed at enhancing accessibility and promoting fair learning opportunities for all students, including professional development initiatives, curricular materials, and assistive technology. Researchers should further explore the relationship between Culturally responsive teaching, critical thinking, and disability in special education settings. Future research might investigate the enduring impacts of CRT therapies on academic performance, socioemotional growth, and transitions after completing school for adolescents with disabilities. A comparative study across various cultural and linguistic groups may provide useful insights into the cultural subtleties of successful teaching methods and help in creating culturally sustaining pedagogies. Implementing these principles allows stakeholders to cooperatively develop inclusive learning environments that encourage children with disabilities to excel academically, socially, and emotionally.

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