Journal of Education and Teacher Training Innovation (JETTI)
Published by Pusmedia Group Indonesia

Journal of Education and Teacher Training Innovation
Volume 4 Issue 1 Year 2026 Pages 42-59
e–ISSN : 3025-3500
DOI: 10.61227
e-mail : jetti.pusmedia@gmail.com
https://journal.pusmedia.com/index.php/JETTI

Teachers' and Students' Views on Multidisciplinary Curriculum Implementation in Secondary Education in Anambra and Enugu States

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Abstract: Secondary education in Nigeria faces increasing demands to equip students with critical thinking and problem-solving skills necessary for higher education and the workforce. Despite policy efforts to introduce multidisciplinary curricula, challenges persist in effectively implementing these approaches in schools, limiting their potential impact on students' cognitive development. The study employed a quantitative descriptive survey design with inferential analysis to examine multidisciplinary curriculum implementation in secondary schools in Anambra and Enugu States. A multi-stage sampling technique was used to select 500 students and educators from public and private schools. Data were collected using a validated and reliable structured questionnaire measuring demographic variables, problem-solving skills, educators' perceived challenges, and students' perceptions of relevance to critical thinking. Questionnaires were administered directly, with ethical standards observed. Data were analyzed using SPSS, applying descriptive statistics, independent samples t-tests, and simple linear regression at the 0.05 level of significance. The results indicate that multidisciplinary education enhances students' problem-solving skills in both states, with Anambra students recording higher mean scores in applying knowledge (3.15 vs. 3.03), creativity (3.47 vs. 3.37), decision-making (3.20 vs. 3.12), and real-world problem solving (3.10 vs. 2.99), while Enugu students reported greater confidence in handling complex tasks (2.82 vs. 1.84). Educators in Enugu perceived more serious implementation challenges, especially inadequate training (2.82 vs. 1.84) and curriculum overload (2.66 vs. 1.41), though both states shared similar concerns about assessment methods (3.31). Students generally viewed multidisciplinary education as relevant to critical thinking, with Anambra showing slightly higher engagement (3.47 vs. 3.41) and deeper thinking (3.42 vs. 3.33). Regression analysis revealed a moderate, significant impact on problem-solving skills ($R = 0.469$; $R^2 = 0.220$; $p < .001$), educators' challenges significantly influenced implementation ($t = -8.238$; $p < .001$), while students' perceptions were not significantly related to critical thinking ($p = .289$). The study concludes that multidisciplinary curricula hold substantial potential to enhance students' cognitive skills, but effective implementation requires targeted teacher training, curriculum adjustments, and improved resource provision. These findings offer guidance for policymakers, school administrators, and curriculum planners aiming to strengthen secondary education outcomes.

Keyword : Multidisciplinary education, problem-solving skills, critical thinking, curriculum implementation, secondary education

Article info: Submitted : 2026-01-02 | Accepted : 2026-02-07 | Published : 2026-02-07

How to Cite :

Introduction

Curriculum reforms worldwide increasingly emphasize multidisciplinary or interdisciplinary approaches to better prepare students for complex real-world challenges (Tonnetti & Lentillon-Kaestner, 2023). In secondary education, these reforms seek to move beyond traditional siloed subject structures towards integrated learning that bridges disciplines such as science, mathematics, and humanities to promote critical thinking and problem-solving skills. However, implementing such curricula poses significant challenges. Teachers often lack adequate training, resources, and time to design and deliver integrated lessons, while students may struggle to navigate the cognitive demands of connecting knowledge across domains. The mismatch between policy intentions for multidisciplinary curricula and actual classroom practices raises concerns about both teacher readiness and student engagement and achievement.

A growing body of research investigates how multidisciplinary curriculum implementation is perceived by teachers and students in secondary education. Although direct empirical studies on perceptions of multidisciplinary curriculum are relatively scarce, overlapping literature on interdisciplinary and integrated curriculum models provides valuable insights into key perceptions, challenges, and outcomes. Teachers' views on multidisciplinary implementation are shaped by both perceived benefits and practical constraints. Across multiple studies, teachers recognize that multidisciplinary or interdisciplinary approaches can enhance learning relevance and student engagement by connecting content to real-world problems (Tonnetti & Lentillon-Kaestner, 2023; Kanmaz, 2022). For example, teachers report that integrating disciplines helps students see relationships across subjects, encourages deeper thinking, and mirrors the complexity of societal issues (Tonnetti & Lentillon-Kaestner, 2023). Similarly, science teachers implementing project-based interdisciplinary units for sustainable development describe the value of linking social, economic, and environmental concepts, fostering holistic learning (Scheie et al, 2025).

Despite these positive views, structural and resource-based challenges heavily influence teachers' experiences. Many educators lack sufficient professional development, collaborative planning time, and institutional support required to enact multidisciplinary curricula effectively. In the context of Merdeka Curriculum implementation in Indonesia, science teachers supported the vision of flexible student-centered learning but reported limited technological proficiency, continued reliance on traditional methods, and inadequate facilities as major hurdles (Putri & Pranata, 2024). These issues reflect broader findings that even when teachers value multidisciplinary approaches, the absence of clear guidelines and adequate resources hampers implementation fidelity, especially in secondary settings where specialization and departmental boundaries are entrenched (Tonnetti & Lentillon-Kaestner, 2023).

Teachers' beliefs and attitudes directly affect implementation decisions. Literature on interdisciplinary teaching suggests that professional seniority and experience influence teachers' openness to multidisciplinary practice, with mid-career teachers often more receptive than those with very long service (Kanmaz, 2022). Professional development emerges consistently as critical for equipping teachers with skills to plan, scaffold, and assess integrated lessons. Student views on multidisciplinary curriculum implementation are less frequently documented but nevertheless important. In specific curriculum reform contexts such as the English language component of the Merdeka Curriculum which students appreciated variety and engagement in learning activities that moved beyond rote, subject-specific tasks; however, they also highlighted challenges such as low participation due to language barriers and unmet learning needs (Setya & Degeng, 2025). These responses suggest that students can find multidisciplinary learning meaningful when it is interactive and relevant, but they may struggle without adequate support or scaffolding.

Literature on interdisciplinary and multidisciplinary teaching suggests that integrated curricula can enhance students' motivation, interpersonal skills, and sustained interest in learning, particularly when concepts are meaningfully linked across subjects and applied to real-life contexts (Tonnetti & Lentillon-Kaestner, 2023). Studies in Nigerian secondary and tertiary education indicate that experiential, blended, and ICT-supported learning approaches foster active engagement and collaborative learning, which are central to effective interdisciplinary instruction (Enemuo & Muogbo, 2023; Okafor et al., 2023). When integration is thoughtfully designed, students demonstrate improved academic achievement and interest by connecting knowledge from different disciplines to authentic problems (Favour et al., 2025; Muogbo & Okafor, 2025). However, evidence also shows that poorly implemented integration characterized by limited teacher competence, rigid subject boundaries, and inadequate resources can undermine instructional effectiveness and confuse learners (Nnoli & Muogbo, 2025; Muogbo & Nnoli, 2025).

The need for this study arised from the growing global emphasis on multidisciplinary curriculum reforms designed to foster higher-order thinking, real-world problem solving, and meaningful integration of knowledge across subjects (Tonnetti & Lentillon-Kaestner, 2023). Although research has explored teacher readiness and student engagement in interdisciplinary learning generally, few studies focus specifically on Nigerian contexts, particularly in southeastern states such as Anambra and Enugu where curriculum reforms are evolving amid distinct sociocultural and resource environments (Gado et al, 2023). Existing literature highlights that teachers often lack adequate professional development and collaborative planning time needed to deliver integrated curricula effectively (Adebayo et al, 2023), but empirical evidence from secondary schools in Anambra and Enugu is sparse. Similarly, while studies have documented student challenges with

navigating multidisciplinary tasks in other regions (Stenalt et al, 2025), students' perceptions within these states remain under-investigated. This gap is significant because contextual factors such as educational infrastructure, language diversity, and teacher training systems that may uniquely shape implementation experiences. Therefore, investigating both teachers' and students' views in these states will fill a contextual gap, inform localized strategy development, and support more effective multidisciplinary curriculum implementation.

Objectives

1. To assess the impact of multidisciplinary curricula on the problem-solving skills of secondary school students in Anambra and Enugu States.
2. To explore the perceptions of educators regarding the challenges associated with implementing multidisciplinary curricula.
3. To investigate the perspectives of students regarding the relevance of multidisciplinary education in developing critical thinking skills.

Research Questions

1. How does multidisciplinary education affect the problem-solving skills of secondary school students in Anambra and Enugu States?
2. What are the perceptions of educators regarding the challenges associated with implementing multidisciplinary curricula in secondary education?
3. How do students perceive the relevance of multidisciplinary education in developing critical thinking skills?

Hypotheses

1. Multidisciplinary curricula do not have a significant impact on the problem-solving skills of secondary school students in Anambra and Enugu States.
2. Educators' perceptions of challenges associated with implementing multidisciplinary curricula do not significantly influence its implementation in secondary schools.
3. Students' perspectives on the relevance of multidisciplinary education do not have a significant relationship with the development of their critical thinking skills in secondary schools.

Methodology

The methodology adopted for this study was quantitative in nature and relied on a descriptive survey design complemented with inferential statistical analysis. This approach was considered appropriate because it allowed for the systematic collection of data from a relatively large number of respondents and enabled the examination of

relationships, differences, and predictive effects among key variables related to multidisciplinary curriculum implementation in secondary schools in Anambra and Enugu States. The target population comprised secondary school students and educators drawn from both public and private secondary schools in the two states. To ensure adequate representation, a multi-stage sampling procedure was employed. Schools were first stratified according to state and ownership type, after which respondents were selected proportionately from each stratum using simple random sampling techniques. This process resulted in a total sample of 500 respondents, with a higher proportion drawn from public schools than private schools, reflecting their relative prevalence and accessibility within the study area.

Data for the study were collected using a structured questionnaire developed by the researcher to capture information relevant to the study objectives. The instrument included items on respondents' demographic characteristics, students' problem-solving skills, educators' perceptions of challenges in implementing multidisciplinary curricula, and students' perceptions of the relevance of multidisciplinary education to the development of critical thinking skills. Responses to the substantive sections of the questionnaire were measured using a Likert-type scale, which made it possible to compute mean scores and standard deviations for comparative and inferential analyses. The instrument was subjected to expert review to establish face and content validity, while reliability was ensured through appropriate internal consistency procedures.

The online administration of the questionnaire was carried out through direct contact with respondents, with the support of trained research assistants. Ethical considerations such as voluntary participation, informed consent, and confidentiality of responses were strictly observed. Completed questionnaires were retrieved, screened for completeness, and subsequently coded for analysis. Data analysis was conducted using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics, including frequencies and percentages, were used to summarize respondents' demographic characteristics, while means and standard deviations were used to address the research questions by comparing responses from Anambra and Enugu States. To test the first hypothesis, simple linear regression analysis was employed to determine the extent to which multidisciplinary teaching approaches predicted students' problem-solving skills.

The regression model was evaluated using model summary statistics, analysis of variance, regression coefficients, and diagnostic tests for collinearity and residuals to ensure that the assumptions of regression were not violated. Independent samples t-tests were used to test the second and third hypotheses by examining differences in implementation and critical thinking outcomes based on educators' perceived challenges and students' perceptions of multidisciplinary education, respectively. All

hypotheses were tested at the 0.05 level of significance, providing a statistical basis for accepting or rejecting the null hypotheses.

Results

Table 1. Distribution of Respondents by School Type

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Public	333	66.6	66.6	66.6
	Private	167	33.4	33.4	100.0
	Total	500	100.0	100.0	

Table 1 shows that out of 500 respondents, 333 (66.6%) were from public schools, while 167 (33.4%) attended private schools. This indicates a majority of students sampled were in public institutions, reflecting either higher enrollment in public schools or greater accessibility for the study, compared to private schools which constituted one-third of the sample.

Table 2. Distribution of Respondents by Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	261	52.2	52.2	52.2
	Female	239	47.8	47.8	100.0
	Total	500	100.0	100.0	

Table 2 indicates that of the 500 respondents, 261 (52.2%) were male, while 239 (47.8%) were female. This shows a fairly balanced gender distribution among participants, with males slightly outnumbering females, suggesting that both genders were adequately represented in the study for comparative analysis.

Research Question 1: How does multidisciplinary education affect the problem-solving skills of secondary school students in Anambra and Enugu States?

Table 3.
Group Statistics on the Effect of Multidisciplinary Education on Problem-Solving Skills of Secondary School Students in Anambra and Enugu States

	State	N	Mean	Std. Deviation	Std. Error Mean
Students can apply knowledge from different subjects to solve problems.	Anambra	299	3.15	.867	.050
	Enugu	201	3.03	.951	.067
Multidisciplinary education improves creativity in solving academic problems.	Anambra	299	3.47	.672	.039
	Enugu	201	3.37	.857	.060
Students demonstrate better decision-making skills during learning activities.	Anambra	299	3.20	.733	.042
	Enugu	201	3.12	.892	.063
Real-world problem-solving skills are enhanced through multidisciplinary teaching.	Anambra	299	3.10	.794	.046
	Enugu	201	2.99	.889	.063
Students show confidence in handling complex tasks.	Anambra	299	1.84	1.125	.065
	Enugu	201	2.82	1.059	.075

Table 3 shows that students in Anambra generally reported slightly higher mean scores than those in Enugu across most indicators of problem-solving skills, including application of knowledge (3.15 vs. 3.03), creativity (3.47 vs. 3.37), decision-making (3.20 vs. 3.12), and real-world problem-solving (3.10 vs. 2.99). Interestingly, Enugu students reported higher confidence in handling complex tasks (2.82 vs. 1.84).

Research Question 2: What are the perceptions of educators regarding the challenges associated with implementing multidisciplinary curricula in secondary education?

Table 4.
Group Statistics on Educators' Perceptions of Challenges in Implementing Multidisciplinary Curricula in Anambra and Enugu States

	State	N	Mean	Std. Deviation	Std. Error Mean
Lack of adequate training is a major challenge in implementing multidisciplinary curricula.	Anambra	299	1.84	1.125	.065
	Enugu	201	2.82	1.059	.075
Insufficient teaching resources limits effective multidisciplinary instruction.	Anambra	299	3.04	1.021	.059
	Enugu	201	3.30	.826	.058
Curriculum overload makes multidisciplinary teaching difficult.	Anambra	299	1.41	.973	.056
	Enugu	201	2.66	1.173	.083
Large class sizes hinder effective multidisciplinary learning.	Anambra	299	3.11	.933	.054
	Enugu	201	3.24	.816	.058
Assessment methods do not adequately support multidisciplinary instruction.	Anambra	299	3.31	.999	.058
	Enugu	201	3.31	.997	.070

The table 4 indicates that educators in Enugu reported higher mean scores than those in Anambra on most challenges, particularly lack of adequate training (2.82 vs. 1.84) and curriculum overload (2.66 vs. 1.41), suggesting greater perceived difficulties. Both states reported similar concerns regarding assessment methods (3.31). Insufficient resources and large class sizes were also notable challenges, with slightly higher means in Enugu.

Research Question 3: How do students perceive the relevance of multidisciplinary education in developing critical thinking skills?

Table 5.
Group Statistics on Students' Perceptions of the Relevance of Multidisciplinary Education in Developing Critical Thinking Skills in Anambra and Enugu States

	State	N	Mean	Std. Deviation	Std. Error Mean
Multidisciplinary education makes learning more meaningful.	Anambra	299	2.98	.859	.050
	Enugu	201	3.03	.787	.055
Learning multiple subjects together improves understanding of concepts.	Anambra	299	3.42	.821	.047
	Enugu	201	3.31	.902	.064
Multidisciplinary teaching helps me think more deeply about issues.	Anambra	299	3.42	.821	.047
	Enugu	201	3.33	.906	.064
I am more engaged during multidisciplinary lessons.	Anambra	299	3.47	.804	.046
	Enugu	201	3.41	.885	.062
Multidisciplinary learning prepares me for real-life challenges.	Anambra	299	3.05	.885	.051
	Enugu	201	2.94	.963	.068

The table 5 shows that students in both states generally perceive multidisciplinary education as beneficial for critical thinking. Anambra students reported slightly higher means in understanding concepts (3.42 vs. 3.31), deep thinking (3.42 vs. 3.33), engagement (3.47 vs. 3.41), and preparation for real-life challenges (3.05 vs. 2.94), while Enugu students rated the meaningfulness of learning slightly higher (3.03 vs. 2.98).

Hypothesis 1: Multidisciplinary curricula do not have a significant impact on the problem-solving skills of secondary school students in Anambra and Enugu States.

Table 6. Model Summary for the Impact of Multidisciplinary Curricula on Problem-Solving Skills of Secondary School Students

					Change Statistics					Durbin-Watson
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	
1	.469[a]	.220	.218	3.30957	.220	140.218	1	498	.000	1.586
a. Predictors: (Constant), Multidisciplinary Teaching Approaches Used										
b. Dependent Variable: Impact on Problem-Solving Skills										

The regression analysis in Table 6 shows a moderate positive relationship between multidisciplinary teaching approaches and students' problem-solving skills ($R = 0.469$). The model explains 22% of the variance in problem-solving skills ($R^2 = 0.220$, Adjusted $R^2 = 0.218$), which is statistically significant ($F(1, 498) = 140.218$, $p < .001$). The Durbin-Watson value of 1.586 suggests no serious autocorrelation in the residuals. This indicates that multidisciplinary curricula significantly influence students' problem-solving abilities, rejecting the null hypothesis.

Table 7. ANOVA for the Impact of Multidisciplinary Curricula on Problem-Solving Skills of Secondary School Students

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1535.841	1	1535.841	140.218	.000[b]
	Residual	5454.709	498	10.953		
	Total	6990.550	499			
a. Dependent Variable: Impact on Problem-Solving Skills						
b. Predictors: (Constant), Multidisciplinary Teaching Approaches Used						

The ANOVA results in Table 7 show that the regression model is statistically significant ($F(1, 498) = 140.218$, $p < .001$), indicating that multidisciplinary teaching approaches significantly predict students' problem-solving skills. The regression sum of squares (1535.841) compared to the residual sum of squares (5454.709) confirms that the model explains a meaningful portion of the variance in problem-solving ability, supporting the rejection of the null hypothesis.

Table 8. Regression Coefficients for the Impact of Multidisciplinary Curricula on Problem-Solving Skills of Secondary School Students

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	8.483	.613		13.833	.000		
	Multidisciplinary Teaching Approaches Used	.523	.044	.469	11.841	.000	1.000	1.000
a. Dependent Variable: Impact on Problem-Solving Skills								

The regression coefficients in Table 8 indicate that multidisciplinary teaching approaches have a positive and significant effect on students' problem-solving skills ($\beta = 0.469$, $B = 0.523$, $t = 11.841$, $p < .001$). The constant (intercept) is 8.483, suggesting the baseline level of problem-solving skills when the predictor is zero. Collinearity statistics (Tolerance = 1.000, VIF = 1.000) show no multicollinearity concerns, confirming the reliability of the predictor in the model. This supports the conclusion that multidisciplinary curricula significantly enhance problem-solving skills.

Table 9. Coefficient Correlations for Multidisciplinary Teaching Approaches and Problem-Solving Skills

Model			Multidisciplinary Teaching Approaches Used
1	Correlations	Multidisciplinary Teaching Approaches Used	1.000
	Covariances	Multidisciplinary Teaching Approaches Used	.002
a. Dependent Variable: Impact on Problem-Solving Skills			

The table 9 shows that the correlation of the predictor, multidisciplinary teaching approaches, with itself is 1.000, as expected, and the covariance is 0.002. This indicates a consistent and stable relationship in the regression model, confirming that the predictor is reliably measured and contributes meaningfully to explaining the variance in students' problem-solving skills.

Table 10. Collinearity Diagnostics for Multidisciplinary Teaching Approaches and Problem-Solving Skills

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	Multidisciplinary Teaching Approaches Used
1	1	1.970	1.000	.01	.01
	2	.030	8.164	.99	.99

a. Dependent Variable: Impact on Problem-Solving Skills

The collinearity diagnostics in Table 10 indicate that the regression model has low multicollinearity. The Condition Index values (1.000 and 8.164) are below the commonly cited threshold of 30, and the variance proportions show that both the constant and the predictor do not exhibit problematic overlap (.01 and .99, respectively). This confirms that the model is stable and that the predictor reliably contributes to explaining the variance in students' problem-solving skills.

Table 11. Residuals Statistics for the Regression Model Predicting Problem-Solving Skills

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	11.0958	18.9338	15.5300	1.75438	500
Std. Predicted Value	-2.528	1.940	.000	1.000	500
Standard Error of Predicted Value	.150	.403	.202	.053	500
Adjusted Predicted Value	11.0071	19.0681	15.5314	1.75801	500
Residual	-13.93379	5.90423	.00000	3.30625	500
Std. Residual	-4.210	1.784	.000	.999	500
Stud. Residual	-4.230	1.797	.000	1.002	500
Deleted Residual	-14.06806	5.99294	-.00143	3.32656	500
Stud. Deleted Residual	-4.304	1.801	-.002	1.010	500
Mahal. Distance	.021	6.388	.998	1.173	500
Cook's Distance	.000	.086	.003	.011	500
Centered Leverage Value	.000	.013	.002	.002	500

a. Dependent Variable: Impact on Problem-Solving Skills

The residuals statistics in Table 11 indicate that the regression model provides a reasonably good fit. Predicted values range from 11.10 to 18.93 with a mean of 15.53,

while residuals have a mean close to zero (0.000) and a standard deviation of 3.31, suggesting no systematic bias. Standardized and studentized residuals are within acceptable ranges (±4.21), and influence measures such as Cook's Distance (maximum 0.086) and Mahalanobis distance indicate no extreme outliers.

Hypothesis 2: Educators' perceptions of challenges associated with implementing multidisciplinary curricula do not significantly influence its implementation in secondary schools.

Table 12. Independent Samples Test on the Influence of Educators' Perceived Challenges on Implementation of Multidisciplinary Curricula

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Educators' Perceived Challenges	Equal variances assumed	7.960	.005	-8.394	498	.000	-2.62936	.31324	-3.24479	-2.01393
	Equal variances not assumed			-8.238	400.680	.000	-2.62936	.31919	-3.25685	-2.00187

The Levene's test in Table 12 indicates unequal variances (F = 7.960, p = .005), so the t-test assuming unequal variances is more appropriate. The results show a significant difference in implementation based on educators' perceived challenges (t = -8.238, df = 400.68, p < .001), with a mean difference of -2.63. This suggests that educators' perceptions of challenges significantly influence the implementation of multidisciplinary curricula, leading to the rejection of the null hypothesis.

Hypothesis 3: Students' perspectives on the relevance of multidisciplinary education do not have a significant relationship with the development of their critical thinking skills in secondary schools.

Table 13. Independent Samples Test on the Relationship Between Students' Perceptions of Multidisciplinary Education and Critical Thinking Skills

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Students' Perception of Relevance	Equal variances assumed	.819	.366	1.062	498	.289	.33625	.31658	-.28575	.95824
	Equal variances not assumed			1.054	418.030	.292	.33625	.31893	-.29067	.96316

Levene's test in Table 13 indicates equal variances (F = 0.819, p = .366), so the t-test assuming equal variances is appropriate. The results show no significant difference in critical thinking skills based on students' perceptions of multidisciplinary education (t = 1.062, df = 498, p = .289), with a mean difference of 0.336. This indicates that students' perspectives on the relevance of multidisciplinary education do not significantly relate to the development of their critical thinking skills, supporting the null hypothesis.

Discussion

The descriptive data indicate that students in Anambra generally scored higher than those in Enugu on indicators such as applying knowledge (3.15 vs. 3.03), creativity (3.47 vs. 3.37), decision-making (3.20 vs. 3.12), and real-world problem-solving (3.10 vs. 2.99), whereas Enugu students reported greater confidence in handling complex tasks (2.82 vs. 1.84). The significant positive regression coefficient ($\beta = .469$, $p < .001$) suggests that multidisciplinary teaching approaches meaningfully contribute to students' problem-solving skills. This finding agreed with research showing that integrated and interdisciplinary curricular models strengthen cognitive processes involved in problem solving and higher-order thinking (Li, 2025). For example, interdisciplinary project-based learning has been found to enhance students' problem-solving ability by integrating concepts from various disciplines to tackle real-life problems (Ling et al., 2024).

In a related study in China, high school students exposed to interdisciplinary programs showed significant improvements in both critical thinking and problem-solving competencies, underscoring the cognitive benefits of integrated

curricula (Li, 2025). In contrast, some research suggests that the impact of interdisciplinary methods varies considerably depending on implementation fidelity and teacher expertise, highlighting that simply combining subjects does not automatically ensure deeper cognitive gains unless instruction is thoughtfully designed (Mosiakova, 2021). Overall, the model explained 22% of the variance in problem-solving (Adjusted $R^2 = .218$, $p < .001$), a moderate effect that suggests multidisciplinary approaches have practical significance but must be complemented with stronger pedagogical supports such as teacher training and contextual adaptation for maximal impact.

Educators in Enugu reported higher perceptions of challenges, especially regarding lack of training (2.82 vs. 1.84) and curriculum overload (2.66 vs. 1.41), while both states similarly perceived issues with assessment methods (3.31). This pattern resonates with international findings that teacher-reported barriers—such as insufficient training, curriculum rigidity, and limited resources—are widely documented hindrances to implementing interdisciplinary and multidisciplinary curricula (Kozhabekova, 2025). For instance, multidisciplinary approaches require teachers to integrate content across subjects, but many lack adequate professional development to design and deliver such curricula effectively. This finding agreed with research indicating that teacher preparation and perceptions are central determinants of whether innovative pedagogies take root; teachers' beliefs about interdisciplinary education influence both their willingness and capacity to implement new practices (Milara & Orduña, 2024). In contrast, when institutional support structures, professional learning communities, and assessment reforms are present, educators feel more confident and capable of adopting multidisciplinary instructional strategies (Kosal et al, 2025). The independent samples test results ($t = -8.238$, $p < .001$) confirm that perceived challenges significantly influence implementation, reinforcing the idea that teacher perceptions are not merely attitudinal but have practical consequences for curriculum enactment.

The mean scores on relevance items were generally positive across both states, with slightly higher scores in Anambra for concept understanding, deep thinking, engagement, and preparation for real-life challenges. These perceptions align with literature showing that multidisciplinary and interdisciplinary learning environments increase meaningful engagement, conceptual integration, and critical reflection (Sabri et al, 2024). For example, fostering cross-disciplinary dialogues allows learners to make connections between different content areas, enhancing their understanding and relevance to real world contexts. However, in contrast, the independent samples test indicated no significant relationship between students' perceived relevance of multidisciplinary education and the development of their critical thinking skills ($p > .05$). This nuance reflects research noting that student perceptions alone may not automatically translate into measurable cognitive growth unless scaffolded by

instructional practices that explicitly target higher-order thinking (Bhutta et al., 2024). In related studies, active learning models such as problem-based or project-based learning often improve critical thinking but require structured activities designed to challenge assumptions and promote analysis (Bhutta et al., 2024).

Conclusion

This study examined teachers' and students' perspectives on the implementation of multidisciplinary curricula in secondary schools in Anambra and Enugu States, focusing on problem-solving skills, critical thinking development, and perceived implementation challenges. The findings revealed that multidisciplinary teaching approaches significantly enhance students' problem-solving abilities, particularly in applying knowledge, creativity, decision-making, and real-world problem-solving, although confidence in handling complex tasks varied between states. Educators' perceptions of challenges, such as inadequate training, curriculum overload, and limited teaching resources, significantly influenced the extent and effectiveness of curriculum implementation, highlighting the critical role of teacher readiness and institutional support. While students generally perceived multidisciplinary education as relevant and beneficial for critical thinking, this perception did not consistently translate into measurable gains in critical thinking skills, suggesting that effective implementation requires deliberate instructional strategies and scaffolded learning experiences.

Acknowledgement

This work was supported by the Tertiary Education Trust Fund (TETFund) through Institution Based Research (IBR) intervention.

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