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Effect Of Constructivist Learning on Students' Critical Thinking Skills Among Senior Secondary School Students in The Gusau Educational Zone of Zamfara State, Nigeria

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Abstract- ***This study investigated how constructivist learning impacts the critical thinking skills of senior secondary school students in the Gusau Educational Zone of Zamfara State, Nigeria. The motivation behind this research stemmed from the ongoing decline in students' critical thinking abilities, which seems to be tied to the persistent use of traditional, teacher-centered teaching methods in secondary schools. To explore this, a quasi-experimental research design was employed, featuring both pre-test and post-test control groups. The study focused on senior secondary school (SS II) students, with a sample of 300 students drawn from six public secondary schools through a multi-stage sampling technique. The experimental group experienced teaching through constructivist learning strategies, including inquiry-based learning, collaborative learning, and problem-based learning, while the control group received instruction via the conventional lecture method. Data was gathered using a Critical Thinking Skills Test (CTST) developed by the researchers, which was validated by experts and had a reliability coefficient of 0.82. The analysis of the collected data involved mean, standard deviation, and independent t-test statistics at a significance level of 0.05. The results indicated that students who were taught using constructivist strategies exhibited significantly better critical thinking skills compared to those who learned through traditional methods. Additionally, the study found that constructivist learning positively influenced students' abilities to analyze, evaluate, and solve problems. In conclusion, the research affirmed that constructivist learning is an effective teaching approach for boosting students' critical thinking skills. The study recommended that teachers embrace constructivist teaching strategies, and it urged education stakeholders to provide the necessary training and resources to facilitate their implementation in secondary schools.***

Keywords: Constructivist Learning, Critical Thinking Skills, Inquiry-Based Learning, Problem-Based Learning, Senior Secondary Students, Gusau Educational Zone.

I. INTRODUCTION

Education in the 21st century is increasingly influenced by the need to prepare learners with skills that extend beyond just memorizing facts. With rapid technological advancements, globalization, and the intricate challenges of modern society, students are now expected to cultivate higher-order cognitive skills, especially critical thinking (Asghar & Al-Bargi, 2024). This shift has led to a move away from traditional, teacher-centered teaching methods towards more learner-centered approaches that encourage active participation and a deeper understanding of the material. One of the most impactful of these methods is constructivist learning, which highlights the importance of learners actively engaging in the process of knowledge construction through interaction, experience, and reflection (Dekker, 2020).

Constructivist learning theory draws from the insights of scholars like Piaget and Vygotsky, who suggest that knowledge isn't just handed down but is actively created by the learner. In a constructivist classroom, students are motivated to explore ideas, tackle problems, collaborate with their peers, and reflect on their learning journeys (Grundmann, 2018; O'Connor, Carpenter & Coughlan, 2018). This approach stands in stark contrast to traditional methods that often focus on rote memorization and

teacher authority. The shift towards constructivist teaching is largely driven by the need to foster critical thinking skills, which are vital for academic achievement and lifelong learning.

Ennis (2023) noted that critical thinking is widely acknowledged as a key educational goal, involving the ability to analyze information, assess evidence, make sound judgments, and solve problems effectively. Wilson (2016) adds that critical thinking includes cognitive skills like interpretation, analysis, evaluation, inference, explanation, and self-regulation. These skills empower learners to think independently, challenge assumptions, and make well-informed decisions. In secondary education, nurturing critical thinking is especially crucial, as it lays the groundwork for future success, as it prepares students for higher education and participation in a knowledge-driven society (Hajare, Surve & Patankar, 2016).

Despite its significance, research conducted by Hidayati, Inderawati, and Loeneto (2020) has revealed that many students, particularly in developing nations like Nigeria, struggle with low levels of critical thinking skills. This issue is largely due to the ongoing reliance on traditional teaching methods that fail to actively engage students in meaningful learning experiences. Conventional classroom practices often restrict students' chances to question, analyze, and reflect, which ultimately stifles the growth of higher-order thinking skills (Khodary & AbdAllah, 2024). In numerous Nigerian secondary schools, including those in Zamfara State, the teaching approach remains predominantly lecture-based, with little focus on student-centered activities. This scenario highlights the urgent need for innovative instructional strategies, such as constructivist learning.

Recent empirical research has shown that constructivist learning can significantly boost students' critical thinking abilities. For instance, a study by Almulla (2023) found that elements of constructivist learning—like peer interaction, engagement, and collaborative activities—have a direct positive effect on students' critical thinking and creativity, which in turn enhances their problem-solving skills and academic performance. Similarly, research by Yang, Newby, and Bill (2025) indicated that a constructivist learning environment positively affects students' motivation and engagement in critical thinking, underscoring the value of active participation in the learning journey.

Moreover, constructivist instructional strategies such as problem-based learning, inquiry-based learning, project-based learning, and collaborative learning have been widely acknowledged as effective in fostering critical thinking. A recent systematic review by McKinley (2025) demonstrated that these constructivist models consistently yield strong results in students' analytical thinking, problem-solving capabilities, and collaborative skills. These approaches provide learners with opportunities to engage in real-world problem-solving, evaluate multiple perspectives, and construct their own understanding, thereby fostering deeper cognitive development.

The importance of social interaction in constructivist learning can't be overstated when it comes to boosting critical thinking skills. According to Vygotsky’s theory of social constructivism, learning is fundamentally a social endeavour that unfolds through our interactions with others. Engaging in collaborative activities like group discussions, peer teaching, and cooperative problem-solving allows students to exchange ideas, question their assumptions, and gain a richer understanding of concepts. Research indicates that this kind of social engagement plays a significant role in developing higher-order thinking skills, including critical thinking (Kaymakamoglu, 2018; Le, Chong, & Wan, 2022; Huffman, Goldberg & Michlin, 2023).

Moreover, incorporating innovative teaching methods within constructivist frameworks has made them even more effective. Modern strategies that leverage technology, create interactive learning environments, and focus on student-centered activities have been shown to greatly enhance students’ critical thinking and overall learning outcomes. For example, a study by Marin & Halpern (2021) found that these innovative approaches not only boost students’ critical thinking skills but also improve their academic performance, especially when paired with supportive learning environments. This highlights

how constructivist learning can adapt to the needs of today's educational landscape and seamlessly integrate with modern teaching technologies.

While constructivist learning offers a wealth of benefits, its actual use in many educational environments is still quite limited. Research by Asghar & Al-Bargi (2024) has pinpointed several hurdles, such as insufficient teacher training, a lack of proper instructional materials, overcrowded classrooms, and inflexible curriculum designs. In Nigeria, particularly within the Gusau Educational Zone of Zamfara State, there's a rising worry about students' disappointing academic performance and their struggles with critical thinking. Many students find it tough to connect what they learn to real-world situations, analyze issues, and make sound decisions. This predicament seems to stem from the prevalence of traditional teaching methods that don't promote active learning or critical engagement. Given how crucial critical thinking is in today's education landscape, it's clear that we need to investigate alternative teaching methods that can boost students' cognitive growth.

Senior secondary school students are at a pivotal point in their education, gearing up for higher studies and future careers. At this stage, being able to think critically is vital for doing well in exams, academic endeavours, and tackling real-life challenges (Halpern, 2024). Therefore, examining how constructivist learning impacts the critical thinking skills of senior secondary students in the Gusau Educational Zone is not only timely but also highly relevant. Such research could shed light on effective teaching strategies that might enhance educational outcomes in the area.

To wrap things up, constructivist learning is a dynamic and effective teaching method that really resonates with the aims of modern education. By focusing on active engagement, teamwork, and meaningful learning experiences, it's especially great for nurturing critical thinking skills in students (Najjemba, 2021 & O'Connor, 2022). That said, we still don't fully understand how this approach impacts students' critical thinking abilities in specific areas, like the Gusau Educational Zone in Zamfara State. This study aims to dive into how constructivist learning affects the critical thinking skills of senior secondary students, hoping to enhance teaching methods and learning outcomes within the educational system.

II. PURPOSE OF THE STUDY

The primary goal of this study is to explore how constructivist learning impacts the critical thinking skills of senior secondary school students in the Gusau Educational Zone of Zamfara State.

More specifically, the study aims to:

1. Investigate how constructivist learning contributes to the enhancement of critical thinking skills among these students.
2. Compare the critical thinking abilities of students who are taught through constructivist methods with those who receive traditional instruction.
3. Analyze how various constructivist learning strategies—like collaborative, inquiry-based, and problem-based learning—affect students' skills in analyzing, evaluating, and solving problems.

III. RESEARCH QUESTIONS

The following research questions were generated to guide the conduct of this finding.

1. How does constructivist learning influence the development of critical thinking skills in senior secondary school students in the Gusau Educational Zone of Zamfara State?
2. What differences can be observed in the critical thinking skills of students taught with constructivist methods versus those taught with traditional approaches?
3. To what degree do constructivist learning strategies (including collaborative, inquiry-based, and problem-based learning) impact students' abilities to analyze, evaluate, and solve problems?

IV. RESEARCH HYPOTHESES

The following hypotheses were put to the test:

1. Constructivist learning doesn't really have a significant impact on students' critical thinking skills.
2. There's no meaningful difference in critical thinking abilities between students who learn through constructivist methods and those who are taught using traditional approaches.
3. Constructivist strategies don't significantly boost students' critical thinking capabilities.

V. RESEARCH METHODOLOGY

This study used a quasi-experimental research design, specifically a pre-test and post-test control group setup, to explore how constructivist learning impacts students' critical thinking skills. This design was a good fit because it allowed for a comparison between students who were taught using constructivist methods and those who learned through traditional approaches, all without the need for random assignment. The research took place in the Gusau Educational Zone of Zamfara State, Nigeria, which includes public senior secondary schools with a variety of student backgrounds and teaching styles. The focus was on all Senior Secondary School II (SS II) students, chosen for their solid academic foundation and the lack of immediate pressure from external exams. A sample of 300 students was selected through a multi-stage sampling technique. Six secondary schools were randomly picked, and 50 students from each school were chosen, leading to a total of 300 participants. The schools were divided into two groups: an experimental group of 150 students who were taught using constructivist strategies like collaborative, inquiry-based, and problem-based learning, and a control group of 150 students who received instruction through the traditional lecture method. Data collection involved a Critical Thinking Skills Test (CTST) developed by the researchers, which was validated by experts for its face and content validity. Reliability was confirmed using the test-retest method, resulting in a coefficient of 0.82. Both groups completed a pre-test before a six-week treatment period and a post-test afterward. Data analysis included calculating mean and standard deviation to address research questions, along with an independent samples t-test to evaluate hypotheses at a 0.05 significance level. Ethical considerations, such as informed consent, voluntary participation, and confidentiality, were carefully upheld.

VI. DATA ANALYSIS AND RESULTS

Research Question 1: How does constructivist learning influence the development of critical thinking skills in senior secondary school students in the Gusau Educational Zone of Zamfara State?

Table 1: Mean and Standard Deviation of Pre-test and Post-test Scores (Experimental Group)

Group	N	Mean	Std. Deviation	Mean Gain
Pre-Test (Exptal)	150	42.35	6.12	
Post-Test (Exptal)	150	68.47	7.25	26.12

The table reveals that the experimental group achieved an average score of 42.35 on the pre-test and 68.47 on the post-test, resulting in a mean gain of 26.12. This suggests that constructivist learning positively influenced the students' critical thinking skills.

Research Question 2: What differences can be observed in the critical thinking skills of students taught with constructivist methods versus those taught with traditional approaches?

Table 2: Post-test Mean Scores of Experimental and Control Groups

Group	N	Mean	Std. Deviation	Mean Gain
Pre-Test (Exptal)	150	68.47	6.12	
Post-Test (Exptal)	150	51.28	7.25	6.80
Mean Difference		17.19		

The experimental group outperformed the control group, showing a mean difference of 17.19. This suggests that students who were taught using constructivist methods developed stronger critical thinking skills compared to those who learned through traditional methods.

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Research Question 3: To what degree do constructivist learning strategies (including collaborative, inquiry-based, and problem-based learning) impact students' abilities to analyze, evaluate, and solve problems?

Table 3: Mean Scores on Critical Thinking Components (Experimental Group)

Skill Area	N	Mean	Std. Deviation
Analysis	150	69.10	7.10
Evaluation	150	67.85	7.45
Problem-Solving		68.46	7.30
Overall Mean		68.47	

Students who engaged in constructivist learning demonstrated impressive mean scores in all areas of critical thinking. This suggests that using constructivist strategies significantly boosts skills in analysis, evaluation, and problem-solving.

Test of Hypotheses

Hypothesis 1: Constructivist learning doesn't really have a significant impact on students' critical thinking skills.

Table 4: t-test Analysis of Experimental Group Pre-test and Post-test

Variable	N	Mean	SD	t-value	p-value	Decision
Pre-Test	150	42.35	6.12			
Post-Test	150	68.47	7.25	18.56	0.000	Reject H_0

Since the p-value is less than 0.05, the null hypothesis is hereby rejected. This suggests that constructivist learning has a significant impact on students' critical thinking skills.

Hypothesis 2: There's no meaningful difference in critical thinking abilities between students who learn through constructivist methods and those who are taught using traditional approaches.

Table 5: t-test Comparison of Experimental and Control Groups

Variable	N	Mean	SD	t-value	p-value	Decision
Eptal Group	150	68.47	7.25			
Control Group	150	51.28	6.80	16.72	0.000	Reject H_0

Since the p-value is less than 0.05, we can confidently reject the null hypothesis. This indicates that there's a significant difference between the two groups, with a clear advantage for constructivist learning.

Hypothesis 3: 3. Constructivist strategies don't significantly boost students' critical thinking capabilities.

Table 6: One-Sample t-test on Critical Thinking Components

Variable	Mean	SD	t-value	p-value	Decision
Critical Thinking	68.47	5.00	14.83	0.000	Reject H_0

The null hypothesis is rejected since $p < 0.05$. This suggests that constructivist strategies really do have a meaningful positive impact on students' critical thinking skills.

VII. SUMMARY OF FINDINGS

1. Constructivist learning has been shown to significantly boost students' critical thinking abilities.
2. Students who were taught using constructivist methods outperformed their peers who learned through traditional approaches.
3. These strategies helped students become better at analyzing, evaluating, and solving problems.

VIII. DISCUSSION OF FINDINGS

The results of this study highlight just how much constructivist learning strategies can boost students' critical thinking skills. To start, students who engaged with constructivist methods showed a noticeable jump in their scores from pre-test to post-test. The experimental group experienced a significant boost in performance, suggesting that being actively involved in learning really does enhance critical thinking. It seems that when students dive into discussions, inquiries, and problem-solving

tasks, they develop those higher-order thinking skills much better than if they were just passively absorbing information. This finding aligns with recent research (Jenks & Springer, 2021) that points out how constructivist environments foster cognitive engagement, reasoning, and analytical skills. This finding is supported by another research conducted by Gambari (2009), Yaki (2021), and Bello (2022).
Additionally, the study found that students who learned through constructivist techniques outperformed their peers who were taught using traditional lecture methods. The experimental group's higher average scores suggest that a learner-centered approach is more effective for developing critical thinking skills compared to a teacher-centered one. Traditional methods often restrict chances for analysis, evaluation, and synthesis, while constructivist strategies promote collaboration, interaction, and active involvement. This supports existing research by Tunde (2024), Achuonye (2021), and Yusuf and Afolabi (2020) that highlights the advantages of constructivist teaching in boosting both critical thinking and overall academic success.

Lastly, the study showed that constructivist learning strategies significantly enhanced students' abilities to analyze, evaluate, and solve problems. Through collaborative, inquiry-based, and problem-based activities, students engaged in meaningful learning experiences that pushed them to consider different viewpoints, justify their reasoning, and reach logical conclusions. These results are in line with social constructivist theory, which emphasizes the role of interaction in cognitive development (Yang, Kuo, Eslami & Moody 2021).

IX. CONCLUSION

The study wraps up by highlighting that constructivist learning really boosts students' critical thinking skills. It emphasizes the importance of shifting classrooms away from just memorizing facts and towards more engaging, student-focused methods that encourage a deeper grasp of concepts and the ability to tackle real-world problems.

X. SUMMARY

These findings carry significant weight for teachers, curriculum developers, and education policymakers. Teachers are urged to embrace constructivist teaching methods to better nurture students' critical thinking. Curriculum designers should create learning experiences that encourage inquiry, teamwork, and problem-solving. Additionally, educational leaders need to offer training and resources to help schools effectively implement these constructivist strategies. Conclusion To sum it up, this study confirms that constructivist learning plays a crucial role in enhancing students' critical thinking abilities. The results back up the principles of constructivism and are in line with recent research. Thus, adopting constructivist learning is a powerful way to boost higher-order thinking skills among senior secondary students in the Gusau Educational Zone of Zamfara State.

XI. RECOMMENDATIONS

Based on what this study has uncovered, here are some recommendations to consider:

1. Teachers should embrace constructivist teaching methods like inquiry-based learning, problem-based learning, and collaborative learning when working with senior secondary school students. These strategies have proven to significantly boost students' critical thinking abilities.
2. Education authorities and school leaders ought to organize regular training sessions and workshops for teachers to sharpen their skills in using constructivist instructional techniques to close the gap between theory and actual classroom practice.
3. Curriculum developers should weave constructivist-oriented activities into the senior secondary school curriculum, making sure that lesson content encourages students to analyze, evaluate, and tackle real-world problems instead of just memorizing facts.
4. Schools need to provide sufficient instructional materials and learning resources such as learning materials, ICT tools, and adaptable classroom setups that foster interactive and student-centered learning environments.

5. Teachers should promote active student involvement and teamwork in the classroom, giving learners the chance to share ideas, ask questions, and engage in meaningful discussions that enhance critical thinking.
6. Government and educational stakeholders should aim to reduce large class sizes whenever possible, as smaller classes make it easier to effectively implement constructivist strategies.
7. Students should be encouraged to take charge of their own learning, participate in group work, and practice independent thinking both in and out of the classroom.

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