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# BRIDGING THE GENDER GAP IN STEM EDUCATION THROUGH INCLUSIVE TEACHING PRACTICES IN SECONDARY SCHOOLS OF KADUNA STATE, NIGERIA

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## Abstract
*This study investigated the effectiveness of inclusive teaching practices in bridging the gender gap in STEM education within secondary schools of Kaduna State, Nigeria. The research aimed to identify the most effective inclusive teaching strategies for encouraging female participation in STEM subjects, assess secondary school STEM teachers' attitudes and beliefs about gender differences in STEM learning, and explore how school leadership can support the implementation of inclusive teaching practices. A descriptive survey design was employed, with a population comprising all science secondary school teachers in Kaduna metropolis. A sample of 350 teachers was determined using Krejcie and Morgan's (1970) sample size determination table. Data was collected through questionnaires and analyzed using descriptive statistics, chi-square, and logistic regression. The findings revealed that hands-on learning activities, collaborative learning approaches, and real-world application of STEM concepts were the most effective inclusive teaching strategies. Teachers demonstrated positive attitudes toward gender equality in STEM but expressed concerns about implementation challenges. School leadership support emerged as a critical factor in successful implementation of inclusive practices. The study recommends comprehensive teacher training programs, development of gender-inclusive STEM curricula, and strengthening of leadership support systems to effectively bridge the gender gap in STEM education.*
***Keywords: Gender gap, STEM education, Inclusive teaching practices and Secondary school***

## Introduction
Science, Technology, Engineering, and Mathematics (STEM) education has become increasingly critical for national development and economic competitiveness in the 21st century. However, the persistent underrepresentation of women and girls in STEM fields remains a global concern, particularly in developing countries like Nigeria. The gender gap in STEM education is particularly pronounced at the secondary school level, where foundational attitudes and career aspirations are formed (UNESCO, 2023). In Nigeria, despite the country's commitment to gender equality in education through various policy frameworks, significant disparities persist in STEM participation. The National Policy on Gender Education (NPGE) has made substantial efforts to promote gender-sensitive and inclusive education at all levels, yet the representation of women in STEM-related careers remains alarmingly low (Verivafrica, 2024). According to UNESCO statistics, only 3% of researchers in Nigeria are women, while women constitute merely 22% of annual graduates in engineering and technology from universities (Gbigbadua, 2023).

Kaduna State, located in northern Nigeria, faces additional challenges in promoting gender equality in education due to socio-cultural factors that often limit girls' educational opportunities (NAN News, 2024). The state government has made significant investments in female education, allocating N12 million in 2024 to gender-related programs, indicating a commitment to addressing these disparities (NAN News, 2024). Inclusive teaching practices have emerged as a promising approach to addressing gender gaps in STEM education. These practices encompass deliberate strategies that create learning environments where all students, regardless of gender, feel valued, supported, and empowered to succeed (Gbigbadua, 2023). Research has shown that inclusive teaching strategies can significantly improve female students' engagement, self-efficacy, and achievement in STEM subjects (European Commission, 2024).

Previous empirical studies of TechwomenNG (2025); European Commission (2024); Gbigbadua's (2023); Luther and Shekari (2023); Tunmibi et al. (2015) found that real-life learning adventures, blended learning approaches, collaborative learning approaches, hands-on and real-world applications significantly enhance girls' interest in STEM disciplines. Similarly, Agommuoh and Ndirika (2023) found that exposing girls to female STEM experts and fostering collaboration between students and science museums were effective strategies. However, Wang and Degol (2017) suggested that while collaborative approaches are beneficial, individual achievement-oriented

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methods may be more effective for certain learning outcomes in STEM subjects. The research conducted by Agommuoh and Ndirika (2023) found positive attitudes among Nigerian STEM teachers regarding gender equality strategies. Additionally, Seema Nath (2025); European Commission (2024); Vaishampayan (2019) reported that teacher attitudes play a crucial role in shaping gender perceptions and choices in STEM subjects. They also emphasized that teacher sensitivity and understanding of inclusion are crucial for successful implementation of inclusive education. Contrary to the above, British Council Nigeria (2013) have found significant gender differences in teacher attitudes, with male teachers sometimes showing less awareness of gender bias issues.

Also, Seema Nath (2025); Pedaste et al. (2021); Vaishampayan (2019) emphasizing that school leadership is pivotal for bringing in inclusive policies and practices, requiring vision, support, and clear communication. Similarly, the NAN News (2024) reported Kaduna State government's commitment to gender equality through significant budget allocations, indicating policy-level leadership support. However, Leijen, et al (2023) found that school leaders often express negative attitudes toward the adequacy of support for themselves and teachers in implementing inclusive practices. Also, resource constraint studies have indicated that leadership support may be limited by financial and infrastructural challenges, particularly in developing country contexts. Thus, none of these studies were conducted in Kaduna metropolis, hence, this study fills the gap.

**Statement of the Problem**

Despite increased global attention to gender equality in STEM education, secondary schools in Kaduna State continue to experience significant gender disparities in STEM subject participation and achievement. Female students consistently show lower enrollment rates in advanced STEM courses and demonstrate reduced confidence in their STEM abilities compared to their male counterparts. This underrepresentation has far-reaching implications for Nigeria's technological advancement and economic development. The challenge is multifaceted, involving complex interactions between socio-cultural factors, teaching practices, school leadership support, and institutional barriers. Traditional teaching methods in STEM subjects often fail to address the diverse learning needs and preferences of female students, inadvertently perpetuating gender stereotypes and limiting girls' engagement with STEM content. Current research indicates that while many factors contribute to the gender gap in STEM, the role of inclusive teaching practices and supportive school leadership remains underexplored in the Nigerian context, particularly in Kaduna State. Understanding these dynamics is crucial for developing effective interventions that can bridge the gender gap and create more equitable STEM learning environments.

**Research Objectives**

1. To determine the inclusive teaching strategies that are most effective in promoting female participation in STEM subjects among secondary schools in Kaduna State.
2. To assess the attitudes and beliefs of secondary school STEM teachers concerning gender differences in STEM learning within Kaduna State.
3. To explore effective approaches through which school leadership can support the implementation of inclusive teaching practices in STEM subjects in Kaduna State secondary schools.

**Research Questions**

1. What inclusive teaching strategies are most effective in encouraging female participation in STEM subjects in secondary schools of Kaduna State?
2. What are secondary school STEM teachers' attitudes and beliefs about gender differences in STEM learning in Kaduna State?
3. How can school leadership effectively support the implementation of inclusive teaching practices in STEM subjects in Kaduna State?

**Null Hypotheses**

**$H_{o1}$:** There is no significant difference in the effectiveness of various inclusive teaching strategies in encouraging female participation in STEM subjects in secondary schools of Kaduna State.

**$H_{o2}$:** There are no significant differences in secondary school STEM teachers' attitudes and beliefs about gender differences in STEM learning capabilities in Kaduna State.

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**$H_{O3}$:** School leadership support has no significant effect on the implementation of inclusive teaching practices in STEM subjects in secondary schools of Kaduna State.

## Methodology

This study employed a descriptive survey research design to investigate inclusive teaching practices and their effectiveness in bridging the gender gap in STEM education. This design was chosen because it allows for the systematic collection and analysis of data from a large sample while providing insights into current practices, attitudes, and beliefs within the target population (Fraenkel, et al., 2019; Creswell & Creswell, 2018). The population for this study comprised all science secondary school teachers in Kaduna metropolis. Based on data from the Kaduna State Ministry of Education, the total population consisted of 1,847 teachers across public and private secondary schools in the metropolitan area. A sample size of 350 teachers was determined using Krejcie and Morgan's (1970) sample size determination table, which is appropriate for a population of 1,847 teachers. This sample size ensures adequate statistical power for detecting significant relationships and differences while remaining manageable for data collection purposes. The study employed a combination of stratified random sampling and simple random sampling techniques. First, stratified sampling was used to ensure proportional representation across key demographic variables including: School type (public/private); Subject specialization (physics, chemistry, biology, mathematics); Teaching experience levels (0-5 years, 6-15 years, 16+ years) and Gender Within each stratum, simple random sampling was used to select individual participants, ensuring that every eligible teacher had an equal chance of being selected.

Data was collected using a researcher-developed structured questionnaire titled "Inclusive Teaching Practices in STEM Education Questionnaire (ITPEQ)." The instrument consisted of four sections: **Section A:** Demographic information including age, gender, teaching experience, qualification, and subject specialization. **Section B:** Inclusive teaching strategies scale containing 20 items measuring the effectiveness of various inclusive teaching practices. **Section C:** Teachers' attitudes and beliefs scale containing 15 items assessing perceptions about gender differences in STEM learning. **Section D:** School leadership support scale containing 12 items evaluating the level of administrative support for inclusive practices. All items in sections B, C, and D used a 4-point Likert scale ranging from "Strongly Agree" (4) to "Strongly Disagree" (1). The instrument was validated by three experts in educational measurement and STEM education. Content validity was established through expert review, and construct validity was assessed through factor analysis. The reliability of the instrument was determined using Cronbach's alpha coefficient, yielding values of 0.86, 0.82, and 0.84 for the three main scales respectively, indicating high internal consistency. Data was collected through direct administration of questionnaires to respondents in their respective schools. The research assistants were trained on proper administration procedures to ensure consistency. The data collection period lasted six weeks, with a 96% response rate achieved (336 out of 350 questionnaires returned). Data was analyzed using SPSS version 28.0. Descriptive statistics including means, standard deviations, and percentages were used to address the research questions. Chi-square tests and logistic regression analysis were employed to test the null hypotheses at 0.05 level of significance.

## Results

**Table 1: Demographic Characteristics of Respondents (N=336)**

| Characteristic | Category | Frequency | Percentage |
|---|---|---|---|
| Gender | Male | 198 | 58.9 |
| | Female | 138 | 41.1 |
| Teaching Experience | 0-5 years | 128 | 38.1 |
| | 6-15 years | 142 | 42.3 |
| | 16+ years | 66 | 19.6 |
| School Type | Public | 218 | 64.9 |
| | Private | 118 | 35.1 |
| Subject Specialization | Physics | 82 | 24.4 |
| | Chemistry | 89 | 26.5 |
| | Biology | 94 | 28.0 |
| | Mathematics | 71 | 21.1 |

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Table 1 shows that 58.9% of respondents were male teachers while 41.1% were female. The majority (42.3%) had teaching experience between 6-15 years, with 64.9% teaching in public schools. Subject specialization was relatively evenly distributed across the four STEM areas.

**Research Question 1: What inclusive teaching strategies are most effective in encouraging female participation in STEM subjects in secondary schools of Kaduna State?**

**Table 2: Effectiveness of Inclusive Teaching Strategies (N=336)**

| Strategy | Mean | SD | Interpretation |
|---|---|---|---|
| Hands-on learning activities | 3.42 | 0.68 | Very Effective |
| Collaborative group work | 3.38 | 0.72 | Very Effective |
| Real-world problem solving | 3.35 | 0.69 | Very Effective |
| Use of female STEM role models | 3.28 | 0.74 | Very Effective |
| Project-based learning | 3.25 | 0.71 | Effective |
| Inquiry-based instruction | 3.22 | 0.73 | Effective |
| Differentiated instruction | 3.18 | 0.76 | Effective |
| Technology integration | 3.15 | 0.78 | Effective |
| Peer tutoring programs | 3.12 | 0.69 | Effective |
| Gender-inclusive language | 3.08 | 0.81 | Effective |

*Scale: 1.00-1.75 = Not Effective, 1.76-2.50 = Less Effective, 2.51-3.25 = Effective, 3.26-4.00 = Very Effective*

Table 2 reveals that hands-on learning activities (M=3.42) was rated as the most effective inclusive teaching strategy, followed by collaborative group work (M=3.38) and real-world problem solving (M=3.35). All strategies were rated as either effective or very effective, indicating teachers' positive perception of these inclusive practices.

**Research Question 2: What are secondary school STEM teachers' attitudes and beliefs about gender differences in STEM learning in Kaduna State?**

**Table 3: Teachers' Attitudes and Beliefs about Gender Differences in STEM Learning (N=336)**

| Statement | Mean | SD | Interpretation |
|---|---|---|---|
| Boys and girls have equal potential in STEM subjects | 3.18 | 0.82 | Agree |
| Gender stereotypes affect girls' STEM performance | 3.25 | 0.76 | Agree |
| Girls need more encouragement in STEM classes | 3.32 | 0.71 | Strongly Agree |
| Inclusive teaching benefits both boys and girls | 3.45 | 0.65 | Strongly Agree |
| Girls prefer collaborative learning approaches | 2.98 | 0.88 | Agree |
| Parental attitudes influence girls' STEM interest | 3.28 | 0.74 | Agree |
| School culture impacts gender participation | 3.22 | 0.78 | Agree |

*Scale: 1.00-1.75 = Strongly Disagree, 1.76-2.50 = Disagree, 2.51-3.25 = Agree, 3.26-4.00 = Strongly Agree*

Table 3 shows that teachers generally held positive attitudes about gender equality in STEM learning. They strongly agreed that inclusive teaching benefits both boys and girls (M=3.45) and that girls need more encouragement in STEM classes (M=3.32).

**Research Question 3: How can school leadership effectively support the implementation of inclusive teaching practices in STEM subjects in Kaduna State?**

**Table 4: School Leadership Support for Inclusive Teaching Practices (N=336)**

| Support Area | Mean | SD | Level of Support |
|---|---|---|---|
| Providing professional development opportunities | 2.89 | 0.92 | Moderate |
| Allocating resources for inclusive materials | 2.76 | 0.88 | Moderate |
| Encouraging teacher collaboration | 3.05 | 0.79 | High |
| Recognizing inclusive teaching efforts | 2.68 | 0.95 | Moderate |
| Creating supportive school policies | 2.82 | 0.87 | Moderate |
| Monitoring inclusive practice implementation | 2.71 | 0.91 | Moderate |
| Facilitating parent-community engagement | 2.85 | 0.89 | Moderate |

*Scale: 1.00-1.75 = Very Low, 1.76-2.50 = Low, 2.51-3.25 = Moderate, 3.26-4.00 = High*

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Table 4 indicates that school leadership support was generally at moderate levels across most areas. The highest support was for encouraging teacher collaboration (M=3.05), while recognizing inclusive teaching efforts received the lowest rating (M=2.68).

**Test of Hypotheses**

**$H_{o1}$:** There is no significant difference in the effectiveness of various inclusive teaching strategies in encouraging female participation in STEM subjects in secondary schools of Kaduna State.

**Table 5: Chi-square Analysis of Inclusive Teaching Strategy Effectiveness**

| Strategy Category | Very Effective | Effective | Less Effective | $\chi^2$ | df | p-value |
|---|---|---|---|---|---|---|
| Hands-on Activities | 156 (46.4%) | 148 (44.0%) | 32 (9.5%) | 47.26 | 2 | 0.000* |
| Collaborative Learning | 142 (42.3%) | 158 (47.0%) | 36 (10.7%) | | | |
| Real-world Applications | 138 (41.1%) | 162 (48.2%) | 36 (10.7%) | | | |

*Significant at $p < 0.05$

The chi-square analysis revealed significant differences in the effectiveness ratings of various inclusive teaching strategies ($\chi^2 = 47.26$, $p < 0.001$). Therefore, the null hypothesis is rejected. There are significant differences in the effectiveness of various inclusive teaching strategies.

**$H_{o2}$:** There are no significant differences in secondary school STEM teachers' attitudes and beliefs about gender differences in STEM learning capabilities in Kaduna State.

**Table 6: One-way ANOVA of Teachers' Attitudes by Gender**

| Source | Sum of Squares | df | Mean Square | F | p-value |
|---|---|---|---|---|---|
| Between Groups | 12.84 | 1 | 12.84 | 0.86 | 0.354 |
| Within Groups | 4987.32 | 334 | 14.93 | | |
| Total | 5000.16 | 335 | | | |

The ANOVA results showed no significant difference in attitudes between male and female teachers ($F = 0.86$, $p = 0.354$). Therefore, the null hypothesis is accepted. There are no significant differences in teachers' attitudes based on their gender.

**$H_{o3}$:** School leadership support has no significant effect on the implementation of inclusive teaching practices in STEM subjects in secondary schools of Kaduna State.

**Table 7: Logistic Regression Analysis of Leadership Support Impact**

| Predictor | B | SE | Wald | df | p-value | Exp(B) |
|---|---|---|---|---|---|---|
| Leadership Support | 0.74 | 0.18 | 16.89 | 1 | 0.000* | 2.10 |
| Constant | -1.23 | 0.45 | 7.47 | 1 | 0.006 | 0.29 |

*Significant at $p < 0.05$

The logistic regression analysis revealed that school leadership support significantly predicted the implementation of inclusive teaching practices ($B = 0.74$, $p < 0.001$). Therefore, the null hypothesis is rejected. School leadership support has a significant positive effect on inclusive practice implementation.

**Discussion of the Findings**

The findings revealed that hands-on learning activities, collaborative group work, and real-world problem solving were rated as the most effective inclusive teaching strategies. This finding aligns with TechwomenNG (2025); European Commission (2024); Gbigbadua's (2023); Luther and Shekari (2023); Tunmibi et al. (2015) research which emphasized that real-life learning adventures, blended learning approaches, collaborative learning approaches, hands-on and real-world applications significantly enhance girls' interest in STEM disciplines. Similarly, Agommuoh and Ndirika (2023) found that exposing girls to female STEM experts and fostering collaboration between students and science museums were effective strategies. However, Wang and Degol (2017) suggested that while collaborative approaches are beneficial, individual achievement-oriented methods may be more effective for certain learning outcomes in STEM subjects. Also, traditional lecture-based studies have shown

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that some students perform better with structured, teacher-directed instruction, though this approach was less favored for promoting gender inclusivity.

The study found that teachers generally held positive attitudes toward gender equality in STEM learning, with strong agreement that inclusive teaching benefits both boys and girls. However, there were no significant gender differences in teachers' attitudes, suggesting a consensus across male and female educators. These findings align with Agommuoh and Ndirika (2023) who found similar positive attitudes among Nigerian STEM teachers regarding gender equality strategies. Additionally, Seema Nath (2025); European Commission (2024); Vaishampayan (2019) reported that teacher attitudes play a crucial role in shaping gender perceptions and choices in STEM subjects. They also emphasized that teacher sensitivity and understanding of inclusion are crucial for successful implementation of inclusive education. Contrary to the above, British Council Nigeria (2013) have found significant gender differences in teacher attitudes, with male teachers sometimes showing less awareness of gender bias issues.

Also, the study findings indicated moderate levels of school leadership support across most areas, with teacher collaboration receiving the highest support. The logistic regression analysis confirmed that leadership support significantly predicts successful implementation of inclusive practices. This support the research by Seema Nath (2025); Pedaste et al. (2021); Vaishampayan (2019) emphasizing that school leadership is pivotal for bringing in inclusive policies and practices, requiring vision, support, and clear communication. Similarly, the NAN News (2024) reported Kaduna State government's commitment to gender equality through significant budget allocations, indicating policy-level leadership support. However, Leijen, et al (2023) found that school leaders often express negative attitudes toward the adequacy of support for themselves and teachers in implementing inclusive practices. Also, resource constraint studies have indicated that leadership support may be limited by financial and infrastructural challenges, particularly in developing country contexts.

## Conclusion

This study has provided valuable insights into the current state of inclusive teaching practices in STEM education within Kaduna State secondary schools. The research confirms that inclusive teaching strategies, particularly hands-on learning activities, collaborative approaches, and real-world problem solving, are perceived as highly effective in encouraging female participation in STEM subjects. The findings demonstrate that while teachers hold positive attitudes toward gender equality in STEM education, there remains a need for stronger school leadership support to fully implement inclusive practices. The moderate levels of leadership support identified in this study suggest significant room for improvement in areas such as professional development, resource allocation, and recognition of inclusive teaching efforts. The research contributes to the growing body of knowledge on gender equality in STEM education within the Nigerian context, providing empirical evidence to support policy development and educational reform initiatives. The findings are particularly relevant for Kaduna State's ongoing efforts to promote female education and bridge gender gaps in STEM participation.

## Recommendations

Based on the findings of this study, the following recommendations are proposed:

1. The Ministry of Education should develop a gender-inclusive STEM curriculum frameworks that emphasize hands-on learning, collaborative approaches, and real-world applications across all secondary schools in Kaduna State.
2. School Administration should strengthen leadership support systems by providing school administrators with training on inclusive education leadership and establishing clear accountability measures for gender equality outcomes in the state. They should also, allocate dedicated resources for inclusive teaching materials, female STEM role model programs, and teacher collaboration initiatives.
3. Science teachers in the state should integrate hands-on learning activities more extensively into STEM curricula, ensuring that these activities are designed to appeal to diverse learning styles and preferences.

## References

Agommuoh, P. C., & Ndirika, M. C. (2023). Strategies for promoting gender equality in STEM towards sustainable development. *Journal of the Nigerian Academy of Education*, *14*(1), 63-73.

ISSN 2736-0091
E-ISSN 2737-0107

Australian Education Council. (2015). *National STEM school education strategy*. Department of Education and Training.

Bandura, A. (2018). *Social cognitive theory*. Stanford University Press.

Barka, L. J., & Aspray, W. (2006). The state of research on girls and IT. In J. M. Cohoon & W. Aspray (Eds.), *Women and information technology: Research on underrepresentation* (pp. 3-54). MIT Press.

British Council Nigeria. (2013). *Assessing girls' education in northern Nigeria: A synthesis of GEARN studies from six states*. https://www.britishcouncil. org.ng/sites/default/f iles/assessi ng_girls_education_in_northern_nigeria.pdf

Crenshaw, K. W. (2019). *Intersectionality: Critical theory and methodology*. New York University Press.

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.

Danmole, B. T. (2021). Emerging issues on the universal basic education curriculum in Nigeria: Implications for science and technology components. *Pakistan Journal of Social Sciences*, *8*(1), 62-68.

Dasgupta, N., & Stout, J. G. (2019). Girls and women in science, technology, engineering, and mathematics: STEMing the tide and broadening participation in STEM careers. *Policy Insights from Behavioral and Brain Sciences*, *1*(1), 21-29.

Eccles, J. S. (2020). *Expectancy-value theory of achievement motivation*. Academic Press.

Eccles, J., Wigfield, A., Harold, R. D., & Blumenfeld, P. (1993). Age and gender differences in children's self- and task perceptions during elementary school. *Child Development*, 64(3), 830-847.

European Commission. (2024). *New report addresses the gender gap in STEM education across educational levels*. NESET Advisory Network.

Federal Republic of Nigeria. (2020). *National policy on gender education*. Ministry of Education.

Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2019). *How to design and evaluate research in education* (10th ed.). McGraw-Hill Education.

Gbigbadua, A. D. (2023). Transforming education: Inclusive strategies for encouraging girls' child in STEM education in Nigeria. *African Journal of Science, Technology, Mathematics and Engineering*, *9*(5), 323-329.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, *30*(3), 607-610.

Leijen, Ä., Arcidiacono, F., & Pedaste, M. (2023). Successful integration? School leaders' attitudes to inclusive education in Estonia. *Research Features*. https://researchfeatures.com /successful-integration-school-leaders-attitudes-inclusive-education/

Luther, M., & Shekari, A. (2023). Blended learning approaches in Nigerian secondary schools: Impact on academic performance. *Educational Technology Research*, *45*(2), 112-128.

NAN News. (2024, November 3). Integrating gender response into Kaduna State education budget. *Nigerian News Agency*. https://nannews.ng/2024/11/04/integrating-gender-response-into-kaduna-state-education-budget/

National Science Foundation. (2024). *Women, minorities, and persons with disabilities in science and engineering*. NSF Publications.

Pedaste, M., Palts, T., Kalmus, V., Pedaste, K., & Kori, K. (2021). School leaders' practices and attitudes towards inclusive education: The case of Estonia. *Educational Management Administration & Leadership*, *49*(3), 485-502.

Seema Nath. (2025). Role of school leadership for developing and sustaining inclusive education. *Samuhik Pahal Organization*. https://samuhikpahal.org/education/role-of-school-leadership-for-developing-and-sustaining-inclusive-education/

TechwomenNG. (2025, July 10). TechwomenNG empowers girls in Kaduna with STEM skills [LinkedIn post]. https://www.linkedin.com/posts/techwomen-nigeria_inspire-project-kaduna-activity-7349369383510499328-TTvc

Tunmibi, S. A., Aregbesola, A. O., Adedeji, O. I., & Ibrahim, O. (2015). Impact of collaborative learning on academic achievement of students in Nigerian secondary schools. *International Journal of Education and Research*, *3*(7), 45-58.

Ugwuada, A. O. (2021). Strategies for reforming science, technology, engineering and mathematics (STEM) teaching and learning in schools. *Proceedings of the 52nd Annual Conference of Science Teachers Association of Nigeria*, 60-65.

ISSN 2736-0091
E-ISSN 2737-0107

UNESCO. (2023). *Girls' and women's education in science, technology, engineering and mathematics (STEM)*. UNESCO Publications.

UNICEF. (2022). *Gender equality in education: Breaking down barriers for girls*. UNICEF Press.

United Nations. (2023). *Sustainable Development Goals Report 2023*. UN Publications.

Vaishampayan, G. (2019). *Leadership for STEM schools: Exploring leadership and teachers' commitment in inclusive STEM high schools* [Doctoral dissertation, University of Illinois at Chicago].

Verivafrica. (2024, August 1). Overcoming gender bias in STEM. *Veriv Africa Insights*. https://www.verivafrica.com/insights/overcoming-gender-bias-in-stem

WAAW Foundation. (2025, February 16). Empowering STEM education: WAAW Kaduna teachers' training program. https://waawfoundation.org/empowering-stem-education-waaw-kaduna-teachers-training-program/

Wang, M. T., & Degol, J. L. (2017). Gender gap in science, technology, engineering, and mathematics (STEM): Current knowledge, implications for practice, policy, and future directions. *Educational Psychology Review*, *29*(1), 119-140.

World Bank. (2023). *Nigeria education sector analysis*. World Bank Publications.

World Economic Forum. (2024). *Global Gender Gap Report 2024*. WEF Publications.