EFFECTIVENESS OF CONVENTIONAL AND INQUIRY-BASED TEACHING METHODS ON CRITICAL THINKING SKILLS AMONG PRESCHOOLERS IN EDUCATION DISTRICTS II AND III, LAGOS STATE

Manuel, Mojissola Nkechi & Adeoye, Modupe Modinat
Dept. of Arts and Social Sciences Education, University of Lagos, Nigeria.
mmanuel@unilag.edu.ng, modupetiti777@gmail.com

Abstract

This study examined the effectiveness of conventional and inquiry-based teaching methods on critical thinking skills among preschoolers in Education Districts II and III of Lagos State. A pre-test, post-test control group quasi-experimental design was adopted. The sample consisted of 120 nursery two pupils selected through stratified random sampling from ten public early childhood education centres. Data were collected using the Preschool Children's Critical Thinking Skills Rating Scale (PCCTSRS), a researcher-developed instrument validated by experts, with a reliability coefficient of 0.78. Descriptive statistics and independent samples t-tests were used to analyse the data at the 0.05 level of significance. The findings revealed that preschool children exposed to inquiry-based teaching demonstrated significantly higher critical thinking skills than those taught using conventional methods across tasks involving identification of dissolvable substances, differentiation of floating and sinking objects, and application of sensory reasoning. The study also found no significant gender difference in the effectiveness of the inquiry-based method. The study concludes that inquiry-based teaching enhances critical thinking skills among preschool children more effectively than conventional methods. It recommends the integration of inquiry-based instructional strategies into early childhood education and the provision of appropriate learning resources to support exploratory learning.

Keywords: Inquiry-based learning, conventional teaching method, preschoolers, critical thinking skills, Lagos State

INTRODUCTION

Early childhood education (ECE) provides the foundation for cognitive, social, and emotional development, particularly during the early years when brain development is rapid and highly responsive to environmental stimulation (Ouabich, Tifroute, & Rafouk, 2024; Adeyinka, Popoola, & Adeyinka, 2022). At this stage, children begin to develop basic reasoning abilities, including observation, classification, and problem-solving, which are essential for later academic achievement and lifelong learning (Farooq, 2023). Consequently, contemporary education systems increasingly emphasise the development of critical thinking skills as a central outcome of early learning experiences.

Critical thinking in early childhood involves the ability to observe, question, compare, predict, and draw simple conclusions based on experience (Chang, Lee, & Wen, 2022). When children engage in structured learning activities that promote inquiry and reflection, they move beyond rote memorisation and begin to construct meaning independently (Ogunleye, 2023). Empirical evidence indicates that early exposure to active and participatory learning environments enhances children's reasoning, communication, and problem-solving abilities (Farooq, 2023; Johnson, 2024). For instance, Farooq (2023) reported that elementary learners exposed to inquiry-based strategies demonstrated significantly higher scientific reasoning skills than those taught using traditional methods. This aligns with findings by Bell, Smetana, and Binns (2020), who demonstrated that

simplified inquiry-based approaches significantly improved reasoning skills among young children in early childhood settings. Similarly, Johnson (2024) found that play-based and exploratory learning approaches improved cognitive engagement and concept retention among young learners in Lagos State.

Despite these benefits, teaching practices in many early childhood classrooms in Nigeria remain largely conventional. The dominant instructional approach continues to emphasise teacher-centred delivery, repetition, and memorisation, often described as the "talk and chalk" method (Adewale, 2023). Such approaches limit children's opportunities to explore, question, and experiment, thereby restricting the development of higher-order thinking skills. Ogunleye (2023) observed that children in classrooms dominated by conventional instruction often demonstrate limited ability to analyse situations or apply knowledge to new contexts. Similarly, Duran (2017) noted that passive learning environments reduce learners' cognitive engagement and hinder the development of reasoning skills.

In contrast, inquiry-based teaching has been widely recognised as a learner-centred approach that promotes active engagement and deeper understanding. Inquiry-based learning encourages children to ask questions, investigate phenomena, and construct knowledge through guided exploration (Brown, 2024). Studies across different contexts have consistently shown that inquiry-oriented instruction enhances learners' critical thinking, problem-solving abilities, and conceptual understanding (Chang et al., 2022; Farooq, 2023). Within the Nigerian context, Adebayo (2025) found that inquiry-based strategies significantly improved learners' participation and comprehension in early science activities, particularly when supported by appropriate instructional materials and teacher guidance.

However, the implementation of inquiry-based teaching in Nigerian preschools remains inconsistent. Factors such as inadequate teacher preparation, large class sizes, limited instructional resources, and rigid curriculum structures constrain the adoption of learner-centred approaches (Adewale, 2023; Ogunleye, 2023). In Lagos State, where early childhood education is expanding rapidly, many preschools continue to rely on conventional teaching methods that prioritise content delivery over active engagement. This situation raises concerns about the extent to which current instructional practices support the development of critical thinking skills among preschool children.

Furthermore, existing studies within Nigeria have largely focused on primary or secondary education, with limited attention to preschool learners. Where studies exist, many adopt descriptive or survey designs, which do not adequately establish causal relationships between teaching methods and learning outcomes. There is, therefore, a need for quasi-experimental studies that directly compare the effects of different instructional approaches on specific domains of critical thinking in early childhood settings.

This gap necessitates a focused investigation into the effectiveness of inquiry-based teaching compared to conventional methods in developing preschool children's critical thinking skills. Therefore, this study examines the effectiveness of conventional and inquiry-based teaching methods on critical thinking skills among preschoolers in Education Districts II and III of Lagos State, with particular attention to skills related to classification, prediction, and sensory problem-solving.

Statement of the Problem

Despite the recognised importance of early childhood education in developing foundational cognitive abilities, many preschool children in Lagos State demonstrate low levels of critical thinking skills, particularly in tasks requiring observation, classification, and problem-solving. This deficiency has been linked to the continued dominance of conventional, teacher-centred instructional approaches that emphasise rote learning and limit opportunities for inquiry and active engagement. As a result, children often exhibit weak science process skills and reduced readiness for higher-order learning. Although inquiry-based teaching has been widely recommended as a more effective approach for promoting critical thinking, there is limited empirical, quasi-experimental evidence within the Lagos context that directly compares its effectiveness with conventional methods at the preschool level. Therefore, this study examines the effect of inquiry-based teaching on preschool children's critical thinking skills in comparison with conventional teaching methods in Education Districts II and III of Lagos State.

Objectives of the Study

The main objective of this study is to examine the effectiveness of conventional and inquiry-based teaching methods on preschool children's critical thinking skills.

The specific objectives are to:

1. determine the difference in the baseline critical thinking skills of preschool children in the treatment and control groups;
2. examine the effect of inquiry-based teaching on preschool children's ability to identify and classify substances that dissolve in water;
3. examine the effect of inquiry-based teaching on preschool children's ability to distinguish objects that float or sink in water;
4. assess the effect of inquiry-based teaching on preschool children's ability to use appropriate senses to solve problems;
5. determine the influence of gender on preschool children's critical thinking skills when taught using inquiry-based methods.

Research Questions

1. What is the difference in the baseline critical thinking skills of preschool children in the treatment and control groups?
2. What is the effect of inquiry-based teaching on preschool children's ability to identify and classify substances that dissolve in water?
3. What is the effect of inquiry-based teaching on preschool children's ability to distinguish objects that float or sink in water?
4. What is the effect of inquiry-based teaching on preschool children's ability to use appropriate senses to solve problems?
5. What is the influence of gender on preschool children's critical thinking skills when taught using inquiry-based methods?

Research Hypotheses

The following null hypotheses were tested at the 0.05 level of significance:

H_0 1: There is no significant difference in the baseline critical thinking skills of preschool children in the treatment and control groups.

H_0 2: Inquiry-based teaching has no significant effect on preschool children's ability to identify and classify substances that dissolve in water.
H_0 3: Inquiry-based teaching has no significant effect on preschool children's ability to distinguish objects that float or sink in water.
H_0 4: Inquiry-based teaching has no significant effect on preschool children's ability to use appropriate senses to solve problems.
H_0 5: Gender has no significant influence on preschool children's critical thinking skills when taught using inquiry-based methods.

LITERATURE REVIEW

The Concept of Teaching Methods

Teaching methods refer to the systematic strategies, techniques, and approaches that teachers adopt to deliver instruction and facilitate learning. They are the frameworks that guide how knowledge is transmitted, understood, and applied by learners. In early childhood education, teaching methods are particularly significant because they influence how young learners perceive, interact with, and make sense of their environment. According to Adeyemi and Fashiku (2021), effective teaching goes beyond transmitting knowledge; it involves creating opportunities for children to explore, ask questions, and construct meaning from their experiences.

At the preschool level, the teacher's choice of method determines the extent to which children engage cognitively, socially, and emotionally. Methods that encourage discovery, play, and hands-on activities promote deeper understanding and creativity, while rigid, content-driven approaches may limit curiosity and reflection (Adewale, 2023). Teaching methods, therefore, form the foundation for learning outcomes, as they shape how children acquire reasoning, problem-solving, and communication skills.

The Concept of Inquiry-Based Learning

Inquiry-based learning (IBL) is a learner-centred pedagogical approach that emphasises curiosity, questioning, and investigation. Rather than receiving ready-made information, learners construct knowledge by exploring ideas and solving problems through guided discovery. Brown (2024) defines inquiry-based learning as an approach that encourages learners to ask questions, seek evidence, and develop explanations through observation and experimentation. The teacher's role is to guide and scaffold these processes rather than dictate them.

Inquiry-based learning is rooted in constructivist theories of learning advanced by Piaget and Vygotsky. Piaget emphasised that children actively construct knowledge through interaction with their environment, while Vygotsky highlighted the social dimension of learning through collaboration and dialogue. In preschool education, inquiry-based learning allows children to connect play with problem-solvingpredicting outcomes, testing ideas, and discussing observations. This approach not only strengthens understanding but also develops higher-order thinking skills such as analysis and evaluation (Adebayo, 2025). Globally, inquiry-based methods are seen as vital for equipping learners with 21st-century skills, including creativity, independence, and adaptability (Johnson, 2024).

The Concept of the Conventional Teaching Method

The conventional teaching method, often termed the teacher-centred approach, is a traditional instructional style that prioritises content delivery over learner participation. It is characterised by direct instruction, note-taking, and memorisation, with the teacher serving as the primary authority in the classroom. Adewale (2023) describes it as a transmission-based method that focuses on factual recall rather than conceptual understanding.

While this approach ensures curriculum coverage and orderliness, it limits opportunities for learners to explore, question, and reason independently. Ogunleye (2023) observes that the repetitive and one-way nature of conventional instruction can stifle curiosity and reduce intrinsic motivation among young learners. In early childhood settings, where experiential and sensory learning are fundamental, overreliance on conventional teaching restricts the development of critical and creative thinking. However, due to systemic factors such as large class sizes, inadequate resources, and insufficient teacher training, the conventional method remains prevalent in many Nigerian classrooms. A gradual pedagogical shift towards inquiry-based approaches is, therefore, essential to promote reflective and participatory learning.

The Concept of Critical Thinking in Early Childhood

Critical thinking in early childhood is the ability of young children to observe, analyse, reason, and make informed judgements based on evidence. Chang, Lee, and Wen (2022) describe it as a disciplined and reflective form of thinking that enables learners to question assumptions and evaluate ideas. At the preschool stage, critical thinking manifests through activities such as comparing objects, predicting results, and explaining phenomena in everyday experiences. These early reasoning experiences help children to interpret, synthesise, and apply knowledge in meaningful ways.

Early childhood represents the optimal period for nurturing critical thinking because of children's natural curiosity and eagerness to explore. Johnson (2024) found that guided questioning and hands-on experiments significantly improved preschoolers' reasoning and communication skills. Similarly, Farooq (2023) emphasised that inquiry-based environments cultivate persistence, problem-solving, and analytical abilities. When children are encouraged to explore, reflect, and communicate their discoveries, they internalise habits of reasoning that form the foundation for lifelong learning. Consequently, integrating critical thinking into early instruction prepares children not only for academic success but also for adaptive thinking in an increasingly complex world.

Challenges of Implementing Inquiry-Based Learning in Nigeria

Despite its pedagogical value, implementing inquiry-based learning in Nigerian preschools presents multiple challenges. Ogunleye (2023) identified limited teacher training, large class sizes, and inadequate materials as key barriers. Many early childhood educators were trained within traditional systems that emphasise rote instruction, leaving them unprepared to facilitate learner-centred exploration. Moreover, classroom environments are often overcrowded, making it difficult to manage inquiry activities effectively.

Policy implementation also remains inconsistent. Although frameworks such as the Early Childhood Care, Development, and Education (ECCDE) curriculum advocate child-centred methods, the emphasis on high-stakes assessments and curriculum completion continues to

reinforce conventional teaching (Adewale, 2023). Furthermore, resource constraints such as insufficient learning materials and limited access to teacher professional development impede innovation. Addressing these challenges requires targeted interventions that include teacher retraining, improved school resourcing, and sustained policy support to institutionalise inquiry-based learning in Nigeria's early childhood education system.

METHODOLOGY

This study adopted a pre-test, post-test control group quasi-experimental design to examine the effectiveness of inquiry-based and conventional teaching methods on preschool children's critical thinking skills in Education Districts II and III of Lagos State. The design enabled the comparison of learning outcomes between two groups exposed to different instructional methods under natural classroom conditions.

The population comprised all preschool children in public early childhood education centres within the two selected districts. A stratified random sampling technique was used to select ten nursery schools, with five schools drawn from each district. From the selected schools, a total of 120 Nursery Two pupils were sampled and divided into two groups: 60 pupils in the experimental group and 60 pupils in the control group. The grouping followed the existing school structure, with pupils in Education District III constituting the experimental group, while those in Education District II served as the control group. This ensured a balanced representation of gender and learning contexts. However, this grouping may introduce contextual differences between districts, which could influence the outcomes independently of the instructional method.

Data were collected using the Preschool Children's Critical Thinking Skills Rating Scale (PCCTSRS), a researcher-developed instrument designed to assess critical thinking skills in early childhood learners. The instrument comprised two sections: Section A obtained demographic information, while Section B consisted of performance-based tasks assessing children's ability to identify and classify substances that dissolve in water, distinguish objects that float or sink, and apply appropriate senses to solve simple problems. Each task was scored using a performance-based rating scale, with 2 points awarded for correct and complete responses, 1 point for partially correct responses, and 0 for incorrect or no response. The total score obtained reflected the child's level of critical thinking ability, with higher scores indicating better performance. Scores were interpreted as follows: 0–6 (low), 7–13 (moderate), and 14–20 (high level of critical thinking skills).

The instrument was subjected to face, content, and construct validation by experts in early childhood education and educational measurement. A pilot study was conducted using 20 preschool children from a public early childhood education centre outside the study area, and the data obtained were analysed using Cronbach's alpha, which yielded a reliability coefficient of 0.78, indicating acceptable internal consistency.

The study was conducted over a period of four weeks. The experimental group received instruction through the inquiry-based teaching method, which involved guided questioning, exploration, and simple hands-on activities designed to stimulate reasoning and curiosity, while the control group was taught using the conventional teacher-centred method characterised by explanation and demonstration. A pre-test was administered to both groups before the intervention, and the same instrument was used as a post-test after the intervention period.

Data were analysed using descriptive and inferential statistics with the aid of SPSS version 27. Frequency counts, percentages, mean, and standard deviation were used to describe participants' characteristics and performance, while independent samples t-test was used to test the hypotheses at the 0.05 level of significance.

RESULTS

Participants' Demographics

Table 1 presents the demographic characteristics of the participants. The total sample comprised 120 preschool children drawn from four public early childhood education centres in Education Districts II and III of Lagos State. There was an equitable distribution of gender, with 61 males (50.8%) and 59 females (49.2%). The participants were aged between 4 and 5 years.

Table 1: Demographic Characteristics of Participants

Table 2: Baseline Comparison of Critical Thinking Scores Between Groups

Group	N	⁇	STD.	Df	P-value	Level	Decision
Control	60	2.93	1.561	118	0.003	0.05	Significant
Treatment	60	4.08	2.458				

P-value = 0.003 < level of significance (obtainable score = 20.0)

Table 2 presents the comparison of baseline critical thinking scores between the control and treatment groups. The control group had a mean score of 2.93 (SD = 1.56), while the treatment group had a mean score of 4.08 (SD = 2.46). The difference between the two groups was statistically significant (df = 118, p = 0.003 < 0.05). Therefore, the null hypothesis was rejected, indicating that a significant difference existed in the baseline critical thinking skills of the two groups prior to the intervention.

Research Hypothesis Two

There is no significant impact of inquiry-based method on preschool children's critical thinking skills in identifying and clarifying substances that can dissolve in water.

Table 3: Comparison of Scores on Identifying and Classifying Substances that Dissolve in Water

Group	N	⁇	STD.	Df	P-value	Level	Decision
Control	60	4.2667	1.42456	118	0.000	0.05	Significant
Treatment	60	7.6000	.49403				

P-value = 0.19 > level of significance (obtainable score = 8.0)

Table 3 shows that the control group recorded a mean score of 4.27 (SD = 1.42), while the treatment group recorded a higher mean score of 7.60 (SD = 0.49). The difference was statistically significant (df = 118, $p < 0.05$). The null hypothesis was rejected, indicating that inquiry-based teaching significantly improved children's ability to identify and classify substances that dissolve in water.

Research Hypothesis Three

There is no significant impact of inquiry-based method on preschool children's critical thinking skills in distinguishing objects that can float or sink in water.

Table 4: Comparison of Scores on Distinguishing Floating and Sinking Objects

Group	N	⁇	STD.	Df	P-value	Level	Decision
Control	60	2.6000	1.42852	118	0.000	0.05	Significant
Treatment	60	7.3833	.97584				

P-value = 0.19 > level of significance (obtainable score = 8.0)

Table 4 indicates that the control group had a mean score of 2.60 (SD = 1.43), while the treatment group had a mean score of 7.38 (SD = 0.98). The difference was statistically significant (df = 118, $p < 0.05$). The null hypothesis was rejected, showing that inquiry-based teaching significantly improved children's ability to distinguish between floating and sinking objects.

Research Hypothesis Four

There is no significant impact of inquiry-based method on preschool children's critical thinking skills in choosing the correct sense to solve a problem.

Table: Comparison of Scores on Use of Senses in Problem Solving

Group	N	⁇	STD.	Df	P-value	Level	Decision
Control	60	1.9000	1.17459	118	0.000	0.05	Not Significant
Treatment	60	3.9667	.25820				

P-value = 0.19 > level of significance (obtainable score = 4.0)

Table 5 shows that the control group recorded a mean score of 1.90 (SD = 1.17), while the treatment group recorded a mean score of 3.97 (SD = 0.26). The difference was statistically significant (df = 118, $p < 0.05$). The null hypothesis was rejected, indicating that inquiry-based teaching significantly improved children's ability to apply appropriate senses in problem-solving situations.

Research Hypothesis Five

There is no significant influence of gender on the effects of inquiry-based method on preschool children's critical thinking skills.

Table 6: Comparison of Critical Thinking Scores by Gender

Group	N	??	STD.	Df	P-value	Level	Decision
Male	57	19.50	0.992	118	0.919	0.05	Not Significant
Female	63	18.53	0.707				

P-value = 0.919 > level of significance (obtainable score = 20.0)

Table 6 presents the comparison of post-test scores based on gender. Male pupils had a mean score of 19.50 (SD = 0.99), while female pupils had a mean score of 18.53 (SD = 0.71). The difference was not statistically significant (df = 118, p = 0.919 > 0.05). Therefore, the null hypothesis was accepted, indicating that gender had no significant influence on the effectiveness of inquiry-based teaching.

DISCUSSION OF FINDINGS

The rejection of the first null hypothesis indicates a pre-existing difference in children's baseline critical thinking skills across districts, suggesting that contextual variations, such as exposure to enriched learning environments, might have influenced their prior development. This finding aligns with Adewale (2023), who reported that early exposure to interactive learning experiences contributes to improved problem-solving abilities in preschool settings.

The rejection of the second, third, and fourth hypotheses affirms the significant impact of inquiry-based teaching on various dimensions of critical thinking among preschoolers. These results are consistent with Duran (2017), who found that learners exposed to inquiry-oriented activities demonstrated enhanced logical reasoning and cognitive flexibility. Likewise, Farooq (2023) established that the process of investigation and discovery intrinsic to inquiry-based learning promotes curiosity, persistence, and analytical thinking. In the context of early childhood education, this outcome supports Brown's (2024) position that inquiry-based methods stimulate exploration and conceptual understanding, which are critical for cognitive growth.

The findings also echo Adebayo's (2025) conclusion that children taught through inquiry approaches retain knowledge more effectively and engage more deeply with learning tasks. The consistent improvement observed in the experimental group across all tasks—identifying dissolvable substances, differentiating floating and sinking objects, and applying sensory reasoning demonstrates that inquiry-based teaching enhances both conceptual and procedural understanding.

In contrast, the absence of a gender effect confirms that the benefits of inquiry-based learning are equally accessible to all learners, irrespective of gender. This supports Chang, Lee, and Wen (2022), who reported no significant gender differences in students' critical thinking performance when exposed to inquiry-oriented instruction. The implication is that inquiry-based methods promote inclusivity and equitable learning outcomes, aligning with modern educational goals of gender fairness and holistic development.

In summary, the findings substantiate the effectiveness of inquiry-based teaching as a superior pedagogical strategy for developing critical thinking skills in early childhood education. By encouraging observation, questioning, and reasoning, the approach fosters independence and deeper understanding. These outcomes suggest that integrating inquiry-based strategies into preschool curricula could significantly improve cognitive development and prepare young learners for future academic success.

CONCLUSION

The findings of this study establish that inquiry-based teaching is highly effective in enhancing the critical thinking abilities of preschool children. The rejection of four null hypotheses confirms that children exposed to inquiry-based instruction significantly outperformed those taught through conventional methods in tasks requiring reasoning, observation, and problem-solving. These results align with global and local research, reinforcing that child-centred, activity-based learning cultivates curiosity, reflection, and sustained engagement in early education.

The study also found no significant gender difference in children's critical thinking performance, suggesting that inquiry-based learning promotes inclusivity and equitable learning outcomes. However, the research highlights the continuing need for teacher capacity-building and policy support to ensure the consistent use of inquiry-based strategies in Nigerian early childhood classrooms. Institutional reforms and targeted training programmes will be essential to sustain these gains and enhance overall teaching quality in the foundational years.

RECOMMENDATIONS

Based on the findings, the following recommendations were made:

1. Early childhood teachers should adopt inquiry-based instructional strategies to promote active participation and enhance children's critical thinking skills.
2. Teachers should include hands-on activities that allow children to explore and classify materials that dissolve in water to strengthen observation and reasoning skills.
3. Educators should integrate guided experiments on floating and sinking to encourage exploration, prediction, and analytical reasoning among preschool learners.
4. Teachers should design classroom tasks that involve using sensory experiences to solve problems, thereby improving children's perceptual and reflective abilities.
5. Schools should ensure gender inclusivity by giving both boys and girls equal opportunities to participate in inquiry-based learning activities.

References

Adebayo, M. O. (2025). Promoting scientific inquiry through play-based methods in Nigerian preschools: A Lagos case study. *Nigerian Journal of Early Childhood Education, 19*(1), 44–59.

Adeyinka, O. O., Popoola, K., & Adeyinka, S. M. (2022). Effectiveness of guided and open inquiry instructional strategies on science process skills and self-efficacy of biology students in Osun State, Nigeria. *African Journal of Teacher Education, 11*(1), 56–74. https://doi.org/10.21083/ajote.v11i1.7014

Adolph, K. E., & Hoch, J. E. (2021). Motor development: Embodied, embedded, enculturated, and enabling. *Annual Review of Psychology, 72*(1), 317–342. https://doi.org/10.1146/annurev-psych-070620-034058

African Charter on the Rights and Welfare of the Child. (1990). *African Charter on the Rights and Welfare of the Child*. Organisation of African Unity. https://au.int/en/treaties/african-charter-rights-and-welfare-child

Alain, G. (2019). Inquiry-based learning: Student teachers' challenges and perceptions. *Journal of Inquiry & Action in Education, 10*(2), 112–129.

Anwar, Y. A. S. (2020). The multilevel inquiry approach to achieving meaningful learning in biochemistry course. *Biochemistry and Molecular Biology Education, 48*(1), 28–37.

Barnett, W. S., & Steven, J. (2015). *Early childhood education: Investing in quality for school success*. Teachers College Press.

Barroso, C., & Pon, S. (2015). The role of childcare programs in early child development. *Early Childhood Research Quarterly, 30*(2), 85–98. https://doi.org/10.1016/j.ecresq.2014.09.010

Battistich, V., Solomon, D., Watson, M., & Schaps, E. (2019). Caring school communities and children's development. *Child Development, 90*(5), 1677–1691. https://doi.org/10.1111/cdev.13265

Bell, R., Smetana, L., & Binns, I. (2020). Simplifying inquiry-based learning for young children. *Early Childhood Education Journal, 48*(3), 287–298. https://doi.org/10.1007/s10643-019-00972-3

Berk, L. E. (2021). *Development through the lifespan* (8th ed.). Pearson.

Brackett, M. A., Mayor, J., & Warner, R. (2021). *Emotional intelligence in education: Integrating social-emotional learning into early childhood practice*. Yale University Press.

Bradley, R. H. (2019). Early childhood education and its long-term outcomes: A review. *Annual Review of Developmental Psychology, 1*(1), 345–368. https://doi.org/10.1146/annurev-devpsych-121318-085021

Bransford, J., Brown, A. L., & Cocking, R. (2020). *How people learn II: Learners, contexts, and cultures*. National Academies Press.

Brown, L. J. (2024). Inquiry-based learning in early years: The case for scientific reasoning development. *Journal of Early Childhood Research and Practice, 22*(1), 15–30.

Case-Smith, J., & O'Brien, J. C. (2020). *Occupational therapy for children and adolescents* (8th ed.). Elsevier.

Chang, P. S., Lee, S. H., & Wen, M. L. (2022). Developing an inquiry-based laboratory curriculum to engage students in planning investigations and argumentation. *International Journal of Science Education, 44*(18), 2659–2684.

Child Rights Act. (2003). *Child's Rights Act, 2003*. Federal Republic of Nigeria Official Gazette.

Denham, S. A., Bassett, H. H., Thayer, S. K., Mincic, M. S., Sirotkin, Y. S., & Zinsser, K. (2020). Observing preschoolers' social-emotional competence. *Journal of Genetic Psychology, 181*(2), 80–92. https://doi.org/10.1080/00221325.2020.1711821

Duran, D. (2017). Learning-by-teaching. *Innovations in Education and Teaching International, 54*(5), 476–484.

Elizabeth, K. (2015). *The power of curiosity and resilience in child development*. Parenting Press.

Facione, P. A. (2023). Defining critical thinking. Foundation for Critical Thinking. https://www.criticalthinking.org/pages/defining-critical-thinking/766

Farooq, A. (2023). Effect of inquiry method on scientific inquiry skills of elementary school students. *Pakistan Languages and Humanities Review, 7*(2), 127–139. https://doi.org/10.47205/plhr.2023(7-ii)11

Gokhale, A. A. (2020). Promoting critical thinking in children. *Journal of Educational Psychology, 112*(4), 625–640. https://doi.org/10.1037/edu0000396

Grierson, E. (2020). Children's rights in context: A global perspective. *Journal of Childhood Studies, 45*(2), 55–70. https://doi.org/10.18357/jcs452202019878

Guralnick, M. J. (2021). Early intervention for children with developmental disabilities. *Journal of Applied Research in Intellectual Disabilities, 34*(6), 1205–1220. https://doi.org/10.1111/jar.12892

Hedges, H. (2020). Learning through play and inquiry. *Journal of Early Childhood Research, 18*(1), 3–15. https://doi.org/10.1177/1476718X19871314

Hernandez, D. J. (2018). *Children in poverty and early education: Closing the gap for equity*. Harvard Education Press.

Inan, H. Z. (2021). Early childhood development and the significance of early years. *International Journal of Early Childhood Education, 53*(1), 21–40. https://doi.org/10.1007/s10643-020-01047-6

Johnson, M. A. (2024). *Play-based method and development of cognitive skills in early childhood education in Surulere Local Government Area, Lagos State* (Master's thesis, Kampala International University).

Jeremy, R., Huy, P., & Maebuta, J. (2016). Brain development and early childhood education: Implications for teachers. *Contemporary Issues in Early Childhood, 17*(3), 245–259. https://doi.org/10.1177/1463949116660955

Kostelnik, M. J., Soderman, A. K., Whiren, A. P., & Rupiper, M. L. (2022). *Developmentally appropriate curriculum* (8th ed.). Pearson.

Lamb, M. E., & Ahnert, L. (2021). *The role of the father in child development* (6th ed.). Wiley.

Ogunleye, S. T. (2023). Developing critical thinking skills in early childhood classrooms in Nigeria. *Nigerian Journal of Early Childhood Education, 18*(1), 44–58.

Ouabich, R., Tifroute, L., & Rafouk, L. (2024). Effectiveness of an inquiry-based science program. *International Journal of Educational Methodology, 10*(4), 543–558. https://doi.org/10.12973/ijem.10.4.543

Owens, R. E. (2022). *Language development: An introduction* (10th ed.). Pearson.

Pedaste, M., et al. (2021). Phases of inquiry-based learning. *Educational Research Review, 34*, 100398. https://doi.org/10.1016/j.edurev.2021.100398

Pelphrey, K., Shultz, S., Hudac, C., & Vander Wyk, B. (2022). Research on the social brain in autism. *European Journal of Neuroscience, 55*(12), 3301–3314. https://doi.org/10.1111/ejn.15875

Piaget, J. (1952). *The origins of intelligence in children*. International Universities Press.

Rusmin, R., & Misrahayu, M. (2024). Critical thinking and problem-solving skills in the 21st century. *Journal of Educational Development, 10*(2), 45–58.

Shonkoff, J. P., Phillips, D. A., & National Research Council. (2023). *From neurons to neighborhoods: The science of early childhood development* (2nd ed.). National Academies Press.

Thompson, E. L. (2022). Active learning in the early years: The enduring relevance of Bruner's theory of discovery. *Journal of Educational Foundations, 38*(3), 84–98.

UNESCO. (2016). *Unpacking Sustainable Development Goal 4*. http://unesdoc.unesco.org/images/0024/002463/246300E.pdf

United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development*. https://sustainabledevelopment.un.org