

**KEY PRINCIPLES OF MONTESSORI APPROACH TO EDUCATION  
AS CORRELATES OF PRESCHOOL CHILDREN COGNITIVE DEVELOPMENT  
IN BENIN METROPOLIS, EDO STATE, NIGERIA**

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**Abstract**

The study examined the key principles of the Montessori approach in relation to the cognitive development of preschool children in Benin Metropolis, Edo State. Six research questions were raised, and six hypotheses were tested at a 0.05 significance level. A survey research design with a correlational approach was adopted. The study population included 200 preschool pupils and 18 lead Montessori teachers from ten registered Montessori schools. A census sampling technique was used. Data was collected using the Teacher Survey on Montessori Principles and Cognitive Development (TSMPCD), a 33-item instrument covering cognitive development, respect for children, absorbent minds, sensitive periods, prepared environment, and auto-education. The instrument was validated by experts, and reliability testing using Cronbach's alpha yielded coefficient of 0.870. Pearson Product Moment Correlation (PPMC) was used to test hypotheses 1-5, while Fisher-Z statistics was used to test hypothesis 6. Findings revealed that Montessori principles significantly enhance preschool children's academic performance, with varying effects based on sex. The study recommended adopting the Montessori approach in schools, educating parents on Montessori principles, and encouraging government support for Montessori-based early childhood education.

**Keywords:** Key Principles, Montessori Approach, Preschool Children, Cognitive Development

**Introduction**

Education is the key to personal growth and societal progress. Education is a fundamental pillar of society, shaping the trajectory of individuals and influencing the development of nations (Lillard & Else-Quest, 2013). It plays a pivotal role in equipping individuals with the knowledge and skills necessary for successful and fulfilling lives while supporting societal development. The educational journey begins early in a child's life and progresses through various levels, from infancy to adulthood, with each stage imparting distinct educational experiences and challenges that together build critical skills over time. The early years, spanning infancy to 8 years old, are especially critical for development due to the rapid brain growth during this time, which creates windows of heightened neuroplasticity (Brown & Jernigan, 2012). These early ages serve as a sensitive period where positive experiences can lay the foundation for lifelong learning by shaping robust neural connections that become the building blocks of cognition (Alaçam & Olgan, 2021).

Infancy, which encompasses the first 1-2 years of life, is a time when newborns actively interact with caregivers and their immediate environment, forming trillions of neuronal connections (Bornstein & Arteberry 2021). This interaction begins laying the groundwork for

later abilities like sensory perception, language, motor skills, and more by developing pathways through the brain. Warm, responsive caregiving during the first years further enhances the nurturing of cognitive, emotional, and social development. Once children reach around 2 years of age, they display powerful progress as toddlers, rapidly acquiring vocabulary, starting to communicate intentions, and forming memories, imagination and basic problem-solving strategies (Budzyrna & Buckley 2023). Early childhood education (ECE) is a crucial phase in a child's development, encompassing educational principles focused on teaching children from birth until they reach the age of five. Traditionally, this period corresponds to the initial years of elementary school, typically up to the equivalent of third grade in the Western world (Alaçam & Olgan, 2021).

In the current educational landscape, there is a heightened emphasis on early learning outcomes, signifying a pivotal era where the foundational stages of education are granted unprecedented attention. This focus is propelled by a growing recognition of the profound impact early childhood experiences have on long-term cognitive development. As policymakers, educators, and parents strive to optimize the learning environment for young minds, the effectiveness of various educational methodologies comes under intense scrutiny. Amidst this backdrop, the Montessori approach emerges as a noteworthy contender deserving of thorough examination.

Maria Montessori's pedagogical philosophy emphasizes self-directed learning, individualized instruction, and hands-on experiences. These principles resonate with contemporary early childhood education, which increasingly values fostering independence, critical thinking, and practical skills from a young age (Rathunde, 2012). The Montessori method is not only historically significant but also aligns with modern understandings of cognitive development in early education. The study of early childhood education has evolved significantly, tracing back to the Enlightenment in Europe and expanding through the establishment of universal primary education in the 19th century. Recently, it has gained prominence as a public policy issue, particularly regarding funding for early education centers. In Nigeria, discussions now focus on creating a uniform curriculum for early childhood programs (UNESCO, 2024). Preschool education is crucial for cognitive development. The Montessori approach is recognized for its methodologies that support holistic growth in children. Understanding how Montessori aligns with established cognitive development theories provides valuable insights for educators and policymakers (Manuel, 2023).

The United Nations Sustainable Development Goal 4 highlights the global importance of early childhood education, emphasizing its role in children's development and societal progress. Research indicates that high-quality early childhood education leads to positive outcomes in cognitive development, academic success, social skills, and emotional well-being (Seldin & Epstein, 2006). Despite the costs associated with such programs, particularly Montessori schools, the long-term societal benefits such as reduced future education costs and improved health outcomes far outweigh these expenses (Rathunde, 2012).

The Montessori approach is built on several key principles: respect for the child, recognizing each child's individuality and allowing them freedom to choose their activities; the absorbent mind, acknowledging that the first six years are critical for absorbing knowledge; sensitive periods, identifying specific developmental stages where children are particularly receptive to learning; holistic education, fostering intellectual, emotional, social, and physical development through a comprehensive curriculum; individualized learning, tailoring lessons to each child's unique needs and interests; freedom of movement and choice, allowing children to explore their environment and select their activities; prepared environment, creating a

structured classroom that encourages independent exploration; intrinsic motivation, fostering a love for learning without reliance on external rewards; independence, encouraging self-sufficiency by providing an environment that supports autonomous learning; and auto-education, empowering children to direct their own learning through engaging materials (Lillard, 2019).

Despite its advantages, the Montessori approach faces criticism regarding the lack of standardized curricula and assessment tools. Concerns about costs and dependence on well-trained educators have also been raised (Alaçam & Olgan, 2021). However, its recognition as a significant educational model suggests its relevance in promoting cognitive development among preschoolers. Effective early childhood education prepares children for primary school success, reduces achievement gaps, and enhances cognitive and social skills. Investments in such programmes yield considerable economic returns and improve individual socioeconomic outcomes (Lillard & Else-Quest, 2006). Implementing effective models like Montessori can significantly benefit society. As educational paradigms shift, the Montessori approach remains relevant due to its focus on child-centered learning and holistic development. Understanding its principles can inform better practices in early childhood education. The emphasis on respect for children's individuality and developmental sensitivity highlights the potential of structured methods to enhance cognitive growth during formative years. Evaluating established programs like Montessori is essential for identifying successful strategies that align with children's needs in an increasingly important educational landscape.

Several studies support the core principles of the Montessori approach and their impact on cognitive development in early childhood. Manuel (2023) found that respect for children's autonomy, a key Montessori tenet, significantly enhanced literacy and overall academic performance among preschoolers in Lagos State. This aligns with the growing recognition of child-centered learning as crucial to brain development. The concept of the "absorbent mind" is also backed by Wolf et al. (2023), whose work in Northern Nigeria showed that preschool programs designed around Montessori strategies led to measurable improvements in children's attention and reasoning skills especially when introduced during sensitive periods of development. Saleh and Danjuma (2017) emphasized the importance of a prepared environment, showing that children exposed to Montessori materials and structured classroom setups in Zaria developed stronger creative and cognitive abilities than their peers. The principle of auto-education, which allows children to direct their own learning, has also been validated. Lillard et al. (2017) demonstrated that self-directed Montessori learners made consistent progress in problem-solving and reasoning. Furthermore, research by Olagbaju (2020) showed that gender does not significantly affect cognitive outcomes in Montessori-based education, suggesting its inclusiveness and effectiveness across diverse learners.

### **Statement of the Problem**

Cognitive development in preschool children is fundamental for their overall growth and academic success. Traditional educational approaches often lack the flexibility and individualized attention necessary to foster optimal cognitive skills during these formative years. As a result, there is a growing interest in alternative educational methods, such as the Montessori approach, which prioritizes self-directed learning, personalized instruction, and hands-on experiences. While existing research acknowledges the potential benefits of early childhood education, including the Montessori Method, there remains a notable gap in understanding the specific correlation between the key principles of the Montessori approach and preschool children's cognitive development in Benin Metropolis. Previous studies have primarily focused on broader aspects of early education's cognitive benefits. For instance,

Manuel (2023) explored the overall impact of the Montessori Method on child development but did not specifically address cognitive outcomes in terms of the sex of children. Similarly, Ashley (2019) provided a comprehensive review of Montessori education but lacked a focused analysis on its cognitive benefits in Benin Metropolis. Moreover, observations suggest that despite the proliferation of Montessori schools in Nigeria, including Benin Metropolis, there are discrepancies in the academic performance and language abilities of students from these institutions compared to traditional schools (Dahunsi, 2014). This raises questions about the actual effectiveness of the Montessori Method in enhancing cognitive development, particularly within the Nigerian education system.

Hence, this study seeks to fill the existing gap in knowledge by investigating into the relationships between key principles of Montessori education and the cognitive development of preschool children

### **Research Questions**

To guide the study, the following research questions were asked;

1. What is the relationship between respect for children and cognitive development of preschool children in Benin metropolis?
2. What is the relationship between absorbent minds and cognitive development of preschool children in Benin metropolis?
3. What is the relationship between sensitive periods and cognitive development of preschool children in Benin metropolis?
4. What is the relationship between prepared environment and cognitive development of preschool children in Benin metropolis?
5. What is the relationship between auto-education and cognitive development of preschool children in Benin metropolis?
6. What is the difference in relationship between the key principles of Montessori Approach and cognitive development of preschool children based on gender?

### **Hypotheses**

The following hypotheses were formulated and tested at 0.05 level of significance:

1. There is no significant relationship between respect for children and cognitive development of preschool children in Benin metropolis.
2. There is no significant relationship between absorbent minds and cognitive development of preschool children in Benin metropolis.
3. There is no significant relationship between sensitive periods and cognitive development of preschool children in Benin metropolis.
4. There is no significant relationship between prepared environment and cognitive development of preschool children in Benin metropolis.
5. There is no significant relationship between auto-education and cognitive development of preschool children in Benin metropolis.
6. There is no significant difference in relationship between of key principles of Montessori Approach and cognitive development of preschool children based on gender.

## Methodology

The design used in this study is survey adopting correlational method to investigate the correlation between Montessori principles and cognitive development in preschool children in Benin Metropolis. The target population included 200 pre-primary class two students aged 3-5 years and 18 lead Montessori teachers from ten schools. The study employed a census approach, including all Montessori preschool children in Benin Metropolis. The research instrument was the Teacher Survey on Montessori Principles and Cognitive Development (TSMPCD), which assessed key principles of the Montessori approach on preschool children's cognitive development. The instrument was a four point scale ranging from 1 to 4 [1(strongly Agree) 2 (Agree) 3 (Disagree) 4 (Strongly disagree)]. The instrument was administered to twenty (20) pupils who were not part of the study. The data collected were subjected to Cronbach Alpha Statistics. The coefficient of 0.677, 0.525, 0.753, 0.672, 0.870 and 0.795 were obtained for cognitive development, respect of children, absorbent mind, sensitive period, prepared environment and auto education questionnaire respectively. Copies of the instrument were given to teachers personally to respond to the items on behalf of the pupils, as teachers are familiar with the pupils spending at least 6 hours with them daily. Pearson Product Moment Correlation (PPMC) was used to test hypotheses 1-5, while Fisher-Z statistics was used to test hypothesis 6. All hypotheses were tested at 0.05 level of significance.

## Results

**Hypothesis One:** There is no significant relationship between respect for children and cognitive development of preschool children in Benin Metropolis.

**Table 1: Pearson Product Moment Correlation (PPMC) showing the relationship between Respect for Children and Cognitive Development**

Variable	N	R	Sig (2-tailed)
Respect for children	200	.490	.000
Cognitive Development			

Table 1 shows a r-value of .490 and a p-value of .000, which is significant at of 0.05 alpha level. Since the p-value is less than the alpha level, therefore the null hypothesis which states that “there is no significant relationship between respect for children and cognitive development of preschool children in Benin Metropolis is rejected. Consequently, there is a significant relationship between respect for children and cognitive development of preschool children in Benin Metropolis.

**Hypothesis Two:** There is no significant relationship between absorbent mind and cognitive development of preschool children in Benin Metropolis.

**Table 2: Pearson Product Moment Correlation (PPMC) showing the relationship between Absorbent Minds and Cognitive Development**

Variables	N	r	Sig (2 tailed)
Cognitive Development	200	.692	.000
Absorbent Mind			

Table 2 shows an r-value of .692 and a p-value of .000, which is significant at of 0.05 alpha level. Since the p-value is less than the alpha level, therefore, the null hypothesis which states

that “absorbent mind and cognitive development of preschool children in Benin Metropolis is rejected. Consequently, there is a significant relationship between absorbent minds and cognitive development of preschool children in Benin Metropolis.

**Hypothesis Three:** There is no significant relationship between sensitive periods and cognitive development of preschool children in Benin Metropolis.

**Table 3: Pearson Correlation between Sensitive Periods and Cognitive Development**

Variables	N	r	Sig (2 tailed)
Cognitive Development	200	.501	.000
Sensitive periods			

Table 3 shows an r-value of .501 and a p-value of .000, which is significant at of 0.05 alpha level. Since the p-value is less than the alpha level, therefore the null hypothesis which states that “there is no significant relationship between sensitive periods and cognitive development of preschool children in Benin Metropolis is rejected. Consequently, there is a significant relationship between sensitive periods and cognitive development of preschool children in Benin Metropolis

**Hypothesis Four**

There is no significant relationship between prepared environment and cognitive development of preschool children in Benin Metropolis

**Table 4: Pearson Product Moment Correlation (PPMC) showing the relationship between Prepared Environment and Cognitive Development**

Variables	N	r	Sig (2 tailed)
Cognitive Development	200	.550	.000
Prepared environmen			

Table 4 shows an r-value of .550 and a p-value of .000, which is significant at of 0.05 alpha level. Since the p-value is less than the alpha level, therefore, the null hypothesis which states that “there is no significant relationship between prepared environment and cognitive development of preschool children in Benin Metropolis is rejected. Consequently, there is a significant relationship between development and cognitive development of preschool children in Benin Metropolis.

**Hypothesis Five:** There is no significant relationship between auto-education and cognitive development of preschool children in Benin Metropolis.

**Table 5: Pearson Product Moment Correlation (PPMC) showing the relationship between Auto-Education and Cognitive Development**

Variables	N	r	Sig (2 tailed)
Cognitive Development	200	.571	.000
Auto-education			

Table 5 shows an r-value of .571 and a p-value of .000, which is significant at of 0.05 alpha level. Since the p-value is less than the alpha level, therefore the null hypothesis which states

that “there is no significant relationship between auto-education and cognitive development of preschool children in Benin Metropolis is rejected. Consequently, there is a significant relationship between auto-education and cognitive development in Benin Metropolis.

**Hypothesis Six:** There is no significant difference in relationship between the key principles of Montessori Approach and Cognitive Development of preschool children based on sex.

**Table 6: Fisher’s Z Statistics of the key principles of Montessori Approach to Education and Cognitive Development by Gender.**

Sex	N	r	Zr	z.cal	z-critical
Male	96	.595	0.6777	-1.4458	+1.96
Female	104	.707	0.8872		

Table 6 shows the calculated z of -1.4458 and z-critical of +1.96 which is significant at 0.05 alpha level. Since the calculated z is less than the z-critical therefore, the null hypothesis which states that “there is no significant difference in the relationship between the key principles of Montessori Approach to Education (respect for children, absorbent mind, sensitive period, prepared environment and auto education) and Cognitive Development of preschool children based on gender is retained. Consequently, there is no significant difference in relationship between the key principles of Montessori approach and cognitive development of preschool children based on gender.

### Discussion of Findings

The finding of hypothesis one revealed that there is a significant relationship between respect for children and the cognitive development of preschool children in Benin Metropolis ( $r=0.490$ ,  $p<0.05$ ). This moderate positive correlation indicates that as respect for children increases, there is a corresponding increase in cognitive development. This finding aligns with the work of Lillard and Else-Quest (2013), who found that Montessori education, which emphasizes respect for children, fostered improved social and academic skills. It also supports the research of Dohrmann et al. (2007), which showed long-term positive effects of Montessori education, including respect for children, on academic performance. However, a study by Johansson and Einarsdottir (2016) found that respect for children alone is not sufficient to enhance cognitive development, emphasizing the need for a broader, more integrated educational approach.

The finding of hypothesis two showed a significant relationship between the absorbent mind and cognitive development of preschool children in Benin Metropolis ( $r=0.692$ ,  $p<0.05$ ). This strong positive correlation suggests that as children with more developed absorbent mind tend to have higher levels of cognitive development. This corroborates Montessori's (1949) theory of the child's mind being particularly receptive during early years. It also aligns with research by Lillard (2013) on the effectiveness of Montessori materials in fostering learning, which is based on the concept of the absorbent mind. Conversely, a recent study by Smith and Tesar (2020) suggests that while the concept of the absorbent mind is important, social interactions play a more crucial role in early cognitive development.

The finding of hypothesis three indicated a significant relationship between sensitive periods and cognitive development of preschool children in Benin Metropolis ( $r=0.501$ ,  $p<0.05$ ). This moderate positive correlation implies that as recognizing and leveraging sensitive period is associated with enhanced cognitive development. This supports Montessori's theory of sensitive periods in child development and is consistent with findings by Shonkoff and Phillips (2000) on the importance of recognizing and leveraging these periods in early childhood education. However, Elkind (2015) argues that the concept of sensitive

periods may be overstated and that continuous, adaptive learning opportunities can be equally effective.

The finding of hypothesis four revealed a significant relationship between the prepared environment and the cognitive development of preschool children in Benin Metropolis ( $r=0.550$ ,  $p<0.05$ ). This moderately strong positive correlation suggests that a well prepared environment is associated with higher levels of cognitive development. This finding is in agreement with Lillard's (2013) research on the role of Montessori materials and prepared environments in fostering learning and cognitive development. However, a study by Gray (2018) found that while a prepared environment is beneficial, the quality of teacher-student interactions plays a more significant role in cognitive development.

The finding of hypothesis five showed a significant relationship between auto-education and the cognitive development of preschool children in Benin Metropolis ( $r=0.571$ ,  $p<0.05$ ). This moderately strong positive correlation indicates that children who engage more in self-directed learning tend to have higher levels of cognitive development. This aligns with Montessori's emphasis on self-directed learning and is supported by research from Rathunde and Csikszentmihalyi (2005) on the benefits of Montessori education for student engagement and motivation. In contrast, recent research by Edwards (2019) posits that guided learning and teacher support are crucial for effective cognitive development, challenging the heavy emphasis on auto-education.

The finding of hypothesis six indicated no significant difference in the relationship between the key principles of the Montessori Approach and cognitive development of preschool children based on sex ( $z$ -calculated=  $-1.4458$ ,  $z$ -critical= $\pm 1.96$ ,  $p > 0.05$ ). This result suggests that the Montessori approach is equally effective for both male and female children in terms of cognitive development. This is consistent with Montessori's aim for gender-neutral education, as discussed by Whitescarver and Cossentino (2008), and supports the universal applicability of Montessori principles regardless of gender. However, recent research by Driessen (2020) suggests that subtle gender biases in educational settings can still influence outcomes, indicating that the Montessori approach may not entirely mitigate these biases.

## Conclusion

Based on the findings of the study, the following conclusions were made:

1. The key principles of Montessori approach (respect for children, absorbent minds, sensitive periods, prepared environment and auto education) significantly enhance the academic performance of preschool children in Benin Metropolis.
2. The key principles of Montessori approach have a varying impact on the cognitive development of preschool children based on sex.

## Recommendations

Based on the findings from the study, the researcher recommended as follows:

1. School owners should adopt the Montessori approach to boost academic performance.
2. Parents should be educated on the Montessori principles so they can support their children's learning at home.

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