

Impact of Montessori Pedagogical Approaches on Preschoolers' Learning Outcomes A Case Study of Mainland LGA, Lagos State

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Abstract

This study evaluated how Montessori pedagogy affects preschoolers' learning in Mainland Local Government Area of Lagos State. A descriptive survey research design was adopted in the study. The population of the study comprised all preschoolers in Mainland LGA, Lagos State. The sample size included a total of 71 pupils from four intact Nursery Two classes from two randomly selected two Montessori and two non-Montessori nursery schools in Mainland LGA. This study utilized the Preschoolers' Achievement Test (PAT) with a reliability coefficient of 0.81, to measure preschoolers' learning outcomes. The data collected was analyzed using descriptive and inferential statistics. Participants' demographics were presented using frequency distribution tables, and the two hypotheses were tested using an independent-samples t-test in SPSS 21.0 at 0.05 significance. The results of this study indicated a significant gap in literacy skills between pupils attending Montessori schools and those attending non-Montessori schools ($p=0.004$, $p<0.05$). Additionally, it was observed that pupils in Montessori schools exhibited significantly higher performance in numeracy compared to their counterparts in non-Montessori schools ($p=0.101$, $p<0.05$). This study recommended that Montessori methods should be used in preschools to improve reading and numeracy. Hands-on, child-centered strategies can help enhance numeracy and reading skills. Montessori-based early intervention programs should be promoted by policymakers. These programs can help underprivileged children develop literacy and numeracy early on.

Keywords: Montessori, Pedagogical Approaches, Preschools, Learning Outcome

Introduction

Early Childhood Education and development are essential for the beginning of life and serve as a dependable basis for ongoing education. The early childhood phase extends till the age of eight years. This phase of education is considered important because it allows children to develop a comprehensive concept of schooling, starting from playgroup to pre-primary and then to primary level (Lillard, 2022). Human learning commences instantly upon birth, although certain talents, such as language acquisition, physical skills, and intellect, typically emerge by the age of eight. The primary purpose of early childhood education (ECE) is to facilitate effective growth and development. ECE establishes a necessary foundation for learning in young children, thus promoting the effective development of skills and abilities during the early stages of childhood. ECE equips families and communities with knowledge and information that improves their ability to contribute to the successful growth and development of young children (Lillard, 2022).

Early childhood education offers a comprehensive curriculum that encompasses wisdom, cognitive abilities, astuteness, attitude, character, knowledge, and skills development. These activities are crucial for children to cultivate a positive mindset that can contribute to their personal growth and development (Lillard, 2022). It is essential for young children to be well equipped to get into the formal education system. For children to be admitted to formal schools, it is crucial that they have a sufficient grasp of academic concepts. This will enable them to effectively adapt to the instructional methods employed by their teachers and improve their performance. ECE plays a significant role in promoting learning and education (Manuel, 2023).

Early childhood education currently serves the dual purpose of preparing children for primary school and facilitating their holistic development through various means. These institutions fulfil the need for creating a developmental domain and social setting that adapt to rapidly evolving life standards. Due to the significant role of ECE, a wide range of instructional approaches are employed in practice. The Montessori method is a choice among the various options available in the realm of educational methodologies. Montessori's objective in education is to cultivate independent children who possess a clear sense of purpose and understanding of their actions (Wentworth & Wentworth, 2013).

Montessori devised an educational approach that prioritizes the needs and interests of the child in order to

accomplish this objective. Montessori schools possess unique attributes; such as those who have had Montessori training, have particular standards that they adhere to. Teachers possess the ability to instruct groups of pupils of different ages, taking into account their respective stages of development. In addition, teachers are knowledgeable in Montessori instructional approaches. Conversely, children attending schools that employ the Montessori approach are subject to certain prerequisites. Children are granted the liberty to roam freely and engage in their own tasks without any disruptions (Yulia, Raharjo, Fakhruddin, & Formen, 2022).

Early Childhood Education (ECE), often known as Nursery or Pre-primary Education, is a field of educational theory that focusses on the teaching of young children, informally as well as formally, until around the age of eight. Early childhood care and education (ECCE) encompasses a variety of procedures and systems that facilitate and enhance development in the early years of life. This includes education and care in areas such as physical, emotional, social, and cognitive stimulation, language, as well as healthcare and nutrition (Olowe, Kutelu, & Majebi, 2014). Additionally, it involves providing the necessary support to families and communities to promote the healthy development of children (UNICEF, 2012). Oduolowu, (2011) defines Early Childhood Education as a field of study that encompasses the fundamental elements of family and program structures for children from birth to the age of six, as mandated by law.

The Montessori methods, initiated by Maria Montessori in 1907, prioritises autonomy and self-directed tasks to augment pupils' cognitive capacity. The approach places children at the focal point of the learning process, with teachers assuming the role of observers and facilitators. Meanwhile, the learning atmosphere is meticulously arranged to cater to the specific requirements of the children (Lillard, *et al.*, 2017; Lillard, 2021). Within this setting, children have the liberty to engage with their immediate environment, which promotes their physiological, mental, and spiritual growth (Fleming, Culclasure & Zhang, 2019). The learning environment emphasises the importance of sensing, living practices, and basic skills, while recognising that freedom is crucial for healthy growth. Montessori contended that genuine autonomy results in self-awareness, enabling children to exercise unrestricted agency and comprehend the outcomes of their choices (Denervaud *et al.*, 2019; Mavric, 2020).

Montessori classrooms are intentionally structured to mirror the organisation and arrangement found in the natural world. Toys are arranged in easily accessible and categorised areas, facilitating consistency and cognitive growth. The educational setting adheres to pragmatic principles by providing children with actual items such as cell phones and other materials that are appropriate for their size, enabling them to grasp and internalise real-world limitations (Janssen, Kinney & Farfaring, 2021). The classrooms are expansive and well-organised, specifically created to promote focus and dynamic engagement. Montessori emphasised the importance of attention in a child's development and advocated for schools to offer materials that facilitate children's ability to focus (Marks, 2016).

The Montessori Method also includes the practice of having children of different ages (3-6, 6-9, 9-12) learn together and engage in self-directed learning for long periods of time. Educational materials are specifically tailored to align with the cognitive and emotional growth of children, guaranteeing that the tasks presented are both demanding and achievable. Montessori categorised development into four distinct stages: infancy, childhood, adolescence, and maturity. She emphasised the importance of aligning tasks with the child's specific level of movement, language, sensory perception, and sense of order (Lillard, 2012).

Theoretical Framework

This study's theoretical foundation is based on Montessori's Planes of Development, which outlines four separate phases of human growth. Each stage is defined by certain learning abilities and developmental objectives. The first phase spans from birth to six years old, the second phase is 6-12 years, the third is 12-18 years and the final phase is 18-24 years.

The first phase of development, which aligns with the focus of this study, is commonly referred to as "The Absorbent Mind" period. This phase holds significant importance in the context of preschool education. During this stage, children have a heightened ability to receive and process sensory information, and they primarily learn by engaging with their surroundings. This is consistent with Montessori's notion that a well-prepared environment, filled with interactive learning materials, facilitates the acquisition of fundamental abilities in reading, writing, and mathematics (Lillard, 2017). The Montessori setting, which is both organised and flexible, promotes independence and cognitive development by allowing children to interact with objects that facilitate self-directed learning (Fleming *et al.*, 2019). Within this developmental stage, infants possess sensitive periods

that facilitate the effortless acquisition of language and mathematical concepts through frequent exposure and exploration (Lillard, 2021). At this time, the focus on tangible experiences aids in strengthening the ability to think in abstract terms, which in turn prepares individuals for achieving academic accomplishments in the future (Gordon, 2023). The Montessori method improves learning outcomes in literacy and numeracy by adapting the educational environment to meet the developmental requirements of children. This approach is in line with Thrush's (2015) argument that effective teaching should be tailored to the learner's psychological and developmental stage.

According to Salminen, Khanolainem, Koponem, *et. al.*, (2021 in Manuel, 2023), the environment in which children grow up has an impact on their development during the developmental period. The early stages of development are crucial for the acquisition of numeracy and literacy skills, since they form the foundation for future mathematical and reading abilities. According to Watts, Duncan, Siegler *et. al.*, (2014), the acquisition of non-symbolic and symbolic numeracy skills throughout early childhood can have a significant impact on a child's future mathematical abilities.

Key foundational numeracy skills encompass the ability to handle and compare quantities, count proficiently, and identify numbers accurately. The longitudinal study conducted by Duncan, Dowsett, Claessens, *et. al.*, (2017) has proven that children's achievement in mathematics and general academic performance is dependent on their strong foundation in mathematics. The study conducted by Morgan, Farkas and Wu, (2019) establishes the significance of numeracy skills in determining children's educational achievement. The findings of the study indicated that 70% of grade 5 students who scored below the 10th percentile also scored below the 10th percentile at the conclusion of their early childhood education.

Literacy skills in children foster the capacity to write and read with assurance, so bolstering their overall communication abilities. The development of literacy skills is of utmost importance for every child, and it is frequently essential for their overall growth and success. Hence, the teacher responsible for facilitating the growth of children's reading skills in ECE must possess a comprehensive understanding of the approaches and techniques that effectively promote skill development (Literacy Project, 2019).

The Montessori Method of teaching posits that the environment plays a significant role in either impeding or facilitating the development of children (Manuel, 2023). The ready-made setting serves as the implementation platform for these fundamental components. It is a pre-established learning environment that is tailored to the child's growth and enables the child to freely explore the classroom. In this framework, a child is entitled to select 'job' learning activities (Lillard, 2013). There is a debate among educators and scholars of education on the suitability of the Montessori approach in the present era. It is argued that this approach is more effective than the traditional teaching method in terms of knowledge acquisition by students (Manuel, 2023).

Furthermore, Studies on gender gaps in literacy skills among Montessori pupils have yielded mixed findings, with certain research revealing differences and others indicating gender-neutral results. Montessori education prioritises personalised learning, which should ideally reduce gender disparities by enabling each child to advance at their own rhythm. Nonetheless, multiple studies have indicated that gender may continue to affect literacy development in diverse manners.

Hohmann and Weikart (2020) discovered that whereas Montessori pedagogy promotes critical thinking and self-regulated learning, boys generally underperform compared to girls in early literacy skills, including reading fluency and comprehension. This disparity is ascribed to developmental variances in language and cognitive abilities during early life (Davis & Mahoney, 2019). Females, on average, tend to develop language abilities earlier, potentially providing them with an advantage in literacy activities. Montessori methods may mitigate these differences by fostering a holistic, child-centered approach that prioritises phonological knowledge and reading comprehension. Lillard (2021) posits that the lack of rigid gender-specific education facilitates increased flexibility, which may lead to more equitable outcomes over time.

Maria Montessori established the teaching method over a century ago as an instructional approach that places the student at the centre of attention. The strategy facilitates the selection of learning activities, organises them into several stages, and promotes uninterrupted work periods. (Lillard, Heise, Richey, *et. al.*, 2017). In addition, Montessori learning resources that encourage active participation are carefully organised and provided to children in a visually appealing environment. Children are encouraged to explore certain interests while also engaging in other activities without receiving any rewards or external grades (Lillard *et. al.*, 2017).

Multiple studies have been carried out in the past decades to examine Montessori education and evaluate the

implementation and impact of participation in the private and public sectors (Culclasure, Fleming, & Riga, 2018). Although numerous studies support the effectiveness of Montessori education, there is a dearth of research specifically examining the influence of the Montessori approach on the development of literacy and math abilities in nursery schools located in Lagos State, particularly in the Lagos Mainland area. Therefore, the paper examines the impact of Montessori teaching methods on the academic achievements of preschool children in Mainland LGA of Lagos State, namely in the areas of literacy and numeracy.

Purpose of the Study

The study examines the impact of Montessori teaching methods on the academic achievements of preschool children in Mainland LGA of Lagos State, namely in the areas of literacy and numeracy. The specific objectives are to:

- evaluate the gap between the literacy skills of pupils attending Montessori schools and those attending non-Montessori schools in Mainland LGA;
- assess the gap between the literacy skills of pupils attending Montessori schools based on their gender in the study area.

Research Hypotheses

The following hypotheses were tested at 0.05 level of significant in this study:

H₀₁: There is no significant gap between the literacy skills of pupils attending Montessori schools and those attending non-Montessori schools in Mainland LGA.

H₀₂: There is no significant gender gap in the literacy skills of pupils attending Montessori schools in the study area.

Methodology

Descriptive survey research design was used for this study. The population of the study comprised all preschoolers in Mainland Local Government Area of Lagos State. The sample size included a total of 71 pupils from four intact Nursery Two classes. Multistage sampling procedure was used in the study. Random sampling was used to select two Montessori schools and two non-Montessori nursery schools in Mainland LGA. Stratified sampling technique was used to select 45 children from the two non-Montessori schools and 26 children were selected from the Montessori schools. Preschoolers' Achievement Test (PAT) was self-designed by the researcher. The researchers administered the PAT to the pupils with the help of their class teachers, after seeking the school administrators' approval. The PAT scripts were collated for data analysis purpose. Split-half technique was used to check the Preschoolers' Achievement Test (PAT) and the reliability coefficient yielded 0.81, to measure preschoolers' literacy skills. The data collected were analysed using descriptive and inferential statistics. Participants' demographics were presented using frequency distribution tables, and the two hypotheses were tested using an independent-samples t-test in SPSS 21.0 at 0.05 significance level.

Results

Table 1: Preschoolers' Demographics

Characteristics	Options	Frequency	Percent (%)
Gender	Male	38	53.5
	Female	33	46.5
	Total	71	100.0
Age	4-5 years	52	73.2
	6-7 years	19	26.8
	Total	71	100.0
Method	Non-Montessori	45	63.8
	Montessori	26	36.2
	Total	71	100.0

Source: Field Survey, 2024

Table 1 indicates that the majority (53.5%) of the preschoolers were male and the remaining 46.5% of them were female. While most (73.2%) of them were within the age bracket 4-5 years and the remaining 26.8% of them were ages 6-7. Similarly, 63.8% of the preschoolers were from non-Montessori schools and the remaining 36.2% of them were from Montessori schools.

Test of Hypotheses

The research hypotheses were tested with the use of one sample t-test, as shown below:

Hypothesis One

There is no significant gap between the literacy skills of pupils attending Montessori schools and those attending non-Montessori schools in Mainland LGA

Table 3: Summary of t-test statistics

Method	N		Std.	df	P-val.	Level	Decision
Non-Montessori	45	6.14	0.531				
Montessori	26	8.72	0.714	70	0.004	0.05	Significant

$P\text{-value} = 0.004 < 0.05$ level of significance

Table 2 shows the evaluation of the mean scores of the pupils selected from Montessori schools and those of their counterparts from non-Montessori schools in their literacy skills outcomes, with the Preschoolers Achievement Test (PAT). The table showed that the pupils from non-Montessori schools had a lower mean score of 6.14 than their counterparts from Montessori schools with a higher mean score of 8.72. Furthermore, a mean score of 8.72 from 26 pupils selected from Montessori schools and a mean score of 6.14 from their non-Montessori school counterparts indicates that those from Montessori schools achieved 2.58 (42.0%) higher than the non-Montessori school pupils. More so, the P-value of 0.004 was found less than the level of significance (0.05); $p < 0.05$. This implies that the null hypothesis that states "there is no significant gap between the literacy skills of pupils attending Montessori schools and those attending non-Montessori schools" is rejected, and its alternative that states "there is a significant gap between the literacy skills of pupils attending Montessori schools and those attending non-Montessori schools" is accepted.

Hypothesis Two

There is no significant gender gap in the literacy skills of pupils attending Montessori schools

Table 3: Summary of t-test statistics

Method	N	Std.	df	P-val.	Level	Decision	
Male	38	8.63	0.252			Not	
Female	33	8.81	0.591	70	0.101	0.05	Significant

$P\text{-value} = 0.101 > 0.05$ level of significance

Table 3 shows the evaluation of the mean scores of the male pupils selected from Montessori schools and their female counterparts from the same schools in their literacy skills outcomes, with the PAT. The table showed that the female pupils had a higher mean score of 8.81 than their male counterparts from same schools with a lower mean score of 8.63. Furthermore, a mean score of 8.81 from 33 female pupils and a mean score of 8.63 from 38 male pupils indicates that the female pupils achieved 0.18 (2.1%) higher than the male pupils. More so, the P-value of 0.101 was found greater than the level of significance (0.05); $p > 0.05$. This implies that the null hypothesis that states "there is no significant gender gap in the literacy skills of pupils attending Montessori schools" is rejected, and its alternative that states "there is a significant gender gap in the literacy skills of pupils attending Montessori schools" is accepted.

Discussion of Findings

The findings of this study revealed substantial gaps in literacy and numeracy abilities of pupils enrolled in Montessori schools compared to those attending non-Montessori schools. This aligns with the assertion that the developmental period of children is influenced by the environment in which they are raised (Salminen, *et. al.*, 2021). The initial phases of development are crucial for the acquisition of numeracy and literacy skills, since they establish the groundwork for future mathematical and reading proficiencies. Watts, Duncan, Siegler, *et. al.*, (2014) argue that the development of both non-symbolic and symbolic numeracy skills during early life can greatly influence a child's future mathematical aptitude. Foundational numeracy skills include the capacity to manipulate and assess quantities, count fluently, and accurately recognise numbers. The longitudinal study undertaken by Duncan, Dowsett, Claessens, *et. al.*, (2017) has demonstrated that children's success in mathematics and overall academic performance is contingent upon their solid grounding in mathematics. The research undertaken by Morgan, Farkas, and Wu (2019) demonstrates the importance of numeracy skills in influencing the educational success of children. According to Manuel (2023), this strategy is believed to be more effective than the traditional teaching method in terms of students' acquisition of knowledge.

Conclusion

This study uncovers significant gaps in literacy and numeracy skills between Montessori and non-Montessori pupils, underscoring the impact of early educational settings on growth and progress. The Montessori methods were proven to boost early numeracy skills, including as counting and comparing, which are crucial for future academic achievement. The results indicate that the Montessori educational approach is more effective than traditional techniques in promoting the development of literacy and numeracy skills in preschool-aged children, while there is no meaningful difference between the performances of male and female pupils' performances in the Montessori schools. This highlights the significance of utilising instructional approaches that correspond to early phases of development, as exemplified by Montessori education. This research provides evidence that the Montessori approach continues to be beneficial in enhancing learning results in preschoolers, particularly in crucial areas like as numeracy and literacy, despite the ongoing arguments regarding its relevance.

Recommendations

The following are recommended based on the findings:

- Montessori methods should be used in preschools to improve reading and numeracy. Hands-on, child-centered strategies can help enhance numeracy and reading skills.

- To adopt Montessori strategies in the classroom, teachers need specialised training. This can prepare teachers to foster cognitive growth and academic performance in preschoolers.
- Montessori-based early intervention programs should be promoted by policymakers. These programs can help underprivileged children develop literacy and numeracy early on.
- Long-term effects of Montessori education on children's intellectual and social development should be studied to fully understand and optimise its benefits in varied educational environments.

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