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IMPACT OF MONTESSORI TEACHING METHODS ON DEVELOPMENTAL DOMAINS IN EARLY CHILDHOOD EDUCATION IN LAGOS STATE, NIGERIA

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ABSTRACT

Introduction: Early Childhood Education and development is a start to life and a reliable foundation to continuing education. One of the reasons that early childhood is regarded up to the age of eight is to enable children acquire a smooth understanding of the entire education from the level of play group to pre-primary and from pre-primary to the level of primary.

Purpose of the Study: The main purpose of this study is to examine the impact of Montessori teaching methods on the developmental domain of young children in early childhood schools in Lagos state.

Methodology: Descriptive survey research design was adopted. Sample size of two (12) schools of 10 pupils each in the selected schools was employed using convenience sampling technique. Validated questionnaire was used for data collection. The collected data was analyzed using descriptive statistics which involves measures of central tendency descriptive statistics (frequency and percentage).

Results: Findings indicate that there is higher impact of Montessori teaching methods on the literacy skills in early childhood education. Pupils from both Montessori and Non-Montessori schools perform equally better in Numeracy Skills. The impact of conventional method of teaching on reasoning skill is better than that of Montessori Method of teaching.

Conclusion: In conclusion, many aspects of Montessori teaching methods positively consider children's developmental needs and should be an integral part of teachers' working modalities in so-called "non-Montessori teaching methods (conventional public schools)" (such as the possibility for each child to be in multi-age classes; to have an absence of explicit, formal grades, rewards, or punishments; and a low teacher-student ratio).

Recommendations: Based on the results of this study, it is therefore recommended that Montessori system of education may be used to improve language skills of children and to understand art of language at early childhood level.

Keywords: Attitude, Developmental Domain, Early Childhood Education, Literacy Skills, Montessori Teaching Methods, Numeracy Skills, and Reasoning Skills.



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PUBLIC INTEREST STATEMENT

Findings of this study may be of immense benefits to serving early childhood education teachers at both public and private schools, to review their methods of teaching in a way that will enhance learning effectiveness. Emphasis on teaching methods that are learner-centred is expected to be focused on, especially at elementary education level, building course on Montessori Method of teaching into the pre-service training of teachers programme will be of help.

INTRODUCTION

Early Childhood Education and development is in fact a start to life and a reliable foundation to continuing education. The period of early childhood is until the age of eight years. One of the reasons that early childhood is regarded up to the age of eight is to enable children acquire a smooth understanding of the entire education from the level of play group to pre-primary and from pre-primary to the level of primary (Lillard, 2012). Human learning begins immediately the child is born, however, abilities, such as language, physical and cognition always gets developed at eight year. Effectual development and growth are the main reason for early childhood education. Early childhood education creates the needed basis for learning among young children, thereby enhances the development of abilities and skills effectively at childhood stage. Through early childhood education, communities and families acquire knowledge and information that enhances their contributions to effective growth and development of young children (Lillard, 2012).

Play is the mode learning during pre-school as children derive pleasure in activities of play, followed by drawing-related activities that eventually enhance education their interest in art. This is followed by the concepts of academics, number and alphabets. Comprehensive education is provided through early childhood education that covers wisdom, cognitive skills, attitude, knowledge, skills, astuteness and character. All these are of great essence children to develop good mind-set that can contribute towards their life progression (Lillard, 2012). The young children have to be well prepared to enter the education system at the formal level. In order to seek admission in formal schools, it is vital for children to possess adequate understanding of

academic concepts, so that they can appropriately cope up with the teaching-learning methods, provided to them by the teachers and enhance their performance. Early childhood education offers an effective contribution in the facilitation of learning and education.

Dr. Maria Montessori founded the method of teaching several years ago as a teaching approach that makes learner the centre of focus. The method helps to guide the choice of learning activities, grouping in multiple stages, and enhances uninterrupted working hours. (Lillard, Heise, Richey et al, 2017). Furthermore, hands-on Montessori learning tools are meticulously arranged and made available to children in an aesthetically pleasing atmosphere. There is encouragement for children to pursue particular interest while engaging in others without any reward or extrinsic grade (Lillard, Heise, Richey et al, 2017). Several studies have been conducted over the last two decades to investigate Montessori education and to assess implementation and effects of participation in both the public and private sectors (Brown & Lewis, 2017; Culclasure, Fleming, & Riga, 2018). While many of these studies show results in favour of Montessori education, they have significant disadvantages, such as small sample sizes, uncertain authenticity of Montessori implementation, and selection bias.

Lide (2018) identified the specific benefits of Montessori Method of teaching. The method facilitates collaborative instruction among peers, it creates a sense mini-society with leadership and professional role displayed in the classroom, it enables children to learn through trial and errors unhindered, it enhance freedom of choice among children. Further, the method creates a natural setting for children to interact freely without undue interference. It enhances concentration among children

during learning because the method is interest-based. Other benefits of Montessori Method of teaching include enhancement of individualized teaching because the teaching class is often small, it helps to develop creativity in children and pave ways for the recognition of children's abilities and interest (Lide, 2018).

According to more recent, rigorous studies, Montessori programs that faithfully execute the paradigm may result in favourable changes in academic, behavioural, and socio-emotional results among participating children (An evaluation of Montessori education in South Carolina's public schools by Culclasure, Fleming & Riga, 2018; Montessori preschool elevates and equalizes child's outcomes: A longitudinal study by Lillard, Heise, Richey et al, 2017). There is need for educationist to further examine the method of teaching in such a manner that will add to the body of knowledge with empirical data. This will help to add to the knowledge about Montessori teaching method and how to evaluate its relevance and strategies. Developing children's ability to differentiate sound, objects and colours was recognised by the Mari Montessori as important aspect of development in children. To develop the three main skills that involve smelling, hueing and colour differentiation, certain activities are required. Progression of material usage by children was established by Montessori. Sensory period concept was used by Montessori, in young children's education. Ude and Nwafor, (2019) emphasised that children are receptive to certain stimuli in their environment at certain period of their lives and this has been confirmed by neuroscience lately.

Salminen, Khanolainem, Koponem, et al, (2021) stated that environment in which a child grows influences the development of toddler during the developmental stage. Early numeracy and literacy skills are developed during this stage and the future mathematical and readings development is founded on this. Watts, Duncan, Siegler et al, (2014) emphasised that nonsymbolic and symbolic skills in numeracy acquired during this early stage of development can

determine the future capacity of every child in mathematics.

Major early numeracy skills include learning to manipulate and compare quantities, learning to count and learning to identify numbers. A Longitudinal Study on Early Childhood by Duncan et al, (2007) had established that success in math and general academic is premised on good mathematics knowledge by children. Study by Morgan, Farkas and Wu, (2009) establish the importance of numeracy skill in children's educational success. Finding of that study revealed that 70% of grade 5 children who fall below 10th percentile also had their performance below 10 percentile at the end of their early childhood education.

Also, literacy skill develops in children the ability to write and read with confidence which eventually enhances overall communication skills. Literacy skills development is very important for every child, and its development is often crucial to every child. Therefore, teacher of early childhood education who is saddled with task of helping children develop the skills must know the method and strategies that will enhance the development of literacy skills in children effectively (Literacy Project, 2019).

Sare, Luik and Tiia, (2016), on their own emphasised that reasoning skill is of great importance for every human being and that the skill is better developed during early stage of life. Author further maintained that the development is highly associated with the environment where the child grows. HOSS, (2022) liken reasoning skill to logical thinking and emphasised that children are helped by the early development of the skill to become analytical thinker as early as possible in life. Reasoning skill is very important to children as it prepares them for real life situation. Reasoning skill enhance the ability to make better decision in children. Teaching of reasoning skill at early childhood education level has proved to enhance ability for critical thinking, creates solid basis for math and scientific concepts and help to effectively activate children brain (HOSS, 2022)

According to Montessori Method of teaching, environment actual exerts the force to hinder or help development in

children. Activity repetition by young children may be meaningless to many, this repetition; however, this is what enables the children to develop into maturity. A comparison between the Montessori Method and non-Montessori method may seem uncommon because both methods have no relationship for several years as there is no connection between the two methods. Careful efforts to examine the principles of Montessori Method of teaching will enable us to have understanding of the operation of the method.

The prepared environment that acts as the implementation platform in accordance with these basic components is the learning environment that has been created in advance in accordance with the child's development and allows the child to roam freely inside the classroom. The child has the right to choose 'work' learning activities in this context (Lillard, 2013). Despite the Montessori Method, there are still gaps in the pupils' literacy, numeracy, and reasoning skills. Also, there is this argument among educators and students of education that Montessori Method seems appropriate in this time and age, and is more effective in acquiring knowledge by pupils than the popular conventional method of teaching. Furthermore, the number of studies on Montessori teaching methods from a variety of perspectives is limited. Hence the need for this study to, examine the impact of Montessori teaching methods and its impact on developmental domain in early childhood education.

STATEMENT OF THE PROBLEM

Early childhood education prepares children for primary school while also supporting their development in a variety of ways. These institutions fill the void by addressing the requirement for the creation of a developmental domain and social environment that evolves in tandem with changing life standards. Because early childhood education serves such an important purpose, numerous teaching methods are used in practice. The Montessori Method is one option in this method diversity. The goal of education, according to Montessori, is to produce free children who know what they want to

accomplish and what they are doing (Wentworth & Wentworth, 2013). Montessori schools have distinct characteristics. Teachers, for example, have particular criteria based on their Montessori training. Teachers are capable of teaching multi-age groups based on developmental phases. Furthermore, teachers are aware of Montessori teaching methods. Children in schools that use the Montessori Method, on the other hand, have some requirements. Children have the freedom to move about and do their own work without being.

Through the use of Montessori teaching method, children have the right to choose 'work' learning activities in this context (Lillard, 2013). However, despite the use of Montessori Method, there are still gaps in the pupils' literacy, numeracy, and reasoning skills. Also, there is this argument among educators and students of education that Montessori Method seems appropriate in this time and age, and is more effective in acquiring knowledge by pupils than the popular conventional method of teaching. Furthermore, the number of studies on Montessori teaching methods from a variety of perspectives is limited. Hence the need for this study to, examine the impact of Montessori teaching methods and its impact on developmental domain in early childhood education.

PURPOSE OF THE STUDY

The main purpose of this study is to examine the impact of Montessori teaching methods on the developmental domain of young children in early childhood schools in Lagos state. Specifically, the study sought to determine:

1. the impact of Montessori teaching methods on the literacy skills,
2. the impact of Montessori Method on numeracy skills, and
3. the impact of Montessori Method on reasoning skills.

RESEARCH QUESTIONS

1. To what extent is the impact of Montessori teaching methods on pupils' literacy skills in early childhood schools in Lagos state?

2. To what extent is the impact of Montessori teaching methods on pupils' numeracy skills in early childhood schools in Lagos state?
3. To what extent is the impact of Montessori teaching methods on pupils' reasoning skills in early childhood schools in Lagos state?

METHODOLOGY

Design

Descriptive survey design was adopted to assess the impact of Montessori teaching methods and its impact on developmental domains in early childhood education in Lagos state. A descriptive research design enables the study to achieve the research objectives. Descriptive research also enables the researcher to gather quantitative data. Comparisons are made between the characteristic-present and the comparison groups and the researcher attempts to identify relationships that may occur between the variables while speculating about possible causes or effects for any observed variations in the collected data for both groups (Montessori and non-Montessori schools).

Population and Sample

The population of the study was all pupils of early childhood education at Mainland Local Government Area of Lagos State. 12 schools (Montessori school (6) and non-Montessori school (6)) were selected. In order to obtain data for the study, convenience sampling technique was adopted to obtain information from selected pupils of early childhood education at Yaba LCDA, Lagos State. A sample size of one hundred and twenty (120) pupils of early childhood education was selected, using convenience sampling technique.

Instrument for Data Collection

The data was collected from respondents using self-structured assessment tool. The instrument was used to assess the impact of Montessori teaching methods on developmental domain (literacy skills, numeracy skills, reasoning skills and attitude of pupils) of

young pupils. Inter-rater reliability was used because expert observation was used by the researcher and a research assistant who administered ten (10) copies of the instrument on similar sample in different schools. The observed scores were tested using Statistical Package for Social Sciences (SPSS) 25.0 version software to generate Cronbach's coefficient alpha (0.86).

Procedure for Data Collection

Permission to use the data for the purpose of the study was obtained from the school head teacher. Data was collected through the use of the prepared assessment, after thorough explanation has been given to the research assistants (teachers) and securing their consent. Copies of research instrument was distributed and administered on the study sample (pupils) one after the other. Assessment as a research instrument was mainly use for collection of primary data by the class teachers and the assessment result was submitted for further analysis. The strategy for generating the data involves the administration of copies of the validated assessment to the pupils through research assistants (teachers). Class teachers who were known by the pupils, were used as research assistant to facilitate ease access to the pupils.

Method of Data Analysis

The collected data was analyzed using descriptive statistics which involves measures of central tendency Descriptive statistics (frequency and percentage). To ensure efficient and effective data analysis, cross tabulation analysis which uses SPSS method version 25.0 was used to regroup and reduce the data to a small number of underlying common factors or domains that will summarize the data to help in the interpretation through recording of variables.

RESULTS

Research Question 1: To what extent is the impact of Montessori teaching methods on pupils' literacy skills in early childhood schools in Lagos state?

Table 1: Percentage and Frequency Count on Literacy Skills of Montessori and Non-Montessori school pupils
 N=60

Range of Scores (%) / Number of Pupils	Montessori School		Non-Montessori School	
	Nursery 2	Basic 1	Nursery 2	Basic 1
A+ (100-90% - Excellent)	11(61.2%)	26(61.9%)	7(25.9%)	24(57.1%)
A (89-80% - Very Good)	5(27.7%)	11(26.2%)	6(33.4%)	12(28.6%)
B+ (79-70% - Good)	2(11.1%)	5(11.9%)	5(27.7%)	6(14.3%)
Total	18(100%)	42(100%)	18(100%)	42(100%)

Source: Field Survey, 2023

Table 1 shows that 11(61.2%) Montessori nursery 2 pupils scored between 100 – 90%, 5(27.7%) scored between 89-80% while 2(11.1%) scored between 79-70%. Also, 26(61.9%) Montessori Basic 1 pupils scored between 100-90%, 11(26.2%) scored 89-80% while 5(11.9%) scored between 79-70%. Also, table 1 shows that 7(25.9%) non-Montessori nursery 2 pupils scored between 100 – 90%, 6(33.4%) scored

between 89-80% while 5(27.7%) scored between 79-70%. Also, 24(57.1%) non-Montessori Basic 1 pupils scored between 100-90%, 12(28.6%) scored 89-80% while 6(14.3%) scored between 79-70%.

Research Question 2: To what extent is the impact of Montessori teaching methods on pupils' numeracy skills in early childhood schools in Lagos state?

Table 2: Percentage and Frequency Count on Numeracy Skills of Montessori and Non-Montessori schools pupils

N=60

Range of Scores (%) / Number of Pupils	Montessori School		Non-Montessori School	
	Nursery 2	Basic 1	Nursery 2	Basic 1
A+ (100-90% - Excellent)	7(38.9%)	28(66.7%)	13(72.2%)	25(59.5%)
A (89-80% - Very Good)	6(33.3%)	8(19.0%)	4(22.2%)	14(33.3%)
B+ (79-70% - Good)	5(27.8%)	6(14.3%)	1(5.6%)	3(7.2%)
Total	18(100%)	42(100%)	18(100%)	42(100%)

Source: Field Survey, 2023

Table 2 shows that 7(38.9%) Montessori nursery 2 pupils scored between 100 – 90%, 6(33.3%) scored between 89-80% while 5(27.8%) scored between 79-70%. Also, 28(66.7%) Montessori Basic 1 pupils scored between 100-90%, 8(19.0%) scored 89-80% while

6(14.3%) scored between 79-70%. Also, table 2 shows that 13(72.2%) non-Montessori nursery 2 pupils scored between 100-90%, 4(22.2%) scored between 89-80% while 1(5.6%) scored between 79-70%. Also, 25(59.5%) non-Montessori Basic 1 pupils scored between

100-90%, 14(33.3%) scored 89-80% while 3(7.2%) scored between 79-70%.

methods on pupils' reasoning skills in early childhood schools in Lagos state?

Research Question 3: To what extent is the impact of Montessori teaching

Table 3: Percentage and Frequency Count on reasoning skills of Montessori and Non-Montessori schools pupils (Basic 1)

N=42		
Range of Scores (%) / Number of Pupils	Montessori School	Non-Montessori School
A+ (100-90% - Excellent)	21(50.0%)	23(54.8%)
A (89-80% - Very Good)	13(31.0%)	15(35.7%)
B+ (79-70% - Good)	8(19.0%)	4(9.5%)
Total	42(100%)	42(100%)

Source: Field Survey, 2023

Table 3 shows that 21(50.0%) Montessori Basic 1 pupils scored between 100-90%, 13(31.0%) scored 89-80% while 8(19.0%) scored between 79-70%. Also, table 4.4 shows that 23(54.8%) non-Montessori Basic 1 pupils scored between 100-90%, 15(35.7%) scored 89-80% while 4(9.5%) scored between 79-70%.

DISCUSSIONS

This study was on impact of Montessori teaching methods and its impact on developmental domains in early childhood education in Lagos State. The responses were analyzed using frequencies tables and percentage. The following are discussions arising from the major findings of the study.

This study revealed that, there is higher impact of Montessori teaching methods on the literacy skills in early childhood education. Pupils responded that there are impact on subjects taught with Montessori Method perform better than those taught with conventional method of teaching. This was supported by Al, (2012) that a special attention in Montessori curriculum is given to early literacy, with children undergoing the program often learning to write and read before the age of six, following "writing to read" principle. This means that children are first thought to write the letters and words (encoding), then to read them (decoding), as Maria Montessori

personally observed this approach to be superior. This was also in consonant with the study by Aghajani and Saheli (2020) that using Montessori Teaching Method was significantly more effective than traditional instruction in improving the EFL learners' writing. In line with the same results, Mcdurham, (2011) study found that there was a significant difference between the academic achievement of seventh and eighth graders who were enrolled in Montessori schools in Texas and their peers who were enrolled in public schools. The results of the study found that the Montessori students got higher literacy in science and mathematics compared with their peers in public schools (non-Montessori students).

This result also conforms to the findings of Ude and Nwafor, (2019) in a study that compared impact of Montessori Method of teaching and conventional method of teaching on academic achievements of primary school pupils in Enugu East Local Government Area. Finding of the study showed that Montessori Method of teaching has a greater impact on the academic achievement of pupils than the conventional method. The author therefore recommended that Montessori Method of teaching should be used in all government primary schools.

Result also showed that pupils from Montessori and Non-Montessori schools perform in staggering manners in

Numeracy Skills, but better. However, the indication evident is that primary one pupil from Montessori school perform much better than those from Non-Montessori school in Numeracy Skills, while primary two pupil from Non-Montessori school also perform better than those from Montessori school in Numeracy Skills. From this result, indication is that, both methods of teaching have equal impact on numeracy skill of the pupils that participated in this study.

This was in line with the study by Mallett (2013) focused his study on comparing the academic achievements between Montessori students and non-Montessori students. The results of the study by Mallett indicated that the achievement of Montessori students in the first and second grades was similar to that of the fourth and fifth grades students in non-Montessori schools.

Result indicated that impact of Montessori Method of teaching on reasoning skills is relatively lower than conventional method of teaching. The indication is that both Montessori and non-Montessori methods of teaching impact positively on the reasoning skills of children, but the performance of pupils from non-Montessori school is higher slightly than those from Montessori school. This does not support the study conducted by Sullivan-Smith (2008) who emphasized that the Montessori program is more effective in developing sensorial skills in preschool children compared with the mainstream method in education. Montessori schools include children of different ages in the classroom. Peer teaching and learning does increase student's confidence in practice and also improves learning in the psychomotor and cognitive domains. However, the finding support the result of study by Lopata, Wallace and Finn (2005) found that when comparing the academic achievement of primary school (4th grade) and middle school students (8th grade) in the Linguistic Arts and Mathematics tests, the Montessori approach had no effect. The achievements of the fourth grade Montessori students were not different from those in public schools (non-Montessori students) in the linguistics, but they achieved better results in

mathematics. Moreover, there were no statistical significance differences among Montessori students in grade eight in linguistics and mathematics compared to their peers from public schools (non-Montessori students).

CONCLUSION

Both teaching methods are great impact to primary school pupils. Montessori and conventional teaching methods have positive impacts on the developmental domains of primary school pupils. Most aspects of Montessori teaching methods positively consider children's developmental needs and should be an integral part of teachers' working modalities in all schools. However, non-Montessori method also has positive impact in the development of developmental domains in children. Nonetheless, Montessori's perspective on the function of language as well as pretend-play should be examined further, as it may help to explain the disparities in the findings of the many studies noted in this study. Therefore, curriculum planers should make a policy that Montessori Method should be a course in the Colleges of Education and faculties of education in Nigerian Universities. This will help the teachers in training to be equipped with Montessori skills and conventional skills.

RECOMMENDATIONS

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

1. Curriculum planers should make a policy that Montessori Method should be a course in the colleges of education and faculties of education in Nigerian Universities. This will help the students of education in various colleges of education and faculties of education in the university's graduate with Montessori skill and conventional skill.
2. Montessori system of education may be used to improve language skills of children and to understand art of language at early childhood level.

Conflict of interest: The study has no conflict of interest.

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The author of this study recognises the contributions of the selected early childhood education schools used for the study. Equally recognised are the respondents to this study, the selected children used as sample for this study.

Disclaimer statement

This work is a study carried out by the author purely for academic purpose.

Notes on Author

Dr. Manuel, Mojisola Nkechi is a lecturer in the Department of Social Sciences, Faculty of Education, University of Lagos. She studied early childhood education at the University of Lagos. She is a seasoned lecturer with several years of experience as early childhood education teachers and teacher trainer. She has published over 25 journal articles to her credit.

REFERENCES

- Aghajani, F., & Saheli, H. (2020). Effects of Montessori teaching method on writing ability of Iranian male and female EFL Learners. *Journal of Practical Studies in Education*, 2(1), 8-15.
- Al, S. S. (2012). A different perspective on education: Montessori and Montessori school architecture. *Procedia-Social and Behavioral Sciences*, 46, 1866-1871.
- Brown, K. E., & Lewis, C. W. (2017). A comparison of reading and math achievement for African American third grade students in Montessori and other magnet schools. *Journal of Culclasure, B., Fleming, D. J., Riga, G. (2018). An evaluation of Montessori education in South Carolina's public schools. The Riley Institute at Furman University, Greenville, SC. Unpublished manuscript. <https://riley.furman.edu/sites/default/files/docs/MontessoriOverallResultSFINAL.pdf>.*
- Duncan, G.J., Dowsett, C.J., Claessens, A., Magnuson, K., Huston, A.C., Klebanov, P., & Japel, C. (2007). School readiness and later achievement. *Developmental Psychology*, 43, 1428– 1446.
- Fleming, D.J., Culclasure, B.T., & Zhang, D. (2019). The Montessori model and creativity. *Journal of Montessori Research*, 5(2), 1-14. <https://doi.org/10.17161/jomr.v5i2.7695>.
- Lide, A. (2018). Montessori education: What is its relationship with the emerging worldview? *Journal of Conscious Evolution*, 8(8), 1-33.
- Lillard, A. S. (2012). Preschool children's development in classic Montessori, supplemented Montessori, and conventional programs. *Journal of School Psychology*, 50, 379-401.
- Lillard, A. S. (2013). Playful learning and Montessori education. *NAMTA Journal*, 38(2), 137-174.
- Lillard, A. S. (2017). *Montessori: The science behind the genius* Oxford University Press.
- Lillard, A. S., Heise, M. J., Richey, E. M., Tong, X., Hart, A., & Bray, P. M. (2017). Montessori preschool elevates and equalizes child outcomes: A longitudinal study. *Frontiers in Psychology*, 8, 33-44. <https://doi:10.3389/fpsyg.2017.01783>.
- Literacy Project, (2019). *Five essential skills needed for childhood literacy. <https://Literacyproj.Org/2019/04/29/Five-essential-skills-needed-for-childhood-literacy/>*.
- Lopata, C., Wallace, N., & Finn, K. (2005). Comparison of academic achievement between Montessori and traditional education programs. *Journal of Research in Childhood Education*, 20(1), 5-13.
- HOSS, (2022). *Why develop logical reasoning skills in a child? <https://houseofsoftskills.com/blog/logical-reasoning-skills-in-a-child>*.
- Mallett, J. (2013). *Academic achievement outcomes: Montessori and non-Montessori public elementary students. Unpublished Master Thesis. USA, Texas: University-Commerce.*
- Mcdurham, R (2011). *A comparison of academic achievement for seventh and eighth grade students from montessori and non-Montessori*

- school programs.* Unpublished Doctoral Dissertation. USA, Texas: Tarleton State University.
- Morgan, P.L., Farkas, G., & Wu, Q. (2009). Five-year growth trajectories of kindergarten children with learning difficulties in mathematics. *Journal of Learning Disabilities, 42*, 306–321.
- Sare, E., Luik, P., & Tiia, T. (2016). Improving pre-schoolers' reasoning skills using the philosophy for children programme. *Trames Journal of the humanities and Social Sciences, 20*(3), 273- 280. <https://doi.org/10.313176/tr.2016.3.03>.
- Sullivan-Smith, M. (2008). Montessori and children with autism sensory skill fullness. *NAMTA Journal, 33*(2), 68-75.
- Ude, V. C., & Nwafor, O.S.C. (2019). Comparison of impact of Montessori Method of teaching and conventional method of teaching on academic achievements of primary school pupils in Enugu East Local Government Area. *Advance Journal of Education Social Science, 4*(11), 20-33.
- Watts, T. W., Duncan, G. J., Siegler, R. S., and Davis-Kean, P. E. (2014). What's past is prologue: relations between early Mathematics knowledge and high school achievement. *Educational Research, 43*, 352–360. <https://doi.org/10.3102/0013189X14553660>.
- Wentworth, R. A. L., & Wentworth, F. (2013). *Montessori for the New Millennium: Practical guidance on the teaching and education of children of all ages, based on a rediscovery of the true principles and vision of Maria Montessori.* Taylor & Francis.