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## RESEARCH ARTICLE

## Montessori Classroom Design and Development of Self-Directed Learning Behaviour in Private Pre-Primary Schools

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The study's objective was to assess the influence of Montessori Classroom design on development of self-directed learning behavior in private pre-primary schools in Mwanza city. The study was guided by the self determination theory developed by Deci & Ryan, which emphasizes autonomy, competence and relatedness, the research explores how key elements of the Montessori approach foster self directed learning. The study employed a qualitative research approach where an intrinsic case-study design was used. Moreover, the study targeted a population of 240 individuals and purposively sampled 30 participants (3 school managers, 3 head teachers, 24 classroom teachers). Data were collected through interviews, classroom observations and document analysis. All aspects of trustworthiness in qualitative research were considered. The data were analyzed and presented through thematic analysis. The findings revealed that a well-prepared Montessori environment with accessible manipulative, choice opportunities, orderly layout and a facilitative teacher role, significantly contributes to the development of learners; autonomy, competence, relatedness and intrinsic motivation which all of them are key aspects of self-directed learning behavior. The study concluded that when properly implemented, Montessori pedagogy holds substantial potential to nurture self directed learning in early childhood settings. Thus, the study recommended that pre-primary schools should adopt Montessori-inspired classroom designs that promote self-directed learning by creating child-centered, well-organized and aesthetically appealing environments. Additionally, teachers should receive training on maintaining and adapting these environments to effectively nurture autonomy, decision-making and intrinsic motivation and a sense of responsibility among learners.

**Keywords:** Montessori pedagogy; self-directed learning; montessori classroom; private pre-primary schools**INTRODUCTION**

Early childhood environment forms the foundation for lifelong learning, curiosity and development (Solang, et al., 2024). Globally, there has been a shift from teacher-centered instruction toward learner-centered pedagogies that nurture children's autonomy and self-directed learning. The Montessori approach developed by Dr. Maria Montessori emphasizes independence, hands-on learning and development of intrinsic

motivation (Lillard, 2019). Central to this pedagogy is the "prepared environment" a thoughtfully organized classroom where children freely choose and engage with hands-on materials at their own pace. Such environments are designed to promote concentration, decision-making and responsibility of all which are key aspects of self-directed learning (Oswaru & Ebohon, 2024). Recent global research underscores the importance of classroom design in promoting learner

autonomy. For instance, a 2024 study by Abiodun in Montessori found that Montessori environments that allowed children to manage their own workspace and materials significantly enhanced self-regulated learning. Similarly, Adhikari and Saha (2024) reported that the Montessori method places a strong emphasis on individual learning. Children in Montessori classrooms are divided into three-year multi-age classes, which facilitate the development of stronger peer connections.

Meanwhile, Ogbemudia (2024) postulates that Montessori pedagogy emphasizes creating a learning environment that is adaptable to the individual needs, backgrounds and mental abilities of children. However, Africa et al. (2024) warn that despite the designed environments in Montessori which encourage self-directed learning and exploration, children still need guidance, instruction and support to master them. In Tanzania, Byemelwa (2024) suggested that Montessori pedagogy has emerged as a promising approach for Tanzanian preschool students, offering a nurturing and interactive learning environment that supports the development of critical academic, social and emotional skills. Also, the Tanzanian 2014 Education and Training Policy's (ETP) 2023 edition and the National Multi-Sectoral Early Childhood Development Programme (NM-ECDP, 2021–2026) align with some Montessori principles, emphasizing child-centered learning, problem-solving, and holistic development (URT, 2021; URT, 2023). These efforts show a growing national recognition of innovative pedagogies including Montessori pedagogy.

However, there remains a gap between policy aspirations and classroom realities, particularly in private pre-primary schools in Mwanza City. While some private schools in Mwanza claim to adopt the Montessori approach, preliminary observations and reports from educators and stakeholders reveal inconsistent and superficial implementation. These schools operate within a national curriculum that emphasizes standardized content delivery and assessments, which often contradict core Montessori principles such as individualized pacing, learner autonomy, and freedom of choice. Also, there is limited empirical research documenting how Montessori practices are applied in Mwanza, and whether the classrooms designs effectively foster self-directed learning behavior among learners in this specific context. Moreover, many teachers in these schools lack formal Montessori training, and schools face resource

constraints in acquiring appropriate materials (Modest & Mwila, 2023). Parents, too, may lack awareness of the Montessori pedagogy leading to misaligned expectations and support at home. These realities raise concerns about whether Montessori pedagogy, as practiced in Mwanza's private pre-primary schools, achieves its intended outcomes, particularly in developing self-directed learning behavior, a foundational goal of early education. Therefore, this study was necessary to investigate the real influence of Montessori classroom design on self-directed learning behavior in Mwanza City. It aimed:

To evaluate the influence of Montessori classroom design on the development of learners' self directed learning behavior.

## REVIEW OF LITERATURE

### Theoretical Review

Self-Determination theory (SDT) was developed by psychologists Edward L. Deci and Richard M. Ryan beginning in the 1970s and formally articulated in the 1980s. This is a widely recognized framework for understanding human motivation, particularly the distinction between intrinsic and extrinsic motivation. At its core, SDT assumes that individual possess an innate tendency towards psychological growth, self-integration and pursuit of well-being. Central to this theory is the proposition that optimal functioning and motivation are supported when three basic psychological needs are satisfied: autonomy (the need to experience self-direction and personal endorsement), competence (the need to feel effective in one's interactions), and relatedness (the need to feel connected and significant to others) (Wang et al., 2024). By applying SDT in this study, the researcher was able to explore how Montessori practices meet these psychological needs, thereby enhancing self-directed learning behaviors in private pre-primary school learners.

### Empirical Literature Review

Understanding how classroom environments influence children's learning behaviors has been a central concern in early childhood education research. Particularly the Montessori pedagogy emphasizes a carefully prepared learning environment that fosters autonomy, exploration and intrinsic motivation. The physical and pedagogical design of Montessori classroom is believed to play a significant role in shaping children's self-directed learning behaviors. This section therefore, reviews relevant empirical studies that examine the relationship between classroom

design and self-directed learning with a focus on insights applicable to Montessori environments and similar early childhood education setting.

### **Montessori Classroom Design and the Development of Learners' Self-Directed Learning Behavior**

According to Atis-Akyol, et al. (2023), Montessori classrooms consist of mixed-age groupings spread over three years: 0-3 years, 3-6 years and 6-12 years. The materials are kept on various low shelves to allow children's accessibility and freedom. These materials are designed in such a way that in case of any mistake, children can easily identify them and make correction without the help of the teacher. The Montessori classroom must be organized and tidy offering freedom of movement and choice within clearly established limits. Research suggests that such environments support children's active engagement, exploration and mastery of skills. For example, Macià-Gual and Peñafiel (2021) conducted a qualitative study in Spain highlighting the role of the prepared environment in supporting children's creativity and critical thinking. In their study, they defined the Montessori classroom as a thoughtfully structured space that fosters learners' developmental growth.

Similarly, Zavala (2022) examined Montessori classrooms in the USA and reported that the Montessori classroom promotes academic skills, cultural awareness, and practical life development. Additionally, Saha and Adhikari (2023), in their review of Montessori education in West Bengal, India, emphasized the aesthetic appeal of classrooms and the integration of indoor-outdoor learning spaces. They pointed out that learning should not be confined only to traditional classroom walls, outdoor expand possibilities for experiential, sensory-rich and content-based learning. While in South Africa, Niekerk (2024) explored how Montessori environments support emotional and developmental needs, framing the classroom as a nurturing space aligned with Maria Montessori's philosophy.

Buldur and Gokkus (2021) in their study of the effect of Montessori education on the development of phonological awareness and print awareness postulates that in a Montessori classroom, there are all types of materials that improve the language the child acquires in the linguistic area. Also, the findings from Abiodun (2024) who examined a systematic literature review study on Montessori education and its application in Kenya showed that in Montessori

schools, the environment is intentionally prepared to encourage self-directed learning. This involves designing classrooms that are accessible, child-friendly and rich in learning materials that encourage exploration and independence.

In contrast, Modest and Mwila (2023) conducted a study in Tanzania on the early childhood Montessori pedagogy. The study aimed to explore best practices for improving the status of early childhood Montessori pedagogy in Tanzania. This study recommended that while Montessori shows great promise in enhancing early education in Tanzania, challenges like inadequate materials, uniqueness of Montessori, cultural relevance, inconsistent implementation and difficulties in teacher training create a barrier for Montessori pedagogy's success. Thus, in order to make Montessori pedagogy more effective, significant investment in these challenges will be necessary, ultimately ensuring the approach is effective and adaptable to various needs. Byemelwa (2024) suggested that Montessori pedagogy has emerged as a promising approach for Tanzanian preschool students, offering a nurturing and interactive learning environment that supports the development of critical academic, social and emotional skills. Montessori pedagogy effectively supports the development of foundational academic skills like reading, writing and arithmetic in young children.

### **METHODOLOGY**

A qualitative research approach was adopted to explore in depth the phenomenon of interest namely, how Montessori classroom design influences self directed learning behaviors among pre primary learners. Within qualitative approaches, an intrinsic case study design was employed, focusing on a bounded case in the context of private pre primary schools in Mwanza City. The target population comprised 240 individuals associated with the selected private pre primary schools (including school managers, head teachers and classroom teachers). A purposive sample of 30 participants was drawn: 3 school managers, 3 head teachers and 24 classroom teachers. These participants were selected on the basis of their role in implementing Montessori pedagogy and their direct involvement with classroom design and learner behavior. Data collection involved three complementary methods: Semi structured interviews with the 30 participants, exploring their perceptions of the classroom environment, materials, learners' autonomy

and self-directed behavior.

Classroom observations guided by an observation checklist focused on the physical layout, availability and use of manipulative, self-correcting materials, learner choice opportunities and teacher-learner interactions. Observation was accompanied by document review to supplement the information obtained from observation and interviews. Document analysis included school policy documents, curricular plans, teacher records and classroom layout plans. Data were analyzed through content analysis focused on coding themes and concepts. Interview transcripts, observation notes and document extracts were coded for themes related to autonomy, competence, choice, material use, environment and self-directed learning behaviors. Thematic mapping was undertaken to link these themes to the constructs of self-determination theory and Montessori classroom design. Findings were organized in relation to the specific objective of the study.

## RESULTS AND DISCUSSIONS

This section presents and interprets the findings of the study in relation to the research objectives and questions. The results are organized thematically to reflect key aspects of Montessori classrooms designs and their influence on development of self-directed learning behavior among young learners.

### Montessori Classroom Design Influence and Development of Self-Directed Learning Behavior in Private Pre-Primary Schools

The first objective aimed to evaluate how specific features of Montessori learning environment such as classroom arrangements, teaching approach and teacher-student interactions support or shape the ability of young learners to become more independent, motivated and responsible for their own learning activities. Data were transcribed, coded and analyzed thematically focusing on environmental factors influencing self-directed learning. The results obtained in this objective are largely viewpoints as presented by various participants, which have been created and assembled under intelligible themes without diluting the views and ideas of the participants.

#### Thoughtfully Prepared Classroom

Montessori classrooms were intentionally arranged to allow learners to freely access materials. Interviews and document data emphasized that physical environment is central to developing learners' independence. Most participants highlighted the importance of a well-prepared environment that fostered autonomy and

exploration. During interview sessions, one respondent emphasized the importance of the physical and aesthetic features of the Montessori classroom stating:

“A Montessori class should be spacious, with attractive colours, clean learning materials and low windows that allow the child to easily look outside. It should also have various educational pictures” (Interviewee-A, July 9, 2025).

This statement reflects a deeper understanding of Montessori's belief that the environment serves as a “third teacher”. It is not only about material accessibility but also about creating a space that is emotionally calming, aesthetically appealing and sensorially enriching. According to Macià-Gual and Peñafiel (2020), children may develop their talents without obstacles when placed in a prepared, stimulating atmosphere, which enables them to reach greater goals. The study suggests that creating a rich, sensory-friendly and emotionally safe environment is crucial for supporting self-directed learning in early childhood. Thus, education stakeholders particularly school administrators and curriculum planners should recognize the physical classroom structure as an instructional tool. Meanwhile, classrooms should be intentionally designed to be attractive, accessible and orderly to enhance independent learning. Teacher training should also include modules on classroom design and maintenance as a pedagogical strategy.

#### Guidance Not Instructions

The findings from interviews indicated that within Montessori classrooms in the visited schools, teachers reported minimal intervention in learners' tasks, instead careful observation and subtle guidance were emphasized. The findings indicate that Montessori teachers, often called “guides” observe more than they directly instruct as reported by one of the respondents that:

“My role is to guide. I observe what each child needs and I only step in when they are stuck or request for help” Interviewee A, July 10, 2025. Another participant was noted saying that “We allow children to choose their tasks and we guide rather than instruct, which encourages self-management” (Interview B, July 10, 2025)

This shows that teachers see themselves as facilitators of learning rather than direct instructors, emphasizing the importance of observing and understanding each child's individual needs. By allowing children to choose their tasks and only intervening when necessary, educators foster independence, self-management, and

confidence in learners. This approach supports a child-centered philosophy where the teacher's role is to guide and support rather than control the learning process. Therefore, shifting the teacher's role from instructor to observer enhance student independence and encourage intrinsic motivation. This aligns with Niekerk (2024) who highlights Maria Montessori's belief that the primary purpose of education is to nurture personal development and equip children with the skills necessary to adapt to and thrive in their environment.

### **Mixed-Age Grouping**

The results demonstrated that classrooms were composed of children across a three-year age span, allowing younger learners to learn from older ones and older learners to reinforce knowledge by helping peers. Several teachers observed that mixed-age classrooms support learning and the development of leadership skills as noted from one respondent saying:

Sometimes, older children help the younger ones to maintain order and encourage responsibility and leadership skills. It builds leadership in them and independence in the younger ones. This peer interaction creates a supportive learning environment where children learn from one another. It also nurtures empathy, patience, and a sense of accountability among the older students (Interviewee C, July 12, 2025).

This findings indicate that involving older children in supporting younger ones is a deliberate strategy to foster leadership and responsibility. It creates a collaborative learning environment where children learn social skills and accountability through peer interactions. Additionally, it promotes independence in younger learners by allowing them to model behavior and practices from their older peers. This aligns with Qadafi et al. (2023) who said, Montessori classrooms exhibit significant autonomy in daily activities. Teachers facilitate this independence by preparing a structured environment with age-appropriate materials and minimal direct intervention.

### **Calm and Orderly Atmosphere**

Montessori classrooms were reported to have a calm atmosphere, structured routines and clear expectations which helped children's focus as reported,

"There is calmness in the classrooms. Children are deeply engaged in their chosen activities. There is no shouting or running around" (Interviewee-B, July 10, 2025).

In addition, during an observation session, the researcher noted that pupils moved quietly, engaged in their tasks independently and return materials after use without being reminded or guided. A peaceful and well-ordered environment contributed to concentration and self-discipline, both key traits of self-directed learning. This situation was identified by Gasco-Txabarri and Zuazagoitia (2022) who affirmed that by recognizing students' interests and needs, allowing for personal choice and fostering self-directed, active and independent learning, Montessori approach promotes comprehension and helps develop self-discipline among learners. The calm and focused environment indicates a high level of self-regulation where pupils demonstrated control over their attention and behavior engaging in learning activities with sustained concentration. Oswaru and Ebohon (2024) highlight the importance of creating effective teacher training programs that equip educators with both educational and pedagogical knowledge. They emphasize the significance of fostering a safe and encouraging learning environment where children can freely pursue their interests without excessive pressure, supporting autonomy and intrinsic motivation. Furthermore, calmness reduces stress and overstimulation allowing children to focus more deeply and make thoughtful decisions which are key features in self-directed learners. As Montessori argued, "Order is one of the needs of life which when it is satisfied, produces a real happiness" (Frierson, 2021). The structured yet flexible classroom environments observed in Montessori settings promote children's autonomy by enabling free access to learning materials and encouraging independent work. The evidence from this study aligns with cross-cultural findings indicating that Montessori's effectiveness is not bound by geography but by fidelity to its principles.

### **Intrinsic Motivation and Engagement**

This theme captured how the Montessori learning environment fosters children's internal drive to learn, explore and engage in tasks without external rewards. It reflects the degree to which learners demonstrated ownership over their learning, sustained interest and enthusiasms all of which are critical to self-directed learning trait. The findings showed that Montessori classrooms were designed to stimulate curiosity and

intrinsic motivation. This was clearly observed in the field whereby children appeared focused, observed in tasks and proud when accomplished a certain task. There was minimal use of extrinsic rewards. Teachers highlighted how interest-based learning sustain motivation as one of the interviewee stated that:

“She loves the bead materials, once she starts counting, she never stops until she finishes counting to 1000. This shows her deep concentration and intrinsic motivation when engaged with hands-on materials. The repetitive, tactile nature of the beads helps reinforce her understanding of number sequences and place value. It also highlights how concrete materials can spark a child’s interest and support sustained focus and mathematical development. Such engagement promotes independence, as the child is able to work through the material without constant guidance. It reflects how well-prepared materials can nurture a love for learning and build foundational skills in a meaningful, self-directed way (Interviewee A, July 10, 2025).

This indicates that Montessori’s interest-driven learning structure fosters intrinsic motivation, a key driver of self-directed learning behavior. The classroom environment was described as peaceful, structured, and conducive to concentration. This implies that a calm and well-organized setting enhances children’s ability to focus and engage deeply with their interests, ultimately supporting their independence and effective learning. This aligns with Byemelwa (2024), who emphasizes that nurturing a well-structured environments promote critical academic and emotional growth. Abiodun (2024) highlights that accessible, child-friendly, and orderly classrooms encourage exploration and autonomy, further supporting intrinsic motivation.

## CONCLUSION AND RECOMMENDATIONS

This study evaluated the influence of Montessori classroom design on learners’ self-directed learning behavior in private pre-primary schools in Mwanza City, using the lens of self-determination theory. Based on the study’s findings, it is evidenced that a well-prepared Montessori environment with accessible manipulative, choice opportunities, orderly layout, and a facilitative teacher role significantly contributes to the development of learner autonomy, competence, relatedness and intrinsic motivation. In turn, these motivational conditions underpin self-directed learning behaviors

among young children, including initiative, problem-solving, self correction and responsibility. The study’s conclusion and findings led to the following suggestions. The pre-primary schools should adopt Montessori-inspired classroom designs that promote self-directed learning by creating child-centered, well-organized and aesthetically appealing environments. Additionally, training programs should emphasize the role of the teacher as facilitator rather than director, focus on creating for learners the conditions of autonomy, competence and relatedness, and support children’s self directed behaviors through appropriate scaffolding and gradual release of responsibility.

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