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ARCHITECTURAL INNOVATION AND EDUCATIONAL PHILOSOPHY IN EARLY CHILDHOOD EDUCATION AND CARE: THE CASE OF FUJI KINDERGARTEN IN JAPAN

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Abstract

This case study explores Fuji Kindergarten, located in Tachikawa City, Tokyo, Japan, renowned for its innovative architecture and design. Rooted in Montessori philosophy, the kindergarten emphasizes free play, children's connection with nature, and autonomy. Designed by architects Takaharu and Yui Tezuka, the building features a distinctive circular layout, offering a 360-degree experience when standing at the center of the grassy playground. This paper examines Fuji Kindergarten's unique architectural features, its educational principles in alignment with

Montessori education, and its broader implications for early childhood education. The success of Fuji Kindergarten not only challenges traditional educational practices but also introduces a new paradigm for integrating architectural innovation with child-centered pedagogies. By blending traditional Japanese architecture with contemporary educational philosophies, it demonstrates how thoughtful design can significantly impact young children's developmental outcomes and educational experiences. This study highlights the importance of creating educational environments that align with pedagogical goals, fostering spaces that support the holistic development of children.

Keywords

Fuji Kindergarten, Innovative Design, Montessori Philosophy, Architecture Pedagogy, Early Childhood Education and Care, Holistic Development

1. Introduction

The global focus on lifelong learning has highlighted the importance of early childhood education and integrated approaches to education and care, as well as effective strategies for addressing the needs of young individuals (Cohen, 2010). Children spend the vast majority of their days at kindergarten, school or in other learning environments and the physical environment of educational institutions greatly impacts the learning experiences of children, especially in early childhood education and care (Şahin et al., 2011). Therefore, we must consider how these places and spaces can best foster inclusive approaches to education where all children can learn together and what roles the learning environments (can) play in encouraging self-regulated learning in the long run (Cohen, 2010).

In most OECD countries, the majority of children participate in early childhood education one year before the start of primary education. In Japan, 98% of children in this age group are enrolled, compared with an OECD average of 96% (OECD, 2024). As of 2022, Japan had around 9,111 kindergartens in operation, predominantly private institutions. Although preschool education is not mandatory in Japan, parents are encouraged to register their children in these facilities. In 2022, 923,295 children attended kindergartens, 87.43% attended private kindergartens (MEXT, 2022).

Some local architects have a vested interest in engaging in a dialogue with stakeholders in early childhood education and care about pressing questions on how innovative approaches to spaces can best serve children's and educators' goals and needs. A remarkable result of such a collaboration is Fuji Kindergarten in Tokyo, Japan, which exemplifies how inspiring architecture can enhance and align with educational theories, prioritizing child-initiated learning. Being the first milestone of an overarching cross-cultural research project, this exploratory paper examines the architectural features of Fuji Kindergarten, and its educational philosophy based on Montessori principles, and investigates its broader influences on early childhood education and care in general. The importance of the physical environment has been recognized in various fields such as health (e.g., Nordin & Elf, 2019), business (e.g., McGuire, 2024) and architecture (e.g., Bungi & Smith, 2002). This is also true in education where spaces designed with children's needs in mind have been known to significantly enhance learning outcomes (e.g., Şahin et al., 2011). Fuji Kindergarten, with its unique construction, pushes the boundaries of conventional educational architecture, creating an environment that goes beyond norms based on the developmental needs

of children. This study argues that innovative designs that address the well-being and intrinsic drives of children, should be considered in future educational reforms, particularly in the context of early childhood education and care.

1.1 Aims

There is little emphasis in public awareness or in the literature on the contribution of architecture to children's education, its links with children's development or on the intersection of these two fields. The aim of this paper is to draw attention to the importance of this interplay, and to show, through the case of Fuji kindergarten, the important links between the construction of a physical environment along a specific pedagogical concept and its potential in child development.

2. Methodology

For the purposes of the study, we employed an unstructured interview (Fontana & Frey, 2005) with the principal of Fuji Kindergarten and conducted a semi-structured observation during a site visit in July and November, 2024. The semi-structured observation protocol included two sections: (1) the kindergarten context (e.g. the description of the physical, material, and human resources in the institution and classroom configuration) and (2) the learning experiences, which includes the specific curriculum and instruction experienced by the children. The unstructured interviews were a natural extension of the observation, since we relied on the spontaneous generation of questions in the natural flow of an interaction (Patton, 2002). Additionally, we reviewed the publicly available information about the kindergarten from books the principal has published (e.g., Kato, 2016), on the institution's website (educational policy, the building and facilities etc.) and on the internet (the architects' webpage, TED talk etc.).

3. Fuji Kindergarten

3.1 The Educational Goals and Learning Environment in the Japanese National Curriculum Standard for Kindergartens

In Japan, kindergarten education is governed by the National Curriculum Standard for Kindergartens (MEXT, 2017). The aim of the Japanese education – similarly to other education systems – is to fully develop the individual character and to cultivate individuals that are sound in mind and body and imbued with the qualities necessary in the people who make up a peaceful and democratic nation and society (MEXT, 2017). The document also stipulates that to promote early

childhood education the national and local governments have to provide an environment that is favorable to the healthy growth of young children. Kindergarten teachers are encouraged to "create a learning environment with the intention of ensuring that children participate in voluntary activities based on an understanding and anticipation of the individual actions of each child. Teachers should therefore create a physical and psychological environment that recognizes the importance of the relationship between the child and other people and things through the creative use of various teaching aids" (MEXT, 2017, p. 3). The Curriculum Standard also describes the expectations from the ideally developed child by the end of kindergarten education. Based on this, the ideal school-ready child is equipped with the following qualities and abilities: (1) *Sound mind and body*, (2) *Independence*, (3) *Cooperativity*, (4) *Fostering of morality and normative consciousness*, (5) *Social participation*, (6) *Fostering of thinking abilities*, (7) *Connection to nature and respect for life*, (8*) Interests in and sensitivity to quantity, figures, signs and letters*, etc., (9) *Mutual verbal communication*, and (10) *Rich sensitivity and expression*. It is stressed again that an appropriate environment should be created to achieve the specific aims and to enable children to gain the experiences they need by developing various activities through their individual proactive interaction with the environment. Importance should be placed on the aspects of life and the imagination of children, and this environment should be appropriately maintained at all times (MEXT, 2017, p. 8).

The 'Content' lists the points to be taught to achieve the above-mentioned aims. Each area sums up and describes the aspects of a child's development: *health* (physical and mental health); *interpersonal relationships* (the relationship between the child and other people); *environment* (the children's surroundings and relationship to them); *language* (the process of language acquisition); and *expression* (feelings and expression) (MEXT, 2017, p.12). The role and relevance of the physical environment and the space where education takes place is mirrored in the health and environment sections. The explicit promotion of health involves moving one's body sufficiently through various kinds of play, playing outdoors willingly, understanding the way of life in kindergarten and recognizing the consequences of their actions while organizing the kindergarten living space without adult assistance and knowledge of where danger lies, what dangerous play is, and how to act in case of disasters, as well as to take action with regard to safety (MEXT, 2017, pp. 12-13). In terms of the environment, the national curriculum standard specifies that kindergartens should facilitate contact with various things in children's lives and the

development of an interest in and curiosity about their nature and organization. Kindergartens should also promote the development and incorporation of an interest in things surrounding children, such as nature and play equipment, and help children think about creative ways to make the best use of them (MEXT, 2017, p. 16).

3.2 Architectural Construction

A notable feature of Fuji Kindergarten is its oval-shaped, and open-plan structure. The playground is situated in the center, which is enclosed by classrooms with sliding doors. The doors all have windows, so children playing in the playground can be easily detected by people in the classrooms. There is also a playground on the roof and children playing on the top are visible from adults in the classrooms since room ceilings are low. The circular playground on the roof encourages children's physical activity. There are irregular windows, chimneys, and trees for climbing above, fostering environmental exploration, human interaction, and autonomy, which relate with the Montessori method (Lippman, 2010). Its structure and layout are carefully planned, enhancing the sensory experiences of children, in-line with the emphasis on environmental preparation which supports the holistic development of children (Saha & Adhikari, 2023). Within the classroom, natural materials such as wood and glass are also used, creating an inviting, warm atmosphere and cultivating a profound bond between children and their surroundings. Wooden bookshelves, not high walls, are used to divide classrooms when necessary, and gliding doors without height difference are used to separate the outside from the inside (Kato, 2016).

The kindergarten is a fluid space where indoor and outdoor activities appear to seamlessly blend, which encourages children's spontaneous and deep connection to the natural world. In Montessori classrooms, it is said that natural materials and links to the outdoors are integral features in a learning environment. Similarly, the large sliding doors at Fuji Kindergarten blur the line between inside and out, and large windows on the sides and ceilings provide ample natural light to the structure (Kato, 2016). These elements cultivate environmental awareness and provide sensory experiences that are vital for the development of young children (Stadler-Altmann, 2021). The presence of natural elements within the school environment has been shown to reduce stress levels, improve concentration, and enhance overall well-being in children. Fuji Kindergarten's design serves as a reminder of the importance of maintaining a strong connection to the natural environment in early childhood education and care (Figure 1).

Figure 1: *Example of Natural Elements Within Fuji Kindergarten's School Environment*

3.2.1 Circular Outline

Fuji Kindergarten's circular outline produces a sense of openness and community (Figure 2). Although Takaharu Tezuka was the mastermind behind the building's unique design, it was Kashiwa Sato, a well-known creative director who has worked with world-famous companies such as Uniqlo and Seven-Eleven, and principal Sekiichi Kato, who envisioned the concept (Kato, 2016). The configuration follows the Montessori principles of placing children in the center of learning, with spaces encouraging free movement and choices (Gentaz & Richards, 2022). In both Fuji Kindergarten and Montessori settings, the absence of rigid boundaries allows for the emergence of children's natural curiosity, making them explore and learn at their own pace (Fattizzo & Vania, 2021). Additionally, the circular layout of the school promotes a sense of equality as the round design naturally discourages the formation of hierarchical relationships that are often reinforced by traditional classroom settings (Smith, 2017). The uninterrupted flow of space also facilitates greater interaction between children and teachers, enhancing the collaborative nature of the learning process (Kato, 2016). This design choice not only reflects a philosophical commitment to child-centered learning but also aligns with research suggesting that open, flexible spaces can enhance creativity and social development in young children (Gandini et al., 2005). The design of Fuji Kindergarten also reflects an understanding of children's needs at this developmental stage, providing them with a stimulating and nurturing environment. It fosters a sense of curiosity and wonder that is essential for lifelong learning by creating a space rich in sensory experiences and responsive to the needs of children.

Figure 2: *Circular Outline of Fuji Kindergarten*

3.2.2 Roof Playground

The roof playground at Fuji Kindergarten serves as a key feature that promotes physical movement, a concept deeply rooted in Montessori education, which recognizes the importance of physical activity in the development of motor skills and cognitive functions (Pate et al., 2014). The continuous playground provides children with the freedom to engage in self-directed learning, allowing children to choose activities that interest them and suit their needs (Grava & Pole, 2021). The integration of this playground into the overall architectural design of the school reiterates the significance of physical activity in the daily lives of young children. Research has shown that regular exercise is not only essential for physical health but also plays a critical role in cognitive development, emotional regulation, and social interaction (Hillman et al., 2008). By providing a space where children can freely explore and engage in physical play, Fuji Kindergarten effectively supports the holistic development of its children, aligning with both Montessori principles and contemporary research in child development (Figure 3).

Figure 3: *Fuji Kindergarten's Roof Playground*

3.2.3 Integration with Nature

One of the central aspects of Fuji Kindergarten's design is its integration with the natural environment with an emphasis placed on the natural world as a crucial element of learning (Summers et al., 2019). In Montessori classrooms, natural materials and a connection to the outdoors are integral to the learning environment. Similarly, as mentioned before, Fuji Kindergarten features large doors that glide. These blur the line between indoor and outdoor spaces, trees growing through the structure, and ample natural light (Kato, 2016). The elements foster environmental awareness and provide sensory experiences that are vital for the development of young children (Stadler-Altmann, 2021). The presence of natural elements within the school environment has been shown to reduce stress levels, improve concentration, and enhance the overall health of children. By creating a seamless transition between the interior and exterior environments, Fuji Kindergarten not only supports the physical and cognitive development of children but also instills in them a deep appreciation for nature. This connection to the natural world is particularly important in today's increasingly urbanized societies, where children often have limited opportunities to engage with the outdoors. Fuji Kindergarten's design serves as a powerful reminder of the importance of maintaining a strong connection to the environment at this developmental stage (Figure 4).

Figure 4: *Example of Fuji Kindergarten's Integration with Nature*

3.3 Educational Philosophy

Teachers at Fuji Kindergarten act as facilitators, like Montessori guides, constructing a learning platform that encourages self-directed, individualized learning. Seikichi Kato's emphasis on cultivating independence and self-motivation among children reflects a broader educational trend towards personalized investigation, where the needs and interests of each child are placed at the center of the educational experience. This approach not only enhances academic outcomes but also supports the development of essential life skills such as solving problems, thinking critically, and understanding others' emotions (Kato, 2016). It assists children to develop a lifelong love of learning, preparing them to navigate the complexities of the modern world with confidence and resilience.

3.3.1 Autonomy Encouragement

Autonomy is foundational in Montessori education, where children are encouraged to take responsibility for their own learning in a prepared environment (Lillard, 2021). At Fuji Kindergarten, children are supported to take ownership of their education. In doing so, children develop a sense of self-efficacy and agency, which are crucial to succeed in both academic and personal pursuits (Kato, 2016). The school's constructional design also allows for a high degree of freedom, enabling children to interact with the environment in techniques that are beneficial and meaningful for their individual learning styles. The importance of autonomy aligns with contemporary educational research as well, which stresses the importance of student-centered learning (Ryan & Deci, 2017; Slemp et al., 2024), and also reflects broader societal changes towards a wider range of individualization and self-direction. Fuji Kindergarten's strategy to foster

autonomy serves as a powerful model for how educational institutions can design environments which support the development of confident, self-directed learners.

3.3.2 Educator as Facilitator

In both Montessori education and Fuji Kindergarten, the role of the educator is to facilitate learning rather than to direct it (Garcia, 2023). Teachers watch over the children providing guidance when necessary, allowing the children to take control of their own learning. This approach encourages self-discipline, independence, and a love of learning (Epstein, 2015). The role of the educator at Fuji Kindergarten is also shaped by the school's architectural design, which promotes interaction and collaboration between children and teachers. By creating an open, flexible environment, the design of the school allows teachers to move freely throughout the space, observing and interacting with children in a more organic and responsive manner. This approach not only enhances the learning experience for children but also empowers teachers to take on a more dynamic and supportive role in the classroom. The emphasis on the educator as a facilitator rather than an instructor also reflects broader trends in education towards more personalized and student-centered learning models. Fuji Kindergarten's approach to the role of the educator offers valuable insights for how educational spaces can be designed to support more effective and engaging teaching practices (Kato, 2016).

4. Conclusion

This paper examined Fuji Kindergarten in Japan, which exemplifies the powerful synergy between architecture and educational philosophy, particularly through its alignment with Montessori education. In this paper, we presented our initial results from a data collection that took place in summer and autumn 2024 with the aim of drawing attention to the importance of the learning environment and space in education and more specifically, in early childhood education. Our findings show that the kindergarten is not only aligned with the national curriculum standards in terms of educational philosophy and principles but also provides an excellent ground for promoting children's mental and physical health and their relation to their environment. By employing innovative architecture through its oval shape and roof playground, it provides children with an environment rich in nature that supports their developmental needs both physically, emotionally and intellectually. This allows children to self-direct their learning and unleash their creativity.

As the field of early childhood education and care continues to evolve, Fuji Kindergarten serves as a model for the design of future educational architecture that supports the holistic development of children. It serves as a reminder of the critical role that physical space can play in shaping children's learning experiences and outcomes. By challenging traditional ideas of classroom design and incorporating elements of Montessori philosophy as Fuji Kindergarten does, it is implied that other institutions may also be able to create more child-centered structures offering a new paradigm for the design of educational spaces in other early childhood education and care settings.

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