

THEORETICAL FOUNDATIONS OF CHILDREN'S EMOTIONAL INTELLIGENCE (EI) AND ITS RELATIONSHIP WITH THE ARCHITECTURE OF PUBLIC KINDERGARTENS IN HO CHI MINH CITY

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Abstract - Development, shaping children's learning, behavior, and social interactions. This paper establishes a theoretical framework linking preschool children's EI with kindergarten architectural design. In response to the growing emphasis on holistic education in Ho Chi Minh City (HCMC), the study synthesizes key EI theories (Mayer & Salovey; Goleman) and educational architecture principles. The proposed framework suggests that the physical environment of public kindergartens - including spatial layout, landscape, color, natural lighting, and functional spaces - can directly and indirectly influence four core EI components: Perceiving, Understanding, Managing, and Using Emotions. Based on these findings, the paper provides theoretical guidance for designing and renovating kindergarten environments that better support children's emotional development. The proposed framework contributes to integrating educational psychology and architectural design, thereby promoting higher-quality, child-centered early childhood education.

Key words - Emotional Intelligence; kindergarten architecture; early childhood education; preschool children; Ho Chi Minh City.

1. Introduction

Early childhood education is widely recognized as a foundational stage in human development, during which children begin to form essential cognitive, emotional, and social capacities. In recent years, the concept of Emotional Intelligence (EI) has attracted increasing attention in the fields of education and developmental psychology.

According to the theoretical framework proposed by Peter Salovey and John D. Mayer, EI refers to the ability to perceive, understand, and regulate one's own emotions as well as those of others, in ways that guide thinking and social behavior [1].

Within early childhood education settings, EI plays a critical role in several key domains: (1) social communication skills, (2) self-confidence and adaptability, and (3) long-term learning outcomes. Empirical studies indicate that fostering EI during early developmental stages enhances children's ability to cooperate, resolve conflicts, and establish positive interpersonal relationships [2].

Beyond educational practices and family influences, the physical environment of schools also exerts a significant impact on children's behavior and emotional well-being. Research in early childhood educational architecture suggests that design elements such as natural lighting, color schemes, materials, play spaces, and access to nature can directly influence children's emotional states and social interactions [3].

In the context of rapid urbanization in HCMC, the public kindergarten system faces numerous challenges, including high building density, limited land availability, and a shortage of green spaces. These constraints may adversely affect the quality of the learning environment and children's emotional experiences.

Therefore, investigating the relationship between kindergarten architecture and children's EI is of significant importance for improving the quality of educational environments in rapidly developing urban contexts. And, this study aims to:

- Establish a theoretical foundation of EI in preschool children;
- Identify architectural factors influencing EI;
- Propose an integrated conceptual framework linking architecture and EI.

2. Research Methodology

This study employs a qualitative research approach, using a systematic literature review combined with theoretical synthesis to establish a scientific foundation for the relationship between children's EI and the architecture of public kindergartens in HCMC.

Research data were collected from academic journal articles, scholarly books, and empirical studies in the fields of developmental psychology, environmental psychology, educational architecture, and early childhood education from databases such as Scopus, ScienceDirect, Springer, and Google Scholar. The selected literature mainly covered the period from 2000 to 2025 using keywords including "preschool architecture", "EI", "learning environment", and "child-centered design".

Through content analysis, the study synthesized and compared environmental factors frequently identified in previous studies, thereby determining 12 architectural factors (AR1-AR12) influencing children's emotional development and social behavior. These factors include spatial organization, natural lighting, green spaces, colors, materials, and interactive spaces.

Based on Bronfenbrenner's Ecological Systems Theory [4], Vygotsky's Sociocultural Theory [5], and Erikson's Psychosocial Development Theory [6], the study proposes that the architectural environment affects children's EI through emotional safety, emotional regulation, and the promotion of social interaction.

These methods were employed to quantify the relationship between architectural environmental factors and children's EI indicators.

3. Theoretical foundations

3.1. Conceptual Foundations of EI in Early Childhood

EI has been widely conceptualized as a set of abilities related to the perception, understanding, regulation, and utilization of emotions in oneself and others. According to Peter Salovey and John D. Mayer [7], EI encompasses the capacity to monitor and discriminate among emotions and to use this information to guide thinking and actions. Later, Daniel Goleman [8] expanded this framework by emphasizing its role in motivation, empathy, and social skills.



Figure 1. Key areas in the science of EI

Source: [8]

- **Self-awareness:** Accurately recognize emotions and thoughts, evaluate strengths and weaknesses, have confidence and optimism.

- **Self-control:** Manage emotions, thoughts, and behaviors, control stress and impulses, and motivate yourself.

- **Social awareness:** Empathize, understand social norms, recognize sources of support from family and community.

- **Relationship management skills:** Establish and maintain healthy relationships, effective communication, cooperation, and conflict resolution.

- **Make responsible decisions:** Choose appropriate behavior, considering ethical standards, safety, and benefits for yourself and society.

In early childhood, EI is often framed within the broader construct of social-emotional competence, which includes emotional awareness, emotional regulation, empathy, and interpersonal skills. Developmental psychology research indicates that these competencies emerge rapidly during the preschool years and are strongly influenced by environmental stimuli and social interactions. Importantly, emotional processes are not independent of cognition; rather, they are integral to attention, memory, and problem-solving processes, making EI a foundational component of early learning and development.

3.2. The Role of EI in Early Childhood Education

A growing body of research highlights the critical role of EI in shaping children's academic readiness, behavioral adjustment, and long-term social outcomes. Children with well-developed emotional competencies

demonstrate higher levels of self-regulation, improved peer relationships, and greater engagement in learning activities [3].

Studies in early childhood education consistently argue that effective learning cannot be separated from emotional development. Emotional regulation, for instance, enables children to manage frustration and sustain attention, while empathy and social skills facilitate collaborative learning and positive classroom interactions. Consequently, educational environments - particularly in preschool settings - must be designed not only to support cognitive development but also to foster emotional and social growth [9].

3.3. Environment-Behavior Theory and Spatial Influence on Emotional Development

The relationship between the environment and children's development has been explained through several important psychological and educational theories, particularly Bronfenbrenner's Ecological Systems Theory, Vygotsky's Sociocultural Theory, and Erikson's Psychosocial Development Theory. These theories emphasize that child development is influenced not only by individual characteristics but also by the surrounding living and learning environments [4], [5].

According to Bronfenbrenner [4], children develop within an ecological system consisting of multiple interconnected environmental layers, including family, school, and community. Among these, the environments closest to children, such as home and school, have the most direct influence on their behavior, emotions, and social abilities. This theory highlights that the quality of the educational environment, including both physical space and social relationships, plays a significant role in shaping children's personality and emotional competencies.

In addition, Vygotsky [5] argued that children's cognitive and emotional development is formed through social interaction. Children learn through communication with teachers, parents, and peers during daily learning and play activities. Therefore, preschool environments should encourage interaction, collaboration, and experiential learning in order to foster EI and social skills.

According to Erikson [6], preschool children are in developmental stages related to autonomy and initiative formation. When the learning environment provides safety, encourages exploration, and supports self-expression, children are more likely to develop self-confidence, communication skills, and positive emotional regulation. Conversely, stressful or unsupportive environments may increase anxiety and negative behavioral responses.

In preschool education, the environment can generally be divided into two major categories: the physical environment and the social environment. The physical environment includes classroom space, natural lighting, colors, materials, acoustics, and spatial organization. Previous studies have shown that natural lighting, open spaces, and child-friendly materials contribute positively to children's emotional well-being, concentration, and psychological comfort [9]. In contrast, overcrowded

classrooms, poor ventilation, and excessive noise may negatively affect children's emotional regulation and social behavior.

The social environment includes teacher–child and peer interactions during learning and play activities. Teachers play an important role in guiding children's emotions and supporting them in expressing and regulating emotions as well as developing communication skills. Collaborative activities and interactive learning spaces also help children develop empathy, cooperation, and conflict-resolution abilities [10].

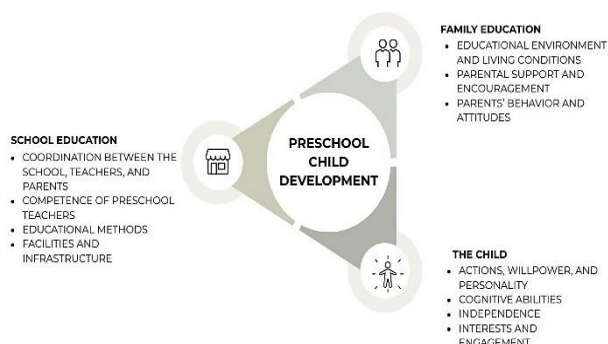
The relationship between physical environment and human behavior has been extensively examined in the field of environmental psychology. The environment–behavior theory posits that spatial conditions influence psychological states and behavioral responses, particularly in young children who are highly sensitive to environmental stimuli [11].

From this perspective, architectural space functions as more than a passive backdrop; it acts as an active mediator of emotional experience. Environmental attributes such as spatial configuration, sensory stimuli, and accessibility directly affect children's mood, stress levels, and patterns of interaction. In early childhood settings, where learning is largely experiential, the built environment plays a decisive role in shaping daily emotional experiences [12].

Therefore, developmental theories consistently confirm that the preschool environment has a comprehensive influence on children's EI, behavior, and social skills. This provides an important theoretical foundation for examining the relationship between public kindergarten architecture and children's EI development in the urban context of HCMC.

3.4. Ecosystem of Factors Influencing Early Childhood Development

This figure illustrates a tripod model, emphasizing that early childhood development is not an isolated process but is fundamentally shaped by the interaction of three primary pillars: School Education, Family Education, and the Child. Comprehensive development can only be achieved when these three pillars operate coherently, interactively, and in mutual reinforcement, forming an integrated developmental system that supports the growth of children's EI.



(1) School Education

School represents the formal institutional environment where children acquire knowledge and engage in social interactions beyond the family context. Key components include:

Facilities and Infrastructure: This factor directly corresponds to the concept of the Architectural Environment (AR) discussed in previous figures. The quality of spatial design, classroom layout, lighting, ventilation, and outdoor play areas significantly influences children's emotional experiences and behavioral responses.

Educational Methods: The pedagogical approaches used to deliver knowledge and foster skills, particularly those encouraging emotional awareness, social interaction, and experiential learning.

Competence of Preschool Teachers: Teachers' pedagogical skills, emotional sensitivity, and capacity for empathy play a critical role in shaping children's EI.

School–Family–Teacher Collaboration: Effective coordination among schools, teachers, and parents ensures consistency in developmental goals and enhances children's emotional and social outcomes.

(2) Family Education

The family serves as the foundational context for personality formation and early emotional development:

Educational Environment and Living Conditions: The quality of the home environment, including spatial conditions and comfort, influences children's psychological well-being and emotional stability.

Parental Support and Encouragement: Positive reinforcement and emotional support foster children's confidence, motivation, and resilience.

Parents' Behavior and Attitudes: Young children primarily learn through observation; thus, parental behavior strongly shapes emotional regulation, empathy, and social conduct.

(3) The Child

In addition to external influences, intrinsic characteristics determine how children perceive and respond to their environment:

Actions, Willpower, and Personality: Individual psychological traits that form the basis of personal identity and behavioral patterns.

Cognitive Abilities: The capacity to understand, process, and interpret the surrounding world.

Independence: The ability to perform age-appropriate tasks autonomously, reflecting both cognitive and emotional maturity.

Interests and Engagement: The degree of active participation in learning and play activities, which directly affects experiential development.

3.5. Architectural elements of preschools affect children's emotions and behavior

• **Architectural works:** The layout of building blocks greatly affects the operation of architectural spaces. The

Figure 2. Ecosystem of Factors Influencing Early Childhood Development – Source: [4], [6], [8], [10]

distance and size of the building determine the connection between spaces. The building and play spaces must be arranged in harmony to have connection with each other to ensure the normal operation of functions. The proportions of the building's shapes must be beautiful and reasonable, contributing to increasing the overall aesthetics. The building's architecture must be suitable for preschool age groups. Funny and cheerful images will have a good impact on children, creating an attraction and desire for children to go to school.

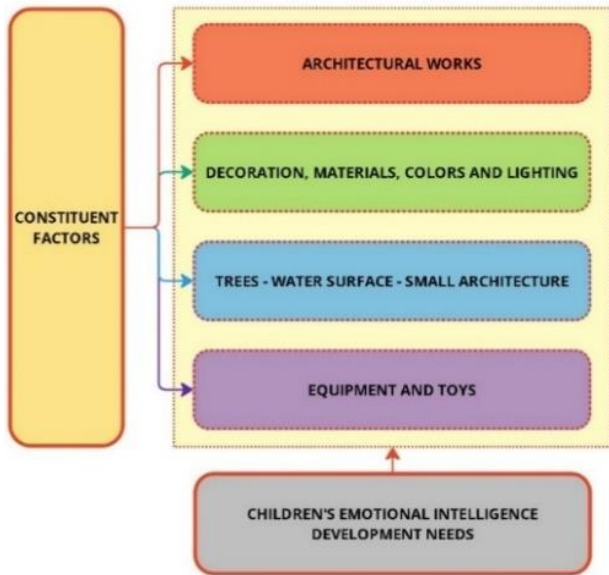


Figure 3. Architectural elements of preschools influenced by EI

Source: [3], [13]

• **Decoration, materials, colors and lighting:**

Decorations, materials, colors and lighting play an important role in organizing the architectural play-learning space for children. Materials must be lively according to each space, especially ensuring safety for children when playing. Light must be enough to provide the interior spaces and colors help reflect light, creating aesthetic effects that are beneficial for children's visual development.

• **Trees - water surface - small architecture:** Trees in the garden provide shade, repel insects, create fragrance and produce beautiful flowers. Trees also contribute to increasing the overall aesthetic of the project. Grass in the garden or in each area not only has the effect of creating scenery but also cleaning and avoiding dust for the project. Small structures (rest huts, sculptures, etc.) will contribute to increasing the quality of the play space. Water surfaces, fountains, and small lakes will create cool air, while also increasing aesthetics, creating a beautiful scene.

• **Equipment and toys:** Equipment in preschools must be highly safe, synchronous, neat and convenient for children to play and study, and must be suitable for the characteristics of each age group. At the same time, the equipment is not complicated for easy monitoring of care and cleaning. Toys and other equipment used for children must be beautiful in shape, balanced, and unique to help with aesthetic education.

4. Architectural Determinants of EI in Preschool Settings

Recent interdisciplinary research has increasingly focused on how architectural design influences children's emotional and social development. Several key spatial factors have been identified:

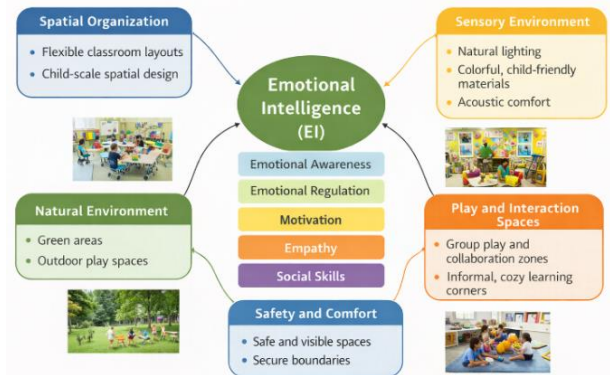


Figure 4. Spatial factors influencing EI in public kindergartens environments

Source: [4] - [6], [9] - [12]

(1) Spatial Organization

Flexible and child-scaled spatial arrangements allow children to exercise autonomy, make choices, and engage in diverse activities. Such environments promote self-regulation and intrinsic motivation by enabling children to control their interactions with space.

(2) Sensory Environment

Lighting, color, materiality, and acoustics significantly influence children's emotional states. Natural lighting has been associated with reduced stress and improved mood, while excessive noise or poor visual conditions may lead to overstimulation and behavioral difficulties.

(3) Natural Environment

The integration of green spaces and outdoor play areas aligns with biophilic design principles, which suggest that human well-being is enhanced through contact with nature. Exposure to natural elements has been shown to reduce anxiety, improve emotional regulation, and foster positive social interactions.

(4) Play and Interaction Spaces

Spaces designed for group play and informal interaction support the development of empathy, communication skills, and cooperative behavior. The spatial configuration of these areas determines the frequency and quality of peer interactions, thereby shaping social competence.

(5) Safety and Comfort

A sense of physical and psychological safety is a prerequisite for emotional development. Clearly defined boundaries, visual supervision, and ergonomic design contribute to children's sense of security, enabling them to explore and engage confidently with their environment.

Collectively, these architectural factors influence EI indirectly through three primary mechanisms: sensory regulation, behavioral structuring, and social facilitation.

5. Detailed Analysis of the Interaction Cycle between Architectural Environment and Children's EI

The figure presents a closed-loop conceptual model that illustrates the multi-layered relationships between the architectural environment, children's behavioral experiences, and the development of EI in early childhood education settings. This process can be systematically analyzed through four main stages:

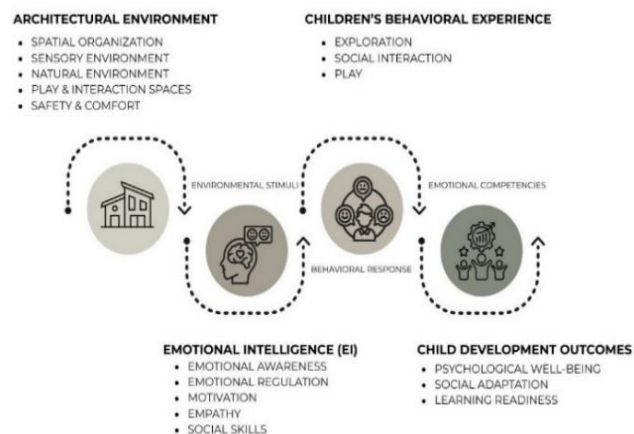


Figure 5. The interaction cycle between Architectural Environment and Children's EI

Source: [1], [2], [4] - [6], [9] - [12]

(1) Starting Point: Architectural Environment

The architectural environment is identified as the primary generator of environmental stimuli, shaping children's spatial experiences from the outset. Five key design dimensions are highlighted:

Spatial Organization: Layout configuration, spatial hierarchy, flexibility, and openness influence children's movement patterns, autonomy, and decision-making.

Sensory Environment: Elements such as lighting, color, materials, and acoustics directly stimulate the sensory system, affecting immediate emotional states (e.g., calmness, excitement, or stress).

Natural Environment: The integration of greenery, daylight, and outdoor spaces contributes to emotional regulation and physiological stress reduction.

Play and Interaction Spaces: Provide opportunities for social engagement, collaboration, and experiential learning.

Safety and Comfort: Establish a psychological foundation that enables children to feel secure while exploring their environment.

Collectively, these elements form an environmental stimuli system that directly influences children's perceptual and cognitive processes. Architecture functions not merely as a physical setting but as an intentional system of stimuli that initiates emotional and behavioral responses.

(2) Mediating Filter: EI

Upon receiving environmental stimuli, children process them through their EI, which acts as an affective-cognitive processing mechanism. EI comprises:

Emotional Awareness: The ability to recognize and interpret one's emotional states within a given spatial context.

Emotional Regulation: The capacity to adapt to environmental stimuli (e.g., maintaining calmness in quiet areas or managing excitement in play zones).

Motivation: Drives children's engagement in exploration and learning activities.

Empathy and Social Skills: Enable children to understand others and participate in meaningful social interactions.

EI is not only an outcome of development but also a critical mediating mechanism that shapes how children interpret and respond to their environment.

(3) Observable Expression: Children's Behavioral Experience

The emotional processing stage leads to behavioral responses, which manifest as children's real-life experiences within the educational environment. Three primary behavioral domains are identified:

Exploration: Children actively engage with and investigate spatial configurations.

Social Interaction: Children communicate, collaborate, and build relationships in shared spaces.

Play: A central activity through which emotional, cognitive, and social competencies are integrated.

These behaviors constitute an experiential learning process, in which children continuously adapt and refine their emotional competencies. Behavior serves as the transitional mechanism that converts environmental stimuli into developmental capacities.

(4) Output: Child Development Outcomes

Through repeated behavioral experiences and the reinforcement of emotional competencies, children achieve long-term developmental outcomes:

Psychological Well-being: A state of emotional stability, safety, and self-confidence.

Social Adaptation: The ability to integrate and function effectively within social contexts.

Learning Readiness: The psychological and behavioral preparedness for formal education.

These outcomes reflect the cumulative effect of EI development. EI acts as a decisive mediating variable, transforming spatial experiences into developmental achievements.

The model illustrates a coherent and cyclical pathway: **Architectural Environment** → **Environmental Stimuli** → **Emotional Processing (EI)** → **Behavioral Response** → **Developmental Outcomes**

This framework emphasizes that:

Architecture does not directly determine child development outcomes

Instead, its influence is mediated through emotional and behavioral processes

Therefore, in early childhood education, architecture should be understood as an emotional pedagogical instrument, rather than merely a physical enclosure.

This perspective is particularly relevant in HCMC, where rapid urbanization imposes spatial constraints, making emotionally responsive design a critical factor in enhancing children's holistic development.

6. Discussion

The proposed conceptual framework elucidates a structured pathway through which the architectural environment influences children's developmental outcomes via emotional and behavioral mediators. Rather than exerting a direct impact, architectural variables - such as spatial organization, sensory conditions, natural elements, play spaces, and safety - function as environmental stimuli that are cognitively and affectively processed by children.

A key contribution of this model lies in positioning EI as a central mediating mechanism. Consistent with contemporary developmental psychology, children do not passively receive environmental inputs; instead, they actively interpret spatial experiences through emotional awareness and regulation. This interpretation shapes subsequent behavioral responses, including exploration, social interaction, and play - activities that are widely recognized as foundational to early childhood development.

Importantly, the framework highlights that behavioral experience serves as a translational layer, converting environmental affordances into developmental competencies. Through repeated interaction with space, children reinforce emotional skills such as empathy, self-regulation, and social communication. These competencies, in turn, contribute to broader developmental outcomes, including psychological well-being, social adaptation, and learning readiness.

In the context of HCMC, where public kindergartens often face constraints related to density, limited green space, and standardized design approaches, this model provides a critical lens for understanding how spatial quality - not merely quantity - affects child development. It suggests that even within constrained urban conditions, strategic architectural design can significantly enhance emotional and behavioral outcomes.

6.1. Theoretical Implications

This study contributes to the interdisciplinary integration of environmental psychology, educational theory, and architectural design by:

- Conceptualizing architecture as an **active developmental agent**, rather than a passive backdrop
- Establishing EI as a **mediating construct** linking spatial experience and developmental outcomes
- Reinforcing the role of behavior as a **mechanism of experiential learning and emotional reinforcement**

The framework extends existing theories by proposing a multi-stage causal pathway, offering a more nuanced understanding of how built environments influence early childhood development.

This framework presents a conceptual model in which

the Architectural Environment (AR) functions as a foundational layer and primary stimulus influencing the formation and development of EI. This relationship is represented by a directional pathway (downward arrow), indicating that spatial and environmental design factors precede and shape children's emotional competencies.

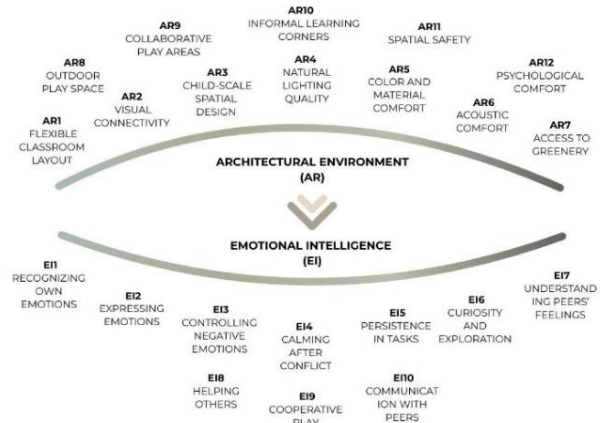


Figure 6. The framework between Architectural Environment and Children's EI

Source: [1], [2], [4] - [7], [9] - [12]

(1) Components of the Architectural Environment (AR)

This framework identifies twelve key design factors that architects should consider in order to support children's development within kindergarten environments. These factors are structured into four interrelated dimensions:

Spatial Organization: This dimension encompasses flexible classroom layouts (AR1), child-scaled spatial design (AR3), spatial safety (AR11), and the provision of informal learning corners (AR10). Together, these elements enhance children's autonomy, spatial comprehension, and sense of security.

Sensory Comfort: This includes the quality of natural lighting (AR4), the appropriateness of colors and materials (AR5), and acoustic comfort (AR6). These factors directly influence children's sensory processing and emotional states, contributing to either stimulation or regulation.

Connectivity and Psychological Experience: This dimension addresses visual connectivity within spaces (AR2), access to greenery (AR7), and the creation of psychologically comfortable environments (AR12). Such features foster a sense of openness, emotional security, and environmental coherence.

Activity Spaces: This includes the provision of outdoor play areas (AR8) and cooperative play zones (AR9), which are essential for facilitating physical activity, social engagement, and experiential learning.

(2) Indicators of EI

The architectural environment outlined above is hypothesized to directly influence ten dimensions of children's EI, categorized into three domains:

Intrapersonal Skills (Individual Competencies): These include children's ability to recognize their own emotions (EI1), express emotions appropriately (EI2), regulate negative emotions (EI3), and recover emotional

balance after conflicts (EI4). These competencies are fundamental to emotional self-regulation and psychological resilience.

Social and Interaction Skills: This domain includes empathy toward peers (EI7), prosocial behaviors such as helping others (EI8), cooperative play abilities (EI9), and peer communication skills (EI10). These skills are critical for social integration and interpersonal development.

Motivation and Exploration: This includes persistence in task completion (EI5) and curiosity-driven exploration (EI6), both of which are essential for engagement and early learning processes.

In the context of public kindergartens in HCMC, this relationship is particularly significant. Given the constraints of dense urban environments and standardized school designs, the quality and intentionality of architectural elements play a decisive role in fostering emotionally supportive learning environments.

6.2. Practical Implications for Design and Policy

For architects, educators, and policymakers, the findings suggest that kindergarten design should prioritize:

- **Emotionally responsive spatial organization:** Flexible layouts that support autonomy and reduce stress;

- **Multisensory environments:** Balanced use of light, color, acoustics, and materials to regulate emotional states;

- **Integration of natural elements:** Access to greenery and outdoor spaces to enhance psychological well-being;

- **Diverse play and interaction zones:** Spaces that encourage both individual exploration and group engagement;

- **Safety and comfort as emotional foundations:** Ensuring physical security to support emotional stability and confidence.

In rapidly urbanizing contexts like HCMC, these principles are particularly critical for optimizing limited spatial resources while maximizing developmental benefits.

7. Conclusion

This study proposes a comprehensive conceptual framework that redefines the role of architecture in early childhood education. By establishing a sequential relationship between environmental stimuli, EI, behavioral responses, and developmental outcomes, the model demonstrates that architecture is not merely a physical container but a dynamic contributor to children's emotional and cognitive development.

The findings underscore that the effectiveness of kindergarten design lies not only in meeting functional requirements but in fostering emotionally supportive environments that enable children to explore, interact, and

grow. As such, integrating EI into architectural thinking represents a crucial step toward more holistic and child-centered educational environments.

Future research should focus on empirically validating the proposed framework through quantitative analyses and context-specific case studies. In the subsequent phase of this research, empirical investigations will be conducted through field surveys of approximately ten public kindergartens, systematic observations of children's behaviors, and interviews with teachers and parents. These approaches are intended to clarify the relationships between architectural spatial design variables and children's developmental indicators. The resulting evidence will strengthen the practical foundation of the theoretical framework and support the formulation of design recommendations for kindergarten architectural environments that promote the development of children's EI and holistic well-being.

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