Vertical Schools and Mediated Spaces; The Necessity of Interaction with Natural Environment

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Abstract:
Population growth along with land scarcity have justified the spread of vertical buildings in major populated cities. The intensity of land use has always been an alternative solution in the face of land scarcity, high land values, and energy consumption rising. Therefore, vertical buildings appear in every function of an urban environment (educational, commercial, official, and residential buildings). In this new building model, traditional horizontal schools are no longer feasible and are not financially viable. As a case study, to provide state-of-the-art educational environments as one of each society’s critical functions, vertical schools have emerged. One of the main gaps in designing today’s vertical school buildings is the lack of interaction with green and open spaces, especially concerning children’s spaces in hot-humid climatic regions. The term kindergarten, derived from the philosophies of German educator Friedrich Frobel (1782–1852) in the 1840s and translates literally to ‘Kids in the Garden’, reveals an underlying proclivity for integrating indoor and outdoor learning environments. As a result of this shortage of interacting with natural spaces, mediated spaces are introduced in this paper as environments between outdoor and indoor spaces, like extended facades, patios, balconies, verandas, internal courtyards, and atria. The main questions here are how and to what extent these mediated spaces would have dedicated the school space so that children would most benefit from pedagogy and well-being aspects?
This paper aims to explore the viability of vertical primary schools through mediated spaces. This study's methodology is benefited from perusing a literature review and case studies related to interacting vertical buildings with nature. The result leads to showcasing the necessity of interaction with the natural environment to improve the quality of learning, well-being, and health population parameters of children’s lives in school settings.

**Author(s) Biography:**

**Elia Ebrahimi Salari:**

Elia Ebrahimi Salari is a PhD candidate in Architecture at the University of Western Australia (Oct 2018-Apr 2022). Her thesis aims to design vertical schools in the hot/hot-humid climates towards an integrated approach to design mediated spaces. She is a professional and experienced Architectural Designer with over eight years of professional experience with an intensive avidity in energy-efficient anent thermal comfort and daylighting, designing deployable systems for temporary applications, and applying climatic principles design with the utilization of renewable energy resources for designing learning environments.

Besides publishing some international papers, she is adept at implementing computational design software to evaluate and analyse energy consumption and environmentally sustainable design in building spaces and facades. She has combined academic qualifications with direct building industry experience in complex high-rise buildings, with valuable experience in appointing, coaching, and managing an architectural draftsperson team.

**Rosangela Tenorio:**

Rosangela Tenorio is an Associate Professor at the UWA School of Design, and has over 20 years of experience as an academic and practicing architect. Born in the northeast of Brazil, she was trained in Recife as an architect, where she started working in affordable housing and slum upgrading projects. Her training continued as she undertook internships and work/research experience in Japan, the USA, and Italy. In Australia, she officially started her academic career (PhD), under the guidance of Dr Steven V Szokolay (UQ), one of the world’s leading experts and pioneers in environmental science. Throughout her professional career, Rosangela has always been committed to the affordability of resources (environmental and financial) and how these two aspects can have a substantial purpose in providing better living conditions, culturally, socially, and economically.

Her original research work focused on building energy simulation and thermal comfort studies of housing in tropical regions. Passive cooling design in hot regions has been at the core of her research interests to tackle bigger urban environmental issues (e.g. Urban Heat Island (UHI)). She has also expanded her research interests towards remote
communities (design for education and development/use of bio-based materials/traditional architecture monitoring and mapping in developing countries).

**Nigel Westbrook:**
Dr Nigel Westbrook is an architectural historian, lecturer, and Deputy Head (Research) at UWA’s School of Design. He specialises in the architectural crossroads between West and East, from the early medieval to the 20th century.

He gained a Bachelor of Architecture from RMIT (1982), undertook the Diploma at the Architectural Association (1980-82) was awarded a Master of Architecture by Research from RMIT (1996), and obtained a PhD from the University of Western Australia (2013). He has been a member of staff since July 1993. After studying architecture at RMIT, he joined the Architectural Association (AA) in London for three years, then returned to Australia to register and work in several architectural offices. In his almost three decades at UWA, Nigel has combined architectural practice with teaching and moved into architectural history research, PhD supervision, and administration.

He is currently Associate Professor in Architecture, Associate Dean (Research), and previously was the Discipline Chair of Architecture for five years. He teaches in architectural design, architectural history, and urban studies and has co-taught five international studios in Athens, Greece (1995, 1997, 2013-15), and one studio in Chicago, USA (2001). He also supervises postgraduate students in cognate fields of research.