



Title: The Syntactic Thermal Relationship Based on School Layouts in Jordan

Abstract

The circulation corridors in a building carry the movement of people, materials, information and energy from one space to another. Since the Space Syntax theory showed that human movement is highly affected by the topological relationships of a layout, we aim in this paper to answer if this applies also to indoor thermal environment.

The proposed methodology consists of five phases. First phase is selecting fifteen case studies of school buildings in Jordan. Second phase is performing a syntactic analysis on each layout using an algorithm built on Grasshopper to obtain measures of integration, control, and choice for each space. Third phase is performing a thermal analysis on each layout using the CFD technology to obtain measures of temperature, humidity and air velocity. Fourth phase is performing a graphical and mathematical comparison to notice any correspondence between these measures. The last phase is presenting the results, and discussing the syntactic thermal relationship.

The results indicates a possible correspondence between choice syntactic measure and the three thermal measures. However, the relationship is considered significant only for choice and air velocity as revealed by the graphical and numerical analysis. This approach helps make the early design decisions of patterns of circulation and configuration layouts.

Keywords: Space Syntax, Circulation Corridors, Indoor Thermal Environment, Choice, Air Velocity