Using the spatial openness metric for comparative evaluation of urban environments

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Abstract
This paper reports on a comparative evaluation of four selected case studies using the 'Spatial Openness' tool in its present stage of development. The selected case studies are urban developments including public and private spaces in diferent spatial configurations, located in different landscapes having similar urban densities and similar ground area. They are surrounded by urban development and have at least one direction of attractive view (a view to the sea or to a green open space). This work demonstrates the use of the computerized 'SOI' tool for evaluating visibility in the urban area.

Keywords
visibility, spatial openness, views, spatial configuration

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The 'Spatial Openness' (SO) index is a quantitative index - expressed in terms of 3-D visual spatial information and can be used for comparison of optional spatial configurations. The SOI represents the volume of space potentially observed from view points inside the buildings looking out to the space around. Thus, this metric can consciously explore the visibility and permeability of spatial configurations and enables the ranking of different spatial configurations. Previous work showed that comparative SO measurements in alternative spatial configurations are correlated with the comparative perceived density so that a higher value of SOI indicates a lower perceived density (Fisher-Gewirtzman, 1998, Fisher Gewirtzman et al, 2002c). A feasible 3-D method for measuring the SO was presented and its potential use in the design process was demonstrated (Fisher Gewirtzman et al, 2002a).

Analysis of the three-dimensional built-environments by its SOI value demands the use of a substantial amount of data in complex calculations and therefore depends on the availability of computer programs for automated calculations. In its present stage of development the SOI tool enables the analysis and evaluation of complex spatial configurations and can be helpful in identifying morphological and typological principles for creating spacious configurations. This metric tool can calculate SOI from the public domain (from the in-between spaces) in addition to the private spaces and enables the simulation of weighted landscapes for a more realistic estimation of the view and its impact on the environmental quality. (Fisher Gewirtzman et al, 2002c).

The work presented here consists of 3D representations of the case studies, in addition relating to their relative value of their surrounding view. Using the computerized tool, SOI was calculated for all case studies, once relating to the

spaciousness only, and once relating to the value of the surrounding views. The outcomes are represented numerically and graphicaly. Then, the SOI outcomes were ranked following relative grading. Two of the case studies achieved higher SOI values than the other two. The reasons for a higher SOI value partly relate to their urban morphology and partly relate to the quality of their surrounding view. The SOI tool outcomes can be clearly viewed thanks to the friendly interface and clear graphical representations.

There have been various attempts to develop spatial analysis methods and tools for assistance in architecture and urban development and urban spatial analysis. The SOI tool belongs to the group of methods and tools that address the visual perception and movement in space (Benedikt, 1979, Peponis et al, 1998, Turner et al, 2001, Batty, 2001) and is an additional step towards the development of quantitative comparative evaluation of building shapes and spatial configurations.

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