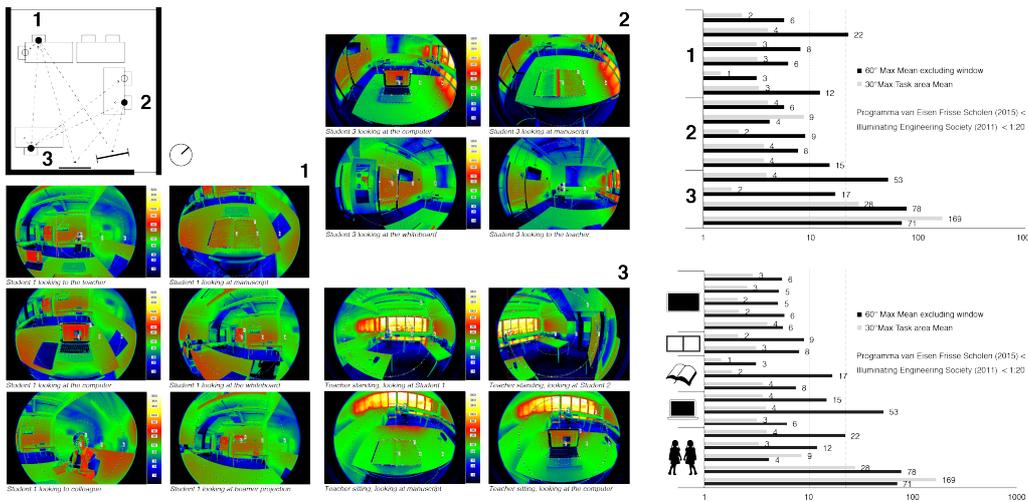


## A multivariable approach to the analysis of visual comfort of classrooms with daylight: towards design guidance

**Keywords:** Daylighting, Visual Comfort, Metrics, Classrooms

**Architectural Engineering + Technology Department/ Building Physics**

**Area of Research:** Building Daylighting Design



**Research Summary:** Currently there are many metrics in use for the analysis of glare in daylit buildings, but no standard accepted method to assess it. There are reservations regarding the robustness of the existing metrics, the performance criteria to be used, and the definition of the calculation methods. The existing guidance for the analysis of visual comfort in classrooms is either based on the prescription of maximum illuminance levels at desk level, on the calculation of glare indices that have originally been developed to depict glare from electric light sources, or on the use of luminance contrast ratios, which criteria is presently poorly defined. The applicability of recently proposed daylight glare indices to the context of classrooms is not known, as the studies that they are based on have been carried out in the context of the cellular office space and for subjects engaged in office-related tasks. Classrooms present specific challenges to visual comfort prediction given their spatial diversity, resulting from a subjects' variable position within space and variable view direction. The objective of this research is to develop architectural design guidance based on a multivariable approach to visual comfort, an approach that will be demonstrated, exemplified and validated based on a range of classroom daylighting design typologies.

**Research Methodology:** The research comprises an empirical study part and a demonstration part. The empirical study consists of a combined subjects' visual comfort evaluation via questionnaire and space luminous conditions measurements using HDR luminance capture and illuminance meters, from which several metrics are calculated, followed by a correlation analysis and the development of metrics' guidelines. The demonstration part consists of the application of the newly created guidelines to the analysis of a range of classroom daylighting typologies via simulation, from which a database of space- and time-based visual comfort performance data is created. The database will be queried for several classroom layout variations and a multivariable visual comfort spatial index for each typology will be produced.

**Key Publications:**



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### Main Question:

Which metrics can better depict visual comfort conditions in classrooms, given the spatial- and view direction-variation resulting from multiple modes of occupancy and activity?

### Deliverables:

Visual comfort metrics guidelines, a database of space- and time-based visual comfort performance data and a multivariable visual comfort design guide, for classrooms.

### Link(s)

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