



Mix Sustentável

RESUMO DE DISSERTAÇÃO

DAYLIGHT IN CLASSROOMS – ANALYSIS BASED ON NEW REGULATORY PARAMETERS.

Luz natural em salas de aula – análise baseada em novos parâmetros regulatórios.

Luz natural en las aulas – análisis basado en nuevos parámetros regulatorios.

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1. INTRODUCTION

In addition to providing visual information, daylight contributes to the regulation of the circadian rhythm and influences non-visual aspects, such as alertness, mental focus, cognitive performance, hormonal regulation, mood, and other factors directly related to academic performance and learning processes. Kaplan's Attention Restoration Theory (1989) suggests that environments with natural outdoor views significantly enhance cognitive function and attention,

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contributing to stress reduction and increased productivity.

Normative instruments contribute to the evaluation of spaces in a quantitative and qualitative way, and evaluations that are more centered on the health of the occupant and that encompass the dynamics of daylight have been presented in international standards. The Brazilian standard NBR 15215-3 was revised and published in 2024, and incorporated these new assessments with five criteria: Daylight Autonomy, View Out, Protection from glare, Minimum Exposure Sunlight and Annual Sunlight Exposure. In order to analyze the applicability of the new normative parameters and the interference between them, the research sought to understand the incidence of daylight, the occurrence of glare and the quality of exterior views in higher education classrooms.

2. METHODOLOGY

The research was divided into five stages: (1) definition of the object of study, which was the Centro de Atividades Didáticas de Ciências Exatas 3 (CAD 3) at the Federal University of Minas Gerais (UFMG), which, even with window films and brise-soleil, presents user complaints regarding daylight; (2) data collection, including diagnostics and characterization of the object of study; (3) assessment of daylight in the analyzed spaces, with 3D modeling in Rhinoceros software and computational simulations using the ClimateStudio plug-in. The simulation considered the height of the visual field of the user when seated (student) and standing (teacher) and varied the conditions of natural lighting systems, comparing the efficiency of existing systems, windows arranged according to regulatory requirements, and the window configurations used in the daily routines of users.; (4) study of alternatives to mitigate glare caused by natural light in the environments, while preserving natural light autonomy and the view; (5) analysis of the results.

3. RESULTS

The standard requires that daylight evaluation be conducted with the windows closed. However, in daily use, windows are often open, and the presence of window films exacerbates glare and affects external views. The case study revealed that analyzing only the availability of natural light and solar exposure may not be sufficient to assess visual quality, as, in classrooms, users generally cannot choose their viewing directions or positions. In these environments, glare becomes the predominant phenomenon for analysis. The seated student's position showed a higher occurrence of visual discomfort. Mitigating glare resulted in a

reduction of natural light availability and the quality of the external view. However, in the case study, the use of horizontal brise-soleil reduced the number of views with disturbing glare by up to 59%, ensuring autonomy of natural light and satisfactory levels of external views. It was also observed that it was not possible to meet all criteria simultaneously for seated users, and these criteria must be prioritized according to the specific type of environment.

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