DAYLIGHT EFFICIENCY AND ENERGY SAVING LIGHTING TO MAXIMIZE STUDENTS' 'HAFAZAN' PERFORMANCE AND VISUAL COMFORT: A CASE RESEARCH OF A SELECTED RELIGIOUS SCHOOL

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Abstract

The philosophy of Illumination—and the scientific knowledge of light show the significant impact to energy efficiency and the development of performance in a building. It is important to improve the intensity of daylight in classrooms through introducing various innovative design of window in order to reduce the non-performance–behavior of students. Current study shows the illuminance level within the recommended range of 300 lx to 500 lx or higher reduced the students' Arabic handwriting speed based on word per minute. Further in the process of '*hafazan*' as a memorization process, reading and writing task must consider sufficient window to-wall ratio, optimum daylight level and reduce the glare effect at the position of '*hafazan*' setting at 300mm height crossed leg ('*rehal*') working plane and 900mm table working plane as a comparison. This research had conducted at Kolej Genius Insan, Universiti Sains Islam Malaysia, Nilai to identify the optimum illuminance level with window to-wall ratio of 30% and task performance at 300mm and 900mm working plane. Daylighting minimizes the artificial lighting with sensor or dimming strategies which can reduce by 19% during the passive daylight technique is applied. When the distribution of the daylight and illuminance level meet the uniformity at a lower working plane, the student's performance is achieved within acceptable glare index. This optimum level of daylight performance range will benefit the designer to insert in the future of energy efficiency guideline and provide a sustainable building.

Keywords: Daylighting, Glare index, "*Hafazan*' setting, Illuminance level, Energy saving

Introduction

The exploration of the scientific knowledge of light had begun from twelfth century where the different of light intensity had given various shape to the forms and make things visible. The earliest scientist Ibn Al-Haytham studied the characteristic of light.