International Journal of Innovative Technologies in Social Science

e-ISSN: 2544-9435

Scholarly Publisher
RS Global Sp. z O.O.
ISNI: 0000 0004 8495 2390

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ARTICLE TITLE	THE USE OF DIRECT OBSERVATION TO EVALUATE THE DEGREE OF VISUAL COMFORT IN THE LIBRARY OF GUELMA UNIVERSITY
ARTICLE INFO	Ismahane Haridi, Messaoud Aiche, Abdeldjalil Hamdaoui, Ahmed Mounir Ansar. (2024) The Use of Direct Observation to Evaluate The Degree of Visual Comfort in The Library of Guelma University. *International Journal of Innovative Technologies in Social Science*. 4(44). doi: 10.31435/ijitss.4(44).2024.3089
DOI	https://doi.org/10.31435/ijitss.4(44).2024.3089
RECEIVED	01 November 2024
ACCEPTED	18 December 2024
PUBLISHED	30 December 2024
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THE USE OF DIRECT OBSERVATION TO EVALUATE THE DEGREE OF VISUAL COMFORT IN THE LIBRARY OF GUELMA UNIVERSITY

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ABSTRACT

In libraries, the integration of natural light through illuminated spaces has long been a hallmark of aesthetically pleasing and comfortable environments, fostering an enjoyable reading experience without glare. This practice has been deeply rooted in architectural tradition for centuries. In reading rooms, proper lighting is essential for effectively supporting reading activities. The study employs various methods to collect data, including both data analysis and observation. For our research, we will specifically use observation as the primary investigative technique. This approach will allow us to analyze photographs taken in the library. The objective of this study is to assess visual comfort in relation to the quality of natural light in the reading room of the Guelma library, using an evaluation grid applied on two different days, one in winter and one in summer. The results will reflect the level of discomfort or comfort experienced during reading activities within the room. The grid will help explain the critical role of observation in this evaluation and provide insight into the current lighting conditions, along with the sensory experience related to the required visual comfort standards.

KEYWORDS

Direct Observation, Guelma, Natural Light, Visual Comfort, University Library

CITATION

Ismahane Haridi, Messaoud Aiche, Abdeldjalil Hamdaoui, Ahmed Mounir Ansar. (2024) The Use of Direct Observation to Evaluate The Degree of Visual Comfort in The Library of Guelma University. *International Journal of Innovative Technologies in Social Science*. 4(44). doi: 10.31435/ijitss.4(44).2024.3089

1. Introduction.

Visual comfort is a multifaceted concept, explored from various perspectives by different experts and organizations. For the SEF (French Lighting Company), it refers to providing adequate lighting that enables the effective performance of visual tasks without causing eye strain or discomfort, especially in educational environments. Given the importance of lighting in these spaces, we have chosen to evaluate the visual comfort in the University Library of Guelma, specifically focusing on its reading rooms.

To assess this comfort, we will use the observation method, a widely used technique in scientific fields, particularly in lighting studies. (Haridi.I, 2022). The method, known as direct or situational observation, involves a

non-directive approach where a group of individuals is observed in their natural setting. This technique is effective in understanding behaviors and attitudes within specific environments, as demonstrated by studies like those of Nakamura and Inui, who sought to link the visual perception of lighting environments with the distribution of luminance. Their goal was to describe the lighting ambiance in a given space, establishing a clear connection between the visual environment and its lighting distribution (COUTELIER, B., 2006).

This study forms a practical component of my doctoral thesis in architecture. It involves using observation to collect qualitative data on visual comfort within the reading rooms of the University Library of Guelma. The approach follows a systematic process where actions are recorded clearly and accurately. To ensure consistency, a detailed observation grid will be employed and completed on-site after a full day of observation conducted during two distinct seasons—winter and summer. This method aims to provide comprehensive and reliable insights into the lighting conditions and visual comfort experienced by library users throughout the year (Haridi, I., 2024).

Materials and Methods.

As part of our research, we conducted direct observation and personal assessment to qualitatively analyze natural lighting in the selected reading rooms, which were used as case studies. This analysis was based on photographs taken personally, using a qualitative grid (Table 1) over the course of a full day (from 9 a.m. to 4 p.m.) during both winter (February 3, 2019) and summer (June 2, 2019). The summer month was specifically chosen to facilitate the evaluation of comfort during the brightest and least illuminated periods of the year.

The natural lighting evaluation grid, based on a descriptive scale designed by Loe et al, represents an analytical approach aimed at quantifying the impact of natural light on comfort and enjoyment within two defined reading areas. Each positive aspect is contrasted with its negative counterpart (COUTELIER, B.2006). We customized this grid for our study using "+" and "-" symbols to reflect these variations. This evaluation technique addresses a range of factors related to natural light and visual comfort, tailored to the specific goals of our analysis. The grid includes variables such as brightness, color, shadows, glare, solar spots, contrast, openings, layout, and surface area. It also involves a detailed examination of the design and positioning of windows, considering their dimensions, locations, and specific attributes to optimize the intake of natural light while minimizing overheating and glare. Furthermore, the model takes into account the interior layout and the use of internal shading devices to assess the overall ambiance and comfort of the reading spaces.

2. Case study:

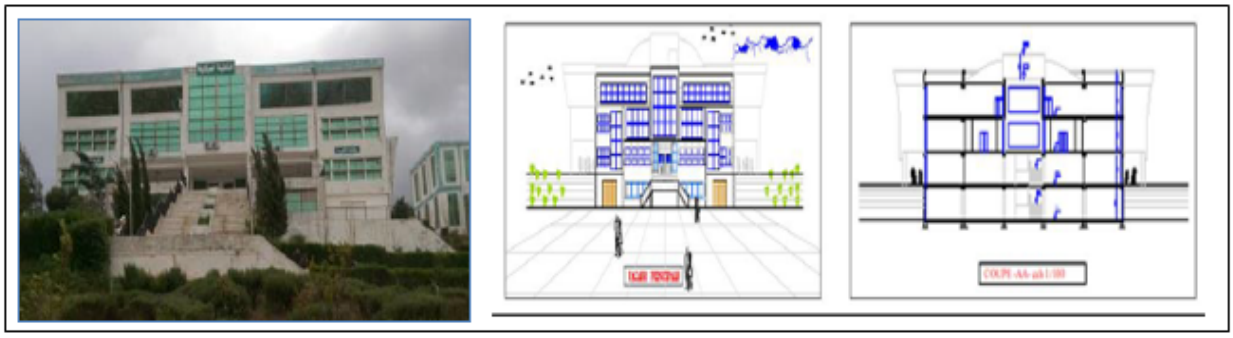

Fig. 1. Library of the University of 8 May 1945, Guelma, Algeria.
Source: Haridi, I., 2019.

The university, situated in the southwest on a mountain in Guelma, lies 500 kilometers east of Algiers, the capital of Algeria. It is a multidisciplinary institution that, during the 2015/2016 academic year, hosted 16,736 students across 27 departments and 7 faculties.

The library, centrally situated within the university campus (36.45°, 7.14°) and oriented westward, is integrated into a larger architectural complex characterized by a cohesive design language across multiple buildings. Its entrance, accentuated by a prominent staircase, serves as a focal point of the structure.

3. Results and Discussion.

Upon entering the reading room, the initial sensation is one of discomfort. This is primarily due to the division of the space into two distinct areas: one section enclosed by the interior layout and another more open.

The enclosed area is dedicated to bookshelves, offering access to various collections, while the open area is designed for work tables, with additional shelves located in the south-east corner. This arrangement creates a somewhat disorganized and uninviting atmosphere, making the reading environment less welcoming and less conducive to concentration and study.

Table 1. View of the northern part showing the natural interior lighting of the reading room in the library of the University of Guelma

Winter:	Summer:
	

Source : Haridi. I, 2024.

The windows are located along the north façade (Table. 1), with large openings stretching across the full length of the wall. On the southeast facade, there are large bay windows, along with additional openings on the northwest side. However, these openings are partially blocked by posters, which greatly limit the amount of natural light entering the room. It is also observed that blinds are frequently used throughout the day on the southern and eastern sides of the room to protect against excessive sunlight.

Table 2. View of the Western part showing the natural interior lighting of the reading room in the library of the University of Guelma

Winter:	Summer:
	

Source: Haridi. I, 2024.

In winter mornings under partly cloudy skies, the southern part of the room receives direct sunlight, but only for a brief period. Throughout the day, natural light remains concentrated in the southern area, while the western part becomes illuminated in the afternoon. The northern section, however, stays dim, receiving minimal indirect light. This uneven distribution of light results in a stark contrast in the northern area, accompanied by occasional scattered glare. As a result, artificial lighting is required for most of the day to maintain visibility.

Table 3. View of the southern part showing the natural interior lighting of the reading room in the library of the University of Guelma

Winter:	Summer:
	

Source: Haridi, I., 2024.

In summer, under clear skies, the southern area experiences intense sunlight, leading to significant glare and reflections throughout the day. This necessitates the frequent use of blinds, especially around noon, when sunspots on the tables are most prominent. Meanwhile, the northern and north-eastern sections receive the highest levels of light in the morning, causing glare on the bookshelves and further disrupting visual comfort.

Table 5. The grid of visual comfort criteria for the reading room of the Guelma Library

La bibliothèque de Guelma										
La date : 03-02-2019							type de ciel : P. Couvert			
Hiver										
Zone	Luminosité	Couleurs	Eblouissement	Contraste	Ombre	Taches solaires	Protection	Ouvertures	Aménagement	Surface
Nord	--	+ +	-	+ +	- -	--	--	--	--	--
Sud	+ +	+ +	+ +	+	+ +	+ +	+ +	--	--	--
Est	--	+ +	--	+	+	--	--	--	--	--
Ouest	--	+ +	-	--	+	+	+ +	+ +	--	--
Centre	--	+ +	--	- -	--	-	+ +	--	--	--
La date : 02-06-2019							type de ciel : Clair			
Eté										
Nord	--	+ +	-	+ +	+ +	+	--	--	--	--
Sud	+ +	+ +	+ +	+ +	+	+ +	+ +	--	--	--
Est	--	+ +	+	+ +	+	-	--	--	--	--
Ouest	+ +	+ +	+ +	+ +	+ +	+ +	+ +	+ +	--	--
Centre	+ +	+ +	--	- -	--	-	+ +	--	--	--

Source: Haridi. I, 2024

Despite the openings and good orientation, the space remains dark in winter and causes inconvenience in summer. It is therefore necessary to resort to artificial lighting and to rethink the layout of the shelves, arranging them towards the openings to the South for the current layout of the North and North-East part, with shelves perpendicular to the openings and very close to the windows, as well as their proximity to each other, explains the glare and contrast problems encountered in summer and winter. The reflection of the sun's rays on the glass display cases of the shelves and on the tables located near the windows, as well as the glare caused by the glass of the wall shelves, create a contrast between the bright and shaded areas. Direct sunlight penetration causes excessive luminance contrasts in the space, causing glare at the tables. This light effect can be moderated to provide a more homogeneous color rendering.

Synthase:

Based on the criteria cited in the observation grid (Table 4), carried out on site and the photographs (Table 1,2 and 3) taken during the assessment, we can conclude that the general environment of the room, summarized in Table (5), gives an overall unpleasant and uncomfortable impression. The distribution of natural light in the reading room is non-uniform, which creates a visually attractive atmosphere inside.

Table 6. Summary of the observations of the Guelma Library's reading room,

Criteria	Reading Room
Pleasant	
Unpleasant	
Comfortable	
Uncomfortable	
Uniform	
Non-uniform	
Interesting	
Boring	

Source: Haridi. I, 2024

4. Conclusion.

In conclusion, this work has deepened the examination of the method used, revealing its effectiveness as a tool for fundamental research. Direct observation of the reading room, based on an evaluation grid and photos, provides a clear understanding of the effects of colors, protective devices, and the overall layout of the environment in the studied case. Measurements should be taken over specific periods using a light meter sensitive to illumination in order to obtain reliable values.

In general, the reading room expresses notable dissatisfaction and a sense of discomfort, the Guelma reading room is perceived as uncomfortable. These results highlight a significant neglect of natural light in the heart of the reading room. This lack of adequate lighting directly impacts user comfort. Moreover, it was observed that the usage of the reading room is proportional to user satisfaction levels. In other words, a high percentage of dissatisfaction leads to a decrease in the reading room's attendance.

To summarize, the combined results emphasize the importance of proper lighting in improving user comfort and, consequently, increasing the attendance in the Guelma University reading room.

5. Limits and constraints of the study.

- Accessing the library to conduct our on-site study proved to be challenging, especially due to the need to take photographs. There were always occupants in the room, which made it difficult to capture the images.
- Additionally, collecting consistent and representative data was made even more complex by the variation in natural light, which is influenced by many factors such as season, time of day and weather conditions.

6. Recommendations.

- Using other methods to analyze can provide more detail and allow comparison with current systems.
- Examining various climate contexts to develop a model or guidelines specific to each climate zone can be very advantageous.

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