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Evaluation of Factors Influencing User's Satisfaction with Visual Comfort in Lagos State Nigeria, as Well as the Challenges Impeding its Utilization in Modern Cinema Design.

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Abstract: *This study investigates visual comfort and user satisfaction in cinemas across Lagos State, Nigeria, with emphasis on the influence of lighting design and related architectural features. Data were collected from ten selected cinemas in Lagos State using structured questionnaires administered to 332 respondents. Descriptive statistics were used to analyse respondents' socioeconomic characteristics and perceptions of cinema environmental conditions. Findings reveal a balanced gender distribution among cinema-goers, with 47.3% male and 52.7% female respondents. The majority of respondents were aged between 26–35 years (23.5%), followed by 36–45 years (21.1%), indicating strong participation of young and middle-aged adults. Educational attainment showed that 31.3% had tertiary education, while 22.3% held postgraduate qualifications. Income distribution indicated that 26.2% earned above ₦200,000 monthly, while 30.1% earned less than ₦50,000, demonstrating socioeconomic diversity. Additionally, 52.4% of respondents reported having eye defects, underscoring the relevance of visual comfort in cinema environments. Results further show that 69.2% of respondents agreed that overall architectural design enhances viewing comfort, while 70.6% confirmed that stepped seating improves visual experience. Similarly, 78.2% reported that seat position significantly affects visual satisfaction, and 63.3% indicated that window placement contributes to glare and reduced visibility. Lighting design was also critical, with over 71.5% expressing satisfaction with general auditorium lighting, while 60% highlighted concerns with glare control and lighting transitions. Overall, the study establishes that visual comfort and user satisfaction in Lagos State cinemas are strongly influenced by lighting design, seating arrangement, and spatial configuration. Premium cinemas demonstrated higher satisfaction levels due to advanced lighting control and non-reflective finishes, while community-based cinemas recorded lower performance due to glare and design limitations.*

Keywords*: Cinemas, visual comfort, user satisfaction, lighting design, Lagos State cinemas, Nigeria*

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I. INTRODUCTION

The global rise in mental health challenges such as anxiety and stress has intensified interest in how built environments influence emotional well-being. Beyond clinical interventions, recreational spaces are increasingly recognized as informal therapeutic environments that support relaxation and psychological restoration. Cinemas, in particular, function not only as entertainment venues but also as immersive spaces that offer temporary escape from daily pressures and contribute to emotional relief through visual storytelling.

Cinemas, or movie theatres, are designed to deliver controlled visual and auditory experiences that enhance audience engagement and comfort. When properly designed, they can promote relaxation, reduce stress levels, and foster social interaction among users. However, the effectiveness of this experience is highly dependent on environmental conditions, particularly visual comfort, which plays a critical role in shaping user satisfaction and overall viewing quality.

Visual comfort refers to the extent to which a space supports clear, strain-free vision while minimizing glare, distortion, and eye fatigue. In cinema environments, it is influenced by lighting design, screen placement, seating arrangement, viewing angles, hall geometry, and interior finishes. Poor visual conditions can lead to discomfort such as eye strain, headaches, and reduced immersion, ultimately diminishing user satisfaction. Studies have shown that well-designed cinema environments improve user satisfaction by enhancing comfort, immersion, and emotional engagement.

Conversely, poorly managed lighting systems and inadequate spatial design negatively affect audience experience, often leading to discomfort and reduced patronage. In Lagos State, where cinemas vary widely in design quality and technological advancement, understanding these relationships is particularly important. It is against this background that this study evaluates users' satisfaction with visual comfort in selected cinemas in Lagos State, Nigeria, with a focus on lighting design and related architectural parameters.

II. Review of Related Literature

2.1 Visual Comfort in Cinemas

Visual comfort refers to the degree to which an environment supports clear, strain-free vision and enhances user satisfaction [18, 19]. In cinema spaces, visual comfort is influenced by factors such as lighting quality, screen brightness, glare control, viewing angles, seating ergonomics, and spatial arrangement [20]. Studies show that poor visual conditions can lead to eye strain, headaches, fatigue, and reduced audience immersion [21].

To achieve optimal comfort, cinemas require controlled lighting systems, unobstructed sightlines, and carefully calibrated screen luminance levels. Research further indicates that dark matte finishes, balanced contrast ratios, and gradual transition lighting improve audience engagement and reduce visual discomfort [22, 23].

2.2 Factors influencing Visual Comfort

Several factors determine visual comfort in cinematic environments. Architectural layout and auditorium geometry influence sightlines and viewing angles, with fan-shaped and tiered seating arrangements generally providing better visibility and reduced neck strain [24]. Lighting design is also critical, as excessive ambient light, glare, and reflections can diminish screen clarity and viewer concentration [25].

Ergonomic seating, including adequate legroom and lumbar support, contributes to physical comfort during prolonged viewing sessions [26]. Environmental factors such as air quality, thermal comfort, and acoustics further affect user satisfaction and concentration levels [27]. In addition, technological elements including LED lighting, adaptive lighting systems, and high-resolution digital projection have improved visual quality and energy efficiency in modern cinemas [28].

2.3 Factors Influencing Visual Comfort

Lighting comfort in cinemas depends on the balance between screen luminance and surrounding illumination. Recommended cinema screen brightness ranges between 41–55 cd/m² to ensure image clarity without causing eye fatigue [29]. Transition lighting between bright lobby spaces and dim auditoria is necessary to support visual adaptation and minimise discomfort [30]. Studies also emphasise the importance of glare reduction through the use of non-reflective materials, recessed fixtures, and controlled emergency lighting [31]. Warm colour temperatures of approximately 2700K–3000K are commonly preferred in lobbies and circulation areas because they create a relaxing atmosphere and prepare viewers for darker screening spaces [32].

2.4 Users' Satisfaction and Well-Being in Cinematic Environments

Lighting comfort in cinemas depends on the balance between screen luminance and surrounding illumination. Recommended cinema screen brightness ranges between 41–55 cd/m² to ensure image clarity without causing eye fatigue [29]. Transition lighting between bright lobby spaces and dim auditoria is necessary to support visual adaptation and minimise discomfort [30].

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III. Research Methodology

3.1 Study Area and Population

The study was conducted in Lagos State, Nigeria, located in the southwestern region of the country (latitude 6°23′N–6°41′N and longitude 2°42′E–3°42′E). Lagos State hosts a significant proportion of cinema facilities in Nigeria and serves as a major hub for entertainment and recreational activities. The study population comprised cinema users across selected cinemas within the state. A total of 332 respondents participated in the study through questionnaire administration.

3.2 Research Design and Sampling

A descriptive survey design was adopted, integrating quantitative and qualitative approaches. Structured questionnaires were administered to cinema users to assess their perceptions and satisfaction with visual comfort variables such as lighting quality, glare control, seating ergonomics, screen visibility, and viewing angles. Secondary data were sourced from academic journals, industry reports, design standards, and existing literature on cinema architecture and visual ergonomics. Data collection was conducted during active cinema operating periods. Of the administered questionnaires, 332 valid responses were retrieved, representing a 100% response rate.

3.3 Data Analysis

Quantitative data were analysed using descriptive statistics, including frequencies, percentages, mean scores, and ranking indices. Inferential statistical tools were also employed to examine relationships between users' satisfaction and visual comfort variables. Qualitative data obtained from case studies and literature were analysed through content analysis..

IV. Results and Discussion

4.1 Socio-Economic Characteristics

Table 1 presents the socio-economic profile of the 332 respondents drawn from ten selected cinemas across Lagos State, Nigeria. The respondents were fairly distributed across different age groups, occupations, and income categories, reflecting the diverse socioeconomic composition of cinema-goers within the state. The highest proportion of respondents fell within the 26–35 years age bracket (23.5%), followed closely by respondents aged 36–45 years (21.1%), indicating that cinema attendance is particularly dominant among young and middle-aged adults. Female respondents (52.7%) slightly outnumbered males (47.3%), suggesting active participation of both genders in cinema-related leisure activities.

Table 1: Socio-Economic Characteristics of Cinema Respondents in Lagos State (N = 332)

S/N	Category	Frequency (N)	Percentage (%)
1	**Age Group**		
	18–25 years	61	18.4
	26–35 years	78	23.5
	36–45 years	70	21.1
	46–55 years	63	19.0
	Above 55 years	60	18.1
2	**Gender**		
	Male	157	47.3
	Female	175	52.7
3	**Educational Qualification**		
	Primary Education	83	25.0
	Secondary Education	71	21.4
	Tertiary Education	104	31.3
	Postgraduate Education	74	22.3
4	**Occupation**		
	Student	56	16.9
	Employed	70	21.1
	Self-employed	72	21.7
	Unemployed	62	18.7
	Retired	72	21.7
5	**Monthly Income (₦)**		
	Less than 50,000	100	30.1
	50,000–100,000	69	20.8
	101,000–200,000	76	22.9

	Above 200,000	87	26.2
6	**Eye Defect**		
	Yes	174	52.4
	No	158	47.6
7	**Cinema Visit Frequency**		
	Less than once/month	76	22.9
	1–2 times/month	86	25.9
	3–5 times/month	99	29.8
	More than 5 times/month	71	21.4
	Total	**332**	**100.0**

Source: Author's Field Survey (2024/2025)

4.2 Conditions determining visual comfort in Lagos State cinemas

As shown in Table 2, a significant majority of participants either agreed (38.9%) or strongly agreed (29.2%) that the way seats were arranged allowed for a clear, unobstructed view of the screen. About 16.9% of respondents remained neutral, suggesting that while most were satisfied, a small portion had mixed experiences depending on the cinema visited. Conversely, only 15.0% of the participants expressed disagreement, indicating that serious challenges with blocked views or poor seating geometry were not widespread but still present in certain venues.

Table 2 Various parameters and their impacts on visual comfort

S/N	Statement	Strongly Disagree (%)	Disagree(%)	Neutral (%)	Agree (%)	Strongly Agree (%)
1.	The shape and layout of the cinema hall affects how well I can see the screen	5.1	3.4	14.0	42.5	30.0
2.	Seating arrangement allows for an unobstructed view of the screen	4.8	10.2	16.9	38.9	29.2
3.	The stepped seating arrangement improves my viewing comfort	3.9	7.5	18.0	41.6	29.0
4.	The position of my seat relative to the screen affects my visual experience	2.7	6.8	12.3	44.7	33.5
5.	The number and placement of windows affect glare and screen visibility	6.2	11.0	19.5	36.0	27.3
6	I did not experience any eye strain or discomfort while watching the movie	3.0	14.5	22.0	34.0	21.5
7	The architectural design of the cinema supports an overall comfortable viewing experience	3..6	7.2	20.0	42.1	27.1

8	I had a clear, unobstructed view of the screen from my seat	4.1	9.5	17.2	40.3	28.9
9	The interior colors and finishes reduced reflections and eye strain	5.3	12.1	21.0	38.6	23.0

Source: Author's Field Survey (2024/2025)

4.3 User's Satisfaction with Visual comfort in Lagos State cinemas based on Identified Parameters

As shown in Table 3, when examining the shape and layout of cinemas, 68.3% of respondents expressed satisfaction. Window placement, however, emerged as the weakest-performing factor, with only 59% satisfaction. Colour and finishes received a moderate 65% satisfaction rate. In terms of screen visibility, 68.2% of respondents reported satisfaction, highlighting that visibility is generally good across cinemas. Nonetheless, distortion was occasionally noted in side seats. To address this, the new design introduced curved layouts that mitigate poor viewing angles and enhance overall immersion. Lighting transition also drew mixed responses, with 66% satisfaction and 16% dissatisfaction. Complaints centered on sudden brightness shifts when moving between spaces. This finding underscores the need for staged transitions, such as lobbies with natural daylight filtered through anti-glare glass, followed by dimly lit vestibules that ease the transition into darkened halls.

Table 3:Users' Satisfaction with visual comfort parameters

Feature	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied	Total (%)
1. General lighting in the auditorium	15 (4.5%)	23 (6.9%)	57 (17.1%)	143 (42.8%)	96 (28.7%)	100
2. Shape and layout of the hall	12 (3.6%)	37 (11.0%)	57 (17.1%)	141 (42.2%)	87 (26.1%)	100
3. Placement of the windows	32 (9.6%)	33 (9.9%)	72 (21.6%)	117 (35.0%)	80 (24.0%)	100
4. Colours of walls/curtains	21 (6.3%)	29 (8.7%)	67 (20.1%)	129 (38.6%)	88 (26.3%)	100
5. Screen visibility from seat	14 (4.2%)	31 (9.3%)	61 (18.3%)	134 (40.1%)	94 (28.1%)	100
6. Lighting transition (lobby to hall)	19 (5.7%)	35 (10.5%)	62 (18.6%)	138 (41.3%)	80 (24.0%)	100
7. Seating layout and arrangement	11 (3.3%)	30 (9.0%)	65 (19.5%)	145 (43.4%)	83 (24.8%)	100
8. Viewing angle from seat	12 (3.6%)	27 (8.1%)	68 (20.4%)	139 (41.6%)	88 (26.3%)	100
9. Glare control and lighting placement	25 (7.5%)	31 (9.3%)	64 (19.2%)	133 (39.8%)	81 (24.3%)	100
10. Overall satisfaction with visual experience	14 (4.2%)	25 (7.5%)	70 (21.0%)	139 (41.6%)	86 (25.7%)	100
11. Window coverings (curtains/blinds)	22 (6.6%)	29 (8.7%)	72 (21.6%)	128 (38.3%)	83 (24.8%)	100

12. Type of window preventing reflections	27 (8.1%)	34 (10.2%)	78 (23.4%)	122 36.5%)	73 (21.9%)	100
13. Ceiling height and immersive experience	16 (4.8%)	28 (8.4%)	60 (18.0%)	137 (41.0%)	93 (27.8%)	100

Source: Author's Field Survey (2024/2025)

4.4 Features best adapted for enhancing visual comfort in the cinemas

A five point likert scale was used in appraising the best visual comfort conditions to be adapted for use in future cinema designs based on responses from respondemts. A significant majority (78.2%) agreed or strongly agreed that the shape of the cinema hall affects viewing comfort, confirming the strong influence of auditorium geometry on visual experience. Stepped seating was rated even higher, with 82.5% agreement, emphasizing its importance in ensuring unobstructed sightlines. In comparison, 70.3% of respondents favored curved layouts over rectangular halls, reflecting growing recognition of their effectiveness in optimizing visual focus.

Table 3: Best Features for Enhanicng Visual Comfort in Cinemas using Likert Scale (N=332)

Feature	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied	Total (%)
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Source: Author’s Field Survey (2024/2025)

V. Design Proposal: Ede North Staff Low-Income Housing Estate

5.1 Design Concept and Brief

Based on the survey findings, users generally express satisfaction with features such as seating comfort, stepped seating layouts, and acoustic panels that minimize sound distractions. However, consistent concerns were raised about obstructive structural pillars, poorly treated windows that allow unwanted daylight, and reflective finishes that disrupt visual focus. These deficiencies directly affect visual comfort, thereby reducing the immersive quality of the cinema experience. Based on these findings, a design for the first cinema in Ogbomoso; Orumogege movie theater was proposed.

5.2 Design Principles

The design integrates the following evidence-based principles: (i) Ergonomic Hall Geometry; (ii) Stepped and Tiered Seatings; (iii) Glare-Free Windows; (iv) Use of Non-Reflective Interior Finishes; (v) Seating Comfort and Ergonomics; (vi) Acoustic Optimisation; and (vii) Integrated Lighting Strategies.

VI. Conclusion and Recommendations

6.1 Conclusion

This study has demonstrated that integrating architectural features such as anti-glare windows in circulation spaces, blackout conditions within auditoria, carefully selected interior finishes, and appropriate lighting transitions. The inclusion of these features is intended to reduce visual discomfort, enhance screen visibility, and minimize the risk of accidents in circulation zones, especially for vulnerable groups such as individuals with eye defects. The proposed Orumogege movie theater offers a context-responsive and replicable model for cinema designs in semi-urban Nigeria.

6.2 Recommendations

Based on the findings, the following recommendations are proposed:

[1] Cinemas should maximize the use of natural light in lobbies, stair halls, and circulation spaces by employing anti-glare glazing, skylights, and diffused openings.

[2] Capacity-building workshops and professional training programmes for architects, engineers, and artisans should be institutionalised to bridge the 82% identified technical knowledge gap.

[3] Future cinema designs should prioritize stepped and staggered seating with appropriate riser heights and ergonomic spacing.

[4] Walls, ceilings, and other finishes within auditoria should adopt matte, low-reflective materials in darker tones. This approach significantly reduce reflections and eye strain, ensuring prolonged comfort during screenings and supporting patrons with heightened visual sensitivity (Yunitsyna and Toska, 2023).

[5] Cinemas should invest in motorized blackout blinds or curtains for windows in any space near auditoria. This ensures that screenings remain undisturbed by daylight while also giving operators flexibility to adjust lighting for multipurpose events..

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