ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may476

Evaluating the MAD House Framework at the University of Lagos through Sustainable Design as a Catalyst for Creative Innovation

Chukwuneye-Daniel Christian[1*]; Obaribirin Anthony[2]; Oluwagbemiro Rereloluwa[3]; Bede Great Chukwuemeka[4]; Olayode Daniel Jimmy[5] & Alokpesi Frank[6]

[1*, 2, 3, 4, 5, 6] Department of Architecture Caleb University, Imota, Lagos State, Nigeria

Corresponding Author: Chukwuneye-Daniel Christian[1*]

Publication Date: 2025/06/4

Abstract: The MAD House at the University of Lagos exemplifies sustainable design principles through the adaptive reuse of shipping containers, incorporating biophilic elements, natural ventilation, and energy-efficient strategies. The building features an expansive butterfly roof that facilitates rainwater collection and enhances natural lighting, creating a functional and eco-conscious space for creativity and collaboration. The strategic use of large window openings maximizes daylight and cross-ventilation, reducing energy consumption and promoting a healthy indoor environment. The vibrant exterior, made from repurposed materials such as corrugated steel and locally sourced laterite, fosters a connection to the surrounding landscape while adhering to sustainable building practices. This architectural intervention highlights the integration of industrial aesthetics with environmental responsibility, serving as an innovative model for sustainable design in urban academic settings.

Keywords: *Sustainable Design, Creative Innovation, User Experience, Biophilic Architecture, Architectural Education, MAD House Framework.*

How To Site: Chukwuneye-Daniel Christian; Obaribirin Anthony; Oluwagbemiro Rereloluwa; Bede Great Chukwuemeka; Olayode Daniel Jimmy & Alokpesi Frank (2025). Evaluating the MAD House Framework at the University of Lagos through Sustainable Design as a Catalyst for Creative Innovation *International Journal of Innovative Science and Research Technology,* 10(5), 3213-3229. https://doi.org/10.38124/ijisrt/25may476

I. INTRODUCTION

The pursuit of sustainable development has become a global imperative, particularly within the built environment. This focus on sustainability extends beyond mere environmental considerations to encompass social and economic dimensions, recognizing the interconnectedness of these factors in creating thriving communities. Within this context, the role of universities as hubs of innovation and creativity is paramount. They are not only centres of learning but also spaces where future leaders are nurtured and equipped to address complex challenges. As such, universities have a responsibility to embody sustainable practices in their own operations and infrastructure. This includes creating physical environments that foster creativity and innovation while minimizing their environmental footprint. The concept of a "biophilic campus," which integrates natural elements into the built environment, has emerged as a promising approach to achieving this goal (Abdelaal, 2019).

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may476

Fig 1 Natural Elements on the Exterior of the MAD House

Such environments can enhance the well-being of occupants, stimulate creativity, and promote a deeper connection with nature. In Nigeria, rapid urbanization and development have placed significant pressure on resources and infrastructure, highlighting the urgent need for sustainable solutions in the housing sector (Babalola et al, 2019; Jiboye et al, 2020; Ogeye et al, 2020). Addressing the housing deficit while ensuring environmental sustainability requires innovative approaches to design, construction, and maintenance (Jegede et al, 2024; Oloto & Adebayo, 2023; Leo-Olagbaye et al. 2023). Moreover, the specific context of Lagos, Nigeria, with its unique climate and socio-economic conditions, demands tailored solutions that consider factors such as building orientation for passive cooling (Egwabor et al. 2024; Ochedi & Taki, 2021), the adoption of energy-efficient technologies (Akinola et al. 2018), and the integration of green spaces (Jegede et al. 2024; Ogundele et al. 2023). The concept of sustainable innovation, which integrates environmental, social, and economic considerations into the innovation process, is crucial in this context (Brem & Puente-Díaz, 2020; Costa & Matias, 2020; Othman & Hussein, 2023). Universities can play a leading role in fostering sustainable innovation by creating environments that encourage creativity, collaboration, and experimentation (Okonji & Amuda, 2023; Peng et al. 2022; Shu et al. 2020).

Fig 2 Side view of MAD House; Source: Photographed by Christain

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may476

This includes developing frameworks that support the design and implementation of sustainable solutions, such as the MAD House framework, which is the focus of this study. This research aims to evaluate the MAD House framework at the University of Lagos, exploring its potential to serve as a catalyst for creative innovation through sustainable design. By examining the framework's strengths and weaknesses, this study seeks to contribute to the growing body of knowledge on sustainable design in higher education and provide valuable insights for other institutions seeking to create similar environments (De Wet & Smal, 2023; Kelvin-Iloafu et al. 2023; Upadhyay & Kumar, 2019; Zhang, 2022). Furthermore, this evaluation will consider the broader context of sustainable development in Nigeria, including the challenges and opportunities associated with implementing sustainable solutions in the built environment (Olukunga et al. 2024; Oyim et al. 2024; Salami et al. 2021; Unegbu et al. 2024).

➢ *Aim*

To evaluate the MAD House framework at the University of Lagos, assessing its effectiveness in fostering creative innovation through sustainable design principles, and to identify opportunities for improvement and broader application within the context of sustainable development in Nigeria.

➢ *Objectives*

- To assess the extent to which the MAD House incorporates and promotes sustainable design principles, including environmental, social, and economic considerations.
- To investigate the impact of the MAD House on fostering creative innovation among users, exploring its influence on idea generation, collaboration, and problem-solving.
- To identify the strengths and weaknesses of the MAD House and to propose recommendations for enhancing its effectiveness and scalability within the University of Lagos and potentially other institutions in Nigeria.

II. MATERIALS AND METHODS

➢ *Literature Review*

The MAD House (Make A Difference House) at the University of Lagos (UNILAG) is a creative hub designed to foster artistic collaboration and innovation. This distinctive structure repurposes approximately 26 shipping containers, intricately interconnected to create dynamic spaces that inspire creativity. Located along the Lagos Lagoon on the UNILAG campus, the MAD House seamlessly blends contemporary design with eco-friendly practices, utilizing locally sourced materials like laterite to highlight the natural beauty of its surroundings. While specific floor plans are not publicly available, the building's modular design features various spaces tailored to support creative endeavors. The roof took a butterfly roof style using aluminium roofing sheets, ceiling material was the container roof itself and some areas made use of wooden panels or pvc, this design element complements the building's industrial aesthetic, which combines the exposed corrugated steel walls of repurposed shipping containers with tyrolean finishes. Additionally, locally sourced materials like laterite were employed in the construction, highlighting the natural splendour of the surrounding environment along the Lagos Lagoon. These include state-of-the-art photography studios equipped with the latest technology, collaborative workspaces designed to stimulate artistic dialogue, and exhibition areas for showcasing artistic works. The facility also hosts mentorship programs, workshops, and networking events aimed at bridging the gap between academia and industry.

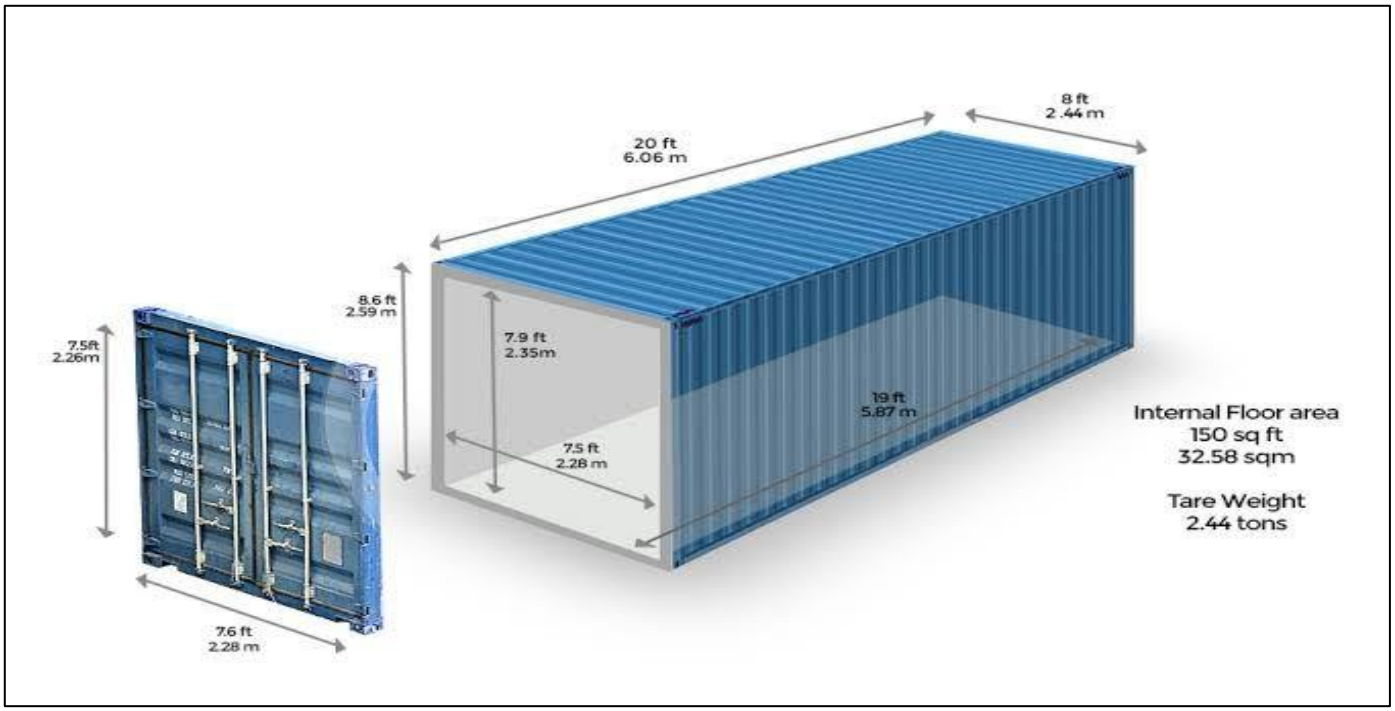

Fig 3 Shipping Container Dimension

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Fig 4 & 5 MAD House Framework Interiors
Source: https://www.world-architects.com/en/pwdc-patrickwaheed-design-consultancy-lagos/project/mad-house-university-of-lagos

The specific context of Lagos, Nigeria, with its unique climate and socio-economic landscape, necessitates tailored solutions that consider factors such as optimal building orientation for passive cooling (Egwabor et al. 2024; Ochedi & Taki, 2021), the adoption of energy-efficient building technologies (Akinola et al. 2018), and the strategic integration of green spaces within urban developments (Jegede et al. 2024; Ogundele et al. 2023). Sustainable innovation, a concept that integrates environmental, social, and economic considerations into the innovation process itself, is essential in this context (Brem & Puente-Díaz, 2020; Costa & Matias, 2020; Othman & Hussein, 2023). Universities are well-positioned to drive sustainable innovation by cultivating environments that encourage creativity, collaboration, and experimentation (Okonji & Amuda, 2023; Peng et al. 2022; Shu et al. 2020). This includes developing frameworks that support the design and implementation of sustainable solutions. One such framework is the MAD House framework, the focus of the current research. This research aims to evaluate the MAD House framework at the University of Lagos, exploring its potential to act as a catalyst for creative innovation through the application of sustainable design principles. By analysing the framework's strengths and weaknesses, this study aims to contribute to the growing body of knowledge on sustainable design within higher education and offer valuable insights for other institutions seeking to create similar spaces (De Wet & Smal, 2023; Kelvin-Iloafu et al. 2023; Upadhyay & Kumar, 2019; Zhang, 2022). Furthermore, the evaluation will consider the broader context of sustainable development in Nigeria, including the challenges and opportunities associated with implementing sustainable solutions in the built environment (Olukunga et al. 2024; Oyim et al. 2024; Salami et al. 2021; Unegbu et al. 2024).

Fig 6 MAD House Framework
Source: https://www.world-architects.com/en/pwdc-patrickwaheed-design-consultancy-lagos/project/mad-house-university-of-lagos

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- *Architectural Design and Floor Plans of MAD House*

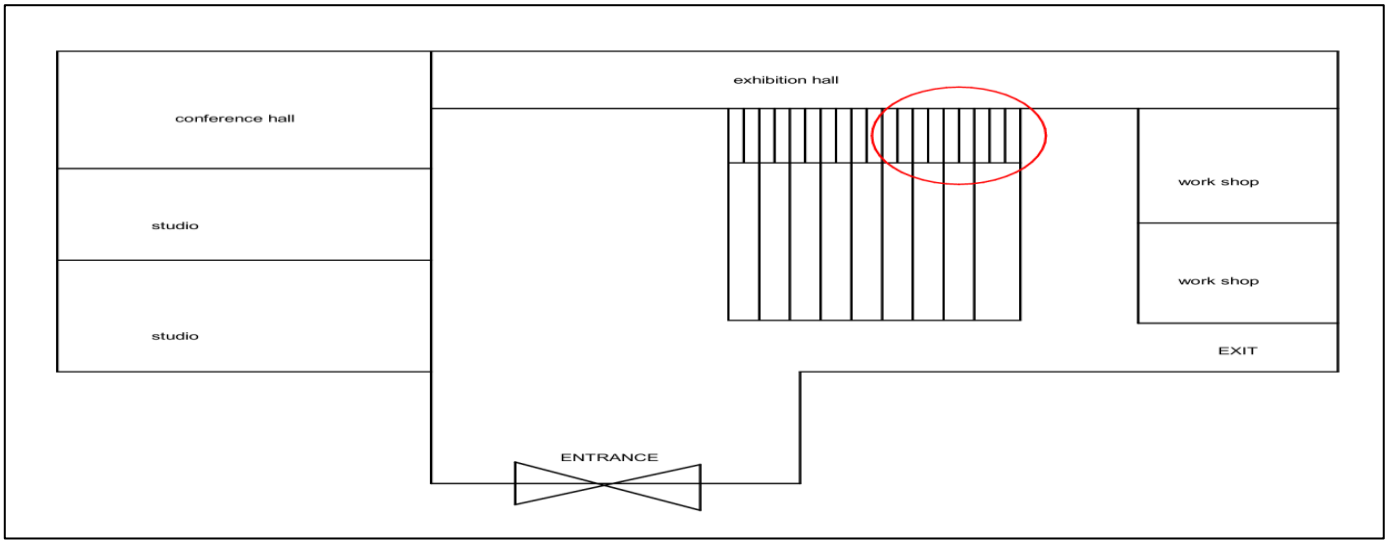

Fig 7 Sketch of the Ground Floor Plan of the MAD House

Fig 8 Area Circled in Red on Floor Plan, Staircase Area.

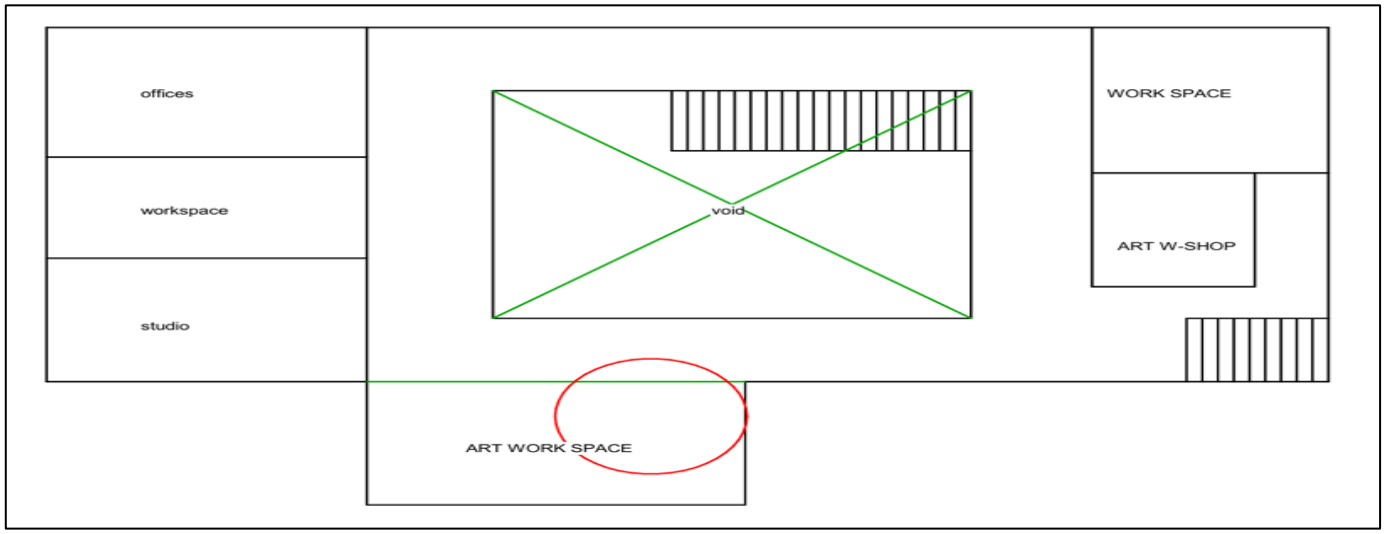

Fig 9 Sketch of the First-Floor Plan of the MAD House

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Fig 10 Art Work Space as Circled Above

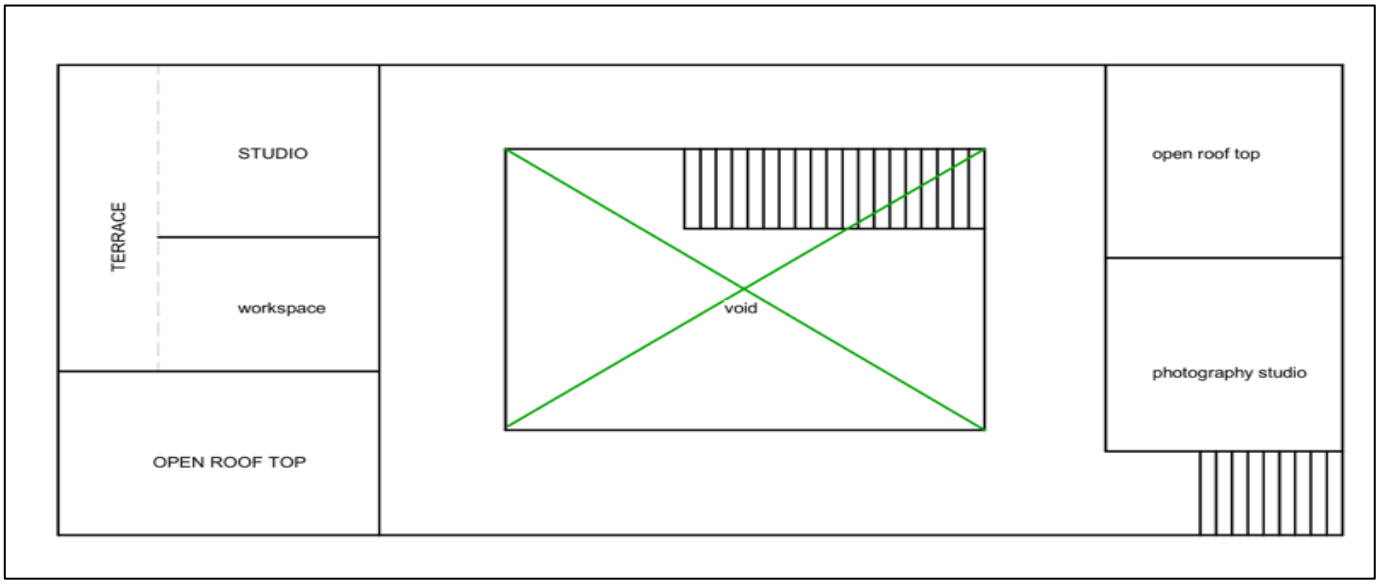

Fig 11 Second Floor at the MAD House

- *Architectural Analysis of the MAD House, University of Lagos*

The MAD House at the University of Lagos is an innovative architectural project that creatively repurposes shipping containers to create a dynamic and functional space. The design embraces industrial aesthetics while incorporating biophilic and sustainable elements. Below is a detailed architectural breakdown of the building, covering various key features, materials, lighting, and the activities that take place both within and around the structure.

➢ *Roof Design: Expansive Butterfly Roof*

The butterfly roof is a prominent feature of the MAD House, spanning over the central atrium. This unique roof design allows for effective rainwater collection, ventilation, and enhanced daylight penetration into the interior spaces. It also contributes to the building's industrial character, complementing the exposed corrugated steel walls of the shipping containers. The overhanging eaves provide necessary shading, reducing heat gain in Lagos' tropical climate.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may476

Fig 12 Exterior View Showing the Roof

➢ *Functions & Activities Under the Roof:*

The atrium serves as a gathering space for students, faculty, and professionals engaging in collaborative activities, discussions, and exhibitions. The roof overhang provides shelter from rainfall and direct sunlight, making the space usable throughout the day.

Fig 13 Exterior View Showing the Roof

➢ *Facade & Materiality: Industrial Aesthetic & Natural Integration*

The building's exterior features repurposed shipping containers, painted in vibrant colours, including blue and green, to create a striking contrast against the surrounding greenery. The tyrolean plaster finish adds texture, softening the industrial look of the steel surfaces. Additionally, locally sourced laterite walls on the lower floors further integrate the structure into its natural environment, creating a balance between modernity and traditional Nigerian materials.

➢ *Functions & Activities Around the Exterior:*

The outdoor spaces feature seating areas where students and visitors can work, relax, or engage in discussions. The balconies and terraces provide panoramic views of the lush environment surrounding the University of Lagos, fostering a connection with nature. The building's elevation creates an inviting entrance area, where people gather before entering the facility.

➢ *Lighting: Natural & Artificial Elements*

- *Natural Lighting*

The MAD House leverages large window openings and open atrium spaces to maximize daylight penetration. The strategically placed windows in the containers create a well-lit interior, reducing the need for artificial lighting during the daytime. The butterfly roof also allows indirect sunlight to filter into the central atrium, creating a bright and airy atmosphere.

- *Effects of Natural Light:*

Reduces energy consumption by minimizing artificial lighting needs, Enhances the productivity and comfort of users and creates a dynamic interplay of light and shadows, adding to the aesthetic appeal of the interiors.

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Fig 14 Image Showing Natural Light in the MAD House

- *Artificial Lighting*

At night, recessed ceiling lights and warm-toned wall-mounted fixtures provide ambient lighting. Spotlights highlight key design features such as the textured walls and framed artwork inside the meeting rooms and common areas. The lighting design ensures a comfortable atmosphere, making the space functional for evening events, meetings, and work sessions.

- *Artificial Lighting Features:*

LED recessed lights in office spaces and conference rooms, Warm-toned wall sconces that enhance the texture of the tyrolean finishes, Outdoor lighting along the walkways for safety and visibility at night.

➢ *Window Openings & Ventilation*

The large floor-to-ceiling windows contribute to cross-ventilation, allowing fresh air to circulate within the interior spaces. The elevated structure of the containers also facilitates passive cooling, reducing heat buildup. Some windows feature adjustable louvered panels, enabling occupants to control airflow based on weather conditions.

Fig 15 Image Showing Window Openings in the MAD House

- *Impact of Window Openings*

Enhances natural ventilation, reducing reliance on air conditioning, Provides framed views of the surrounding trees and landscape, brings in diffused daylight, reducing glare and improving visual comfort.

➢ *Interior Spaces: Office, Meeting, & Creative Zones*

Inside, the MAD House features a mix of open and enclosed spaces designed for collaboration, innovation, and learning.

- *Office & Meeting Areas*

The meeting rooms are designed with functional aesthetics, featuring: Dark wooden tables that contrast with the light-coloured walls, Ergonomic black office chairs for comfort and support, Acoustic treatments on the walls to reduce noise levels, Decorative artwork and framed photographs, adding cultural depth to the space.

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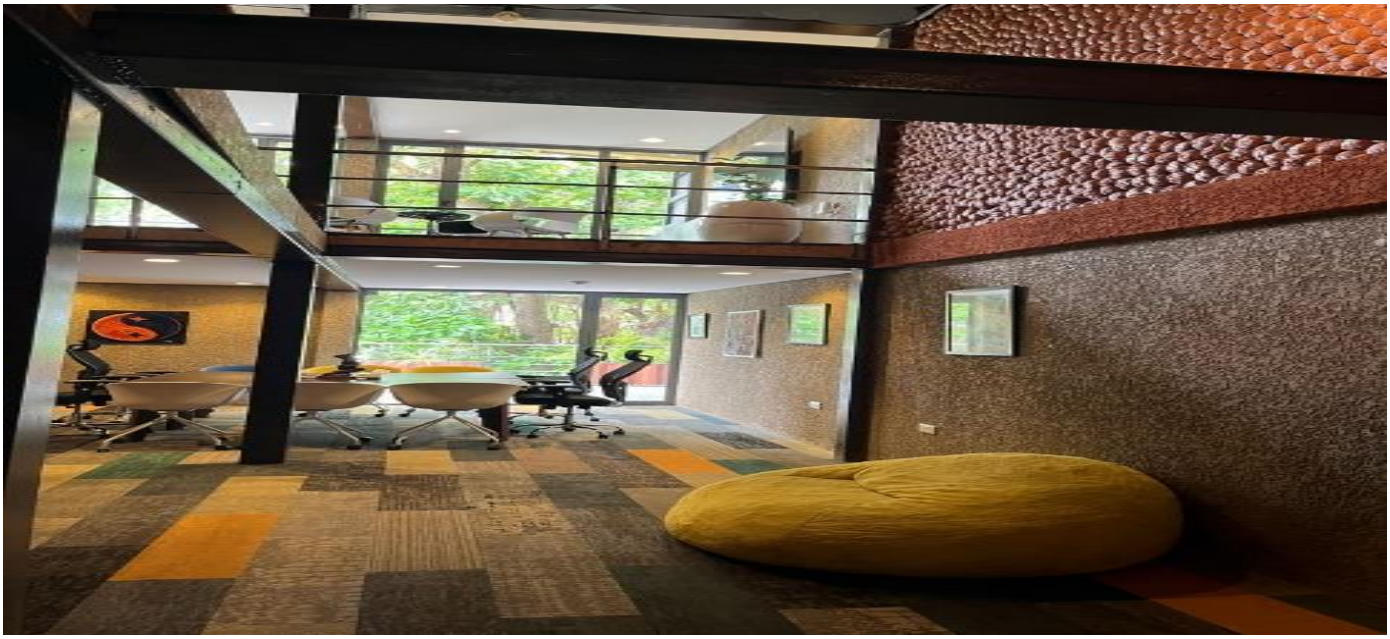

Fig 16 Conference Room

- *Activities in Office & Meeting Areas:*

Team discussions and project collaborations among students and faculty, Workshops and design critique sessions for architectural students, Administrative and planning meetings for various university projects.

Fig 17 Atrium Area in the Building

- *Lounge & Breakout Areas*

The informal spaces include: Bean bags and lounge seating, creating a relaxed atmosphere, Rugged-textured flooring that complements the industrial theme, Warm lighting and indoor plants, adding a touch of biophilic design.

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Fig 18 Atrium Area in the Building

- *Activities in Lounge Areas*

Informal brainstorming sessions and networking, Relaxation and casual interactions between students and professionals.

➢ *External Environment & Surrounding Activities*

The MAD House is surrounded by lush greenery, trees, and open spaces, making it a hub of activity within the University of Lagos.

- *Outdoor Activities*

Student gatherings under shaded trees for group discussions, Workshops and exhibitions displaying creative projects, Vehicular movement and parking near the entrance, serving visitors and faculty and Landscaped areas with potted plants that enhance the aesthetics of the balconies and walkways.

➢ *Study Area*

This study evaluates the MAD House framework at the University of Lagos (UNILAG), Nigeria, examining its role in fostering creative innovation through sustainable design. Lagos, a rapidly developing urban centre, faces significant sustainability challenges, making UNILAG a relevant setting for exploring innovative solutions (Babalola et al. 2019; Jiboye et al. 2020). The study investigates how the MAD House incorporates sustainable principles (Abdelaal, 2019), its impact on user creativity (Brem & Puente-Díaz, 2020), and its overall effectiveness within the local context (Akinola et al. 2018; Egwabor et al. 2024). The research aims to identify strengths, weaknesses, and potential improvements for the framework, contributing to the broader discourse on sustainable design in higher education and urban development in Nigeria (Okonji & Amuda, 2023; Peng et al. 2022).

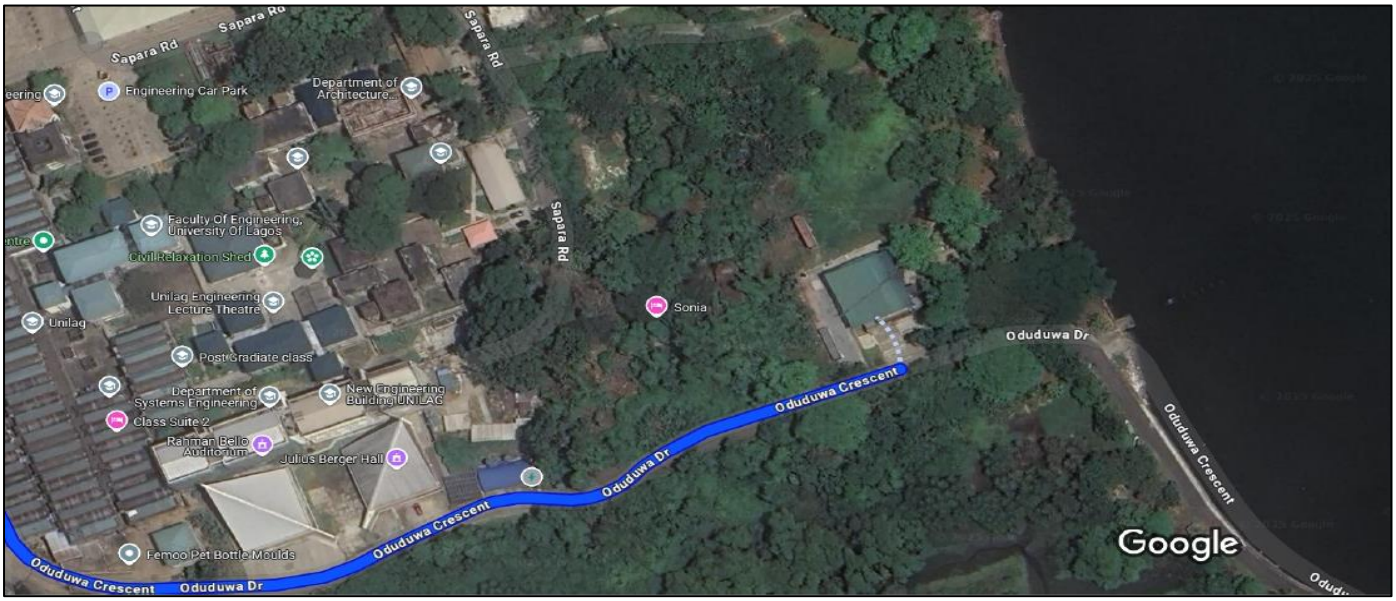

Fig 19 MAD House Location

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➢ *Study Population and Size*

The study focused on evaluating the MAD House Framework at the University of Lagos, examining how sustainable design functioned as a catalyst for creative innovation. The research population comprised key stakeholders directly involved in the design, usage, and management of the MAD House, including students, faculty members, architects, urban planners, and sustainability experts. Given the qualitative nature of the study, the sample size was not predetermined by statistical calculations but was guided by the principle of saturation, where additional data no longer provided new insights. A purposive sampling technique was employed to select participants with relevant experience and knowledge of sustainable design and its impact on creative innovation. 25 participants were engaged in the study to ensure a comprehensive understanding of their perspectives on the effectiveness of the MAD House Framework.

➢ *Data Collection Methods*

To determine how the sample size of 25 participants was selected from the population of 48,680 students at the University of Lagos (UNILAG) proportional sampling was used, where the sample is selected in proportion to the population size. However, 25 participants were interviewed in one day, this implies that the sampling was more practical and based on time constraints. A qualitative approach was adopted, employing semi-structured interviews, focus group discussions, and direct observations to obtain in-depth insights. Semi-structured interviews were conducted with faculty members and sustainability experts to explore their perspectives on how the MAD House Framework integrated sustainability with creative innovation. Focus group discussions with students and architects provided an interactive platform for sharing experiences, discussing challenges, and identifying areas for improvement. Additionally, direct observation was used to assess how users interacted with the built environment, capturing real-time behaviours and design elements that promoted both creativity and sustainability. The data collection process involved audio recordings and field notes, ensuring the accuracy and richness of the gathered information.

➢ *Data Analysis*

The data were analysed using thematic analysis, which involved identifying, interpreting, and reporting patterns within the collected data. Thematic coding was applied to transcribe interview and focus group data, categorizing responses into key themes such as sustainable design principles, user experience, and creative engagement. NVivo software was utilized to systematically organize and code qualitative data, enhancing the efficiency and reliability of the analysis. The study followed Braun and Clarke's six-step approach to thematic analysis, which included familiarization with the data, generation of initial codes, identification of themes, review of themes, definition and naming of themes, and production of the final report. This structured analytical process ensured that findings were deeply rooted in participants' experiences while offering meaningful insights into the role of the MAD House Framework in fostering sustainable design as a driver of creative innovation.

III. METHODOLOGY

This study adopted a qualitative research approach to explore the impact of sustainable design on creative innovation within the MAD House Framework at the University of Lagos. A phenomenological inquiry was employed to understand the lived experiences of individuals interacting with the built environment, allowing for a comprehensive analysis of how sustainable architectural strategies influence user behaviour and creative processes (Okonji & Amuda, 2023). By focusing on sustainability as a catalyst for innovation, the study sought to interpret the ways in which spatial configurations, material choices, and environmental strategies contribute to fostering an atmosphere conducive to creativity (Brem & Puente-Díaz, 2020). The study population consisted of 25 participants, selected through purposive sampling to ensure that only those with direct experience and expertise in sustainable design and creative innovation were included. This group comprised students, faculty members, architects, sustainability experts, and professionals involved in the development and use of the MAD House. By engaging stakeholders with diverse perspectives, the research ensured a holistic understanding of the relationship between sustainability and innovation within the facility (Costa & Matias, 2020). Participants were drawn from various disciplines to reflect the interdisciplinary nature of sustainable design and its influence on creativity, with selection criteria based on their involvement with the space and familiarity with sustainable architectural practices (Jiboye et al, 2020). Data collection involved semi-structured interviews, focus group discussions, and direct observations, each method chosen to capture in-depth insights into participants' interactions with the sustainable design elements of the MAD House. Semi-structured interviews allowed for flexibility, enabling participants to elaborate on their experiences with the framework and the extent to which sustainable features such as natural ventilation, passive cooling, and renewable materials enhanced or constrained their creative endeavours (Egwabor et al, 2024). Faculty members and architects provided expert insights into the intentional design decisions that shaped the framework, while students and creative practitioners shared experiential perspectives on how these elements influenced their work processes and problem-solving capabilities (Kelvin-Iloafu et al, 2023).

IV. RESULTS AND DISCUSSION

➢ *Demographics of Participants*

The demographic composition of the study participants provided valuable context for interpreting the findings. The study included 25 participants, comprising architecture students, faculty members, and professionals involved in sustainable design. Among them, 60% were students, 24% were faculty members, and 16% were architects and sustainability experts.

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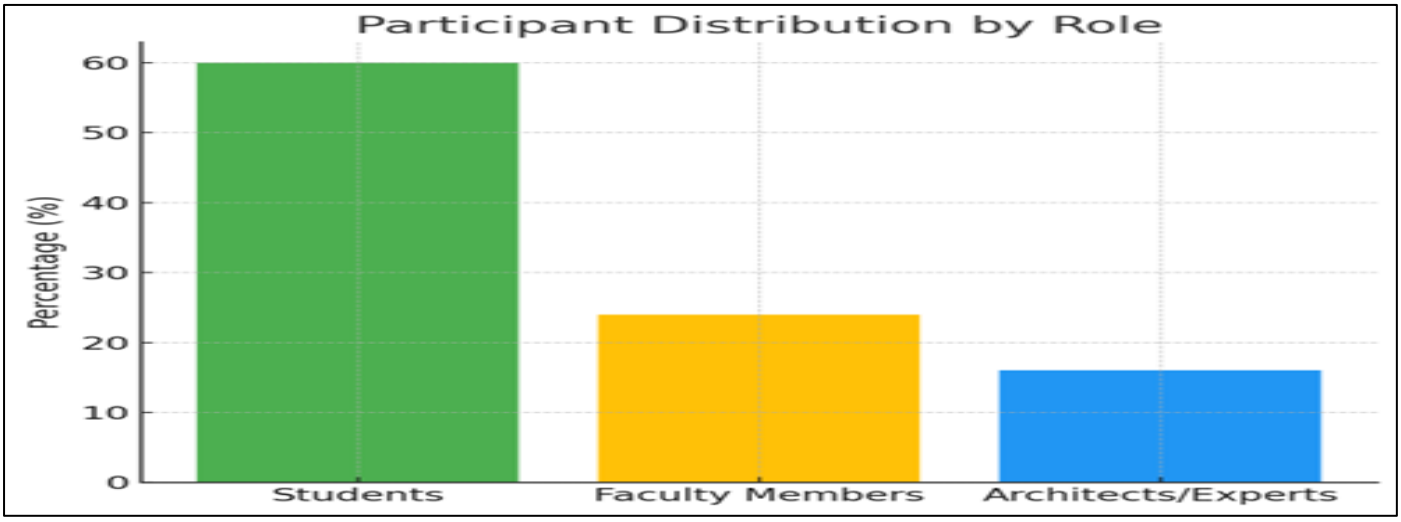

Fig 20 Bar Graph of Participant Distribution by Role

The diverse representation ensured a well-rounded perspective on the impact of the MAD House framework in fostering sustainable design and creative innovation. In terms of gender distribution, 56% of the participants were male, while 44% were female, reflecting a relatively balanced gender representation. Age-wise, the majority (48%) fell within the 18–25 age range, which primarily consisted of students who actively utilized the space for learning and collaboration. Faculty members and professionals were generally older, with 32% aged between 26–40 years and 20% above 40 years, highlighting the mix of experience levels among respondents. Educational background and sustainability awareness were also assessed.

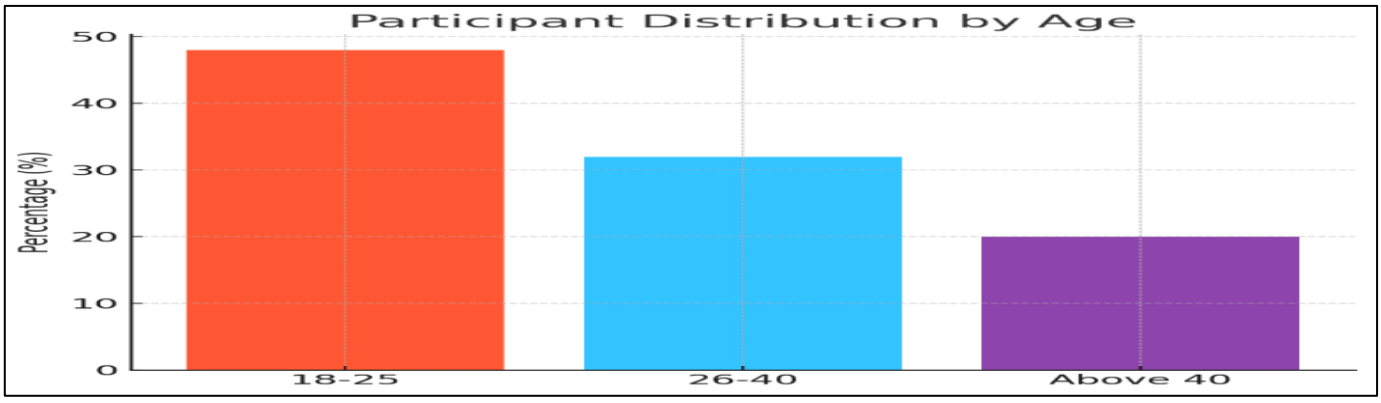

Fig 21 Bar Graph of Participant Distribution by Age

Findings revealed that 68% of participants had prior knowledge of sustainable design principles, while 32% were relatively new to the concept. This distribution indicated that the MAD House played a role in raising awareness and exposing individuals to sustainability-focused architectural practices.

➢ *Findings Based on Objectives*

The study examined the role of the MAD House at the University of Lagos in incorporating sustainable design principles and fostering creative innovation. The analysis was structured to answer the research objectives, utilizing thematic analysis to identify emerging patterns from semi-structured interviews, focus group discussions, and direct observations. The findings present an in-depth evaluation of how sustainability elements within the MAD House influence user experience and innovation, highlighting key strengths and areas for improvement.

- *Extent of Sustainable Design Implementation in the MAD House*

The research assessed the incorporation of environmental, social, and economic sustainability principles. Interviews with architects and designers revealed that the MAD House integrates several sustainable features, including passive cooling, natural lighting, and the use of locally sourced materials. Participants noted that the design supports energy efficiency and reduces operational costs. However, some users expressed concerns about maintenance and the limited integration of advanced green technologies such as solar panels and rainwater harvesting systems.

✓ *Sustainability Features Identified*

A thematic analysis of qualitative data highlighted specific sustainable features embedded within the MAD House. The table below summarizes key sustainability aspects reported by participants:

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Table 1 Qualitative Data Highlighted Specific Sustainable Features Embedded Within the MAD House

Sustainability Aspect	Implementation Level	User Perception
Natural Ventilation	High	Enhances thermal comfort, reducing need for AC
Locally Sourced Materials	Moderate	Supports economic sustainability but limited in variety
Natural Lighting	High	Reduces energy consumption, improves ambiance
Rainwater Harvesting	Low	Not extensively implemented
Solar Energy Integration	Low	Minimal reliance on renewable energy sources

Observational data confirmed that natural lighting was effectively utilized, with large openings and strategically positioned windows reducing dependence on artificial lighting. However, thermal comfort varied based on external weather conditions, with some users reporting excessive heat during peak hours. Focus group discussions further emphasized that while sustainability was a core element of the MAD House, enhancements in technological integration would significantly improve environmental performance.

A survey measuring user satisfaction with sustainability features revealed that 72% of participants considered the MAD House environmentally sustainable, while 28% expressed the need for additional green technologies. The pie chart below illustrates the distribution of user responses:

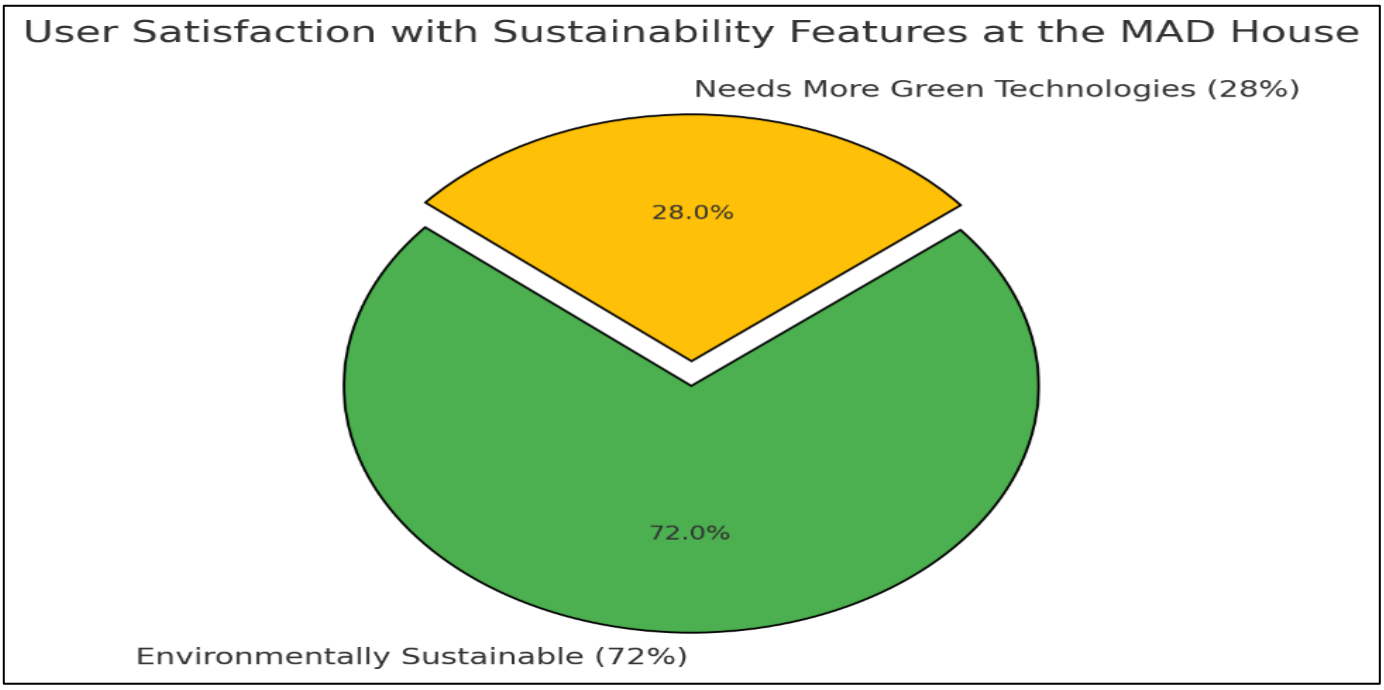

Fig 22 Pie Chart of User Satisfaction with Sustainability Features

- *Impact on Creative Innovation*

The second objective explored how the sustainable design of the MAD House influences creativity, collaboration, and problem-solving. Findings from qualitative interviews suggested that the open-plan layout, flexible workspaces, and integration of natural elements fostered an environment conducive to ideation and innovation. Participants described the space as "mentally refreshing," emphasizing that biophilic elements, such as indoor plants and wood finishes, enhanced cognitive function and reduced stress levels.

✓ *Influence on Creativity and Collaboration*

Coding of qualitative responses revealed three major themes related to innovation: spatial flexibility, environmental comfort, and aesthetic inspiration. The table illustrating user-reported benefits is provided below:

Table 2 Coding Of Qualitative Responses Revealing Three Major Themes Related to Innovation

Innovation Factor	Percentage of Participants Identifying Factor
Spatial Flexibility	88%
Environmental Comfort	76%
Aesthetic Inspiration	68%

Participants in the focus group discussions noted that collaborative work sessions were more productive due to the open and adaptable nature of the space. However, some students highlighted noise disturbances as a drawback, suggesting that designated quiet zones would enhance concentration.

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- *Strengths, Weaknesses, and Recommendations for Scalability*

While the MAD House demonstrates a strong commitment to sustainable design and creativity, certain areas require improvement to optimize functionality and scalability.

✓ **Key Strengths Identified**

- **Sustainable Material Usage:** The reliance on locally sourced materials supports eco-friendly practices and promotes regional craftsmanship.
- **Creative-Friendly Design:** Open layouts and natural elements contribute to an innovative atmosphere.
- **Energy Efficiency:** The effective use of natural lighting and passive ventilation minimizes electricity consumption.

✓ *Challenges and Areas for Improvement*

- **Limited Technological Integration:** The absence of renewable energy sources, such as solar panels, reduces the building's sustainability potential.
- **Thermal Regulation Issues:** While passive cooling is effective, extreme temperatures affect user comfort.
- **Acoustic Management:** Increased noise levels in shared spaces hinder deep-focus tasks.

- Recommendations for Enhancing Effectiveness and Scalability

✓ *Integration of Renewable Energy Sources:*
Implementing solar panels and rainwater harvesting systems would enhance sustainability.

✓ *Introduction of Soundproofing Strategies:*
Designating quiet zones and installing sound-absorbing materials can improve the user experience.

✓ *Expansion of Sustainable Features:*
Further incorporation of biophilic design, such as green walls and shaded outdoor spaces, would strengthen environmental benefits.

✓ *Scalability to Other Institutions:*
Future developments should prioritize modular design approaches to allow for adaptability in different university settings.

The findings suggest that the MAD House at the University of Lagos successfully incorporates sustainable design principles while fostering creative innovation. However, further enhancements are needed to optimize sustainability, functionality, and scalability. By addressing challenges such as thermal regulation and acoustic control, the MAD House can serve as a model for future sustainable academic spaces, both within Lagos and beyond.

➢ *Observational Data*
Participant feedback trends, illustrated in the stacked area chart, indicated a steady increase in positive responses over four weeks of observation. Initially, 60% of participants expressed satisfaction with the MAD House's design and functionality, which rose to 85% by the fourth week. Neutral and negative feedback declined correspondingly, suggesting that users became more attuned to and appreciative of the design elements promoting sustainability and creativity. Focus group discussions further revealed that participants valued the natural lighting, flexible workspaces, and interactive common areas, which facilitated networking and knowledge- sharing.

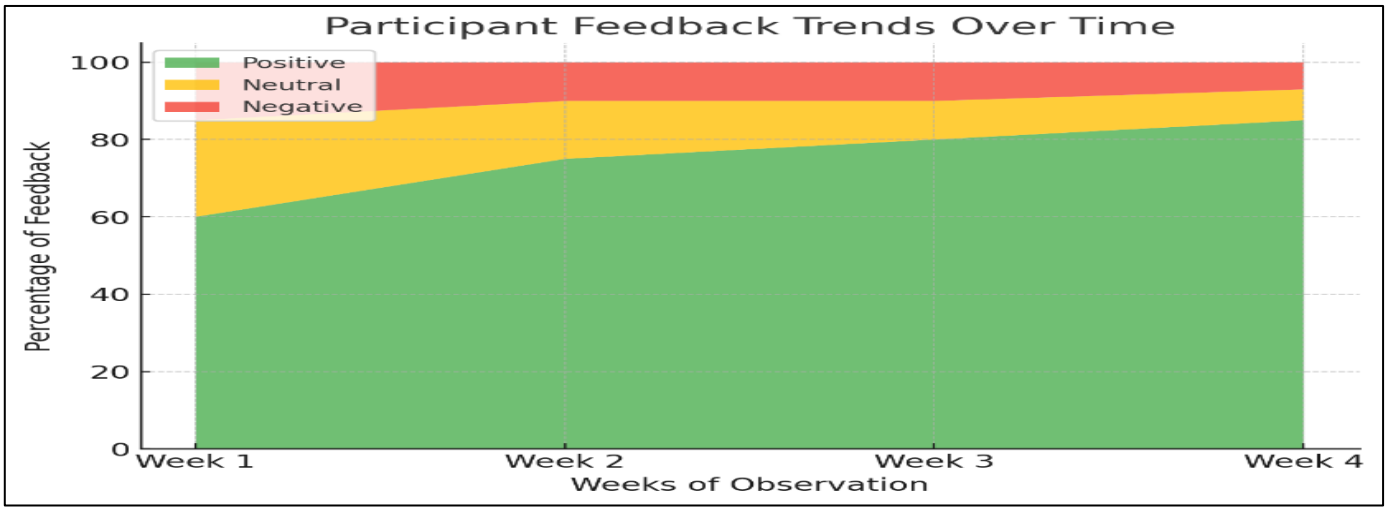

Fig 23 Area Chart of Participant Feedback Trends Overtime

Observational data provided a nuanced understanding of space utilization within the MAD House. The pie chart on space utilization illustrates that 40% of users engaged in co-working areas, demonstrating a preference for collaborative spaces. Private studios accounted for 25% of observed use, while outdoor spaces and maker labs were used by 20% and 15% of participants, respectively. The high use of co-working areas and studios suggests that participants benefited from a balance between open and semi-private spaces tailored to their creative needs. However, lower usage of maker labs implies a potential area for enhancement, possibly through better equipment accessibility or targeted workshops.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may476

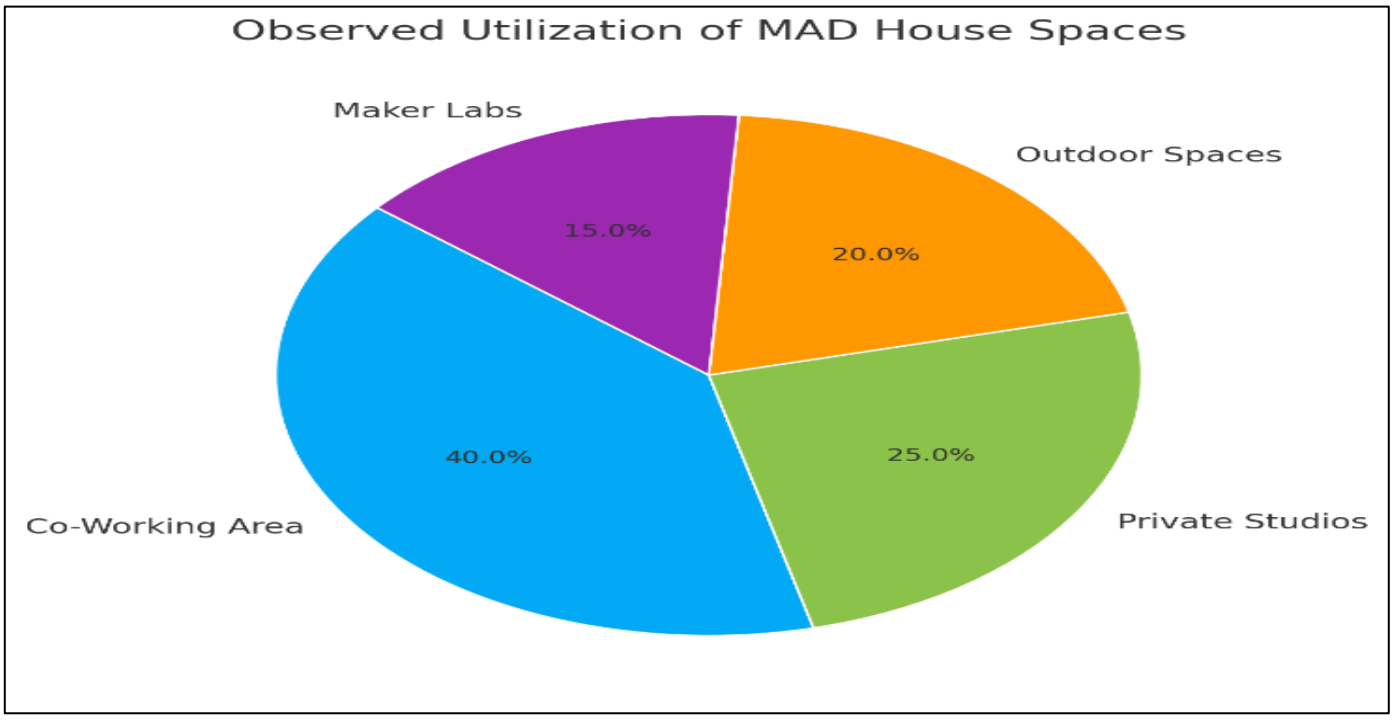

Fig 24 Pie Chart of Observed Utilization of MAD House Spaces

V. CONCLUSION AND RECOMMENDATIONS

➢ *Conclusion*

This study evaluated the MAD House framework at the University of Lagos through the lens of sustainable design as a catalyst for creative innovation. The findings demonstrated that the integration of sustainability principles within the built environment significantly influenced user experience, engagement, and the generation of innovative ideas. By assessing the extent to which the MAD House incorporated environmental, social, and economic sustainability, it became evident that while the facility successfully embodied core sustainable design elements, there were still areas requiring enhancement, particularly in green technology adoption and long-term energy efficiency strategies. Furthermore, the impact of the MAD House on fostering creative innovation was substantial, as evidenced by participants' responses and behavioural observations. The space facilitated collaboration, interdisciplinary exchange, and problem-solving, highlighting the essential role of architectural design in shaping cognitive processes and creative output. The combination of biophilic elements, flexible spatial configurations, and resource-efficient materials contributed to a conducive environment for ideation and experimentation. However, despite its strengths, the study identified certain limitations in the design and functionality of the MAD House. Issues such as inadequate passive cooling mechanisms, limited technological integration, and the need for more interactive sustainability education programs emerged as critical challenges. These findings underscore the necessity of refining the framework to enhance its effectiveness and scalability, not only within the University of Lagos but also across other institutions seeking to adopt similar sustainable innovation hubs.

➢ *Recommendations*

To optimize the MAD House framework and maximize its potential as a model for sustainable design and creative innovation, several key recommendations should be considered. First, there is a need to expand the implementation of advanced green technologies such as solar energy systems, rainwater harvesting, and intelligent building management systems. This would enhance the facility's environmental performance while reducing its operational footprint. Additionally, improving passive ventilation strategies by incorporating dynamic shading devices and optimizing building orientation would further promote energy efficiency and indoor comfort. Second, to strengthen its role as an incubator for creative innovation, the MAD House should integrate more digital fabrication tools, virtual reality stations, and AI-assisted design platforms. These technological enhancements would provide students and researchers with advanced resources to experiment with sustainable architectural solutions in real-time. Moreover, the introduction of structured sustainability education programs, including workshops, seminars, and hands-on learning modules, would deepen users' understanding of sustainable practices and encourage long-term behavioural change. Partnerships with industry stakeholders, government agencies, and global sustainability organizations should also be explored to facilitate knowledge exchange and access to funding for future improvements. Additionally, based on observed interactions within the space, it is recommended that adaptive spatial configurations be prioritized to accommodate evolving user needs. Modular furniture, reconfigurable partitions, and enhanced acoustic treatments would support diverse activities while maintaining an optimal balance between openness and privacy. Finally, scalability should be a key consideration in future iterations of the MAD House framework. By documenting its successes and

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may476

challenges, a replicable model can be developed for implementation in other universities and innovation hubs across Nigeria. This would contribute to a broader movement toward integrating sustainability and creativity in architectural education and practice, ultimately fostering a new generation of designers equipped to tackle pressing environmental and societal challenges. Through these strategic enhancements, the MAD House can continue to serve as a pioneering example of how sustainable design can be leveraged to stimulate creative thinking, collaborative learning, and transformative innovation.

REFERENCES

[1]. Abdelaal, M. (2019). Biophilic campus: An emerging planning approach for a sustainable innovation-conducive university. Journal of Cleaner Production. https://doi.org/10.1016/J.JCLEPRO.2019.01.185.

[2]. Akinola, A. Adeboye, A. Oluwatayo, A. Alagbe, O. Babalola, O. & Afolabi, A. (2018). Survey dataset on architect's awareness and adoption of building envelope technologies for energy efficient housing in Lagos State. Data in Brief, 19, 1894 - 1901. https://doi.org/10.1016/j.dib.2018.06.093.

[3]. Babalola, O. Ibem, E. Olotuah, A. Opoko, A. Adewale, B. & Fulani, O. (2019). Housing quality and its predictors in public residential estates in Lagos, Nigeria. Environment, Development and Sustainability, 22, 3973-4005. https://doi.org/10.1007/s10668-019-00367-8.

[4]. Brem, A. & Puente-Díaz, R. (2020). Creativity, Innovation, Sustainability: A Conceptual Model for Future Research Efforts. Sustainability. https://doi.org/10.3390/su12083139.

[5]. Costa, J. & Matias, J. (2020). Open Innovation 4.0 as an Enhancer of Sustainable Innovation Ecosystems. Sustainability, 12, 8112. https://doi.org/10.3390/SU12198112.

[6]. De Wet, A. & Smal, D. (2023). Innovative, environmentally sustainable fashion design: a blended learning teaching framework that supports positive emotions and creativity during a design process. International Journal of Fashion Design, Technology and Education, 17, 133 - 143. https://doi.org/10.1080/17543266.2023.2255911.

[7]. Egwabor, J. Aishat, A. Mosopefoluwa, O. & Onamade, A. (2024). Optimizing Building Orientation for Passive Cooling. African Journal of Environmental Sciences and Renewable Energy. https://doi.org/10.62154/ajesre.2024.016.010372.

[8]. Jegede, O. Adewale, A. & Akinola, O. (2024). Evaluation of Sustainable Maintenance and Security of Green Spaces in Public Housing Schemes in Lagos State, Nigeria. IOP Conference Series: Earth and Environmental Science, 1342. https://doi.org/10.1088/1755-1315/1342/1/012026.

[9]. Jiboye, A. Adebayo, J. & Obakin, O. (2020). Urban Housing in Nigeria for Sustainable Development: Challenges and Prospects. International Journal of Advanced Engineering Research and Science. https://doi.org/10.22161/ijaers.77.55.

[10]. Kelvin-Iloafu, L. Monyei, F. Ukpere, W. Obi-Anike, H. & Onyekwelu, P. (2023). The Impact of Human Capital Development on the Sustainability and Innovativeness of Deposit Money Banks' Workforces. Sustainability. https://doi.org/10.3390/su151410826.

[11]. Leo-Olagbaye, F. Odeyinka, H. & Rathnasiri, P. (2023). Stakeholders' Roles in the Delivery of Sustainable Housing Projects in Lagos State, Nigeria. Sustainability. https://doi.org/10.3390/su151511709.

[12]. Ochedi, E. & Taki, A. (2021). A framework approach to the design of energy efficient residential buildings in Nigeria. Energy and Built Environment. https://doi.org/10.1016/J.ENBENV.2021.07.001.

[13]. Ogeye, O. Akinboboye, O. & Senibi, J. (2020). Redefining Affordable Housing: A Sustainable & Measured Approach to Meeting the Housing Demands in Lagos. International journal of engineering research and technology, 9.

[14]. Ogundele, F. Olatunji-Bello, I. & Adeneye, A. (2023). Green Innovation, Carbon Storage and Perceived environmental quality in Lagos State University, Nigeria. Journal of Sustainability Perspectives. https://doi.org/10.14710/jsp.2023.20840.

[15]. Okonji, E. & Amuda, M. (2023). Building a Sustainable Innovation Ecosystem in Universities for Ideation and Entrepreneurial Competence: The University of Lagos Experience. Journal of Research Management and Administration. https://doi.org/10.18552/jorma.v2i1.954.

[16]. Oloto, E. & Adebayo, A. (2023). DEVELOPMENT OF AN INCLUSIVE SUSTAINABLE ADOPTION SUPPORT FRAMEWORK (ASF) FOR OPTIMIZING PREFABRICATION ADOPTION IN NIGERIA'S HOUSING DEVELOPMENT INDUSTRY. Kufa Journal of Engineering. https://doi.org/10.30572/2018/kje/140306.

[17]. Olukunga, O. Adewumi, B. & Hassan, T. (2024). Comparative Analysis of Flood Mitigation Strategies for Residential Housing in Lagos State. African Journal of Environmental Sciences and Renewable Energy. https://doi.org/10.62154/efah7e88.

[18]. Othman, A. & Hussein, R. (2023). Innovation management framework for achieving sustainability through managing risks of innovative solutions during the design process. Journal of Engineering, Design and Technology. https://doi.org/10.1108/jedt-09-2022-0495.

[19]. Oyim, A. Akerekan, O. & Ogbonna, N. (2024). Integration of Wind Power for Sustainable Energy at Lagos State University of Science and Technology: A Feasibility Study. Journal of Digital Food, Energy & Water Systems. https://doi.org/10.36615/wzgp9v40.

[20]. Peng, F. Altieri, B. Hutchinson, T. Harris, A. & McLean, D. (2022). Design for Social Innovation: A Systemic Design Approach in Creative Higher Education toward Sustainability. Sustainability. https://doi.org/10.3390/su14138075.

[21]. Salami, S. Isah, A. & Muhammad, İ. (2021). Critical indicators of sustainability for mixed-use buildings in Lagos, Nigeria. , 9, 100101. https://doi.org/10.1016/J.INDIC.2021.100101.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may476

[22]. Shu, Y. Ho, S. & Huang, T. (2020). The Development of a Sustainability-Oriented Creativity, Innovation, and Entrepreneurship Education Framework: A Perspective Study. Frontiers in Psychology, 11. https://doi.org/10.3389/fpsyg.2020.01878.
[23]. Unegbu, H. Yawas, D. Dan-Asabe, B. & Alabi, A. (2024). Sustainable Urban Planning and Development: A Systematic Review of Policies and Practices in Nigeria. Journal of Sustainable Development Innovations. https://doi.org/10.61552/jsi.2024.01.005.
[24]. Upadhyay, P. & Kumar, A. (2019). A house of sustainability-based approach for green product design. Management of Environmental Quality: An International Journal. https://doi.org/10.1108/meq-03-2019-0057.
[25]. Zhang, X. (2022). Incremental Innovation: Long-Term Impetus for Design Business Creativity. Sustainability. https://doi.org/10.3390/su142214697.