The scale **Journal Website:** https://thescalejournal.com.ng/
An Interdisciplinary Journal of
The ACADEMIC STAFF UNION OF POLYTECHNICS - ZONE D
ISSN: 2992-3727 Published 25th May, 2025

AN ASSESSMENT OF THE ARCHITECTS AWARENESS OF SUSTAINABLE ARCHITECTURE IN CONSTRUCTION INDUSTRY

Nnoje Kingsley Chima (MAARCHES, AMIOE, MNES.)
Department of Architecture, School of Environmental Design and Technology. Federal Polytechnic Oko, Anambra State, Nigeria
arcnnoje@gmail.com ; arcnnoje@jumia.com ; **+2348062636327**

Abstract
Despite the growing interest in sustainability, negative associations of this term with naïve discourses, green-washing, or low-quality design are still common within some areas in the discipline of architecture. Sustainability is so important that both the MDGs and SDGs as United Nations development initiatives have listed it as a vital component. The United Nations conference on environment and development, and the Bonn agreement of 2001 drew attention to the fact that professionals in the built environment should rethink their role on the issues of the environment and sustainability. Non-sustainable practices lead to depletion and destruction of the environment with consequences that are still being understood. This could even get worst if professionals in the building industry do not key into the sustainability initiative. Architects, as professionals in the built environment, take the most important decisions as far as the design and construction of buildings are concerned. Their awareness and knowledge of sustainable building is very important in solving this emerging problem. The study revealed that Architects sometimes do not like pushing boundaries out of their comfort zones as far as specification writing is involved. In conclusion, the study recommended the updating of building bye-laws of the state, intending to make the Architects update their knowledge of sustainable Building as a result of the more regular application in their designs. This study is aimed at evaluating the level of awareness of Architects on sustainable Building this is measured by looking at the knowledge, specification and application of sustainable buildings.
Keywords: Sustainability; architecture education; design; ecology, sustainable architecture; environmental humanities

1. Introduction

The contemporary environment today has been undergoing many changes. Particularly the interference of the human activities with the natural environment ends up with universal changes, and thus, these changes add new dimensions to the ecological equilibrium of the world. The developments created by humankind for his comfort are threatening his own life. Never before in history have human beings had such an impact on the Earth. The resulting problems are a product of the size and growth of population, quantity of consumption and quality of technology. A general acceptance, regarding environmental crisis is reflected on both local and global levels that, the present form and degree of resource exploitation and associated consumption practices are unsustainable.

The role of an Architect goes beyond the design of buildings. Their role covers the three main phases of the evolution of a building project, which are; design, documentation and construction. The Architect leads the team of professionals that are involved in all three phases and ensures public safety while overseeing the project.

Stated that an Architect has the responsibility of creating designs, and maintaining a built environment that is resilient, and has the flexibility to adapt and recover from different types of disasters.

Over the past two decades, the increasing awareness of environmental issues has encouraged architecture schools to expand their offers on sustainability lectures and programs. Many institutions are even integrating

ISSN: 2992-3727 Published 25th May, 2025

architectural schools into the more comprehensive Environmental Design departments, which have a much more interdisciplinary approach to construction than the traditional architecture education. However, there is still within the discipline a subtle rejection of sustainability usually stronger among historians and theorists (Hurley, 2019; Baird, 2021) that has inadvertently distanced many architects from the entire subject of environmental problems.

Although negative views of sustainability are not prevalent, they have been nonetheless withholding the full engagement of the discipline with environmental issues, and it is the intention of this article to discuss the reasons behind these negative views. To this end, first, the literature review presents an analysis of the bad reputation of sustainability among architecture professionals and scholars in section

The understanding of the 20th century architecture has a big responsibility in achieving this unsustainable result. Architecture in the 20th century began as a celebration of the Age of Industry and Technology; but this is rapidly changing in response to a new Age of Information and Ecology. Most conventional practitioners of modern design and construction find it easier to make buildings as if nature and place did not exist. Fossil fuels make buildings in both locales inhabitable, lighting them, cooling them, heating them. However, the consumption of fossil fuels is one of the biggest environmental problems. We may think of cars and factories as the most obvious enemies of the environment, but buildings consume more than half the energy used worldwide [Wines 2000].

The aim of this presentation is to obtain a general exploration of one of the most complex and problematic issues facing the humanity over the last and current centuries that is, how to construct a human habitat in harmony with nature.

Aim of Study

The aim of the study is to explore and evolve on the Awareness of Architects on Addressing Sustainable Architecture in Building Industry.

1.2 The Rise of Sustainability Discussions in The Design and Construction Sectors

The rise of the concept of sustainability and environmental concerns since the late 20th century is one of the greatest influences on the design and construction sectors, partly as a result of increasing social pressure (Mallgrave and Goodman, 2021). Even though various literatures continue to discuss the exact contribution of buildings to climate change, it is well known that these sectors have significant potential to address global environmental concerns, due to the high number of end-users involved in the extended phases of design and construction (Melchert, 2017; Fischer and Guy, 2019; Erten and Yilmaz, 2021; Sev, 2021; Faulcon, 2022; Papargy, et al., 2022). These sectors claimed to be making significant contribution to this unsustainable situation through consuming large amounts of energy and water, releasing excessive volumes of CO2, consuming resources irresponsibly, creating waste and pollution problems, resource depletion and increased health issues during and after construction (Cole, 2020). Alyami and Rezgui (2022, p. 52) estimated that design and constructions sectors “account for one sixth of world’s fresh water withdrawals, one quarter of wood harvested and two fifths of all material and energy flows”. The potential energy use and greenhouse gas emissions caused by design and construction activities has inspired researchers to discuss their contribution in degrading environmental sustainability, in international conferences and other platforms (Harris and Borer, 1998; Haapio and Viitaniemi, 2008; Parr and Zaretsky, 2010). As Ding (2018) argues “environmental impact of construction, green buildings, designing for recycling and eco-labeling of building materials have captured the attention of building professionals across the world”, however, in his argument Ding (2018) anticipated that the achievement of a mutually beneficial solution for sustainability could prove difficult due to the physical and social reasoning of the large variety of actors and phases in this sector (see also Johnson, 2013; Cole, 2018; and Crawley.

ISSN: 2992-3727 Published 25th May, 2025

2. Sustainability and Architecture Education

Despite all the criticism of current practices of sustainability, there is a general agreement on that future architects should be educated on the subject. Nevertheless, the integration of any current issue into education is bound to provoke controversies, and sustainability has not been an exception. One of the most vocal critics of the incorporation of sustainability into education is the British architect, Austin Williams. In his view, environmental discourses tend to be misanthropic (Williams, 2018) and he argues that sustainable education 'undermines critical engagement and replaces it with blind loyalty' (Williams, 2020). This point of view is extreme and shared by few (Peterson & Wood, 2022), but is driven by a premise widely accepted among architects, which is the shortage of critical approaches to sustainability.





3. Sustainability

Sustainability is most certainly concerned about excessive use of finite resources and the efficient management of the ecosystem, greenhouse gases, storm water pollution, efficient food production as well as fundamental concerns for social equity and social justice. The idea of sustainable development helps to base the human standard of living on the carrying capacity of nature. Sustainability, in essence, is a way of thinking about one's relationship to the natural world in the context of time. The word "sustainable", according to the Dictionary of Webster's New collegiate, is defined as follows:

"Sustainable development is the kind of development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs.

" The concept of 'sustainability' has progressed with 'Agenda 21' which was developed after the Rio Summit by the European Union in 1995. According to it, valuing resources includes valuing existing building stock as physical materials, and embodied energy, but also the cultural resources and heritage of people. Part of the process involves requiring local and regional authorities to carry out audits of 'present conditions. This includes the social, economic and cultural context. The thrust of Agenda 21 is that sustainability should be incorporated into all regional plans, and community participation is a key activity to ensure that those ultimately affected by proposals are fully represented [Farmer 2019].

ISSN: 2992-3727 Published 25th May, 2025

Sustainability represents a balance that accommodates human needs without diminishing the health and productivity of natural systems. The American Institute of Architects defines sustainability as: [Mendler, Odell 2022]

Although sustainability is one of the most significant concepts of this decade, influencing the design of global government policy, economics, energy resources, technology, manufacturing, community planning and architecture; the idea of sustainability is not new. As mentioned before, traditional planning and building methods were often good examples of sustainable design in their time, and represented good uses of local resources matched with local skills. In combination, they produced a built environment which met people's needs. However, factors such as demographic growth, and shifts from rural to urban areas create an imbalanced population distribution, natural and man-made resource depletion, and significant changes in expectations and life-styles, all of which combine, in their various ways, to erode the viability of traditional approaches to shelter provision. A building method that worked well in the past in its given context may have now become difficult to afford, build and maintain, and it may no longer meet the desired requirements of the family or community [Oktay 2021].

But it is essential to look to buildings in the distant past for ideas about how to build in the future. Indeed, before the advent of air-conditioning and other technologies that is now taken for granted, architects and builders had no choice but to create sustainable structures. In the late nineteenth century before electrical heating, cooling and illumination architects used a combination of mechanical devices and "passive" techniques (which worked without electrical or mechanical equipment) to illuminate and ventilate the interior spaces of even high-rise and long-span buildings.

4, Design

Courses in which students engage in design practice are considered the backbone of architectural education. This category includes everything from the first drawing and modeling lectures to graduation projects where future professionals must create comprehensive architectural designs. Studio-based courses are regarded as the most important for the development of design skills. Architecture schools offer several studio options with different approaches to design achieved by either integrating art, making emphasis on computational skills, or focusing on the conservation of historical areas. It is in design studios where students learn how to integrate the knowledge acquired in other lectures. This fact becomes especially relevant for sustainability since design decisions can have an important effect on the building's performance. A proper orientation can maximize natural sunlight, the level of insulation changes according to the materials chosen, and facade decisions can hinder or favor natural ventilation.



ISSN: 2992-3727 Published 25th May, 2025

5. Sustainable Architectural Design

Over the past two decades, sustainable design has been in the process of being defined world-wide. Sustainable architectural design, is the kind of design which respects natural resources, and embraces, human, cultural, and historical distinctions. Architecture is an intervention upon Nature. It protects human beings from the intensities of solar exposure, climate and other humans [Crowther 2022]. Besides, architecture is a reflection of the contemporary society in attitude, customs, desires, needs and technology; and in present society, the natural coherence and sustainability become important priorities in the process of design. Sustainability in architecture requires efficient and healthful interior solar and climatic space planning. Besides, the relationships of the interior spaces with the exterior spaces have to be strong and the coherence of nature has to be provided. Modern technology and methods of construction have sadly degraded natural resources- agricultural land, forests, air, and water. There has been a loss of energy on the Earth because of misuse. Sustainable design assumes that this misuse can no longer be sustained, because the world's population is expected to be more than double in the next fifty years. One of the defining features of the machine-age twentieth century, has been how separated and sealed off from the environment people have



become. Whether in air-conditioned buildings, the shopping centers or the theme park, technology has been used to construct a world that removes people from nature [Farmer 2019]. So sustainable design focuses on optimizing and using the environment. It requires a fundamental change in mind set and a change in values towards less consumption and environmental awareness. In the context of sustainability, architecture seems to act as a container of changing circumstances, where individuals and groups play an important role in the creation of their habitats, and at the same time it provides opportunities for long term flexibility and adaptability. So, architecture must be capable of sustaining changes and be based on long user needs. Architecture does not end with its foundation and outer walls. But the complete design infrastructure of urban planning, interior, landscape, product and systems design are part of the sustainable architecture [Crowther 2022]. Many factors account for the shift toward a more human and contextual design approach. These factors can be grouped under the heading of "criteria for sustainable architecture".

Main Criteria for Sustainable Architecture

5.1 Energy

Energy is the precondition of any civilization. First wave societies drew their energies from human and animal muscle power; or from the sun, wind and water. Second wave industrial societies began to draw their energy

ISSN: 2992-3727 Published 25th May, 2025

from irreplaceable fossil fuels-oil, coal and natural gas. This revolutionary shift meant that for the first time a civilization was eating into nature's capital rather than merely living off the interest it provided. Third wave civilization must and will draw on an amazing variety of energy sources-hydrogen, solar, geotermal, perhaps advanced fusion power, as well as other energy sources not yet imagined [Onal 2017].

5.2 Climate

The architecture itself as a fixed state construction has to contend with the dynamics of people and the dynamics of the sun and climate. Within its "fixity" adaptive ecologic attributes can be given to architecture by design [Crowther 2022]. Architecture must be a response to climate. In colder climates, comfort depended on shelter from prevailing winds by sitting, land form, and vegetation, together with low ceilings, thick walls, and windows on the exposed side. In the extreme cold (as in the extreme heat), buildings were buried in earth or covered [Onal 2017]. The northern facades usually have only a few openings, whereas the southern facades contain the main openings, thus maximizing the benefit of the limited sunshine. The ideal orientation for buildings in such a climate is with their long axis running along east-west

5.3 Building Materials

The building materials can also change, enhance or negate climatic advantage. Besides, the sensual perception of an interior space is largely determined by the materials which line its surfaces; as light is transmitted and refracted through materials, or reflected by the texture and color of the internal surfaces, its quality, delight and utility are established. Thermal sensation is influenced by the interaction of the materials with heat. Thus, for an input of energy into a material, either from direct insulation or by transfer from the air, the amount the temperature of its surface increases depends upon the combination of its thermal capacity, its thickness and how readily the heat is conducted into its depth. Additionally, the materials on the ground of exterior spaces will also affect the microclimate [Onal 2017].



5.4 Flexible Design

Flexible design, provides ease of expansion and reconfiguration when needed. Design in flexibility has to be considered, to accommodate future needs through the use of modular planning and flexible building infrastructures for power, and communications. The use of fixed cabling and chases that are embedded into the building structure can be difficult and costly to change [Mendler, Odell 2020].

5.5 Indoor Air Quality

Air is an essential resource for supporting life, a unifying substance for mankind. Every molecule of air we breathe has a 99 percent chance of having been breathed before. Air knows no boundaries or borders, and it is not recognized as a finite resource, and a sense of responsibility for it has not yet been developed. The attitude toward air fails to recognize the responsibility for maintaining air quality and cleaning the polluted

air. And as trees and other plant life – the planet's natural systems for cleaning air – are destroyed, the problem becomes more acute.

6. Final Considerations

The way environmental issues are confronted within architectural education is a reflection of the way the subject is dealt with in research and practice. It could be said that sustainability has already been assimilated within the technical areas of architecture. However, some of the drawbacks that architects perceive in sustainability are reflected on the curricula, which presents the fragmented approach seen in practice and it is overly focused on energy efficiency. There is, however, a promising interest of a small group of lectures in the interaction of the built and natural systems among professionals that is reflecting a consideration of the life cycle of materials, water treatment, and even architectural waste.

Within design studios, the situation is more complex since students must learn to comply with construction specification while creating functional spaces with aesthetic quality, meaning, and in the best-case scenario, even artistic value. While some studios plays special emphasis on environmental issues, the tendency is for sustainability to be treated as one of the factors among the many that students must consider when designing a building. Most probably, this integrative tendency will continue, and sustainability measures will become as assimilated to the design process as are now, for example, safety measure. Irrespectively of positions on the integration of sustainability into design studios, the main agent driving the transition to a more sustainable architecture is the increasing legislation to minimize the environmental impact of constructions. Therefore, if design studios keep in touch with the real-world requirements, the inclusion of sustainability will eventually become unavoidable.

The engagement with environmental issues of architectural humanities is certainly limited if compared with other areas of the discipline. In the case of architecture education, the knowledge of historical and cultural problems associated with environmental issues becomes particularly relevant since construction happens to be one of the human activities with high impact on the environment (Ortiz, Castells, and Sonnemann, 2019). However, the long-standing architects' interest in nature has been relatively slow to transform into a sound critical perspective on environmental problems (Buchanan, 2018; Ursprung, 2017). At present, this situation is rapidly improving since references from environmental humanities are providing the historical, theoretical, and speculative approaches to evaluate the socio-cultural dimensions of environmental problems (Neimanis, Åsber and Hedrén, 2015; Carr, 2016). Moreover, examinations of environmental issues could be integrated into architectural education through indirect paths, as through the growing interest in social problems related to the environment as green gentrification (Rigolon & Németh 2020) or social justice (Marsh, Pilkington and Rice 2020).

7. Recommendation

While the importance of sustainability for the future of planet earth cannot be overemphasized, a good number of architects are still lagging behind. The results above clearly revealed that awareness of sustainable among Architects is inadequate. Though some group fared better than others, as a whole there is an urgent need for better awareness of sustainable built environment.

With the vital role Architects play in the built environment as the lead designers of buildings and specification writers, this makes adequate knowledge of sustainability a must. The quantity of raw materials consumed by the building industry is reason enough for humanity to rethink how planets resources are extracted and used. As done in many developed countries the force of policy might be required to enforce the culture of sustainability. This can be done by a regular update of the nation's building codes and states building bye-laws. This is because sustainability as a field is in continuous change. Enforcing these updated laws will provide

a better incentive for Architects to familiarize themselves with sustainability as lack of such knowledge will make practice more difficult if not impossible in a modern world. This is the way to go for posterity to be appreciative.

8. Conclusion

For planet earth and its inhabitants to have a safe and sustainable future, sustainability is vital. As human population continue to grow, the stress on the environment and its resources are also on the increase, that if nothing is done the results can be catastrophic.

As a conclusion, what is expected of architects in the coming century is, wherever they work, they are to understand and digest the nature of climate, history and culture, that is to say, obtain inspiration from the essence of place and render contribution to create relevant architecture and city. The images and forms of technology are often deceptive. Although 'intelligent buildings' have been anticipated for some twenty years, the prohibitive costs of many of the technologies involved have limited their realization. The possibilities of technology could transform buildings into automatic, self-regulating systems which could produce a subtly changing and modifying environment at apparently little energy cost. However, sustainable design is more than a technological add-on. The social, political and economic structures which underlie the making of buildings will have to be reformed to enable designers to use their skills to provide naturally sound environments in the broadest sense.

For the sustainable architectural design, the factors of durability, maintenance needs and embodied energy costs (including that needed to transport materials or components site and put them together) have to be evaluated. Studies can be done as to the effects of resource extraction and depletion on the natural habitat and which materials degrade biologically. Qualitative assessment can be made of the energy required for further processing, if materials can be recycled. The model for sustainable design is nature itself. Nature is efficient and effective by design, essentially producing no waste. Sustainable architectural design, guides an openness and attention on fitting materials, fitting forms and fitting systems, so that human habitation supports the life of a locale. Combining the local knowledge with an understanding of sustaining materials and energy systems, architects can create buildings that encourage healthy interaction with the natural environment.

Architectural design based on environmental preservation is the only option for maintaining quality of life and preventing lasting environmental damage. Pollution reduction, waste minimization and energy conservation can be furthered through environmentally friendly architectural design and construction. The environmental community has promoted the slogans of reduce, recycle, and reuse. Recently it has been suggested that a fourth one: Recover added. The remediation of environmental pollution and damaged natural resources is vital to the support of future sustainable development. So, a new kind of architecture has to be created that actively treats its waste products and cleans the air of the cities.

References

Adams, W.M., "Green Development, environment and Sustainability in the Third World", Routledge London, 2001.

Altomonte S. (2019). Environmental Education for Sustainable Architecture. Review of European Studies, 1(2), 12-21.

American Institute of Architects (AIA) (2016). Ecology and Design. Ecological Literacy in Architectural Education. 2006 Report and Proposal (pp. 21-40). The AIA Committee on the Environment.

Anon. (2018, July 15th). Sustainable Building, Materials. Retrieved from Sustainability for All.

ISSN: 2992-3727 Published 25th May, 2025

ARCON. (2018, July 5). Architect Registration Act. Retrieved August 2, 2019, from Architect Registration Council of Nigeria: https://arconigeria.org.ng/architects-act

Arvanitis, Agni, Vlavianos, "Bio-Syllabuss for European Environmental Education", Biopolitics International Organisation Athens, 2012.

Axel N., Colomina B., Hirsch N., Vidokle A., Wigley M. (Eds.) (2018) Superhumanity: Design of the Self. Minnesota: U. of Minnesota Press.

Baird G. (2021). Sustainability Scrutinized. Architectural Record, 199(8), 27.

Batty M., Marshall S.W. (2012), The Origins of Complexity Theory in Cities and Planning. In: Portugali J., Meyer H., Stolk E. (Eds.) Complexity Theories of Cities Have Come of Age. (pp. 24-47). Berlin: Springer Verlag.

Bejtullahu, F. (2017). Role of the Architects in Creating Building and Urban Resilience. Journal of International Business Research and Marketing, II (5), 14-17.

Blaviesciunaite A., Cole R. J. (2021). The Cultural Values Embedded in Building Environmental Assessment Methods: A Comparison of LEED and CASBEE. Proceedings of the International Sustainable Building Conference. Helsinki, Finland, 18–21 October 2019.

Broersma S. (2016). Zero-Energy Design. TU Delft Course Browser. Retrieved http://www.studiegids.tudelft.nl/a101_displayCourse.do?course_id=41031.

Chigozie, A. C., & Jide, A. K. (2015). The Contemporary Roles of Architect and Other Building Professionals "Panacea to The Menace of Quacks And Quackery. Civil and Environmental Research, VII (10), 68-75.

Cole R. J., Valdebenito M. J. (2021). The importation of building environmental certification systems: international usages of BREEAM and LEED. Building Research and Information, 41(6), 662-676.

College of Environmental Design, University of California Berkeley. (2016). Sustainable Environmental Design Major Handbook 2016-2017 University of California Berkeley.

Crawford M., Stewart A. (2017). Seminars/Art of writing. Retrieved from: http://artofwriting.berkeley.edu/buildings-cities/

Cronon W. (1995). Uncommon Ground: Rethinking the Human Place in Nature. New York: Norton & Co.

Crowther, Richard, "Ecologic Architecture", Butterworth-Heinemann Boston, 1992. Farmer, John, "Green Shift", edited by Kenneth Richardson, Architectural Press Boston, 1999.

Czajkowski J. D. (2016) Perceptions of Sustainability. Interview by T. Santini, unpublished. December.

Dassah, E., & Nimlyat, S. P. (2010, August 23rd). The Roles and Resposibilities of Professionals in the Built Enviroment in Contributing to Sustainable Development in Nigeria. Retrieved from ResarchGate: https://www.researchgate.net/publication/258935346

Dirlich S. (2012). The building stock and traditional building principles : sustainability assessment for historic buildings. Proceedings of the 1st International Conference on Building Sustainability Assessment, 31-38.

Fuller R. (2010). Beyond Cliché – Reclaiming the Concept of Sustainability. Australian Journal of Environmental Education, 26, 7-18.

Gale F., Davison A., Wood G., Williams, S., Towle N. (2015). Four Impediments to Embedding Education for Sustainability in Higher Education. Australian Journal of Environmental Education, 31(2), 248-263.

Graham W. (2016). Are we greening our cities, or just greenwashing them? Los Angeles Times. Retrieved from: http://www.latimes.com/opinion/op-ed/la-oe-graham-folly-of-green-buildings-20160306-story.html

ISSN: 2992-3727 Published 25th May, 2025

Hakkinen, T., & Belloni, K. (2017). Barriers and drivers for sustainable building". MAYFEB Journal of Environmental Science, II, 1-9.

Happold, B. (2019, `july 10). Sustainable materials. Retrieved Agust 30th, 2019 from Designing Building Wiki: https://www.designingbuildings.co.uk/wiki/Sustainable_materials

Isnin, Z., & Sh Ahmad, a. (2012). Challenges and the Way Forward for Building Materials Management in Building Adaptation Projects. Advanced

Keskeys, P. (2019, March 3rd). Architects Must Rekindle Their Relationship With Building Materials. Here's How. Retrieved from Architizer: https://architizer.com/blog/author/paul keskeys/

Leeds, R. (2016, August 15th). Top 4 Challenges Facing The Construction Industry. Retrieved August 10th, 2019, from Digitalist: https://www.digitalistmag.com/future-ofwork/2016/08/15/top-4-challenges-facing-constructioindustry-04388065

Mendler, S., Odell, W., "The HOK Guidebook to Sustainable Design", John Wiley & Sons, Inc. New York, 2000.

Nagashima, Koichi, "Glocal Approach Toward Architecture of the Future", XX UIA Beijing Congress, Japan Institute of Architects, 1999.

Oktay, Derya, "Green Spaces and the Ecological Quality of Housing:The case of Cypriot settlements", Ekistics, Vol.65,No.391/392/393, July/Aug.-Sept./Oct.-Nov./Dec., 1998, pp. 283-284.

Onal, Sebnem, "Designing For Sustainable Architecture", EMU Faculty of Architecture Dept. Of Arch. Press, Famagusta, 1997. Wines, James, "Green Architecture", Taschen Verlag Köln, 2000.