

## COURTYARD ENHANCES NATURAL VENTILATION AND DAYLIGHTING IN BUILDINGS IN NIGERIA

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### ABSTRACT

Building designs are aim at creating comfort for humans through various means either mechanical or natural. Thus ventilation of spaces is very important in building design and construction, ventilation can be achieved through artificial or natural means, either way is good but the most important thing is that every space within a building should be properly ventilated. One way of enhancing natural ventilation in buildings is through the incorporations of courtyards, it enhances air movement as it provides a microclimate within the building envelop and increases day lighting as well. This journal paper examines how courtyards enhance natural ventilation and day lighting in buildings. The method adopted for the research paper is the secondary methods of sources of information which includes review of existing literatures (papers) written by others, with emphasis on ventilation and day lighting. This paper is to encourage the incorporation of courtyard design in buildings as a means of enhancing ventilation and day lighting as to the reliance on mechanical means of using artificial cooling systems such as air conditioners which is not eco-friendly and it is more expensive and causes high energy consumption in buildings which is a major factor to climate change.

**Keywords:** *courtyards, ventilation, day-lighting, energy-consumption, therapeutic, micro-climate, eco-friendly and organic.*

### INTRODUCTION

For centuries, interior courtyards have been created to aid the purpose of natural ventilation and day lighting. Ventilation itself serves many purposes. It provides fresh air, improves oxygen

supply and dilute odours. It is important that the internal spaces in public buildings are well ventilated through the natural means that is, the use or incorporation of courtyards into the building form to reduce energy use in buildings which is a critical component of meeting carbon reduction commitments (Lutzenhiser, 1993).

Hot climatic regions like Nigeria experiences hot and harsh weathers which result in high temperature, this has lead to high need for indoor cooling using mechanical means which are not just expensive but require frequent maintenance and skilled workmanship, all of these practices has lead to high cost of building construction and maintenance. The high desire for comfort and cooling of the inner spaces within a building, it has resulted in high reliance on artificial cooling devices and machines in public buildings, because of this there is high energy consumption in buildings, and has contributed to climate change, a key factor of eliminate change. This has efficiency of having a courtyard in public buildings because courtyard ventilation also has passive cooling effects during the night which bring the overall temperature down. In addition to this, a courtyard filled with plants and garden area helps keep the building cool even in scorching and arid climates.

## **COURTYARDS**

A courtyard is an architectural design element commonly applied in tropical buildings for its social, environmental and therapeutic potentials (Reymolds, 2002). A courtyard is a common architectural feature that has been applied for thousands of years in many parts of the world particularly in houses. Courtyards were often the primary meeting places for specific purposes including gardening, cooking, working, playing, sleeping or even in some cases as places to keep animals (Edwards et al., 2006). As an open space within a cluster or urban fabric, courtyard fulfils various functions, social, leisure and microclimate. The importance of such a space was by their being located in central sites within the urban fabric or building surrounded by arcades and colonnades, paved, landscaped with various plants, shade and light, they all play an important role in our social and working life (Meir, 2000).

Moreover, courtyard as a space can provide climatic as well as visual or acoustic protection. The courtyard geometry as well as its makeup should be considered in the design stage in order to provide the highest level of thermal comfort possible (Meir, 2000). In addition, the courtyard was developed to be climate responsive. Furthermore courtyard can be utilized as an appropriate place for promoting natural, healing environment. According to Rust (2010), architects could place healing components of nature in courtyard within the building footprint, along with windows at the end of corridors to allow natural light to filter through to the public and private areas, shade, water, trees and flowers, wind, pavement, and colours could induce positive effects towards the five senses of the human body.

## **METHODOLOGY**

This work adopts the secondary method of research which involves their view of existing literatures and books done on similar topics related to the subject matter. It highlights key facts to and explains it in-depth for clearer understanding of the reader.

## **DISCUSSION**

Aside the fact that provide day lighting and natural ventilation in buildings, courtyards also perform these functions to enhance comfort of the building occupants; these includes, provision of a micro-climate of fresh air and refreshing environment within the building envelope, it serves as a space for relaxation(outdoor garden) within the building and it enhances air circulation within the building supplying fresh air to the adjacent spaces around it.

### **Benefits of Courtyard**

Architecturally, courtyards make perfect sense. They give the residents of a home a private outdoor space, which is secure and usable throughout the day. With its natural ventilation, a courtyard helps the house stay appropriately warm or cool without the need for heaters and air conditioners. (Justwards, 2016).

In a warm climate, a courtyard can bring down the house's temperature, saving on energy bills. Several courtyards also

include natural cooling elements as a part of their design like fountain, a basin, an artificial waterfall, thick external walls and double-glazed windows (www. Homify.com/my 2016).

Interior courtyards are very much in vogue today for the above reasons. They provide an aesthetic means of spending time with nature in the midst of a busy schedule. And the best part is that courtyards, work with any style of home-modern or traditional. So from growing an indoor garden to creating a serene corner in a crash and burn busy lifestyle, interior courtyards can do so much to enrich one's life.

When creating a courtyard, keep room for cross ventilation, which offers the maximum cooling effect.

### 1. Light



*Figure 1: Courtyard provides natural light (day-lighting) in buildings.*

An interior courtyard centrally sits under the open sky, flooding the space around it with daylight. Every space that opens into the courtyard gets its dose of sunlight during the day, helping you get energy savings. The benefits of being exposed to this optimum quantity of sunlight are well known, and even during a daily workday, you will benefit by simply having your morning tea in a natural refreshing environment.

For a courtyard that is located at the front or back of the house, the adjacent room can be the kitchen or living room, which is most often used during the day.

Centrally located courtyards in urban setups may be surrounded by high walls restricting the entry of light. In such cases, you can use exterior reflect or son your windows and doors.

## 2. Separate Spaces



*Figure 2: Courtyard separate spaces in buildings*

A courtyard acts as a space separator within the home. A courtyard between the living room and bedrooms, can work to increase the privacy between these areas, not letting casual visitor walk in unwittingly. It provides a break in the decoration too, with each section gaining a new personality that goes only with the central flow. A courtyard between the kitchen and living room is a perfect place for entertaining guests as well as unwinding after the day's work.

### 3. Connecting Spaces



*Figure 3: Courtyard connect other spaces*

A courtyard can also be connector of spaces within the home, providing accessibility to different parts with ease. If you have a courtyard in the front or at the back of your house, it not only acts as an entrance or exist point, but can connect to more than one room depending on your courtyard architecture. A centrally located courtyard, on the other hand, can provide access to multiple rooms in the house, making movement easier.

Take a cue from this stylish courtyard rendered by balance property Ltd, interior architect in London.



*Figure 4: Stylish courtyard design*

#### 4. Refreshing View Of Nature



*Figure 5: Visual connection with nature*

With a courtyard, you have the option to enjoy the refreshing joy of being amidst greenery without having to look for it in far flung jungle reserves and nature resorts. Simply head to your courtyard to rejuvenate your eyes with the sight of green-its beneficial for health.

The great part of having a courtyard is that you can enjoy what different seasons brings in from blossoming flowers under the summer sun to the hundred hues of green during the rains, to

the select blossoms of winter, you can enjoy it all without stepping out from your home.

If you love and enjoy your connection with your courtyard, you can take a step further in your courtyard. You can not only plant decorative plants, but also use a small area for vegetables and herb farming. Your own little patch of organic farming can find a wonderful place in your courtyard where sunlight and cool breezes will keep it company.

When you start with courtyard planning for edibles, always go for ones with a quick turnaround time between 60-90 days, like leafy greens which can be harvested before the change of season. Also choose to plant these in a pot than directly in the soil, so that you can move them around in case of an unexpected downpour. There are different types of lawn grass that can be replicated in patches in your courtyard that can envelope your feet in morning dew. Choose the local soft variety that doesn't attract insects, and is fairly resistant to climatic changes. Or if you don't have the time to grow or maintain plants, then decks the place with pebbles, rocks, and pieces of wood for an organic feel.

### **5. Creating A Cosy Environment**



*Figure 6: Create a cosy environment within the building.*



A courtyard with beautiful and comfy seating area, flowing curtains, plush rugs and quicky coffee tales can be an ideal spot for quiet reflection, meditation, reading books, or enjoying a cosy chat. It can be a place to unwind, entertain, connect with nature and enjoy the simple pleasures in life. With some courtyard planning, you should be able to gift yourself a meaningful space.

## RECOMMENDATION AND CONCLUSION

The incorporation of a courtyard into a building form offers a microclimatic buffer zone between the outdoor and indoor environments of the building, it offers a substantial potential for utilizing passive strategies for indoor thermal comfort. A courtyard presents a greater flexibility in promoting larger areas of internal passive zones, which can benefits from natural ventilation and daylight.

Courtyard should be encourage in our designs as architects to save energy, reduce cost of construction through the installation of artificial cooling systems thus encouraging eco-friendly buildings and taking full advantage of the therapeutic, cooling, day-light and natural ventilation that courtyard provides.

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