Proposed Staff School Design for Lead City University Ibadan
(The Effects of Colours on the Psychology of Children in Primary School Learning Environments)

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Certification

This is to certify that, David-Joshua Uzoamaka OSHAFI, with matriculation number LCU/PG/005087 carried out this research work titled 'The Effects of Colours on the Psychology of Children in Primary School Learning Environments' in the Department of Architecture, Faculty of Environmental Design and Management, Lead City University, Ibadan, for the award of Master Degree (M.Sc) in Architecture and this has not been previously submitted.

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Dedication

This thesis is dedicated to the Almighty God.

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Abstract

This study investigates the Impact of Colours on the Psychology of Children in Primary School Learning Environments. Despite the established effects of colours on human behaviour and psychology, limited research has explored the long-term effects of colour exposure on primary school children's attitudes, behaviour, and psychology. The thesis aims to explain the effect of colour on pupils in the primary school learning environment and to also shed light on how colour might be thoughtfully applied to improve the learning experience for these children. The objectives of this study are to identify colours that stimulate positive psychological responses in children, to examine the effect of colour choices on their overall engagement, and to determine the optimal colour schemes for primary school learning environments and effectively design a primary school for Lead City University with identified colour scheme. The methodology used in this thesis was a combination of literature review and case study deductions. The findings of this study will provide insights for educators, designers, and policymakers to create effective learning environments that promote children's overall development and academic success. The results of the thesis showed that different Colours have significant effects on children's behavior, emotions, and learning outcomes. Calming Colours like light blue and pale green should be used in areas where children need to relax and focus, such as reading corners and quiet zones. Stimulating Colours like red, and orange should be used in areas where creativity and engagement are encouraged, such as art rooms and play areas.

Keywords: Academic Achievement, Colour Psychology, Cognitive Development, Children's Behaviour, Emotional Development, Primary School Learning Environments, Social Development.
Word Count: 248 words

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Introduction

1.1 Background to the Study

Primary school learning period is an important period in a child's developmental educational journey, laying the groundwork for future academic endeavours or personal growth (Carvalho, 2020). It is considered a significant aspect of the beginning of a child's learning, and should be delicately handled. During this stage, essential skills, beliefs and values that eventually shape the future of these children are developed and a conducive learning environment linked with the desired positive behavioural as well as learning outcomes is required (Pellegrini, 2005); (Carvalho, 2020). Well-designed learning environments have been found to enhance student motivation, behaviour, engagement, and overall learning outcomes (Hao, 2021).

Colour, as a significant visual element in design, is known to have a direct impact on a child's psycho-physiological and behavioural features, emotional and social development as well as cognitive abilities and therefore are a crucial aspect of children's learning environments (Elsea, 2020); (Mijovic, 2019). Recent studies have investigated the effects of colours on children's behaviours and assimilation and moods in various settings including learning environments such as school classrooms. (Ruggiero, 2017)

Colour is a crucial aspect of children's lives. Children are colour sensitive and often drawn to bright and warm colours. Colour can also be used by children to express their emotions. For example, youngsters utilize light colours to indicate pleasant emotions and dark colours to represent negative emotions (Jonauskaite et al., 2019). In one study, researchers discovered that yellow, pink, and blue are associated with pleasant emotions in youngsters, but red and black are associated with negative emotions (Ravishankar 2020). As research has shown that colours have a strong impact on behaviour,

emotions, mood, cognition of children, the use of colours in learning environments has been a topic of interest for some years now. (Kuhn, 2001). With regards to learning spaces such as primary schools worldwide, colours have been said to play a significant role and these learning spaces should be designed effectively to develop both creativity and logical thinking in children while developing their ability to read and write (Lichtenfeld, 2012)

Despite the interest and growing research on the impact of colours in learning processes, there is still need for further investigation into the specific colours appropriate for the design of a primary school learning environment especially with regards to how the colours affect the psychology of the children (Hao, 2021). Colour psychology in architecture is a relatively recent field of research, nonetheless (Wan et al., 2020).

This study aims to address this gap in the literature by exploring the effects of Colours on the psychology of children in primary school learning environments. It aims to give educators, architects, and policymakers ideas on how to construct supportive and productive learning environments that support children's overall development and academic performance by reviewing existing literature as well as original research.

1.2 Statement of the Problem

Although colours play a significant role in primary school learning environments, unfortunately, the concept of colours and the effect on the users in a space is often ignored. A learning environment that does not support learning, morale, constructive conduct or positive behaviours can result from this ignorance. As a result, research on the effect of colours in primary school learning environments is necessary to clarify how the strategic use of colour might improve the educational experiences of these primary school students.

1.3 Aim and Objectives of the Study

The thesis aims to appropriately explain the effect of colour on pupils in the primary school learning environment and to also shed light on how colour might be thoughtfully applied to improve the learning experience for the children in the primary school setting, with a view of designing an effective primary school for Lead City University.

The objectives of this study are:

- to identify colours that stimulate positive psychological responses in children.
- to examine the effect of colour choices and placement on students' attention span, perception of time, and overall engagement.
- To determine the optimal colour schemes for primary school learning settings and effectively design a primary school for Lead City University with identified colour scheme.

1.4 Research Questions

The following questions will be addressed by this study:

- Which colours stimulate positive psychological responses in children?
- What affects does certain colours have on children's moods and emotions?
- What are the preferrable colours to be used in the design of a primary school?

1.5 Significance of the Study

This research is significant because it will provide insights into the influence of colours on children in primary school learning environments. This study will shed light on how the thoughtful application of colour can enhance the educational experience for primary school students. The findings of this study

will be useful for educators, school administrators, policy makers and architects in creating optimal learning spaces that foster learning, morale, and positive behaviors among students.

1.6 Scope of the Study

This research will concentrate on the impact of colours and its effects on pupils in a primary school learning environment. The study will look at the psychological and physiological effects of different colours on primary school pupils' moods and behaviour. It will also look at how careful colour selection improves students' interests and overall involvement. The study will determine which colour schemes are most effective in primary school learning environments.

1.7 Operational Definition of Terms

Primary School: A primary school, also known as an elementary school or grade school, is an educational institution that provides primary education to children typically between the ages of 4 to 10 years old.

Psychology: The mental or behavioural characteristics of an individual.

Physiology: The characteristics of an individual's healthy or normal functioning.

Learning Environments: This refers to the physical, social, and cultural contexts in which learning takes place.

Chapter Two

Literature Review

2.1 Conceptual Review

Colour influences our everyday living, more so in man's health and behaviour. "Colour can either increase or lower blood pressure. A room that is uncomfortably hot or cold can lower thresholds for frustration that can affect the acoustical environment" (Schneider, 2002).

Psychology is the science or study of personality and all the various elements that influence personality and thought processes, including mental state-related issues. Colour psychology thus encompasses the process of introducing learning to children, as well as the role of colour in the learning process. Colour psychology is a fascinating field that explores the impact of different hues on our emotions, moods, and overall well-being. From the calming effect of blues and greens to the energizing properties of reds and yellows, the colours we surround ourselves with can have a profound effect on our mental and physical health.

In fact, studies have shown that certain colours can even influence our appetite, productivity, and creativity. As such, it's important to consider the psychological effects of Colour when designing our living and work spaces.

Educators, psychologists, and designers have long been interested in the use of Colour in primary school learning spaces. Children's cognitive development and general learning experience can be greatly impacted by the emotional and psychological reactions that Colours are known to elicit.

Mahnke (1996) found that school Colour selection impacts efficiency, quality, security, and cost-effectiveness. However, Colour has been disregarded while developing learning environments. Administrators and teachers often choose Colour schemes based on personal preferences, disregarding

established scientific standards. Colour is not always planned in advance, even by specialists. Often, their approach lacks a solid understanding of psycho-physiological aspects (Mahnke, 1996) and comes as an afterthought.

According to Colour theory, some hues can help with attention and focus, while others might inspire feelings of creativity or serenity. Teachers can create a more dynamic and conducive learning atmosphere in the classroom by carefully choosing and incorporating different Colours. It can also be easier for children to navigate and interact with their environment when different learning areas or activities are distinguished by the use of Colour (Suh et al., 2020).

Smilek et al. (2002) discussed the potential of vigorous activity to improve short-term and long-term memory, the peculiarities of human memory performance being improved under the conditions of harmonious Colour against other Colours. Zavaruieva et al. (2022) discussed the impact of Colourful graphics and visuals. According to Wichmann et al. (2002), there was no statistically significant difference between the perception of Coloured pictures and subsequent memory recall compared to black and white ones. Furthermore, it is preferable to provide attention-grabbing tasks to pupils in brighter light, and memory-intensive tasks in less bright light (Castro-Alonso et al., 2018; Mogas-Recalde and Palau, 2021).

Lighting can help students perceive things more clearly (Lekan-Kehinde and Asojo, 2021; Liu et al., 2022). Experts Suh et al. (2020) have found that Colour and light have a big impact on learning quality.

Through the integration of Colour psychology principles into educational practice and design, educators may create vibrant and captivating environments that support children's cognitive growth, emotional stability, and academic success.

The main goals of this study are to determine how Colour influences the learning of elementary school students and how to use the simplest design principles to improve the Colour of classroom environments.

2.1.1 Concept of Colour

Colour is a perceptual feature of light defined by qualities such as hue, brightness, and saturation. It essentially describes how our brains interpret the various wavelengths of light that enter our eyes (American Heritage Dictionary, 2016). Colour is a visual perception feature characterized by Colour categories such as red, blue, yellow, and green, which are linked with objects and materials depending on the wavelengths of light they reflect or emit (Merriam-Webster).

Colour is an expressive element in architectural design that can be utilized to highlight a building's individuality and create harmony and unity, or it can be purposely contrasted to enliven or accentuate. It may influence how people respond to their surroundings and can heighten a state of serenity or elation (Bell, James , 2008).

2.1.2 Historical Context and Perspectives

For ages, scientists have been fascinated by the concept of Colour, leading to countless theories and study efforts to unravel its origins and features. Sir Isaac Newton and Aristotle contributed to our understanding of Colour (Elliot, 2015). Newton's research on Colour was groundbreaking in its scientific approach and experimental rigor. He conducted experiments with prisms, observing the dispersion of white light into different Colours and developing the theory of Colour because of varying wavelengths. This theory, known as Newton's theory of Colour, proposed that white light is composed of a spectrum of Colours and that the perception of Colour arises from the interaction between light and the human eye.

On the other hand, Aristotle had a different perspective on Colour (Elliot, 2015). He believed that Colour arises from the interaction between objects and light (Truesdell, 1976).

Colour, according to Aristotle, is a byproduct of how objects reflect or emit light rather than an intrinsic quality of the items themselves. Aristotle stated that diverse Colours are formed by the combination of two opposing qualities: brightness and darkness. Aristotle believed that Colour was the result of a combination of white and black, and this was widely held until 1666, when Isaac Newton's prism experiments gave the scientific foundation for understanding Colour. Newton demonstrated that a prism could split white light into a range of Colours, which he dubbed the spectrum, and that recombination of these spectral Colours recreated white light.

Although Newton realized that the spectrum was continuous, he used the seven-Colour names red, orange, yellow, green, blue, indigo, and violet to denote portions of the spectrum, analogous to the seven notes of the musical scale (Nassau, 2024).

Newton recognized the existence of Colours outside the spectral sequence. However, he stated that "all the Colours in the universe which are made by light, and depend not on the power of imagination, are either the Colours of homogeneal lights (i.e., spectral Colours), or compounded of these" (Goethe's Farbenlehre: Theory of Colours II, 2018).

While having different conceptions of Colour, Newton and Aristotle both made important contributions to our knowledge of this perceptual stimulus. Specifically, they agreed that light plays a fundamental role in the formation of Colour; additionally, Newton's experiments with prisms provided empirical evidence for the phenomenon of Colour dispersion, and his theory served as the basis for contemporary theories of Colour (Topper, 1990).

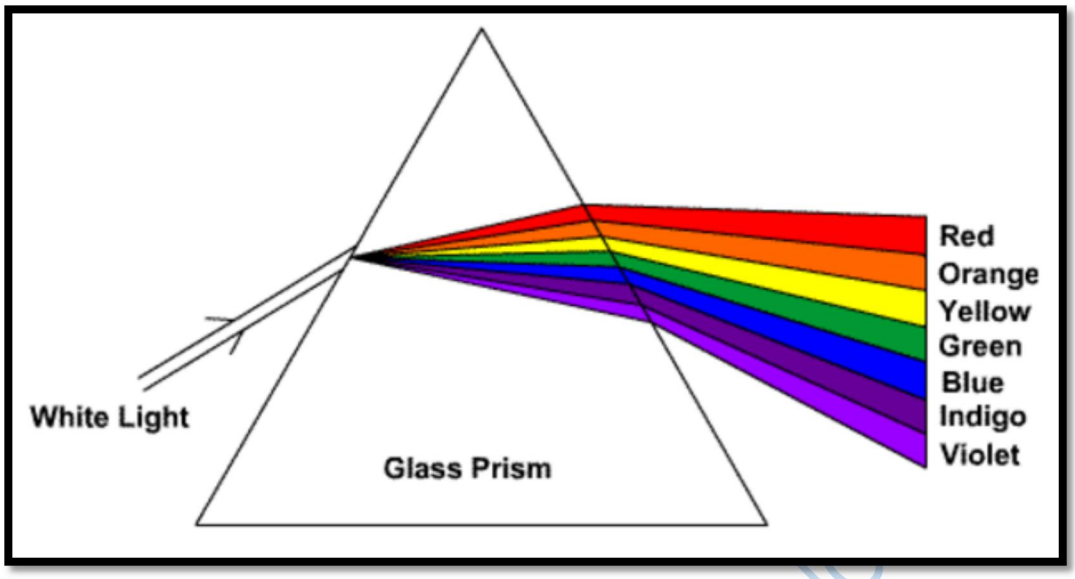

Fig 2.1: Diagram of the Prism Experiment Performed by Isaac Newton in 1665.

Source- (Google Search, 2024)

2.1.3 Types of Colour

Colour is a fundamental aspect of our visual perception, with various types of Colours playing important roles in different contexts (Kuhbandner et al., 2015). The history of Colour theory dates back to Aristotle's (322–322 BCE) On Colours and Claudius Ptolemy's (168–168 CE) Optics. It was studied and further revealed by al-Kindi (d. 873) and Ibn al-Haytham (d. 1039) that light affects Colour. In contrast to Aristotle's theories, Ibn Sina (1037), Nasir al-Din al-Tusi (1274–1244) found that there are several Colour pathways leading from black to white. The writings of Leonardo da Vinci (1490) and Leone Battista Alberti (1435) contain more contemporary interpretations of Colour theory concepts. The RYB primary Colours, which are the basic sensory characteristics combined in the perception of all physical Colours and, on the other hand, in the physical mixture of pigments or dyes, formed the basis of 18th-century theories of Colour vision. The 18th century's studies of many purely psychological colour effects, particularly the difference between "complementary" or opposing hues

created by colour afterimages and in the contrasting shadows in coloured light, contributed to the advancement of these theories.

In the late nineteenth century, German and English scientists determined that colour perception was best explained in terms of a new set of primary colours—red, green, and blue-violet (RGB)—modelled as an additive mixing of three monochromatic photons. Subsequent studies linked these main colours to the distinct responses to light of three types of colour receptors or cones in the retina (trichromacy). On this foundation, the quantitative description of Colour mixtures, or Colourimetry, emerged in the early twentieth century, along with a series of increasingly sophisticated models of Colour space and Colour perception, such as the opponent process theory.

The science and art of using colours are combined in Colour theory. It describes how humans see Colour as well as the ways in which colours contrast, blend, or mix to create visual effects see Colours. In addition, Colour theory covers how Colours are replicated as well as the meanings they convey. Primary, secondary, and tertiary Colours are the three groups into which Colours are arranged on a Colour wheel in Colour theory (Decker & Decker, 2022).

The three primary hues are blue, yellow, and red. There are two reasons they are referred to as primary. Firstly, it is impossible to combine two Colours to get a primary Colour. Only natural pigments can be used to produce primary Colours. By combining primary Colours, it is possible to make any other Colour on the Colour wheel.

Purple, green, and orange are the secondary hues. Any two basic or primary Colours can be mixed in equal quantities to generate secondary Colours. Green is the result of blue and yellow. Purple is made up of red and blue (violet) and orange is produced by combining red and yellow. Equal parts of a primary and a secondary Colour are combined to make tertiary hues. A more complex spectrum is produced by combining primary and secondary Colours to produce tertiary Colours. For artists and

designers, these Colours—which include shades like yellow-orange, red-orange, red-purple, blue-purple, blue-green, and yellow-green—offer a sophisticated palette.

It is possible to create complex and understated designs using tertiary Colours because they combine the richness of secondary Colours with the vividness of primary Colours. They offer countless opportunities for creativity and expression, perfectly capturing the intricacy and adaptability of Colour (Zhang et al., 2019).

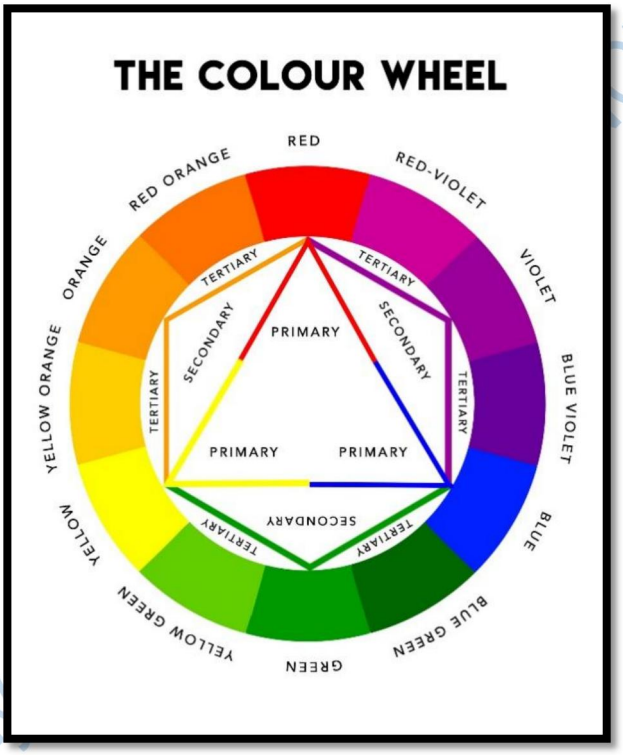

Fig 2.2: Diagram of the Colour Wheel Showing Primary, Secondary and Tertiary Colours.

Source- (Google Search, 2024)

2.1.4 Physical Basis of Colour: Introduction to Electromagnetic Radiation

Light demonstrates properties of both a wave and a particle with regard to wavelength, frequency, and amplitude. The wave theory of light, put forward by Christian Huygens in the seventeenth century,

holds that light is composed of oscillating electric and magnetic forces that propagate over space (Hecht, 2017). Light can be transmitted, absorbed, or reflected when it comes into contact with an object. The light wavelengths that an object reflects define its Colour. According to Gibson and Holladay (2019), a red apple, for instance, appears red because it reflects wavelengths linked to the Colour red. The distance between a light wave's successive peaks and troughs is referred to as its wavelength. It establishes the hue of light; higher frequencies are associated with shorter wavelengths and vice versa. For instance, blue light is more frequent and has a shorter wavelength than red light (Feynman, 1985).

The electromagnetic spectrum represents the continuum of wavelengths that make up light. It covers a wide range of electromagnetic radiation, from radio waves with the longest wavelengths to gamma rays with the shortest wavelengths (Nave, 2020). The basic principles of light absorption, reflection, and transmission by materials serve as the foundation for Colour perception. Objects look Coloured because they selectively absorb certain wavelengths of light and reflect or transmit others. This phenomenon is caused by the interaction of light with the material's atomic or molecular structure. The absorption of light causes electrons in the material to shift to higher energy levels, with the exact wavelengths absorbed reflecting the energy differences between these states. The remaining wavelengths that are not absorbed help to determine the object's apparent hue. The Beer-Lambert law describes this process, which connects light absorption to the qualities of the material and the route length of the light through it (Skoog, West, Holler, & Crouch, 2014).

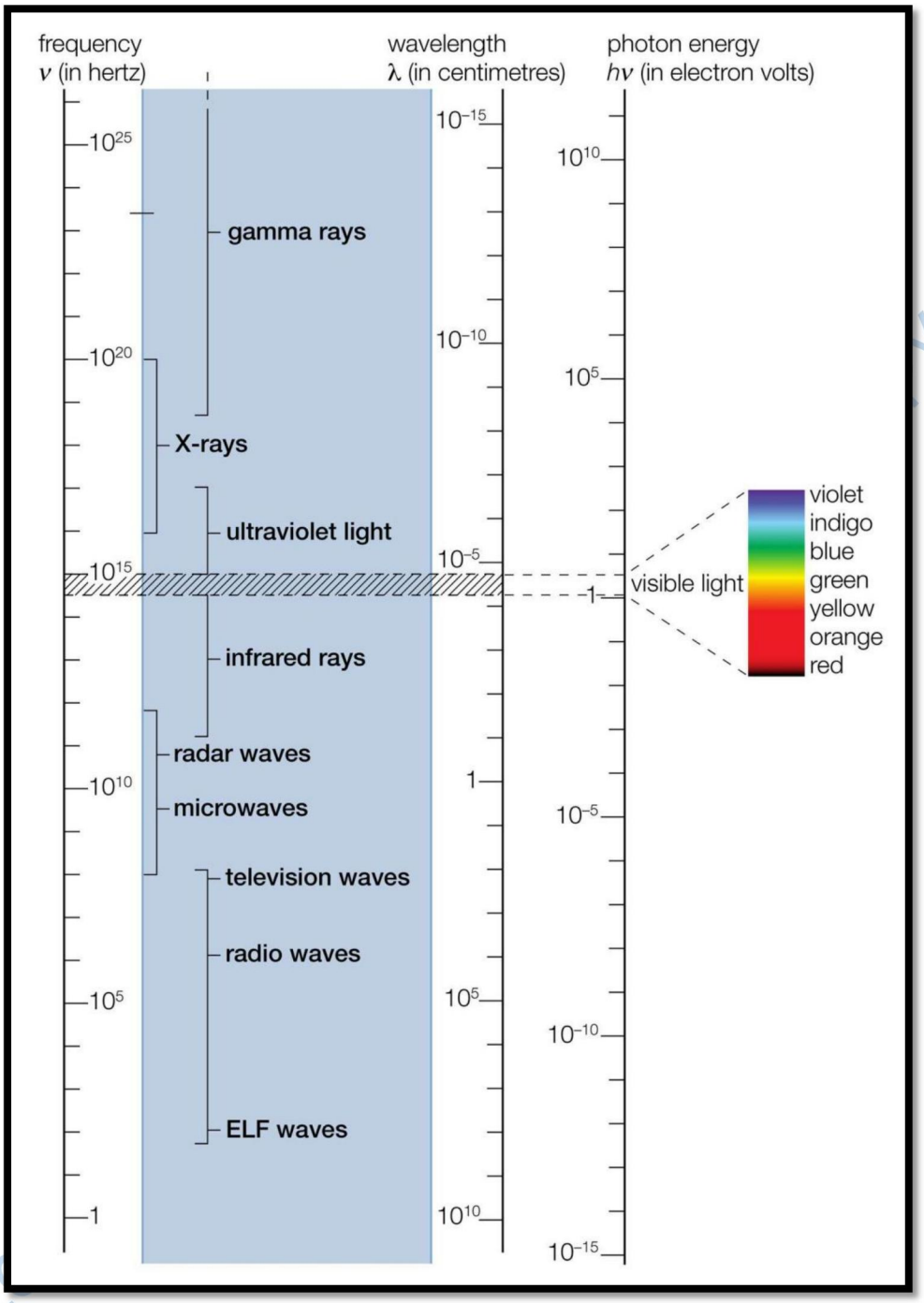

Fig 2.3: The Electromagnetic Spectrum.

Source- (Google Search, 2024)

2.1.5 The Relationship between Wavelength and Colour Perception

Colour perception is intrinsically linked to the wavelength of light. The human visual system perceives different wavelengths of light as distinct Colours, a phenomenon known as spectral Colour perception. This relationship between wavelength and Colour perception is governed by the physiological characteristics of the human eye and the neural processing in the visual cortex. The human eye has specialized photoreceptor cells known as cones, which are responsible for Colour perception. Cones are classified into three types based on their wavelength sensitivity: short-wavelength cones (S-cones), which are sensitive to short wavelengths (blue/violet), medium-wavelength cones (M-cones), which are sensitive to medium wavelengths (green/yellow), and long-wavelength cones (L-cones), which are sensitive to long wavelengths (red/orange). This trichromatic system helps the brain to process and interpret the numerous signal combinations from these cones, allowing it to sense a wide range of Colours (Wandell, 1995).

The perception of Colour begins with the absorption of light by cone cells in the retina. Each type of cone responds differently to different wavelengths of light, with varying degrees of sensitivity. The relative activation levels of the three types of cones determine the Colour perceived by the brain. For example, if the L-cones are strongly activated while the S- and M-cones are less active, the brain interprets the stimulus as red. Similarly, different combinations of cone activations result in the perception of other Colours across the visible spectrum.(Molday & Moritz, 2015). The human eye has specialized photoreceptor cells known as cones, which are responsible for Colour perception. Cones are classified into three types based on their wavelength sensitivity: short-wavelength cones (S-cones), which are sensitive to short wavelengths (blue/violet), medium-wavelength cones (M-cones), which are sensitive to medium wavelengths (green/yellow), and long-wavelength cones (L-cones), which are sensitive to long wavelengths (red/orange). This trichromatic system helps the brain to process and

interpret the numerous signal combinations from these cones, allowing it to sense a wide range of Colours (Wandell, 1995).

While the relationship between wavelength and Colour perception is generally stable among people with normal Colour vision, cultural and environmental influences can have an impact on Colour perception to some degree. For example, language and cultural practices can influence Colour categorization and associations, influencing how people perceive and describe Colours. Furthermore, lighting conditions and background context can affect Colour perception by changing the relative strength of distinct wavelengths in the visual field (Palmer & Schloss, 2010).

2.1.6 The Psychology of Colour

Colour psychology is the study of how different Colours affect human mood and behavior. It explores how Colours can influence emotional responses, as well as how responses to Colour are affected by factors such as age and cultural background (Elliot & Maier, 2014).

2.1.7 Concept of Colour Psychology

According to psychology research, Colours elicit emotional and psychological responses because they are associated with certain meanings and experiences (Elliot et al., 2007). For example, red is frequently connected with passion and urgency, but blue is associated with peace and trust (Elliot et al., 2007). Human behavior and decision-making are also influenced by Colour; for example, warm hues like red might increase appetite, while contrasting Colours in ads can draw attention (Kwallek et al., 1988). People tend to display Colour preferences based on their cultural background and personal experiences, which affects how they perceive organizations and what goods they choose to buy and what they choose to interact with (Hurlbert & Ling, 2007).

2.1.8 Importance and Applications of Colour Psychology

Colour has become an integral part of how people view and define the world. It has become an important part of everyday life in society and has many different uses, such as being used by people to express themselves in order to differentiate themselves from others. Colour has a vital role in many facets of human existence by affecting feelings, thoughts, and actions. Comprehending the significance of Colour is crucial in domains like psychology, design, and marketing, where Colour selections may exert significant influences on people and the community.

In visual communication, Colour is essential because it helps people interpret and comprehend their surroundings (Gage, 1999). We can navigate and engage with the environment around us because Colour allows us to comprehend depth, form, and contrast (Gage, 1999). Colour is a potent tool in design and aesthetics that may be used to set the tone and create ambiance.

People's feelings and behaviors in a particular location are influenced by the emotions and connections that different Colour palettes create (Albers, 1963).

It is strategically employed in branding and marketing to communicate ideas and evoke desired reactions from customers. In an effort to draw in and keep their target audience interested, brands strategically choose Colours to convey their identity, values, and personality (Labrecque & Milne, 2012).

According to Fraser and Banks (2003), Colour also has a big impact on cultural symbolism and identity, expressing society values, customs, and beliefs. In various cultures, some Colours have particular connotations and meanings that influence social customs and rites. Moreover, Colour affects how people think and behave as well as how they perceive things, places, and experiences. According to research, Colour has a significant impact on mood, cognition, and decision-making in a variety of situations (Elliot et al., 2007).

Understanding the meanings and applications of specific Colours is essential to having a favorable effect on viewers because Colour also has an impact on human behavior and psychology.

2.1.9 Theoretical Foundation of Colour Psychology

One of the earliest publications on Colour psychology was written in 1810 by German poet and artist Johann Wolfgang von Goethe. He spoke on the significance of various shades in his book Theory of Colours because he thought that Colours may evoke particular feelings. For example, he linked blue with melancholy and yellow with "gladdening" and "serene."

When the book was published, the scientific community disapproved of it since it was primarily based on Goethe is own beliefs rather than being supported by empirical evidence. However, several of his observations—most notably the notion that Colours have the power to influence our emotions and moods—have been supported by more recent studies (U. 2023, Guide to Colour Psychology)

Expanding on Goethe is work, Kurt Goldstein became one of the first psychologists to undertake empirical research in the field of Colour psychology. German neuropsychologist Goldstein was well-known for treating patients with conditions affecting the central nervous system. In an effort to ascertain whether or not specific Colours could affect motor performance, he tested the theory on five of his patients in 1942. Goldstein studied how his patients' symptoms, like tremors and balance issues, changed when they stared at various red and green items. Green appeared to lessen their symptoms and enhance their general motor performance, whereas red tended to exacerbate their problems (Meiers et al., 1990).

According to Goldstein's theory, green enhances motor performance since it is a relaxing Colour, while red is a stimulating Colour. Green, in his opinion, is a Colour that will help everyone, not only his patients. Due to the fact that Goldstein's Colour hypothesis was not confirmed by other researchers, it is thought to be erroneous. Nevertheless, Goldstein's contributions had a significant impact on

contemporary Colour psychology. It popularized the theory that Colours can elicit physiological reactions, a theory that is still being studied today.

2.1.10 Modern Approach to Colour Psychology

The three primary areas of concentration for contemporary Colour psychology study are physiological reactions to Colour, Colour preferences, and the impact of Colour on human emotions and behavior.

When investigating physiological responses to Colour, researchers evaluate blood pressure, heart rate, and electrical activity in the brain to assess whether or not a Colour is physically stimulating. Colours that are stimulating typically raise blood pressure, pulse rate, and brain activity, whereas Colours that are relaxing lower them. Researchers such as Ali and Gerard discovered that red is stimulating while blue is relaxing. Additionally, studies have demonstrated that cool Colours are calming while warm Colours are often stimulating. Different Colours have different effects on individuals, and these effects can vary from person to person (Elliot & Maier, 2014).

Researchers frequently ask people to rank a variety of hues to assess their Colour preferences. According to studies, most people's favorite Colour is blue, with red or green coming in second. Eysenck first noted this in the 1940s. People also love vivid, saturated Colours. People's least favorite Colours, on the other hand, are typically dark. Brown, black, and yellowish green are frequently listed as people's least preferred Colours. Researchers have attempted to measure the emotional effects of Colour by administering psychological tests such as semantic differential scales to assess people's opinions regarding Colour.

A semantic differential scale is a rating scale that includes two separate adjectives. They always have opposite meanings, like the terms cheerful and sad. The scale normally has five or seven gaps between the two words.

The scale is presented to study participants, who are then asked to choose where an object—in this case, a Colour—belongs on it. This allows researchers to assess people's emotional responses to Colour (Elliot, 2015).

2.1.11 Learning Environments

A student's learning environment encompasses the various physical spaces, cultural contexts, and learning situations they encounter. The term "classroom" is often used as a more accurate or preferred alternative to "classroom," which has more limited and traditional connotations—a room with rows of desks and a chalkboard, for example—because students may learn in a wide variety of settings, such as outside of school locations and outdoor environments. The phrase also refers to the methods in which teachers may build up an educational environment to support learning, as well as the culture of a school or class—its dominant ethos and traits, such as how people interact and treat one another (The Glossary of Educational Reform, 2014).

2.1.11.1 Elements of a Productive Learning Environment

I. The Physical Setting:

- A classroom set up that encourages participation and collaboration.
- Suitable lighting and cozy sitting arrangements.
- Sufficient materials and resources available to students.
- An uncluttered, well-organized area devoid of disturbances.

(Fisher, K., & Frey, N., 2009)

II. The Emotional Context:

a) Uplifting and encouraging environment that promotes a feeling of community.

b) Exchanges between students and teachers that are inclusive and respectful.

c) Promotion of experimentation and taking risks without fear of failure.

d) Acknowledgment and honoring of varied viewpoints and efforts.

(Hattie, J., 2009)

III. The Cognitive Environment

a) Learners are informed of the expectations and clear learning objectives.

b) Tough assignments that encourage critical thinking and problem-solving skills.

c) Chances to engage in inquiry-based learning and active involvement.

d) Comments and scaffolding to help learners advance.

IV. Social Context:

a) Through group projects and activities, cooperation and teamwork are promoted.

b) Chances for mentorship and peer learning.

c) Peer-assisted learning and constructive peer criticism.

d) Encouragement of community development and interpersonal relationships among students.

V. Flexible Environment:

a) Adaptability to accommodate diverse learning styles, preferences, and needs.

b) Differentiated instruction to address individual learner strengths and challenges.

c) Provision of choice and autonomy in learning activities and pathways.

d) Flexibility in scheduling and pacing to accommodate varying learning paces and priorities.

2.1.11.2 Types of Learning Environments

2.1.11.2.1 Formal Learning Environments

Formal learning environments are organized spaces created especially with education in mind. These settings include online learning environments with scheduled courses and programs as well as conventional establishments like schools, colleges, and universities. Policymakers, educators, and students all need to understand the features and effects of formal learning environments (Rivlin & Weinstein, 1984).

Characteristics of Formal Learning Environments

A number of essential characteristics define formal learning environments:

a) A curriculum that is predetermined and arranged into subjects or disciplines with clear learning objectives and outcomes is the norm in formal learning contexts.

b) Teachers or instructors with the necessary qualifications lead these learning environments, provide training, and evaluate students' progress.

c) Scheduled Classes: Educational activities are arranged into classes or sessions that have set hours and lengths for discussion, instruction, and evaluation.

d) Assessment and evaluation: Assignments, projects, tests, and quizzes are some of the tools used in formal learning contexts to measure and evaluate students' learning.

e) Certification and accreditation: Completing educational tasks successfully in structured settings frequently results in accredited degrees, certificates, or other credentials that attest to the attainment of learning objectives. (Ertmer & Newby, 1993)

The Advantages of Formal Learning Environments

Formal learning environments, which include establishments like colleges, universities, and school-based online platforms, have a significant impact on how people develop as individuals and as societies.

These settings, which are defined by planned classes, assigned teachers, organized curricula, and evaluation procedures, have a big influence on students, teachers, and society at large.

The facilitation of information acquisition and skill development is one of the most prominent effects of formal learning environments. Formal learning settings offer learners the chance to gain new knowledge, skills, and competences that are in line with educational standards and objectives through supervised learning activities and structured instruction. Formal learning environments provide a methodical approach to information acquisition that equips students for success in a variety of subjects, including science, math, and language study (Hattie, 2009).

The development of critical thinking, problem-solving, communication, and teamwork skills—all necessary for success in the twenty-first century—is another benefit of formal learning environments. In addition to teaching subject-specific knowledge, formal educators foster higher-order thinking abilities in their pupils by pushing them to assess, analyse, and synthesize their material. Learners gain the capacity to collaborate on projects, have productive conversations, and give presentations. These skills are critical in today's interconnected world as they enable successful communication, teamwork, and problem-solving (Burnett, 1990).

Challenges and Considerations in Formal Learning Environments

Even though they offer regulated educational experiences, formal learning environments have drawbacks and things to take into account. These settings, which are defined by scheduled classes,

established curricula, and assessment methods, encounter a number of challenges that affect students, teachers, and the educational system as a whole.

The preference for standardization over individualization in formal learning environments is a major obstacle (Ertmer & Newby, 1993). Standardized tests and curriculum provide uniformity and comparability throughout educational establishments, but they also could stifle chances for individualized instruction catered to the requirements and preferences of each student. Within the confines of a standardized curriculum, instructors may find it difficult to accommodate students' varied learning styles, interests, and talents, which can cause students to become disengaged and frustrated. Another difficulty in formal learning contexts is sustaining learner motivation and engagement (Hattie, 2009). In formal settings, lecture-based training and rote memorization are widespread. However, they may not pique learners' attention or have any connection to their daily lives, which leads to passive learning and disengagement. Teachers need to come up with creative ways to make learning engaging, relevant, and pleasant so that students will be intrinsically motivated and develop a lifelong love of learning.

In formal learning environments, fairness and accessibility are crucial factors to take into account (UNESCO, 2019). Despite the widespread belief that everyone has the right to an education, access to formal learning environments may be restricted due to institutional hurdles, socioeconomic status, and geographic location. Entry-level obstacles for students from marginalized or underprivileged backgrounds can include a lack of educational resources, insufficient support services, and discriminatory practices. These can exacerbate educational disparities and prolong cycles of disadvantage.

An additional challenge in formal learning environments is adaptability, especially in light of the quick changes in technology and the demands of the labor market.

It may be challenging for traditional educational methods to keep up with changing societal demands and technological advancements; in order to be relevant and successful, they must constantly innovate and adapt. To fulfill the demands of learners in the twenty-first century, educators need to be open to implementing new pedagogical approaches, utilizing emerging technologies, and modifying existing practices.

2.1.11.2.2 Informal Learning Environments

A vast array of locations and activities that take place outside of conventional educational institutions are included in informal learning contexts. These settings can be found in businesses, libraries, museums, community centers, and online communities. Informal education is frequently experiential, self-directed, and motivated by individual interests (Falk & Dierking, 2000).

Characteristics of Informal Learning Environments

A number of essential traits set apart informal learning contexts from conventional educational settings:

a) **Flexibility**: Learners' interests, preferences, and requirements are taken into consideration and accommodated in informal learning contexts. Students are allowed to investigate a variety of subjects and pursuits according to their own interests and goals.

b) **Authenticity:** Learners can apply their knowledge and abilities in meaningful and pertinent ways in informal learning environments, which offer authentic, real-world learning situations. Through engaging with online communities, taking part in community projects, or visiting museums, students gain real-world experiences that deepen their comprehension and appreciation of the world.

c) **Accessibility**: Learners of all ages, backgrounds, and educational levels can typically access informal learning situations. These settings can be found in public spaces like parks, libraries, and cultural institutions, and they can be free or inexpensive.

d) **Unstructured Socialization**: Unstructured learning environments encourage peer-to-peer learning, mentorship, and the sharing of ideas and viewpoints. They also encourage social contact and collaboration among students. In casual environments, students socialize informally, forming networks and relationships that aid in their academic and personal growth (Ertmer, P. A., & Newby, T. J., 1993).

The Advantages of Informal Learning

Informal education, as opposed to formal education, which includes classroom settings, a suitable curriculum, and a schedule, is more open and less restricted. There are no timetables, schedules, or calendars that a person should follow. There are no professional professors in informal learning; instead, one learns from experience and what happens around him or her. Individuals are allowed to pursue an education in the manner that best suits them. It is more of a practical learning experience because they are expected to deal with any hurdles or problems that arise in their path effectively and swiftly. Informal learning occurs immediately and without delay because it does not require a predetermined schedule or the content to be learned. Practical knowledge is more effective because it stays with us for a longer time (Skills, 2022).

Informal education is spontaneous and encourages lateral thinking and problem-solving techniques. Lateral thinking is a problem-solving method that takes a roundabout and innovative approach to problem-solving by employing non-obvious reasoning. It involves concepts that may not be possible to achieve by typical step-by-step logic.

Informal education provides people with the responsiveness to communicate with the environment. People can act freely in forthcoming situations. Free choice and change of interests are provided by informal learning and lastly, it helps bridge the gap between theory and practicality. These advantages of informal education make one wonder if it is better than formal education. Self-study, watching

videos, podcasts, and mentoring are some examples of informal learning which are popular in today's world (The True Value of Informal Education Essay, 2023).

2.1.11.2.3 Primary Learning Environments

Primary learning environments serve as the initial stepping stones in a child's educational journey, laying the basis for academic, social, and emotional development. From early childhood to preadolescence, these environments are critical in determining how young learners view education and how successful they will be in subsequent academic pursuits (Elliott & Ryan, 2018).

According to Berger (2017), primary learning environments are distinguished by a number of essential elements that address the special requirements and developmental phases of young children. These features include:

a) A child-centered approach that puts each student's unique needs, interests, and strengths first is essential to primary learning environments. Instructors utilize an array of pedagogical approaches, including play-based learning and interactive exercises, to actively include young students in the process of learning (Nandigam et al., 2014).
b) The cognitive, social, emotional, and physical aspects of children's development must all be supported in primary learning contexts. Activities are created to foster development in all of these areas while fostering kids' social skills, emotional fortitude, and intellectual curiosity.
c) An integrated curriculum, which links different topic areas and facilitates interdisciplinary learning experiences, is frequently used in primary learning contexts. Comprehensive exploration of themes and topics affords students the chance to form significant connections and apply their knowledge in practical settings.
d) In primary learning contexts, it is critical to create a safe, supporting, and nurturing environment. In addition to building strong bonds with their charges, teachers also offer

emotional support and foster a sense of community and belonging in the classroom. Teachers play a pivotal role in utilizing various pedagogical approaches, such as play-based learning and interactive exercises, to actively engage young students.

Benefits of Primary Learning Environments

Primary learning environments offer numerous benefits that contribute to children's overall development and academic readiness (Pianta et al., 2009):

a. **Foundational skill sets**: To provide the groundwork for future academic achievement, these settings concentrate on developing fundamental reading, numeracy, and critical thinking abilities. Children acquire fundamental abilities through age-appropriate activities and instruction, which serves as the foundation for more complex learning.
b. **Early Intervention**: For children with a range of learning difficulties, primary learning environments are essential for providing early intervention and support. Instructors recognize and handle each student's unique strengths and weaknesses, offering focused interventions and support services to guarantee every child has the chance to achieve.
c. **Cognitive Stimulation**: In primary contexts, cognitive development and intellectual curiosity are fostered through stimulating and engaging learning activities. Youngsters are urged to investigate, ask questions, and work through problems in order to cultivate a passion of learning and a curiosity for information.
d. **Socialization and Peer Contact:** Opportunities for socialization and peer contact are provided in primary learning environments. This fosters the development of cooperative learning styles, empathy, and interpersonal skills. By learning how to engage, collaborate, and settle conflicts with their classmates, children lay the groundwork for forming strong social bonds.

Examples include:

a. Kindergarten classrooms

b. Early elementary school settings

c. Playgroups and preschools

Disadvantages / Challenges of Primary Learning Environments

Primary education settings are the cornerstones of a child's educational career, influencing both their intellectual and personal growth. But in the process of striving for academic greatness, it is necessary to acknowledge and address the serious drawbacks that these settings entail. One of the most significant difficulties confronting primary learning environments is the lack of resources. Many schools face budget difficulties, resulting in insufficient financing for necessary educational resources, technology, and personnel. According to the National Education Association (NEA), budget cuts have become a widespread issue, hurting student education quality (NEA, 2019). Insufficient resources limit instructors' capacity to provide effective education customized to students' needs, compounding academic achievement gaps.

Furthermore, overcrowded classrooms are a serious hindrance to providing quality education in primary schools. Classrooms in densely populated locations or underserved populations may exceed capacity, limiting teacher-student contact and specialized instruction. The National Center for Education Statistics (NCES) found that overcrowding has a negative impact on learning outcomes, with bigger class sizes impeding academic progress and worsening behavioral issues (NCES, 2020).

Socioeconomic gaps intensify inequalities in primary school settings, perpetuating cycles of poverty and impeding efforts to improve educational equity. Children from low-income homes frequently encounter challenges such as insufficient money, limited access to extracurricular activities, and

minimal parental participation (Sirin, 2005). These inequities exacerbate the achievement gap and undermine the notion of equal opportunity in education.

Inequitable punishment practices exacerbate the disadvantages that pupils confront in basic learning environments. Systemic prejudices and discrimination lead to disproportionate disciplinary actions for pupils of Colour and those with disabilities. Studies have shown that differences in suspension and expulsion rates contribute to the school-to-prison pipeline and perpetuate patterns of marginalization (Losen et al., 2018).

Addressing the disadvantages of primary learning environments would need a collaborative effort from policymakers, educators, parents, and community partners. Prioritizing equitable resource allocation is critical to ensuring that all schools have adequate financing and support services. Furthermore, reducing class numbers and encouraging inclusive practices can improve teacher-student relationships and establish a conducive learning environment for all students. We may establish primary environments for learning that support every child's potential, regardless of their circumstances or background, by emphasizing equitable resource allocation, lowering class sizes, reevaluating assessment methods, and encouraging inclusive and restorative practices.

2.1.11.2.4 Secondary Learning Environment

Middle schools and high schools, also referred to as secondary learning settings, are crucial stages in a student's educational journey that help them make the transition from adolescent to early adulthood. These learning settings help students get ready for further education, career training, or entry into the profession by building on the fundamental abilities they learned in primary school (Eccles & Roeser, 2011). These learning settings, including but not limited to traditional classroom education, online courses, and vocational training programs, help students develop the necessary skills and knowledge

for further education or entry into their chosen profession. This foundation builds on the fundamental abilities acquired during primary school.

Characteristics of Secondary Learning Environments:

Secondary learning settings are critical in preparing students for success in college, work, and life. Secondary learning environments exhibit several key characteristics that distinguish them from primary settings (Feldlaufer et al., 1988):

a. **Subject-Specific Instruction**: Secondary learning environments frequently have a subject-based curriculum, with students taking classes taught by subject-area specialists in subjects such as mathematics, science, language arts, and social studies. This framework enables deeper research and mastery of specific curriculum areas.

b. **College and Career Readiness:** Secondary learning environments focus on building the essential skills and competences required for success in higher education, vocational training, or the labor force. Professional and technical education (CTE) programs, internships, and work-based learning experiences help students prepare for their future professional paths and post-secondary goals.

c. **Transition Support**: Secondary learning settings offer assistance and direction to children as they make the transition from childhood to adolescence, as well as from middle to high school. Counselors, advisers, and peer mentors provide academic and social-emotional support to students, addressing their specific needs and problems.

d. **Extracurricular Opportunities:** Secondary learning environments include a diverse choice of extracurricular activities, organizations, and sports teams to supplement students' academic

experiences. Extracurricular activities develop leadership abilities, encourage personal interests and talents, and strengthen social relationships.

Benefits of Secondary Learning Environments

Secondary learning environments help children develop academically, socially, and personally. Secondary learning environments promote socialization, collaboration, and emotional resilience among students. Peer interactions, group projects, and extracurricular activities foster positive relationships, teamwork, and leadership skills. These environments also help equip students with the knowledge, skills, and competencies required for success in college, the workplace, and life. Students are prepared for the academic demands of higher education by taking rigorous coursework, pursuing advanced placement alternatives, and participating in college prep programs.

Secondary learning environments offer tailored assistance and direction to meet the unique requirements and difficulties of each student. To promote students' academic, social, and emotional well-being, counsellors, advisors, and educators provide academic advising, counselling services, and interventions. This personalized approach ensures that each student receives the support and resources they need to succeed both in and out of the classroom. By addressing individual challenges and strengths, secondary learning environments can empower students to reach their full potential and thrive in their academic pursuits. Through collaboration and communication between students and staff, a strong foundation is built for students to overcome obstacles and achieve their goals (National Research Council, 2004).

Disadvantages / Challenges of Secondary Learning Environments

In secondary education, students build on the fundamental knowledge they learned in elementary school and get ready for their future academic and professional endeavours. This is an important phase in their educational journey. Secondary learning environments are important, but they are not without problems. Like primary schools, secondary learning environments sometimes struggle with excessive class numbers that can impede meaningful relationships between teachers and students as well as individualized education. According to research, secondary school classroom overcrowding may be a factor in behavioural problems, poor academic achievement, and decreased student involvement (Langevin et al., 2016). Insufficient customized attention has the potential to perpetuate academic gaps by failing to challenge high-achieving pupils and leaving struggling kids behind.

Another challenge is while secondary education aims to provide students with diverse learning opportunities, limited elective offerings constrain students' ability to explore their interests and talents fully. Budget constraints and curriculum requirements often result in a narrowed selection of electives, restricting students' exposure to subjects beyond the core academic disciplines (Tozer et al., 2014). This limitation may hinder students' ability to discover their passions and pursue interdisciplinary studies that align with their career aspirations.

Students in secondary school environments are frequently under more academic pressure to meet standards for college applications, standardized testing, and demanding curriculum. Students may experience stress, anxiety, and mental health issues as a result of the emphasis placed on getting good grades and test scores (Levy et al., 2017). Furthermore, secondary education's competitive atmosphere may put a premium on academic success at the expense of students' overall growth and social and emotional development.

Secondary environments for learning are not without difficulties and flaws, despite the fact that they are crucial in determining students' academic and eventual professional paths. In order to address the

drawbacks mentioned, parents, legislators, educators, and community stakeholders must work together. Through putting student well-being first, class sizes down, increasing elective offerings, improving career preparation programs, and addressing socioeconomic inequalities, we can establish secondary learning environments that support equity, holistic development, and the full potential of every student.

Examples include:

a. Middle schools
b. High schools
c. Vocational schools

2.1.11.2.5 Tertiary Learning Environment

Tertiary education settings, which include colleges, universities, adult education programs, and vocational schools, are the highest level of formal education and training. For those looking to extend their education beyond the school level, these settings provide advanced academic and professional options (Marginson, 2016). Furthermore, postsecondary educational settings enable students the option to focus on a certain subject, enhancing their competence and competitiveness in the labor market. These establishments frequently provide an extensive array of courses and programs, allowing students to customize their education to fit their own professional objectives. By offering the resources and tools required for both professional and personal growth, postsecondary learning environments significantly contribute to the shaping of the workforce of the future.

Characteristics of Tertiary Learning Environments

According to Scott (2019), tertiary learning environments differ from primary and secondary settings in a number of important ways. These features include:

a. **Personalized Training:** Based on students' academic interests, professional aspirations, and learning objectives, postsecondary learning environments offer customized training and instruction. Faculty members engage students in advanced coursework, research projects, and opportunities for experiential learning because they are experts in their professions.

b. **Opportunities for Lifelong Learning**: Through online learning, certificate programs, and continuing education, postsecondary educational settings facilitate professional growth and lifelong learning. These programs encourage ongoing growth and adaptation in a world that is constantly changing by enabling people to pursue personal interests, grow in their employment, and upgrade their skills throughout their lifetimes.

c. **Diversity and Inclusion**: Postsecondary educational settings encourage equality, diversity, and inclusion by embracing students with a range of experiences, viewpoints, and backgrounds. In order to build a sense of community and belonging among students, professors, and staff, they work to establish a welcoming and inclusive campus environment that celebrates and embraces individual differences.

d. **Research and Innovation**: As essential elements of academic achievement, research, scholarship, and innovation are highlighted in tertiary learning environments. To address challenging challenges and improve knowledge in their domains, faculty members work with industry partners, undertake state-of-the-art research, and contribute to scholarly publications.

Benefits of Tertiary Learning Environments

Numerous advantages that support students' academic, professional, and personal growth are provided by tertiary learning environments. Tertiary learning environments offer students the chance to engage with a diverse community of peers and faculty members, providing valuable networking opportunities and the chance to collaborate on research and projects. The exposure to different perspectives and

ideas in these environments can also help students develop critical thinking skills and expand their worldview.

These environments provide students with advanced education and training opportunities beyond the secondary level, equipping them with the knowledge, skills, and competencies needed for success in their chosen fields. Undergraduate, graduate, and professional degree programs offer specialized instruction, research opportunities, and practical experience that prepare students for diverse career pathways. Tertiary learning environments cultivate global citizenship and engagement by exposing students to diverse perspectives, cultures, and worldviews. International exchange programs, study abroad opportunities, and cross-cultural experiences broaden students' understanding of the world and prepare them to navigate global challenges and opportunities with empathy, tolerance, and intercultural competence (Pascarella & Terenzini, 2005).

Challenges/ Disadvantages of Tertiary Learning Environments

Higher education settings present a wealth of chances for growth on all fronts—academic, professional, and personal—but they also confront a number of difficulties that may limit their usefulness and relevance in the quickly evolving world of today. In order for postsecondary institutions to carry out their role of offering top-notch instruction and equipping students for success in a worldwide society, these issues must be resolved.

Ensuring access and affordability for all people, regardless of their socioeconomic status or geographic location, is one of the main problems facing tertiary learning environments (Hossler & Shapiro, 2013). Raising tuition fees, a lack of financial aid, and inadequate support services can make it more difficult for students from underrepresented or low-income households to enroll, which can further entrench socioeconomic and educational disparities.

In addition, the absence of close campuses or the restricted transportation alternatives may make it difficult for students living in rural or isolated places to attend institutions of higher learning. This lack of access to higher education for certain groups of students can perpetuate cycles of poverty and limit social mobility. Without adequate resources and support, these students may struggle to access the same opportunities and benefits that their more privileged peers have. As a result, the divide between the haves and the have-nots in terms of educational attainment and economic success continues to widen. Efforts must be made to address these barriers and create a more equitable and inclusive higher education system for all students, regardless of their background or circumstances.

Technology is being incorporated into tertiary education at a rapid pace, which offers universities both benefits and challenges (Bates, 2019). Digital technologies can improve teaching and learning in new ways, but they also come with a high cost in terms of infrastructure, support services, and training. Furthermore, the digital divide—unequal access to internet connectivity and technology—can make already-existing gaps in educational results worse, especially for pupils from rural or low-income families. It is imperative for educational institutions to guarantee that all students and teachers have equal access to technology and to continuous support so they can use digital tools in their teaching.

Another major difficulty facing institutions is maintaining and improving the relevance and quality of tertiary education programs (Westerheijden et al., 2010). Higher education institutions must constantly update their curricula, teaching strategies, and learning materials in order to guarantee that students have the knowledge, skills, and competencies necessary for success in the twenty-first century. This is due to the rapid advancements in technology, globalization, and workforce demands.

On the other hand, attempts to innovate and adjust to changing educational demands may be thwarted by bureaucratic obstacles, opposition to change, and antiquated teaching methods.

In conclusion, there are many issues that tertiary learning environments must effectively address, which calls for proactive and teamwork. Institutions can effectively navigate these challenges and carry out their essential role in promoting innovation, advancing knowledge, and enabling individuals to fulfill their educational and career ambitions by emphasizing accessibility and affordability, improving quality and relevance, supporting student retention and completion, carefully integrating technology, and guaranteeing financial sustainability.

Examples include:

a) Colleges

b) Universities

c) Community colleges

d) Technical institutes

e) Adult education centers

The primary environments of learning that children are exposed to have a significant impact on how they grow as individuals. These surroundings have a significant impact on many facets of a child's development and well-being, from the family to the classroom and beyond (Residence, 2023). A child's cognitive, social, and emotional development is largely determined by their home, which serves as their first and most personal learning environment. A child's academic performance and general well-being can be greatly impacted by the quality of their home environment, which includes the degree of parental involvement, the presence of a loving and supporting family, and the availability of educational resources, as research has repeatedly demonstrated (Oden, 2017).

According to one study, children frequently perceive their parents, siblings, and immediate surroundings as the most important elements in supporting or lowering their self-esteem and academic achievement (Anthonia, 2019). Children are profoundly affected by their environment, both physically

and psychologically. The parents or guardians of these children are responsible for creating a home environment that promotes effective learning for their children. Parental educational background, socioeconomic level, marital status, and home location all have an impact on a child's academic achievement at home.

In addition to the home, the school environment influences a child's learning experience. The quality of teachers, resources, and general school culture can have a significant impact on a child's academic progress. It is critical that parents and educators collaborate to foster a caring and nurturing atmosphere in which children can prosper academically. The classroom can help or impede a child's intellectual advancement depending on the teacher-student dynamic, peer relationships, and academic content. Several studies have shown that kids who attend supportive, well-resourced schools with caring teachers typically fare better academically and have greater social-emotional growth. Smaller class sizes, individualized attention, and access to resources like technology, libraries, and extracurricular activities are frequently offered by these institutions. On the flip side, students who attend underfunded, overcrowded schools with unskilled teachers may face emotional and intellectual challenges.

The standard of the school environment has a big impact on how well a child learns and feels in general. Moreover, a child's learning can be further improved by the existence of a great school culture, excellent leadership, and community relationships.

A child's growth and development can also be greatly impacted by primary environments for learning outside of the family and school, such as community centers, after-school programs, and extracurricular activities. Children can explore their interests, learn new skills, and have meaningful social relationships in these contexts. We can comprehend the complex elements that contribute to a child's overall well-being and academic achievement better by taking into account the primary learning environments and their impact on children's life (Nagelhout, 2023).

2.1.12 Relationship between Types of Learning Environments and Colour Psychology

Colours in learning environments, whether formal or informal, can have a significant impact on students' mood, engagement, and cognitive processes (Fradila & Sunarti, 2022). For example, the presence of charming colours and pictures in a learning environment can create a positive and stimulating atmosphere, while ergonomic furniture promotes comfort and focus (Manca et al., 2020). In the formal learning environment, the use of colours can be strategically employed to enhance concentration, creativity, and overall engagement (Fradila & Sunarti, 2022). In informal learning environments, Colours can also play a role in stimulating creativity and encouraging exploration (Alsawalha, 2018).

Overall, the use of colours in learning environments, whether formal or informal, is essential for creating a positive and stimulating atmosphere, promoting comfort and focus.

2.2 Design Considerations for Primary Schools

School building design is influenced by a number of factors. Firstly, student population and age groups have a big impact on building layout and size. Secondly, student preferences and needs—like playgrounds, colourful buildings, and large windows—are important considerations. Lastly, risk factors related to construction projects—like water supply, qualified contractors, and safety measures—also have an impact. Lastly, energy consumption is a major factor—ventilation needs, insulation materials, and window-to-wall ratios affect energy performance. Lastly, policies related to urban planning, design trends, and the influence of foreign design solutions also shape school building design.

The first four to eight years of a child's formal education—a period of structured learning that is required in the majority of countries—take place in primary school facilities.

Children in primary school often start at age four or seven (four if the school offers kindergarten, which is an introductory program for students ages four to six). This first phase of schooling is often referred to as "elementary," "grade," and "grammar" school. Different developmental phases of children are promoted by different elements such as light, Colour, scale of their environment, and even school navigation. Adverse conditions might also have a harmful impact on children.

Primary education is described as "Education given in an institution for children" by the National Policy on Education (2013), with the typical age range being 6 to 11. Students at this level are getting ready for Secondary Education. As stated in the objectives, it is essential that we teach learners the fundamentals. The National Policy on Education (2013) stated that the goals of primary education are to: instill permanent literacy and numeracy as well as the capacity for effective communication; establish a solid foundation for scientific and reflective thinking; guarantee citizenship education as a basis for effective participation in and contribution to the life of the society; build character and moral training and the development of sound attitudes; give the child the opportunity to develop manipulative skills that will enable him to function effectively in the society within the limits of his capacity; and finally, provide basic tools for further educational advancement.

When designing elementary schools, several aspects must be carefully taken into account to provide settings that support young kids' growth, learning, and well-being. Every part of the school environment, from the interior design to the architectural plan, is vital in determining the educational experiences and results that students receive (Barrett et al., 2015).

For rooms to be secure and welcoming to students, natural lighting, safety, and ease of access must be given top priority in architectural layout. Colour schemes, furniture selections, and classroom layout are examples of interior design components that might affect students' concentration, creativity, and general well-being.

2.2.1 Scale: Anthropometric Considerations

Anthropometric considerations are critical in primary school design to ensure that the physical environment meets the specific size, proportions, and developmental demands of young pupils. Designing environments, furniture, and amenities with children's anthropometric dimensions in mind increases comfort, safety, and accessibility, thereby improving their learning experience (Mahmood & Hussein, 2018). By adding anthropometric data into the design process, designers may build more inclusive and accessible goods and places for a broader spectrum of users. Understanding variances in body dimensions can help to guarantee that children of various sizes and abilities can engage with the built environment in a comfortable and safe manner. Furthermore, using anthropometric measures can improve the overall user experience, resulting in higher happiness and usefulness.

Desks and chairs are essential classroom furnishings that should be ergonomically built to promote appropriate posture, comfort, and concentration during learning activities (Hedge & Powers, 2017). Desk height should be adjustable so that children of different heights can sit with their feet flat on the floor and their arms comfortably resting on the desk surface. Chairs should provide proper lumbar support, seat depth, and backrest height to encourage spinal alignment and prevent fatigue from prolonged sitting. Corridors and entrances also serve as vital circulation spaces in the school environment that should be constructed to allow for easy movement and accessibility for students of all ages (Luebkeman et al., 2019). Corridors should be broad enough to accommodate numerous students strolling side by side, with clear sightlines and minimal barriers to avoid congestion and accidents. Doorways should be broad and tall enough to enable wheelchairs while still allowing students and staff to pass through easily, especially those carrying bulky things or equipment.

Primary school surroundings must have outdoor play areas that are carefully planned to support children's motor skills and physical development (Fjørtoft, 2004). To accommodate children of varied

ages and abilities, playground equipment should have variable levels of challenge and complexity that are age-appropriate. Ensuring that outdoor areas are safe and inclusive for children with disabilities or mobility impairments through accessible pathways, ramps, and surfacing materials encourages discovery, physical exercise, and social engagement.

2.2.2 Materials: Sustainability and Durability and Sensory Engagement

Establishing a secure, long-lasting, and sustainable learning environment requires careful material selection. It is important to pick high-quality, non-toxic materials for flooring, walls, and furniture that can endure regular cleanings and heavy use (Teller & Howard, 2018). It is important to select materials that are safe and long-lasting, capable of withstanding repeated washings and extensive use without losing their integrity or causing health risks (Howard & Tellier, 2018). Low-emission, non-toxic materials improve indoor air quality and shield pupils from dangerous chemical exposure.

Students' engagement, creativity, and cognitive development are improved when sensory-rich materials like real wood, tactile surfaces, and vivid Colours are used (Ginsburg et al., 2019). A visually engaging and immersive learning environment is produced by the combination of tactile stimulation provided by textured materials and visual perception and mood stimulation caused by Colours.

2.2.3 Safety and Security

Safety is also a very important factor to take into consideration when drawing up designs for a primary school building. In order to guarantee the security and well-being of students, employees, and visitors, safety and security concerns are crucial in the design of elementary schools. Controlled entry points, perimeter fencing, security cameras, emergency exits, and designated safe zones are examples of design elements that assist reduce risks and improve emergency response times (Nelson et al., 2008). Moreover, making defined drop-off and pick-up locations, obvious emergency protocols, and wayfinding signage legible improves safety and makes school operations run more smoothly.

2.2.4 Colours

Primarily, Colour influences the ambiance and tone of elementary school settings. Vibrant, upbeat hues like yellow, green, and blue encourage optimism, vigor, and creativity, while subdued tones like beige and gray offer a soothing, impartial background for concentrated learning activities (Havi & Pekarovicova, 2018). Incorporating visual aids and Colour-coded clues throughout the school also supports learning and academic accomplishment by assisting students in navigating their surroundings, reinforcing organizing systems, and improving memory recall.

Other factors to take into cognizance include:

2.2.5 Spatial Arrangement

Primary schools should have well-planned spatial arrangements to enable effective movement, supervision, and access to facilities. The movement of students and teachers during the school day can be impacted by factors including classroom placement, corridor width, and closeness to communal spaces (such playgrounds, cafeterias, and libraries) (Lippman et al., 2015). Versatility and creativity in education are fostered by flexible and adaptable environments that can support different group sizes, activities, and teaching styles. According to research, carefully considered spatial designs in primary schools can help foster a welcoming and encouraging learning environment where kids can develop their intellectual, social, and emotional skills. Teachers and school administrators can improve the quality of education and students' general wellbeing by taking into account how spatial layouts affect primary learning environments. Different teaching modalities, activities, and learning styles should be accommodated by a range of learning spaces in primary schools. Apart from conventional classrooms, design factors could encompass breakout spaces, cooperative work areas, peaceful places, outdoor educational settings, and adjustable seating configurations (Koenig & Schmid, 2017). These

multipurpose areas encourage student involvement, creativity, and exploration by supporting project-based learning, specialized instruction, peer collaboration, and active learning.

2.2.6 Natural Lighting and Cross Ventilation

Since natural light and ventilation have been demonstrated to improve kids' attitude, behavior, and academic achievement, they are also crucial factors to take into account while designing primary schools (Heschong Mahone Group, 2003).

Large windows, skylights, and atriums increase natural light penetration and lessen the need for artificial lighting in school buildings, resulting in a more visually exciting and energy-efficient learning environment. Furthermore, improving indoor air quality and thermal comfort through natural ventilation techniques including operable windows, cross-ventilation, and passive cooling systems benefits students' general wellbeing.

Primary school design takes into account a multitude of aspects that affect children' physical, emotional, and cognitive health. School designers can create engaging and supportive environments that foster student success and promote lifelong learning by optimizing spatial layout, promoting natural light and ventilation, creating multifunctional learning spaces, integrating technology and connectivity, and placing a high priority on safety and security.

2.2.7 Spatial Considerations for a Primary School Design

From a space syntax perspective, spatial configuration describes how spaces relate to each other based on visibility or accessibility. This influences students' movements, co-presence, and encounters by allowing or limiting their opportunities to mix in space, which in turn shapes their social lives and activities that follow (Hillier 1996). The functions and configurations indicated above are thought of as spatial input that affects the potentiality of school design, which is the capacity to affect the kinds and arrangements of student learning activities. It is therefore claimed that space affects activities, relating

back to the entanglement of the overarching parameters: the learning process, the students, the school building and the sense of design potentiality, since the latter is linked to a particular social parameter of the student activities in the school.

According to Hajdukiewicz et al. (2016), primary school buildings should be laid out to maximize space use and promote effective circulation. It is easier for students, staff, and visitors to navigate a facility when distinct parts are zoned for different purposes, such as classrooms, administration, libraries, and recreational areas. This encourages organization and clarity inside the building. Zoning various spaces for particular uses could encourage organization, but it also restricts the school building's ability to be flexible and adaptable. Prioritizing circulation and space utilization when designing a plan may limit the ability to make later modifications or revisions in response to changing educational demands. Appropriate natural light and ventilation improve the quality of the indoor environment and support the health, happiness, and academic achievement of students (Heschong Mahone Group, 2003). While moveable windows, clerestory openings, and ventilation louvers improve air circulation and thermal comfort, strategically positioned windows, skylights, and atriums enhance daylight penetration and minimize the need for artificial lighting and mechanical HVAC systems.

Buildings in primary schools ought to be inclusive and accessible to children of all abilities (UNESCO, 2016). All children can engage completely in school activities and programs thanks to sensory-sensitive design components that support students with sensory processing variations. Accessible doors, ramps, elevators, and tactile signage accommodate people with mobility limitations. Furthermore, classrooms must to include movable furniture to accommodate students with different heights and physical requirements. Students with disabilities or visual impairments should have easy access to assistive technologies, Braille materials, and visual aids. To foster a friendly and inclusive learning

environment for all kids, school personnel should also be trained in how to accommodate students with varying abilities.

According to Baird et al. (2017), primary school architecture must be flexible in order to accommodate a range of teaching modalities, activities, and learning styles. Flexible space design that incorporates moveable partitions, multipurpose rooms, and modular furniture facilitates smooth transitions between various learning modalities and supports project-based learning, individualized activities, and collaborative learning. Moreover, research has shown that flexible school architecture can also enhance student engagement, motivation, and overall academic performance. By providing students with a variety of learning environments, educators can better cater to the diverse needs and preferences of their students. Additionally, flexible spaces can promote a sense of ownership and autonomy among students, as they are able to choose where and how they learn best. This can lead to increased student agency and a greater sense of responsibility for their own learning.

2.3 Empirical Review

Colour psychology is a comprehensive field that includes school architecture and the various ways that colour is applied on the walls, ceilings, within classrooms, and on various school structures. Therefore, we are concentrating on the significance of Colour in the child's personality, including how they learn, they accept Colour, and how Colour influences them as a part of the surroundings while taking academic lessons and other things that a child should learn in their formative years of learning.

Colours influence how we feel and how we process the world. So how do children feel about Colours? Can colour have a profound impact on a child's development and mental state? There is a science of Colour that tells us that infants and children relate to the world through Colour. Colour perception in child development is a far more powerful influencing factor than we think. In simple terms, colour can change the way a child feels and thinks.

2.3.1 Understanding how colours Affect Children's Psychology in Elementary School Learning Environments

The foundation for comprehending how colours affect children's psychology in primary school settings is provided by certain theoretical frameworks. These frameworks, which draw from a variety of fields including psychology, neurology, and environmental design, provide insights on the behavioural, emotional, and cognitive reactions that distinct colours in educational settings evoke.

2.3.1.1 Biopsychological Theory

Biopsychological theories explore the physiological and neurological mechanisms underlying Colour perception and its effects on mood and behavior. Research in this area highlights the role of the visual system, including the retina, optic nerve, and visual cortex, in processing Colour information and transmitting signals to brain regions associated with emotion and cognition (Palmer & Schloss, 2010). From the retina to the visual cortex in the brain, the human visual system is a sophisticated web of neuronal circuits that process visual information (Hubel & Wiesel, 1962). Cones are specialized photoreceptor cells in the retina that react to various light wavelengths to see Colour. Red, green, and blue are the three fundamental hues that cones are sensitive to; these Colours combine to form the entire Colour spectrum that humans are aware of.

The visual cortex receives neural signals from the cones and processes and integrates them to create a coherent perception of Colour (Livingstone & Hubel, 1988). Neurons in distinct visual cortical regions are specifically trained to handle Colour information, reacting differently to different shades, contrasts, and intensities.

According to the biopsychological theory, both direct and indirect neural pathways may allow Colour perception to trigger emotional and behavioral reactions (Grossberg & Mingolla, 1985). For instance, the sympathetic nervous system may be triggered by warm hues like red and orange, which can raise

arousal, breathing, and heart rate. On the other hand, cool hues like green and blue could be relaxing and help lower stress levels (Jacobs & Hustmyer, 1974). The ventral striatum and orbitofrontal cortex, for example, are regions involved in the perception of pleasure and positive reinforcement when pleasant Colours are viewed (Palmer & Schloss, 2010). These biological reactions to Colour influence people's thoughts, feelings, and behaviors by adding to the subjective sense of mood and affect.

The neuronal mechanisms underpinning Colour perception and its impact on emotion, behavior, and cognitive functions are clarified by the biopsychological hypothesis. Colour can be used by educators, designers, and legislators to build environments that maximize learning, well-being, and performance in primary school settings by understanding how Colours affect the brain's physiological and psychological responses.

2.3.1.2 The Piagetian Theory

The Swiss psychologist Jean Piaget is well-known for his revolutionary research on children's cognitive development. As they actively create knowledge and awareness of the world around them, children move through various stages of cognitive development, according to Piagetian theory. The cognitive, reasoning, and problem-solving processes of children change qualitatively at each of these stages: sensorimotor, preoperational, concrete operational, and formal operational.

Sensorimotor Stage (Birth to 2 Years)

Using their senses and their movements, newborns use this stage to investigate and learn about their surroundings. Within this stage, newborns move from reflexive responses to intentional acts and symbolic representation through six sub stages that Piaget outlined (Piaget, 1952). Infants use their senses and their movements to explore the world while they are in the sensorimotor stage. Their cognitive growth and visual perception are greatly enhanced by Colours. Infants' attention is drawn to

and encouraged to engage in exploratory actions by bright and contrasting Colours, which enhances their sensory-motor learning experiences.

Preoperational Stage (2 to 7 Years)

Considerable progress in language acquisition, symbolic play, and representational thinking define the preoperational period. At this stage, children think egocentrically, struggle to see things from other people's perspectives, and frequently display magical thinking and animistic beliefs (Piaget, 1952). Activities centered on conservation, such the conservation of mass, volume, and amount, highlight children's deficiencies in comprehending conservation principles and their propensity to prioritize surface characteristics over fundamental characteristics.

In the preoperational stage, children develop symbolic representation and imaginative play skills. Colours become symbolic tools for communication and expression, as children assign meaning to different hues and use them to represent objects, emotions, and ideas in their drawings, paintings, and pretend play activities.

Concrete Operational Stage (7 to 11 Years)

During the concrete operational stage, toddlers learn to reason logically and apply mental processes to tangible objects and situations. They acquire the ability to think reversibly, conserve, classify, and serice (Piaget, 1952). Children's comprehension of Colour deepens as they go on to the concrete operational stage. They can do Colour-based Colour sorting, Colour-based classification based on similarities and differences, and Colour-gradient seriation tasks. Their conservation duties also involve Colours, as they must learn to distinguish between objects that change in size or shape but retain the same hue.

Formal Operational Stage (Individuals Eleven Years and Up)

The formal operational stage, which is distinguished by logical reasoning, metacognition, and abstract and hypothetical thinking, represents the pinnacle of cognitive development. In this stage, adults and adolescents are capable of scientific thinking, hypothetical-deductive reasoning, and complex problem solving (Piaget, 1952). Adults and adolescents acquire the ability to think abstractly and hypothetically during the formal operational stage. Their cognitive processes are still influenced by Colours, but in more intricate ways. In addition to investigating Colour symbolism in literature and art, they might examine the psychological and cultural implications of Colours and apply Colour theory concepts to design and other creative efforts.

2.3.2 Colour Psychology in Children Learning Spaces

Colour is a pervasive aspect in our environment that has a tremendous impact on our feelings, perceptions, and actions. The importance of Colour in elementary school settings, where developing brains are fostered and academic foundations are built, cannot be emphasized. The use of Colour in children's learning spaces has long been a topic of interest for educational researchers and designers. Colour can have a profound impact on a child's mood, attention, and cognitive performance (Elliot & Maier, 2012).

One study suggests that Colour is a crucial visual experience for human beings, and its influence extends to the educational setting (Saleh & Huffer, 2020). The researchers found that Colour can impact the level of attention and emotional arousal, which in turn can enhance memory performance.

The study of how Colour influences human mood and behavior is known as Colour psychology (Ella et al. 2018). When a Colour is perceived by the eyes and conveyed to the brain, the brain releases chemicals that in turn influence our mood (Vakili, Niakan, and Najafi 2019). This process is known as

the psychological response to Colour. As a result, using different Colours in a room might affect people's moods and emotions (Sebastian 2020). Since the wavelengths and frequencies of different Colours vary, so too can their effects on us. For instance, red has negative connotations such as danger, rage, and conflict, but positive connotations like as passion, love, and power (Sebastian 2020).

Colour plays a significant role in children's lives. Children are particularly sensitive to colour and drawn to warm, vibrant hues. Children use colour as a tool to express their emotions as well.

Children, for example, utilize light colours to symbolize happy emotions and dark colours to symbolize negative emotions (Jonauskaite et al. 2019). Children's negative emotions are associated with red and black, whereas pleasant emotions are associated with yellow, pink, and blue (Ravishankar 2020).

According to a study, students' memory and attentiveness are improved in classrooms with chilly Colours (Llinares, Higuera-Trujillo, and Serra 2021). The Colour blue has been shown to improve pupils' performance on challenging assignments and increase their IQ scores (Llinares, Higuera-Trujillo, and Serra 2021). Yet, warm Colours will encourage pupils to engage in active learning (Llinares, Higuera-Trujillo, and Serra, 2021).

While warm Colours like orange, red, and yellow can encourage children to move around.

Therefore, to add even more excitement to the classroom, warm Colours can be combined with the blue and green decor. However, since they will make the kids feel depressed, light blue and light green—bright Colours—are better suited for the classroom than dark blue and dark green.

When utilizing various Colours in architecture, careful research and planning has to be done. Applying primary or bright Colours in the classroom is insufficient since these Colours can quickly divert a child's attention. To put it another way, Colour psychology and architecture go hand in hand. A planner or architect should consider the goals and purposes of the structures as part of the whole architecture,

rather than just installing bright buildings. A school building should reflect a child's enjoyment of Colour based on their perception of the surroundings rather than only its aesthetic appeal. The setting itself is a learning process that involves accepting his early experiences. A child's experience can be enhanced or diminished by colour, which can impede their development.

Therefore, it is important to carefully regulate the application of Colour so that it can boost and improve the educational and learning process. If the perception of Colour and light as harmful to health exists, it is only when these elements are used improperly.

Apart from the use of colour, there are other factors that might establish a serene and tranquil atmosphere in an elementary classroom. For example, the interior environment's lighting, materials, and ventilation.

Light's perceived temperature is not the same as its real temperature. This is explained as follows: Light seems bluer or colder depending on its physical temperature. It appears redder, yellower, or warmer when the actual temperature is lower. It is important to choose the right light source carefully (Gardner and Hannaford, 1993; Miller, 1997, p. 125).

2.3.3 The Effects of Classroom Colours on Child Psychology

Primary schoolers have a predisposition for warm, cheerful Colour palettes that go well with their exuberant personalities. Fehrman's study (2000, p53) shows that primary school kids preferred Colour schemes extend beyond primary Colours to include a sophisticated Colour palette with superb Colour balance.

A. Primary Colours (Red, Blue, Yellow):

- Red: Red is often associated with energy, passion, and excitement. It can stimulate brain activity and increase heart rate and blood pressure.

Impact on Children: Red can be used to create a stimulating environment that encourages physical activity and creativity. However, excessive use of red may lead to overstimulation and agitation in some children.

- Blue: Blue is known for its calming and relaxing properties. It can promote feelings of tranquility and reduce stress and anxiety.

Impact on Children: Blue is often used in primary school classrooms to create a peaceful learning environment that fosters concentration and focus. It can also help children feel more comfortable and at ease during learning activities.

- Yellow: Yellow is associated with happiness, optimism, and creativity. It can stimulate mental activity and promote a sense of joy and enthusiasm.

Impact on Children: Yellow can be used to create a cheerful and vibrant atmosphere in primary school settings. It can enhance children's mood and motivation, making learning activities more enjoyable and engaging.

B. Secondary Colours (Orange, Green, Purple):

- Orange: Orange combines the energy of red with the brightness of yellow. It is associated with enthusiasm, creativity, and social interaction.

Impact on Children: Orange can be used to create a lively and dynamic learning environment in primary schools. It can stimulate children's imagination and encourage collaboration and communication among peers.

- Green: Green is often linked to nature, growth, and harmony. It has a calming effect on the mind and can promote feelings of balance and stability.

Impact on Children: Green is commonly used in primary school settings to create a relaxing and nurturing atmosphere. It can help children feel more connected to their surroundings and foster a sense of well-being and belonging.

- Purple: Purple is associated with luxury, creativity, and spirituality. It can stimulate imagination and promote introspection.

Impact on Children: Purple can be used to create a sense of inspiration and wonder in primary school environments. It can encourage children to explore their creativity and express themselves through art and other creative activities.

C. Tertiary Colours (e.g., Red-Orange, Yellow-Green, Blue-Violet):

The characteristics of primary and secondary colours are combined in tertiary colours to create subtle effects that can change according on the shade and application. They typically display a mix of the psychological effects linked to their primary and secondary colour components, though. Tertiary colours can be used to give the learning environment in elementary school settings more depth and complexity while also fostering artistic expression and aesthetic appeal. They can also be deliberately used to arouse particular feelings or moods that complement the learning objectives and activities carried out in the classroom.

Chapter Three

Methodology

3.1 Introduction

This chapter show the methodological procedures that were used in gathering and analysing data on the effects of colours on students in primary school learning environments. This thesis adopted a combination of case study reviews and literature reviews for the collation of the data. In addition, oral interview was deployed to aid in the collection of data on teachers' views on the effects of the colours on the students' learning.

A case study is a research approach that is used to generate an in-depth, multi-faceted understanding of a complex issue in real-life context. It gives information about existing designs, patterns, and methods. It helps to learn the best practices to imbibe and those to eliminate in your design from the example of others. The chosen case studies for this thesis have been properly appraised to serve as tools for the realization of the set aim and objectives. The case study analysis focuses on investigating colours that when incorporated in a primary school, can have a positive influence on children's emotions and mood. A critical analysis of the merits and demerits also helped to see such projects in retrospect and serve as a guide as to how certain colours effect the learning process of students in a primary school environment.

3.2 Collection of Data

The primary source of data collection for this research work was observation. For the purpose of this thesis, five case studies were analysed. Two of which were local. These case studies carried out are to examine existing examples and find out the effects of colours in a primary school learning environment.

The primary school analysed for this thesis were:

1. Thompson Elementary School
2. Sangam Elementary School
3. Ecole Maternelle Pajol
4. University of Lagos Staff School
5. University of Ibadan Staff School

3.3 Case study analysis

3.3.1 Case Study One – Thompson Elementary School.

3.3.1.1 Description of the Building

Thompson Elementary School is a state educational facility situated in Arlington, USA. It currently hosts 380 students within a 57,600 square foot area with a student-teacher ratio of 15: 1 and ranked in the top 30% of schools in the State of Massachusetts and was constructed in 2013. The school combines several distinct educational spaces, with an innovative design that gives it a welcoming appearance. The 57,000 square - foot facility was designed to meet the Massachusetts Coalition for High Performance Schools (MA -CHPS) standards, a state - adopted program that ensures healthy school environments through the construction of high-performance school buildings that minimize energy and water usage while sourcing sustainable building materials.

3.3.1.2 Location

Thompson Elementary school is located 187 Everette Street, Arlington Massachusetts, United States.

3.3.1.3 Appraisal

Fig 3.1: Picture Showing the Entrance of Thompson Elementary School.

Source- (Google Search, 2024)

3.3.1.3.1 Exterior

This school will be analysed from an exterior and interior point of view and the roles the colours applied might play would be examined.

From the external point of view, the predominant colour is brown due to the bricked facade. This is accompanied by stripes of bright yellow and orange that create both a sense of dynamism and geometric perfectionism.

According to Goethe's Theory of Colours, orange is known to be a stimulator for the mind, conveying excitement, warmth, determination and encouragement. At this early stage, it is important that children feel supported in order to maintain a high level of enthusiasm that can be crucial in one's educational and future prospects. If they feel a lack of encouragement in their school career, they could revisit this negative feeling every time they attend school, making it easier to lose interest in it.

Fig 3.2: Picture Showing the Exterior of Thompson Elementary School.

Source- (Google Search, 2024)

Because of this, the application of the colour orange could act as a boost of motivation. While brown is used as a complementary colour to soften the brightness of orange and yellow, these

two hues are instead applied with the intent to excite students and generate a sense of positive energy all around the schooling environment.

3.3.1.3.2 Interior

The interior of Thompson Elementary school is simply sensational. From the moment you enter the school and arrive at the reception, you are welcomed by playful design, defined by large open spaces and curving forms. The building is divided into 3 different storeys, each characterised by leading colours paired two by two: green and orange on the ground floor, yellow and purple on the first floor and red and blue on the top floor.

From the logistical point of view, this subdivision can help young students find their way around school. On the other side, we need to investigate the psychological function of the colours used for the purpose of this thesis.

Starting from the ground floor, green is a colour that immediately recalls nature. Goethe considers it a peaceful colour, symbolising growth, harmony and freshness. Furthermore, the colour green makes people perceive a sense of safety and reliability: The Architects might have decided to have it right on the first floor and as a background to the reception as an indication of safety once you enter the school. Its calming effect on the human psyche could also be useful when children are over excited coming back from breaks or PE lessons. Kendra Cherry writes in an online article: "Green is often used in decorating for its calming effects. For example, guests waiting to appear on television programs often wait in a "green room" to relax. (Kendra Cherry, 2019).

Orange is a very eye-catchy colour and it stimulates the brain activity. Combining such strong colour with green can help balance out each other's effect, creating the perfect atmosphere for learning. Children won't be overly excited but won't be too relaxed either.

Moving onto the first floor, we find yellow and purple, two complementary colours. Yellow is vivid, cheerful and warm, reason why the Architects might have chosen it. Purple is the combination of blue and red and therefore it blends the effects of both hues. Red reflects dynamism and excitement while blue calmness and tranquillity, hence purple recalls wisdom, dignity, independence, creativity.

Using purple and yellow together, we obtain a mixed effect that causes both excitement and creativity, but that also combines maturity, as children on this floor are a few grades older than the ones on the first floor.

The top floor features red and blue. Red is one of the primary colours with the longest wavelength. Children associate it with excitement and happiness. Furthermore, they also learn from superheroes such as Superman or lron Man that red means strength and power. On the other side, "Blue calls to mind feelings of calmness or serenity. It is often described as peaceful, tranquil, secure and orderly." (Cherry, 2019) . However, excessive blue can cause loneliness and alienation. These hues are

complementary colours and, as such, they are in harmony. Their combination reflects on children both a sense of enthusiasm for learning and strength to build confidence in themselves, together with a sense of peace of mind and security, while avoiding negative emotions.

Fig 3.3: Picture Showing the Gym of Thompson Elementary School.

Source- (Google Search, 2024)

The Thompson School gymnasium serves a variety of uses throughout the school day—assembly, athletics and performances among them. The size of the multipurpose room is smaller than a conventional gymnasium, and its range of functions led the design team to seek out a creative and practical flooring solution. Rather than select a traditional wood floor, the final choice was a poured recycled rubber surface.

Compared to wood surfaces, this material is more adaptable for a variety of uses. It also reduces the risk of injury. Atop the rubber flooring is a low VOC polyurethane topcoat, Qualipur 6510. This topcoat provides a semi-matte finish over the rubber, with excellent wear and abrasion resistance. The

visual delight of the multipurpose space is found in the painted letters, numbers and shapes that appear as cutouts on the surface of the gym floor. An inspiration for these colourful elements is the old-fashioned schoolhouse alphabet and number graphics, updated here for the 21st century. In an earlier generation of school interiors, alphabet letters and sequential numbers typically appeared in straight lines as a border for walls, chalkboards, bulletin boards and windows. The interpretation seen in the Thompson School is less structured, and it aligns with the creative and improvisational spirit of a school that celebrates education and supports a variety of learning and teaching styles.

A prominent shape on the multipurpose room surface is a pineapple, a universal symbol of welcome. This familiar shape is seen as a design element carried throughout the interior space of the school. An oversized yellow steel pineapple extends a can't-miss welcome at one of the two main entrances. The pineapple form also appears on the gymnasium floor and on the floor of the gathering space outside the library. The yellow pineapple even anchors the Thompson School's website.

Fig 3.4: Picture Showing the Cafeteria of Thompson Elementary School.

Source- (Google Search, 2024)

Fig 3.5: Picture Showing the Interior of Thompson Elementary School.

Source- (Google Search, 2024)

Fig 3. 6: Picture Showing the Interior of Thompson Elementary School.

Source- (Google Search, 2024)

Fig 3. 7: Picture Showing the Interior of Thompson Elementary School.

Source- (Google Search, 2024)

Fig 3. 8: Picture Showing the Interior of Thompson Elementary School.

Source- (Google Search, 2024)

3.3.1.3.3 Outdoor Spaces

The primary school includes outdoor play areas where children can engage in physical activities, explore nature and participate in interactive learning experiences. These spaces include playgrounds, outdoor learning spaces, sports arena.

Fig 3. 9: Picture Showing the Interior of Thompson Elementary School.

Source- (Google Search, 2024)

3.3.1.3.4 Amenities

The primary school typically includes amenities like cafeteria, stores, restrooms to provide conveniences for users of the building.

3.3.1.3.5 Colour Appraisal

Level of application

1 – 0% - little to no use

2 – 20% - Fair use

3 – 40% - Good use

4 – 60% - Very good use

5 – 80% - Excellent use

Table 3. 1 Showing the Variables and Level of Application

S/N	Variables	Characteristics	Level of Application					Remark
			1	2	3	4	5	
1	Red	Red is often associated with energy, passion, and excitement. It can stimulate brain activity and increase heart rate and blood pressure. Red can be used to create a stimulating environment that encourages physical activity and creativity. However, excessive use of red may lead to overstimulation and agitation in some children					5	Can be seen to be prominently used. It is the major colour used on the topmost floor. It is combined with blue on the topmost floor and some places with tones of white. This is probably to reduce the overstimulation

				that the colour red causes. It can be found on the playground as it encourages physical activity and in home rooms as it stimulates creativity.
2	Blue	Blue is known for its calming and relaxing properties. It can promote feelings of tranquillity and reduce stress and anxiety. Blue is often used in primary school classrooms to create a peaceful learning environment that fosters concentration	5	Blue was also combined with red on the topmost floor. It was also used in some of the common rooms which could be as a result of its calming characteristic.

		and focus. It can also help children feel more comfortable and at ease during learning activities		By creating an environment rich in blue hues, children in the primary school are provided with a conducive setting that supports their focus, cognitive abilities, and overall engagement.
3	Yellow	Yellow is associated with happiness, optimism, and creativity. It can stimulate mental activity and promote a sense of joy and	5	Observations reveal that the colour yellow has been prominently incorporated in both the

		enthusiasm. Yellow can be used to create a cheerful and vibrant atmosphere in primary school settings. It can enhance children's mood and motivation, making learning activities more enjoyable and engaging.		exterior and interior of the building. Some window panes are also painted yellow. This deliberate use yellow suggest that children within these surroundings may experience positive effects such as increased engagement and enthusiasm leading to interest in engagement of activities
4	Orange	Orange combines the	5	Observations

	energy of red with the brightness of yellow. It is associated with enthusiasm, creativity, and social interaction. Orange can be used to create a lively and dynamic learning environment in primary schools. It can stimulate children's imagination and encourage collaboration and communication among peers.	show that the colour orange was used predominantly on the ground floor, and it was combined with green. Orange is a very eye-catchy colour and it stimulates the brain activity. Combining such strong colour with green can help balance out each other's effect, creating the perfect atmosphere for

				learning. Children won't be overly excited but won't be too relaxed either.
5	Green	Green is often linked to nature, growth, and harmony. It has a calming effect on the mind and can promote feelings of balance and stability. Green is commonly used in primary school settings to create a relaxing and nurturing atmosphere. It can help children feel more connected to their surroundings and foster a sense of well-	5	Upon close observation, it is evident that the colour green has been extensively integrated into the buildings interior with it being the welcoming colour of the building as it is used to paint the reception of the building.

	being and belonging.	The Architects might have decided to have it right on the first floor and as a background to the reception as an indication of safety once you enter the school. Its calming effect on the human psyche could also be useful when children are over excited coming back from breaks or PE lessons.

6	Purple	Purple is associated with luxury, creativity, and spirituality. It can stimulate imagination and promote introspection. Purple can be used to create a sense of inspiration and wonder in primary school environments. It can encourage children to explore their creativity and express themselves through art and other creative activities.	5	After observation, purple was found to be combined with yellow on the top floor. Purple is the combination of blue and red and therefore it blends the effects of both hues. Red reflects dynamism and excitement while blue calmness and tranquillity, hence purple recalls wisdom, dignity,

	independence, creativity. Using purple and yellow together, we obtain a mixed effect that causes both excitement and creativity, but that also combines maturity, as children on this floor are a few grades older than the ones on the first floor.

Source (Researcher's Field Work, 2024)

3.3.2 Case Study Two - Sangam Elementary School.

Fig 3.10: Picture Showing the Exterior of Sangam Elementary School.

Source- (Google Search, 2024)

3.3.2.1 Brief History of the Building

In olden times, students were taught in open environments under the trees. We have been inspired by this concept as it helps children connect with nature. It is a wonderful way to learn various life skills, and presents an opportunity for kids to run, jump, slide, make a mess and explore themselves in an informal way.

3.3.2.2 Location of the Building

The school is located in the urban fabric of Bhilwara, Rajasthan, India. The project covers an area of 2612 Sq. M. The design is focused on establishing an entity for students, where the built space and environment together becomes a successful tool for learning.

3.3.2.3 Description of the Building

The form of the building was inspired by a triangular cheese sliver with tiny holes on its sides as seen in cartoons; likewise, the external surface of the building has multiple punctures. The exterior facade has many tiny window panels to maintain visual connectivity with nature and the surroundings. The size of the windows is small to ensure safety and positioning is driven by the height of the students. The students get a view of the outside while sitting at their desks. Each floor is staggered which creates small planters and generates an organic form of the structure.

From a distance, the building looks like a sloping garden. Near the main entrance is an open amphitheatre which is used for activities such as morning prayers, dramas and performances. The size of the plot and space needed for the project left limited peripheral space for essential outdoor activities. This made us repurpose the roof of the entire building into a sloping garden interconnecting each floor. The flat area of the roof is used as a cycling track.

The first slope has two huge custom-made slides; the second slope, which is the longest slope in the building, has obstacle courses; and the third slope, which has enough sunlight, has planters, one kitchen garden for each class to grow their own vegetables and flowers. This creates a special bond between the children and the nature around them. The topmost part of the roof has a jungle gym where they climb and swing with a view of the entire city beyond.

The building is a three storied structure. The built form is highly perforated and has two courtyards which permit filtered daylight to seep into the corridors. The courtyards help reduce the heat gain and provide efficient air circulation in the entire building, which is essential for the harsh climatic conditions of the region. With the air and diffused light that enter from the top, the inner portion of the building remains cool and well-lit.

The shape and volume of the classrooms are organic, unlike the usual rectangular classrooms. The double height spaces are converted into multi-purpose mezzanine spaces for the kids to play, relax and unwind. Built for three- to seven-year-old kids, the idea was to create a space such that the thought of going to school would bring a smile on their faces.

Fig 3.11: Picture Showing the Exterior of Sangam Elementary School.

Source- (Google Search, 2024)

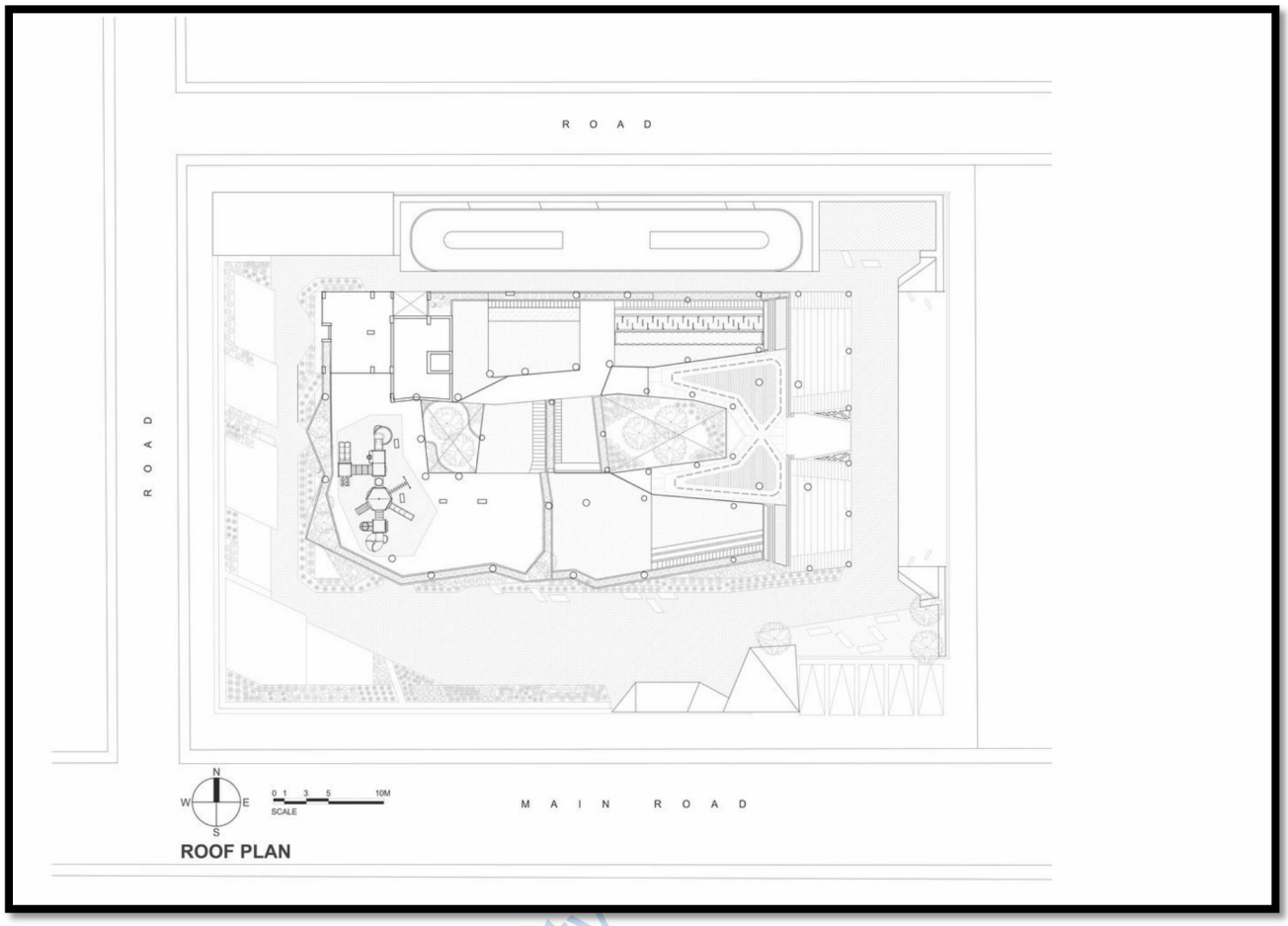

Fig 3.12: Picture Showing the Roof Plan of Sangam Elementary School.

Source- (Google Search, 2024)

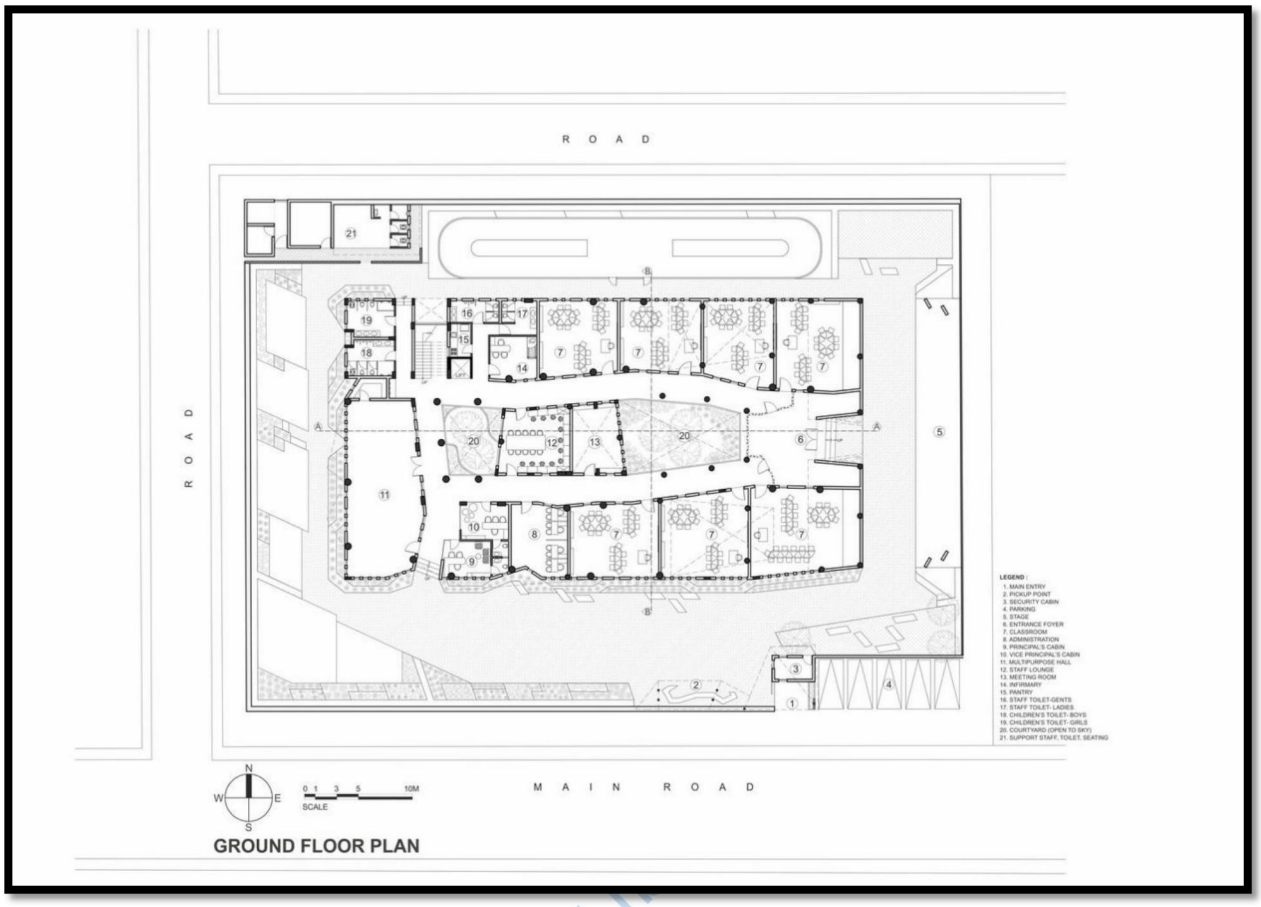

Fig 3.13: Picture Showing the Ground Floor Plan of Sangam Elementary School.

Source- (Google Search, 2024)

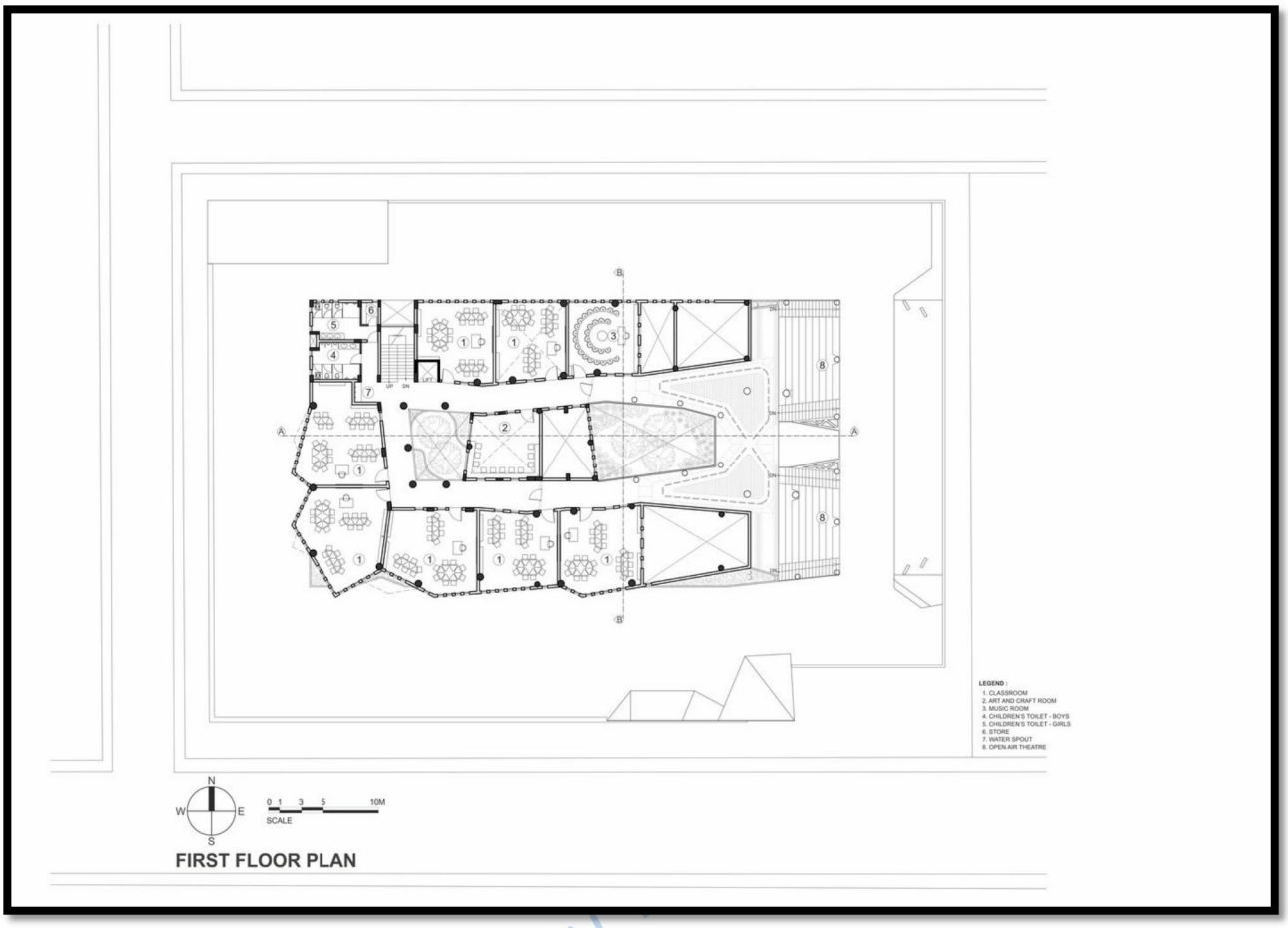

Fig 3.14: Picture Showing the First Floor Plan of Sangam Elementary School.

Source- (Google Search, 2024)

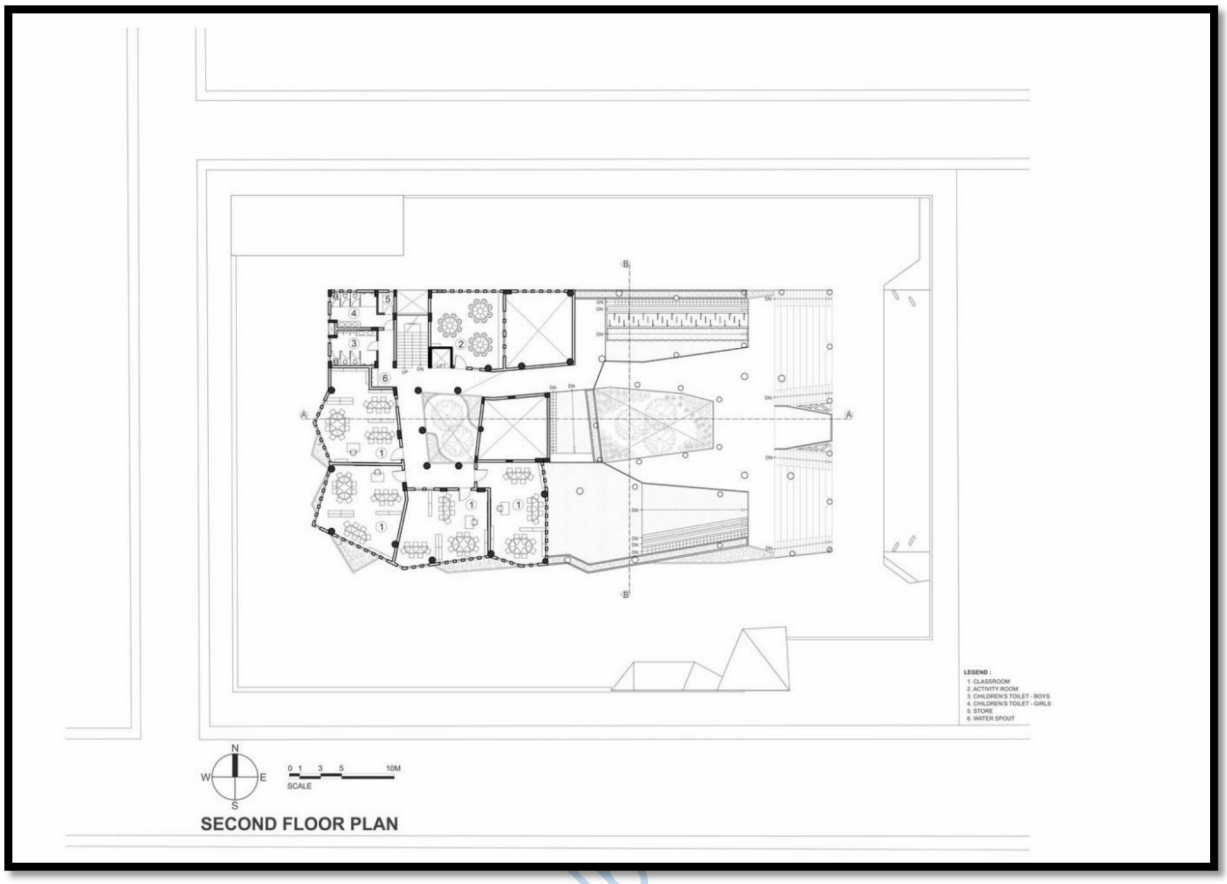

Fig 3.15: Picture Showing the Second Floor Plan of Sangam Elementary School.

Source- (Google Search, 2024)

Fig 3.16: Picture Showing the Exterior of Sangam Elementary School.

Source- (Google Search, 2024)

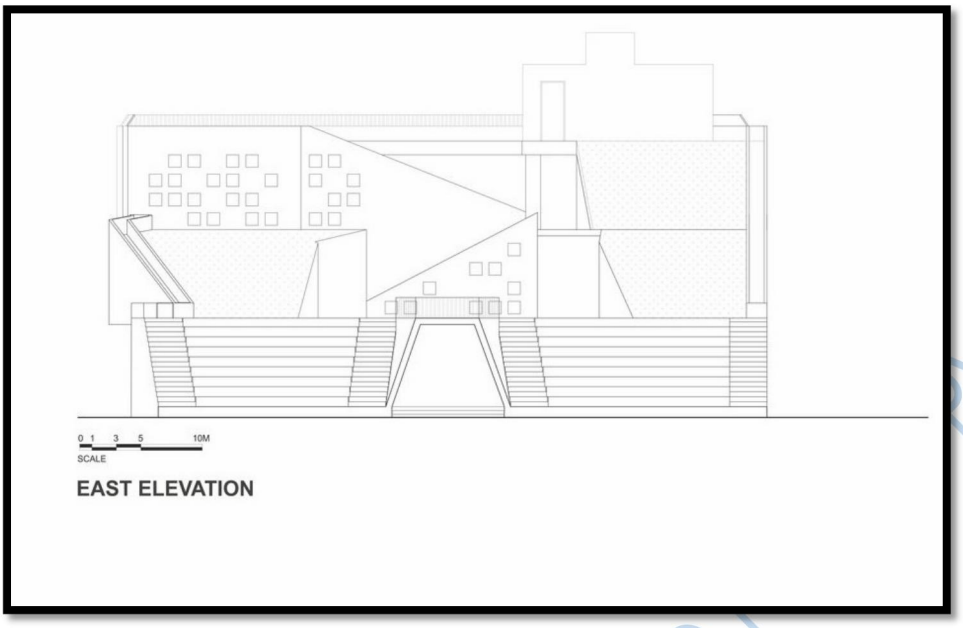

Fig 3.17: East Elevation of Sangam Elementary School.

Source- (Google Search, 2024)

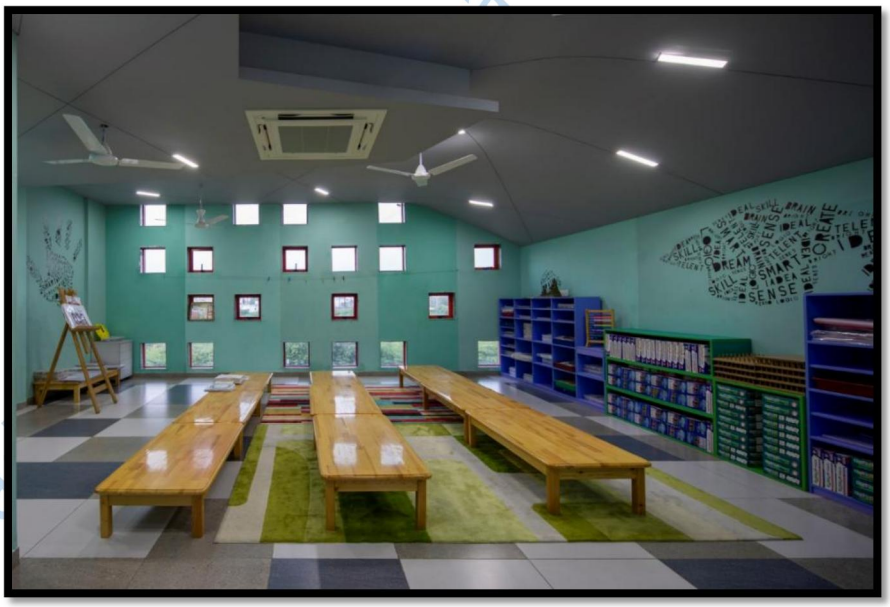

Fig 3.18: Picture Showing the Arts and Craft of Sangam Elementary School.

Source- (Google Search, 2024)

Fig 3.19: Picture Showing a Typical Classroom of Sangam Elementary School.

Source- (Google Search, 2024)

Fig 3.20: Picture Showing the Amphitheatre of Sangam Elementary School.

Source- (Google Search, 2024)

Fig 3.21: Picture Showing the Interior of Sangam Elementary School.

Source- (Google Search, 2024)

Fig 3.22: Picture Showing the Amphitheatre of Sangam Elementary School.

Source- (Google Search, 2024)

3.3.2.4 Appraisal of the Building

Designed by SferaBlu Architects in the year 2018 on a site of about 2600m^2 in Bhilwara, India. The style of Architecture was that of the whole structure of building in RCC framework. The form of structure is a triangular and sloping like cheese piece. The school has two courtyards for the the reduction of heat gain and maximum ventilation and lighting.

3.3.2.4.1 Site Analysis

Site is perfectly rectangular and has 3 roads on 3 sides. It is also located in a dense urban city residential neighbourhood. Entry into the site is from the main road at the south and the building is east face oriented.

3.3.2.4.2 Openings and Building Form

The external surface has multiple punctures as windows, the exterior façade has many tiny window panels to maintain visual connectivity with nature and the surroundings.

The slopes give rise to double height volumes, which gave rise to mezzanines inside the classrooms. These additional spaces provide room for multipurpose activities.

3.3.2.4.3 Colour Appraisal

Use of colours and shapes in furniture as proper use of colours should not only reflect on walls and floors, but also in the furniture of the school and environment. The incorporation of railings and planters as a form of safety for children is also commendable. Repurposing of the rooftop as a playing area and the use of the upper classroom for senior students.

Level of application

1 – 0% - little to no use

2 – 20% - Fair use

3 – 40% - Good use

4 – 60% - Very good use

5 – 80% - Excellent use

Table 3. 2 Showing the Variables and Level of Application

S/N	Variables	Characteristics	Level of Application					Remark
			1	2	3	4	5	
1	Red	Red is often associated with energy, passion, and excitement. It can stimulate brain activity and increase heart rate and blood pressure. Red can be used to create a stimulating environment that encourages physical activity and creativity. However, excessive use of red may lead to overstimulation and agitation in some children			2			Upon close observation, the colour red can be seen to be sparingly used in this building. It is not noticed at all in a typical classroom and can only be seen on the playground and a few furniture in the interior. Some seats and window frames

				are also seen to be red. The minimal use of red in this building can be as a result of the architects trying to reduce the overstimulation it causes in children, as well as the absorptance of heat quality.
2	Blue	Blue is known for its calming and relaxing properties. It can promote feelings of tranquillity and reduce stress and anxiety. Blue is often used in primary school	3	The walls of the arts and crafts room are painted with a light blue colour. The shelves in the same room are

		classrooms to create a peaceful learning environment that fosters concentration and focus. It can also help children feel more comfortable and at ease during learning activities		painted blue. Blue is predominantly seen on the playground and this suggests a peaceful playing environment and this can reduce stress and anxiety in the children and help them feel comfortable during learning periods.
3	Yellow	Yellow is associated with happiness, optimism, and creativity. It can stimulate mental	3	Observations reveal that the colour yellow has been prominently

		activity and promote a sense of joy and enthusiasm. Yellow can be used to create a cheerful and vibrant atmosphere in primary school settings. It can enhance children's mood and motivation, making learning activities more enjoyable and engaging.		incorporated in the interior walls of the play area. This brings a sense of joy to the children which creates and interest in participating in the activities ongoing in that space. The amphitheatre is also painted with this colour making activities more engaging and enjoyable.
4	Orange	Orange combines the energy of red with the brightness of yellow.	0	Observations show that the colour orange

		It is associated with enthusiasm, creativity, and social interaction. Orange can be used to create a lively and dynamic learning environment in primary schools. It can stimulate children's imagination and encourage collaboration and communication among peers.		was almost not present in the building. Only very few window panes frames and few furniture had this colour.
5	Green	Green is often linked to nature, growth, and harmony. It has a calming effect on the mind and can promote feelings of balance and stability. Green is commonly used in primary school	4	With the use f a lot of plants and green areas, the colour green is richly used in this building. The roof top, courtyards and

	settings to create a relaxing and nurturing atmosphere. It can help children feel more connected to their surroundings and foster a sense of well-being and belonging.	furniture in the classes are this colour. This helps the children feel relaxed and calm during learning periods.

6	Purple	Purple is associated with luxury, creativity, and spirituality. It can stimulate imagination and promote introspection. Purple can be used to create a sense of inspiration and wonder in primary school environments. It can encourage children to explore their creativity and express themselves through art and other creative activities.	4	The furniture in the classes are either purple or green. The combination of these colours increases children's wonder, creativity and assertiveness while still keeping them relaxed.

Source (Researcher's Field Work, 2024)

3.3.3 Case Study 3 - École Maternelle Pajol Kindergarten school.

Fig 3.23: Picture Showing the Entrance of École Maternelle Pajol Kindergarten school.

Source- (Google Search, 2024)

3.3.3.1 History of the Building

The Ecole Maternelle Pajol Kindergarten school in Paris, France is a newly renovated 1940s building by Palatre et Leclere architecture firm. While the basic structure of the building remains true to its historic roots surface exterior as well as interior received a vibrant and bold revamping.

3.3.3.2 Location of the Building

The building is located at Paris, France and was renovated in 2011.

3.3.3.3 Appraisal of the Building

In Ecole Maternelle Pajol, the architect used colour boldly both inside and out. They also provided a variety of shapes and forms in the furniture, furnishings and on the walls, in the play areas, rest areas and even in the bathrooms. In addition, they provided a variety of textures from tile and glass to rubber and wood. The colour spectrum brings life to the walls and even ground of the school. Youthful graphic art splashes on the walls and playground around the school creating a youthful and fun cartoon-esque environment for the students and faculty. No space in the building was left out as we see even the restrooms filled with colours. The building has kept its 1940s brick-wall feel, yet it radiates exuberance and has an up-to-date energy.

3.3.3.3.1 Building Design

The building used to be in poor condition, even with its obvious architectural qualities: the brick and the generous openings on the outside in the rooms upstairs. The façade overlooking the courtyard is designed as the optimistic and strongly identifiable urban signal of the kindergarten. It unfolds on all three levels, creating a fun environment for the children. On the ground floor, the façade is slightly set back to make of the courtyard the real agora of the building as well as a sunny area.

3.3.3.3.2 Interior

The interior spaces raise a wide range of emotions: the different colours on the walls, the variable geometry of the furniture, the heterogeneous materials and pleasant to the touch (wood, rubber, metal, etc.) to provide a stimulating and positive environment for the children and the staff.

3.3.3.3.3 Exterior

A preschool rainbow: The rainbow has become the driving force behind the project, because it both fascinates all children, and is associated with joy and happiness, heralding a time of good weather after the rain.

3.3.3.3.4 Building Spaces

The different colours of the rainbow were applied on the project to guide children. They also play the role of identification in our project: the doors of health are red, to mark the urgency. Each level has a specific colour. The doors of the classrooms have the same colour on their floor. The classroom wall are painted white so that children can fully express themselves. The language of colour is the first taken up by children, the building should be familiar to children so the colour is present in all spaces. It is both signs (toilets, differentiation levels, classrooms) and fun (games of hopscotch in the yard, snake, educational garden).

Fig 3.24: Picture Showing the Rear View of École Maternelle Pajol Kindergarten school.

Source- (Google Search, 2024)

Fig 3.25: Picture Showing the Site Plan of École Maternelle Pajol Kindergarten school.

Source- (Google Search, 2024)

Fig 3.26: Picture Showing the Playground of École Maternelle Pajol Kindergarten school.

Source- (Google Search,2024)

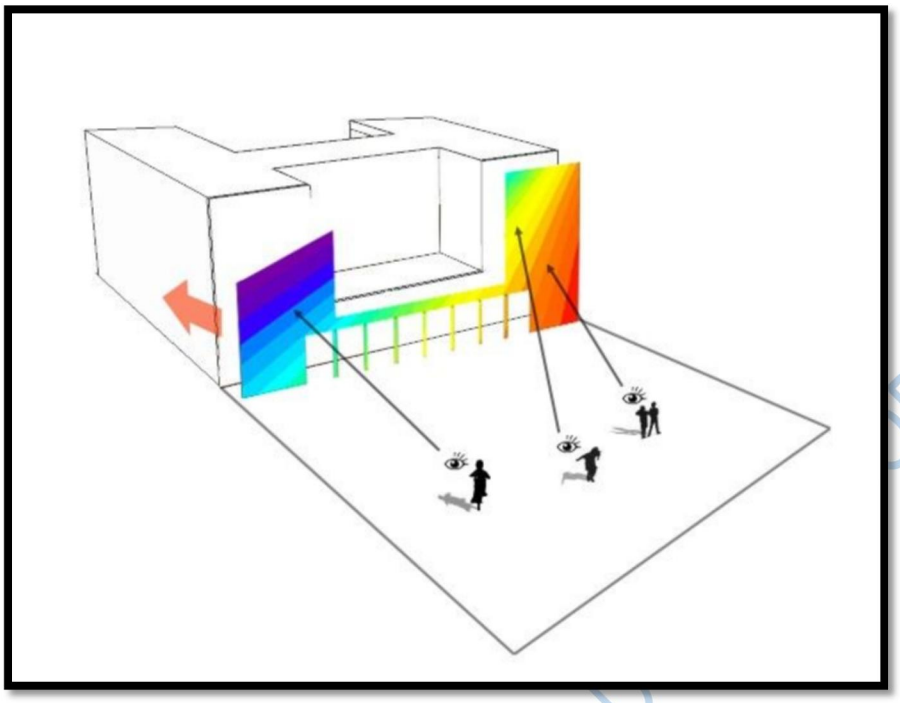

Fig 3.27: Picture Showing Colour Perception of École Maternelle Pajol Kindergarten school.

Source- (Google Search, 2024)

Fig 3.28: Picture Showing the Toilet of École Maternelle Pajol Kindergarten school.

Source- (Google Search, 2024)

Fig 3.29: Picture Showing the Toilet of École Maternelle Pajol Kindergarten school.

Source- (Google Search, 2024)

Fig 3.30: Picture Showing the Stair Hall of École Maternelle Pajol Kindergarten school.

Source- (Google Search, 2024)

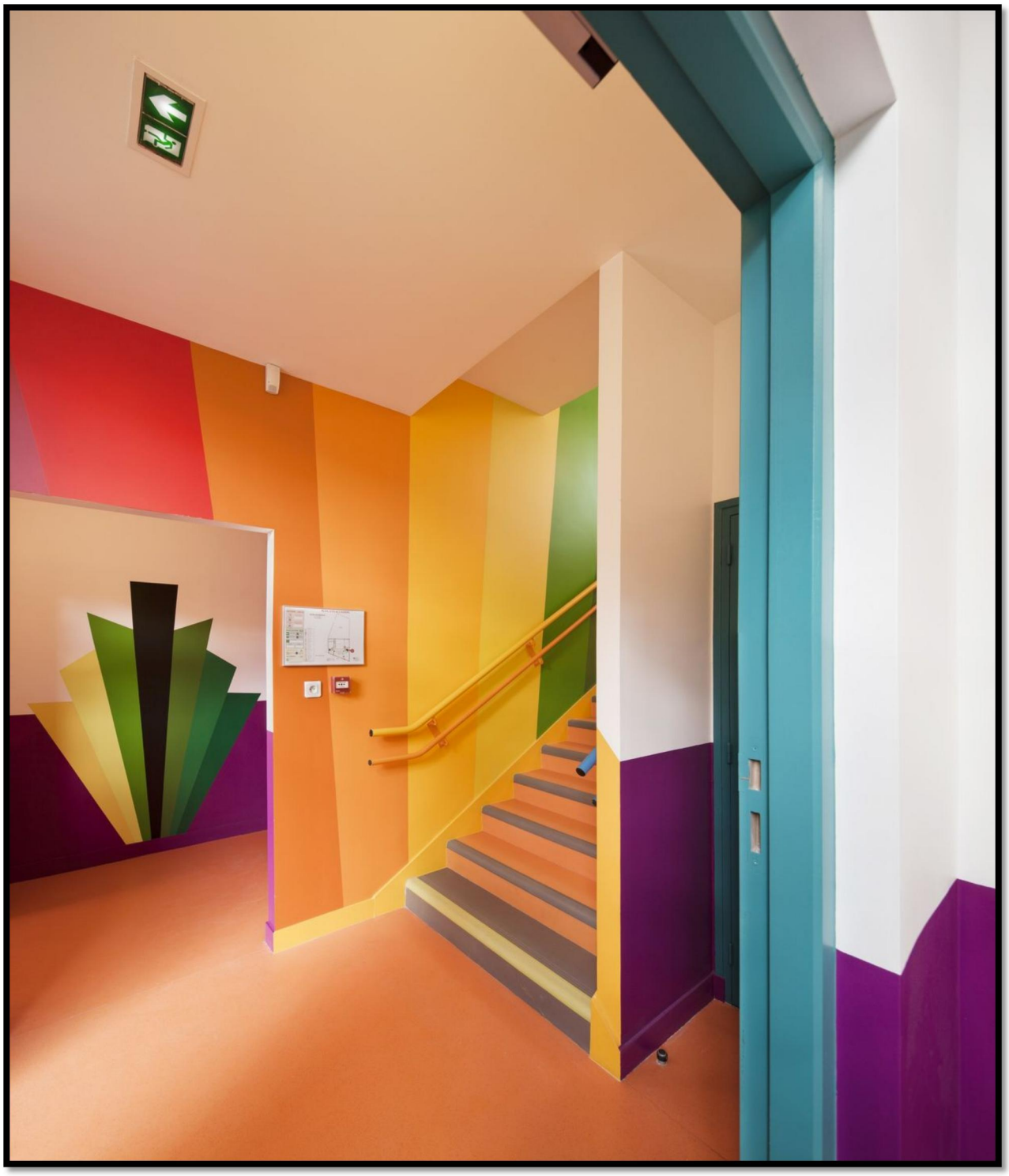

Fig 3.31: Picture Showing the Stair Hall of École Maternelle Pajol Kindergarten school.

Source- (Google Search, 2024)

Fig 3.32: Picture Showing the Reception of École Maternelle Pajol Kindergarten school.

Source- (Google Search, 2024)

3.3.1.3.5 Colour Appraisal

Level of application

1 – 0% - little to no use

2 – 20% - Fair use

3 – 40% - Good use

4 – 60% - Very good use

5 – 80% - Excellent use

Table 3. 3 Showing the Variables and Level of Application

S/N	Variables	Characteristics	Level of Application					Remark
			1	2	3	4	5	
1	Red	Red is often associated with energy, passion, and excitement. It can stimulate brain activity and increase heart rate and blood pressure. Red can be used to create a stimulating environment that encourages physical activity and creativity. However, excessive use of red may lead to overstimulation and agitation in some children					5	Upon observation, red can be seen to be very prominently used. It was used in different spaces including the toilets, and even on the doors. The architects noted that the colour red was used on specific doors to show

				urgency of that space. It can also be found on the playground as it encourages physical activity.
2	Blue	Blue is known for its calming and relaxing properties. It can promote feelings of tranquillity and reduce stress and anxiety. Blue is often used in primary school classrooms to create a peaceful learning environment that fosters concentration and focus. It can also help children feel more comfortable and	5	As the school is known for its generous use of rainbow colours, different hues of blues were seen around the building. The interior as well as exterior walls of the building were seen to be painted with

	at ease during learning activities	different shades of blue. This was probably done to reduce the agitating effect of the other colours such as red. Blue can be found on the floors, in the playground, as some of the school furniture. Some doors were also painted blue. The architects noted that the different colours of the rainbow were applied to

					guide the children. Blue can be said to have been used because of its calming characteristic. By creating an environment rich in blue hues, children in the primary school are provided with a conducive setting that supports their focus, cognitive abilities, and overall engagement.
3	Yellow	Yellow is associated		5	Observations

	with happiness, optimism, and creativity. It can stimulate mental activity and promote a sense of joy and enthusiasm. Yellow can be used to create a cheerful and vibrant atmosphere in primary school settings. It can enhance children's mood and motivation, making learning activities more enjoyable and engaging.	reveal that the colour yellow has been prominently incorporated in both the exterior and interior of the building too. Yellow can be seen on the exterior walls, floor of the playground, the tables of some classrooms as well as shelves. Tiles of yellow could also be found in the toilets. This generous use of the colour

				yellow suggests that children within these surroundings may experience positive effects such as increased engagement and enthusiasm, seeing as it was used for the furniture in some classes.
4	Orange	Orange combines the energy of red with the brightness of yellow. It is associated with enthusiasm, creativity, and social interaction.	5	The colour orange was used on doors as a means of identification of classrooms,

	Orange can be used to create a lively and dynamic learning environment in primary schools. It can stimulate children's imagination and encourage collaboration and communication among peers.	as suggested by the architects. Orange was also seen as the major colour of the staircase in the school. As it is a rainbow colour, it could also be found on the playground. It could also be found to be used on walls. Orange colour was also used at the escape stairs. Children won't be overly excited but won't be too relaxed either.

				The use of orange in these spaces encourages collaboration among children. Orange creates a lively learning and playing environment as well.
5	Green	Green is often linked to nature, growth, and harmony. It has a calming effect on the mind and can promote feelings of balance and stability. Green is commonly used in primary school	5	Green, being the colour of plants, trees, and grass, creates a strong connection with nature in the primary school.

		settings to create a relaxing and nurturing atmosphere. It can help children feel more connected to their surroundings and foster a sense of well-being and belonging.	Planters were put on green painted floor,the entrance into the building from the playground is painted green. The walls in the school can also be seen to be generously painted with green. This could be an indication of safety once you enter the school. Its calming effect on the human psyche could

also be useful when children are over excited coming back from breaks or PE lessons. The incorporation of green elements enriches their interactions, helps connect them with their external environments and creates a space that nurtures their curiosity and imagination. The presence of green

			provides children with a sense of peace and tranquillity, fostering a harmonious and calming experience during learning hours too.

6	Purple	Purple is associated with luxury, creativity, and spirituality. It can stimulate imagination and promote introspection. Purple can be used to create a sense of inspiration and wonder in primary school environments. It can encourage children to explore their creativity and express themselves through art and other creative activities.	5	Strips of purple can be seen around the building, especially in spaces where the rainbow painting concept was adopted. In some corridors, purple was also used as the base colour and combines with white. This colour was probably used to increase the inquisitiveness of the children which aids

learning.

7	White	-	5	Upon observation, most of the classrooms were seen to be painted white, although not fully, and the architects stated that they wanted the walls of the classrooms to be white so that children could fully express themselves

Source (Researcher's Field Work, 2024)

3.3.4 Case Study 4 - University of Lagos Staff School.

Plate 3. 1 : Picture Showing the Entrance of University of Lagos Staff School.

Source- (Researcher's Fieldwork, 2024)

3.3.4.1 Brief History of the building

The school, located within the Akoka Campus was established on the 10th of October, 1966. Being a community school, it was initially founded with the objective of providing primary school education for the children of staff of the University.

3.3.4.2 Location of the building

University Of Lagos, Akoka Rd, Yaba, 101245, Lagos

3.3.4.3 Appraisal of the Building

3.3.4.3.1 Building Design

The staff school consists of about five buildings. connected with covered lobbies. The all have two floors. The nursery and creche classes are in a separate building, while the higher classes have their

own buildings as well. There are about three playgrounds and separate assemblies are conducted on these outdoor spaces. There is a carpark for about 20 cars.

3.3.4.3.2 Interior

The interior of the buildings for the senior classes are either painted a bright green colour or cream colour. The floor finish is ceramic floor tiles. The seating arrangement for the primary classes is the regular classroom seating arrangement, with students seating to face the board. Two students to a table and chair. The nursery, reception and creche classes however, are painted bright colours of purple, pink, blue etc. Linoleum floor finish is used for the reception and creche classes, but tiles are used in the nursery classes.

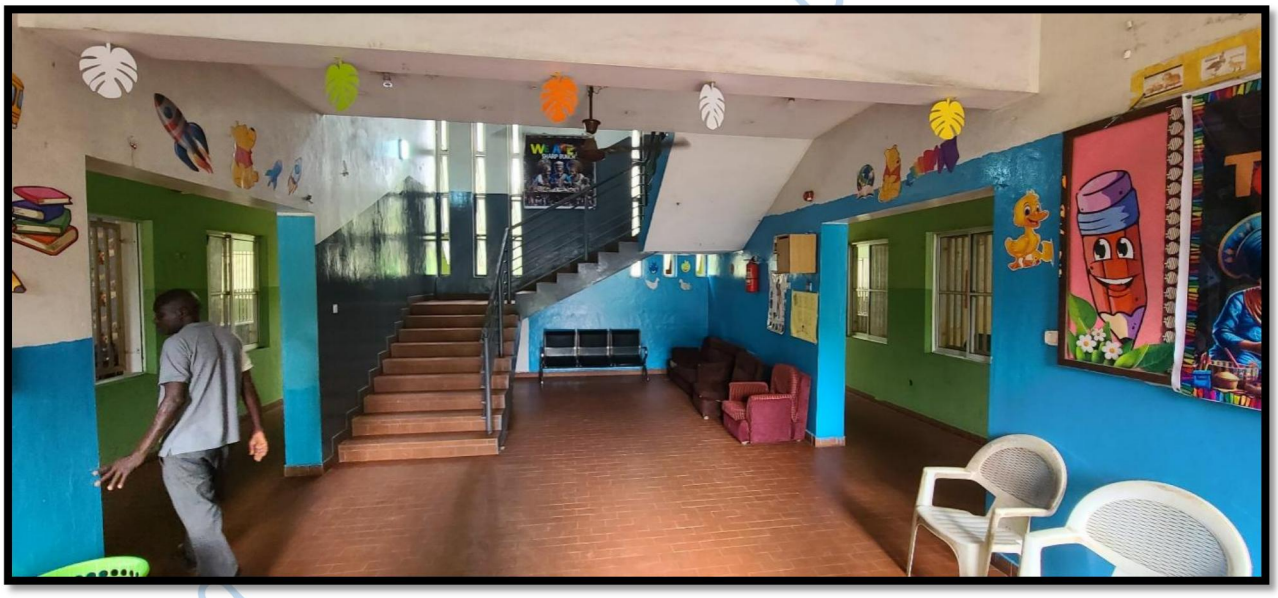

Plate 3. 2 : Picture Showing the Reception of University of Lagos Staff School.

Source- (Researcher's Fieldwork, 2024)

Plate 3. 3: Picture Showing the Classroom of University of Lagos Staff School.

Source- (Researcher's Fieldwork, 2024)

3.3.4.3.3 Exterior

The exterior part of the building is painted a bright cream colour and mixed with brown. The colours are pained with bright colours. And there are wall paintings and posters that help make the environment children friendly. There is protective railing on the external corridors. The external floor finish is ceramic tiles.

Plate 3. 4 : Picture Showing the Exterior of University of Lagos Staff School.

Source- (Researcher's Fieldwork, 2024)

3.3.4.3.4 Outdoor Spaces

There are different green areas that have been converted to playgrounds for the children, but there is a major one with toys for them to play, and a major field for football tournaments. The nursery students however have a separate playground that is covered.

Plate 3. 5 : Picture Showing the Playground of University of Lagos Staff School.

Source- (Researcher's Fieldwork, 2024)

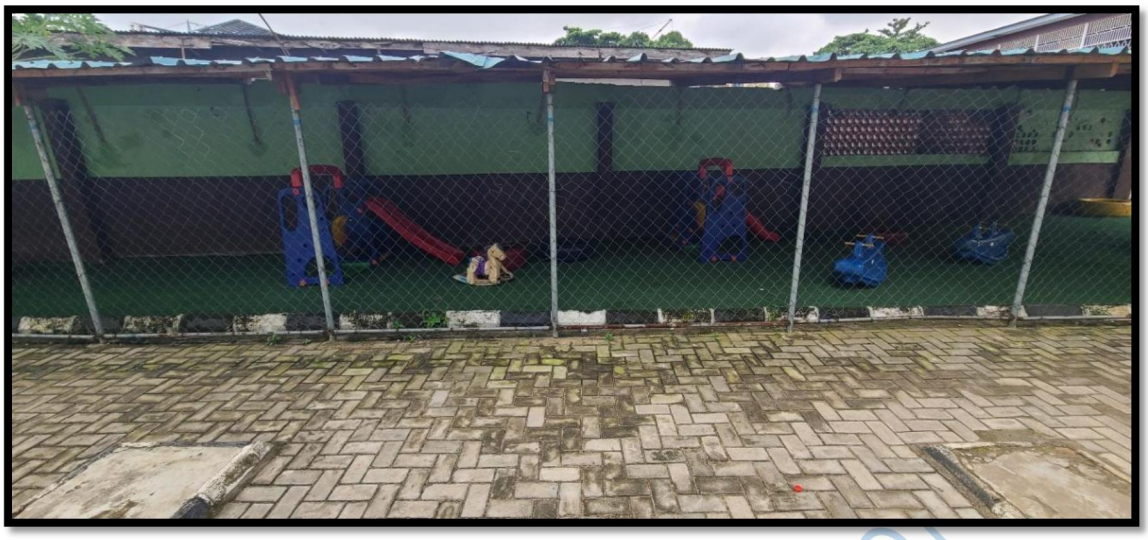

Plate 3. 6 : Picture Showing the Playground of University of Lagos Staff School.

Source- (Researcher's Fieldwork, 2024)

3.3.4.3.5 Ancillary Facilities

The building has other facilities such a s a science laboratory, a library, as well as a computer room that has about 12 work stations.

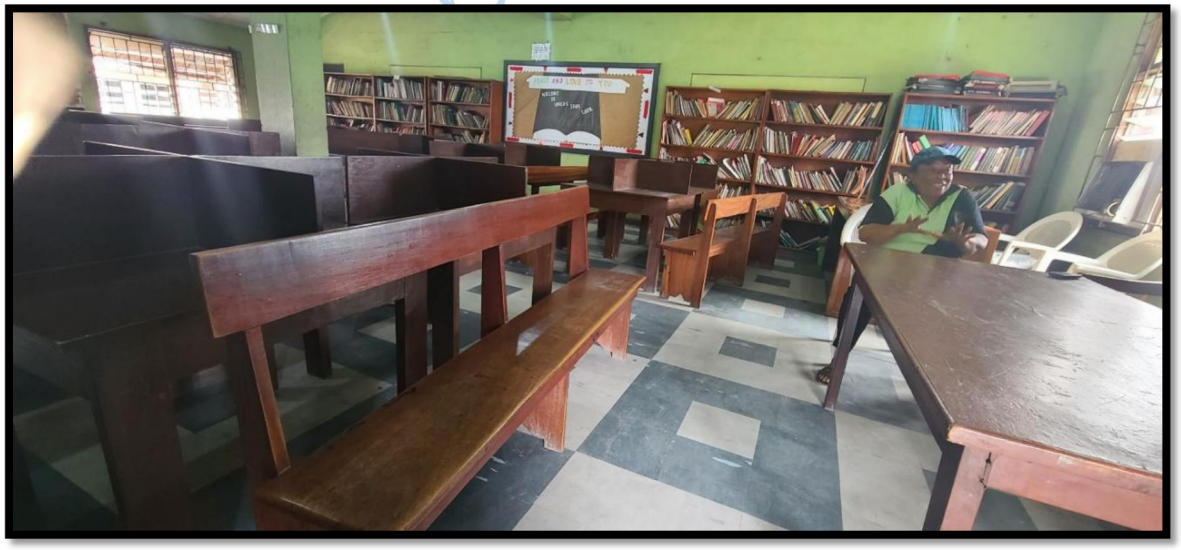

Plate 3. 7 : Picture Showing the Library of University of Lagos Staff School.

Source- (Researcher's Fieldwork, 2024)

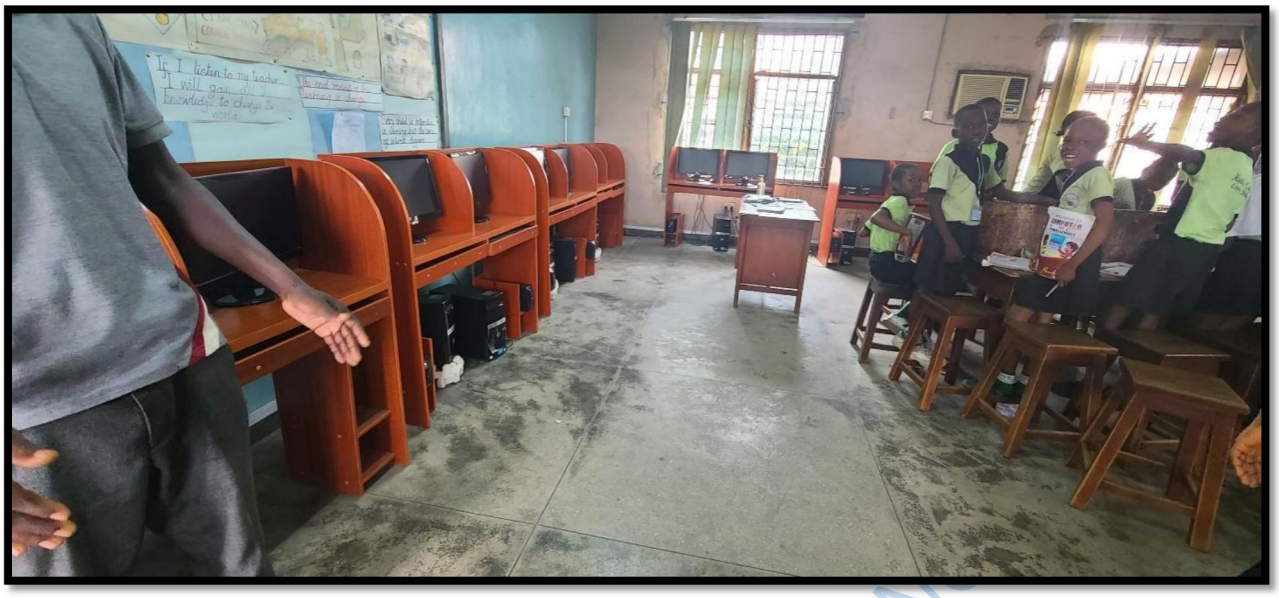

Plate 3. 8 : Picture Showing the Computer Room of University of Lagos Staff School.

Source- (Researcher's Fieldwork, 2024)

3.3.4.3.6 Lighting and Ventilation

The classes were properly lit and ventilated with large opening in the classrooms. The window type used were louvres. The rooms were also artificially lit and ventilated with led bulbs seen and ceiling fans hung.

3.3.4.3.7 Colour Appraisal

The primary school classes were either painted green or cream, or a mixture of both. There were colourful cutouts and murals around the central corridors which gives identity to the school. The exterior walls of the school building are painted brown and cream. The pre-school however, is more colourful and attractive. The exterior of the pre-school is painted green, and the interior walls of the major circulation space is painted blue and white with colourful murals painted on the walls, while the walls of the classes that serve as a demarcation from the lobbies are painted green and white. The interior of the other classrooms in this building are plastered with combinations of blue, purple, pink

and cream wallpapers. The creche is painted white and has a cream wallpaper. The furniture in this class is however painted with yellows, reds, blues and greens, and this serves as a way of adding colours to the rooms.

Level of application

1 – 0% - little to no use

2 – 20% - Fair use

3 – 40% - Good use

4 – 60% - Very good use

5 – 80% - Excellent use

Table 3. 4 Showing the Variables and Level of Application

S/N	Variables	Characteristics	Level of Application					Remark
			1	2	3	4	5	
1	Red	Red is often associated with energy, passion, and excitement. It can stimulate brain activity and increase heart rate and blood pressure. Red can be used to create a stimulating			2			The colour red can be seen in paintings and as furniture colours but it cannot readily be seen on the walls. The red

		environment that encourages physical activity and creativity. However, excessive use of red may lead to overstimulation and agitation in some children		colour is used very minimally in the building. Children in the staff school will not readily be agitated or overstimulated
2	Blue	Blue is known for its calming and relaxing properties. It can promote feelings of tranquillity and reduce stress and anxiety. Blue is often used in primary school classrooms to create a peaceful learning environment that fosters concentration and focus. It can also help children feel more comfortable and	4	Upon observation, the pre school building has generous use of the colour blue. The entrance lobby which serves as the major lobby to other spaces on the building is painted blue. Other rooms also have

		at ease during learning activities		touches of blue in the building. As blue has a calming effect on students, this can be said to be the cause of the use of this colour in the building. Students will feel comfortable enough and eager to learn once they enter into the building.
3	Yellow	Yellow is associated with happiness, optimism, and creativity. It can stimulate mental	4	The primary classes have a very light shade of yellow being

		activity and promote a sense of joy and enthusiasm. Yellow can be used to create a cheerful and vibrant atmosphere in primary school settings. It can enhance children's mood and motivation, making learning activities more enjoyable and engaging.		cream and the colour yellow can also be seen in the pre-school environments. The walls of the nursery school classes are painted yellow. This gives a cheerful environment to the children and it can enhance children's moods and make learning more enjoyable and engaging.
4	Orange	Orange combines the	2	The colour

	energy of red with the brightness of yellow. It is associated with enthusiasm, creativity, and social interaction. Orange can be used to create a lively and dynamic learning environment in primary schools. It can stimulate children's imagination and encourage collaboration and communication among peers.	orange was not really seen in this building except on small cutouts and furniture in the pre-school. It adds texture to the rooms and spaces. The colour orange is associated with enthusiasm and creativity. Introducing it into these classes however subtle, it would help improve creativity if students in the

				school and encourage collaboration. This will cause social interaction between students which is a good for a child's formative years. It helpls them to not become socially awkward and improves their ability to interact with confidence.
5	Green	Green is often linked to nature, growth, and harmony. It has a	5	Green, being the colour of plants, trees,

	calming effect on the mind and can promote feelings of balance and stability. Green is commonly used in primary school settings to create a relaxing and nurturing atmosphere. It can help children feel more connected to their surroundings and foster a sense of well-being and belonging.	and grass, creates a strong connection with nature in the primary school. The school has a lot of greens. The entire external walls of the pre-school is also green. The walls of the lobby are also painted green. The interior of the rooms in the primary classes are also painted green. This colour has a calming effect on

	students and brings about a sense of stability and balance for them. The generous use in this school suggests an environment that nurtures stability and balance in the students as well as a calm mind.

6	Purple	Purple is associated with luxury, creativity, and spirituality. It can stimulate imagination and promote introspection. Purple can be used to create a sense of inspiration and wonder in primary school environments. It can encourage children to explore their creativity and express themselves through art and other creative activities.	3	The colour purple can be seen in the reception class of the pre-school. The wallpaper used in the room is coloured purple. Colour purple encourages children to explore their creative sides and express themselves thorugh art. In this class, children are encouraged to express themselves

	through art and this colour is one that encourages that, so it suggests that children exposed to this colour, through it are more expressive and creative.

3.3.5 Case Study Five - University of Ibadan Staff School.

3.3.5.1 Description of the building

The staff school is an official institution affiliated with the University of Ibadan. Nigeria's oldest University. It was established to cater to the educational needs of the children of the university staff. It was founded to provide to provide quality education within the university environment, ensuring convenience for the children of faculty and staff.

Plate 3. 9 : Picture Showing the Hall of University of Ibadan Staff School.

Source- (Researcher's Fieldwork, 2024)

3.3.5.2 Location of the School

The school is located within the school premises, beside the Bode Amao primary school, opposite the Physiology Department, University of Ibadan.

3.3.5.3 Appraisal of School

3.3.5.3.1 Building Design

There are different buildings, scattered about the premises with different converging areas for their assemblies. All the buildings are all single floors and majority are painted grey. Others are painted cream and blue.

3.3.5.3.2 Interior

The building interior is painted grey and is properly ventilated. There are large windows on both sides of the classes. Classrooms are naturally as well artificially ventilated.

Plate 3. 10 : Picture Showing the Classroom of University of Ibadan Staff School.

Source- (Researcher's Fieldwork, 2024)

3.3.5.3.3 Exterior

There are many buildings divided into blocks for each class. The building's exterior walls are painted grey, but the block K is painted cream and grey. There is a new hall where older students have their assembly painted two different shades of blue.

Plate 3. 11 : Picture Showing the Classroom Blocks of University of Ibadan Staff School.

Source- (Researcher's Fieldwork, 2024)

Plate 3. 12 : Picture Showing the Side View of the Hall at University of Ibadan Staff School.

Source- (Researcher's Fieldwork, 2024)

Plate 3. 13 : Picture Showing the Classroom Block of University of Ibadan Staff School.

Source- (Researcher's Fieldwork, 2024)

3.3.5.3.4 Colour Appraisal

Level of application

1 – 0% - little to no use

2 – 20% - Fair use

3 – 40% - Good use

4 – 60% - Very good use

5 – 80% - Excellent use

Table 3. 5 Showing the Variables and Level of Application

S/N	Variables	Characteristics	Level of Application					Remark
			1	2	3	4	5	
1	Red	Red is often associated with energy, passion, and excitement. It can stimulate brain activity and increase heart rate and blood pressure. Red can be used to create a stimulating environment that encourages physical activity and creativity. However, excessive use of red may lead to overstimulation and agitation in some children			1			The colour red cannot be seen at all in the school.
2	Blue	Blue is known for its calming and relaxing properties. It can			2			Upon observation, the school has

		promote feelings of tranquillity and reduce stress and anxiety. Blue is often used in primary school classrooms to create a peaceful learning environment that fosters concentration and focus. It can also help children feel more comfortable and at ease during learning activities		minimal use of the colour blue. It can only be seen on the hall prominently. Students will feel comfortable and welcome in this environment.
3	Yellow	Yellow is associated with happiness, optimism, and creativity. It can stimulate mental activity and promote a sense of joy and enthusiasm. Yellow can be used to	1	The colour yellow cannot be seen at all in the building.

		create a cheerful and vibrant atmosphere in primary school settings. It can enhance children's mood and motivation, making learning activities more enjoyable and engaging.		
4	Orange	Orange combines the energy of red with the brightness of yellow. It is associated with enthusiasm, creativity, and social interaction. Orange can be used to create a lively and dynamic learning environment in primary schools. It can stimulate children's imagination and	1	The colour orange was not seen at all in this building.

		encourage collaboration and communication among peers.		
5	Green	Green is often linked to nature, growth, and harmony. It has a calming effect on the mind and can promote feelings of balance and stability. Green is commonly used in primary school settings to create a relaxing and nurturing atmosphere. It can help children feel more connected to their surroundings and foster a sense of well-being and belonging.	2	The building has a lot of green areas and this gives the building some sort of identity and contrasts the monotonous grey colour seen in all the buildings. This helps the students connect with the surroundings and foster a sense of

				wellbeing.
6	Purple	Purple is associated with luxury, creativity, and spirituality. It can stimulate imagination and promote introspection. Purple can be used to create a sense of inspiration and wonder in primary school environments. It can encourage children to explore their creativity and express themselves through art and other creative activities.	1	This colour is not seen at all in the building.

Source (Researcher's Field Work, 2024)

Chapter Four

Site Analysis and Design Synthesis

4.1 Study Area/Site Selection

The site selection process was crucial to determining the best location for the Lead City University staff school. Several factors were considered, including:

Accessibility: Proximity to the staff quarters and staff offices, as well as ease of access for various user groups

Contextual Relevance: Alignment with the local urban fabric, sensitivity to neighbouring buildings and potential for contextual dialogue. The siting of the building on this site will not only ease the stress on the staff of the university but also serve as an educational institution for people living in the neighbourhood

Environmental Sustainability: there is opportunity for natural ventilation, daylighting, and passive solar design as well as minimal disturbance to existing ecosystems

This site offers unobstructed views of the surrounding landscape, proximity to the work place and home, a prominent location within the urban fabric, fostering community engagement, among other important things.

4.1.1 Site Location/Description

The site of the proposed Lead City University Staff school is located opposite the College of Medicine Building in Lead City University, adjacent the Chapel of Peace and Joy in Lead City University, Ibadan, Oyo state, Nigeria.

Fig 4.1: Picture Showing the Site Location.

Source- (Researcher's Fieldwork, 2024)

4.1.2 Site Analysis

The site selection process plays a crucial role in shaping the final design outcome, as it is where the project's tangible aspects come together. The site's characteristics and environment significantly influence the design solution, making wise site selection essential for success. Various factors, including topography, physical features, microclimate, and existing nearby elements, impact the building's layout, form, aesthetics, and economy. A thorough site analysis is necessary to understand the site's suitability for the intended purpose, fostering a harmonious relationship between the site and the structure. By adapting to the site's environment, the design solution should reflect and respond to its unique conditions, ultimately achieving the design's objectives.

Fig 4.2: Picture Showing the Site Analysis.

Source- (Researcher's Fieldwork, 2024)

Site Accessibility

The site has easy and convenient access for both vehicles and pedestrians. The site is accessible from the major road that runs through lead city, the road that leads to enterprise hostel and the road outside the second gate of the University

Nearness to Public Utilities

The site has adequate access to basic infrastructure like good roads, electricity, water, telecommunications, security, etc

Drainage and Topography

The site has a gentle slope spread evenly throughout; it is however necessary to create a slope that allows rainwater flow towards a part of the site for collection encourages

Vegetation

Lead City is located within the tropics; hence it enjoys two distinct seasons which are the cold and dry seasons. This enables a wide range of vegetation ranging from the thick undergrowth, short grasses to evergreen trees in the site's immediate vicinity. Soil is loamy and is presumed to have adequate bearing capacity.

The site has relatively good and firm grounds with good load bearing capacity suitable for the construction of the staff school. The site is covered with shrubs, thick grass, and vegetable leaves and trees. All the vegetables and shrubs are to be removed. The site displays a relatively thick vegetation covers that is, there are tall grasses, shrubs as well as big trees.

Soil Condition

It has a firm laterite soil with good sub-surface condition for construction ad landscaping. It gives satisfactory geological and soil condition with no rock crops.

Wind Direction

The design takes into account the regional wind patterns, which impact occupant comfort. The harsh north-east trade winds bring cold, dust, and harmattan, while the south-west trade winds bring refreshing humidity. To capitalize on natural ventilation, the building's elongated east and west elevations are strategically oriented to maximize airflow. Conversely, the shorter north and south facades are positioned to minimize exposure to the unfavorable north-east trade winds, ensuring a more comfortable indoor environment for the staff school.

Sunlight and Temperature

Solar gain and temperature are an important factor as solar energy is utilized as an alternative form of power generation in the staff school. Solar panels are placed on the roof to gain as much incident solar radiation throughout the day.

4.2 Project Analysis/ Design Synthesis

4.2.1 Design Criteria/ Consideration

This section outlines the thoughtful and intentional design considerations that have shaped the project. By carefully evaluating the site, climate, and user needs, the design responds to the unique challenges and opportunities presented. The following considerations have guided the development of the design, ensuring a harmonious and functional solution that meets the project's objectives

Colours

The appropriate use of colours to improve the overall psychology, physiology and learning process of the pupils in the school

Safety

The design incorporated safety measures like secure and monitored entrances, controlled access points, emergency exits, and safe outdoor play environments

Natural Lighting and Ventilation

Maximizing natural light and ventilation in a healthy environment be using large windows, skylights, atriums. Courtyards to bring in daylight and incorporate ventilation in systems for fresh air circulation.

Accessibility and Circulation

The school is accessible to all students, including those with disabilities. This involves ramps, elevators, wide corridors, and accessible facilities like bathrooms

Outdoor Learning Environment

Outdoor spaces that foster learning and play including classrooms, gardens, sports fields, playgrounds, promoting physical activities, exploration and connection with nature.

Aesthetics and Identity

A school environment that reflects community values and culture, incorporating artwork, murals, school colours, signages will foster pride and belonging.

Scale and Proportion

Creation of spaces that are children scaled so that children will not feel lost.

Zoning

Proper zoning and arrangements of spaces to make spaces with like uses to be together to improve functionality and reduce noise

Adaptive reuse of spaces

Ability to convert the use of spaces from one use to another, seamlessly without functional disturbance.

Material Selection

Choosing durable materials and finishes that can withstand heavy use and are easy to maintain

Sustainability

Create a school environment that is energy efficient and implements sustainability principles.

The careful consideration of these factors has yielded a design that is both functional and harmonious with its context

4.2.2 Brief Analysis

Lead City University, a prestigious institution, recognizes the need for a dedicated staff school to provide a nurturing environment for its employees' children to grow and learn. Currently, this essential facility is absent from the university's infrastructure.

The objective is to design a staff school that not only addresses this need but also sets a high standard for educational excellence. The school should be a safe, accessible, and inclusive space that fosters a sense of community among students, teachers, and the wider university community.

Sustainability and energy efficiency are key considerations, reflecting the university's commitment to responsible development. The building's design should also reflect the university's brand and values, creating a lasting impression on all who enter.

The staff school should be a functional and flexible space, accommodating diverse learning methods and amenities such as a library, auditorium, and playgrounds. Compliance with building codes and accessibility standards is essential, ensuring a safe and welcoming environment for all.

Ultimately, the design should provide a cost-effective and maintainable solution, meeting the needs of the university and its community while enhancing the overall campus experience

4.2.3 Brief Development

A number of spaces were found to be common in the case studies examined for this design. These spaces were studied critically to determine the standard required, the number of units per people, their capacity and exact function they perform in a primary school design. These spaces are:

- Reception

- Admin building/ accounts
- Head teacher and assistant head teacher's office
- Secretary offices
- Creche classes
- Playgroup classes
- Nursery classes
- Grade/primary classes
- Board room
- Library
- Conveniences
- Computer room
- Science room
- Arts room
- Music room
- Staff lounges
- Garden
- Outdoor learning environment
- Playground

- Cafeteria
- Gymnasium

4.3 Conceptual Development

In architecture, concepts are often derived from various sources and can be categorized into five main types:

Ideal: Concepts that aim to solve specific architectural problems or improve existing designs.

Essence: Concepts that focus on the intrinsic nature or essence of a design, going beyond its functional purpose.

Analogous: Concepts inspired by other things, such as nature, art, or technology, and applied to architectural design.

Metaphorical: Concepts that use abstract ideas or metaphors to create a design that represents an idea or concept beyond its physical form.

Pragmatic: Concepts that prioritize functionality and practicality, focusing on the building's purpose and user needs.

Building Concept

Asides from the passive design techniques that have shaped this building, the building follows a pragmatic concept by adhering to the school of thought that form should follow functionality, whilst not neglecting its aestheticism. The concept of the building is spectriform which is a combination of the fluid form of the building, and generous use of colours to enhance learning and improve the overall educational experience of the children.

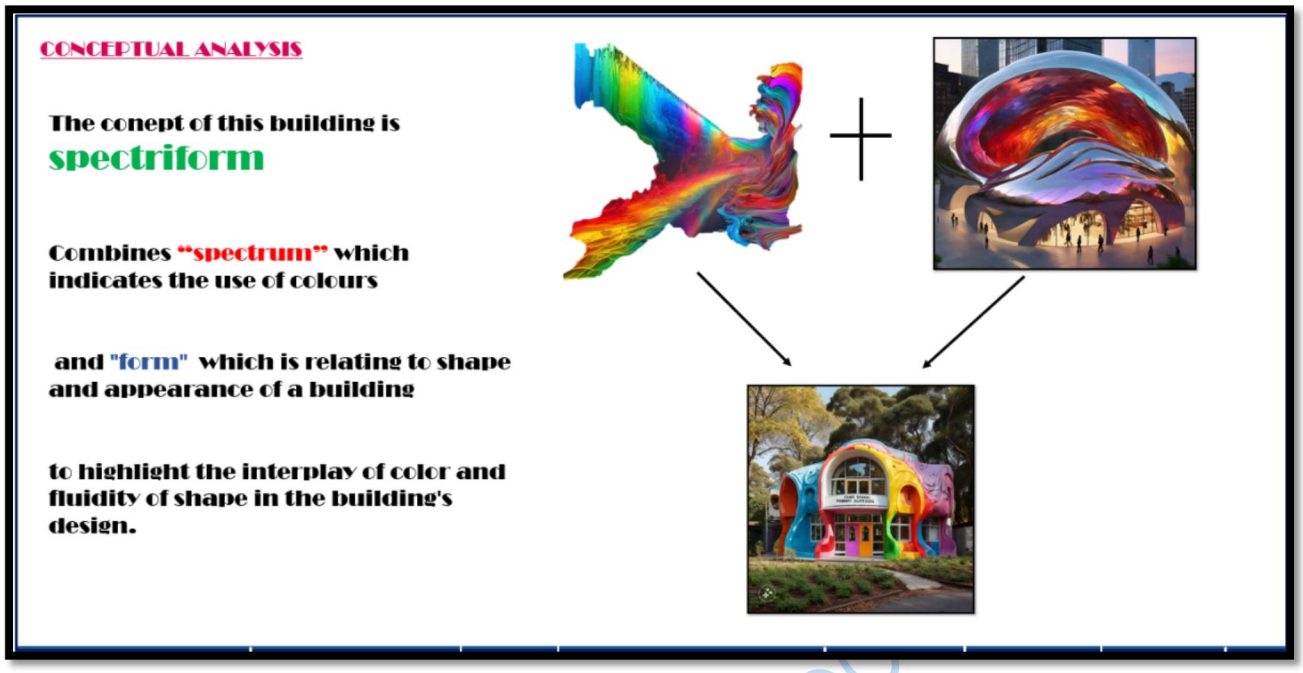

Fig 4.3: Picture Showing the Conceptual Analysis.

Source- (Researcher's Fieldwork, 2024)

4.3.1 Functional Relationship

4.3.2 Space Allocation / Schedule of Accommodation

Spaces were grouped into five, depending on their relationship with one and another, and the similarities of the activities performed there.

Administrative Spaces

- Reception
- Admin/Acoounts
- Head teacher's offices
- Asst Headteacher's office
- Secretaries' offices

- Board room
- Medical room

Classes

- Creche
- Playgroup
- Nursery classes
- Grade classes

Leisure and Recreation

- Cafeteria
- Playground
- Lounges
- Gardens
- Gymnasium/hall

Extracurricular

- Library
- Computer room
- Science lab
- Music room

- Arts and creative room

Ancillary Facilities

- Conveniences
- Stores

Schedule of Accommodation

SPATIAL PROGRAMMING

S/N	SPACE NAME	USE OF SPACE	FURNITURE IN SPACE	MAXIMUM NUMBER OF PEOPLE IN THE SPACE	Furniture dimensions	TOTAL AREA
1	CLASSROOM	SPACE WHERE THE PULPILS RECEIVE TEACHING	CHAIRS, TABLES, ETC	25	1.2m x 0.45	48sqm
2	ADMIN OFFICES	OFFICE FOR ADMINISTRATIVE STAFF	CHAIRS, TABLES, SHELVES	4	1.8m x 0.9	13.5sqm
3	MULTIPURPOSE HALL	A HALL FOR ACTIVITIES SUCH AS QUIZZES	CHAIRS	250	0.9m x 0.9m	280sqm
4	COMPUTER ROOM	FOR TEACHING OF THINGS REQUIRING THE USE OF	COMPUTERS,TABLES, CHAIRS	25	30 tables at 1.5m x 0.75m each	40sqm
5	GYMNASIUM	A ROOM DEDICTAED TO indoor SPORTING ACTIVITIES	SPORTING EQUIPMENT	150		
6	MEDICAL ROOM	A ROOM DEDICATED TO RECEIVING MEDICAL TREATMENT	BEDS, CHAIRS, SHELVES	5	2 Beds at 0.7m x 2.1	15sqm
7	TEACHER'S LOUNGE	A ROOM FOR TEACHERS TO RELAX	SOFAS	20	7 sofas at	81sqm

S/N	SPACE NAME	USE OF SPACE	FURNITURE IN SPACE	MAXIMUM NUMBER OF PEOPLE IN THE SPACE	AREA PER PERSON	TOTAL AREA
8	RESTROOM	TOILETS, WASHROOMS	WC, URINALS, WASH BASINS	4	4 spaces of 1.2m x 0.9 sqm	10sqm
9	STORAGE ROOMS	A ROOM FOR STORING THINGS	SHELVES	4		6sqm
10	KITCHEN	A SPACE FOR COOKING AND DOING KITCHEN RELATED THINGS.	CABINETS	4		36sqm

Fig 4.4 : Picture Showing the Schedule of Accommodation

Source – (Researcher's Field Work, 2024)

4.3.3 Construction Methods and Materials

Sustainable materials were used in the design of this project. Factors that influenced this choice are:

- Durability
- Availability
- Functionality
- Cost
- Laws and regulations
- Aesthetics

Substructure: Reinforced Concrete

Walls: Sandcrete blocks, MDF wood and glass for internal partition

Interior walls: painted with Airlite paint to protect against growth of mold and microbes and eliminate germs

Floor: Vinyl flooring, over cemented floor

Door: wooden panel doors, steel doors, glass doors

Roof: Long span aluminum roofing sheet with steel roof support. Felted concrete slab, wooden pergolas for garden.

Ceiling: POP ceiling finish

4.4 Building Services

Emergency: Fire Extinguishers, sand pots and emergency stairs are placed strategically throughout the building in case of a fire emergency.

Lighting: The circulation space is well ventilated by the large courtyard in the middle of the building. This courtyard also serves for lighting and ventilation for every space in the building.

Water Supply: Water supply to the site would be from the existing water supply mains in the school. A Bore hole would be drilled for distribution of water supported with a reservoir.

Drainage: gutters to be dug and channeled to the existing gutters.

Electricity: The electricity supplied to the school by the power distribution company will be connected to the building.

Chapter Five

Conclusion

5.1 Appraisal

This thesis investigated to find out the effects of colours on the psychology of children in primary school learning environments. 6 case studies were investigated in the course of this thesis. The results showed that different Colours have significant effects on children's behavior, emotions, and learning outcomes.

According to literature, the colours recommended for the major spaces used by the children in the primary school are:

Pre-School classes:

- Bright and warm Colours like Yellow, Orange, and Red
- Pastel shades like Light Blue, Pink, and Pale Yellow

Classrooms (Grades 1-6):

- Calming and focusing Colours like Light Green, Blue, and Purple (Kullmann, 2017)
- Earthy tones like Beige, Brown, and Green (Lau, 2018)

Art and Music Rooms:

- Vibrant and stimulating Colours like Red, Orange, and Yellow
- Inspiring Colours like Purple, Blue, and Green

Library:

- Soothing and calming Colours like Blue, Green, and Neutral tones

- Comforting Colours like Beige, Brown, and Soft Gray

Ultimately, this study demonstrates that Colours are not just an aesthetic consideration, but a critical factor in creating supportive and effective learning environments for children in primary schools.

5.2 Recommendation

Based on the findings of this study, the following recommendations are made:

1. Educators and designers should consider the psychological effects of Colours when designing primary school classrooms.

2. Calming Colours like light blue and pale green should be used in areas where children need to relax and focus, such as reading corners and quiet zones.

3. Stimulating Colours like yellow and orange should be used in areas where creativity and engagement are encouraged, such as art rooms and play areas.

4. Earthy tones like brown and beige should be used in areas where children need to feel comfortable and secure, such as classrooms and hallways.

5. Further research should be conducted to explore the long-term effects of Colours on children's psychology and behavior in primary school learning environments.

By implementing these recommendations, primary schools can create supportive and effective learning environments that promote children's cognitive, emotional, and social development.

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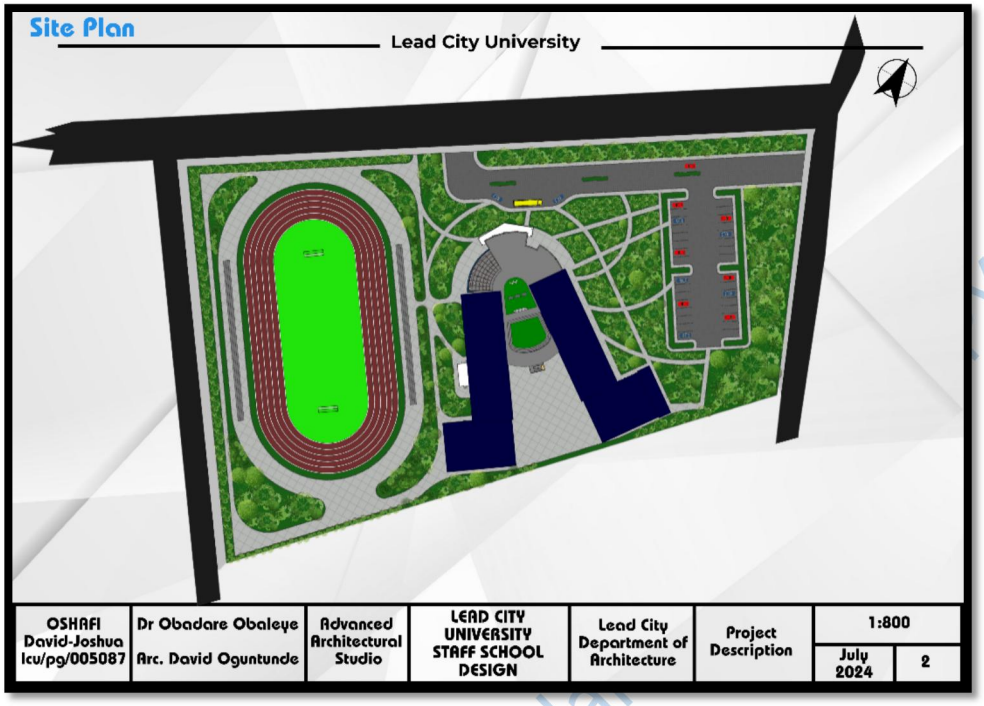
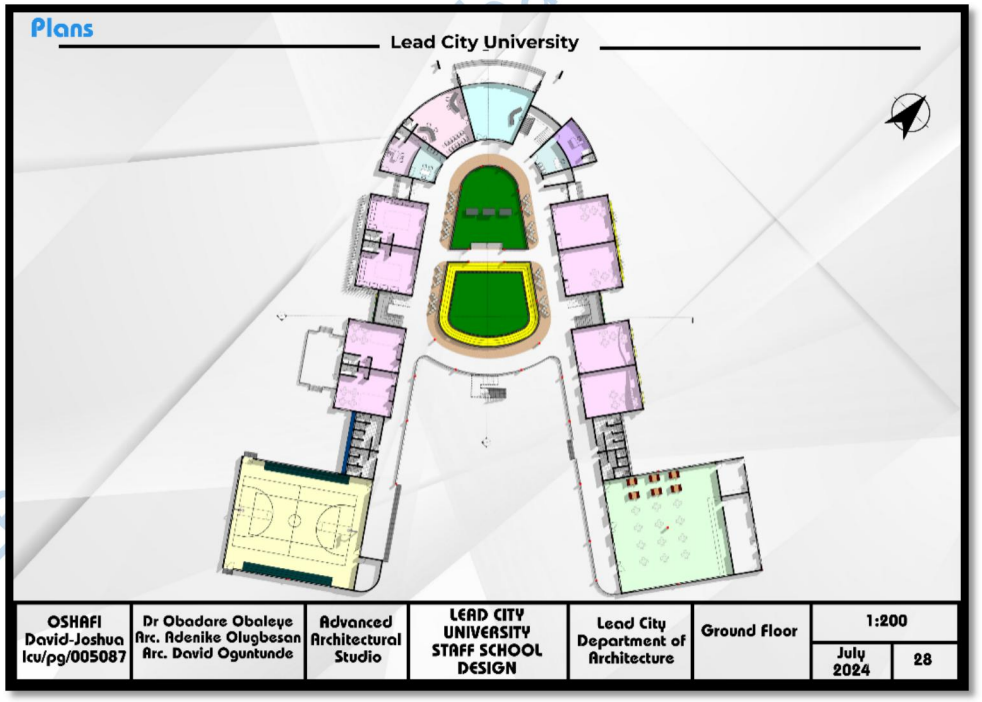
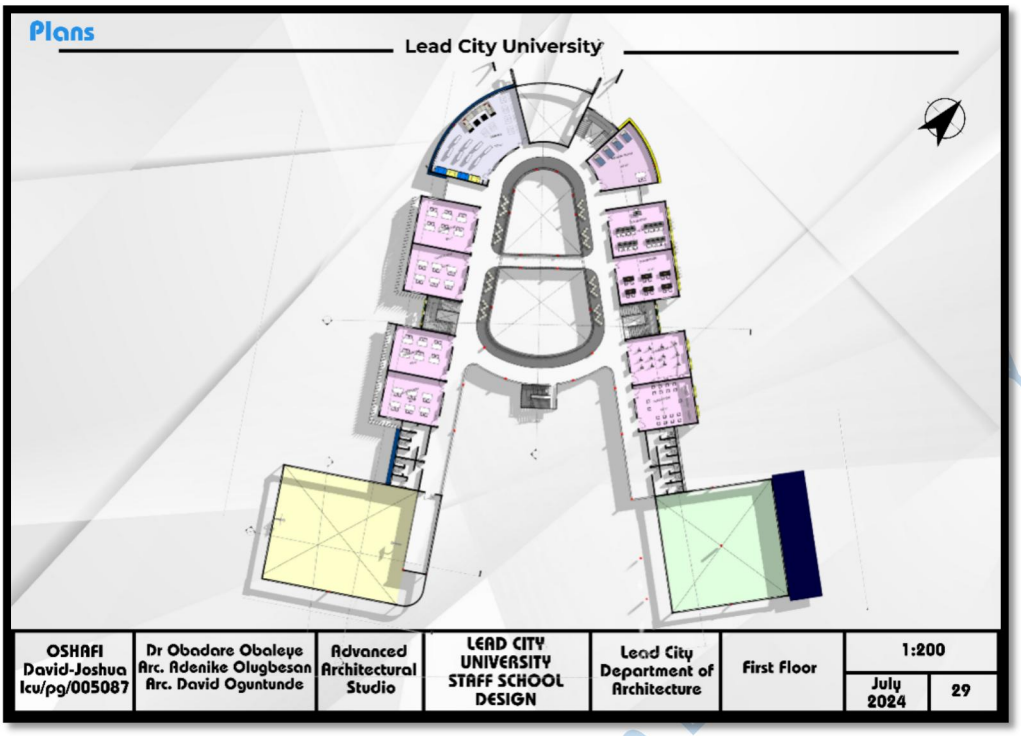
Appendices - Appendix 1- Presentation Drawings



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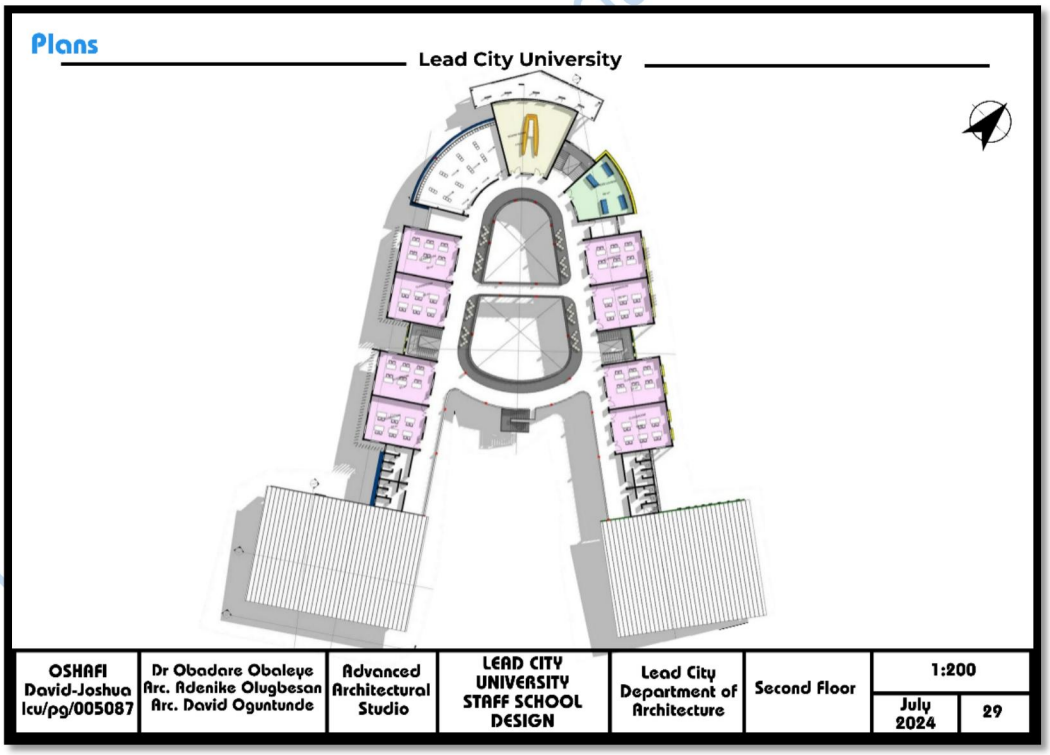
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Dr Obadare Obaleye Arc. Adenike Olugbesan Arc. David Oguntunde
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Lead City Department of Architecture
Second Floor
1:200
July 2024
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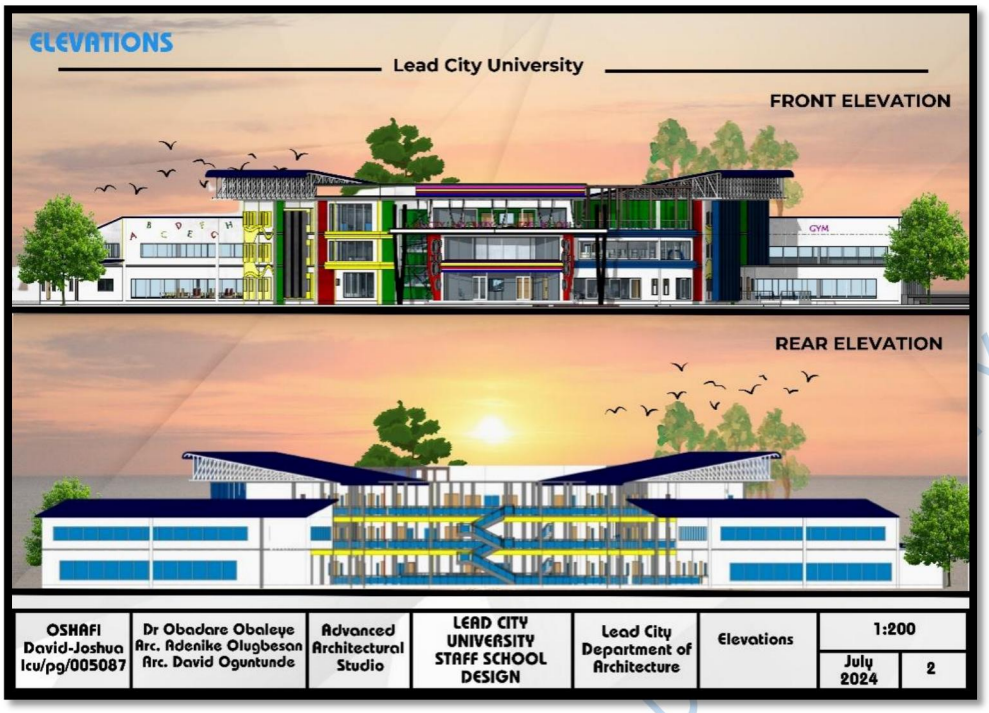
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REAR ELEVATION
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Arc. Adenike Olugbesan
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Elevations
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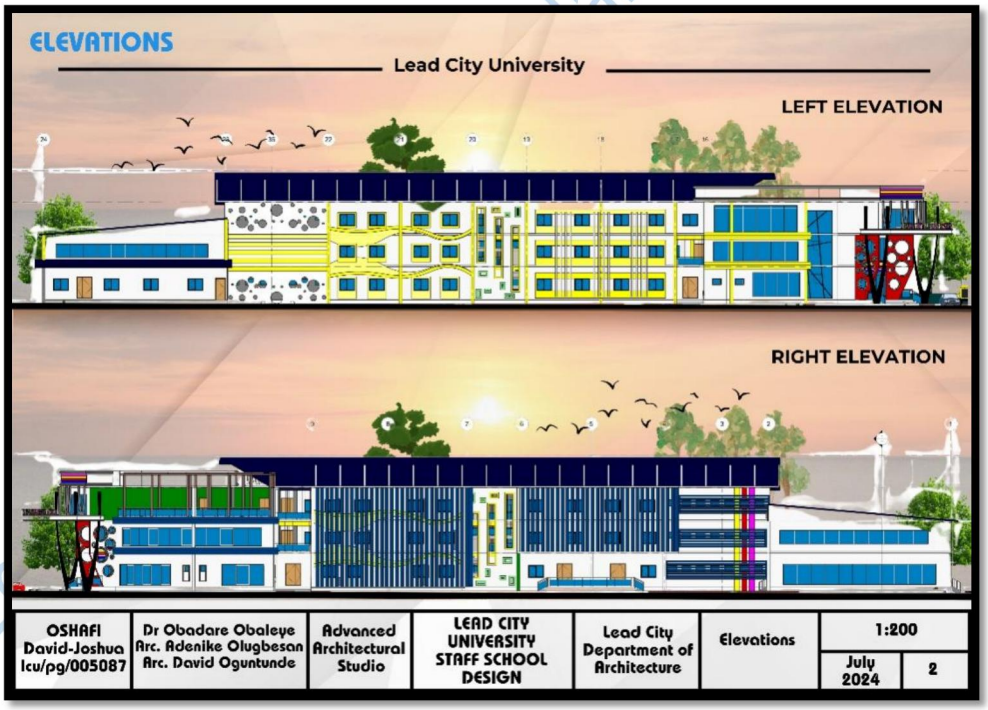
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RIGHT ELEVATION
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Dr Obadare Obaleye
Arc. Adenike Olugbesan
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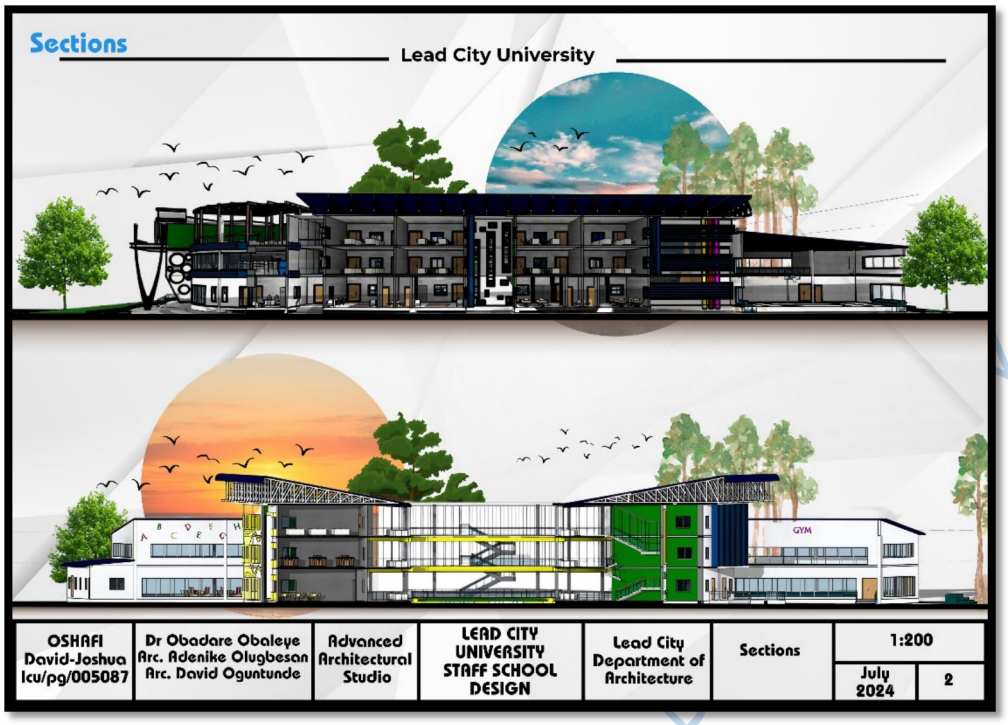
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GYM
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Arc. Adenike Olugbesan
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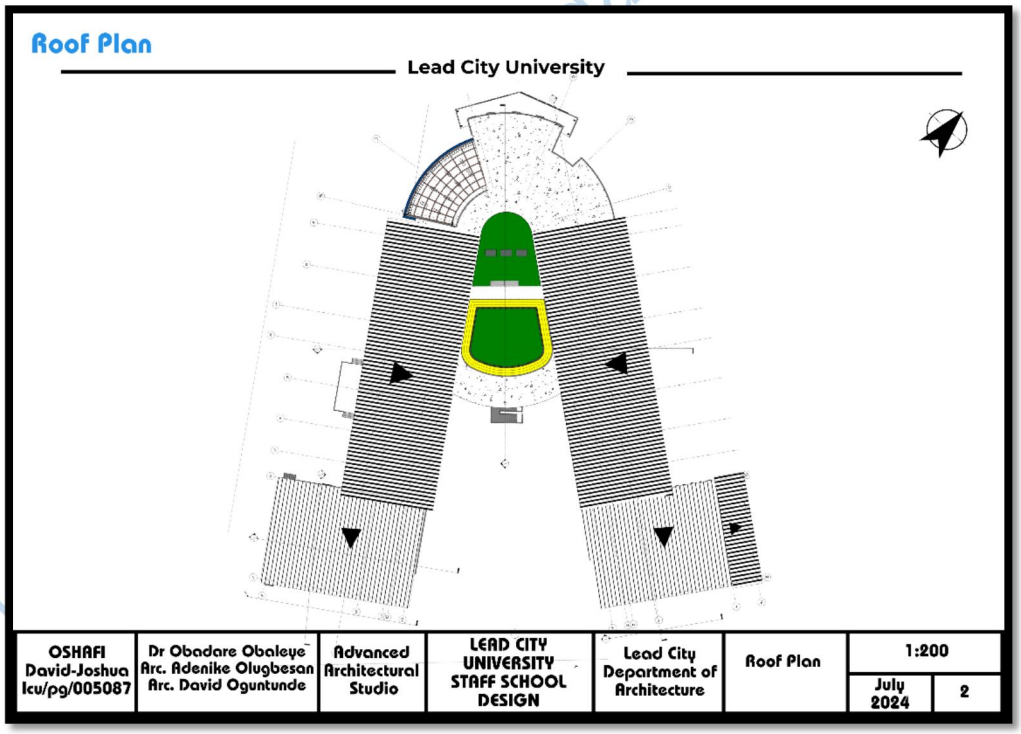
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OSHAFI David-Joshua lcu/pg/005087
Dr Obadare Obaleye
Arc. Adenike Olugbesan
Arc. David Oguntunde
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Lead City Department of Architecture
Roof Plan
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July 2024
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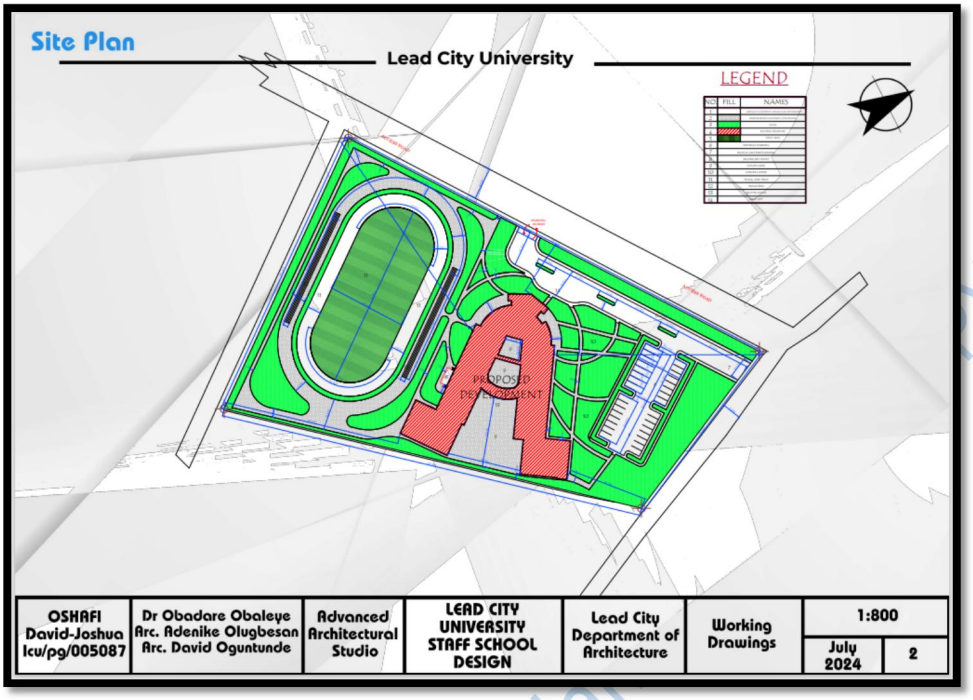
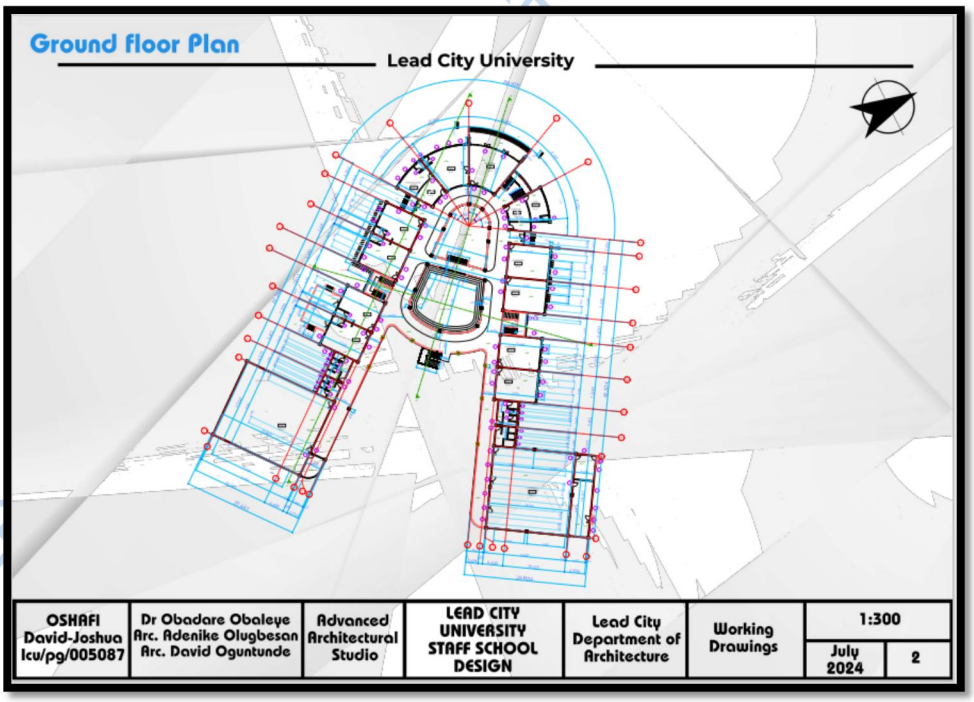
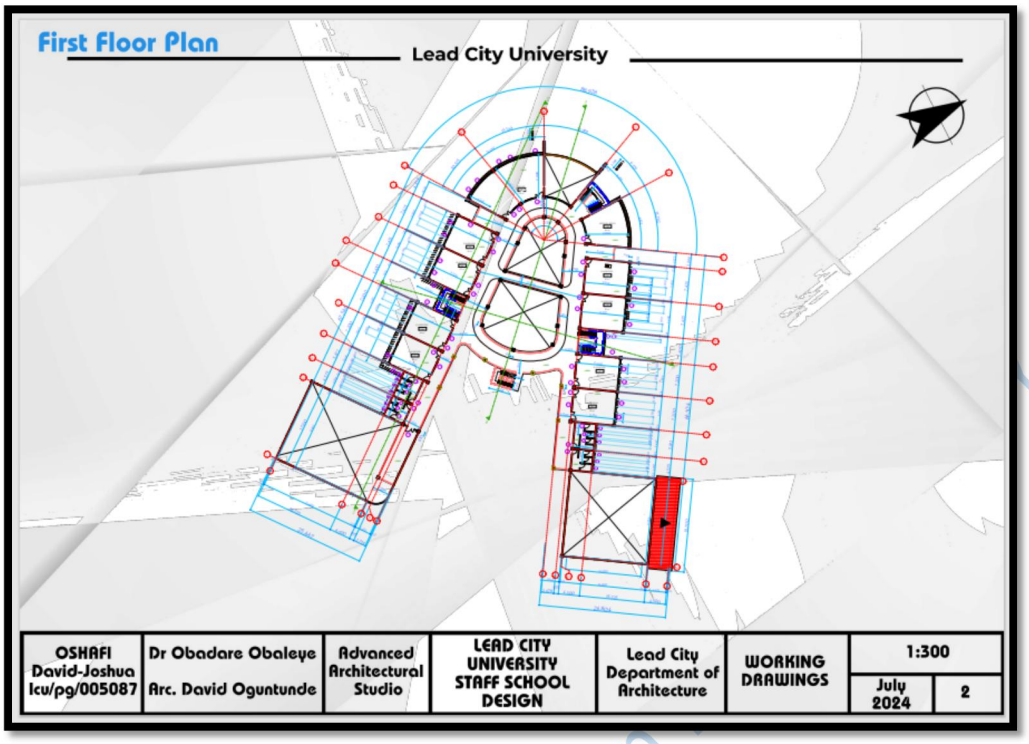
Appendices - Appendix 2- Working Drawings



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Dr Obadare Obaleye
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WORKING DRAWINGS
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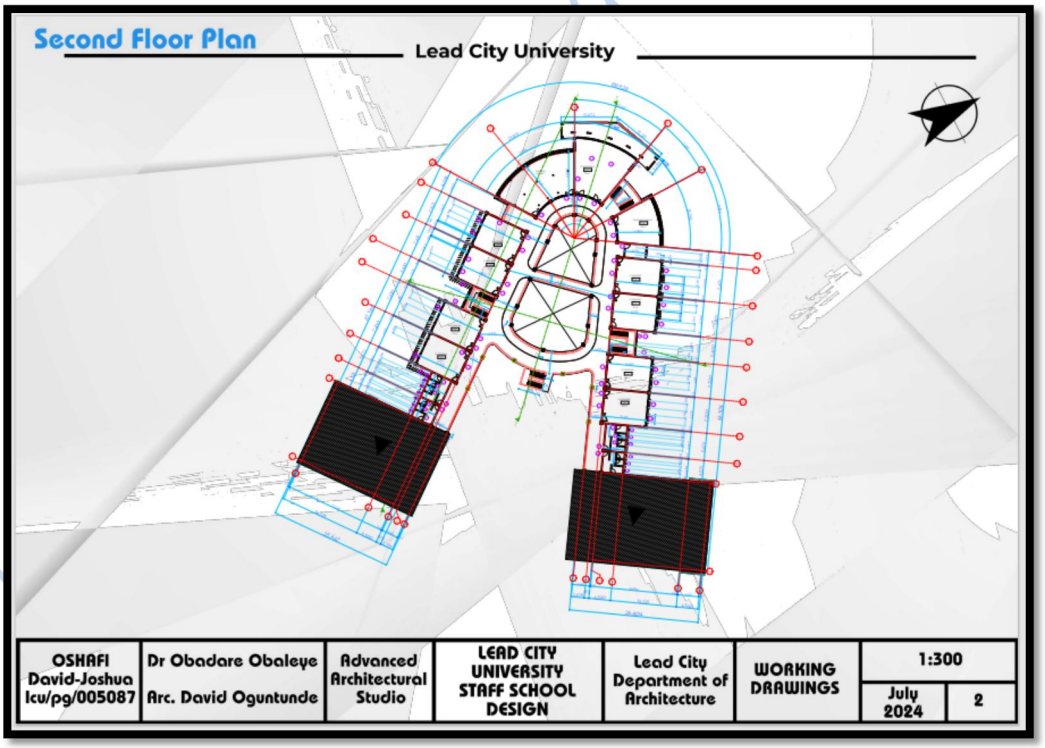
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Lead City Department of Architecture
WORKING DRAWINGS
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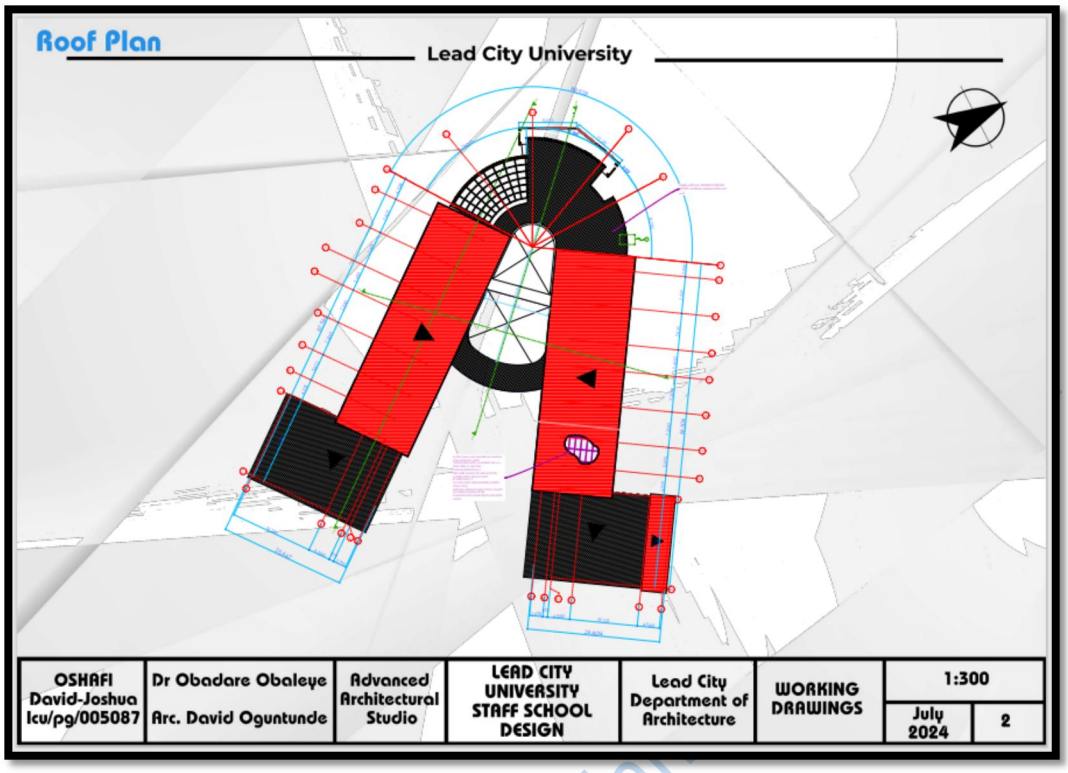
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WORKING DRAWINGS
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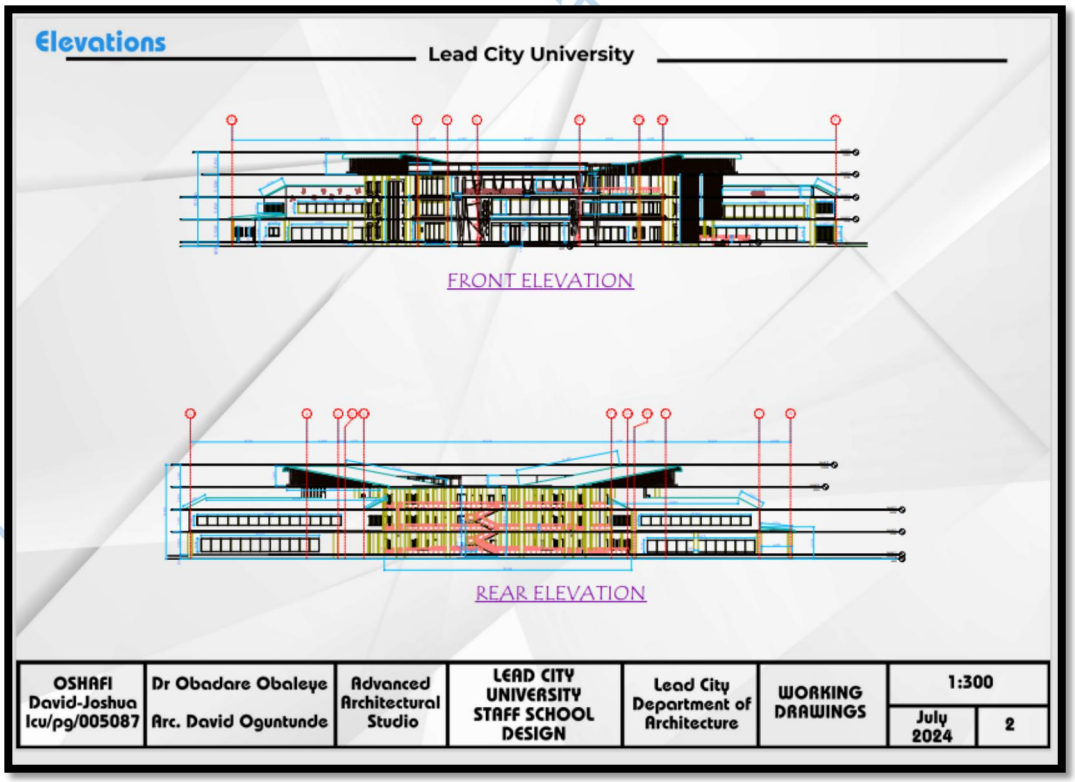
Elevations
Lead City University
FRONT ELEVATION
REAR ELEVATION
OSHAFI David-Joshua lcu/pg/005087
Dr Obadare Obaleye
Arc. David Oguntunde
Advanced Architectural Studio
LEAD CITY UNIVERSITY STAFF SCHOOL DESIGN
Lead City Department of Architecture
WORKING DRAWINGS
1:300
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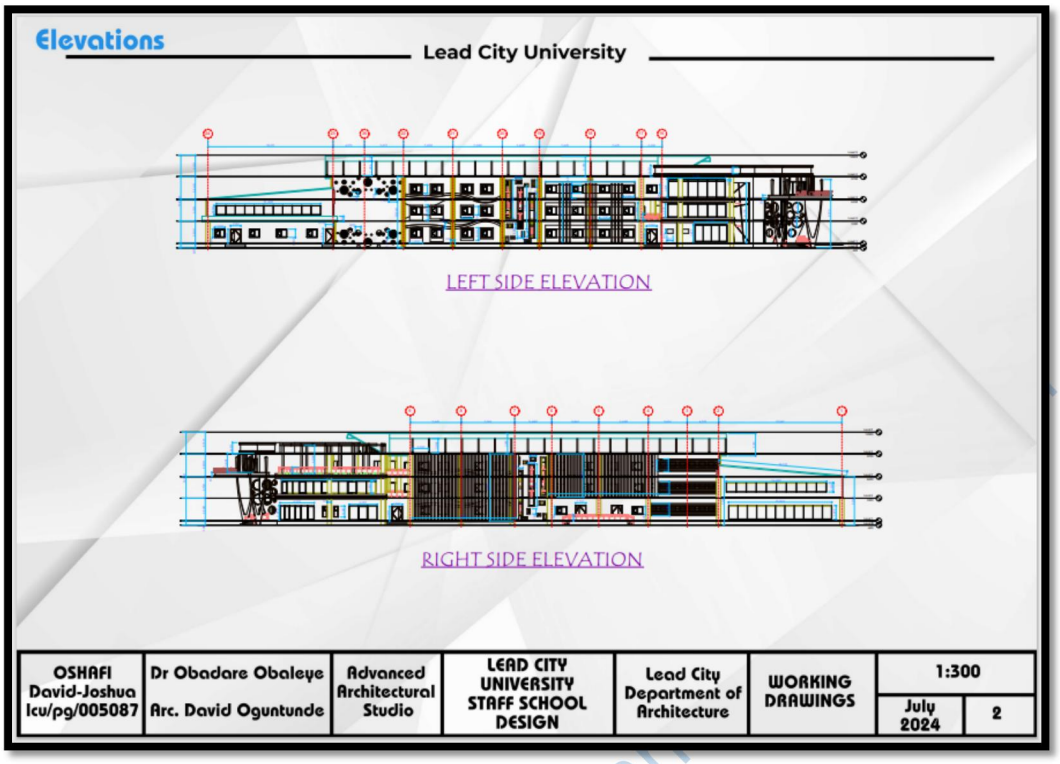
Elevations
Lead City University
LEFT SIDE ELEVATION
RIGHT SIDE ELEVATION
OSHAFI David-Joshua lcu/pg/005087
Dr Obadare Obaleye
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LEAD CITY UNIVERSITY STAFF SCHOOL DESIGN
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WORKING DRAWINGS
1:300
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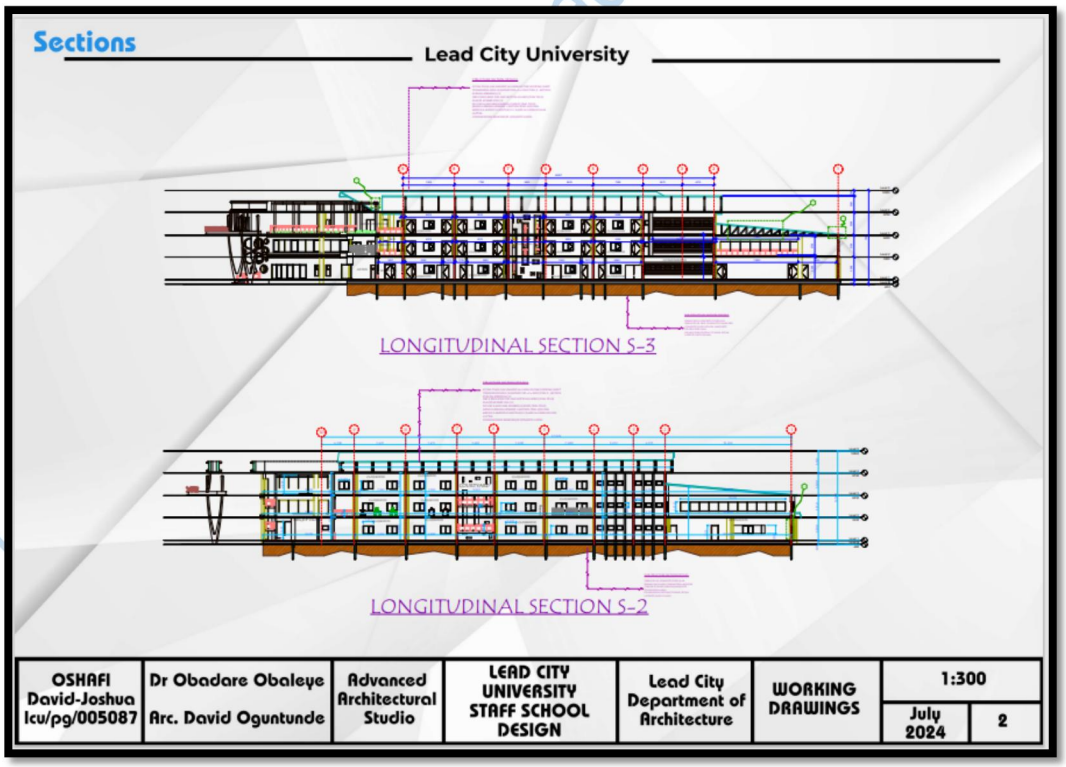
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Dr Obadare Obaleye
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Lead City Department of Architecture
WORKING DRAWINGS
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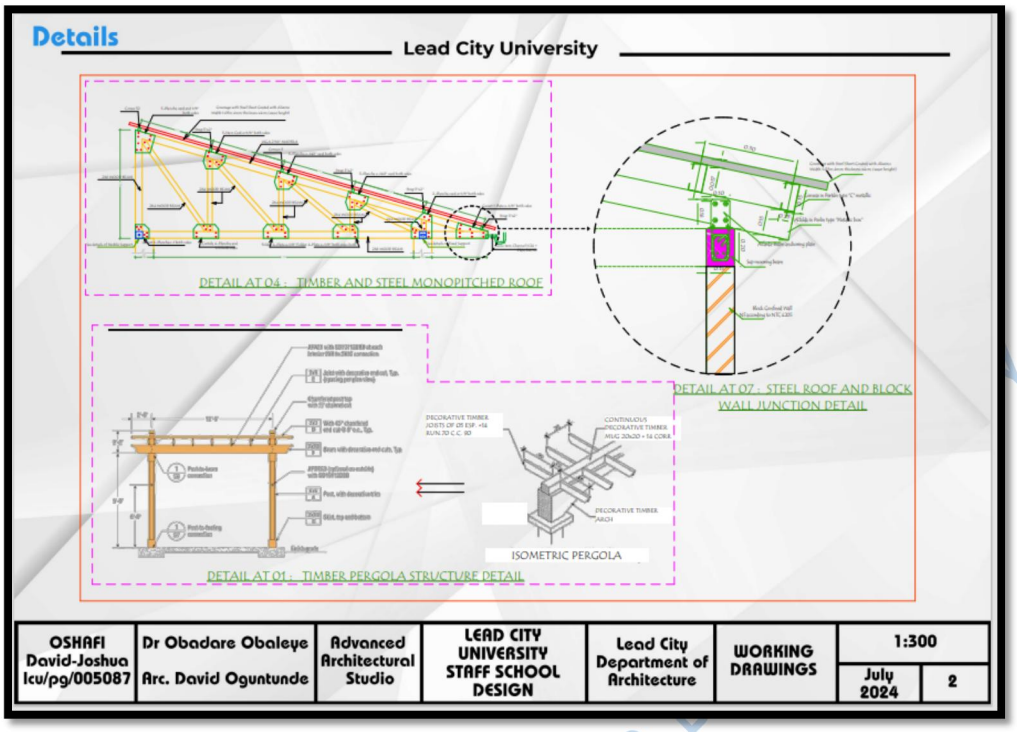
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DETAIL AT 01 : TIMBER PERGOLA STRUCTURE DETAIL
ISOMETRIC PERGOLA
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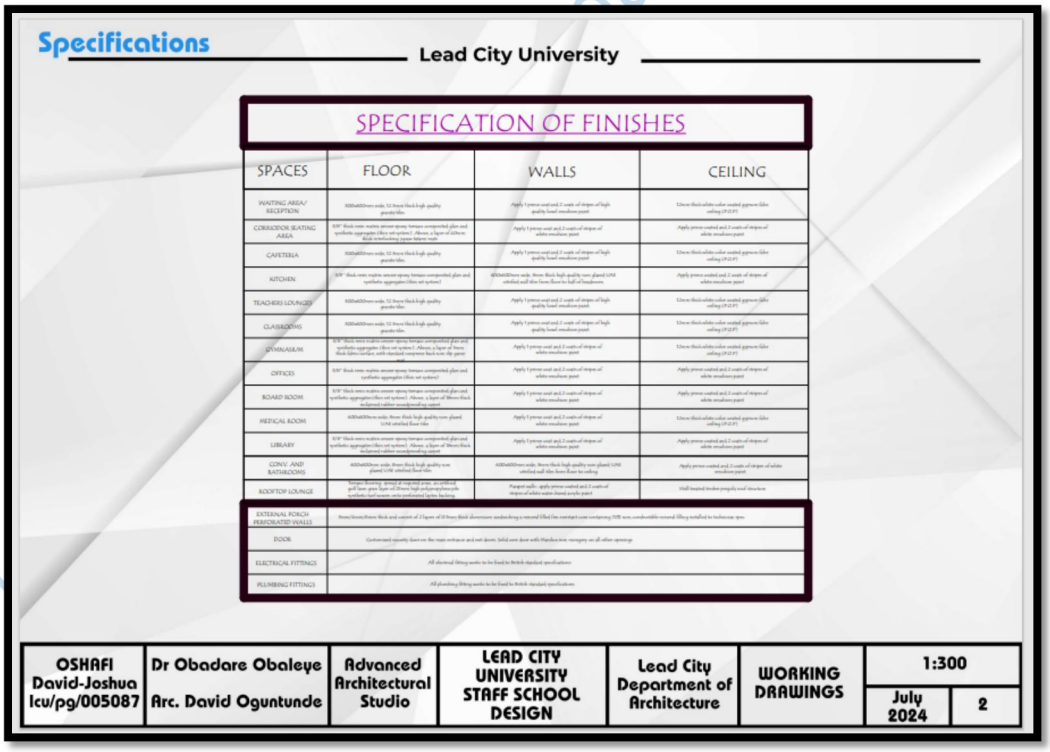
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CAFETERIA
KITCHEN
TEACHERS LOUNGES
CLASSROOMS
GYMNASIUM
OFFICES
BOARD ROOM
MEDICAL ROOM
LIBRARY
CONV. AND BATHROOMS
ROOFTOP LOUNGE
EXTERNAL PORCH PERFORATED WALLS
DOOR
ELECTRICAL FITTINGS
PLUMBING FITTINGS
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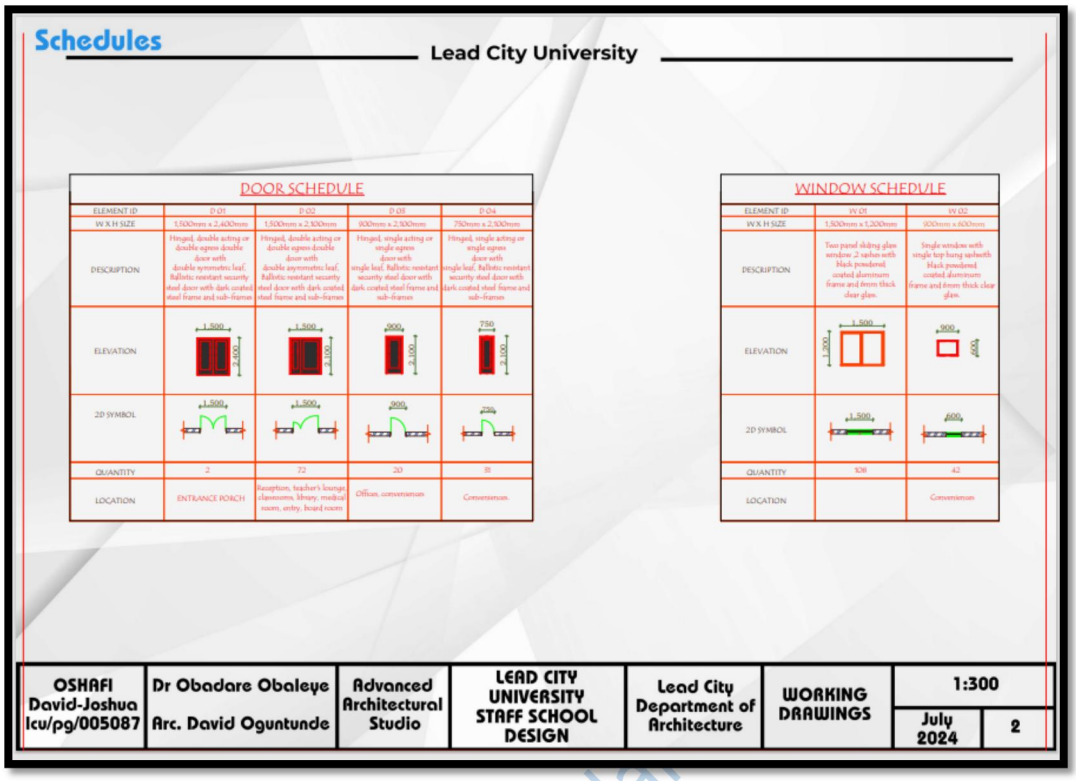
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D 03
D 04
ENTRANCE PORCH
WINDOW SCHEDULE
W 01
W 02
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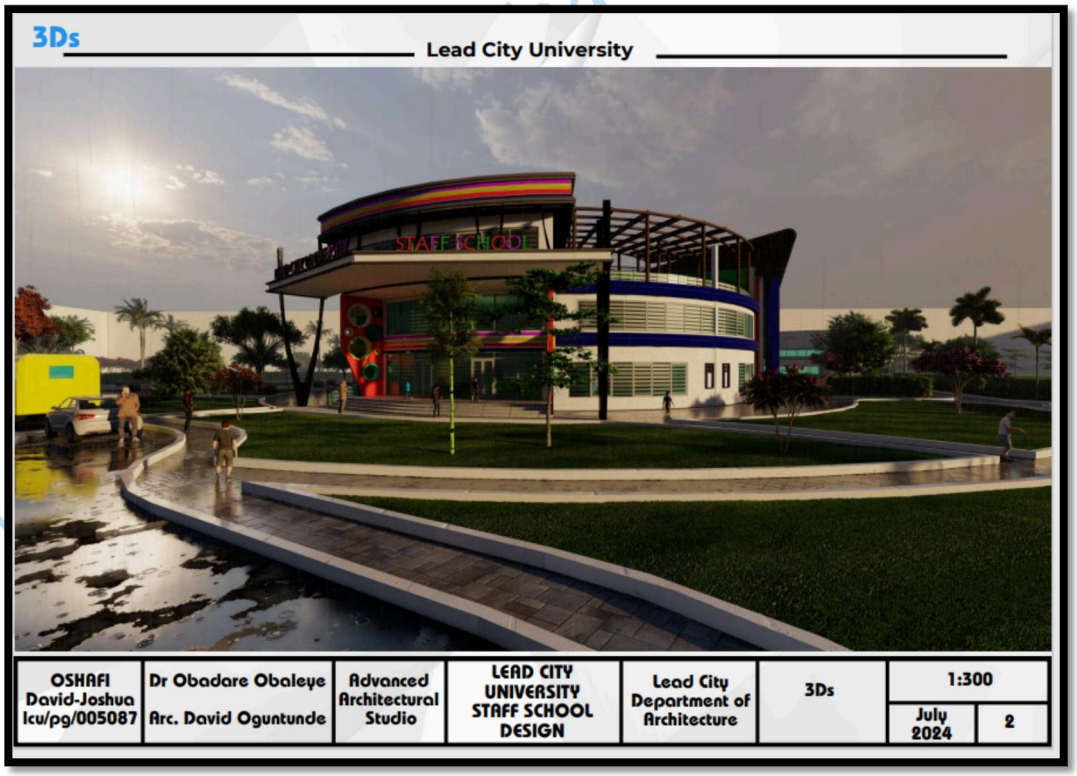
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Lead City University
STAFF SCHOOL
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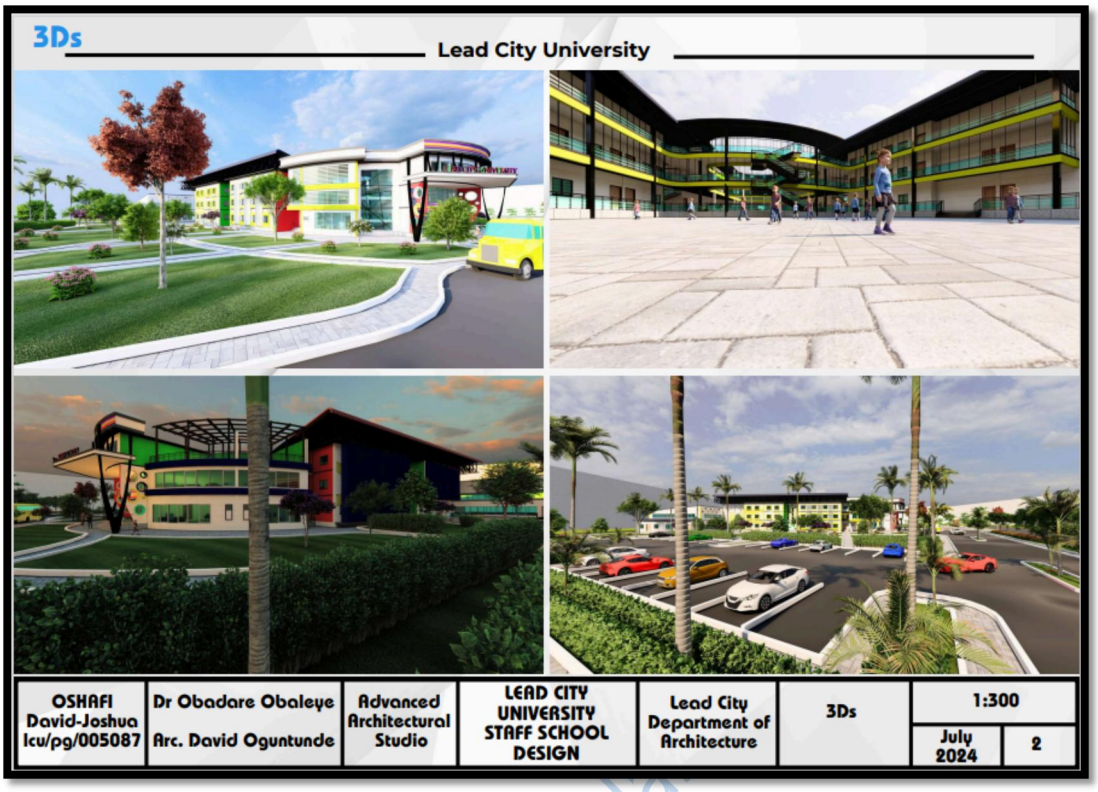
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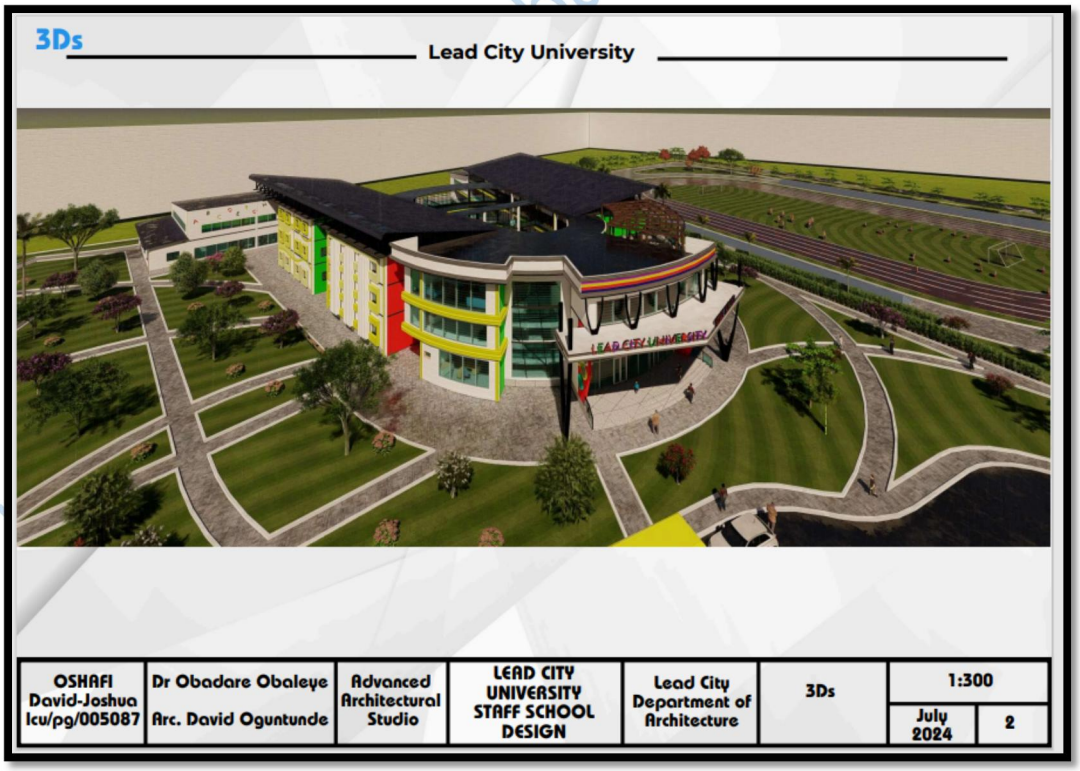
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Lead City Department of Architecture
3Ds
1:300
July 2024
2

Bio-data

A. Personal Data

1. Full Name: **OSHAFI David-Joshua Uzoamaka**
2. Address: Ibadan, Nigeria
3. Email Address: djoshafi@gmail.com
4. Phone Number: 08096835276
5. Date of Birth: 03/02/2000
6. Place of Birth: Nigeria
7. Nationality: Nigerian
8. Marital Status: Single
9. Name and Address of Next of Kin: Oshafi Glory-Anna, Abuja

B. Educational Background

1. Educational Institutions Attended with Dates and Qualification:

Qualification	Institution	Date
Msc. Architecture	Lead City University, Ibadan, Oyo State.	2022- Ongoing
BSc. Architecture	Lead City University, Ibadan, Oyo State.	2018-2022
Secondary School Leaving Certificate	Pathfinder College Ibadan.	2010-2016
Primary School Leaving Ceritificate	Lifeline Preparatory School, Mokola, Ibadan	2001- 2010

C. Awards and Fellowships:

1. Most well-behaved Student 2020/2021 – Faculty of Environmental Design and Management.
2. Students' Ambassadors Team – Member
3. University Chapel Music Director: 2022-2024

D. Work Experience

1. BGM Architects (Student Architect): January 2021 – October 2021
2. 302 Atelier (Architect): November 2022 – Present
3. BW Designs (Architect and Interior Designer): August 2024 - Present

E. Publication –

…….. …….

Signature Date

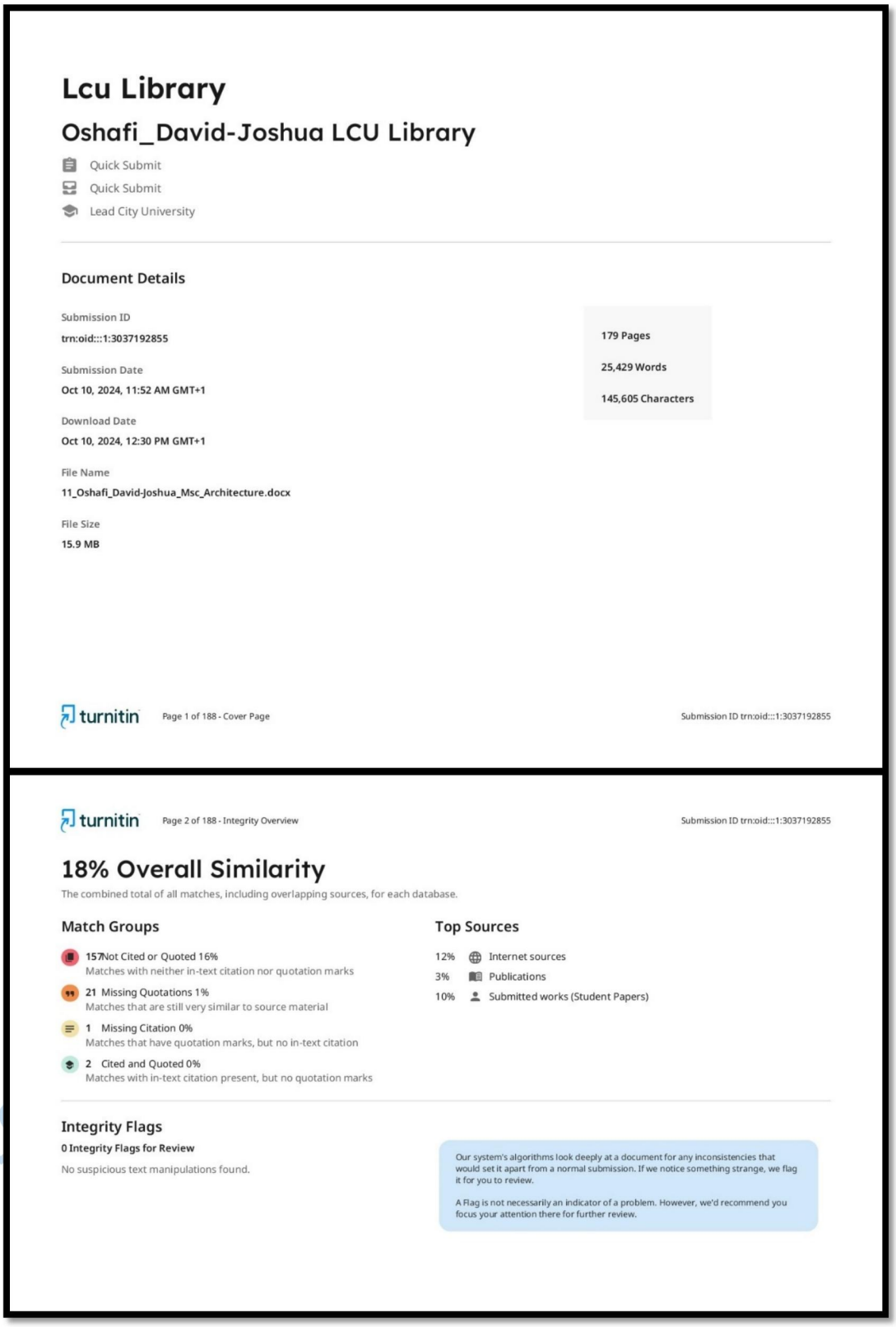
The University Compliance Certification

This is to certify that the Thesis by David-Joshua Oshafi, with the matriculation number LCU/PG/005087 in the Department of Architecture, Faculty of Environmental Design and

Management, Lead City University, Ibadan is in full compliance with the University format and style of Thesis.

…….. ……..

Signature Date



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