UNIVERSITY OF CAPE COAST

DETERMINANTS OF CHOICE OF INTERIOR DESIGN BY ACADEMIC STAFF OF THE UNIVERSITY OF CAPE COAST

BY

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DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature …… Date ..……

Name: ……

Supervisor's Declaration

We hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Principal Supervisor's Signature …… Date ..……...….

Name: ……

Co-Supervisor's Signature ……..…… Date ..……...….

Name: ……

ABSTRACT

Interior design is specifically important at the initial phase of a project where information is gathered about the client's spatial needs. This is because a successful project is arguably established by the client choosing that space as acceptable. The objectives of the study explore prevalent human factors issues within office interiors, as well as, cognition, the external environment and human factors influencing the individual's choices of interior design. Using responses from 175 academic staff of the University of Cape Coast, Ghana, the response rate of 72% sufficiently represents the sample. This two-phased study included answering of questionnaires by respondents, followed up by analysis and then two more interviews with two project management members. The tools employed for this study included Kendall's Coefficient of Concordance, SEM and a narrative analysis. Eleven items were identified as factors having an impact on choice of interior design and they were categorised under three variables. Results of the ranking revealed standard clearances, crowding and proxemics within the interior are major problems. The result of the SEM analysis of the three identified factors affecting choice of interior design revealed that the cognitive and environmental factors had significant relationship with choice of interior design at ρ-values of 0.000 and 0.001, respectively, while human factors had significant relationship with choice of interior design at a ρ-value of 0.014. The results were supported by the qualitative findings and captured relevant data that answered the objectives of the study. The study recommended that reviews and audits, consultation with project management before completion of the interior project and careful design planning in the initial stages of the project.

KEY WORDS

Environment

Choice

Cognition

Interior

Preference

Project

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DEDICATION

To Ivan Mixailovich Ikol, Bondarenko Victoria Vyacheslavnaya, Irina Vladimirovna, Vladimir Petrovich, Zolotuxa Hadyezhda Anatolevnaya and Valentina Alexseevna.

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LIST OF ACRONYMS

AEC	Architecture, Engineering and Construction
DPDEM	Directorate of Physical Development & Estate Management
IDBOK	Interior Design Professional's Body of Knowledge
MEB	Maintenance of Existing Buildings
PMBOK	Project Management Body of Knowledge

CHAPTER ONE

INTRODUCTION

Over the last two decades, researchers have deemed it crucial to assess the relation between the interior environment, interior elements, and the human experience since majority of people spend most of their time (70%-90%) indoors. Previous studies found that most people spend their time in residential, educational, occupational, transportation, and health-care facilities (Kaplan 1978; Hendy, 2011; Environmental Protection Agency, 2014; Ruparathna, Hewage & Sadiq, 2016; Radwan & Ergan, 2017; Stokols, 2018; Cheng, Zhang, Huan, Oladokun & Lin, 2019). These studies have focused on the user, the external and internal components of the built environment because every individual differs in their requirements for effective functioning and well-being (Kaplan & Kaplan, 1982). Choice for a specific environment may indicate the potential that environment could have on health and well-being (Hartig & Evans, 1993; Hartig & Staas, 2006; Nilsson, Sangster, Gallis, Hartig, De Vries, Seeland & Schipperijn, 2010).

Background to the Study

In organisations such as academic institutions, layout of certain interiors result in low occupancy rates and under-utilization, with academic staff occupying their workspaces for an average of about 30–40 per cent of the working day (Pinder, Kessel, Green & Grundy, 2009). Due to this, there is an understanding that a considerable amount of the user's ideas about space is directly entwined with the urban and architectural form of their environments (Janetius, 2016). This is also why spaces should meet aesthetic, ergonomic, quality, psychological and economic expectations (Al Horr, Arif, Kaushik,

Mazroei, Katafygiotou, & Elsarrag, 2016). Hence, highlighting the importance of architects (structural, interior and landscape architects) when designing such a space.

Architectural and interior design have been ranked as aesthetic bonuses to projects and the environment within which human activities take place (Ricci, 2018; Dash, 2018). According to Dash (2018), the interior can be remodelled to enhance the spatial experience and create a positive impact on human behaviour. Although project management is a major part of interior design in the construction industry, not much attention has been given to it in Ghana. There are limited published research works in project management looking to issues of interior design. The quality of the interior space may depend on the amount of time and money put into planning and executing the project but most importantly, on client acceptability. It is agreeable that choosing a design concept for a university is not simple task because there are so many stakeholders involved (e.g. sponsors, students, staff, contractors, government and many more).

Since the 1960s, large amount of research findings from architecture, interior design, psychology, health and safety, risk management, ergonomics, environmental studies have looked at how physical setting influences the user's ultimate satisfaction (Harrell, Hutt, & Anderson, 1980; Bitner 1990). Also, research in organisational behaviour suggests the physical setting can influence employee productivity, satisfaction, and motivation (Becker, 1981; Davis, 1984; Sundstrom & Sundstrom, 1986; Steele, 1986; Sundstrom & Altman 1989). Additionally, previous studies have analysed the effect of the interior environment on users, including wellness (Ulrich, 1990); well-being (Veitch &

Newsham 2000; Milton, Walters & Glencross 2000; Heschong, Wright & Okura, 2002; Hameed & Amjad, 2009); stress, (Dilani, 2004); motivation (Balcetis & Dunning, 2006), and workplace identity (Bowles, 2007).

Furthermore, there is extent works on designs, but mainly in the area psychology. These studies have looked at psychology and design (Colombo, Laddaga & Antonietti, 2015); impact of design on morale, performance and productivity (Baldry & Barnes, 2012; Al Horr *et. al.*, 2016); the interior's effects on employees' job satisfaction (Cummings & Worley 2005; Varghese & Jayan 2013); acquisition, representation, and use of spatial and non-spatial knowledge in environmental choice (Yalcin, 2017). Others looked at plants in the interior (Xu, 2018); building information models for risk management and architectural designs (Heimonen, Immonen, Kauppinen, Nyman & Junnonen, 2007; Zou, Kiviniemi & Jones, 2016; Abd Hamid, Mohd Taib, Abdul Razak & Embi, 2018) and many others on finishing and decorative elements.

There are few, though important, studies that looked at the building and interior project (as a service and a product) in West Africa and within Ghana. Interior finishings and décor (Shorn & Molokwane, 2003; Boahin, Asubonteng & Gyebi–Agyapong, 2016; Senyasu, 2018); project schedule (Assaf & Al-Hejji, 2006); building maintenance (Cobbinah, 2011); servicescape (Simpeh, Simpeh, Abdul-Nasiru and Amponsah-Tawiah, 2011); health and safety (Yankah, 2012); building sustainability (Iwaro & Mwasha, 2014); service quality supported by the interior (Anabila, Anome & Kumi, 2018), and project success (Kissi, Agyekum, Baiden, Tannor, Asamoah & Andam, 2019). These have been major themes regarding interior and building projects in Ghana.

Risks involved in interior design projects that pose challenges in the Architecture, Engineering and Construction (AEC) industry in Ghana. These issues are normally present in each phase of the project. Identifying and dealing with these risks at the initial and planning stages will reduce any negative impact on cost, standard, time and stakeholder acceptability. Project management (PM) is a vital facet of interior design and vice versa. The knowledge areas for interior designers according to the Interior Design Professional's Body of Knowledge (IDBOK, 2010), consist of several aspects of PM including coordinating the tasks and scheduling. It also looks at program requirements, size and scope with consultants; meetings, visits, on-site observation (Arashpour, Wakefield, Abbasi, Lee, & Minas, 2016) and project accounting (Steyn & Nicolas, 2017).

In as much as most building projects have a continuous cycle for the project management phases, interior designers are important from the initial phase of a project to gather information on what the occupant needs in their space. The function of interior design should be integrated into the architectural design at the project development stage to create suitable interior for users (Kerzner, 2017). Therefore, in the initial stages, the user and how he will perceive the interior; the external environment and how it will influence the interior and the ergonomics of the interior and how they will impact the interior should be considered. Then, focus should be how these factors could impact the user's choice of that particular interior design – client acceptability. More links between project management and interior design were shown in Figure 1, Appendix D.

Statement of the Problem

There are clear aesthetic and ergonomic issues that could possibly affect one's perception of an interior as the interior itself could influence so many parts of daily social and personal lives. The interior designer's duty is to work with the project team including architects and engineers to ensure the plan for the interior does not interfere with other aspects of the building including structural balance and environmental harmony. Thus, delivering a successful project which meet criteria necessary for the individual, the external environment and internal environment as it will impact choice of interior design.

There are gaps in literature with interior project studies especially in Ghanaian literature. These gaps include the use of the three determinants: human factors, environmental factors and cognitive factors on choice of interior design in preference studies or interior project studies; the use of a rigorous statistical analysis in environmental preferences studies; and a lack of this type of study within the study organisation and the importance of the study to workers of the organisations as they spent hours with various interiors of the university. From observation, there are notable interior design concerns within the study organisation. Such concerns range from interior layout and aesthetics warranting this research (see Appendix E). From the images, there are issues of privacy, crowding, movement flow, safety, airflow and lighting. Such situations may result in stress, fatigue, health complications, poor safety situations, risk, discomfort and poor workflow.

Meanwhile, Eco (1980) submits symbolic messages are given by the way work space is arranged and presented to occupants, meaning that the interior itself, the environmental factors affecting the interior and their way of

perceiving the interior will impact their choice of interior design. The choice of interior design within the physical workplace should allow the user to avoid harmful environments and adapt (Ulrich, 1983; Kaplan, 1987), given that, it is built to accommodate and assist their work and social influence (Baldry, 1999). Hence, if users experience high levels of stressors from the interior, the external environment and psychologically, they may want to choose an interior that reduce these stressors (Waroonkun, 2018).

Giving the gaps in research, and observation from the study organisation, there was the need to investigate how the observed potential deficiencies could impact on the user's choice of interior design. It was also necessary to look at how critical issues including ergonomics, cognition and external environment could impact on choice of interior design. Furthermore, it was important to employ a much more rigorous statistical method to analyse how these factors influence choice of interior design.

Purpose of the Study

The purpose of this study is to analyse three significant areas of interior design and how they impact choice of interior design.

Research Objectives

The objectives of the study were to:

1. examine the prevalent issues of human factors within the office design.
2. analyse how cognitive factors influence choice of interior design.
3. assess how environmental factors influence choice of interior design.
4. assess how human factors influence choice of interior design.

Research Question

The study was guided by the following question:

1. What are the prevalent human factor problems within the office designs?

Research Hypotheses

The following research hypotheses were tested in the study:

H1: There is a significant positive relationship between cognitive factors and choice of design.

H2: There is a significant positive relationship between environmental factors and choice of design.

H3: There is a significant positive relationship between human factors and choice of design.

Significance of Study

A number of building projects on the University of Cape Coast (UCC) campus, have been completed and there are some in the process of being built or completed over the next couple of years. The significance of this study is to share the importance of interior design in project management, as well as to convey a need for more professional interior designers within the university and country as a whole. Furthermore, this may encourage more public tertiary institutions to enrol Interior design as a degree and postgraduate course as done by the Takoradi Technical University and Kumasi Technical University. Hopefully, laws and a professional body within the country to be allocated in recognition of the interior design profession. This may help to build on one of the most successful industries in Ghana

Lastly, experts in this field, play an essential part in contributing to the Interior Design Body of Knowledge through research and several practical

interior design projects (Birdsong & Lawlor, 2001; Guerin & Martin, 2001, 2004, 2010; Martin & Guerin, 2006; Dickinson, Anthony, & Marsden, 2009; Dickson & White, 2009; Clemons & Eckman, 2011; Ragan, 2013). Also, a deeper look could be taken into the prevalent issues within the university's interiors for them to be addressed for example through renovation.

This study should also encourage project managers to employ interior designers to enhance construction of interiors according to specifications of their users, creating a suitable and functional space for them.

Delimitations

Delimitations of this study are that it covers the all the main buildings on UCC campus thus giving management, staff and necessary stakeholders an idea on what can be done better. It also closes the gap of research on this area on the university campus. This study will permit findings and results to be general to the study organisation thus opening the gap of research on this area to cover non-academic staff offices, lecture halls, libraries, labs, restaurants/ canteens, storage areas, administrative buildings and even hostels/ halls. It will offer valuable quantitative and qualitative insights which could be applicable across the university.

Limitations

Some limitations include not using certain standards as a measurement since it differs due to stakeholder specifications, location, budget and time. The study combines different professionally known aspects and utilizes information from different corresponding fields of interior design and project management. Thereby, it does not use the typical project management analytic tools.

Definition of Terms

Interior Design

Interior design is the art and science of enhancing the interior of a building to achieve a healthier and more aesthetically pleasing environment for the people using the space.

Project

A temporary event/ endeavour which has a start and an end that leads to a unique product.

Cognitive factors

Features influencing the mental action or process of acquiring knowledge and understanding through thought, experience, and the senses.

Environmental factors

Refers to any external: man-made and ecological factor that influences the individual and interior.

Human factors

The study of how humans behave physically and psychologically in relation to some specific design aspects of a particular environment or product/ service, using perception, reactions and preferences in relation to visual and other sensory stimuli.

Choice of Interior Design

Aspects within the interior and surrounding the interior that that make it aesthetically pleasing, suitable and functional to users.

Organisation of the Study

This study is organised into five chapters according to the School of Graduate Studies Guidelines for preparing and presenting project work, dissertation and thesis, UCC.

Chapter one presented the background to the study, statement of the problem, purpose of the study, research objectives, research question and hypotheses, significance of the study, delimitation, limitation, definition of terms and organisation of the study. Chapter two focused on the literature review including theoretical review, empirical review and conceptual framework. Chapter three covered the research methods including the research philosophy, research design, research approach, study organisation, population, sampling procedure, data collection instrument, data collection procedure, ethical considerations, data processing and analysis. Chapter four presented the quantitative and qualitative results and discussions. Lastly, chapter five focused on summary, conclusions and recommendations of the study and suggestions for further research.

CHAPTER TWO

LITERATURE REVIEW

Introduction

This chapter reviews literature on cognition and choice of interior design, human factors and choice of interior design, and, environmental factors and choice of interior design.

It commenced by looking at the theories behind interior design and psychology which explain choice. This literature review contains summarized research evidence from the fields of project management, architecture, interior design, health and safety, psychology (environmental and interior), sociology and ergonomics.

Theoretical review

Among the theories that explain the choice of design, is the Environmental Preference theory by Kaplan (1987). This theory was chosen because it is appropriate for discussing the relationship between factors influencing choice of design and the user. Finally, a summary of the theories' general arguments, assumptions and how they relate to determinants of interior design and choice of interior were presented.

Environmental Preference Theory

The Environmental Preference Theory (EPT) is grounded on the idea that people differ in their preference for different types of settings (Kaplan, 1987), as individuals express their needs by choosing environments in which they tend to flourish. These choices of settings include involving and pleasing environments instead of boring and plain (Gaines, Bourne, Pearson and Kleinbrink, 2016) and even, beneficial, therapeutic, healthful (Marselle, 2019).

Preferred environments are prone to provide lasting survivability in which humans are more likely to perform effectively (Kaplan & Kaplan, 1982; Zube, Pitt, & Evans, 1983; Ulrich, 1983; Kaplan & Kaplan, 1989; Parsons, Tassinary, Ulrich, Hebl, & Grossman-Alexander, 1998; Beute & de Kort, 2019).

The present study is underpinned by the Environmental Preference Theory as it aims at analysing how human factors, environmental factors and cognitive factors influence the choice of interior design. The proponents of the theory were also of the view that the study of the human–environment experience is intricate, and varied methods may be needed to understand how individuals perceive their environment as it is appropriate to use when studying well-being. The constructs of EPT have been categorised into four.

Firstly, complexity which is the amount of visual information or detail within the environment. Secondly, coherence which refers to features in the environment that help in directing attention to the space, thus organising and understanding the environment. Thirdly, legibility which is defined as a space that has easy wayfinding measures and could be understood or remembered. Lastly, mystery of the internal and external environment which refers to features that encourage interest of that space.

Scott (1993), emphasized that although the EPT focused on landscapes, interior environments are relatively important as they are to respond to basic human needs. The environmental attributes identified in the EPT are also observable in interior spaces. Preference or choice is based on the quality of the physical media conveying aspects of the interior. From this, experts have employed shape, size, density of interior forms, surface texture and pattern, direction, spatial organisation, and so on, and constructs of choice. This concept

helped to build on the variable "Choice of Interior Design" using the elements of design.

Kaplan and Kaplan (1982), contend that information and content from the environment is also important to choice of interior design. Accordingly, choice will be influenced by the information about the interior from the person, information about the interior from the external environment and information given about the interior from the layout of the interior. Moreover, to understand preference, a valuable ingredient is cognition as cognitive attributes may have potential for explaining choice of interior design. Human factors come in when referring the layout of the interior and how suitable it is for the user. Furthermore, from the building blocks of the EPT, there is emphasis on the issue of the external environment which also seeks to emphasise on the design of one's surroundings when selecting a scene. This may explain environmental factors in detail as studies had shown that people prefer environments with pleasant external environments such as beautiful landscapes and safety (Kaplan, 1975, 1983).

Hence, negative environmental stressors on the interior such as poor lighting, noise, extreme heat, risk; poor layout and suitability and stressors on the user, will reduce the chances of that interior being selected. The theory may be applied to the determinants of choice of interior design within the study organisation. The predictors of the EPT help in understanding the three determinants of this study.

Although this study explains why people may choose certain environments over another, it generally looks at the preference factors; coherence, legibility, complexity and mystery, explaining choice. Thus,

possibly failing to explain preference using the different components of the built environment: the interior, the exterior and the person. The predictors of EPT, may however explain cognitive factors, environmental factors and human factors, on choice of interior design.

Empirical Review

The section looks at the works of scholars on the concepts of human factors, environmental factors, cognitive factors and attempts to establish the relationship between these variables and latent variable– choice of interior using some indicators from the previous research. In the study, research on determinants of interior design on choice of interior design were examined from a global standpoint. Upon review of literature, there is no scholarly work in Ghana specifically establishing a relationship between the variables. Majority of studies focused on Europe, Asia, the Americas and on other African countries except Ghana. The ensuing section discussed the findings.

Human Factors and Choice of Interior Design

Having an area of personal territory in the office space, is a significant feature of numerous architectural designs which can reduce the negative impacts of crowding in metropolitan environments (Calhoun, 1947). With this information, researchers have investigated the interior and individual behavioural responses to the interior environment. Ritzman, Bradford and Jacobs (1979) address that depending on the standards and function, office layout problems vary and may be due to competition for the same resources.

Human Factors in Interior Design according to Nielson and Taylor (2010) include Standard clearances, anthropometrics, proxemics and territoriality, and crowding. Human factors fell into the four highest contributors

which confirmed the importance in protecting the welfare of occupants and were therefore selected as variables for this study (IDBOK, 2010).

Human factors (ergonomics) deal with the subject matters of human-technology and environmental relationships that co-exist in self-regulating domains mainly on cognitive, behavioural, and physical sciences (Ahasan, Hassan & Imbeau, 2015). Basically, it involves the interaction of humans and other elements of an object/ system/ environment. In this way, the object/ system or environment's design should be based on the physical and psychological characteristics of its users. Human factors and ergonomics may be an autonomous area since it covers an extensive range of knowledge, skills and experiences.

Ergonomics combines anthropometrics (human body measurement data), physiology, and psychology in response to the needs of the user in the environment. For the purpose of this study, the study focuses on biological factors (body dimensions, capabilities, physiological processes) and physical factors (conditions of the environment; objects – tools, furniture, etc.) within the interior structure. Movement areas within any building interior should be as free as possible of obstacles and should be noticeable depending on the type of space, size, layout and user requirements (Mahmoud, 2017). Henceforth, attention needs to be paid when designing office interiors because of the increase in staff numbers (Vink, Bakker, & Groenesteijn, 2017).

Environmental factors and Choice of Interior Design

Various studies have come out with different descriptive indicators in different settings such as: spatial identity, social including human expectations and requirements, physical (location, climatic) and economic factors

(Proshansky, 1978; Proshansky, Fabian & Kaminoff, 1979, 1983, 1995; Proshansky & Fabian, 1987; Bell, Fisher, & Loomis, 1978; Dickson & White, 1997; Khaslavsky, 1998; Bozdayı, 2004; Knieling & Othengrafen, 2009; Yalçin, 2015; Orchowska, 2017). In this view, Wohlwill and Harris (1980) asserted that there is a complex and broad relationship between aesthetic preference and the existence of man-made features in natural settings.

Levin (1996), in his paper "*Design for multiple indoor environmental factors In Indoor Air*" categorised the indoors as four broad categories: chemical, physical, biological, and psychological. His position was that the design of an indoor environment should lessen sicken, irritation and uneasiness in the user as these symptoms can result from external aspects such as noise, deprivation of privacy, poor lighting, lack of territoriality and other environmental factors. Bluyssen (2013) maintained that the relationships between environmental factors and the interior matter by stating that any intrusion of external and internal stressors may intensely limit any feeling of intimacy, control and safety, thus diminishing psychological and social functions of the interior. Then, badly situated offices could affect physical well-being and health of people (Yakubu, Akaateba & Akanbang, 2014).

The built environment consists of the design of the interior, its surroundings and layout of a space, (Rijnaard, van Hoof, Janssen, Verbeek, Pocornie, Eijkelenboom, Beerens, Molony, & Wouters, 2016; Kort, Duijnstee, Rutten, Henson & van Hoof, 2016; Eijkelenboom, Verbeek, Felix & van Hoof, 2017). Eijkelenboom et al. (2017), agreed that within the built environment, factors that influence perception/ preference and comfort that could be altered by the external environment included look and feel, the outdoors/ landscape,

location, privacy, personal effects, technology. Security is another concern, beginning with the perimeter to the interior, since there could be an unclear breach between the exterior and interior security (Fischer, Halibozek & Walters, 2018). This means that, if users experience high levels of perceived environmental stressors within the interior, they are less likely to choose that interior as a good space (Waroonkun, 2018).

Cognitive Factors and Choice of Interior Design

A major argument is the fact that there is no evidence that fundamental perceptual and cognitive processes vary between cultures (Cole & Scribner, 1974; Kennedy, 1974), thus, these may be the best measures among different cultures or people rather than age, sex and other measures. The quality and complexity of conscious experience change throughout a person's life as affective-cognitive structures are formed (Izard & Buechler, 1980). The views of Altman and Chemers (1980), support this by maintaining that there is a significant influence between cognition and countless aspects of persons' relations with the physical environment. As a result, there is a strong correlation between cognition and choice.

In the view of Perez and Arce (1997), there is an interaction between culture and cognition, where cognition is the mental action or process through which one acquires knowledge and understanding of the objective world through thought, experience, and the senses. Similar findings were reported by Wu (2011). He stated that perceptual/ conscious attention as a process of selecting specific perceptual inputs which leads to attention influencing the way things perceptually appear. Several characteristics of the perceiver can affect the interpretation of what they sense. The major characteristics of the perceiver

influencing perception are: attitudes, motives, interests, expectations and experiences. Cognition is particularly broad, starting from perceptions, automatic thoughts, intermediate beliefs, up to schemas, self-concepts, existential life goals and more generalized concepts (Beck & Haigh, 2014).

Abdelrazik (2015) argues that perception is part of cognition. As a result, choice is usually made due to one's perception of what is aesthetically pleasing, good or bad, due to the individual's experiences, interests and expectations of the interior subsequently creating the concept of "cognitive factors". Önal and Turgut (2017), may help to explain the interaction between the user and interior as their study found that conceptual structures which allow people to store perceptual and conceptual information about his/her lives and interpret these experiences and expressions (cognitive schemas) are important.

It can be deduced that human factors fell under the five abstract knowledge factors in the knowledge areas (Kas) of the IDBOK, including some aspects of Environmental factors. These affect perception on specifications of any interior and could affect the safety and happiness of the occupant. The relationship between these factors sets design for welfare directly on responsible practice of the interior design profession (IDBOK, 2010).

Conceptual Framework

Conceptual frameworks are used to demonstrate and explain the relationships between the variables used in a study. The main variables in this study are the aspects that affect perception of the interior (human factors, cognitive factors and environmental factors) which in turn affect choice of interior design. Determinants that affect perception and choice of the interior are essential to identify in order to reduce any problematic interiors.

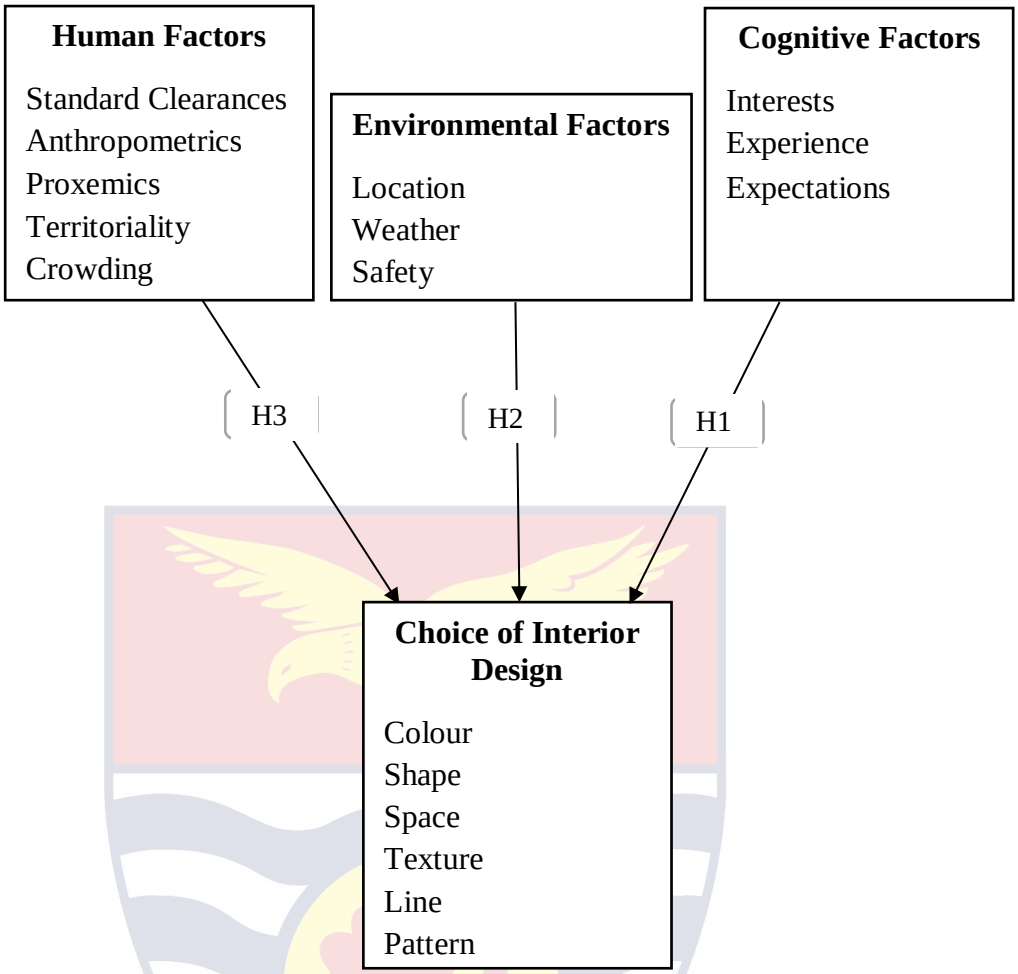


Figure 2: Conceptual Framework (Determinants of choice of interior)
Source: Author's Work, Godwyll (2019)

From Figure 2, it was revealed that all the variables are components of the environment and person. The environment can be broken down into two: the internal– physical, psychological and biological (human-interior interaction) and external environment – man-made and natural (external settings). The person includes cognition (behavioural phenomena concepts of cognition). Fundamentally, from the environment, the concepts of Environmental factors and Human factors were established, whereas from the person, the concept of Cognitive factors. When these components are favourable to the users, it becomes what impacts their choice and the attributes of the interior that contribute to their choice are summarised as the design elements in its

constructive, installation, functional and decorative form. Thus, choice is dependent of the other three variables. Linking this to the theoretical framework, one's preference of their environment is greatly impacted by schemes created cognitively. Environmental and human factors may also affect choice of interior design. A broader summary of these factors were presented in Figure 6, Appendix D.

Operationalisation of Measurement Variables

Human factors (HF)

Based on Nielson and Taylor (2010), human factors were measured using:

Standard clearances: movement flows/ traffic paths within the interior (Panero & Zelnik, 1979).

Anthropometrics: measurement of the human body with disabilities in mind (Panero & Zelnik, 1979).

Proxemics: distances needed by people to communicate in social settings or the way people use space and the way that use is related to culture (Hall, 1966).

Territoriality: a study of proxemics where focus is on how people choose the size of their own space and the need to have one's own space (Hall, 1966).

Crowding: number of people/ objects in a room; less than 8-10 sqm per person in residence (de Lauwe, 1959).

Cognitive factors (CF)

Based on a study by Renninger and Riley (2013), cognitive factors were measured using:

Interests: desire to know or learn about the interior.

Experience: practical contact with and observation of the interior.

Expectation: seeing what one already imagines to see.

Environmental factors (EF)

Based on physical factors affecting construction projects Loosemore (2003), environmental factors were measured using:

Weather: the conditions of the atmosphere at a particular place and time (including wind, sunshine, rain etc.).

Location: a particular geographical area or place the building and interior are situated (e.g. views the users will have from the window, sounds etc.).

Safety: being free from danger whether occupational, ecological, mental, physical and so on.

Choice of Interior Design (CI)

Based on the gestated fundamental principles of aesthetic order in visual design by Graves (1941), choice of interior design factors were measured using:

Colour: the property of an object where it is visually perceived as a result of the way it reflects or emits light.

Space: and two-dimensional or three-dimensional area which is open or closed.

Shape/ Form: a two- or three-dimensional element defined by other elements of design.

Texture: a replication of three-dimensional surfaces through various drawing and media techniques to be experienced by touch or vision.

Line: a point in motion, with only one dimension – length and has both a position and a direction in space. The variables of line are: size, shape, direction/ pattern, position. Points create lines, lines create shapes or planes and volume.

Pattern: a repeating part of shape or form.

Chapter Summary

This chapter presented a summary of reviewed literature on theoretical, empirical and conceptual basis relating to the independent variables – human factors, environmental factors, cognitive factors, and the dependent variable – choice of interior design. This section has further implications of the methodology, analyses, findings, discussions, conclusions and recommendations which follow in the subsequent chapters.

CHAPTER THREE

RESEARCH METHODS

Introduction

This chapter presents the research methods of the study, justifying its fitness for the study's objectives (Boohene, 2006). Primary data was collected with the help of semi-structured questionnaires and interviews using a semi-structured interview guide. It further discussed the strengths, weaknesses of the chosen methods. Academic from the various schools/ colleges were sampled for both surveys. Interview was conducted with two members from the project management committee of the Directorate of Physical Development and Estate Management (DPDEM) at the University of Cape Coast. This section covers population, study organisation, the instrument design, pre-test, validity testing, reliability testing, reactivity testing, ethics, field work, and data analyses.

Research Philosophy

The study adopted the pragmatist approach to research. This is because the philosophy enables one to focus on the 'what' and 'how' of the research problem, as it places "the research problem" as central and applies all approaches to understanding the problem (Creswell, 2003). The philosophy supports the use of mixed research methods. The study sought to analyse the components affecting perception in respect to selecting interior design.

Research Design

The explanatory sequential method included the questionnaire administration, followed by individual interviews with officers from the Directorate of Physical Development & Estate Management (DPDEM). Plano (2011) explains explanatory sequential design entails collecting quantitative

data first, and then collecting qualitative data to support explanation of quantitative results or for elaboration. This is because the quantitative data and results provide a broad picture of the research problem. Thus, more analysis, specifically through qualitative data collection is necessary to enhance the general picture.

In this design, quantitative data was first collected and analysed. Hereafter, qualitative data was collected and analysed to aid in explaining the initial quantitative results, building on the first phase. The two phases were analysed at different times and were connected in the intermediate stage in the study. Although the quantitative data collection is more important, the qualitative results help in explaining and interpreting the findings of a quantitative study (Creswell, 2003). To do this, the researcher identified specific quantitative results that need additional explanation and then designed a short qualitative study based on the quantitative results. The sample for the qualitative were smaller and the participants were different.

Conferring to the researcher's inquiries, there were no empirical models for the related studies in UCC that discuss the determinants of choice of interior design. As based on the thesis' concept, human factors, environmental factors, cognitive factors and choice of interior design, were measured using variables prescribed by the interior design body of knowledge, empirical reviews and experts.

Research Approach

The mixed methods is an approach for gathering, analysing, and incorporating both quantitative and qualitative data at a particular stage of the research process within a single study in order to obtain clarity on the research problem (Tashakkori & Teddlie 2003; Creswell 2005). According to Creswell, Ivankova and Stick (2006), since neither qualitative nor quantitative methods are insufficient on their own, mixing both kinds of data within a study captures the trends and details of a circumstance. Thus, a combination of the two methods complement and strengthen each other allowing for a more robust analysis (Green, Caracelli & Graham; 1989; Miles & Huberman 1994; Green& Caracelli 1997; Tashakkori & Teddlie 1998).

This study begins with a quantitative approach which examined the determinants of choice of interior design. After questionnaires were delivered and collected, the analyses of the data arising from the survey and findings are identified. This quantitative analysis, was based on data retrieved from the respondents using questionnaires (Hancock, 1998).

The qualitative analysis includes data collection techniques such as observation, case studies, interview guides and reviews of literature (Yates 2014). Qualitative analysis comprises of the researcher gathering data based on results from the quantitative survey, through personal interviews with project management committee personnel. Subsequently this data collection method is time consuming, hence, data is collected from a smaller number. The project management committee members were interviewed to ascertain the extent of observations and to find out in greater detail the underlying cause(s) of these observations to add richness to the data (Hancock, 1998).

One of the advantages of the qualitative survey is that it is straightforward. Also, it allows for exploration of the quantitative results in more detail since there were some unexpected results from a quantitative study (Morse, 1991; Ivankova, Creswell & Stick, 2005). Some disadvantages are that this design may be lengthy and the need to have availability of resources to collect and analyse both types of data. (Creswell, Goodchild & Turner 1996; Green & Caracelli 1997; Creswell 2003, 2005; Moghaddam, Walker & Harre 2003).

Study Organisation

The study organisation is the University of Cape Coast. Academic staff included were from: College of Agriculture and Natural Sciences, College of Health and Allied Sciences, College of Humanities and Legal Studies, College of Distance Education and College of Education Studies.

The University may require more academic staff, hence the need for accommodation with regards to office spaces. Many of the office blocks were built over fifty years ago with the oldest being completed in 1962 and the newest, completed in 2012 and 2015. While some buildings were made specifically for offices, the lack of space had caused the university to change corridors, lecture halls and other unused spaces into offices. Due to this, quite a number of academic staff may share small office spaces, whereas others have enough room for themselves and teaching staff and guests. Also, colleges do not always have a specific building hence most of the buildings are communal blocks and offices are also not always arranged according to department/ faculty.

For example, College A share their building with College B. Department A and Department B have offices in three different locations with Department C having offices in two different buildings at different distances. School A's building does not host Departments D and E which are under it. College C has buildings on the two different campuses. In 2018 alone, the number of staff (academic and non-academic) increased to 1400. For full-time academic staff, the number of males were 580, while females were 134 (Directorate of Human Resources, UCC). Working hours for most academic staff are from 6:30am to 7:30pm on Monday till Fridays as they spend time within various interiors in the University.

Population

The target population of the study consisted of all full-time academic staff in the University of Cape Coast numbering about 714 as of 2018/ 2019 academic year (Directorate of Human Resources, UCC). For the second phase, the target population included construction project management team members from the Directorate of Physical Development & Estate Management (DPDEM).

Sample Size and Sampling Procedure

Sample size was determined using the Krejcie and Morgan (1970) sample size determination table to calculate the minimum sample size. Using this table, the minimum sample size required was 242. The simple random sampling was used because relative to others, it is easily understood, provides equal chances for each member of the population to be targeted and the sample results could be projected to the target population.

Further information was needed from the results provided during the first stage of the study. Through purposive sampling, two officers from the development office were selected to gather more information since they had prior knowledge in the area of study.

Data Collection Instrument

The instrument was developed by the researcher purposely for this study, hence, warranting a pilot test. The questionnaire was used to collect data on occupants' choice of interior design with their office spaces. Questionnaires provide privacy and convenience for respondents during completion, guarantees greater uniformity, consistency, anonymity, and objectivity in data collected (Neelankavil, 2007; Saldana 2009).

Structure of the questionnaires were made up of five sections. The first section (Section A), presented background information (gender, current rank, office layout, office space description, college and if the building is disabled-friendly) containing 6 questions. Section B, Section C, Section D and Section E comprised of a table with eight items each. These sections presented the following: Human factors, Cognitive factors, Environmental factors and Choice of Interior Design. Items on the questionnaire totalled thirty-eight in number, comprising of some open-ended questions (in the background information section) and mainly close ended questions. All other sections were made up of eight closed ended questions each which, according to Becker and Watts (1999), save time spent in completing, coding and analysing questionnaires, and guarantees accurate, one-dimensional, exhaustive and mutually exclusive responses.

Rating-scale questions were employed in measuring all variables from Section B to Section E, using a continuous scale of 1 (*least agreement*) to 7 (*highest agreement*). A scale, according to Yates (2014) is a measurement instrument that associates qualitative constructs with quantitative metric units. Rating scales including Likert-like scales and other attitude and option measures containing either five or seven response categories, are the most reliable, easy to construct and most widely used scale in measuring people's attitudes, options and beliefs (Shaw & Wright, 1967; Peter, 1979; Bearden, Netmeyer & Mobley, 1993; Yates, 2014). Cox (1980), deduced that the ideal number of item alternatives seemed to be centered on seven, with some situations needing as few as five or as many as nine. Fundamentally, the argument was that an odd number of alternatives allows for a neutral response, were preferable.

Research validates that data from Likert-like items becomes significantly less accurate when the number of scale points are below five or above seven (Johns, 2010). Scaling is achieved by ensuring variation in high-scoring and low-scoring individual responses on each of the items selected for inclusion in the index (Scheuren, 2004). The questionnaire was focused on the variables of the survey, which were adapted from literature reviewed based on the objectives of the study. This included: Human factors (HF), Environmental factors (EF), Cognitive factors (CF) and Choice of interior (CI). These were measured using a ratio scale.

The advantages of using questionnaires are that they are cost effective, fast to deploy and can contain a good range of indicators derived from the literature on nationally or internationally accepted standards. For the purposes

of this study, items found in this data instrument were developed to provide measures for the different variables.

Interviews involved the asking why, who, what and how of the results from the questionnaire, done in a semi-structured form, to capture specific data and ensure in-depth questioning. The information for this qualitative study guide was obtained from questionnaires handed to respondents, the interviewer's personal observations of the interiors. The interviews were used as confirmatory study. Qualitative surveys were reported and analysed using a narrative to obtain better understanding of the social world and the assembling of data (Bruner, 1986; Denzin, 1989; Geertz, 1975; Riessman, 1993; Rosenweld & Ochburg, 1992). Thus, the use of narrative analysis in the study creates story rather than account better interpretation (Rabinow & Sullivan, 1979).

A narrative is a form of analysis whereby researchers interpret stories that are told within the context of research and/or are disclosed in everyday life (Allen, 2017). It may have two interconnecting scopes (Lieblich, Tuval-Mashiach & Zilber, 1998). The first dimension involves the unit of analysis and whether this is a particular type of event/ experience or the narrative as a whole. The second is between analytical approaches that are concerned with the content of a story/narrative and those that focus on the way it is structured (its form). The focus of the narrative for this study is on the setting, actions and the language used (Gilbert, 2008).

Validity testing

The validity of researcher's questionnaires and interview questions are tested and confirmed by expert input (from the university architect), standards from the IDBOK and literature. Three aspects were followed to improve the

validity of interviews (Maurer, 1994): the interviewers used situational and study-related questions, interviews/ questionnaires were semi-structured and carried out by the researcher and the questions measured the criteria for the validation of the study.

Reliability

Reliability of a scale gives an indication of how free it is from random error (Pallant, 2013) or the extent to which the scale produces consistent results if repeated measures are taken (Kent, 2007). Two of the commonly used indicators for scales reliability are indicator reliability, and internal consistency (Tabachnick & Fidell, 2007). Hulland (1999) theorises that 0.70 or higher is preferred unless in an exploratory research where 0.4 or higher is acceptable. Reliability of interview questions and answers are a significant part of data collection. Reliability was assured by the use of semi-structured questionnaires, semi-structured interviews, writing down the interviews on paper and person-to-person interviews.

In this case, reliability of the items was tested using Reliability Analysis in SPSS using the Cronbach alpha. The reliability analysis revealed a Cronbach's alpha of 0.957 for all the question items (thirty-two items). For HF, the Cronbach's alpha was 0.906; for CF 0.89; for EF 0.789 and for CI 0.910.

Reactivity Testing

Reactivity for qualitative ethnographic studies, also known as the observer effect, takes place when the act of doing the research changes the behaviour of participants, thereby making the findings of the research subject to error (Given, 2008). Reactivity of the interviews is confirmed by the

following: the researcher was not disruptive but respectful during observations and interviews, and, showed interest in respondents' activity and answers.

Ethical considerations

Several ethical issues were taken into consideration. The introductory paragraph of the questionnaire contained a clause, assuring respondents that their input will remain confidential. All interviews and observations were done with the respondents' knowledge and in confidentiality. Permission was sought from and granted by each department. Permission was sought personally from all respondents who were approached, while only interested persons received questionnaires to fill in. The researcher did not use any names of persons and offices, making use of the expressions "respondent A" or "office A" or "department A" to ensure strict confidentiality during the analysis of the data.

These were some of the procedures observed to ensure that the researcher and the study followed and implemented the accepted ethical standards and practices, respecting participants' discretion.

Pilot Test

A pilot test was undertaken in December, 2019 as a prelude to the main study. Pilot tests were done using respondents from the Faculty of Interior Architecture, Takoradi Technical University and others from the Cape Coast Technical University. These locations seemed appropriate due to their proximity to the main study area and also shared similarities with academic staff in the main study area. Also, since these universities are technical universities, input and corrections from academic staff of interior design or any form of décor were necessary. Groat and Wang (2002) specified in a study that one way to

ensure that a questionnaire is of high accuracy is to conduct a content validity test using experts in the fields of design, research, and survey administration.

Pretesting took place between 11th December and 22nd December, 2018. All the questionnaires were returned between the 23rd and 24th of December, from the respective organisations. Data imputation was affected from the 25th to the 29th of December, 2018. Analysis and necessary corrections were made from the 8th to 9th of January, 2019. There was a response rate of 100%, with all 20 questionnaires answered. Pilot tests were conducted in order to assess time, feasibility, test contingencies, and improve upon the study design before the main study (Whitehead, Julious, Cooper & Campbell, 2016). The results from the pilot test were to ensure that instruction, questions and scale items were clear, that potential respondents understood and were be able to respond appropriately, and, helped to identify and eliminate any questions or items that may upset potential respondents.

After analysing the responses, it showed that respondents understood all questions and thus had no challenges completing the questionnaire. After changing four constructs under background information, two constructs human factors, one should have been removed from environmental factor but was left in case change in sample size, changed the weight of this item. To conclude, the final instrument was ready to be administered during the main survey.

Data Collection Procedure

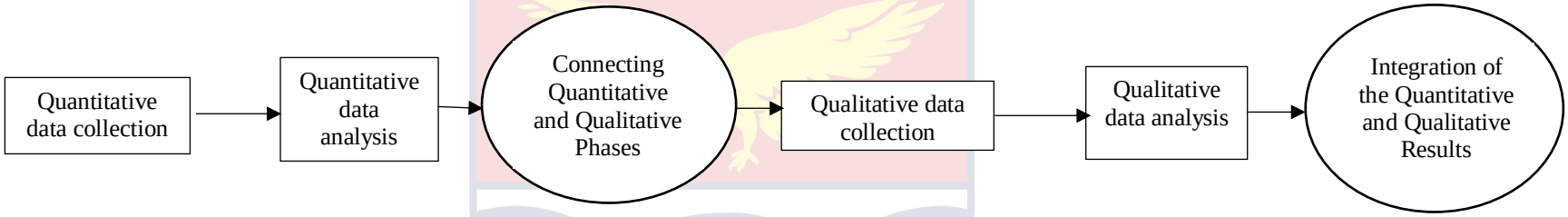
The questionnaires were administered to academic staff in the University of Cape Coast from the 14th of January, 2019 to 12th April, 2019, between 8am and 5pm daily (sometimes, excluding Fridays because some academic staff are not available on those days). The researcher, personally

delivered copies of the questionnaire to 70% of the participants and collected them within four months, while 30% of questionnaires were given to academic staff by other academic staff and administrators. Due to a mandatory leave at the time of data collection some employees were not on campus and could not be traced to respond to the questionnaire.

The minimum sample size was 242, 182 were retrieved and after sorting, only 175 were used for analysis leading to about a 72% response rate. This response rate was an adequate representation of the sample (Rea & Parker, 2014) and therefore the results of the study may be used to make inferences about the general population.

Since the some of the questionnaires were personally administered, it was very necessary to directly observe the respondents and their office spaces, to get a clearer understanding of what they could not express on questionnaires. Finally, the interviews took place on 15th April, 2019 with the Estates officer and on 16th April, 2019, with the Maintenance officer. A summary of the data collection methods is shown in Table 1.

Table 1: Summary of Data Collection Methods

Phases						
						
Procedure	Cross-sectional survey (n = 175)	**SPSS software v.22** • Data screening • Factor analysis • Frequencies • Kendall's coefficient **SMART PLS software 3** • Consistent algorithm • Bootstrapping Consistent Blindfolding	• Purposefully selecting 2 participants from the Development Office from expert advise • Developing interview Questions	• Narrative analysis • Individual in-depth interviews with 2 participants • Reviewing documents (MEB reports) • Elicitation materials	•Analysis • Narrative	• Interpretation and explanation of the quantitative and qualitative results
Product	Numeric data	• Descriptive statistics, missing data, Factor loadings, ranking • VIFs, R squared, Discriminant reliability, T-stats, STDEV.	• Respondents (n= 2) Interview protocol	• Text data (interview transcripts, documents, office description) Image data (photographs)	•Codes Similar categories	• Discussion • Implications • Future research

Source: Adapted from Ivankova, Creswell and Stick (2005)

Data Processing and Analysis

Since the data type is mainly primary, the data sources included responses from users of the facilities, two members of the university's development office and observation from the facility sites. The unit of analysis was the academic staffs' offices. Received questionnaires were sorted, those that were incomplete or poorly answered were removed. The researcher also had to print extra questionnaires to make up for misplaced or unanswered ones, giving them to different respondents for oversampling.

Responses were analysed using Statistical Package for Social Sciences (SPSS 23) and SMART-PLS data packages. Objective 1 was analysed quantitatively in SPSS using descriptive statistics. The Kendall Coefficient was used rather than sample mean ranking to reduce biases and emphasize the most prevalent issues. Objectives 2, 3 and 4 were analysed using inferential statistics in SMART PLS, for the assessment of the reliability and validity of the measurement and the structural models.

Qualitatively, results from the quantitative study were analysed and explained to two project management personnel and their responses were analysed using a narrative from interview questions of who, what, why, when and how (see Appendix B). Personal interviews involved notes, direct observation (covert and overt), and pictures (see Appendix E). Qualitative insights from respondents during the second survey helped to explain the results of the first phase. It involves: links between statements, general perceptions of respondents and researcher, repeated phrases (from respondents) and tables/ diagrams.

SMART-PLS

SEM (structural equation modelling) is a blend of two statistical methods: factor analysis and path analysis (Ullman, 2001; Agyapong & Obro-Adibo, 2013) and Partial Least Square (PLS), which approximates parameters for the measurement and structural models. Partial Least Squares influences the analysis model (i.e. structural inner model) by examining the association between latent variables. PLS path models consist of three components: the structural model, the measurement model and the weighting 80 scheme.

Structural equation models (SEM) are very popular in many disciplines especially in the social sciences (Hair, Risher, Sarstedt & Ringle, 2019). SEM could be a CFA (Confirmatory Factor Analysis) and multiple regression because SEM is more of a confirmatory technique, but it also can be used for exploratory purposes (Schreiber, Nora, Stage, King & Barlow, 2006). According to Sarwoko, Surachman, and Hadiwidjojo (2013), SEM is two-part n nature. Firstly, the measurement of the part that relates the observed variable with latent variable through confirmatory factor analysis. Secondly, the structural part, which then establishes the relationship between the latent variables with regression simultaneously (Ghozali, 2005; Agyapong & Obro-Adibo, 2013). Thus, SEM examines effects among the variables.

Chapter Summary

Despite the effort put into the chapter, there are many limitations realised during execution and after completion. The benefits of this data collection method was that firstly, it made use of mixed methods approach thus collecting relevant data through questionnaires and buttressed by responses from interviews.

One weakness of this method is that, most Interior Design studies and surveys done are qualitative, hence most questions may have needed more in-depth answers. Majority of preference theories have used a 5-point Likert scale also using variables of the preference theory and attention restoration theories as measures or using pictures. However, there was a need to use a more rigorous method. Another weakness of mixed methods is that answers may be affected by researcher's presence, respondents' moods, hurriedness and so forth. Another could be personal values, professional experience and attitudes that may lead to bias, difficulty in data analysis and interpretation of qualitative data. Also, some respondents did not return the questionnaires, returned it incomplete or had misplaced their copy. Most of the time was spent, going back to respondents to remind them to fill the questionnaires and giving extra copies.

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

The preceding chapter presented the methodology employed for the study. Chapter Four however, presents the data collected, summarized, organized and analysed according to the objectives and research questions of the study. It begins with an analysis of the background data of respondents and then follows with the analysis of responses to the research questions.

Descriptive statistics such as frequencies and percentages were used to analyse the background characteristics of the respondents and their work environments, while ranking was used to analyse a research objective. Finally, the remainder of the research objectives were tested through inferential analyses by assessing the direction, strength and level of significance. In all, questionnaires were administered to the sample size with only 175 respondents providing usable data for the study. This was considered adequate for analysing and interpreting the data since this 72% represented the population. Interviews with two project management team members as well as qualitative data gathered while distributing the questionnaires are reported and analysed.

Quantitative Survey

Background Characteristics of Respondents and Work Environments

The background characteristics and work environment of the respondents studied included sex, rank, office layout, office space description, College and whether or not their office building is disabled-friendly. Other characteristics were whether the respondents have held other position and if they have additional responsibility. In order to put the study into context, these

demographic characteristics were studied to serve as the basis for differentiation with regard to the phenomena being studied. The background characteristics data is captured in Table 2.

Table 2: Background Characteristics of Respondents and Work Environments

Background Characteristics	Frequency	Percent
Sex		
Male	143	81.7
Female	32	18.3
Total	**175**	**100**
Rank		
Assistant lecturer	48	27.4
Lecturer	66	37.7
Senior lecturer	41	23.4
Associate professor	13	7.4
Professor	6	3.4
Other	1	.6
Total	**175**	**100**
Office layout		
Open space	3	1.7
Private office	70	40.0
Team/group cluster	56	32.0
Cubicle	35	20.0
Other	11	6.3
Total	**175**	**100**

Table 2, continued

Office space description		
Old	83	47.4
Renovated	54	30.9
New	34	19.4
Other	4	2.3
Total	**175**	**100**
College		
College of Agriculture and Natural Sciences	44	25.1
College of Health and Allied Sciences	56	32.0
College of Humanities and Legal Studies	50	28.6
College of Distance Education	8	4.6
College of Education Studies	11	6.3
Total	**175**	**100**
Disabled friendly		
Yes	56	32.0
No	119	68.0
Total	**175**	**100**

Source: Field survey, Godwyll (2019)

From Table 2, majority of the respondents, 81.7 percent, were males and 18.3 percent were females. This confers with the report from the Directorate of Human Resources, UCC as the percentage of male full-time academic staff was 81.2% and to female full-time academic staff, 18.7%. It also agrees with the views of Prah (2011), where he stated in his study that since the 1960s, academic staff in Ghanaian universities had more males than females. An analysis of respondents' positions shows that out of the 175 respondents, 48 of the respondents work as assistant lecturers; 66 as lecturers; 41 as senior lecturers; 13 as associate professors; six as professors and one stated "other" as their rank in the University.

In addition, Table 2 presents that three respondents described their office layout as an open space, 70 said they have private offices, 56 share and office or table as a team/group cluster, 35 stated that their offices are cubicles while out of 11, 9 stated that their office layout was shared, 1 specified "share office with one other lecturer", the last stated "unsure". Also, 83 respondents described that their office spaces as old, 54 noted that their offices were renovated over the years, 34 indicated that their offices were new. Out of the 4 who chose other, one described his office space a dilapidated, the other stated "very old", while the last two stated "unsure."

Majority (33.5%) of the respondents were from the College of Health and Allied Sciences, 28% from College of Humanities and Legal Studies, 24.7% from College of Agriculture and Natural Sciences, while 6% affirmed that they were from the College of Education Studies. The final 4.4% were from the College of Distance Education. Thirty-three percent of the respondents stated that their office buildings were disable friendly while a majority (65.4%) held a contrary view, as the remaining 1.1% did not specify as captured in Table 2.

Analysis of the Objectives

The objectives were analysed quantitatively using two tools: SPSS and SmartPLS. The first objective was analysed by ranking, while the last three objectives were analysed using SEM. Results were displayed using tables and figures. The interviews with the project management team members were analysed using a narrative and the results were discussed.

Ranking Analysis

The purpose of the first objective was to determine which of the human factor issues are most prevalent within the academic staff offices. The human

factor variables of anthropometrics, proxemics, territoriality, standard clearances and crowding, are ranked as shown in Table 3 and Table 5 (see Appendix C). The respondents were required to indicate the extent to which they agreed with the statements relating to human factors within the interior. Each indicator for this variable were analysed into means using Kendall's coefficient of concordance, all indicators with means below the midpoint indicate that it is not very prevalent, while those above the midpoint indicate high levels of prevalence. Table 4, Appendix C, displayed a summary of sample statistics.

Table 3 shows the prevalent human factor issues with academic staff offices on the University of Cape Coast campus. In the table, a significant number of respondents agreed that crowding was a problem with the mean of 5.58. This indicated that crowding of their offices were due to too many people within the space was prevalent but not due to too many objects. Standard clearances ranked second with a mean of 5.27 which could be due to crowding because there may not be enough walking space where there are many people seated or with poor arrangement of space.

Table 4, summarised the data for ranking showing that the mean answer of the 175 respondents was 4.07. The ranking of human factors using Kendall's coefficient was significant (0.000<0.05). Kendall's W of 0.149 explains that there was a low pattern of agreement amid respondents, and in essence, their responses may be regarded as random.

Table 5: Ranking of most prevalent human factor issues within the interiors

Rank	Code	Mean Rank	Human Factor Variables
1	HF2	5.27	Standard clearance
2	HF6; HF7	5.145	Crowding
3	HF5	4.83	Proxemics
4	HF1; HF3; HF4	3.95	Anthropometrics
5	HF8	3.75	Territoriality

Source: Field survey, Godwyll (2019)

In Table 5, after constructing the aggregated human factors from each variable, standard clearances is ranked the highest as the most dominant with an average of 5.27. This implies that most respondents agreed that this is the most important problem within their interior. The human factor that ranked second is crowding (with a combined average of 5.15) while proxemics ranked third at 4.83 territoriality ranked third. With the mean answer being 4.07, this indicates that these three variables were the most prevalent within the offices while anthropometrics and territoriality were not.

Thus, a deduction is made that movement flows within the office spaces is the first focus that the project management team should tackle and solve when preparing for renovations. Other issues like crowding of humans and objects; distances needed by people to communicate in social settings, the suitability of the interior using measurement of the human body and disabilities will be solved once the initial matter is addressed, and, territoriality.

Since most of the buildings within the university are old, these issues are to be expected as it confers with the findings of Ritzman, Bradford & Jacobs (1979). The authors stated that assigning offices to faculty and staff within older buildings may be difficult, since the building structure could limit flexibility for

renovations. Also, the quality of interior design, maintenance, poor layouts, overcrowded offices affect physical well-being and health of people (Yakubu, Akaateba & Akanbang, 2014). This agrees with Vink, Bakker and Groenesteijn (2017), that attention should be given to ergonomic designs of office interiors because of the increase in knowledge workers. The findings of Mahmoud (2017), finalize these results. He stated that the designs of interior architectural accessibility and circulation differ according to space layout, size, type, and user requirements, hence all circulation features within any space or building should be as free as possible of obstructions and easily distinguishable.

Test of the Theoretical Model

A further investigation of the hypothesised relationship between the independent and dependent variables of the study and their constructs, as the indicators were considered to be caused by the latent variable. An initial analysis was done and items measuring the variables (human factors, environmental factors, cognitive factors on choice of interior design), that loaded poorly were removed. Constructs that met the SEM criteria were maintained in the model. Based on theory and findings from the study, the research questions were tested by assessing the direction, level and strength of significance of the path coefficient estimated by PLS. The reflective model is shown in Figure 3.

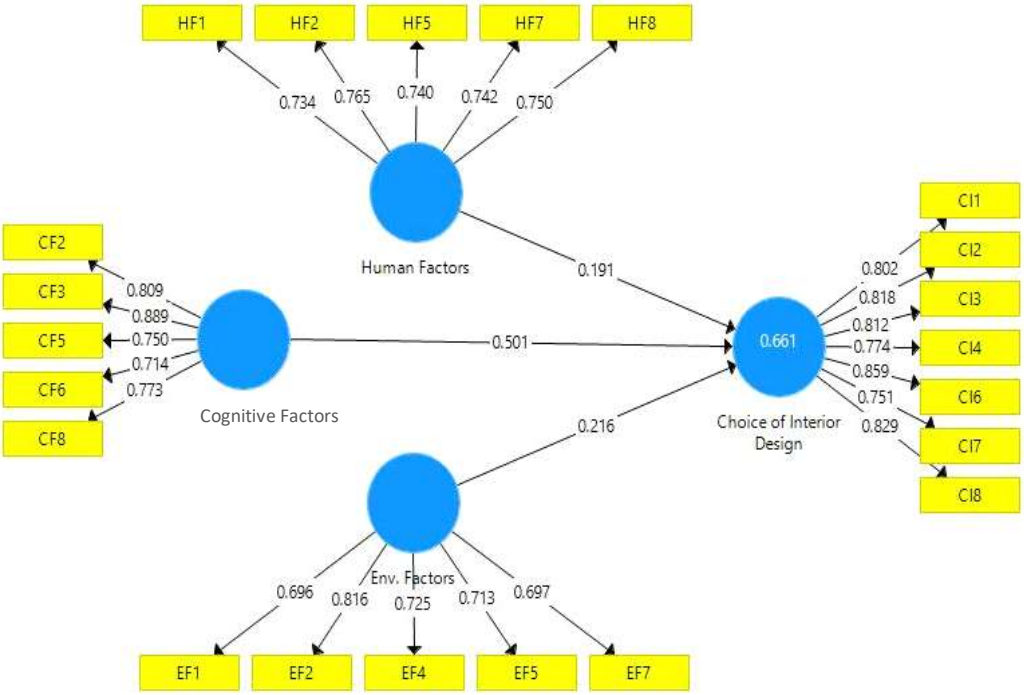


Figure 3: Test of the research model (PLS, n=175)
Source: Field survey, Godwyll (2019)

The results from Figure 3 shows that the coefficient of determination, R^2, is 0.661 for the Choice of Interior Design (CI) endogenous latent variable. This means that the three latent variables – Human Factors (HF), Cognitive Factors (CF), and Environmental Factors (EF) explain 66.1% of the variance in model.

Likewise, the numbers on the arrow (the path coefficients) describe how strong the effect of one variable is on another variable while the weight of different path coefficients enables us to rank their relative statistical importance. Therefore, the inner model suggests that the relationship between Choice of Interior Design and Cognitive Factors was moderate (0.501), but low for Environmental Factors (0.216) and Human Factors (0.191). Firstly, the hypothesized path relationship between Cognitive Factors and Choice of Interior Design is positive and statistically significant. Secondly, the hypothesized path relationship between Environmental Factors and Choice of

Interior Design is statistically significant. Thirdly, the hypothesized path relationship between Factors and Choice of Interior Design is statistically significant since its standardized path coefficient (0.191). As the number of observations or samples are less than 1000 (Wong, 2013), we can conclude that all the factors are moderate predictors of Choice of Interior Design.

Measurement Model

If the indicators are highly correlated (CI-CF: 0.771; CI-EF: 0.678; CI-HF: 0.672; EF-CF: 0.661; EF-HF: 0.681) and interchangeable, they are reflective and the results from the Structural Equation Modelling (SEM) conform to various validity and reliability checks such as construct validity, which was assessed using the convergent and discriminant validity tests before relying on the model (Haenlein & Kaplan, 2004; Hair et al., 2013).

Reliability

Individual factor reliability can be evaluated by observing the loadings of each factor on their corresponding latent constructs as Wong (2013) proposed. If there is a greater shared variance between the construct and its measures than the error variance, the loadings higher. To retain factors for newly developed items, the factor loading for every item should exceed 0.5 but for established items, the factor loading for every item should be 0.6 or higher (Hair, Anderson, Babin & Black, 2010). The factor loadings from the PLS measurements can be observed in Figure 3 and Table 6. Thus, all the constructs of each variable correctly measured the human factors, environmental factors, cognitive factors and choice of interior design.

The coefficients of the constructs ranged from 0.696 to 0.889 as suggested by Hair et al (2010). This measure is preferred over Cronbach's alpha

because it offers a better estimate of variance shared by the respective indicators (Wong, 2013; Hair et al., 2014).

The range of acceptable values for Cronbach's α is from 0.700 to 0.950 (DeVellis, 2003). Moreover, Hair et al. (2014) recommended a composite reliability threshold of 0.7 is acceptable for this study. The factor loadings, composite reliability, Cronbach's alpha, and Average Variance Extracted (AVE) values calculated by PLS algorithms are presented in Table 6.

Table 6: Factor loadings, Items, Cronbach's alpha, composite reliability and AVE

	Item	Factor loadings	Cronbach alpha	Composite reliability	AVE
HF			0.803	0.863	0.557
HF1	Anthropometrics	0.734			
HF2	Std. clearances	0.765			
HF5	Proxemics	0.740			
HF7	Crowding	0.742			
HF8	Territoriality	0.750			
EF			0.781	0.851	0.534
EF1	Location	0.696			
EF2	Location	0.816			
EF4	Safety	0.725			
EF5	Weather	0.713			
EF7	Safety	0.697			
CF			0.847	0.891	0.622
CF2	Interest	0.809			
CF3	Experience	0.889			
CF5	Interest	0.750			
CF6	Expectation	0.714			
CF8	Experience	0.773			

Table 6, continued

CI			0.911	0.929	0.651
CI1	Space	0.802			
CI2	Shape	0.818			
CI3	Pattern/ Line	0.812			
CI4	Texture	0.774			
CI6	All	0.859			
CI7	Colour	0.751			
CI8	All	0.829			

Source: Field survey, Godwyll (2019)

Convergent Validity

According to Hair et al. (2006) convergent validity is the degree to which items measuring the same concept are in agreement, thus, a good convergent validity requires that any item forming one construct shares a high proportion of variance in common. A simple measure of convergent validity is higher inter-item correlation between the items of a scale greater than 0.50 while higher measures of convergent validity are average variance explained and factor loadings (Hair et al. 2006). Results indicated that the variance extracted ranged from 0.534 to 0.651 (see Table 7 above) which meets the convergent validity criteria as indicated by Wong (2013). Since the findings revealed that all construct reliability values exceeded the 0.50 threshold level of acceptability, therefore, the scale used possessed convergent validity.

Discriminant Validity

Discriminant validity is the degree to which any single construct is different from the other constructs in the model (Hassan *et al.*, 2012). Discriminant validity was measured using Fornell and Larcker criterion in which the pair-wise correlations between factors obtained were compared with

the variance extracted estimates for the constructs making up each possible pair as the 'square root' of the AVE of each latent variable should be greater than the correlations among the latent variables (Wong, 2013).

The Discriminate validity is adequate when constructs have an AVE loading greater than 0.5 meaning that at least 50% of measurement variance was captured by the construct. The diagonal elements are the square root of the AVE score for each construct (human factors, environmental factors, cognitive factors and choice of interior). Discriminant validity is established when there is low correlation between two scales (Tabachnick & Fidell, 2007). The results presented in Table 7 shows adequate discriminant validity since the items load well.

Table 7: Results Summary for Reflective Outer Models

	HF	EF	CF	CI
Human Factors **(HF)**	**0.746**			
Environmental Factors **(EF)**	0.681	**0.731**		
Cognitive Factors **(CF)**	0.665	0.661	**0.789**	
Choice of Interior **(CI)**	0.672	0.678	0.771	**0.807**

Source: Field survey, Godwyll (2019)

Structural Equation Model Analysis

In Partial Least Squares (PLS), the structural modelling and objectives were tested by computing path coefficients. There are two parts in a PLS path model: a measurement model/ outer model relating the observable variables to their own latent variables and a structural model/inner model relating some endogenous latent variables to other latent variables (Tenenhaus et al., 2005). The quality of the structural model for each endogenous variable can be measured using the capacity of the model to predict its observable variables from the indirectly connected latent variables; also known as the Redundancy

index (Chantelin, Vinzi & Tenenhaus, 2002). VIFs are less than 5 between 1.399 and 3.739. According to Hair, Hult, Ringle and Sarstedt, (2017), a bootstrapping procedure using 5000 sub samples is performed to evaluate the statistical significance of each path coefficient. Table 8 shows hypothesized path coefficients along with their bootstrap values, 'T' values.

Table 8: Path coefficients along with their bootstrap values, 'T' values

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	ρ Values
Cognitive Factors -> Choice of Interior Design	0.501	0.503	0.074	6.737	0.000
Environmental Factors -> Choice of Interior Design	0.216	0.218	0.068	3.198	0.001
Human Factors -> Choice of Interior Design	0.191	0.190	0.078	2.455	0.014

Source: Field survey, Godwyll (2019)

Cognitive factors on Choice of Interior Design

Objective 2 was to analyse how cognitive factors influence choice of interior design. It was observed in Table 8 and Figure 3, that the relationship between cognitive factors and choice of interior design was significant and positive with ($\beta = 0.501$, $t = 6.737$), at $\rho < 0.05$. This indicates that cognitive factors have direct positive significant influence on choice of interior design. Thus, it evidently shows that a 100-point change in cognitive factors will bring about a 50.1-point change in the user's choice of interior design. Referring to the hypotheses:

$H1_0$: There is no significant positive relationship between cognitive factors and choice of design.

$H1_1$: There is a significant positive relationship between cognitive factors and choice of design.

The null hypothesis is rejected ($\rho < 0.05$).

The finding is backed by the views of Altman and Chemers (1980). They maintain that cognition indisputably significantly influences infinite aspects of individuals' relationship with the physical surrounding and as a result in a strong correlation between cognition and choice. Another major argument is derived from the fact that there is no indication that vital perceptual and cognitive processes vary between cultures (Cole & Scribner, 1974; Kennedy, 1974). A study by Önal and Turgut (2017), may explain the interaction between the user and interior through cognitive schemas are important. These schemas are conceptual structures which allow people to store perceptual and conceptual information about his/her lives and interpret these experiences and expressions. This concerns the individual, situations, events/ sequences of events and objects.

Environmental factors and Choice of Interior Design

Objective 3 was to analyse the relationship between environmental factors and choice of interior design. The results in Table 8 show that the relationship between environmental factors and choice of interior design was positive and significant with ($\beta = 0.216$, $t = 3.198$), at $\rho < 0.05$. Thus, environmental factors change in direct proportion to choice of interior design with a coefficient of 0.216. This clearly indicates that a 100-point change in

environmental factors will only bring about a 21.6-point change in choice of interior design. This does not support the null hypothesis, thus

$H2_0$: There is no significant positive relationship between environmental factors and choice of design.

$H2_1$: There is a significant positive relationship between environmental factors and choice of design.

The null hypothesis is rejected ($\rho < 0.05$).

The finding is not consistent with the views put forward by Wohlwill and Harris (1980) that there is no simple general relationship between aesthetic preference and the presence or extent of man-made features in natural settings. On the contrary, it supports the position of Bluyssen (2013). The author maintained that the relationships between environmental factors and the interior matter by stating that any intrusion of external factors or stressors (indoor stressors) strongly limits this feeling of safety, intimacy, and control, thereby reducing the mental and social function of the interior. This means that, if users experience high levels of perceived environmental stressors within the interior, they are less likely to choose that interior as a good space (Waroonkun, 2018).

Human factors and Choice of Interior Design

Lastly, objective 4 was to assess how human factors influence choice of interior design and the results are presented in Table 8. The results show that the relationship between human factors and choice of interior design was significant with ($\beta = 0.191$, $t = 2.455$), at $\rho < 0.05$. This indicates that human factors have direct positive significant influence, on choice of interior design. Therefore, a 100-point change in human factors within the interior will bring about a 19.1-point change in the user's choice of interior design.

$H3_0$: There is no significant positive relationship between human factors and choice of design.

$H3_1$: There is a significant positive relationship between human factors and choice of design.

Therefore, the null hypothesis rejected.

The finding is consistent with the assertion of Janestius (2016) that deciding what environment is preferable is a difficult task for designers as they have to consider various human aspects in the designing process. Similarly, Ritzman, Bradford and Jacobs (1979) stated that remodelling spaces, concerning the size, air conditioning, proximity to departmental offices, and other prerequisites may be complicated by interests. Physical characteristics of the office may influence perceived crowding of the interior (Stokols, 1972; Schiffenbauer, Brown, Shulack & Zanzola, 1977). Furthermore, social interaction and privacy may be regulated through both psychological and environmental coping processes (Altman, 1975; Archea, 1977; Evans, Lepore & Schroeder, 1996).

The beauty of the interior should meet traditional subjects proposed in philosophy of art, aesthetics of the everyday living, as well as environmental aesthetics (Fisher, 2016). Ultimately, achieving to set up an interior design entails an actively creating designs that fulfil the user psychologically, thereby meeting the preferences, needs, values, and satisfactions of the occupant. The designs of interior architectural accessibility and circulation vary according to space type, size, layout and user requirements (Mahmoud, 2017). Von Castell, Hecht and Oberfeld (2018) also stated that the perception of interior space and the clearance between head and ceiling is relevant for daily living.

Qualitative Survey

Semi-structured Interviews

The main qualitative study took place on two different days at the Development office, first, at the Estates office and secondly, at the Maintenance office. Each interview did not take more than 20 minutes. The findings from the semi-structured interviews were analysed using a narrative.

Perceptions of Interior Design in the University

Interior design within the university was for functional efficiency. The purpose of interior design, was to provide a workspace in which users should have all the necessary equipment and furniture for their work. For these participants, the university may lack stylish interiors with decorative elements but interior design is important once people are going to spend time that space. The University is in need of space for more academic staff as the number of students increase and there seems to be an urgency to make use of available spaces.

"Academic staff and workers should definitely have a nice comfortable place to work and rest although it isn't always the case. I think the interiors within University are simple and functional." (Officer 1).

"I don't think we have any specific style of interiors. If we do, I do not know what it is. The offices don't have a lot of décor but they are usable spaces. We just need a place to work." (Officer 2).

Per observation and information received, designs within the university are done using the university's colours: shades of white, blue, cream and red. Walls are usually painted in cream and white, while partitions may be in dark reddish-brown wood or painted. Window frames are in grey or blue and doors

are also clear, white, grey or with blue frames. Some older offices were painted in pink, green and other shades of cream.

Role of Respondents

The duty of the development office collectively was to see to planning, construction, repairs and maintenance of various things on campus. It includes the new School of Business building plan and execution as well as the new administrative block, Fire service, Goil filling station, road signs and traffic lights on campus, landscaping, office interiors, plumbing, electricals and so on. The estates office mainly deals with assets management such as door labels, name plates, embossment of assets, furniture and equipment, road signs and all that. Moreover, for most of the obstacles discussed, the Estates officer was clear that he was not the best person to speak to when it came to the physical structures as his duty was limited.

"…these questions will be best answered by the maintenance officer, you should go and see him." (Officer 1).

The Maintenance officer's role was to see to repairs and upkeep of building structures including lecturers' bungalows, the schools, administrative blocks, staff offices and parts of the building.

Processes and Stakeholders Involved

Significantly, it emerged that when a building project is proposed, the project team meets with the stakeholder(s). The architects in the project office creates the building plan and interior plan and the main architect oversees or revises the plans when necessary. Sometimes, someone from the development office will go to the site to supervise the work. When the buildings are

completed, the departments have the opportunity to furnish and finish the interiors using resources from the development office and the department.

"Most of the departments do not consult us when it comes to designing and decorating the interior. This is why some small offices have large desks taking up space. Some departments state cost as the reason for not using our recommended furniture even though the dimensions for furniture in certain spaces are specified. The university colours of cream and white are the basic colours for the interior walls. Older buildings with partitioning were done in dark brown wood and walls painted most in white. The flooring and ceiling all depend on funds of the department and choice of the stakeholders." (Officer 1).

In this case, both respondents inferred that decorating is left to the departments if you want more information on their processes, so the administrators and HoDs oversee the type of furniture and décor within the offices of their departments. When there are maintenance problems like structural damages, the lecturer would have to fill a Maintenance of Existing Buildings forms (MEB) which we have given to the administrators of each department. Problems with the interior may be reported to the Faculty Officer or Administrator (See Figure 4, Appendix D). When the MEB forms are filled, the administrator of that department sends the forms to the Estates office, where it is then endorsed and filtered for the Estates office or Maintenance office. Thus, there were multiple stakeholders who interact at different levels.

There are two sections on the MEB Request Forms. The first part includes: Date, From, Bungalow/ Flat/ House No, To (Maintenance section; Grounds & Gardens, Electricity section; Sanitary section; Estate section and Refrigeration & Air-condition section) and large section for Description of

Work Required. The second part is filled by the Works Branch or personnel from the development office. It includes: To, Details of Work Done, a breakdown of costs of Materials and Labour, Date of Completion and Signature for three officials.

Given this, reports received by the Maintenance office are sorted, afterward, the site is inspected and worked on. A technician is then sent to view the facility, afterwards, depending on the type or severity of the damage they either repair the fault or discuss it with the unit to outsource the repair to private personnel. After repairs are done, another form should be filled by the HOD or unit concerned to report that the work has been done and they are satisfied.

Furthermore, the documents reviewed, documents proved that few of these issues had been reported (see Table 9, Appendix C). At the beginning of the January till April, 2019, there were 95 complaints which included broken chairs, faulty doors, leaking pipes and ceilings, broken desks, repainting, door labels, request for shelves, damaged roof and ceiling change, burglar proofing and net changes from only nine departments. This made up only 16.8% of the reported problems in 2019. Academic staff reports of problems within their interior also made up only 18.97% and 15.5% of the MEB reports in 2017 and 2018 receptively.

The Estates and Management officers both revealed that some these limits could be due to the unwillingness of the academic staff to go for the MEB request forms to write down the problem, and send it to the office. Or it may be attributable to failure of the administrators to relay the MEB reports to the Development office. Their statement was backed by the documents. Thus, there could be a communication problem along the project communication levels (see

Figure 4, Appendix D). They also stated that some of these problems could be solved by the user or the department but could be indisposed because the office is not personal property as one could easily be relocated.

Challenges regarding Processes

The respondents were clear and consistent about some of the main setbacks they encounter.

"We only have three offices and about eight officers on the campus. One at Old site, then at Science and then one near the ECG office before the Kwaprow junction." (Officer 2).

Although MEB reports are meant to be relayed to the administrator or faculty officer, the respondents acknowledged that they had met some staff who have made verbal complaints to them, "but when I tell them are told to write it down, they never do. I think sometimes the admins do not send MEBs." (Officer 1).

"I also think that some little fixtures could be done by academic staff or departments but due to budgets, departments hardly make those changes. Definitely, people may not improve their interior because it is not their own. Some feel that after improving their office, they may be moved from there for someone else to occupy it hence refuse to modify their interiors." (Officer 1).

Discussion

The data from questionnaires, respondents of different facilities and the two project management team members, gave valuable input which was analysed. The data was discussed using the research objectives and literature.

Cognitive factors and Choice of Interior Design

According to Kaplan and Kaplan, (1982), everyone differs in preference due to cognition and the choice of interior design should allow the user to avoid harmful environments and adapt (Ulrich, 1983; Kaplan, 1987). Thus, using the variables of the study: interests, experiences and expectations, it is evident that choice is controlled by these. In the quantitative data, there was a positive significant relationship between cognitive factors and choice of interior design. This is explained by the things observed by the researcher, answers from some statements made by the project management team members.

Thus, responses indicated that the academic-staff were interested in their interior and expected it to be aesthetically pleasing to have a good experience of that space. One of the project management team members' response explains the varying states of the academic staff offices. He claimed that although it is the duty of the development office to resolve these problems, some of the little damages or dislikes could be solved by the users.

"it is not their personal property, that is why some people don't want to fix things. But I understand. Some are afraid that when they fix things and make the office look nice, they might be relocated and their office could be given to someone else, especially of a higher rank." (Officer 2).

Environmental Factors and Choice of Interior Design

Environmental factors such as location, weather and safety were evidently important variables from the results of the interviews from the sample. Although significant, it had only a 21.6% change in choice of interior design.

Documents from the Development office showed that a few of these problems had been reported (see Table 9, Appendix C). The Estates and

Management officers both mentioned that some of these could be unwillingness of the academic staff to go for the MEB forms to write down the problem and send it to the office or failure of the administrators to relay the MEB reports to the Development office. Thus, the officer was right when he said that "there is definitely a communication problem" (see Figure 4, Appendix D). They also stated that some of these problems could be solved by the user or the department but could be reluctant because the office is not personal property as one could easily be relocated.

Human Factors and Choice of Interior

According to the quantitative analysis, human factors bring about a 19.1% change in the user's choice of interior design. The interior is built to host the various people who come through but most important to suit the occupant(s). Thus, interior ergonomics such as standard clearances, crowding, proxemics, anthropometrics and territoriality are vital. Objective 1 established the most prevalent issues within the office interiors as standard clearances, crowding and proxemics. Office spaces came in different sizes as some of the offices as the spaces was small and could not accommodate additional persons or the extra furniture that were situated in the offices but others were large enough.

When it came to crowding, some offices that were crowded with people and others had too many equipment/ items/ objects in the interior. Literature informs us that those who have less than 8-10 sqm per person in residences, space crowding exists and illness, stress are rampant people who have more than 14 sqm per person, have lesser stress experience (Levy & Herzog, 1974). It was learned that offices are designated temporarily, sometimes depending on ranks. Thus, there was hardly any form of territoriality within the academic staff

offices which explains it ranking last. This is confirmed by the reports from Estates and Maintenance offices.

".. departments do not consult us when it comes to designing and decorating the interior…not using our recommended furniture even though the dimensions for furniture in certain spaces are specified." (Officer 1).

The word disabled seemed trigger that thoughts of wheel-chairs as many claimed that disabled person in a wheel-chair could not easily access this interior. This was the notion for the smaller offices (from the first floors and above) in old buildings, whereas those in the newer buildings were sure that the disabled could access their offices when the lift was running.

Implications of the Determinants of Choice of Interior Design on Project Management Constraints

The variables and findings of the study have implications on the internal and external project environment. By applying the findings to the constraints of PM (Barnes, 1969), project success within the study organisation may be assumed. Alarcón, Grillo, Freire & Diethelm (2001) have argued that the iron triangle (time, quality and cost) is not adequate for continuous improvement since it is ineffective in identifying the causes of productivity and quality risks. The iron triangle moreover, is becoming obsolete as changes have been made in regards to constraints of project success (Al-Tmeemy, Abdul-Rahman, & Harun, 2011; Ngacho & Das, 2014; Todorović, Petrović, Mihić, Obradović, & Bushuyev, 2015, Ofori-Kuragu, Baiden, & Badu, 2016). For the purpose of this study, the objectives and findings were linked to the quadruple constraints of time, cost, quality and client acceptability (Al-Tmeemy *et al*., 2011).

Drawing on literature, considering the occupants needs (Hendy, 2011) is the most important thing when it comes to interior design because cognition highly influences choice. Once the client is not satisfied, there might be a need to review time, cost and quality. Cost is involved in creating an interior to the user's preference especially if they have high expectations for their interior design. This including remodelling, adding furniture etc, which may end up as an expensive to the user, department or university. Time is needed by both the project team and client to take down ideas and create different plans and models for the new interior (see Exhibit K, Appendix E).

Users who are very interested and willing to experience the design and décor processes, may pay a lot of money for good work, spend money to know the progress via phone calls or trips (Ribeiro, Paiva, Varajao, & Dominguez, 2013). Thus, the execution phase may involve the academic staff either temporarily using another office or taking some days off so that the office can be renovated. It may also affect their work schedule as they have to settle into a new place or be absent for work. This may call for scheduling reviews and renovation plans, provision of criteria for award of contract for any construction project management team to include an interior designer, audits and meetings.

Human factors, environmental factors and cognitive factors influencing the choice of interior has a ripple effect on the quadruple constraints. This is because with regards to cognition, the perception of the user as the client, determines if the project was considered successful or not (Ghanbaripour, Langston & Yousefi, 2017). Human factors explain the setup of the interior, presence and absence of certain things such as cabinets, chairs, curtains, fans and so on. The office layout affects the number of objects and people within the

space, type of equipment and furniture, ease of use, ease of movement and how they interact within the space. Poor arrangement of the interior leads to discomfort and difficulty in moving around, possible injury, high stress levels, unhappiness, poor health and so on. Due to this, one may either like or dislike that interior.

Environmental factors explain external things that cannot be completely controlled by the user. This includes the location of their office, weather conditions and security. Where theft could occur, there may be a need to hired more security personnel, change locks and doors, use burglar-proofing on windows/ doors, add security cameras to corridors, pay for workmanship, employ security operators. Location and weather can come with good or bad views, peaceful or relatively noisy offices, dust/ pollen, good or bad lighting, and good or bad airflow. Choice for such environments impact the constraints.

The negative impacts of human factors and environmental factors may be considered as risk factors (Ghanbaripour, *et. al*., 2017), since they lead to different outcomes in terms of delivery success or failure (e.g. leakages, damage to personal property, health implications etc.). They could prolong the schedule thus increasing cost, reduce quality thus increasing time need to improve on any issue with quality or increase cost to ensure quality.

Regarding the university's interiors, it may seem that there are a number of failed projects when there is an analysis on client acceptability, quality, impact on the customer, impact on the team, occupational and direct success, and preparation for the future (Johnson, 2006; Shenhar & Dvir, 2007). Communication is so important to project success as it is the foundation of project management (Kerzner, 2018). Between the staff (stakeholders) and

project management team, it seemed to be a problem as most of the issues observed and explained were unknown by the project team.

The movement of written data from the user to the administrator to the Development office could lead to loss of data. Likewise, imputation of written data from forms into an Excel spreadsheet. Mudler, Galyen, Hauner and Munzer (2018), indicate that electronic communication is the most effective communication method. Whichever the communication method, the end-product should be tailored for the customer to meet his needs (Pacagnella, da Silva, Pacifico, Ignacio and da Silva, 2019).

Chapter Summary

This chapter has summarised, organised, analysed and discussed the data collected, in accordance with the objectives and research questions of the study. It analysed the background data of respondents and the analysis of responses to the research questions and semi-structured interviews. The analysis indicated direct positive significant relationships between the independent variables and choice of interior design. Additionally, links were created between the factors through the interviews and discussions although they were not objectives of the study but proved significant in a supplementary analysis (see Figure 5, Appendix D). Other links were made between the variables of the study in relation to the quadruple constraints of project management.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter presents a summary of the research process and major findings from this study. It then draws deductions, leading to recommendations for policies and practice. Suggestions are also made for further research.

Summary

The study organisation was the University of Cape Coast where the researcher conducted a survey in order to observe the factors influencing design on choice of interior design. After reviewing theoretical, empirical and conceptual literature on these determinants, a significant relationship between the variables of the study were established. The study was conducted in the University of Cape Coast to examine the prevalent issues of human factors within the office design. There was then an analysis on how cognitive factors influence choice of interior design, furthermore an assessment on how environmental factors influence choice of interior design and finally assessed how human factors influence choice of interior design.

The survey design was explanatory sequential design. The population for this study comprised academic staff of the University of Cape Coast. Simple random sampling was used and a total number of 175 respondents participated in the study. These are made up of instructors of all categories grouped into five ranks, namely; assistant lecturer, lecturer, senior lecturer, associate professor, professor, and an option for other ranks. They had different offices layouts, mostly private offices, team/ group cluster, cubicles and others. Questionnaires were pretested at the Cape Coast Technical University and Takoradi Technical

University because they shared similarities with academic staff UCC. These questionnaires were modified and used to collect data for the study. The composite factor reliability coefficients of the constructs ranged from 0.851 to 0.929, a Cronbach alpha for the means of all four variables 0.901, and were correlated with figures ranging from 0.661-0.771. The items were administered by the researcher with help from administrators and other academic staff. The research instruments were designed with the assistance of the supervisor and experts.

The background information from the respondents, and first objective was coded, presented and analysed using SPSS while the focal data were analysed using SmartPLS. The results were then presented in tables and figures for discussion, consequently aiding in answering the specific research objectives. Semi-structured interviews with estates and maintenance officers were also narrated.

Main Findings

The study revealed that there were significant relationships between each factor to the dependent variable. The three factors accounted for 66.1% of the variance in choice of interior design, thereby indicating that 33.9% of other unknown factors may account for variance in the model. Firstly, it showed that the most prevalent human factor issues within the offices are with the movement flows, crowding and proxemics. Secondly, there is a positive significant relationship between human factors and choice of interior design. This indicates that human factors influence choice of interior design as it was apparent from comments of the project management team who claimed that due to lack of

space, there may be overcrowding in the office. Also, due to lack of consultation, there are offices with unsuitable furniture.

The study again determined that the relationship between environmental factors and choice of interior design was positive and significant. Finally, the relationship between the University of Cape Coast's full-time academic employees' cognitive factors and choice of interior design was significant. From the interviews, it was proved that cognition highly influence on choice of interior design as well. However, using the summary of the MEB reports, it seems as though quite a number of academic-staff are unaware of the structures put in place to formally solve problems with their office interiors. Therefore, communication levels among the stakeholders may be in need of improvement.

In conclusion, the results of the study explain the links between the variables of the study and the Environmental Preference Theory. Therefore, the is an established relationship between cognitive factors, human factors and environmental factors.

Conclusions

Choices made about the type of design one perceives as suitable and functional largely depend on interior design factors. These factors play a key role in attracting and maintaining employees, keeping them safe and healthy and ensuring that they are able to work effectively and efficiently. As a result, the following conclusions are drawn.

First of all, the layout of an employee's office does influence their choice of interior design. This implies that if the employees are given a physically suitable and functional office space with the necessary furniture, there is a greater the possibility of them choosing that interior. Poor arrangement and

crowding of the interior leads to discomfort and difficulty in moving around, possible injury, high stress levels, unhappiness, poor health and so on. This causes some occupants to either avoid the space or doing less work there. When possible, there are staff who make personal changes but just repositioning the items in the office, adding decorative elements like paintings, plants and pictures, changing the flooring or paint, buying new furniture or bringing their own furniture from home. Thus, the constructs of EPT (coherence, legibility, mystery and complexity) within the interior are important. However, interior layout may have a low impact or no effect at all on the choice of interior design for certain individual.

Furthermore, an office space with harmful conditions from the environmental factors, is less likely to be chosen as a good space. However, some have adapted to these conditions and they do not affect the user's preference. Thus, implying that location, the weather and safety do not really influence most users' choice of interior design where urgency for space and lack of options. However, EPT suggests that outdoor aesthetics of the location also encourage choice for that interior. In spite of this, after familiarising one's self with a particular environment, one would find ways to reduce the impact of unwanted environmental stressors affecting their interior. This explains the low magnitude of environmental factors on choice of interior design. There are other unknown factors that account for variance in choice of interior design part from the three dependent variables of this study.

Evidence from the theory and results present that cognition is significant in preferences for particular environments. This means that the more the user's interest, expectations and experience within that interior, the more their desire

to choose that interior. Interest encourages the individual to or prevents the person from making changes. Additionally, as both observation and analysis revealed certain issues within academic staff offices, documentation showed that a number of these problems had not been reported. This explained a problem along the communication lines, thus accounting for the existing problems that could be solved. This is crucial because the time, cost, quality, client acceptability and project communication management are relevant for project success.

Recommendations

On the basis of the findings and the conclusions drawn from the study, the researcher recommends that management and decision makers ought to attempt to review each office (according to a schedule), in order to learn what conditions employees are in and help where necessary. Practically, relocating some occupants and equipment will improve movement flows and reduce crowding. Enhancing the interiors through renovation may help to retain and restore health and safety of employees mentally and physically. Coherently, management should be able to employ a qualified interior designer in the project team, for renovation purposes taking into consideration, the occupants' input (for example see Exhibit K, Appendix E). It may also be beneficial to some of the university's departments if management enforced consultation with the architect or interior designer for approved furniture for the offices.

Evidently, there is a need to employ more staff in the Development Office, including estates and maintenance officers as the officers stated that they were few. From example, there could be one DPDEM representative for each department. The University also needs a more efficient way to report issues

within the interior seeing that communication between academic staff and development office workers is poor. Management may allow for the creation of online google forms, where links will be automatically put in the staffs' academic mail drive. It may help staff to send MEB (Maintenance of Existing Buildings) Request Forms to the Estates office to avoid the cumbersome work of writing letters or filling forms which may be forgotten or misplaced.

Suggestions for further research

This study sets the ground for future studies on interior design in other tertiary institutions, living spaces, office spaces and in Ghana. It is suggested that the relationship among the other factors/ components of this study and other variables affecting perception and choice of interior design, that is, what is viewed as suitable and functional for the occupant, should also be examined (see Figure 5, Appendix D). Since the three dependent variables accounted for 66.1% of the variance in choice of interior design, research could be done to discover the variables that account for the other 33.9% in variance choice of interior design. Cognitive factors/ personal preference may also be used as a mediating factor. The environmental preference theory and its constructs may also be used in interior design project studies. Accordingly providing in-depth explanation concerning the roles of the elements to consider when designing an interior to enhance users' likelihood to choose that type of design.

Furthermore, a replication of this study on a longitudinal basis will make known trends within the variables in the West African context as a result, enriching the quality of recommendations made to public and private institutions within Ghana. The role of familiarity in affecting preferences could also be researched. This study may be replicated using only a qualitative method

whereas for further studies on campus, researchers may speak to Heads of Departments, administrators or faculty officers for in-depth evidence. Studies employing the Environmental Preference theory may focus on the three components of this study – the person, interior and external environment. This covers recommendations for future theory, methods and practices.

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APPENDICES

APPENDIX A

University of Cape Coast
College of Humanities and Legal Studies
School of Business
Department of Marketing and Supply Chain Management

Contacts: +233507144962
+233559909715

QUESTIONNAIRE

Dear Sir/Madam,

I am Kezia-Beryl Godwyll, a Master's student carrying out a survey on the topic **"Determinants of Choice of Interior Design by Academic Staff of the University of Cape Coast."** Interior design is an important aspect of our daily lives, having the ability to arouse positive or negative emotions in an individual. One's perception of the interior is controlled by many elements including cognition, the external environment, design factors (in this context human factors) etc. Using a mixed method which describes the situation in the setting, this study aims to look at the suitability and functionality of the office spaces within the university.

The outcome of this research will result in information for practice, thus, disclosing the vital role of interior designers in project management especially in the construction industries. It will also result in policy formulation in the University of Cape Coast and other organisations in Ghana.

Your input is necessary and will remain confidential. Hopefully, this should not take more than fifteen minutes of your time. Thank you for participating in the study.

SECTION A

BACKGROUND INFORMATION

1. Sex

(a) Male [ ] (b) Female [ ]

2. Please appropriately indicate your current rank

(a) Assistant lecturer [ ] (b) Lecturer [ ] (c) Senior lecturer [ ]
(d) Associate professor [ ] (e) Professor [ ] (f) Other (please specify)……..

3. Please appropriately indicate your type of office layout

(a) Open space [ ] (b) Private office [ ] (c) Team/group cluster [ ]
(d) Cubicle [ ] (e) Other (please specify)……

4. Office space description

(a) Old [ ] (b) Renovated [ ] (c) New [ ] (d) Other (please specify)……

5. Please specify your College……..……...

6. Indicate if your office building is disabled-friendly

(a) Yes [ ] (b) No [ ]

SECTION B

To what extent do you agree with the following statements?

Where: 1 – Least agreement to 7 – Highest Agreement

	Human Factors	1	2	3	4	5	6	7
HF1	The nature of the interior is as if it was designed precisely for me							
HF2	Moving around the interior is easy							
HF3	The furniture is good							
HF4	A disabled person can easily access this interior							
HF5	There is enough space between the next person and I							
HF6	There are not too many people in the office space (not overcrowded)							
HF7	There are not too many equipment/ items/ objects in the interior							
HF8	I can easily choose my own space							

SECTION C

To what extent do you agree with the following statements?

Where: 1 – Least agreement to 7 – Highest Agreement

	Cognitive Factors	1	2	3	4	5	6	7
CF1	I am very aware of the design and décor within this interior							
CF2	I am fascinated by what my interior looks like							
CF3	The interior is well done							
CF4	I had high expectations for this interior when I was coming here							

CF5	I like the furniture in my interior							
CF6	I picked the furniture I liked the most							
CF7	I added my personal style of my personal space							
CF8	There is no need to change the appearance of the interior							

SECTION D

To what extent do you agree with the following statements?

Where: 1 – Least agreement to 7 – Highest Agreement

	Environmental Factors	**1**	**2**	**3**	**4**	**5**	**6**	**7**
EF1	The quality of air is good							
EF2	I have no physical discomforts in my interior							
EF3	Noise levels are not high							
EF4	I do not feel the need to hide some things when I get inside							
EF5	The nature of the interior is not affected by the weather							
EF6	The windows and doors contribute to lighting in this space							
EF7	There are no cracks in the building (structure ceiling, walls, floors)							
EF8	Burglar proofing and/ cameras are not necessary							

SECTION E

To what extent do you agree with the following statements?

Where: 1 – Least agreement to 7 – Highest Agreement

	Choice of Interior	1	2	3	4	5	6	7
CI1	I am satisfied with the finishing of the interior (windows, doors, ceiling, flooring, painting)							
CI2	The combination of furniture, that is, materials, shapes and style are harmonious							
CI3	There are uniformed patterns in the interior (symbols, shapes, natural)							
CI4	Variety of texture is available within the interior (rough-knitted fabric, smooth- glass, metal)							
CI5	There is enough natural and artificial light							
CI6	The décor is very decent							
CI7	The wall colour(s) in this particular space is/ are satisfactory							
CI8	The space is very functional							

Thank you.

APPENDIX B

Interview Guide for researcher

1	Please briefly tell me something about your role in UCC
2	What does interior design mean to you?
3	Why do we need to look at interior design in the institution?
4	What are the types of designs within the university?
5	What examples can you give of good designs within the university?
6	What examples can you give of bad designs within the university?
7	What are the processes involved in designing and decorating the interiors?
8	Who are those involved in designing and decorating the interiors?
9	What functions do they play?
10	What barriers are there with design, renovation and maintenance?
11	How will these issues be solved?

APPENDIX C

Table 3: Prevalent human factor issues within academic staff offices

Code	Question	Mean Rank
HF1	The nature of the interior is as if it was designed precisely for me	3.28
HF2	Moving around the interior is easy	5.27
HF3	The furniture is good	5.06
HF4	A disabled person can easily access this interior	3.51
HF5	There is enough space between my neighbour and I	4.83
HF6	There are not too many people in the interior	5.58
HF7	There are not too many things in the interior	4.71
HF8	I can easily choose my own space	3.75

Field survey, Godwyll (2019)

Table 4: Preference statistics for sample

M	N	Min	Max	SD	Var	Sig. Value	**Kendall's W**
4.07	175	1	7	1.325	1.716	0.000	**0.149**

Source: Field survey, Godwyll (2019)

Table 9: MEB Requests 2017-2019

Month	2017	2018	2019
January	34	36	27
February	25	21	33
March	38	25	35
April	42	34	–
May	20	35	
June	27	30	
July	16	23	
August	28	20	
September	23	21	
October	37	29	
November	30	28	
December	12	14	
Total from all University buildings:	**332**	**316**	**95**
Actual total from academic staff offices:	**63 (18.97%)**	**49 (15.5%)**	**16 (16.8%)**

Source: Maintenance Office, University of Cape Coast (2019)

APPENDIX D

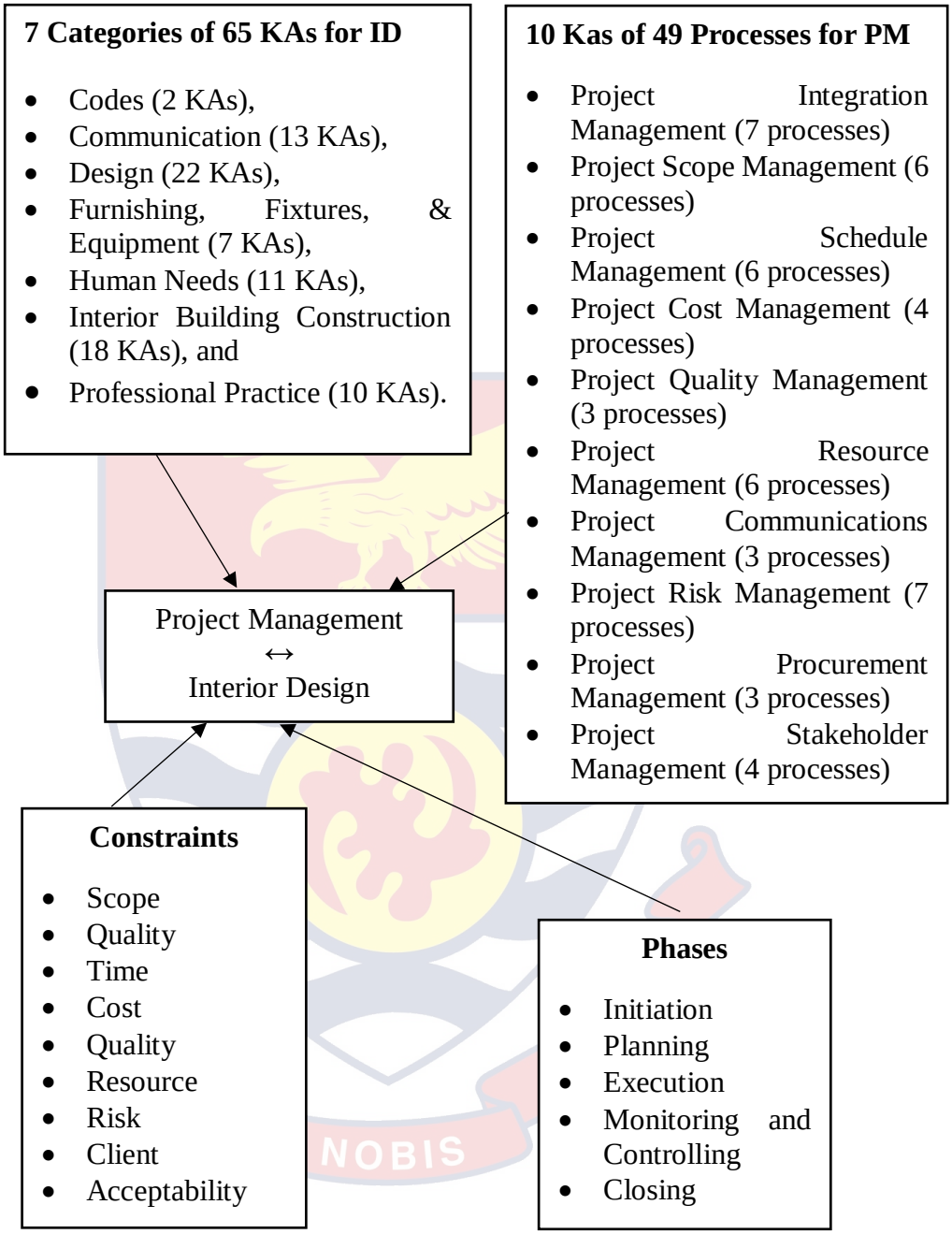


Figure 1: Links between project management and interior design
Sources: (IDBOK, 2010 and PMBOK, 2017)

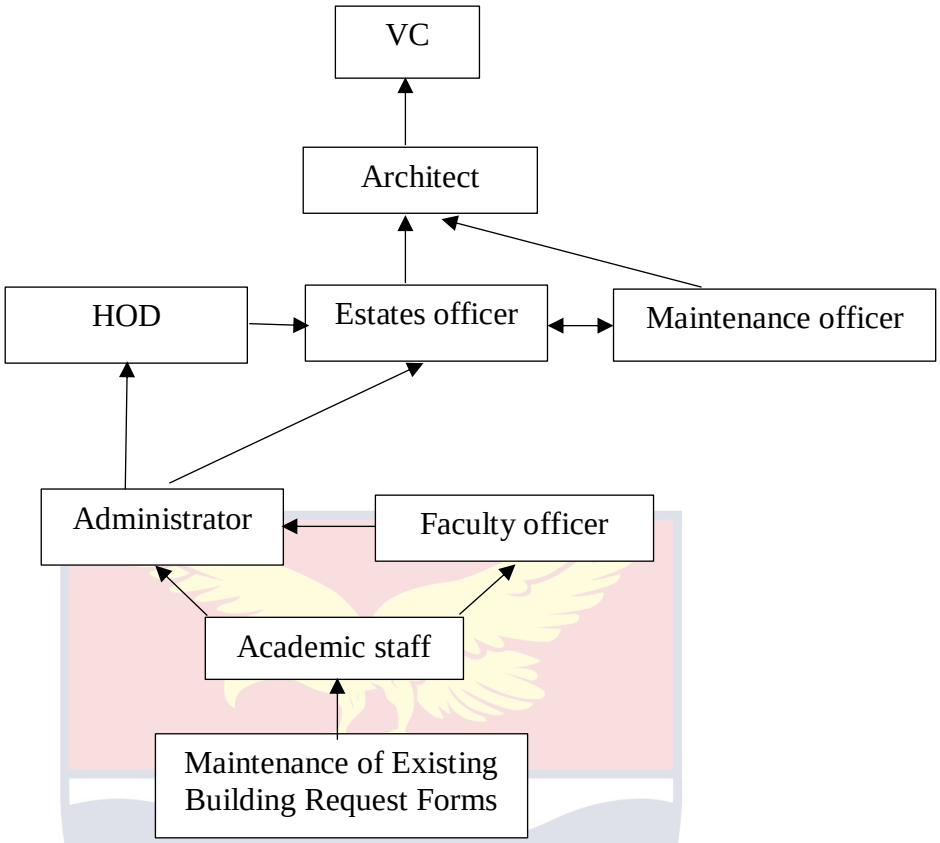


Figure 4: Project communication links for reporting project pitfalls
Source: Field survey, Godwyll (2019)

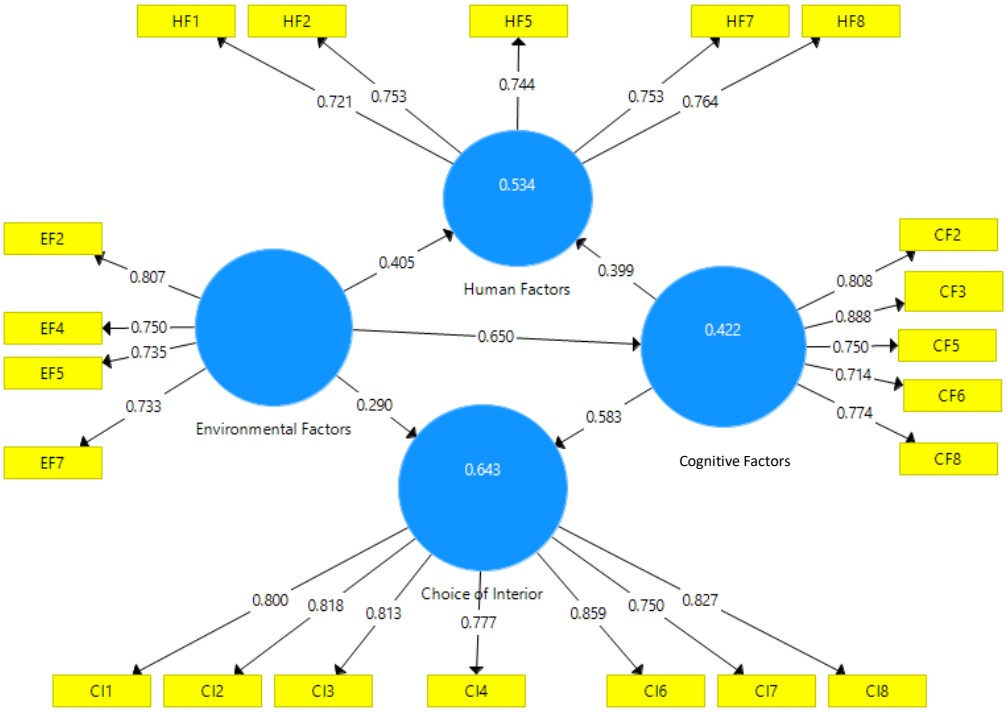


Figure 5: Path Model (Relationship between all variables)
Source: Field survey, Godwyll (2019)

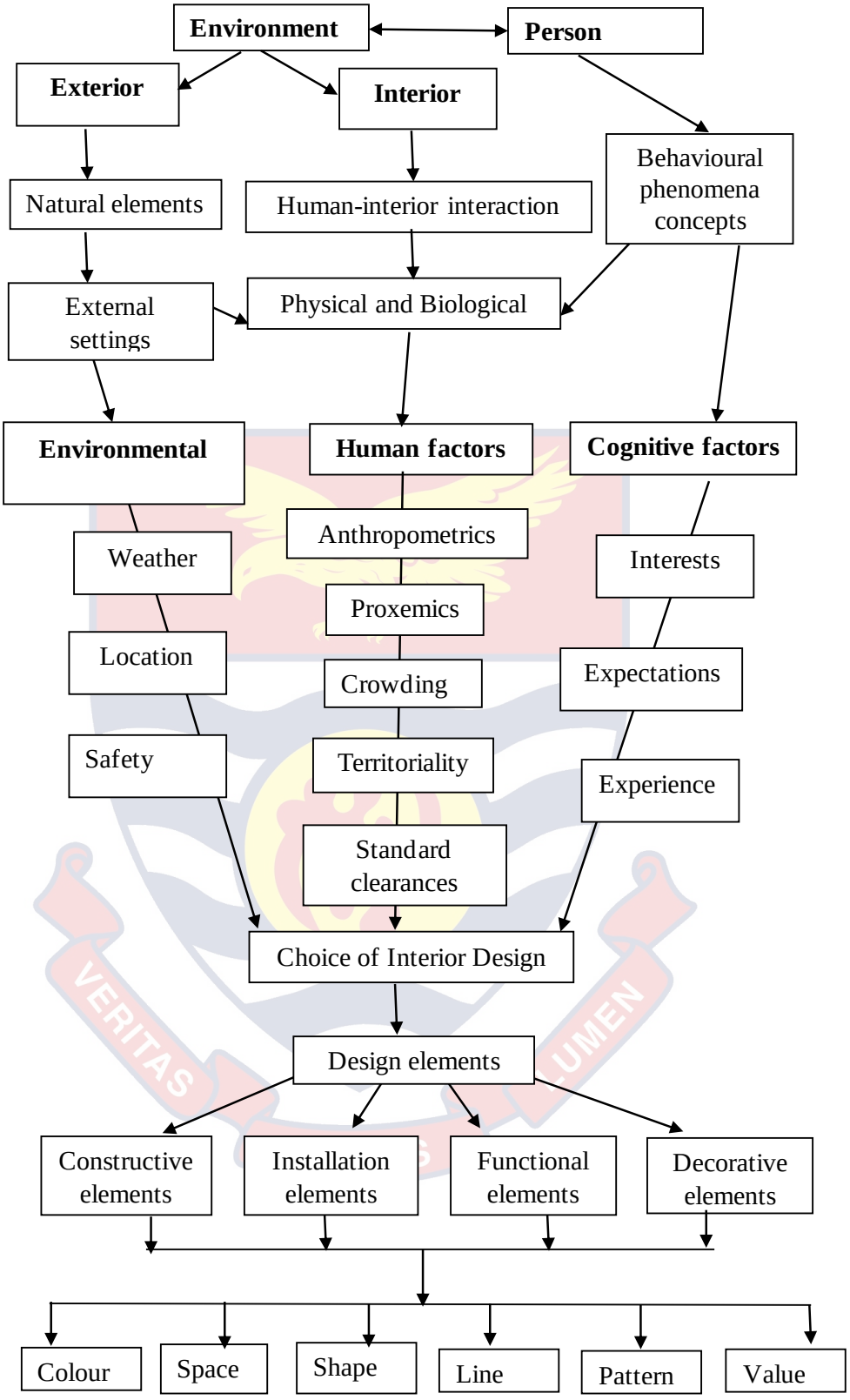


Figure 6: Links between determinants of design on choice of interior design
Source: Empirical Review, Godwyll (2019)

APPENDIX E

Exhibit A: Office A

Exhibit B: Office B

Exhibit B: Office B

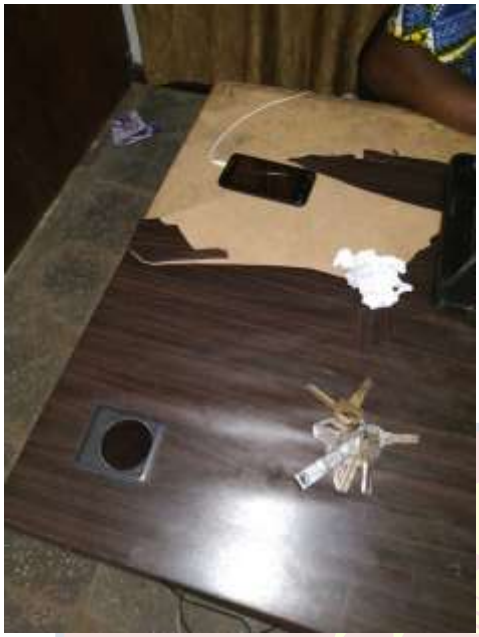



Exhibit C: Office C

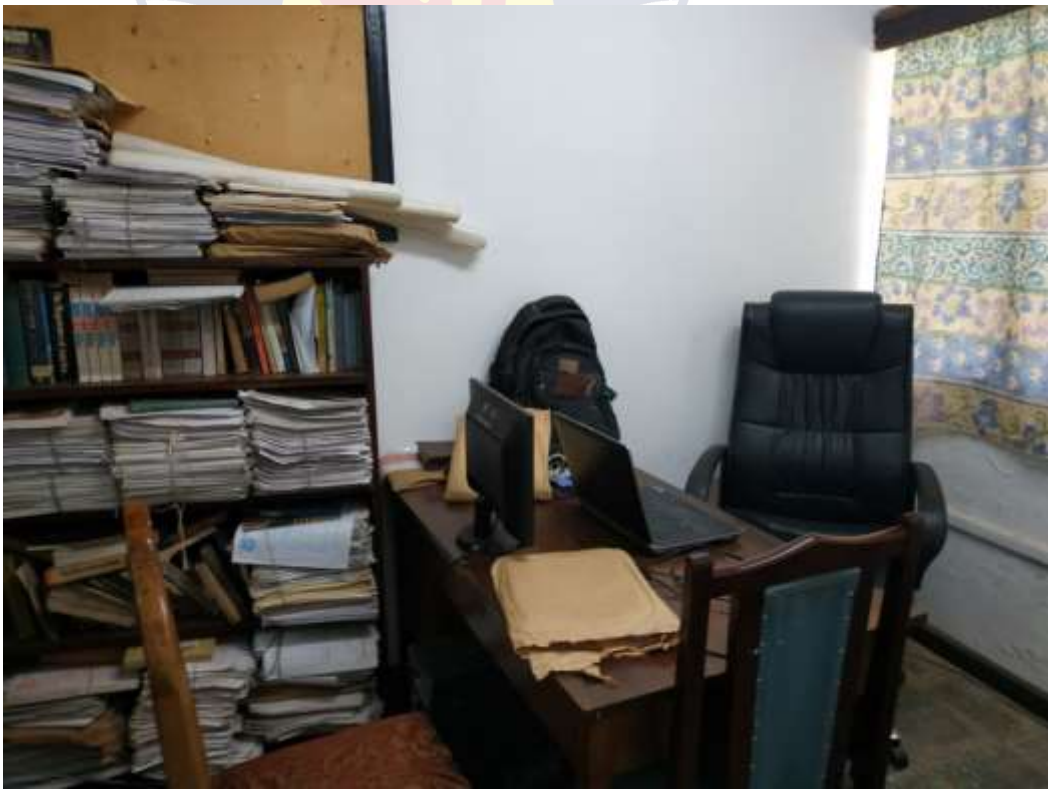


Exhibit C: Office C

Exhibit D: Office D

Exhibit E: Office E

Exhibit F: Office F

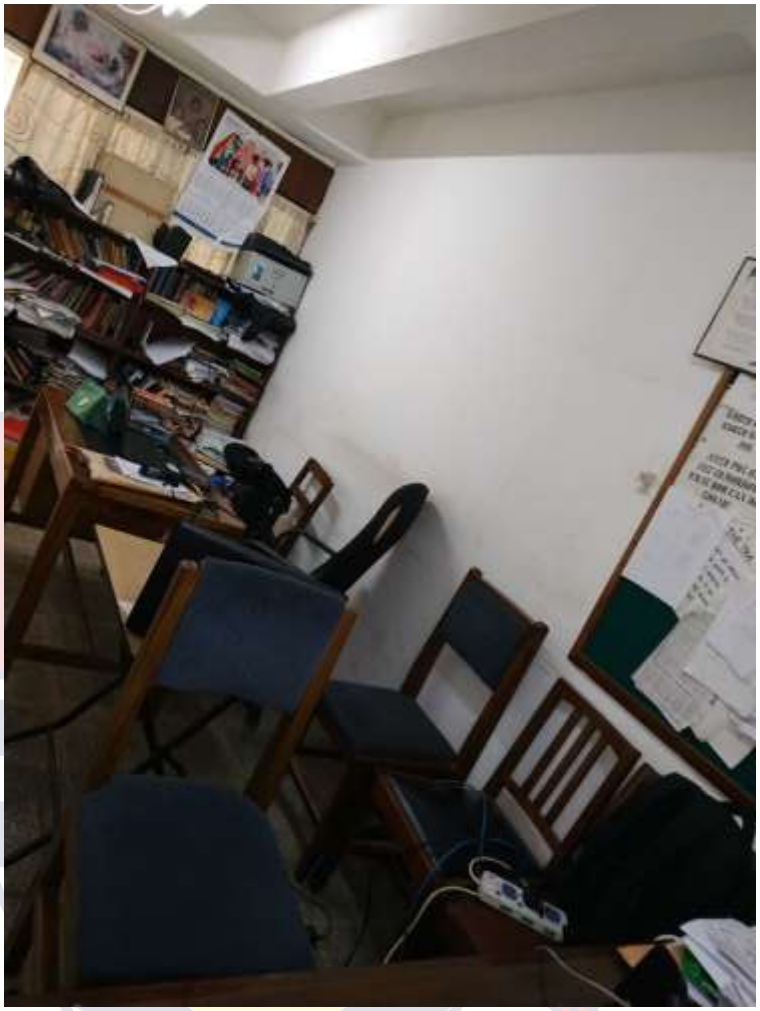


Exhibit F: Office F

Exhibit G: Office G

Exhibit H: Office H

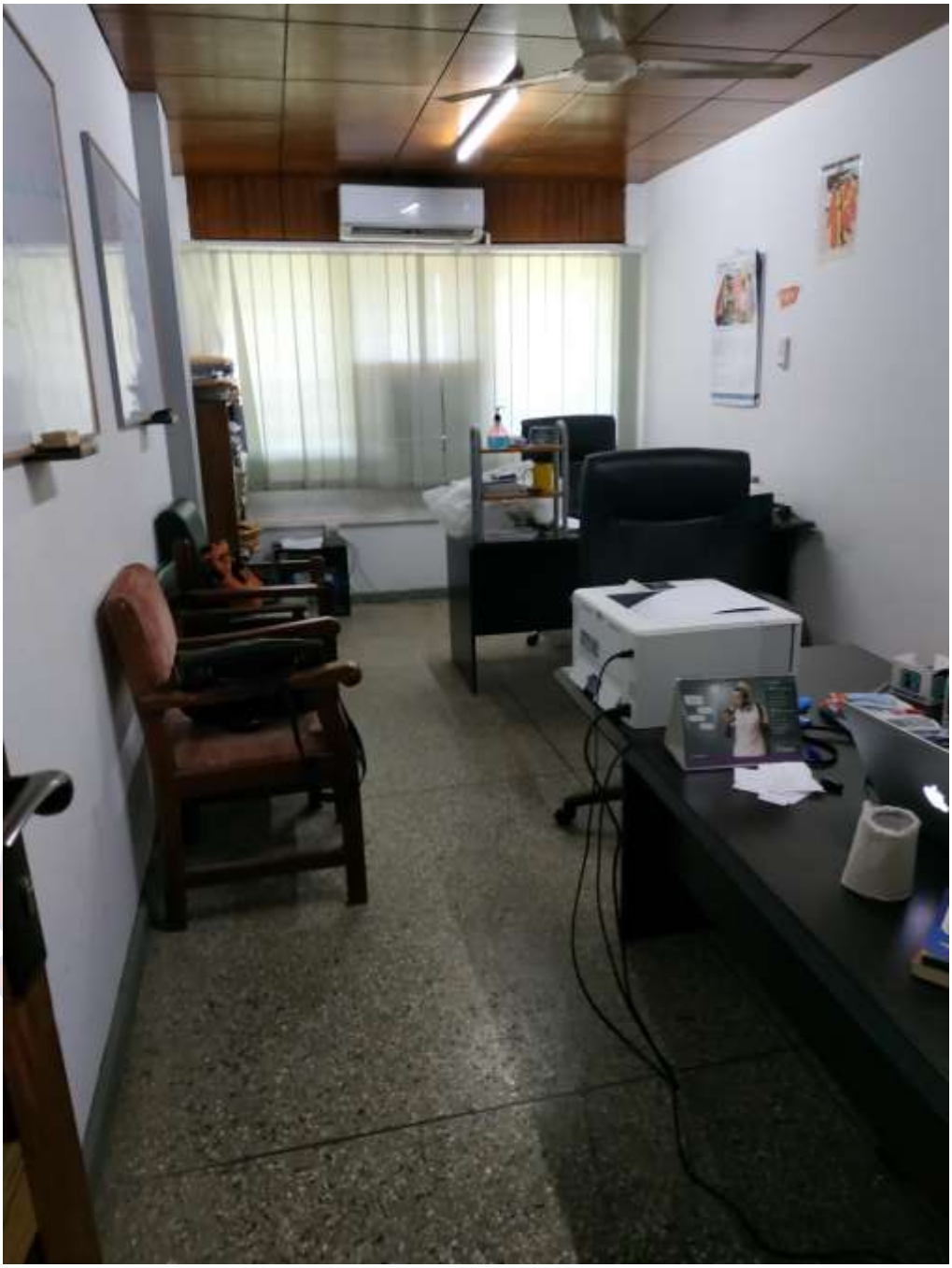
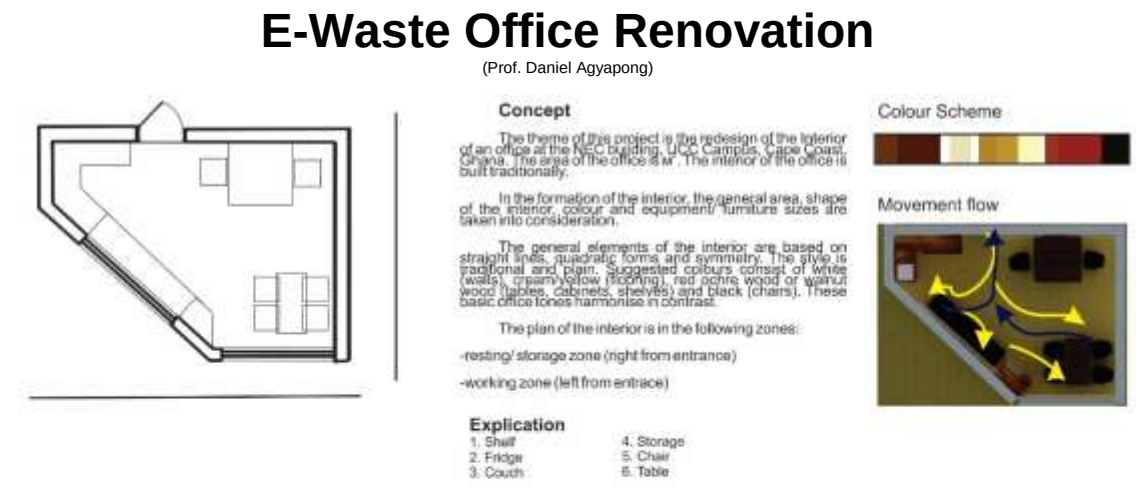


Exhibit I: Office I

Exhibit J: Office J

Exhibit K: Office A Renovation Plan with Rendered Interior



View 1: Render

View 2: Original photo

View 3: Render

Kezia-Beryl Effie Godwyll. Interior Architect/ Designer. 2018

APPENDIX F

UNIVERSITY OF CAPE COAST
COLLEGE OF HUMANITIES AND LEGAL STUDIES
SCHOOL OF BUSINESS
DEPARTMENT OF MARKETING AND SUPPLY CHAIN MANAGEMENT

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UNIVERSITY POST OFFICE
CAPE COAST, GHANA

Our ref: DMSCM/S.1/V.1/93
Your ref:

8th March, 2019

TO WHOM IT MAY CONERN:

Dear Sir/Madam,

LETTER OF INTRODUCTION - MS. KEZIA-BERYL EFFIE GODWYLL

The bearer of this letter, **Ms. Kezia-Beryl Effie Godwyll**, with registration number **SB/PMG/17/0001** is a student pursuing **Master of Commerce in Project Management** at the Department of Marketing and Supply Chain Management, School of Business.

She is currently conducting a research on the topic: "***Determinants of Choice of Interior Design in the University of Cape Coast***" which requires that she collects data from Teaching and Non Teaching Staff.

We write therefore to introduce and respectfully request that your offer her the necessary assistance to facilitate her research.

Thank you.

Yours faithfully,

Prof. Daniel Agyapong
HEAD