MEASURING THE PERCEPTIONS OF PHYSICAL ENVIRONMENT COMFORT ON OFFICE EMPLOYEES' PERFORMANCE: A CASE STUDY AT THE DURBAN UNIVERSITY OF TECHNOLOGY, SOUTH AFRICA

BY

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Submitted in fulfilment of the requirements of the degree of
Master of Management Sciences in Administration and Information
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ABSTRACT

In a dynamic world of office environment where the office is continually changing, there has been a huge need for addressing physical environment comfort of employees to improve their performance, while retaining a happy and healthy workforce. It is against this backdrop that the study was carried out to measure the perceptions of physical environment comfort on employee performance at Durban University of Technology (DUT). A model of office physical elements was used as a conceptual framework to highlight physical environment comfort elements that affects employee performance. The objectives of the study were to measure perceptions of physical environment comfort on employee performance, as well as identify the relationship between physical environment comfort and employee performance. This research adopted a mixed method approach, using the DUT as a case study, with questionnaires and interviews employed as data collection instruments. The target population comprised 81 administrative staff members, including six interviewees who were Head of Departments (HoDs) based at all six DUT campuses.

The findings generally indicated a high agreement level with regard to the role of office furniture's comfort, favourable temperature, good office design and welcoming colours as important in increasing their performance. There were, however, divisions and high disagreements where office furniture's flexibility is concerned in addition to the strain it caused. Moreover, the amount of noise across offices was found to be quite distracting. It was concluded that the academic administrative staff generally expressed positive perceptions on the importance of physical environment comfort for office employee performance, echoed by the interviewed HoDs. In conclusion, office employees and HoDs expressed positive perceptions on the importance of physical environment comfort for improved performance. This makes it critical for DUT management to address areas of weakness on physical environment comfort for improved productivity.

DECLARATION

I, Jabulani Samuel Mhlanga, declare that this dissertation, "Measuring the perceptions of physical environment comfort on office employees' performance: A case study at the Durban University of Technology, South Africa.", is my own original work. All sources used or quoted have been indicated and acknowledged by means of complete references. This dissertation has not been presented to any other university for examination or for any other reason.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS AND ACRONYMS

AMO   Ability, Motivation, and Opportunity

DUT   Durban University of Technology

HoDs   Heads of Departments

HR   Human Resources

IRBM   Integrated Results-Based Management

KMO   Kaiser-Meyer-Olkin measure

KZN   KwaZulu-Natal

SA   South Africa

SPSS   Statistical Package for Social Sciences

UNDP   United Nations Development Programme

VC   Vice Chancellor

CHAPTER ONE
INTRODUCTION AND BACKGROUND

1.1   INTRODUCTION

Office employees play a critical role in many institutions, as they ensure everything happens as scheduled. These employees usually possess the most crucial organisational and planning skills required by even the highest ranking officer in an institution, to assist with efficient execution of leadership duties. For these reasons, it is important that office employees should be well taken care of in many ways, including the basic environment in which they work. Their comfort should have a positive impact on how they perform their duties and the manner in which they provide the necessary support to different structures of an institution. In the dynamic world of the office environment, where the office is continually changing, there has been a huge need to address the physical environment comfort of employees to improve their performance, while retaining a happy and healthy workforce. Hence, the reported study set out to measure the perceptions of physical environment comfort on office workers.

Chapter one provides the context of the research. The discussion develops the justification for the research subsequently undertaken, further indicating the problem identified as the subject of the study, along with its aims and research questions. The ensuing chapters are listed and the current chapter concluded.

1.2   BACKGROUD OF THE SELECTED UNIVERSITY OF TECHNOLOGY

The Durban University of Technology (DUT) comprises the context of the study, with the focus on its office employees. For this reason, it is deemed essential to commence with a brief background information on this context and its personnel in an effort to locate the study.

A visit to the DUT website (https://www.dut.ac.za/) explains the formation of the institution on 1 April 2002, as as a result of a merger of two previous technikons - Technikon Natal and ML Sultan Technikon - with seven campuses located across Durban and Pietermaritzburg in the province of KwaZulu-Natal (KZN), in South Africa (SA). According to the organogram, the institution is headed by the Chancellor, while

the current Vice Chancellor (VC), Professor Thandwa Mthembu, is the executive head of the institution. Eurydice (2008) report states that the executive head (Vice Chancellor) is generally the main figure responsible for strategic planning, programming and development, organisation, management and monitoring institutions. It is further noted by the Eurydice (2008) report that the VC performs these duties within the institution's governance body or University Council. The VC at DUT is deputised by the three VCs responsible for academic, operations and engagement, respectively, while research and post graduate support direction also form part of the responsibility of the Deputy VC for engagement.

There are six faculties at the DUT, namely: Health Sciences, Management Sciences, Applied Sciences, Accounting and Informatics, Engineering and the Built Environment, and Arts and Design. Each faculty consists of departments managed by a Head of Department (HoD) who operates under an Executive Dean, who, in turn, reports directly to the Registrar. The Academic Registrar operates under the auspices of the Deputy VC (https://www.dut.ac.za).

The staff component of DUT is mainly divided into teaching and non-teaching staff. Teaching staff include lecturers and project supervisors who are responsible for guiding the learning process of students. Non-teaching staff include administrators, such as faculty secretaries, central records, procurement, and transport as well as faculty administrators, who provide administrative support to the teaching staff and students.

1.3   CONTEXT OF THE RESEARCH

An office, as defined by Vimalanathan and Babu (2014), is the location in an organisation where administrative work and professional duties are performed. A workplace environment's physical features can directly impact various aspects of office employees' productivity and morale, along with their health, comfort and safety, while also affecting their concentration and job satisfaction (Vimalanathan and Babu 2014). According to the Institute for Quality of Life (2018), the physical work environment not only plays a pivotal role, but also contributes to the performance of work produced by employees.

Parveen *et al.* (2012) confirm that the physical environment affects both the quality and quantity of the work generated by employees; a poor environment will, in turn, produce employee inefficiency and reduce job satisfaction. This is also supported by Maarleveld, Volker and van der Voordt (2009) and Naharuddin and Sadegi (2013), who specify the physical work environment design and furniture as essential to individual employee performance and company efficiency and productivity, whilst also communicating overall and strategic corporate goals of companies. Naharuddin and Sadegi (2013) further explain physical environment comfort as the optimal standard of the working environment that employees are content and at ease to work under. This standard, for example, encompasses not only the illuminance level, but also the relative humidity and optimum room temperature. Other important aspects to consider include office space, furniture design and arrangement, as well as paint colours. A physical work environment's standard is, therefore, dependent on employees' perceptions and the nature of the job.

In view of this, the study was carried out to determine the manner in which office employees' performance at the DUT in KZN, SA, are affected by physical environment comfort.

1.4   JUSTIFICATION OF THE STUDY

Saleem *et al.* (2012) assert that numerous factors influence organisational performance, such as employees, cultural aspects, health and safety and work environment. Particularly, issues of health and safety in the work environment have come to the fore during the coronavirus (COVID-19) global pandemic that has changed the way in which offices have come to be viewed. This view by Saleem et al. (2012) is supported by Kingsley (2012) who states that one of the integral determining factors of the high level of organisational accomplishment, performance, and productivity is that of excellent employee performance. These views show physical work environment as one of several influencing elements leading to excellent employee performance. While values and objectives of the company are communicated by the physical work environment, it also signals the overall corporate goals and strategy to not only employees, but also to customers. Organisations are established in order to add value to society through excellent organisational performance (Kingsley 2012). Therefore, factors that affect organisational

performance, such as physical environment comfort, warrant empirical research that could enhance not only organisational performance, but ensure health and safety of employees and customers during times of global pandemics such as the COVID-19 pandemic. This research could benefit the following stakeholders:

1.4.1 The Organisation (DUT)

If implemented, the DUT management could benefit through recommendations informed by the findings of this research. Physical environment comfort should be conducive to excellent employee performance, which should influence organisational performance in general.

Furthermore, in adding to the body of knowledge about physical work environment, this research could benefit the University, particularly management, who could employ the findings in the manner in which employee performance is impacted by the perceived physical work environment.

1.4.2 Employees

The study's empirical findings intend to provide an overall perspective of the current physical environment comfort of academic administrative staff at DUT. While positive perspectives of the DUT office physical environment would need to be maintained and enhanced, negative perspectives will point management towards areas that require intervention. In this manner, DUT employees might benefit from this research through findings that could improve their welfare at the workplace, reducing the possibility of becoming ill as a result of an unhealthy physical work environment. This will, hopefully, translate into increased employee morale and performance.

1.5   RESEARCH PROBLEM

Based on studies conducted by Kamarulzaman *et al.* (2011) and Stoddart (2016), employee performance can be significantly affected by the physical office environment. As alluded to by Kingsley (2012), the physical environment of the office directly and indirectly impacts employee performance. Chua, Ali and Lim (2016) aver that there is a positive relationship between physical work environment in an office and employee performance. However, these views are drawn from studies conducted in a business environment. This indicates a gap in studies conducted in an academic environment. The DUT, as a merged institution with many office

employees that provide support to a high number of management and academic staff and students, ought to provide a comfortable physical office environment for support staff to deal efficiently with the demands of their duties. Yet, it is problematic that the perspectives of these office employees have not been sought in an effort to understand whether the environment in which they work meets their expectations.

Thus, perceptions on physical environment comfort of administrative staff at DUT have not been measured. This poses a problem because there are some physical environment elements that could prove to be negative towards DUT's organisational performance. This, then, warrants empirical research so as to measure the perception of physical work environment on office employees' performance at DUT.

1.6   STUDY AIM

The aim of this study was to measure office employees' perceptions of physical environment comfort on their performance at DUT.

1.7   RESEARCH OBJECTIVES

- To investigate critical factors of physical environment towards administrative staff performance at DUT.
- To determine critical work environmental factors influencing administrative staff at DUT.
- To ascertain the measures implemented by DUT faculties to manage physical environment comfort of administrative staff towards improving performance.

1.8   RESEARCH QUESTIONS

- To what extent does physical environmental comfort critically affect DUT administrative staff performance?
- What enviromental challenges do DUT administrative staff face?
- What measures have been implemented to improve the physical environment of administrative staff in DUT faculties?

1.9   OVERVIEW OF CHAPTERS

The following five chapters outline the study:

1.9.1 Chapter one: Introduction and Background

The introductory chapter familiarises the reader with the work and deals with the study background, justification of the study, and statement of the research problem, as well as the research aim, its objectives and the research questions. An overview of the entire study's chapters is presented before the conclusion of the first chapter.

1.9.2 Chapter two: Literature review

The second chapter examines the literature that pertains to several aspects of the work, thus locating it within a scholarly context.

1.9.3 Chapter three: Research Methodology

The methodology used is outlined in the third chapter discussing, among others, the research design, research tool and target population.

1.9.4 Chapter four: Analysis of Data and Discussion

The results of the fieldwork carried out are presented in the fourth (Chapter 5), along with a discussion of the findings.

1.9.5 Chapter five: Conclusion and Recommendations

In the final chapter, a summary is presented of the findings and conclusions, while also offering recommendations based on the study conclusions. Limitations are pointed out and areas of further study are proposed, bringing the study to a close.

1.10   SUMMARY

In conclusion, the first chapter has introduced the work presented in this dissertation by providing its background, justification, problem statement, the research aim and objectives, as well as the research questions. In addition, an overview of chapters that comprise the entire study is outlined.

The next chapter situates the study within a scholarly context with an examination of literature that pertains to various factors of the work environment.

CHAPTER TWO
LITERATURE REVIEW

2.1 INTRODUCTION

The preceding chapter provided the study background as a means to show the context and theoretical context that inspired the current work. Such information assisted the researcher in the formulation of the study's problem statement, with the aim, objectives and questions of the research having been listed subsequent to that.

This chapter seeks to place the perception of physical environment comfort and its effect on office employees' performance in the context of earlier works by researchers. In doing so, there is first a discussion that provides an understanding of the related higher education setup. Further to this, employee performance is discussed in detail since it forms the core of the current study, which investigates perceptions on how physical environment comfort affects office employees' performance. The factors within the work environment that affect employees' comfort and performance are outlined, after which the chapter concludes.

2.2 UNDERSTANDING THE HIGHER EDUCATION SETUP

Eurydice (2008) report states that institutions of learning primarily have three functions, namely: education, research and contributing to the development of society. Leibowitz *et al.* (2017) attest that research and education are intertwined; research enables higher level learning, while people are developed through education to do research. Knowledge has become key to economic growth, thus, universities operate in an environment where knowledge is vital, but perishable because knowledge is created rapidly through continuous research.

The service sector, which includes universities, operates in a market environment where demand is excessive and Leibowitz *et al.* (2017) highlight that, in order to meet the increased demand, organisations have to evaluate the value chain and all factors that affect employee performance, in particular, and organisational productivity, in general. Therefore, institutions of higher learning need to ensure prompt circulation of accumulated knowledge back to society.

Higher learning is adult education, which is self-directed and self-motivated. In explaining the higher education setup, Knowles (1975) further states that higher learning is self-directed, which entails that students should contribute to learning content and its process. In higher education, much is learnt by students through experience, hence, the focus of their learning should lie in adding to their existent knowledge base. Palis and Quiros (2012) note the aim of students in higher learning is for practical learning and content should, therefore, focus on issues related to their work and personal life.

As the name suggests, higher education is the highest level of education; this means it is responsible for creating new knowledge and inventing new technologies of producing goods and services. Institutions of higher learning are, thus, learning organisations. As explained by Senge (2004), learning organisations are organisations where a continuous expanding of people's capacity takes place, so that they may create the outcomes they really want, where nurturing of new and unreserved thinking patterns takes place, where joint goals and ambitions are liberated, and where how to learn together is a constant. Therefore, the concept of a learning organisation encapsulates a format for higher learning.

2.3   EMPLOYEE PERFORMANCE

The definition of employee performance is stated by Armstrong (2006) as the origination and promotion of measured objectives, which means the rationale behind establishing organisations is to harness excellent performance. Good performance is, therefore, the essence of establishing and sustaining an organisation. Ulrich and Brockbank (2005) attest that achievement of corporate goals of an organisation is directly linked to the job performance of its employees. Moreover, Madhekeni (2012) points out that organisations are established for performance so as to provide service and goods to society, which will later transform the standard of living the society.

The environment or society in which the organisation operates is highlighted as being transformed by the value created through organisational performance. Furthermore, organisational performance is explained as a product of many factors, with organisational employees chief among these (Madhekeni 2012). Parveen *et al.*

(2012) agree that organisational performance is influenced by numerous factors, which include not only employees, but also cultural aspects, health and safety, and the work environment. Every entity, thus, requires high performing employees to ensure attainment of corporate objectives and competitive edge. An integral determinant of the high level of organisational performance, excellent employee performance is claimed by Kingsley (2012) to also be one of the factors that add to productivity and accomplishment.

Harikaran (2015) argues that employee performance is the accomplishment of spelt-out tasks against predetermined standards. Parveen *et al.* (2012) conclude that employee performance can be strongly linked with an organisation's planned goals and further determined that the performance of employees can be viewed as a major, many-sided construct, with the aim of achieving results. Beardwell, Holden and Claydon (2004) show employee performance as a product of effort, ability and perception, while Armstrong (2009) highlight its purpose as comprised of both ability and motivation. Mullins (2010) points out that employee motivation is attained by meeting the perceived best socio-economic needs of an individual employee, which include provision of the best perceived comfortable working environment.

In explaining the concept of employee performance, Kingsley (2012) makes a distinction between the aspect of action and the outcome characteristic of performance.

2.3.1 Action Aspect

Action aspect is the process element of performance, which Kingsley (2012) explains as employee actions and behaviours during the production of services and goods. The actions aspect, according to Kingsley (2012), refers to that which an individual accomplishes in the work situation, which has both a direct and an indirect impact on overall output. In the context of DUT, the action aspect of performance can, on the one hand, be seen as the lecturing to students in a lecture room. On the other hand, for administrators, the action aspect of performance entails, among others, students registration, the processing of student results and uploading these to online student portals.

2.3.2 Outcome Aspect

The outcome aspect of performance entails the impact of outputs. The UNDP (2014) states that outputs are products, goods and services produced by interventions necessary for achievements of results. Rasappan (2005) further reiterates that outcomes are changes directly influenced by outputs. For instance, the output in a motor vehicle assembly plant is a complete vehicle and its outcome is easy and fast transportation of goods to consumers. Applying the outcome aspect of performance to the DUT setup, outputs are the number of graduates produced each year and the outcomes are an increased standard of living, through goods and services produced by graduates as a result of education.

Furthermore, according to Chua *et al.* (2016), there are two types of performance, namely: task and contextual performance. The first, task performance, consists of those activities that add to the transformation of raw materials into either services or goods. Borman and Mtowidlo (1997) determine that task performance denotes the stipulated role adhered to by an employee, so as to achieve organisational goals. This also entails the efficiency of performed activities, which further adds to the organisation's technical core development. This contribution is attested by Díaz-Vilela *et al.* (2015) to be direct, which includes applying part of organisational technology or the indirect provision of services or materials that are required in performing technical processes of an organisation. Task performance may be affected by availability of equipment and machines, skills and competences.

Díaz-Vilela *et al.* (2015) attest that although behaviours that are not directly associated with job tasks were part of contextual performance, they significantly impact the organisational context, as well as social, mental and emotional (psychological) contexts. In order to efficiently undertake the entrusted task, these behaviours function as catalysts. Borman and Mtowidlo (1997) note the understanding that contextual performance equates citizenship behaviours, which consist of enthusiastic perseverance and added endeavours to conclude task activities, offering to perform these unrelated job activities, assisting and working together with others, keeping to procedures and rules of the organisation, while validating and upholding the organisation's objectives.

Ulrich and Brockbank (2005) assert that the context of employee performance is that of corporate goals, objectives, strategy and the nature of a job. In other words, employee performance is an action or behaviour of employees in accomplishing a task to meet set goals and objectives. Mullins (2010) further states that high levels of performance are key in sustaining high productivity, due to it being a source of employee satisfaction. As a high performer, some feelings of personal mastery and pride are evoked that can motivate individuals to accomplish more. Thus, a high level of employee performance is sustained by high employee performance because it is a source of employee satisfaction.

Having excellent employee performance is suggested by Naharuddin and Sadegi (2013) to increase corporate productivity levels, which translates into corporate financial excellence. It is, therefore, crucial for an organisation to assess and evaluate issues and factors that impact employee performance.

Key to the dynamics of employee performance is the willingness of employees. Naharuddin and Sadegi (2013) are of the view that a person's ability to perform also determines employee performance as does the inclusion of the opportunity and willingness to perform. An employee's aspiration to put as much effort towards their job as they are able to, further signifies the willingness to perform. This concurs with the AMO (Ability, Motivation, and Opportunity) model of performance that Bailey (1993) initially propounded, when it was suggested that three components are required to guarantee the discretionary effort of an employee; they must be equipped with the necessary skills, coupled with appropriate motivation and employers must offer them an opportunity to participate.

Marin-Garcia and Tomas (2016) point out that the AMO model's acronym comprises three elements: individual Ability (A), motivation (M) and opportunity to participate (O) and these enhance employee performance. The dimension of ability is, in turn, explained by the KSA acronym, representing Knowledge, Skill and Abilities (Fu *et al.* 2013). An employee's aspiration to perform is termed as motivation, enhanced mostly by intrinsic and extrinsic motivation. These include incentives and career opportunities (Ghergulescu and Muntean, 2014). The opportunity dimension is further stated to consider the work environment (Marin-Garcia and Tomas, 2016).

2.4   EMPLOYEE RETENTION ON PERFORMANCE

According to Vancouver (2011), within the organisation the single most valuable element is people, as business is unable to generate revenue without them. This shows the significance of people to the organisation and the need to retain them. Williams (2008) explains that present day high performers can be likened to a wheelbarrow with frogs inside that may and can, at any time, jump out. Furthermore, the concept of having a 'job for life' is no longer common with most employees, who are mostly inclined to leave for perceived better opportunities. To retain talented people, concerted action is, thus, required.

Armstrong (2011) defines employee retention as a human resources (HR) policy and practice of treating employees well so they would want to stay with the organisation. Employee retention creates stability among employees, which is crucial for team cohesion and productivity. Vancouver (2011) states that constant high turnover creates unrest among the remaining employees and backlogs and slow productivity can be caused by a sense of frustration that stems from this instability. In addition, Williams (2008) asserts that for the first three months, a new employee operates within the range of 25 to 50 percent of their level of productivity, which does not take the time expended by existing employees into account in assisting these new employees. Therefore, employee retention stabilises the workforce, which helps to maintain or increase performance, due to team cohesion being maintained and upheld.

Beardwell *et al.* (2004) attest that high employee retention nurtures a committed workforce with high morale. Since employees consider themselves as appreciated, valued and respected, they become effective employees and not merely 'hired hands' and tend to go the extra mile in executing their duties. Kotler and Keller (2011) state that in the service sector, such as in a university setup where service production is performed in the presence of the customer, members of a highly committed workforce are seen as brand ambassadors and are highly likely to produce excellent service. Employee retention is an excellent HR value proposition, which concurs with Ulrich and Brockbank's (2005) assertion that should the

organisation look after its employees, the business will look after itself. This implies that employee retention directly translates to high organisational performance.

According to Vancouver (2011), employee retention builds a good company reputation in the long-term, as no business will confidently engage in business with an organisation that cannot retain its employees. High employee turnover suggests poor management and planning, which shuns aware customers. Thus, employee retention builds a brand that attracts and retains customers; a key indicator of high performance in the service sector, corresponding to that of the university setup.

2.5   COMMUNICATION AS A TOOL TO IMPROVE STAFF PERFORMANCE

It is maintained by Guirdham (2005) that communication is the collective and interactive process of generating and interpreting messages, verbal or non-verbal. Basically, communication is the transaction of information between two or more people.

People work for people, hence the importance of communication with regard to performance cannot be underrated. Mullins (2010) attests that communication is the lifeblood and heart of every organisation. As stated earlier, performance being the development of defined goals, it all starts with communication. Employees need to know the company mission, vision and strategy before they start executing any task. Armstrong (2011) explains that in continuing to inform employees, their feelings of inclusion are increased, which aids their realisation that the company considers them as important.

Communication, as a tool for increasing performance, is crucial on performance review. Vancouver (2011) notes that performance review is a formal way to communicate an employee's contribution to the company. This increases the opportunity for an employee who is underperforming to develop and enhance their performance, since performance gaps can be identified. In addition, customer feedback is also utilised as a communication mechanism that improves performance. Kotler and Keller (2011) further attest that in the service sector, customer feedback is integral to the provision of excellent service, as customers are able to state their dissatisfaction, which offers the organisation a chance to improve service provision.

From the definition by Guirdham (2005), communication is said to also entail non-verbal communication. It can, therefore, be asserted that in providing a quality physical work environment, it serves to communicate the value the employer attaches to the employee and their performance.

2.6   PERFORMANCE MANAGEMENT SYSTEM

Armstrong (2006) notes performance management as both an integrated and a strategic approach in the delivery of ongoing success maintained by organisations in the improvement of employee performance, the delivery of capable teams and contributions of individuals. The aim of performance management is to bring about a culture of high performance, where teams continuously improve their own skills and business processes, towards achieving organisational goals. Heavin and Adam (2013) argue that performance management concerns the alignment of individual and organisational objectives, while guaranteeing that core values are upheld by individuals.

The definition of a performance management system is set out by Striteska and Spickova (2012) as a process of monitoring and assessing performance, which clearly defines results that can make a distinction between performance that is either excellent, satisfactory or unsatisfactory. Examples of performance management systems include that of Integrated Results Based Management (IRBM) and Balanced Scorecard.

According to Striteska and Spickova (2012), IRBM is a management strategy and philosophy centred on results that are clearly defined, with the aim of changing the manner of an organisation's operations through timeous and appropriate attainment of identified goals at all levels. Performance contracts and agreements are signed between supervisors and subordinates prior to execution of sites.

Armstrong (2006) attests that the approach of employing a balanced scorecard to performance management combines strategic management with an objective-based approach. Objectives are categorised into four performance criteria or broad perspectives, namely: growth perspectives, customer perspective learning, internal

processes and financial perspectives. Beardwell *et al.* (2004) note that strategic goals of an organisation are positioned at the top level and stepped down to performance goals of individuals, further categorised into the four perspectives mentioned above.

2.7 ENVIRONMENTAL FACTORS AFFECTING EMPLOYEE PERFORMANCE

Work performance is one of the important dependant variables and, according to Díaz-Vilela *et al.* (2015), it is affected by numerous factors. Naharuddin and Sadegi (2013) state that considerations such as meaningful work, the physical work environment, performance expectation, and equipment, as well as standard operating procedure knowledge and skills, along with attitudes, and feedback on performance, contribute to lack of employee performance. Classification of factors that affect employee performance results in two categories, namely: factors that stem from the immediate work environment and those that are management driven.

The following environmental factors are identified by Al-Anzi (2009) in the immediate work environment that affect employee performance:

- Furniture

Chandrasekar's (2011) research reveals that the second leading physical aspect is that of furniture and furnishing, ranked by a mean value of 2.17, according to employees. Included as furniture are chairs, tables or desks and workstations. These provide comfort that has an effect on employees' health. Kingsley (2012) notes that one of the main sources of neck and back injuries is furniture, which tends to affect employees' health and performance. Office furniture has a direct impact on employee health which, in turn, affects employee performance.

- Temperature and Humidity

Parveen *et al.* (2012) note that good temperature increases work performance. Ajala (2012) also attests that in both the coolest and warmest temperatures, employees indicated feeling slightly uncomfortable, experienced their workload as more difficult and are less motivated, with a consequent productivity downturn.

15

- Light intensity

Good lighting is crucial for office workers' satisfaction and health. It will also promote employee health, reduce accidents in the workplace and enhance productivity. Ajala (2012) attests that good lighting reduces fatigue and eyestrain, thereby increasing organisational performance.

- Noise/vibration

Noise affects the concentration level of office workers, especially in jobs that require a high degree of mental concentration, similar to that in a university. Parveen *et al.* (2012) postulate that productivity can be considerably impacted by noise and that it is seen as one of the principle causes of discontent within the office setting. Noise can also be a harmful impact on employees' levels of stress and health, thereby affecting performance (Chahandrasekar 2011).

Kamarulzaman *et al.* (2011) concur with Al-Anzi's (2009) listed factors on work environment that contribute to employee satisfaction with the condition of their office's physical environment condition which, in turn, lead to the production of better work results. Furthermore, Ajala (2012) confirms that surrounding features in the environment of the office, including temperature, lighting, and free air movement have an influence on employees' attitude, behaviour, satisfaction, and performance, as well as their productivity. This view serves to suggest that perceived satisfaction with their work environment improves employees' performance, which is an important factor in the success of an organisation. Physical environmental factors that influence employee performance are further summarised in Figure 2.1.
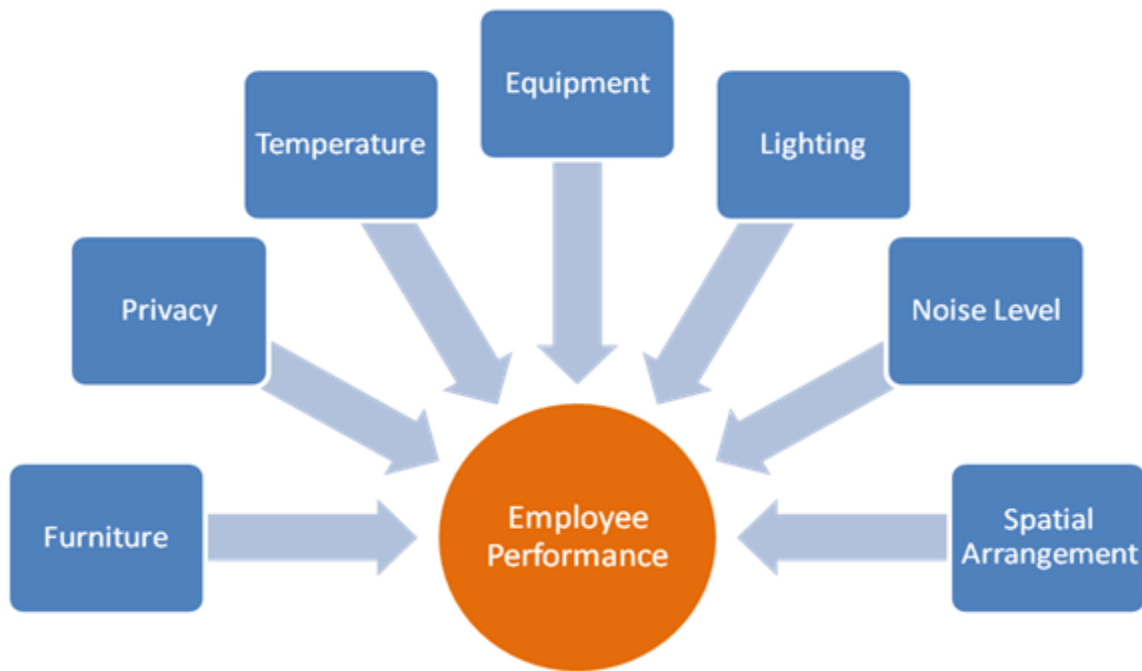
Figure 2.1: Conceptual Framework: Model of physical office elements on performance

Source: Adopted from Various Sources

Having acknowledged the fact that employee performance is a dependable variable with many factors and elements affecting it, the general idea of the study involved measurement of employees' opinions with regard to the effect of physical environment comfort on office employees' performance in the DUT context.

Management driven factors

Organisational structure is one of the responsibilities of senior management. This, in turn, influences the allocation of responsibilities through work design at all levels of the organisation. Kingsley (2012) states that employee performance is affected by the definition of a job description and the accessibility to administrative and management support that is required to complete any given task.

Working patterns, shift work, and flexible work arrangements are other management-driven factors that impact employee performance. These affect the time taken at work, with breaks taken during working periods also influencing the level of employee performance. Furthermore, the managerial style of leadership can also

affect employee performance. Armstrong (2009) states that the managerial style that offers employees autonomy is always associated with high employee performance.

Remuneration strategy is another fundamental management-driven factor that affects employee performance. Ulrich and Brockbank (2005) describe a remuneration package as an organisation's non-verbal communication of how employees are valued and how much energy and effort they should exert towards their day-to-day duties. Both monetary and non-monetary aspects of employee compensation affect employee performance. This is what informs reward management practices, such as performance related pay, as a strategy of increasing employee performance.

2.8   WORKPLACE ENVIRONMENT SETUP IN HIGHER EDUCATION

An office is defined by Vimalanathan and Babu (2014) as a location at which administrative work and professional duties are performed in an organisation. This definition clarifies that working in an office is different to, for example, that which is undertaken in a lecture room. Thus, elements of performance and the manner in which performance is determined differ with the type of work conducted.

Office work might appear to be easier because it includes the use of computers, communicating with other organisational employees via telephone and/or e-mail, along with record keeping and maintaining of files. However, the workplace environment of the office demands a high level of order and setup for institutional objectives to be met. To this effect, Kamarulzaman *et al.* (2011) clarify an office building as a workplace at which information and knowledge are processed; this includes designing, planning, filing, supervising, analysing, communicating and deciding. Therefore, developing an office setup is derived from the requirement of planning, co-ordination and administering certain endeavours that take place in a lecture room and across the higher education setup.

The crux of the matter in measuring office employees' perceptions of physical environment comfort is that the physical environment has a bearing on employee health and safety, attitude and well-being. These factors determine employee

motivation and commitment, particularly in a higher education setup, as this forms the context of the current study.

2.9   PERCEIVED PHYSICAL WORK ENVIRONMENT COMFORT ON EMPLOYEE PERFORMANCE

Physical Workplace Design and Employee Performance

It is of paramount importance to provide employees with a properly furnished and equipped workplace in order to harness the best from a company's HR. According to Saleem *et al.* (2012), office layout and space increase productivity and allow employees to do more than their share of daily work, when offered an improved workplace environment. The provision of a best perceived office environment ensures increased employee commitment, which will translate to increased employee performance. Beardwell *et al.* (2004) note that committed employees tend to exhibit organisational citizenship, becoming loyal to the organisation and working for the same organisation for extended periods.

Furthermore, Chua *et al.* (2016) highlight that a positive relationship exists between productivity and spatial arrangement. As an example, the scope of work for most office employees includes reading and writing, tasks performed on a computer and occasional document delivery between offices/workstations. These tasks require an office with considerable space that allows for movements from workstations possibly because offices with limited space can affect employee productivity. These results are supported by those from a study in the corporate industry by Hameed and Amjad (2009), which reveal office design as crucial, where expanding employee productivity is concerned. This generates interest in the investigation of office design impact on employee productivity in higher learning setups akin to universities. Harikaran (2015) attests that layout of office space has a significant influence on employee behaviour that will affect employee performance.

Furthermore, it is worth noting that where open-plan offices are concerned, although physical cost has proven to be lower, a lack of positive outcomes offsets potential savings gained from a physical design that is less expensive. One factor highlighted by Samani (2015) that could potentially challenge any expected productivity and efficiency gains brought by open-plan office designs, is that of noise. Conditions of

the open plan office have been reported to be stressful and there is a lack of privacy. Kamarulzaman *et al.* (2011) contend that evidence of open-plan office studies have shown these spaces are the cause of reduced motivation, lower perceived privacy, and subsequent decreased job satisfaction, consequently resulting in a decrease in employee performance. Some employees working in open plan offices have complained of fatigue, irritation, headaches, and respiratory infections; this shows that physical environment comfort directly affects employee performance.

Ironically, the introduction of several physical workplace designs, such as open-plan offices, is done with the intention of increasing employee performance, yet they, instead, include factors that undermine good intentions. This is a systematic problem referred to by Senge (2004) as compensating feedback, which entails a situation where responses from the system are called forth through well-intentioned interventions, whereby intervention benefits are offset. In the carpet analogy, a merchant saw a large lump in the centre of one of his carpets, which he successfully stepped on to flatten it out, only to have the lump reappear in a new spot not far away. This shows that without thorough empirical research, solutions implemented today will cause problems tomorrow.

In solving the challenge encountered in the use of an open plan office, there is a need to measure the perceptions of people working in that environment prior to concluding the outcome of the new design and not assume it will work simply because it worked in another organisation. What may work in one organisation might not work in another. Thus, any physical work design intervention warrants research on measuring how employees perceive the environment they are working in.

Noise
The definition of noise, according to Nassiri *et al.* (2013), is unpleasant and unwanted sound that usually disrupts human life balance or activity. This definition suggests that noise is to blame for distracting attention away from tasks, leading to performance that is reduced, specifically in the performance of complex cognitive tasks, as also performed in a higher education setup. For example, the recording of marks and distribution of funds require a high level of attention to avoid making mistakes.

Samani (2015) asserts noise was a more common problem often associated with offices. Sources of noise include ventilation systems, machines, conversation of other people, and keyboard typing, as well as telephones. Studies reveal that when there is minimal sound, work errors are reduced and an increase in productivity results. Due to the distractive nature of noise, it can also potentially contribute to poor performance, in addition to stress that can result in increased cognitive workloads of employees, along with employee inefficiency. Saleem *et al.* (2012) posited that the productivity of employees if badly affects by the overall impact of noise.

As further explained by Samani (2015), studies reveal that a diverse number of office noise components, specifically the ringing of telephones and people talking, negative impact employees' concentration, with these leading to high levels of mistakes, hence poor performance. Nassiri *et al.* (2013) conclude that both treble and intermittent noise effectively worsen environmental conditions during the performance of a task.

Indoor temperature on performance
Three different indoor temperatures were researched by Lan, Lian and Pan (2010), that is: 17°C, 21°C and 28°C. Their findings revealed that in both the coolest and the warmest temperatures, employees felt uncomfortable, were less motivated and perceived a more onerous workload, with a decline in productivity as a consequence. It was concluded by Saleem *et al.* (2012) that these results concurred with those found by Niemela, Wallenius and Kotiranta (2002), wherein it was determined that productivity is adversely affected by a temperature higher than 25°C.

Chua *et al.* (2016) consider thermal comfort as imperative because employee performance can be reduced by five to 15 percent when the thermal condition is not within the thermal comfort zone. They further state that in offices where the temperature is maintained between 23°C to 26°C, most employees work comfortably. Therefore, the optimal comfortable temperature for productive employees in the workplace is 25°C, supported by the literature. This finding is supported by Chua *et al.* (2016) who posit that an office building's optimum

temperature should be at 25 to 26°C. Anything more or less than this range can negatively affects employee performance.

Related to temperature, humidity is another physical environment phenomenon that affects employee performance. Relative humidity of 40 to 70 percent has been determined as the acceptable range; Chua *et al.* (2016) note it is reasonably understood that some negative effects of feeling stuffiness and becoming easily fatigued are brought about by high humidity.

Influence of colour and lighting in office environment
The influence of colours are asserted by Garris and Monroe (2005) to not only affect employees' productivity, but also their wellness and mood. While certain colours provide calmness, others are stimulating, and some offer comfort. Furthermore, Silvester and Konstantinou (2010) note findings pertaining to the colour of the office having an effect on a person's mood and work performance. Thus, colour schemes assist in creating attention, which is important in employee performance. Without a high level of concentration and attention, employee performance will be low. Kamarulzaman *et al.* (2011) state that proper guidance should be provided for colour considerations to improve productivity.

Moreover, Kort and Smolders (2010) argue that factors all too common in the office are those of stress and attention fatigue, thus office workers' well-being are impacted impacting by the potential environmental feature of lighting. Studies highlighted by Silvester and Konstantinou (2010) suggest lighting as one of several factors that combine to create a healthy work environment, employee well-being and productivity.

Chua *et al.* (2016) state that for office work with infrequent writing and reading, a lux reading of about 200 is required. The optimum level of lighting lies between 280 and 150 lux. A variety of interrelated health symptoms, including that of difficulty in concentration, becoming easily tired, dry skin, and stuffy, tired or dry eyes, have been found to be associated with ambient working conditions, such as temperature, humidity and lighting. Chua *et al.* (2016) postulate that research has proven the existence of a relationship between lighting, relative humidity and room temperature,

and health-related issues such as feeling stuffy, becoming easily tired, poor work performances and experiencing difficulty concentrating. Therefore, the health of a building's occupants are impacted by the surrounding physical environment comfort, as is employee performance.

Effects of interior plants on performance
Both passively and actively interacting with plants can alter the attitudes of humans, their physiological responses and their behaviours. Samani (2015) contends that there are well documented benefits of stress reduction from the passive viewing of plants in natural settings. Daly, Burchett and Torpy (2010) note findings where plants were found to significantly improve indoor air quality in office buildings, whether they do or do not have air-conditioning. Moreover, plants have been found to significantly reduce carbon dioxide and air-borne plastics in an office. Daly *et al.* (2010) further state that plants' presence have been shown to be directly linked to office workers' productivity and improved performance. Studies conducted by Bringslimark, Hartig and Patil (2007) reveal a 30 to 60 percent reduction in feelings of anxiety, stress, and low spirits among university staff, resulting from plants in the office.

Furthermore, the effects of plants in offices on employee performance have also been studied by Smith, Mathew and Michael (2011), who assert that benefits of plants include the offer of contributing to the wellbeing of employees and a guarantee of enhancing employee perception, while further determining that buildings with interior planting are perceived by employees to be more relaxed and welcoming. The study further revealed where employees work in offices with indoor plants they were less nervous and anxious. When participants had no indoor plants in their work environment, the highest degree of anxiety and tension was noted. Thus Smith *et al.* (2011) concluded that in offices with plants and windows employees reported feeling more positive regarding their work and their job, thus contributing positively to employee performance. Similarly, Thomsen, Sønderstrup-Andersen and Müller (2011) note that ornamental plants and views of nature in an office environment are associated with higher job satisfaction. Siphoning from the above discussion, it is apparent that interior plants can wield a positive impact on university administrators' performance.

Thomsen *et al.* (2011) attest that employees' mood can be improved and positive feelings invoked by placement of ornamental plants in workplaces. This concurs with the view that physical discomfort can be reduced with the presence of plants in office settings. Therefore, the presence of plants in an office environment contributes positively to employee performance.

It is against this backdrop that this study purports to measure DUT employees' perceptions of the impact of the physical environment comfort on their performance.

2.10   SUMMARY

This chapter reviewed studies and published findings on issues of perceptions with regard to the workplace environment and its impact on employee performance. The issue was reviewed from the industry perspective in an effort to determine existing gaps on the same issue, but with a higher education sector focus. It emerged that most available studies were conducted in the business industry. The identified lacuna serve to justify and strengthen the current study conducted in higher education among office employees with regard to their perceptions concerning the impact on their performance by their work environment. Some environmental factors identified in literature include furniture, noise, temperature, and office design, as well as colours, the inclusion of plants and the view from the office to the outside. The next chapter discusses the approach and methodology adopted in conducting this study that is set in a higher education environment.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 INTRODUCTION

As revealed through the literature review in the previous chapter, employees are more likely to produce better work outcomes when they are satisfied with their physical work environment. Elements of the physical work environment that influence employee attitude, behaviour, satisfaction and performance were determined and include design of the workplace, the office colour, interior plants, and the indoor temperature, as well as lighting, noise, and ventilation. Further to this, one of the key aspects the literature review revealed lies in difficulties encountered when measuring physical work environment comfort, because of complexity created by individual employees' varied perceptions of work environment comfort. This results in each element generating singular values on employees' satisfaction and behaviour. It is, therefore, of paramount importance that top management has a clear understanding of the manner in which organisational employees perceive the physical work environment in an office.

The research methodology that this study employed is outlined and explained in this chapter, with discussion on the research design and approach, the study's target population, sampling, and research instruments, as well as data analysis method and ethical considerations.

3.2 RESEARCH DESIGN

The design of a research study deals with the plan adopted for activities to be undertaken in a research proposal, outlining the strategy to be implemented to fulfil the objectives of the study. As a means to organise a research project, Tashakkori and Teddlie (2010) state that the research design considers all aspects from the inception of such a programme in order to increase the prospect of producing verification and allowing for accessible answers to the research questions for the resource level provided. In addition, Kothari (2004) explains the focus of research design as being adapted to decisions that deal with the research study's context,

objectives, study area, and means to achieve outcomes. According to Bhattacherjee (2012), the design of a research study is the outlined plan that highlights activities to be performed so that research questions may be answered. In this study, a case study design is used to satisfy the research objectives that have been identified.

On the one hand, Kothari (2004) explains that a case study is basically a framework wherein complete and careful observations of a unit are made that endeavour to undertake a detailed study of all aspects of the unit being observed, after which a broad view is outlined and conclusions are drawn from the case data obtained. On the other hand, Howitt and Cramer (2011) posit that a case study intensively investigates a particular unit, with the study being either quantitative or qualitative. Furthermore, the definition espoused by Adams, Raeside and Khan (2014: 98) describe a case study as: "…an in-depth study which explores issues, present and past, as they affect one or more units (organisation, group, department or person)." The emphasis of a case study is, thus, on a contextual analysis of events, interrelations and conditions. Adams *et al.* (2014) further state that the use of case studies allows a researcher to determine whether a particular method could be successful in a specific setting.

DUT is used as the unit of analysis in regard to this study, with thorough inquiry made at the university to establish the perception of physical environment comfort on office employees' performance. On the merits of case study for this research, Bhattacherjee (2012) notes that because of their extensive nature, case studies allow for the collection of an abundance of information, thus, allowing for conclusions that are more precise to be elicited. Apart from being flexible where various data collection methods are concerned, for example, questionnaire, secondary documents, and interviews, researchers are further assisted through case studies to better grasp the motivation for particular decisions that arise from their participation in the studied subject.

Notwithstanding these advantages, the biggest setback in case study design that Howitt and Cramer (2011) identify is its narrow focus on the setting of the case, which means it may not offer adequate information from which to derive valid generalisations for other institutions. This is largely due to the differences and

uniqueness of each organisation, although to a certain degree of some inferences can be generalised to other institutions.

3.3   METHODOLOGY

The standardisation of the process of research to realise the established objectives is known as the research methodology. As explained by Adams *et al.* (2014: 5): "…research methodology is the science and philosophy behind a research". In explaining the manner in which knowledge is created, the method of research underlies 'how people know what they know'. However, research methodology, as Kothari (2004) argues, transcends mere research methods, incorporating the reasoning for the method choice that is implemented in the research study's context. It, additionally, expounds the motivation for the use of a specific method as opposed to alternative methods, in order that the end results may be evaluated by the researcher or others.

Kumar (2011) states that research methodology validates knowledge creation, taking specific care of the practice used to create knowledge that will result in it being acceptable, usable, and trustworthy. Moreover, in this manner the research problem is solved systematically. This systematic method is comprised of the research approach, design, instruments, and procedure/method of sampling, along with the sample frame and size, ethical factors to be considered, the study limitations and delimitations, as well as data analysis and presentation.

3.4   RESEARCH APPROACH

Whereas Kelly (2011) iterates that a research approach signifies a collection of theoretical and philosophical commitments that impacts decisions made regarding the choice of data collection and analysis methods, a research approach may also be a description of the research initiative's orientation adopted during data collection and analysis. In the light of this definition, the understanding of the research approach will focus on the technique of data collection a research study adopts. The approach of the research study can be one of two types, namely: qualitative, where there is a greater emphasis on words than on measurement and approximation, or quantitative, where the study is centred on variables and consists of unpredictable

associations between concepts that are well-defined (Kelly, 2011; Bryman and Bell 2011).

This research study employed a mixed methods approach, which is best explained as a combination of the qualitative and quantitative approaches. Creswell and Clark (2011) define the research approach wherein mixed methods are employed as a method with focus on the collection, analyses, and mixing of both qualitative and quantitative data in one study. As argued by Johnson and Onwuegbuzie (2004), the virtue of the mixed method approach to research is that it ensures achieving more extensive, detailed, and varied data as both quantitative and qualitative approaches allow for matching information on the same occurrence.

Deriving its strong points from the corresponding manner of both approaches, a mixed method approach to research allows these strengths to counteract any weakness the other approach may have. The underlying rationale is that the combined use of qualitative and quantitative approaches results in more clarity of the research problems, which are so multifaceted they require answers that are beyond mere numbers in quantitative sense and words in a qualitative sense. Combining these two methods, thus, allow for a thorough analysis of the problem.

For this research, the mixed method approach is imperative as perceptions are qualitative in nature, while measuring entails a quantitative approach. Hence, the research problem warrants the adoption of a mixed method approach. Moreover, some of the physical environmental factors, such as humidity and temperature, are better expressed using a quantitative approach. Nonetheless, the effects of some physical environmental elements, for example, the colour of the office paint, on performance can be better investigated through a qualitative approach. Therefore, the use of a mixed method, employing a combination of qualitative and quantitative approaches, offers better comprehension of the research problem, as opposed to either approach being employed on its own.

3.5   TARGET POPULATION

The research participants researchers are interested in are known as the target population, which refers to the group of objects or individuals in its entirety that allow

the researcher through its use, to make generalised conclusions from the study while, generally, the population characteristics vary. According to Castillo (2009), a target population is also identified as the theoretical population. Effective research is explained by Sekaran and Bougie (2009) as requiring a clearly defined study population to permit determining a sample size that is representative and be obviously reducible or generalised.

This study's target population comprised academic administrative staff based at all DUT campuses in Durban and Pietermaritzburg and six Heads of Departments (HoDs). Academic administrative staff members were selected as the focus of the study because of the critical supportive role they provide to both the academic staff and students in an institution with its core business being academic in nature. The selection of HoDs for interview purposes was because of their accessibility as personnel who hold managerial positions that enable them to influence change in faculties, allowing employees in their departments to perform to their capacity and be effective. HoDs have access to Deans and their deputies and join them at some of the strategic meetings designed to help improve the overall functioning of academic departments and the academic institution as a whole.

3.6   SAMPLING

According to Cooper and Schindler (2003), the manner by which participants are selected from a total population to participate in the research is referred to as sampling. The rationale behind sampling is that the population is extensive and it will be costly and time consuming to make use of the entire population. Sampling encompasses detecting those from the target population who will be included in the study. Kumar (2011: 193) states that "sampling is the process of selecting a few from a bigger group to become the basis for estimating or predicting the prevalence of an unknown piece of information, situation or outcome regarding a bigger group". As Bhattacherjee (2012: 65) explains, sampling comprises "the statistical process of selecting a subset of a population of interest for purposes of making observations and statistical inferences about that population".

Two broad categories constitute sampling, namely: probability and non-probability sampling. Etikan, Musa and Alkassim (2016) reiterate that non-probability sampling

is a technique of sampling whereby samples are collected through a process that does not offer all population units or participants an equal opportunity to be included. The sample of the study that relates to a bigger group is the DUT staff, yet, non-prabability sampling is used by focussing only on administrative staff members and all HoDs available to assist. Such an approach is referred to as census since all participants will have an equal opportunity to be imcluded.

Bhattacherjee (2012) states that a census study is when the size of the whole population is quite small, to the extent that the whole population is included. It is referred to as a census as data is collected on every population member. Lavrakas (2008) attests that the attempt to list all group elements and determine one or several aspects of those elements through measurement is known as a census, providing in-depth and extensive information on all or most population elements.

According to Adams *et al.* (2014), the use of a census consists of generalised and simplified ways of collecting data that are unable to deal with concepts that are complicated or focused on subgroups that are diverse. Bhattacherjee (2012) emphasises that a census relies on cheap methods of collecting and recording data, with the merits of this method of choosing participants being that accurate and reliable data is obtained from each and every unit concerned. Therefore, this study focussed on all 81 administrative staff and six HoDs that were accessible and willing to assist.

3.7   DATA SOURCES
Both primary and secondary sources of data were utilised so as to acquire a detailed understanding of the study area.

Primary Sources
Velentgas, Dreyer, Smith and Torchia (2013) describe primary data sources as the kind of information directly obtained from the participants by the researcher. This could take various forms, such as in person or by relying on suitable technology. First-hand data is provided by primary sources of data gathered to satisfy the research needs. Primary sources of data are explained by Greener (2008) as those created during the research process, allowing the research objectives to be

achieved. Greener (2008) further asserts that data are gathered from these sources either by recording or witnessing events or conditions being documented. Primary data were collected in this research study by means of a questionnaire and interviews.

Secondary Sources

Greener (2008) refers to secondary data sources as data not directly collected from the participants by the researcher. No direct connection exists between the subjects or events being researched or these documents. It is argued that this resembles more of a review of existing information in what is known as statistical data manipulation in the quantitative context (McDonald and Headlam 2015). The authors further point out that since this method is divorced from the researcher's present needs, it is indirect; however, through interpretation and presentation it can offer insights.

3.8 RESEARCH INSTRUMENTS

A questionnaire and semi-structured interviews were used by the researcher in the collection of data. This section elaborates on these two tools by providing the rationale behind their choice and how they were administered.

3.8.1 Semi-Structured Interviews

On the one hand, Leedy and Ormrod (2010) define an interview as the initiation of a two-way conversation by a researcher so as to gather information from a respondent. On the other hand, although guided by predetermined questions, there is a degree of flexibility in semi-structured interviews as the interviewer can pose probing questions. Kothari (2004) notes that new ideas may be raised during the interview when using semi-structured interviews as they are more open. This is confirmed by Kumar (2011), who highlights the advantages of semi-structured interviews as including the freedom they offer in terms of content and structure. This allows for questions to be formulated and issues raised contingent on the discussion's context. This means the researcher has the flexibility to pose probing questions and obtain comprehensive qualitative data on administrators' perceptions.

In this study, interviews were conducted with the HoDs following a formulated schedule. Semi-structured interviews encapsulate the collection of both qualitative and quantitative data, thereby concurring with the research approach of this study.

3.8.2 Interview design

Buckingham and Saunders (2007) and Leedy and Ormrod (2010) recommend the use of interviews as they are reliable, allowing an interviewer to use a written list of questions that can be prepared beforehand for one-on-one interaction with an interviewee. For this research, the list of questions was formulated using the study objectives articulated in the first chapter. Participants were required to express their understanding of the variables in question, that is, employee performance and physical environment comfort, in response to the first two questions. The rest of the questions were formulated to solicit employee perceptions on the physical work environment element and its effect on employee performance.

3.8.3 Questionnaire

Kumar (2011) defines a questionnaire as a list of written questions with the respondents recording the answers. Questions were read by the respondents who interpreted the questions and then responded to them in writing. Sekaran and Bougie (2009) clarify use of a questionnaire as a well-known tool through which data may be collected, with researchers able to obtain data fairly easily in this manner, while responses to a questionnaire may be coded more easily and truthful data obtained for questions that are sensitive without the need for face-to-face interactions. In many research endeavours, a questionnaire is indubitably a primary source through which to obtain data. Kelly (2011) acknowledges the use of a questionnaire as being a relatively inexpensive way of collecting data. The questionnaire administered consisted of mainly closed-ended questions, with a single open-ended question (Appendix 1).

An open-ended question was included as this type of question allows participants to frame and convey their own responses and ideas. A 5-point Likert-type rating scale with the following categories was used in the questionnaire: strongly agree/ agree/ neutral/ strongly disagree and disagree and numerical ratings ranged from one to five. A space for 'additional comments' was included to offer respondents an

opportunity for inserting any information they felt had been excluded from the Likert-scale questions. The questionnaire was administered to academic administrative staff across all six DUT faculties, including the Pietermaritzburg campuses. A questionnaire was chosen as a measuring instrument because of its potential to reach as many respondents as possible, allowing for both reliability and data analysis within a short space of time (Bryman and Bell 2011).

3.8.4 Questionnaire design

The questionnaire was designed to collect both quantitative and qualitative data. In collecting quantitative data, a 5-point Likert-type scale with numerical ratings was used to measure employees' perceptions on physical work environment elements and their effect on their performance. In collecting qualitative data, an open-ended question was included, which provided participants with the leeway to express their perceptions.

3.9   METHOD OF DATA ANALYSIS

The analysis of data is the process whereby raw data is turned into information that is able to, in turn, serve as a basis from which to develop theories, concepts, understanding or explanations. Data analysis is defined by Somekh and Lewin (2011) as the way in which data are inspected, cleaned, transformed and modelled, in order to highlight information that may be useful, while conclusions may also be suggested and decision-making supported. To make the raw data more meaningful and agreeable, it has to be processed and sorted to provide answers. Qualitative data analysis, according to Bhattacherjee (2012), concerns making sense of a phenomenon or understanding it through the use of text data that are extracted from scripts of a completed questionnaire and interviews.

To fulfil the objective of data analysis, Miles and Huberman's (1994) data analysis method was used, which is described as as a process comprising three activity flows, namely: data reduction, display and verification or the drawing of conclusions. The reduction of data is an action whereby data are selected, simplified, focused, and abstracted, as well as transformed; this organising and sorting of data is done in a manner allowing final conclusions to be reached. As soon as tangible field notes are available, along with tapes and interviews, other instances of data analyses may

be utilised, such as summaries of data, subsequent coding, determining of themes, and clustering of data, as well as writing stories of further data condensation and selection.

Furthermore, the second activity flow, that is, data display, entails an organised, compressed information assembly allowing for the drawing of conclusions or taking action. Charts and graphs are included as displays with the researcher needing to see a reduced set of data under this activity to serve as a basis for considering its implications. Structured synopses or summaries may be included in more focused displays.

The third activity flow comprises drawing conclusions with the analyst deciding on the meaning of the data, while patterns are noted, in addition to clarifications, causal flows and suggestions. Tactics used range from assessment of relationships or differences, documenting themes and patterns, clustering, and metaphor use to substantiating or validating tactics, for example, triangulation, seeking out negative cases and verifying results with respondents.

These processes are further stated by Miles and Huberman (1994) as occurring prior to the collection of data, in the process of study planning and design, at the time of and after data collection and even as the final product is considered and concluded. Miles and Huberman's (1994) data analysis method was, therefore, be employed for qualitative data analyses.

Quantitative data were analysed using descriptive statistical analysis. Bhattacherjee (2012) states that use is made of descriptive statistics to summarise collected data and through the use of frequency analysis and graphs, allowing an understanding of the information. The advantage of this technique is that it enables the establishment of patterns and distribution of the study variables. Closed-ended questions were used to determine perceptions regarding the critical factors of physical environment comfort on employee performance.

3.9.1 Pilot testing

To ensure the questionnaire would yield consistent results, a pilot test was performed. Pretesting was conducted on employees from six study institutions to ensure understandability and readability of the questionnaire, with corrections made as and where needed. These respondents were, however, not included in the study sample.

3.10   ADMINISTRATION OF QUESTIONNAIRES

The study questionnaire was personally administered by the researcher. Sekaran and Bougie (2009) attest that when research is limited to a local area, effective data collection is possible by means of a self-administered questionnaire. This way of administering a questionnaire was convenient for the researcher, being a student at DUT. Participants were visited at their workstations and requested to complete the questionnaire at their convenience, but within a period of five working days. A covering letter of information and consent accompanied each questionnaire that was distributed. Administration of the questionnaire was conducted from May to June 2019.

3.11   CONDUCTING INTERVIEWS

As guided by Sekaran and Bougie (2009) on the importance of self-administered data collection, interviews were conducted with selected participants, who were chosen based on indication of their willingness to avail themselves for interviews. The interviewees were HoDs and interviews were conducted at the participants' offices at a time convenient to them. In order to prompt the participants, 11 guiding questions (Appendix 2) were prepared. Interviews were conducted in September and October 2019 with each session lasting approximately 15 minutes.

3.12   ETHICAL CONSIDERATIONS

Ethics in research, according to Bhattacherjee (2012), deals with the moral difference between what is considered as right and what is considered as wrong. Where Kelly (2011) is concerned, the branch of philosophy concerned with morality denotes ethics. In other words, it aligns with the intent or purpose of moral conduct and the manner in which this objective can be achieved by people. Being mindful of this, ethics can, thus, be comprehended in the context of observing specific or

prescribed moral standards that Bhattacherjee (2012) states, are frequently outlined at regulatory level. Fouka and Mantzorou (2011) postulate that ethics where research is concerned, entail conditions applicable to daily work, safeguarding subjects' dignity and the publication of research information. Ethics encompasses decision-making dynamics with regard to what is seen to be either right or wrong. The ethical considerations observed by the researcher during the course of the research study are as follows:

- Authorisation and access – Permission and authorisation for access to the study location in the form of a gate-keepers letter and ethical clearance from the DUT Research Ethics Committee (Appendix 3) were obtained before any research commenced.
- Confidentiality and Anonymity – In adherence to this principle, participants' identities were protected by ensuring their identities were not disclosed in research instruments, but merely referred to them as participants or respondents.
- Use of obtained data – the data gathered were used for academic purposes only.
- Participants were informed the purpose of the study by means of a cover letter that explained the study objectives, the study beneficiaries and implications of the results. The documentation also included a request for their consent to participate, in addition to general information, so they could make an informed decision whether they were willing to participate in this study.
- Voluntary Participation – taking part in the study was done on a voluntary basis and participants could withdraw whenever they felt the need to do so without fear of consequence.

3.13   SUMMARY

The chapter presented the research methodology adopted for the study, with the methodology described as a mixed method approach in the sense that a questionnaire was utilised as the data collection instrument, alongside interviews. The analysis of data was, therefore, both quantitative and qualitative. The sample selected for the collection of data consisted of office employees in a higher education environment at six DUT campuses located in Durban and Pietermaritzburg in the province of KZN. Critical ethical issues were also detailed in this chapter, with regard

to matters of obtaining a gatekeeper's letter and alerting participants to their rights. The next chapter details findings generated through methods of data collection, as discussed in the current chapter.

CHAPTER FOUR
DATA ANALYSIS AND DISCUSSION

4.1   INTRODUCTION

With the previous chapter having outlined and discussed the study's research methodology and design, this chapter proceeds with the data analysis and sets out the findings. In the preceding chapter, mention was made of sampling techniques, the target population, data collection instruments and ethical issues that were considered. It was pointed out that the study adopted a mixed-research approach in which a questionnaire and structured interviews were used in collecting data among office employees of the six DUT campuses. A total of 81 office employees completed the questionnaire. In addition, the study involved the participation of six HoDs who were interviewed.

The findings that resulted from analyses of the data collected are, therefore, reported on in this chapter. Analysis of the responses to questionnaire was done through the use of the Statistical Package for Social Sciences (SPSS) version 25.0, with the findings presented in the form of descriptive statistics using graphs, tables and figures.

4.2   STATISTICAL ANALYSIS

In order to ensure quality in analysis of the collected data, the services of a qualified statistician were sourced. Version 25.0 of the SPSS was relied upon as a tool in conducting the analysis. Descriptive and inferential analysis were utilised as statistical methods for the empirical data sets. On the one hand, a descriptive phase assisted in defining the data features through the use of graphs, tables and figures. On the other hand, the inferential phase served to draw inferences that involved correlation use and Chi square test values.

4.2.1 Descriptive analysis

Descriptive analysis is the process undertaken once data has been collected. This process involves procedures undertaken by researchers to simplify collected data by summarising and organising it in the form of graphs and tables in order to display data in frequency and percentage form (Anastas 2013; Peck, Olsen and Devore

2016). In organising the data in this format, the researcher was able to conduct comparative and contrastive analysis of variables in a reader-friendly manner (Lacobucci and Churchhill 2010).

4.2.2 Inferential statistics and Chi-square

Inferential statistics are useful as a means to analyse and evaluate data obtained from the targeted population so that the researcher can make informed assumptions for references (Krishnaswami and Satyaprasad 2010). This process requires the use of the three available inferential statistical tests known as z test, t test and the chi-square. These tests serve different purposes. While the z test and the t tests help to define parameters or characteristics of the population, the chi-square test is simply known to define non-parameters because it is not used to define the parameters of the population.

4.2.3 Reliability

Leedy and Ormrod (2010) and Neuman (2011) describe reliability as the degree to which data collection techniques can be depended upon to produce accurate and consistent results. To ensure reliability, necessary measures were taken to ensure the tool used was of a reliable nature by, amongst other things, conducting a pilot test and seeking guidance from the project supervisor. In addition, Cronbach's Alpha was used to measure the extent to which a set of variables match. Hence, the accuracy of the collected data as displayed in Table 4.1.

Table 4.1: Reliability statistics

Variable	No of items	Cronbach alpha
Office design and furniture	4	0.804
Office noise levels	5	0.762
Office temperature levels	5	0.775
Office electrical lighting	4	0.778
Office privacy	2	0.724
Office spatial arrangement	3	0.797

The scores, shown in Table 4.1, are in line with recommendations per the Cronbach's alpha value of 0.70. As reflected earlier, the sections' scoring had acceptable scores of reliability.

4.2.4 Kaiser-Meyer-Olkin Measure and Bartlett's test

Results of the Kaiser-Meyer-Olkin (KMO) Measure and Bartlett's test of appropriateness are presented in Table 2.

Table 4.2: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.803
Bartlett's Test of Sphericity	Approx. Chi-Square	154.585
	Df	15
	Sig.	.000

The analysis (Table 4.2) presents acceptable conditions for factor analysis. In this case, the value of the KMO measure is > than 0.500 with Bartlett's Test of Sphericity offering a sig. value of < than 0.05. It can, therefore, be concluded that the data obtained from office employees is appropriate.

4.3   RESPONSE RATE

The number of questionnaire distributed to academic administrators was 100. It is interesting to note is that the response rate shows as many as 81 (81 percent) of the questionnaire were returned and found usable. The notable high success rate is attributed to the questionnaire having been hand-delivered and personally collected from the participants. This was facilitated by that the researcher being a student at the university and having previously worked as a part-time employee of the university.

4.4   PRESENTATION OF THE FINDINGS

As addressed in Chapter three, the study used of a mixed-method approach with both qualitative and quantitative data collected. The questionnaire comprised 24 closed-ended questions and one open-ended question. The semi-structured

interview consisted of 11 questions. The data presented first in this section are the results of the questionnaire.

4.5   THE QUESTIONNAIRE

The questionnaire was divided into five sections and designed to provide data on the themes indicated below:

Section A: Biographical data

Section B: Factors of physical work environment

Section C: Other physical environment factors

4.5.1 Biographical Information of Participants

Biographical information was sought through the use of four questions. The questions were on gender, age, administrative work experience and the faculty the participants belonged to.

4.5.1.1 Gender

Table 4.3: Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	FEMALE	45	55.6	55.6	55.6
	MALE	36	44.4	44.4	100.0
	Total	81	100.0	100.0	

The gender distribution between females and males who participated in the study (Table 4.3) shows the participants comprised 45 (55.6 percent) females and 36 (44.4 percent) males. This finding suggests a reasonable balance between female and male staff members who perform administrative duties in this institution. However, it should be remembered that the office administration environment is traditionally dominated by females, even though this picture is now changing. It is, therefore, not a surprise that the majority of administrative staff members who were willing to participate in the study, rather than the actual statistics as provided by the HR office of the institution, were female.

4.5.1.2 Age group

Table 4.4: Age Group

Age	16-25YRS	26-35YRS	36-45YRS	46-55YRS
Frequency	4	31	44	2
Percentage	4.9	38.3	54.3	2.5

The age distribution of the participants is displayed in Table 4.4. The 16-25 years age group, had as little as 4.9 percent of participants. This is unlike the high number of participants in the 26-35 years group at 38.3 percent and the 36-45 years group at 54.3 percent. Again, in the 46-55 years group there was a limited number of respondents at 2.5 percent. The findings are consistent with the general situation in the country, where the majority of young graduates are unemployed.

4.5.1.3 Years of administrative experience

Table 4.5: Work experience

	<Less than 1yr	1-5yrs	6-10yrs	11-15yrs	Above 15yrs
Frequency	3	10	34	32	2
Percentage	3.7	12.3	42.0	39.5	2.5

The majority of participants were well-experienced (Table 4.5). This makes their responses of value because they can be assumed to be reporting on something they know very well. In this regard, those with less than one year experience as administrators were at 3.7 percent. Similarly, the group between one and five years was as low as 12.3 percent. However, the 6-10 years group was remarkably higher at 42 percent. Close to this was the 11-15 years' experience group at 39.5 percent. Beyond 15 years of work experience, the results show a mere 2.5 percent of participants. The figures on work experience are consistent with the age-groups of the participants, as discussed in the preceding section. The majority of participants indicated their age-group to be in the 26-35 years age range (38.3 percent) and 36-45 age-group (54.3 percent), which matches the work experience of the majority in the 6-10 years (42 percent) and the 11-15 years (39.5 percent) range.

4.5.1.4 Faculty of the participants

Table 4.6: Faculty distribution

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Acounting_Informatics	2	2.5	2.5	2.5
	Arts_Design	14	17.3	17.3	19.8
	Applied_Sciences	11	13.6	13.6	33.3
	Health_Sciences	14	17.3	17.3	50.6
	Management_Sciences	32	39.5	39.5	90.1
	Engineering_Builtenv	8	9.9	9.9	100.0
	Total	81	100.0	100.0	

The distribution of administrative employee participants across the University faculties (Table 4.6) indicates that all six faculties were represented in the study. However, the numbers per faculty are skewed because participants from the Faculty of Management Sciences are the highest at 39.5 percent. This should be understood in the context of the study that falls within the Faculty of Management Sciences and the fact that the researcher could easily access them. On a positive note, the high number of administrative employees from this faculty indicates they would likely have a better understanding of the study and make a better contribution. This, in no way, suggests that the rest of the participants are not to be trusted because they also work in the same administrative environment and would have the same qualifications as those from the Faculty of Management Sciences. Health Sciences had 17.3 percent participants, which was similar to those from the Faculty of Arts and Design (17.3 percent), with Applied Sciences at 13.6, Engineering Built Environment at 9.9 percent and the lowest response from Accounting Informatics at 2.5 percent.

### 4.5.2 Factors of Physical Work Environment

The second section of the questionnaire required the office employees to report on the physical environment in which they worked. This line of questioning was inspired by Naharuddin and Sadegi (2013), who argue that factors such as the physical work environment, equipment and standard operating procedures can affect employees'

performance. The intention was, therefore, to understand whether the physical environment affected office employees' performance at DUT. This section consisted of four sub-sections, with between four and five statements each. The respondents were required to agree or disagree with the statements by ticking either Strongly Disagree (SD), Disagree (D), Neutral (N), Agree (A), or Strongly Agree (SA).

The following statements are based on office furniture as a factor to employee performance.

4.5.2.1 Office furniture as a factor on employee performance

The first sub-section comprised four statements based on office furniture as a factor of employee performance. The first of these statements required respondents' views with regard to office furniture comfort and its influence on employee performance.
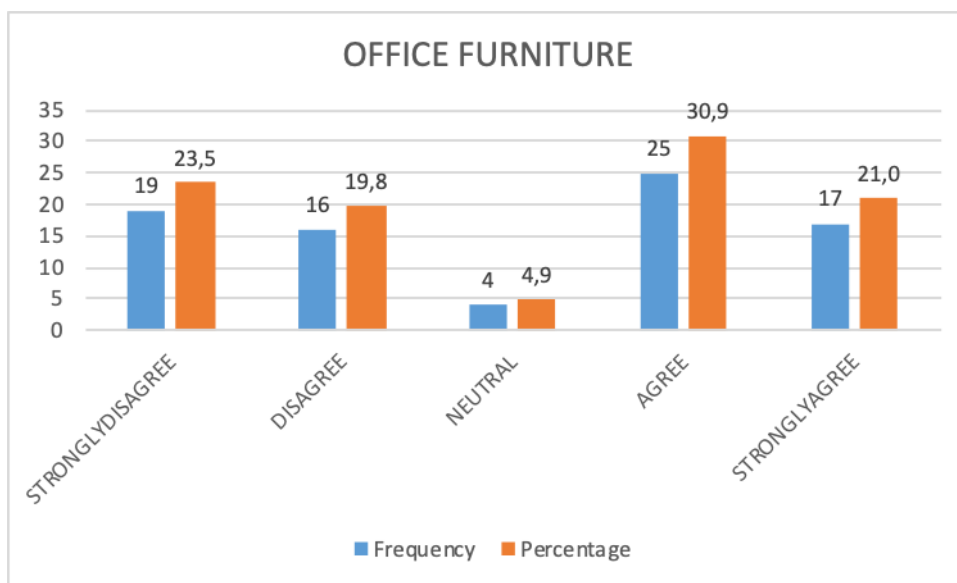
Figure 4.1: Office furniture

The results (Figure 4.1) indicate agreement by a majority of the respondents (30.9 percent) with the statement that office furniture comfort influences employee performance. This was followed by 21 percent of those that strongly agreed, making the aggregate level of agreement 52 percent. Those that strongly disagreed were at 23.5 percent and those that disagreed 19.8 percent. The overall number of the respondents that disagreed was, therefore, at 43 percent. The gap between those who agreed and those who disagreed was very small, suggesting a division among

respondents. A mere 4.9 percent of respondents were uncertain about this statement regarding the connection between office furniture comfort and employee performance.

The second statement sought to establish whether office furniture was flexible enough to enable rearrangement by employees.
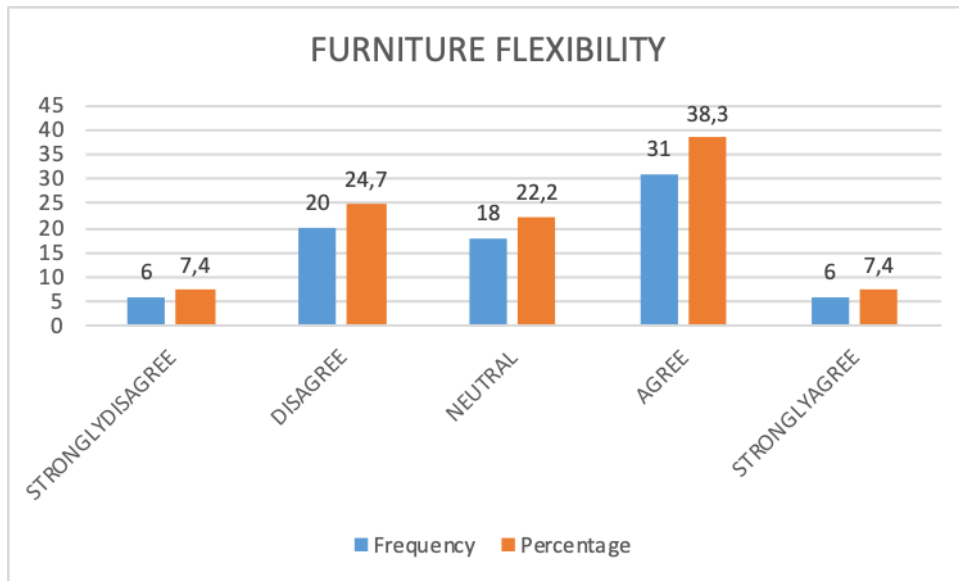
Figure 4.2: Furniture flexibility

A 38.3 percent level of agreement is illustrated, followed by 7.4 percent among those that strongly agreed, with disagreement levels at 24.7 percent among those that disagreed, followed by 7.4 percent of those that strongly disagreed. A concerning high number of respondents were neutral in their response to this statement. The overall response was, therefore, 45 percent agreement and 32 percent disagreement (Figure 4.2). This suggests that while some offices were spacious enough to enable furniture rear rangement, others were not.

The third statement indicated that office furniture was comfortable enough to allow employees to work comfortably enough so as not to be physically strained.
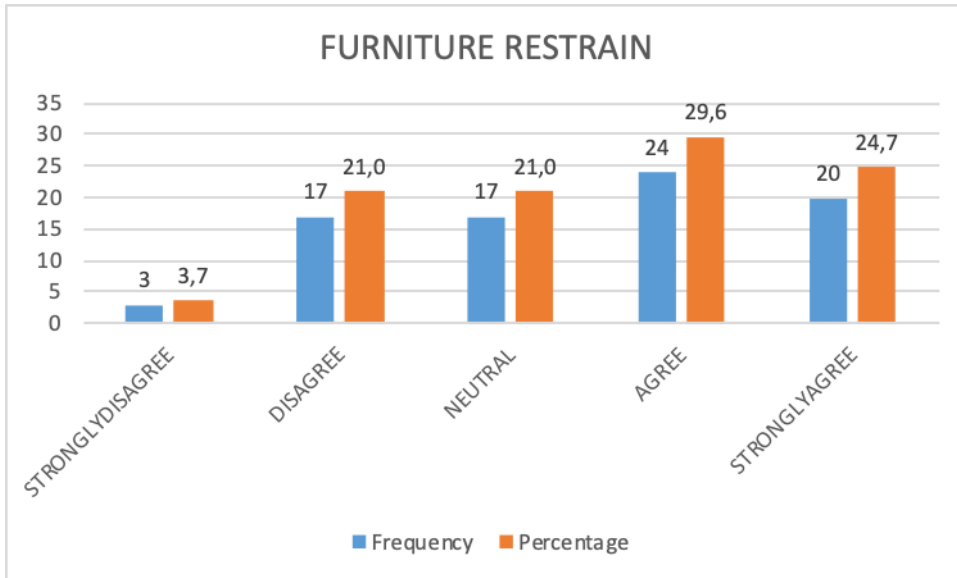
Figure 4.3: Furniture restrain

A very positive response is reflected (Figure 4.3), since there was agreement indicated by the majority of respondents who either agreed (29.6 percent) or strongly agreed (24.7 percent) with the statement. The overall positive response was, therefore, at 55 percent. This was unlike the low levels of dissatisfaction with furniture that was perceived to be restraining. In this case, 21.0 percent disagreed and 3.7 percent strongly disagreed that their furniture was comfortable enough for them to work without being physically strained. Even though this group is smaller than those who agreed with the statement, it is still high enough at 24 percent for it to warrant concern. This figure is even more concerning when seen together with those who were neutral on the issue, at 21 percent.

The fourth statement aimed to obtain respondents' views concerning the office furniture being comfortable enough to enhance the performance of the administrative staff.
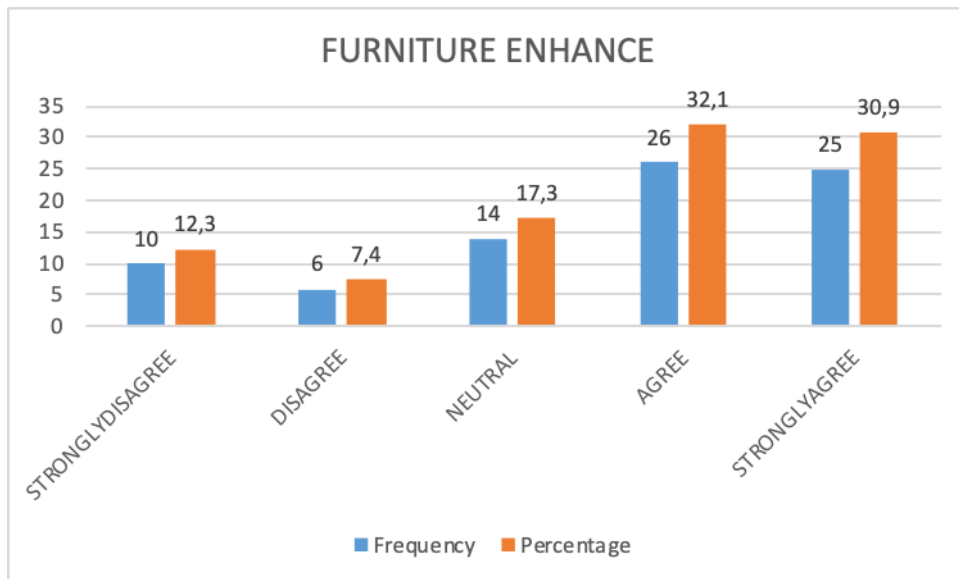
Figure 4.4: Furniture enhance

Very high levels of satisfaction are reflected (Figure 4.4) with the comfort of the furniture being beneficial to the enhancement of performance. This is evident in that 32.1 percent agreed and 30.9 percent strongly agreed. The positive responses give an overall 63 percent support of the statement. As a result, very few respondents either strongly disagreed (12.3 percent) or disagreed (7.4 percent). The negative responses translate to an overall 19 percent when combined. This leaves almost the same number of 17.3 percent as neutral to the statement.

The following statements are based on office noise level as a factor to employee performance.

4.5.2.2 Office noise level as a factor

Parveen *et al.* (2012) assert that noise can be a source of dissatisfaction for employees because of its potential to impact negatively productivity. Hence, the next set of five statements garnered the views of the respondents on the amount of noise levels as a factor that impacted on their work performance.

The first statement insinuated that the noise level around offices at DUT was distracting.
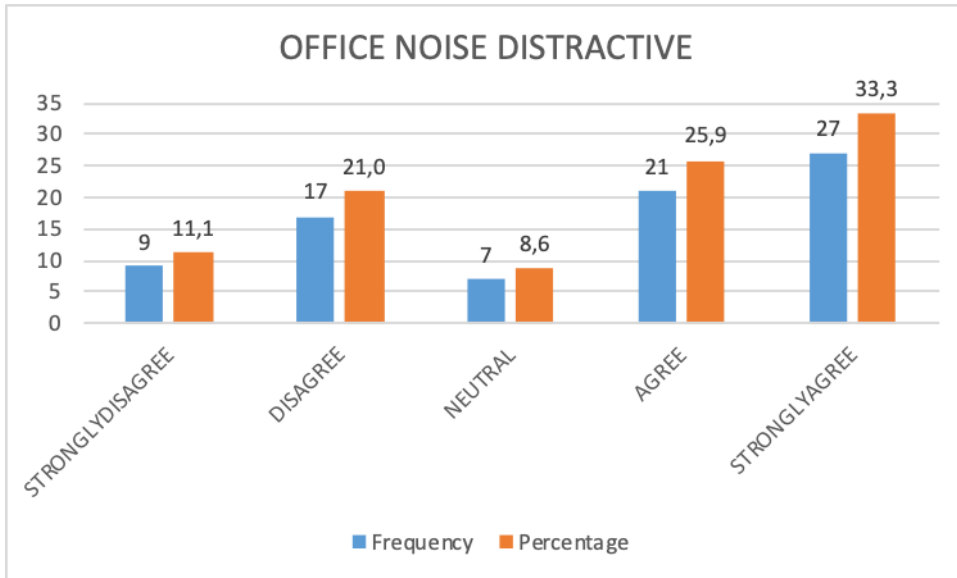
Figure 4.5: Office noise distractive

The majority of the respondents (Figure 4.5) found noise levels to be distracting in their work environment. This is evident in the fact that 33.3 percent of respondents strongly agreed and 25.9 percent agreed, making 59 percent. This was, however, not surprising in a University environment, where there is likely to be groups of students in the hallways moving between lectures. A smaller percentage of respondents strongly disagreed (11.1 percent) and disagreed (21.0 percent) with the statement regarding noise levels as being distracting at the workplace. The results, therefore, indicate that noise levels in and within the office environment negatively influence the performance of administrative staff. This finding is consistent with the argument put forward by Parveen *et al.* (2012) regarding noise as a source of dissatisfaction for employees.

The second statement under this section described noise levels as influential in plummeting productivity levels in the office environment.
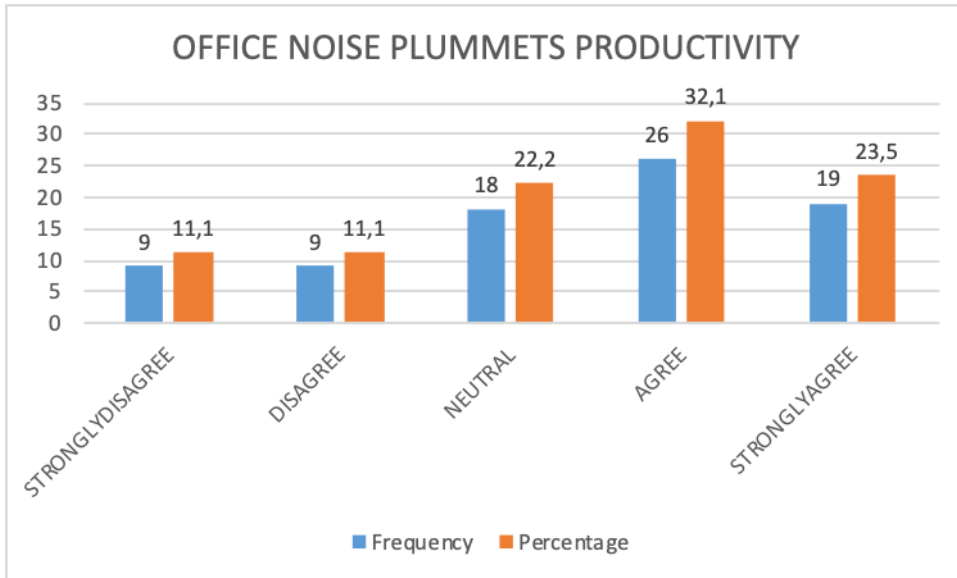
Figure 4.6: Office noise plummets productivity

There was a high level of agreement with regard to the negative impact of noise on productivity levels (Figure 4.6), with a total of 56 percent of participants who thought their productivity drops when there are high levels of noise. In this high agreement, 23.5 percent strongly agreed and 32.1 percent agreed. In contrast, only 22 percent disagreed, with an equal number between those who strongly disagreed (11 percent) and those who disagreed (11.1 percent), and 22 percent remaining neutral to the statement.

The third statement made a suggestion to the effect that noise levels contribute to poor performance.
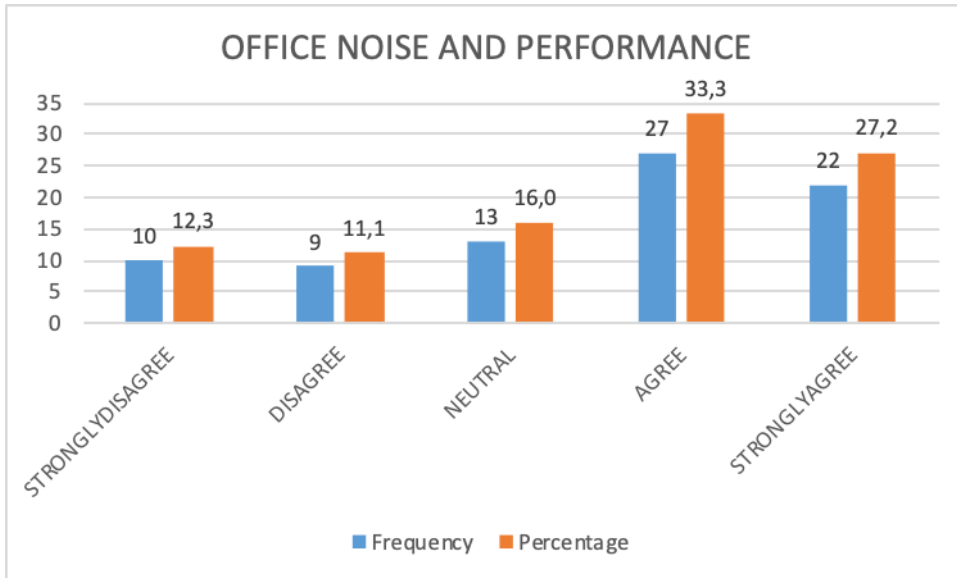
Figure 4.7: Office noise and performance

The results displayed in Figure 4.7 show the majority (60 percent) of respondents concurred that noise levels contribute to poor performance. This is reflected in a combnation of 27.2 percent that strongly agreed and 33.3 percent who agreed. This high level of agreement is consistent with responses received in the previous two statements. Only 23 percent of respondents did not view levels of noise as negative towards their work performance. These respondents were divided between those that strongly disagreed (12.3 percent) and those that disagreed (11.1 percent). Neutral respondents formed only 16 percent.

The fourth statement indicated that multi-tasking becomes difficult when there is office noise. The responses to this statement are displayed (Figure 4.8) below.
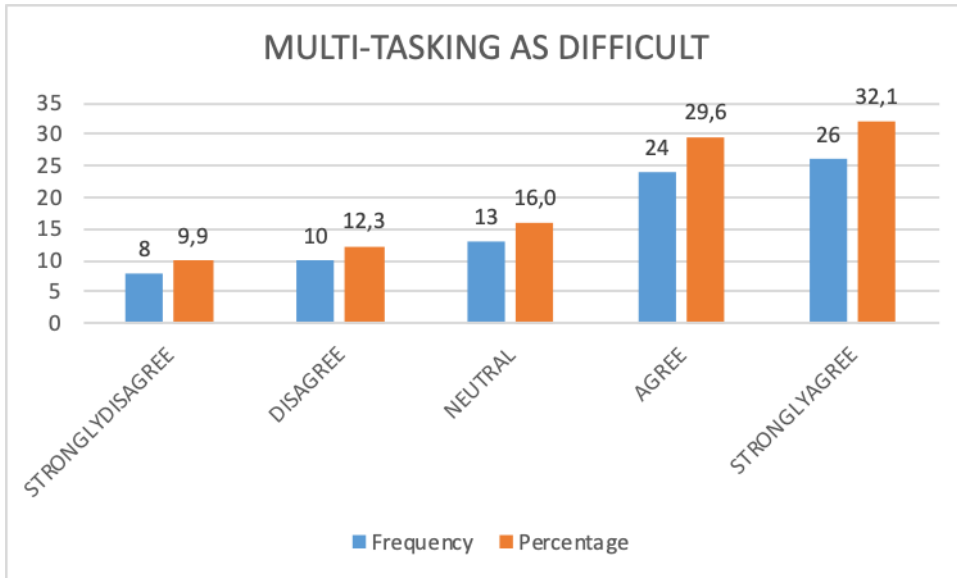
Figure 4.8: Multi-tasking as difficult

The above results in Figure 4.8 show the majority (62 percent) of respondents supported the statement regarding multi-tasking being a challenge when there is noise in the office environment. A breakdown of the aggregate percentage shows 32 percent of the respondents strongly agreed and 29.6 percent agreed. Disagreement was indicated by 22 percent of the respondents that did not think noise levels in the office interfere with their ability to multi-task. In this case, 9.9 percent strongly disagreed and 12.3 percent disagreed. Uncertainty was indicated by 16 percent whether there could be difficulty when it comes to multi-tasking because of noise in the office.

The fifth and last statement indicated that motivation to do work is affected by office noise levels. The results on this statement (Figure 4.9) are displayed below.
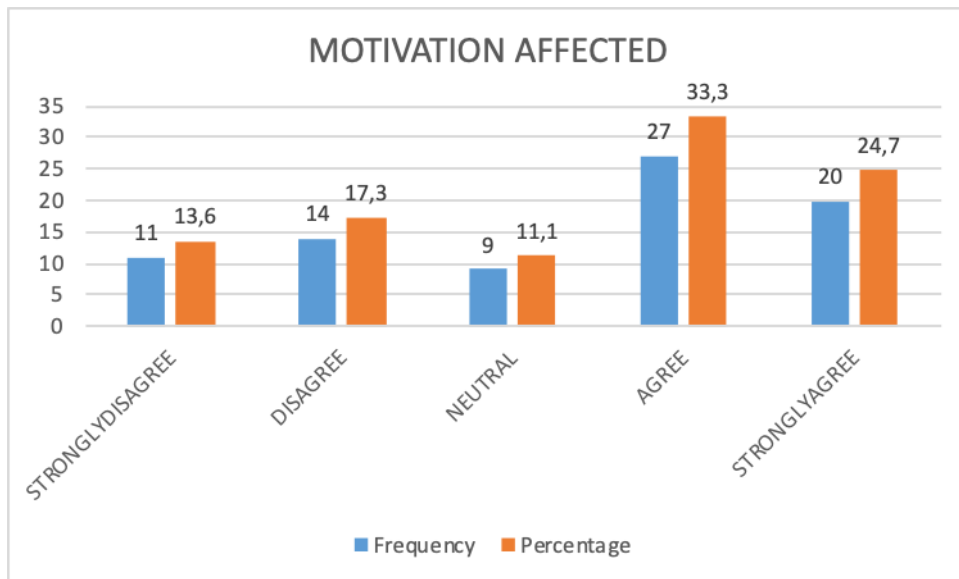
Figure 4.9: Motivation affected

A high degree of agreement was indicated (Figure 4.9) by the majority (58 percent) of office employees concerning their motivation to conduct their duties as affected by noise levels. The breakdown of these demotivated respondents because of noise levels shows that 24.7 percent strongly agreed and 33.3 percent agreed. This stands in contrast with the 13.6 percent who strongly disagreed and 17.3 percent who disagreed that office noise level affects their motivation to conduct their duties. This score suggests a reasonably high number (31 percent) of highly motivated employees that do not allow noise levels to distract them from doing their office work. In addition, 11 percent of respondents were neutral on this matter.

The findings generally confirm the view expressed by a number of authors with regard to noise as detrimental to performance. For instance, Nassiri *et al.* (2013) and Samani (2015) are in agreement on the subject of noise being distractive to the point that it can affect cognitive workloads, resulting in poor employee performance.

The following statements are based on office temperature levels as a factor to employee performance.

4.5.2.3 Office temperature levels as a factor in employee performance

Ajala (2012) avers that unfavourable workplace temperature levels lead to less motivated employees, which can contribute to a drop in their performance. Hence, the next set of five statements was intended to understand the views of office

employees who participated in the study, regarding the extent to which office temperatures could have an impact on their performance.

The first of these statements suggests that office temperature levels affect employees' performance. The responses are displayed in Figure 4.10.
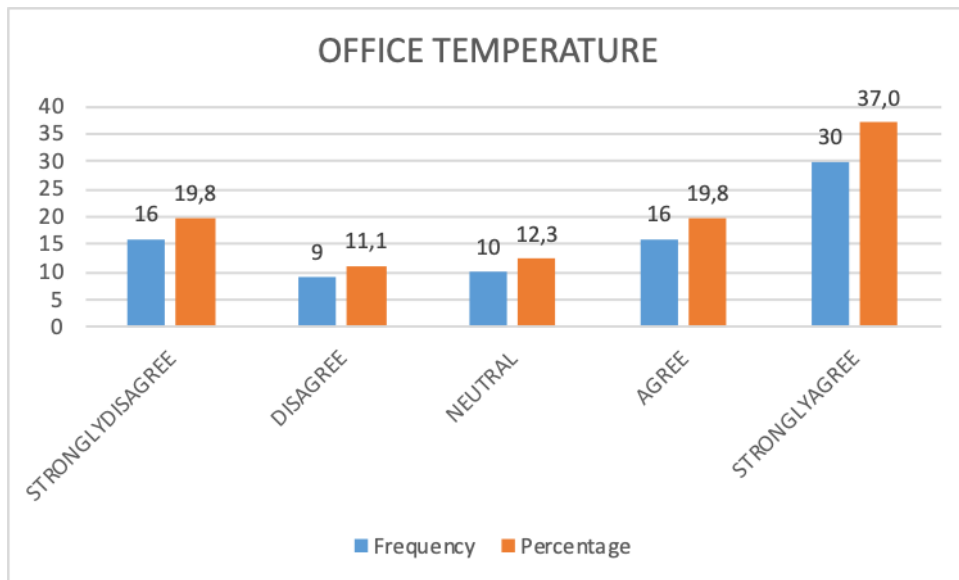
Figure 4.10: Office temperature

The overall response shows the majority (57 percent) of respondents found office temperatures to be an inconvenience in performing their duties. This was evident in that 37.0 percent strongly agreed and 19.8 percent agreed with the statement. The number of those who had a different view shows 19.8 percent strongly disagreed and 11.1 percent disagreed with the statement, while 12 percent were neutral.

The second statement indicated that productivity suffers when it is too hot in the office. The responses from the office employees who were part of this study are displayed in Figure 4.11.
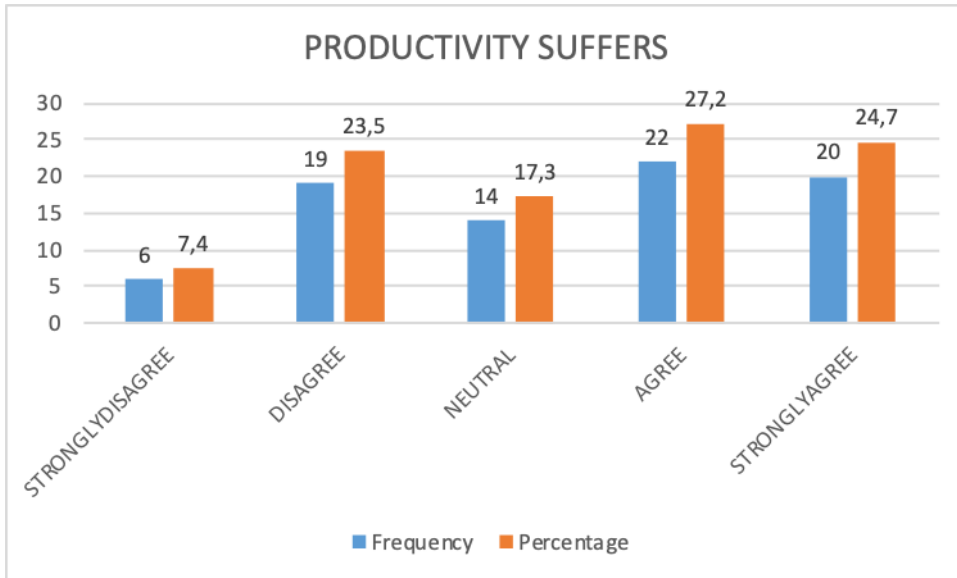
Figure 4.11: Productivity suffers when it is too hot

As many as 24.7 percent of respondents strongly agreed and 27.2 percent agreed with the statement concerning high temperatures being detrimental to productivity (Figure 4.11). Surprisingly, 31 percent of respondents suggested they are still able to work productively, despite high temperatures in their office environment. In this case, 23.5 percent disagreed and 7.4 percent strongly disagreed with the statement. To add to this figure, 17.3 percent of respondents were neutral to the statement concerning productivity being disrupted by high office temperatures. It was surprising some office workers were uncertain about how seemingly unbearable temperature impacted their productivity.

The third statement concerned cool temperatures as being best suited for excellent performance. The views of the respondents on this statement are shown in Figure 4.12.
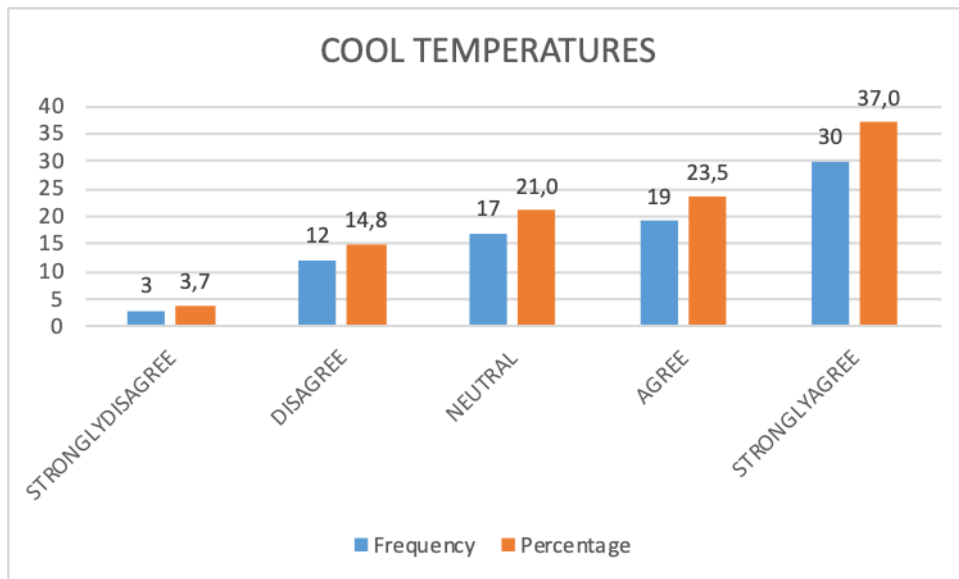
Figure 4.12: Cool temperatures

The results in Figure 4.12 indicate that 37 percent of participants strongly agreed and 23.5 percent agreed that cool temperatures are best suited for excellent performance. In total, the statement was supported by a majority of 60 percent of respondents. The high support was not unexpected, since it is normal for most employees to want to be in a cool environment whilst working. It is not surprising, therefore, that only 3.7 percent strongly disagreed and 14.8 percent disagreed with what would be considered as a normal expectation for office temperatures to be cool. The respondents who were unsure about their views on the matter were at 21 percent. Their uncertainty, including those participants who disagreed (18 percent) with the statement, could be understood in the context of an office environment that would be too cold for one to perform excellently. It is, indeed, not uncommon to hear complaints about office spaces that are too cool for one to bear. In offices where employees are unable to control the temperature one would see papers and tapes put around the area that releases cool air, in an attempt to block it.

Overall, the findings match the results of studies by Ajala (2012), La *et al.* (2010) and Parveen *et al.* (2012) with regard to the role of workplace temperature on employee performance. In a nutshell, if the temperature levels are favourable performance will be good, if not, the opposite will happen.

As a follow-up to the previous statement, the fourth statement sought to understand whether office employees were able to control their office temperature. This was stated against a background where it is common for either organisations or different buildings within one organisation to have different types of cooling systems. Some are centrally controlled, whereas others would be office controlled. The responses are displayed in Figure 4.13.
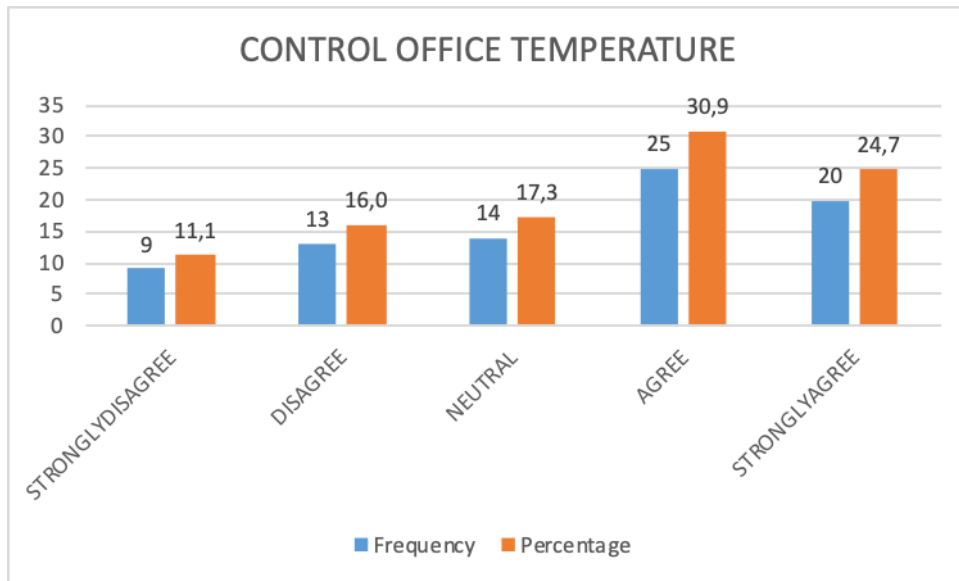
Figure 4.13: Control office temperature

A situation in which most offices have stand-alone air conditioning systems reflects strong agreement by 24.7 percent and 30.9 percent of agreement by respondents with the statement that they are able to control their office temperature (Figure 4.13). There were only 11.1 percent of respondents that strongly disagreed and 16 percent that disagreed. As many as 17.3 percent were strangely unsure what one could have thought was an either or scenario. This may be taken as a case where, perhaps, someone else within a shared office environment would tend to dominate the control of the office temperature. At the same time, the results regarding those who indicated neutral could be taken as consistent with the responses that emerged in the previous statements, where not everyone would be comfortable with the same temperature. For example, someone with low blood pressure would not be comfortable being in a cool environment, whereas this would be favoured by someone with high blood pressure. The person to find and keep the remote control

first on the day, if not most of the time would, therefore, adjust the temperature to suit their preference.

The fifth and last statement in this sub-section aimed to understand whether there were enough office windows that allowed fresh air and adequate lighting. The responses are illustrated in Figure 4.14.
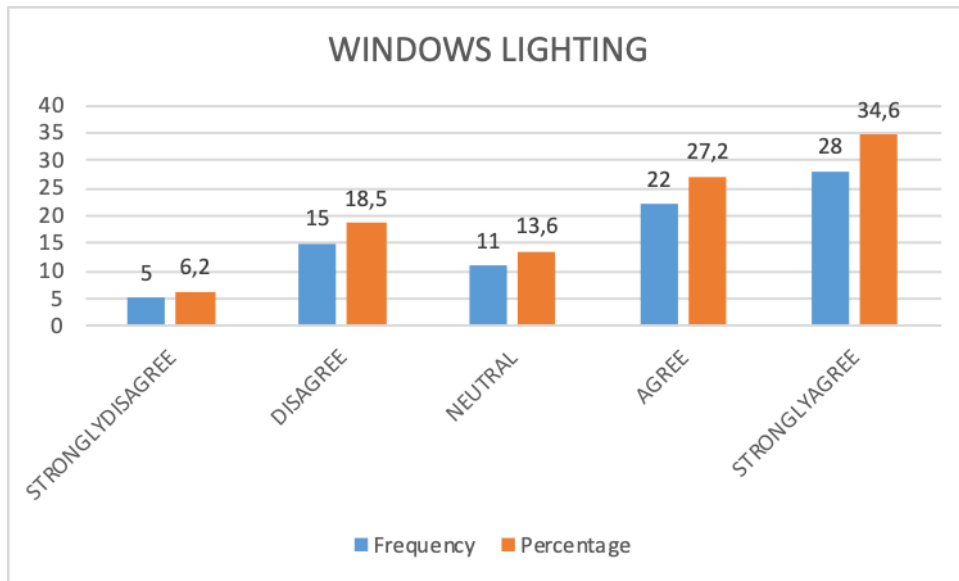
Figure 4.14: Window lighting

The majority (62 percent) of respondents (Figure 4.14) indicated there is sufficient fresh air and lighting in their office space. In this case, 34.6 percent of the respondents strongly agreed and 27.2 percent agreed with the statement. Among the remaining respondents, it was found that 6.2 percent strongly disagreed, 18.5 percent disagreed and 13.6 percent were neutral.

The following statements are based on office electrical lighting as a factor affecting employee performance.

4.5.2.4 Office electrical lighting as a factor

Chua *et al.* (2016) and Silvester and Konstantinou (2010) concur that lighting is one of several factors that affect staff performance due to the amount of reading and writing involved in their work. Hence, this sub-section inquired as to whether office

electrical lighting is a factor in employee performance. The sub-section consisted of four statements.

The first statement was with regard to electrical lighting in the office as being comfortable enough to support undisturbed performance. The responses are shown Figure 4.15.
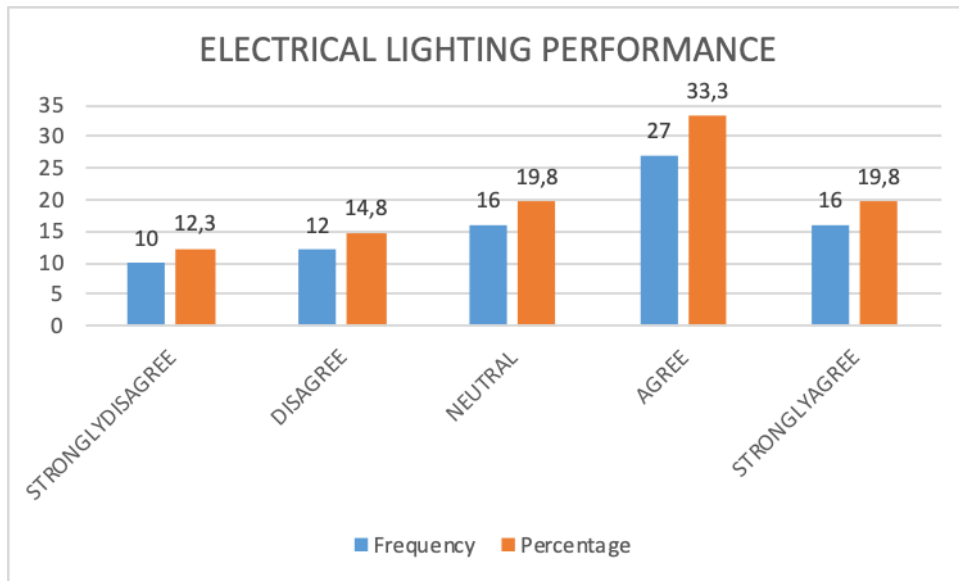
Figure 4.15: Electrical lighting and performance

The results, as depicted in Figure 4.15, show that 19.8 percent strongly agreed and 33.3 percent agreed that electrical lighting in their office was comfortable enough for them to have their performance undisturbed. In contrast, 12.3 percent strongly disagreed and 14.8 percent disagreed, whereas 19.8 percent were neutral.

The second statement was regarding whether or not an ample amount of natural light comes into offices. The responses are presented in Figure 4.16.
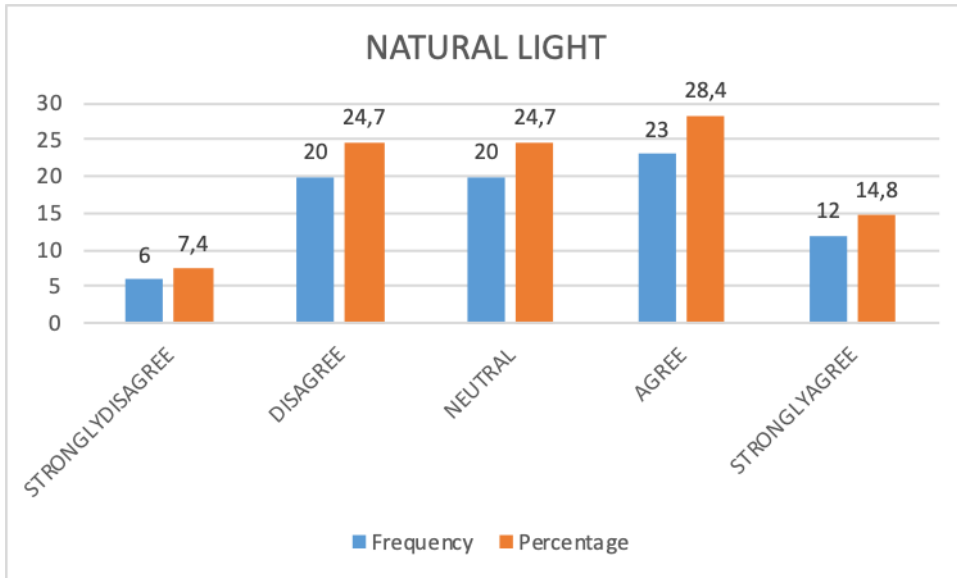
Figure 4.16: Natural light

Figure 4.16 indicates that 14.8 percent of respondents strongly agreed and 28.4 percent agreed there was an ample amount of natural light coming into their offices. This was, however, not the case for other respondents, since 7.4 percent strongly agreed and 24.7 percent disagreed. The remaining 24.7 percent were neutral.

The third statement concerned the efficiency of electrical lighting in the office that supported employees to work without straining their eyes. Figure 4.17 presents the responses received from participants.
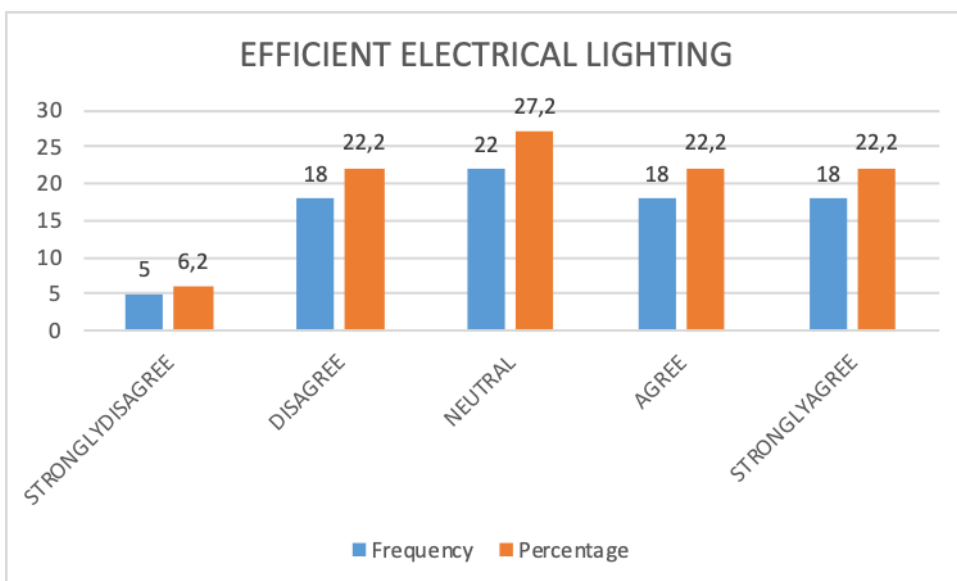
Figure 4.17: Efficient electrical lighting

Figure 4.17 shows some equal division in opinions on the matter of efficient electrical lighting. This is evident in that 22.2 percent strongly agree, 22.2 percent agree and 22.2 percent disagree. The difference is that 6.2 percent disagree, while 27.2 percent are neutral. This may suggest some discrepancies in how offices are maintained and serviced by the maintenance department of the institution. At the same time, it could just be an indication of varying personal views on the matter.

The fourth and last statements indicated that office employees have control over the lighting in their offices. Their responses are reflected in Figure 4.18.
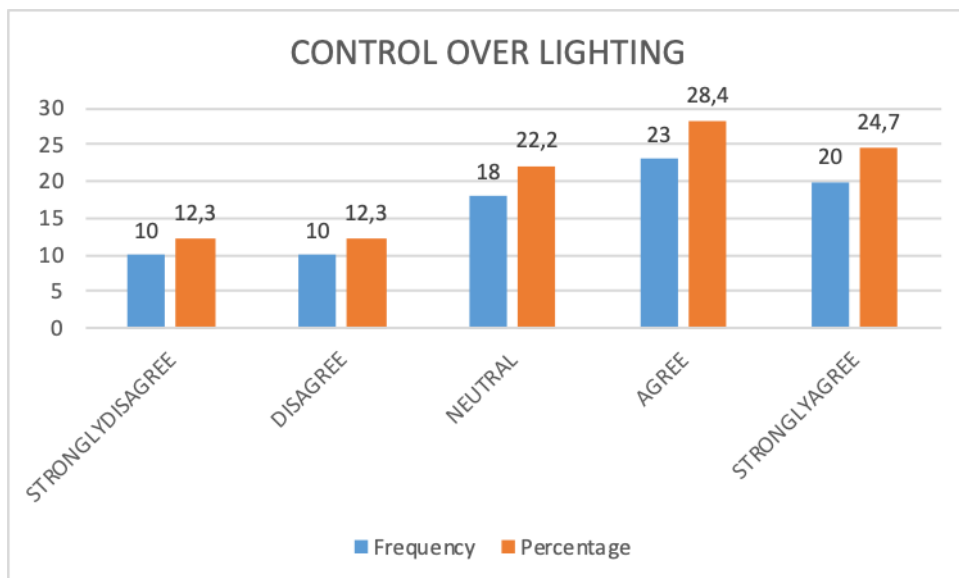
Figure 4.18: Control over lighting

The responses displayed in 4.18 show that 24.7 percent of the respondents strongly agree and 28.4 percent agree that, as employees, they have control over lighting in their offices. Among those respondents that disagreed, it was found that 12.3 percent strongly disagreed and 12.3 percent equally disagreed. The remaining 22.2 percent were neutral, suggesting uncertainty about whether they have control or not. The uncertainty and split in views may suggest lack of clarity in the statement as it did not specify the type of control the respondents were expected to report on. As a result, the statement could have either been construed to mean control of electrical switches or natural light that would be controlled by opening doors and windows. In respect of electrical lights, it is not uncommon for buildings to have a central switch

so that all lights can be switched off after working hours as a measure to save electricity. In other cases, offices will either have a switch or a body movement detector to provide employees some control over the lights in their offices.

Irrespective of areas of differences among the participants, it is, however, clear that the views of the majority are consistent with earlier research findings which identify lighting as critical to employee performance (Chua *et al.* 2016; Kort and Smolders, 2010).

4.5.3 OTHER PHYSICAL ENVIRONMENT FACTORS

There are many other factors that can either impact negatively or positively on employee performance. These factors include office space layout (Kamarulzaman *et al.* 2011; Saleem *et al.* 2012), design (Hameed and Amjad 2009) and colours (Garris and Monroe 2005; Silvester and Konstantinou 2010). As a result, the last sub-section of the questionnaire aimed to elicit participants' views on these other physical environment factors in their office work environment and how they impact on performance. This sub-section analyses responses to five related statements.

4.5.3.1 Office space layout

The first of these statements was on the significant impact made by office space layout on employee performance. The responses are shown in Figure 4.19.
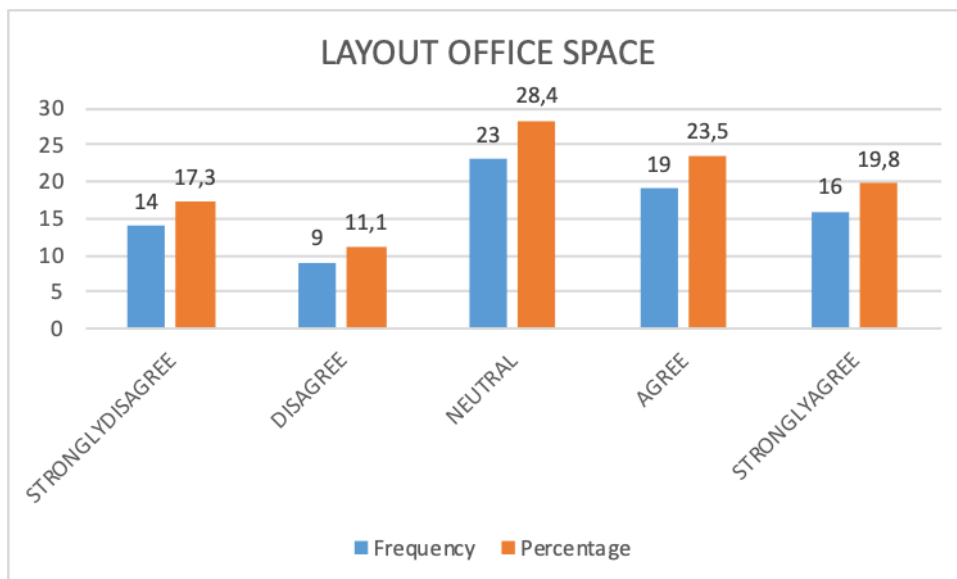
Figure 4.19: Office space layout

61

A split in views is reflected in Figure 4.19 on the effect of office space layout on employee performance. On the one hand, 19.8 percent of respondents strongly agreed and 23.5 percent disagreed. On the other hand, 17.3 percent strongly disagreed and 11.1 percent disagreed, while 28.4 percent expressed a neutral view. These different views suggest a lack of uniformity in how offices are arranged. In some cases, it may not even be easy to tell whether the layout is favourable or not to employees' performance, judging by the high number of those that indicated neutral (28.4 percent).

4.5.3.2 Amount of office space

The second statement was with regard to employees' satisfaction with the amount of space in their office. Their responses are displayed in Figure 4.20.
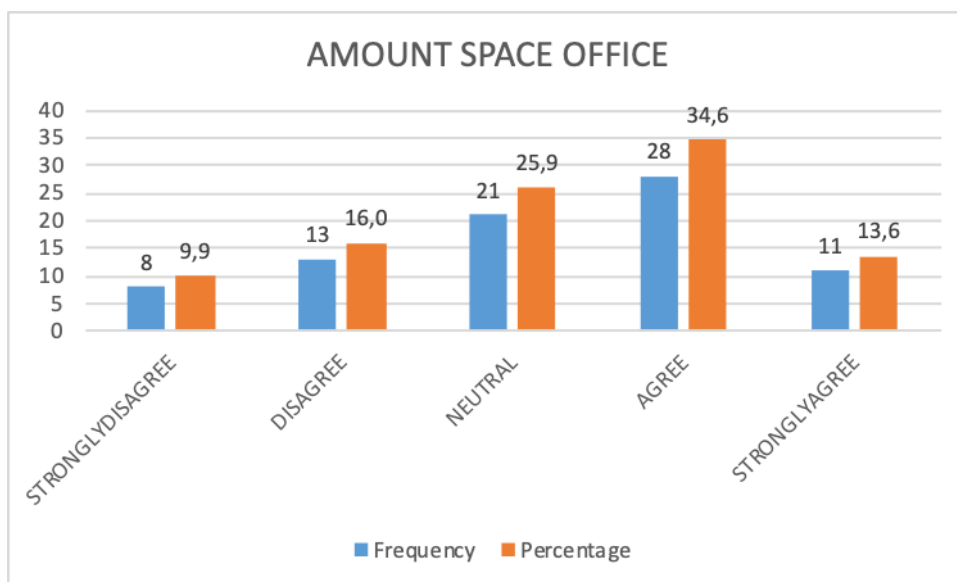
Figure 4.20: Amount of space in office

Different levels of satisfaction are indicated (Figure 4.20) with regard to the amount of office space by different employees. It appears that 13.6 percent of respondents strongly agreed with the statement and 34.6 percent agreed. The respondents that strongly disagreed are at 9.9 percent and those that disagreed are at 16 percent. The neutral response shows a high number at 25.9 percent. The general picture that emerges is that the university is doing well as the majority of respondents are satisfied (48 percent), while the minority (26 percent) are not. The neutral group of respondents is also high at 26 percent; as with those that are unhappy. This may

suggest that there is still room for improvement by the university in addressing the issue of office space.

4.5.3.3 Employee privacy

The third statement suggested that employee privacy in the office leads to better performance. The responses of the participants are shown in figure 4.21 below.
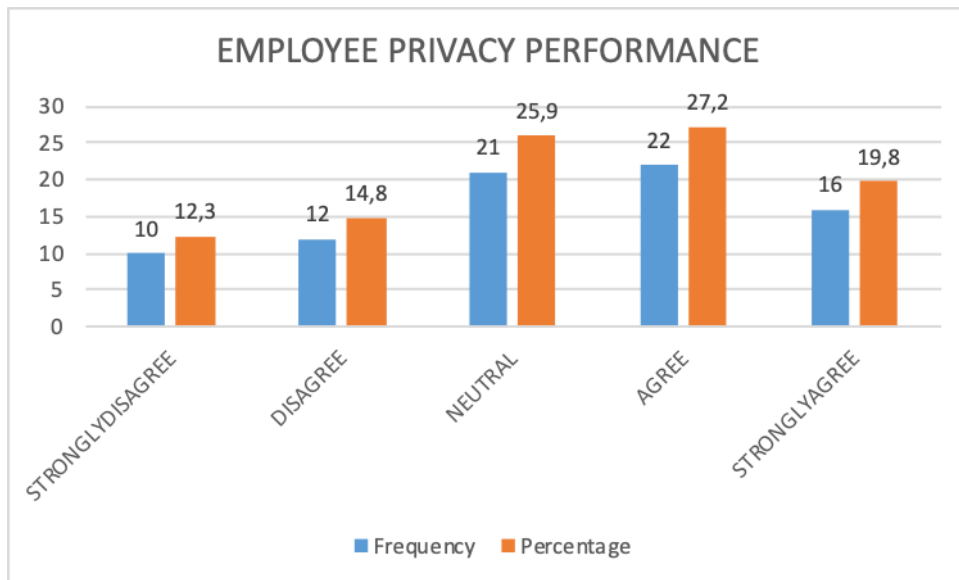
Figure 4.21: Employee privacy and performance

It is shown in Figure 4.21 that 19.8 percent of respondents strongly agreed and 27.2 percent agreed that employee privacy in the office leads to better performance. This translates to 47 percent agreement with the statement. In contrast, only 14.8 percent disagreed and 12.3 percent strongly disagreed, making it a 27 percent disagreement. Close behind this was a 26 percent neutral view of the issue at hand. While the majority of respondents perceived employee privacy in the office as a contributory factor to their improved performance, the remainder of the respondents were almost equally split between those who disagreed (27 percent) and those who were neutral (26 percent).

4.5.3.4 Office colour painting

The fourth statement insinuated that the colour in which the office was painted could affect employees' comfort. The reaction of the participants to this statement is reflected in Figure 4.22.

63
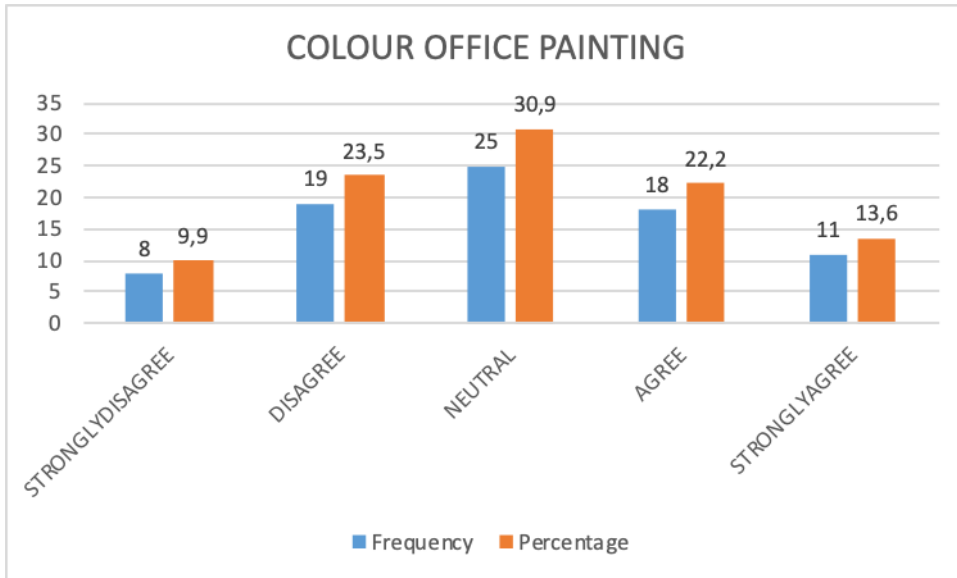
Figure 4.22: Colour in which office is painted

On the colour in which the office is painted and its effect on comfort, the results show in Figure 4.22 show that 13.6 percent of respondents strongly agreed and 22.2 percent agreed the paint colour could affect performance, in contrast with 9.9 percent that strongly disagreed and 23.5 percent who disagreed. The different percentages translate into 36 percent in support, against 24 percent negative views regarding the statement. Responses that were neutral towards the statement were quite high at 31 percent, suggesting respondents either could not see the connection between the colour in which the office is painted and their comfort or that their offices were not marked by any colours that would stand out enough to affect them. The university might need to look into this area and make use of the students and lecturers of design available at City Campus.

4.5.3.5 Office design

The last statement of this sub-section, related to the previous one, indicated that office design affects performance. Participants' responses are shown in Figure 4.23.
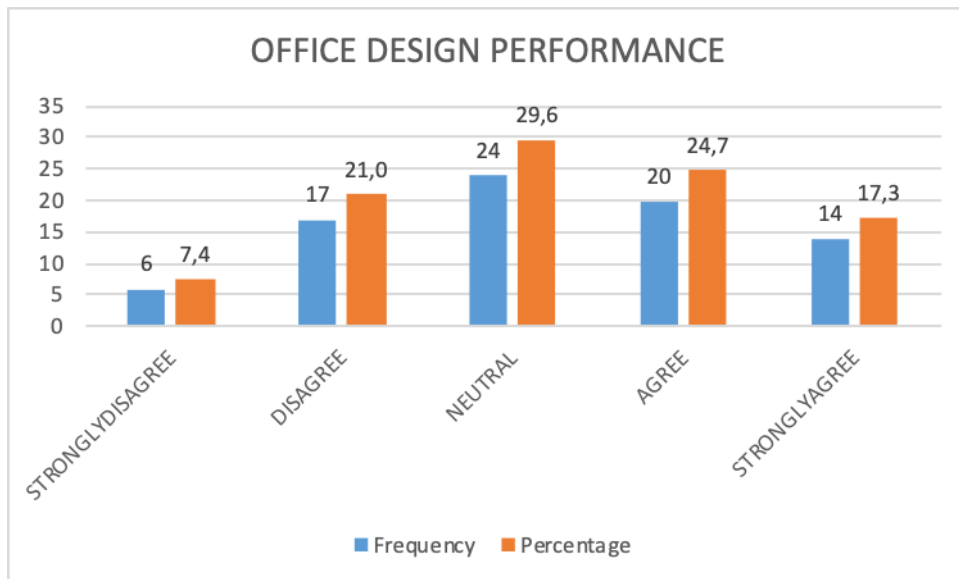
Figure 4.23: Office design and performance

The results in Figure 4.2 show that 17.3 percent strongly agreed and were supported by 24.7 percent of respondents that also agreed. This means 42 percent concurred that office design affects performance. In contrast, 28 percent disputed this statement because 7.4 percent strongly disagreed and 21 percent disagreed. There were as many as 29.6 percent that were neutral about the role of office design on employee performance. This neutral group on office design is similar to the one that emerged in response to the previous statement regarding office colours and comfort.

The last part of the questionnaire was an open-ended question, which required participants to make recommendations that could enhance the environment comfort in their office, in order to enhance performance. Disappointingly, there were no responses to this question. Hence, no report can be made.

4.6   SEMI-STRUCTURED INTERVIEWS

As part of the semi-structured interviews, a list of 11 questions was prepared for discussion with six HoDs who had indicated their availability and willingness to participate. The selection of HoDs was made after interviews with the initially targeted Deputy Deans proved to be very difficult to secure because of their busy schedules. The questions were structured in such a way that they encapsulated the collecting of both qualitative and quantitative data. Discussion of the limited form of quantitative data emerged in a form of 'Yes' and 'No' responses that the participants

had to provide before explaining why they agreed or disagreed with the scenario the question presented. In addition, participants could express a neutral answer ('Not Sure') in case they were uncertain with regard to what related to their workplace environment.

The discussion on data collected reflects on both qualitative and quantitative data that emerged during interviews.

The first question was structured as follows:

1.   Do you think physical environment comfort has a positive influence toward staff productivity? Yes/No. Please support your answer.
This question received a 100 percent affirmation from all the participants with an overwhelming "Yes". The reasons provided in support of this positive response included:

> *Because without proper physical comfort one cannot perform well.*
> *Because the environment of office motivates one to work.*
> *Because office must be comfortable in order for one to perform better.*
> *Because without proper office performance would be bad.*
> *Without comfort no production. Very important for the staff to have proper furniture.*
> *They (administrative staff) are the lifeblood of any organisation.*

Participants' explanations confirm the researcher's intent in determining the effect of physical environment on performance. Explanations indicated a strong correlation between a proper office environment and productivity. Subsequent questions were intended to supplement the first question, probing what participants understood as a comfortable physical environment.

The second question inquired about the availability of proper resources to enable administrative academic staff to perform their duties efficiently. It was set as follows:

*2.	Does the department have proper basic resources such as IP telephones, computer/laptops/printing machine, desks, filing cabinets, etc. to help administrative staff to perform their jobs efficiently and effectively?*

While responses that emerged from participants were positive, the explanations varied to a small degree. The explanations were as follows:

The department does have such resources.

The department has most of the equipment mentioned but it's hard for any department to have them all.

Laptops were bought this year although it is not what we wanted for the administrative staff. But generally the department has some of the items.

We are trying to provide as many resources as they can, except when there is a lack of budget.

They might not have it all but they do provide and it is assisting office employees to perform well.

The supporting statements indicate a physical environment that is generally well-equipped. In cases where certain items might not be available this is explained by budget constraints, without expressing a sense of disappointment about this challenge. As a way of showing understanding, some participants used words such as "they are trying" and "except where there is a lack of budget". This suggests that the HoDs perceive office employees to be content with what they have.

The third question probed further as to resource availability by inquiring about the frequency at which their departments improved or changed office resources to keep the physical environment comfortable. In this regard, the question was phrased as follows:

*3.	How frequently does your department improve or change their equipment/furniture for better physical environment comfort?*

The responses to this question were not as positive as those received to the previous two questions. In a nutshell, responses can be described as neutral:

I am not sure.

It takes some time, but, the department is doing their best.

I can't remember how often, but, it has been sometime without any change.

It takes long time to be changed, maybe more than ten years, due to budget constraints.

It takes time but I cannot remember when the last change was.

Not sure but they do change some of the items such as laptops.

As already noted, the overall response to question three can be described as neutral. The majority of participants could neither specify the frequency nor the last time they noted either the improvements or changes made in departments' office equipment and furniture to academic administrative staff's satisfaction. One critical tool mentioned by one of the participants as having been changed was laptops.

Notably, the computers (laptops) mentioned in response to the previous question were purchased in the same year data for this study was collected. It appears the laptops were purchased to replace desktop computers since the same participant who mentioned them in response to question two expressed unhappiness by stating: "it was not what we wanted for the administrative staff". However, this cannot be confirmed since there was no follow-up to determine in what way this was not what the participant wanted for their administrative staff. It is possible that the issue was with the type of laptops purchased, which may not have met specifications for the performance of duties.

The mention of computers suggests that the institution ensures critical items to keep up with frequent advances in technology are replaced despite what one participant mentions as "budget constraints" that could hinder the regular replacement of many office items.

The fourth question queried if the physical office environment allows for effective performance. The question was phrased as follows:

4.   Does the administrative staff's office physical environment allow for effective performance?

All the participants agreed the physical environment of their office was conducive to effective performance by administrative staff at work. The explanations provided were as follows:

Yes, we do because of space.

Yes, all staff are able to use the office which means the office is big enough.

Yes, because there is enough space and enough equipment.

Yes, it does and that is why their performance is good.

These reasons indicate overwhelming agreement on both space and equipment perceived as adequate for office employees to effectively perform their duties.

Question number five inquired what happens around the office spaces to determine whether it was comfortable enough to contribute to productivity. The specific environmental factor of inquiry was noise levels that could either emanate from inside or outside the office space. For example, on the inside the noise could either be in the form of communication with colleagues around the office or with clients who visit and telephone conversations in the office. Externally, this refers to an environment not exposed to environmental and human noise that could interfere with the performance of duties in a productive manner. The question was put as follows:

5.   Do you think office noise level affects staff productivity? In what way do you think this has a negative impact on administrative staff performance?

There was 100 percent agreement on the potential of office noise levels interfering with productivity. When participants were asked to elaborate on the manner they thought noise levels could impact administrative staff performance negatively, they explained as follows:

It does because the level of noise makes one not to perform better.

When there is too much noise it makes the staff not to concentrate.

Because admin is the main person that has to record everything so it's important to be in a peaceful place.

Yes, most especially when their staff are busy, we need to keep controlling the level of noise.

Private offices are available.

Yes, it does but at least we have private offices to be protected against any disturbances.

The participants' explanations emphasised their understanding of the negative impact noise levels could have on administrative staff's performance and productivity. The critical role they serve is indicated, which requires a relatively high level of focus to avoid errors. For example, when administrative staff have to record certain information they need to be accurate as failure to do so would render them poor performers. It also emerged that, in this context, management appears to have considered this concern by providing office employees with private offices. This augurs well for the DUT physical environment as it would be perceived as conducive to productivity by office employees.

Question six further probed the office environment by focussing on availability of proper and well-controlled air conditioners to enable employees to perform their duties efficiently. The question was phrased as:

*6.	Are there proper air conditioners to help cool the office environment in order to help improve work efficiency?*

The majority of participants indicated this to be the case by providing a "Yes" response. However, it is worth noting that one of the participants did not share the same sentiment as the rest. The response provided in disagreement reads as follows:

Not always. Sometimes they work sometimes they don't and this makes the staff not to concentrate, especially when it is hot.

This explanation appears to be neutral and realistic. The participant agreed air conditioners function efficiently, but conceded this is not always the case. This is a realistic nature of many technological equipment, as they are bound to fail at times. As the participant stated, this is "not always", suggesting the system functions well most of the time. Overall, it can be argued that all the participants concurred that the

air conditioning system of their office environment functions properly, enabling administrative staff to execute their duties efficiently.

Lighting is also an important part of the office environment, whether natural or electrical. Hence, question seven sought a comment in this respect from the participants by focussing on electrical lighting. The question was:

7.   Is the office's electrical lighting conducive for the office environment to enhance productivity? Please elaborate.

All the participants agreed that the electrical lighting in the office environment was conducive enough to enhance the productivity of administrative staff. One participant further explained as follows:

> *If there's a problem we call the maintenance office to fix lighting to ensure it is good at all costs.*

The general perception is that the office electrical lighting is conducive to the office environment in that it is of good quality and well-maintained.

The next question focussed on the possible effect the office physical environment comfort had on the health of administrative staff. The question was:

8.   Do you think physical environment comfort can affect administrative staff health? If yes or no, please elaborate your answer.

All the participants concurred on the potential negative impact of lack of comfort in their physical office environment on the health of administrative staff, which was elaborated as follows:

> *Yes, if chairs are not conducive for the office environment they can cause certain diseases.*
> *Yes because if there is no enough comfort it can cause stress and body discomfort.*

Yes if the comfort in the office is poor it can be hard for any administrator to perform.

Yes. It can lead to serious problems like back pain. This is a very important aspect.

Yes. It can cause stress and lead to absenteeism.

These comments show a clear understanding of the negative effect an uncomfortable physical environment has on the health of administrative staff. The health aspects mentioned were "certain diseases", "stress" and "back pain". Furthermore, these health issues were pointed out to potentially "lead to absenteeism" which would, in turn, impact productivity.

As a follow-up to the previous question, question nine was interested in establishing how participants perceived the impact of physical environment comfort on staff absenteeism, poor performance and staff motivation. The question was formulated as follows:

9.   Does physical environment comfort contribute to staff absenteeism, poor performance and staff demotivation? Please elaborate your answer based on the three points above.

All the participants agreed these three issues (staff absenteeism, poor performance and staff motivation) could result from an uncomfortable physical environment. Their elaboration was as follows:

Yes, especially if there is no comfort in the office.

Yes it does, otherwise how can one work if the office is not comfortable?

Yes it can, if the staff are not happy about the environment they are working under.

The responses generally show a good understanding of the negative results posed by an uncomfortable work environment on administrative staff productivity. This makes it imperative for management of any organisation to ensure staff are comfortable at all times for both their own health and productivity.

Question 10 sought contributions from the participants in the form of suggestions that could be shared with top management of DUT and any other organisation, with regard to what could be done to improve comfort. The question enquired after the kind of physical environment comfort that could help administrative staff perform and coordinate their activities better. It was framed as:

10.   How can physical environment comfort be improved to help administrative staff to better manage and coordinate the internal and external operations of the department?

The following suggestions were made:

Staff need to be part of the process in terms of selecting equipment which is conducive to them, including paintings and colours of the equipment.
That can be improved by asking staff to draft what they need and as a department help them.
By allowing admin staff to choose what is good for them.
This depends on the motivation from higher authority, it's not on us.
By listening to the people working as administrators.
The improvement depends on budget, so as much as we might need improvements but budget plays a major role.

It emerged from the above suggestions that office employees should be consulted when it comes to measures taken to improve comfort in their physical environment. The reasons put forward are that this would be important because it would produce what is "conducive to them", "what they need" and "what is good for them". The responses showed a good understanding by participants of how democracy works. Despite this understanding, there are voices of reason and caution among the participants. It is noted that what administrative staff might need might not be achieved, since the final decision lies with "higher authority" in the workplace. The decisions management can make would also be influenced by resources they have, since "budget plays a major role".

The last question was intended to question the quality of the research study, rather than measurement of participant perceptions of physical environment comfort and its impact on performance.

11.   Do you have any suggestions or comments that would help improve the quality of this research study?

There were no suggestions received, except to state that the study was on the right track. Support for the study was evident in the following comment:

Most administrators are not monitored whereas their offices need to be taken care of.

This comment was taken to suggest that the study was significant in addressing the stated issues and the office environment that are often ignored by many, whereas it is important.

4.7   SUMMARY

In conclusion, administrative staff participants from DUT expressed positive perceptions on the questionnaire concerning physical environment comfort and its significance for office employee performance. These were further echoed by the HoDs who provided suggestions during interviews that could be considered by top management towards the improvement of office employees' comfort. The findings, therefore, assist in answering the study's research questions and objectives. Measurement of office employees' and their immediate supervisors' perceptions, in the form of the few HoDs who participated in the study, assisted in uncovering critical factors of the physical office environment to evaluate work environment challenges. In addition, it allowed for a better understanding of the extent to which management support staff ensure comfort and good performance, through the provision of a supportive office environment and equipment.

CHAPTER FIVE
CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

Results were provided in the previous chapter with a discussion of the findings that emerged from participant responses. This chapter discusses the findings in terms of their meeting the study objectives, followed by a list of recommendations. The study limitations are outlined prior to concluding the chapter, with suggestions as for future research identified from discussion of the findings.

5.2 STUDY AIM AND OBJECTIVES

The study's overall aim, outlined in Chapter One, was to measure administrative staff perceptions of the impact of physical environment comfort on their performance at DUT. To achieve this aim, it was necessary to address the following objectives:

- To examine critical factors of physical environment towards employee performance at DUT.
- To critically evaluate work environmental challenges faced by administrative staff.
- To ascertain measures to be implemented by faculties in management of physical environment comfort of administrative staff towards improving performance.

At this stage, therefore, the intention is to assess whether the study aim and objectives have been accomplished or not.

5.3 ACHIEVEMENT OF THE OBJECTIVES

This sub-section presents a summary of the findings as they relate to the three study objectives. In doing so, the sub-themes of the questionnaire are used, since they were developed in accordance with the research objectives. The purpose of following this structure is to indicate the extent to which the study achieved what it initially set out to accomplish. Such a discussion would serve to show whether the study was successful or not.

5.3.1 Objective 1: Critical Factors of Physical Environment towards Employee Performance

The aim of this objective was to understand whether the physical environment affected employees' performance at DUT. In garnering participants' perceptions, this section of the questionnaire consisted of four statements (2.1.1 - 2.1.4), to which the respondents had to indicate 'Agree' or 'Disagree'. The results revealed respondents were in general agreement with regard to the role of office furniture comfort in increasing their performance and its flexibility in ensuring a working environment without strain. This suggests employees were satisfied with their physical working environment.

Noise levels as a factor on staff performance appeared to be viewed as unacceptable by the majority of respondents. This was evident in that the majority of respondents agreed with the statement in which office noise was described as distracting at work, influencing plummeting productivity, affecting performance, limiting to one's multi-tasking abilities and negative for employee motivation to work. The suggestion is clearly that noise should be avoided at all cost, should office employees be required to perform their duties as expected.

With regard to employee views on the extent to which office temperatures could have an impact on their work performance, participants shared the same views concerning inconvenience caused by unacceptable levels of temperature that tend to affect their performance. Unfavourable temperature impacted negatively on their productivity, whereas cool temperature was deemed excellent for their performance. The majority were satisfied that they had access to their office temperature control unit. However, there was a sizeable number who were unhappy with how the temperature was set. In addition to the air-conditioning system, it was found that the office environment was well-designed to provide them with access to natural air.

Office electrical lighting did not appear to be an issue among the participants. They were comfortable with the amount of light they received from the electrical equipment installed by DUT, as well as the design of the buildings that further provided them with natural light. This access to good quality light was perceived to positively impact their performance.

Other physical factors questioned by the study were the space layout, privacy, office colours and office design. It emerged that that these factors were perceived as favourable for performance. For instance, as much as 48 percent of respondents were satisfied with the amount of office space available. This was against 26 percent that disagreed and another 26 percent that were neutral. Other responses worth highlighting are that 47 percent of respondents considered their office privacy as critical to their performance. Satisfaction was indicated by 42 percent with office design, while 36 percent expressed support for office colours.

5.3.2 Objective 2: Work Environment Challenges Faced by Administrative Staff

While the previous section (5.1.1) indicates positive responses to the physical environment as factors that contribute to improved performance, there were some critical voices worth highlighting in this section. Therefore, this section explores areas indicated as work environment challenges to the performance of a considerable number of respondents who work as office administrators at DUT. There were no specific questions that sought to inquire with regard to these challenges. Rather, the challenges emerged from various responses where participants indicated dissatisfaction. Such areas were judged based on the number of respondents that expressed negative views and those that were neutral.

There were two responses that, when combined, rated above those that expressed positive responses and could, therefore, not be ignored. Equally important to consider were cases where respondents appeared to be divided on a statement. Such a split was viewed as a challenge that would require addressing in order to improve the work environment to satisfactory levels. Overall, there were five areas viewed as challenges. These were on office furniture, noise levels, temperature levels, and electrical lighting, as well as office layout.

Office furniture comfort and its impact on performance was not very positively perceived at DUT. This was evident in that disagreement with the statement was indicated by 43 percent of respondents and 4.9 percent were neutral. There were also issues with the flexibility of the furniture because 32 percent disagreed and 22 percent were neutral. Another area not well perceived was the connection between

comfort and physical strain to employees. It is concerning that 24 percent disagreed and 21 percent were neutral about the comfort of office furniture.

Noise levels on campus and around administrative offices were seen as a considerable challenge among employees. As many as 59 percent of respondents found noise levels to be distracting, while 56 percent thought noise levels contribute to a drop in productivity. Performance at work was equally affected by high noise levels, according to 60 percent of respondents, with 62 percent indicating they could not multi-task in such a noisy work environment and 58 percent were not at all motivated to work.

Temperature levels within the office environment were generally deemed inconvenient to efficient performance when they were unfavourable, according to 57 percent of respondents. Specifically when the temperature was considered too hot, 51 percent of respondents viewed this as detrimental to productivity.

Electrical lighting was another area of critical challenge among respondents. A 32 percent disagreement and 25 percent indication as neutral suggest dissatisfaction with the volume of accessible natural light in the office area. It was, therefore, equally not surprising to see that 28 percent disagreed and 27 percent were neutral about the amount of received light as impacting their efficient performance. It is also a challenge that 24 percent disagreed and 22 percent were neutral with regard to having access to the control of lights.

Lastly, the office layout appeared to be an area with some challenges. Disagreement was indicated by 28 percent and another 28 percent were neutral about the office layout's convenience for their performance. There were concerns from 26 percent who disagreed and 26 percent that were neutral about office space. The amount of privacy and its impact on performance was a concern for 27 percent of respondents who disagreed and 26 percent who were neutral. Office colours were not comfortable for 24 percent of respondents and for 31 percent that were neutral. In addition, the office design was viewed as a challenge to performance by 28 percent of respondents and 29.6 percent that were neutral.

5.3.3 Objective 3: Measures to be implemented by Faculties to Manage Physical Environment Comfort of Administrative Staff towards Improving Performance

The previous section (5.1.2) on challenges is viewed as a window to areas where faculties would need to implement measures in managing physical environment comfort. This simply means that where a certain aspect of physical environment has emerged as a challenge, it should be addressed to improve the comfort of office employees.

Having identified disquieting views on office furniture comfort and its impact on performance, this needs to be attended to. Concerns were also raised with furniture flexibility and its comfort, which caused strain on employees.

As noted, noise levels were identified as very concerning by the majority of employees who participated in the study. Noise levels were viewed as distracting, dropping productivity, affecting performance, preventing multi-tasking and demotivating to workers. Therefore, the faculties would need to consider installing sound proofing to manage noise levels, as proved to be a physical barrier to communication and work performance for employees.

Temperature levels around the office space would need to be addressed by faculties, with the heat perceived as affecting many office employees' performance levels. Faculties can address this matter by providing air-conditioning systems that can be controlled from offices, as opposed to those that are centrally controlled.

The amount of available light was not very well perceived by a concerning number of respondents and perceptions were mainly with regard to the amount of natural light accessible to office areas. Electrical lights were also not efficient and there was inadequate amount of light control for many offices. Faculties would, therefore, need to rely more on natural light, rather than electricity, especially in the SA context where load-shedding is common. Natural light can be accessed by creating more windows that face the outside area. Such a move could also mean a huge saving on the DUT utility bill.

Office layout concerns can easily be addressed by faculties. It is not an unrealistic expectation of faculties to create adequate space, improve privacy, as well as change the colours and the design of offices. These changes would, however, depend on budgetary constraints.

5.4   CONCLUSION ABOUT THE STUDY OBJECTIVES

It can be concluded that the three study objectives initially set out were achieved. Adequate information was gathered on factors of physical environment for employees' performance, challenges and areas in which measures can be implemented by faculties to address identified challenges. However, it is acknowledged the study might not have been perfect for the results to be taken as final to the matters under investigation. Consequently, the next section presents areas that could be viewed as limitations to this study.

5.5   LIMITATIONS

While the study was undertaken within the six DUT campuses, the response level was at 88 in respect of completed questionnaire, with only six interview participants. Moreover, a disconcertingly high number of responses saw respondents provide neutral responses in the questionnaire. For this reason, the results of the study cannot be generalised to all DUT campuses' office environment. However, the empirical finding of this study can be used to improve physical comfort of employees at the DUT and also in any general office working environment.

5.6   SUGGESTIONS FOR FUTURE RESEARCH

During the study, a questionnaire was administered and interviews conducted with willing participants with the aim of measuring perceptions of physical environment comfort on the performance of DUT office employees. It would, therefore, be encouraged for future studies on this aspect of the office environment to adopt a different approach as to how staff productivity could be increased. In this case, it is recommended that surveys and interviews should be combined with site visits that entail observation. This would assist in triangulating the results.

Further studies could seek to compare different types of office environments within the same university, which could highlight that offices allocated to office

administrators serving the executive management present a different environment when compared to offices allocated to academic administrative staff. Such a finding would help expose inequality and unfairness in the allocation of resources and managing of offices.

5.7   SUMMARY

Despite the noted limitations, it is anticipated that results of the current study are deemed beneficial by DUT management. The results indicate areas of strengths and weaknesses, with suggestions regarding implementation of certain measures to address the identified office environment challenges. The institutions' management would need to consider the areas perceived by some of the respondents to be well taken care of, which could be further developed and cascaded to all offices to ensure motivated and comfortable personnel. In addition, a conducive environment would mean a safe and healthy workforce in times of a global pandemic such as the coronavirus (Covid-19) that has drawn attention to the need for better organised and spaced offices. In turn, it is expected that if this is done, staff performance and efficiency in executing their duties could increase.

Most importantly, the study has contributed to knowledge by identifying what works and what needs to be improved at the selected institution of higher learning. This approach differs from previous studies that had mainly been focussed on office spaces within the business environment.

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APPENDICES

APPENDIX A: GATEKEEPERS' LETTER

15th August 2018

Mr Jabulani Mhlanga
c/o Department of Information and Corporate Management
Faculty of Accounting and Informatics
Durban University of Technology

Dear Mr Mhlanga

PERMISSION TO CONDUCT RESEARCH AT THE DUT

Your email correspondence in respect of the above refers. I am pleased to inform you that the Institutional Research and Innovation Committee (IRIC) has granted full permission for you to conduct your research "Measuring the perception of physical environment comfort on office employees' performance" at the Durban University of Technology.

The DUT may impose any other condition it deems appropriate in the circumstances having regard to nature and extent of access to and use of information requested.

We would be grateful if a summary of your key research findings can be submitted to the IRIC on completion of your studies.

Kindest regards.
Yours sincerely

PROF CARIN NAPIER
DIRECTOR (ACTING): RESEARCH AND POSTGRADUATE SUPPORT DIRECORATE

APPENDIX B: QUESTIONNAIRE

SECTION A: Demographic information. (Please tick where applicable)
Please tick the appropriate box.

1.1 Please indicate your gender:

Male	
Female	

1.2 Please indicate your age group.

16-25	
26-35	
36-45	
46-55	

1.3 Please indicate your years of administrative experience.

Less than a year	
1-5	
6-10	
11-15	
21 and above	

1.4 Please indicate the faculty you belong under.

Accounting and Informatics	
Art and Design	
Applied Sciences	
Health Science	
Management Science	
Engineering and Built Environment	

SECTION B: FACTORS OF PHYSICAL WORK ENVIRONMENT

This sections intends to gather data that affect the environmental comfort on employee performance at the DUT.

Please place a tick (x) in the box below reflecting the level of agreement or disagreement with the statement provided, where 1=SD; 2=D; 3=N; 4=A and 5=SA

Example

Statement	Strongly disagree (SD) 1	Disagree (D) 2	Neutral (N) 3	Agree (A) 4	Strongly agree (SA) 5
2.1 Office design affect my performance					X

Statement	Strongly Disagree (SD) 1	Disagree (D) 2	Neutral (N) 3	Agree (A) 4	Strongly Agree (SA) 5
2.1 The following statements are based on office furniture as a factor to employee performance					
2.1.1 Office furniture comfort influences employee performance					
2.1.2 My furniture is flexible to be rearranged.					
2.1.3 Furniture in my office is comfortable enough to that I can work without being physically strained					
2.1.4 My furniture is comfortable such that my performance is enhanced.					
2.2 The following statements are based on office noise level as a factor to employee performance					
2.2.1 Office noise level is distractive.					
2.2.2 Office noise					

93

	Strongly Disagree (SD) 1	Disagree (D) 2	Neutral (N) 3	Agree (A) 4	Strongly Agree (SA) 5
plummets productivity levels.					
2.2.3 Office noise level contributes to poor performance.					
2.2.4 Multi-tasking becomes difficult when there is office noise.					
2.2.5 Motivation to do my work is affected by office noise level.					
2.3 The following statements are based on office temperature level as a factor to employee performance					
2.3.1 Office temperature affects my performance.					
2.3.2 Productivity suffers when it is too hot in the office					
2.3.3 Cool temperatures are best suitable for excellent performance.					
2.3.4 I am able to control my office temperature					

1.1 LIGHTING

Statement	Strongly Disagree (SD) 1	Disagree (D) 2	Neutral (N) 3	Agree (A) 4	Strongly Agree (SA) 5
Lighting in my office is comfortable such that my performance is not disturbed.					
There are enough windows in my office that allow fresh air and adequate lighting.					
Ample amount of natural light comes in my office					
There is efficient lighting in my office such that I can work without straining my eyes					
I have control over the					

lighting on my desk.					

1.2   OTHER PHYSICAL ENVIRONMENT FACTORS

Statement	Strongly Disagree (SD) 1	Disagree (D) 2	Neutral (N) 3	Agree (A) 4	Strongly Agree (SA) 5
Layout of the office space has a significant impact on employee performance.					
I am satisfied with the amount of space in my office					
Employee privacy in the office leads to better performance					
Privacy level in my office affect my effective performance.					
The colour of my office painting affects my comfort.					
Office design affects performance					
Due to your overall office physical environment can you complete your daily tasks easily?					

11. What recommendation can you give to enhance environment comfort in your department?

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Thank you for taking your time to complete this questionnaire

APPENDIX C: INTERVIEW QUESTIONS

INTERVIEW SCHEDULE

Date: _____

Time: _____

Place: _____

Title of the study:

Measuring the perception of Physical Environment comfort on office employees' performance: A Case study at the Durban University of Technology

**Please note that the background to the study will be provided before the interview session. Letter of info and consent form is attached.

1. Do you think physical environment comfort has a positive influence toward staff productivity? Yes/No. Please support your answer.
2. Does the department have **proper** basic resources such as IP telephones, computer/laptops/ printing machine, desks, filing cabinets etc. to help administrative staff to perform their jobs efficiently and effectively?
3. How frequent does your department improve or change their equipment/furniture for better physical environment comfort?
4. Does the administrative staff office physical environment allow for effective performance?
5. Do you think office noise level affects staff productivity? In what way do you think this has a negative impact on administrative staff performance?
6. Is there proper air conditioners to help cool the office environment in order to help improve work efficiency?
7. Are the office electrical lighting conducive for the office environment to enhance productivity? Please elaborate your answer.

8. Do you think physical environment comfort can affect administrative staff health? If yes or no, please elaborate your answer.

9. Does physical environment comfort contribute to staff absenteeism, poor performance and staff demotivation? Please elaborate your answer based on the three points above.

10. How can physical environment comfort be improved to help administrative staff to better manage and coordinate the internal and external operations of the department?

11. Do you have any suggestions or comments that would help improve the quality of this research study?

Thank you for participation. Your participation is greatly valued.

Interviewee: Mr/Miss/Mrs/Dr/Prof: _____

Faculty/Department: _____

Interviewer: Mr J.S. Mhlanga

Department: Information and Corporate Management

Faculty: Accounting and Informatics

APPENDIX D: LETTER OF INFORMATION AND CONSENT

LETTER OF INFORMATION

Title of the Research Study:
Measuring the perception of Physical Environment comfort on office employees' performance: A Case study at the Durban University of Technology

Principal Investigator/s/researcher:
Mhlanga Jabulani Samuel

Co-Investigator/s/supervisor/s:
Dr KS Ngwane
Dr M. Ngibe

Brief Introduction and Purpose of the Study:
Physical work environment communicates values and objectives of the company and it also signals the company's strategy and overall corporate goals to employees and customers. Organisations are established so as to add value in the society through performance, excellent organisational performance is the heartbeat of any organisation. Therefore, the study will investigate the perception of physical environment comfort on office employee's performance. The researcher will then investigate other admin staff in order to make a sound suggestion for improvement of what will be needed to be improve to better the performance.

Outline of the Procedures:
You are kindly requested to complete the questionnaires as honesty and fully and fully as you are able. Incomplete forms cannot be included in the survey. Your answers will be anonymous and the findings aggregated. Therefore, it is kindly requested that you fully complete the questionnaire. Permission to conduct this study has been acquired from the Research Committee of the University.

Risks or Discomforts to the Participant:

There is no risk to you as a participant of this research

Benefits:
Current staff at the University should benefit from the improved service quality which may be implemented as a result of the findings and recommendation of the study

Reason/s why the Participant May Be Withdrawn from the Study:
Anytime, you may decide to withdraw from the study without any negative result to yourself.

Remuneration:
No remuneration or incentives to be offered to you as participant.

Costs of the Study:
You will not be liable for any cost of this study

Confidentiality:
Any information provided by you will remain confidential. The statistician, the researcher, supervisor and co-supervisor will be the only people to be given access to the information

Research-related Injury:
The Study will not cause any harm to you

Persons to Contact in the Event of Any Problems or Queries:

Researcher:
Jabulani Samuel Mhlanga (072 594 7719 or jmhlanga2@gmail.com)

Supervisor:
Dr KS Ngwane (031 373 6025 or ngwaneks@dut.ac.za)

Co-supervisor:
Dr. M Ngibe (031 373 5858 or musawenkosin1@dut.ac.za)

General:
Potential participants must be assured that participation is voluntary and the approximate number of participants to be included should be disclosed. A copy of the information letter should be issued to participants. The information letter and consent form must be translated and provided in the primary spoken language of the research population e.g. isiZulu.

CONSENT

Statement of Agreement to Participate in the Research Study

- I hereby confirm that I have been informed by the researcher, **Jabulani Samuel Mhlanga** about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number:
- I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerized system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

☐ I agree to be part of the research study.

I have fully been informed about the nature of this study and my role as a participant. By ticking (X) the box, I provide consent to be part of this research study.

I, _____herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

_____   _____   _____
Name of researcher   Signature   Date

APPENDIX E: CERTIFICATE OF EDITING & AUTHENTICATION

Helen Richter
Advanced Editing, Proofreading
& Copywriting
feetjieding@gmail.com
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17 June 2020

To whom it may concern

CERTIFICATE OF EDITING & AUTHENTICATION

I have proofread and language edited the Master's thesis titled:

**"Measuring the perception of physical environment comfort on office employees'
performance: A case study at the Durban University of Technology"**
by
Jabulani Samuel Mhlanga

To the best of my knowledge, the work remains free of spelling, grammar, structural and stylistic errors, as per available guidelines, and the contents are certified as the authors' own work.

With thanks.

H. S. Richter