

University Administrative Employees' Perceptions of Their Offices' Physical Environment Comfort

Sandiso Ngcobo,  <https://orcid.org/0000-0002-8256-4453>

PhD, Professor, Mangosuthu University of Technology, South Africa

Jabulani Samuel Mhlanga,  <https://orcid.org/0000-0003-2888-0620>

MA, Lecturer, Mangosuthu University of Technology, South Africa

Corresponding author: Sandiso Ngcobo, sandiso@mut.ac.za

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Abstract: *Administrative office employees spend much time confined in their workspaces as they work hard to provide the critical support required for the overall performance of their organizations. As a result, their comfort should be given priority by their organizations, be it private or public. This article investigated the administrative employees' perceptions of their offices' physical environment comfort in a public university. Different aspects of their physical environment, such as furniture, noise, office temperature, lighting and space, were examined as variables influencing their performance. The systematization of literary sources for solving the problem of arranging a comfortable physical environment in private organizations proved a significant dependence of the productivity of employees on the physical environment in which they perform their duties. However, there is the scarcity of research conducted in a public organization, especially in the higher education sector. The methodological tool of the research was the method of quantitative analysis, in which a questionnaire was used to collect data from 81 administrative staff of a public university with several campuses in South Africa. The findings indicated that many respondents generally perceived a comfortable physical environment necessary to increase performance. These were, however, not always matched by their perceptions of what transpired at their offices. For instance, 63% of respondents viewed comfortable furniture as critical for the performance of their duties. Nevertheless, only 55% of respondents agreed that their university furniture was comfortable, with 24% disagreeing and 21% taking a neutral stance. The split in perceptions makes it imperative for the university to attend to areas of weakness and inequality in providing physical environment resources. A future study could examine whose offices are more comfortable than others in university contexts. In addition, a promising direction of future research should be the reconciliation of employees' perception of the comfort of the physical environment in offices with the results of observations. This will enrich the obtained results.*

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Introduction

Administrative employees provide a critical support role to leaders at various levels and generally to all staff members in an organisation. Most of the time, they find themselves having to work under severe pressure because of the demanding nature of their work (Ngcobo & Mhlanga, 2022). It is for this reason important that administrative employees' office physical environment is comfortable if they are to deliver the maximum support expected throughout the organisation. Their comfort should positively impact how they perform their duties and provide the necessary administrative support to different structures of an organisation (Putri et al., 2019). It is one of the essential human resource managements (HRM) practices to satisfy the employees' work environment for organisations' performance to be at its best (Gastearena-Balda et al., 2021). HRM would, however, rely on responsible departments, such as procurement, maintenance, and facilities, within the organisation to provide the expected office physical environment resources. It is important to address because employees who perceive organisational support positively, in terms of provided resources, tend to have the improved work engagement (Unguren & Kacmaz, 2022).

In this context, an office is a location within an organisation where administrative and professional duties are performed (Vimalanathan & Babu, 2014). The administrative duties of interest in this article may include filing, capturing records, planning, organizing events, trips, and meetings, analyzing information, retrieving required data and communicating with internal and external stakeholders in person and online. These administrative duties are mainly performed by employees referred to as secretaries in organisations. Yet, employees in other administrative offices may perform these and more administrative duties in support of professionals and other organisational stakeholders they serve.

Offices within organisations became unpopular during the Coronavirus pandemic of 2019 (COVID-19) since employees were forced to work from home (Forbes, Birkett, Evans, Chung, & Whiteman, 2020). However, the physical workplace environment needs to be improved to be flexible and adaptable to post-Covid-19 needs (Chua et al., 2022). While Baert et al. (2020) argues that working from home will continue beyond the post-pandemic era, it should be noted that working from home has physical environmental challenges for many employees (Neo et al., 2022). Moreover, a study by Saltiel (2020), which conducted a survey on the feasibility of working from home in developing countries, such as South Africa, found that this was regarded by many of the respondents as not always feasible because of their limited home physical environment.

This article is prompted by previous studies conducted in private organisations. They indicate that employee performance can significantly be affected by the physical office environment's comfort in which they perform their duties (Kamarulzaman et al., 2011; Pawirosumarto et al., 2017; Stoddart, 2016; Institute for Quality of Life, 2018; Yuan & Ekhsan, 2020; Hamidi et al., 2020; Maulidiyah & Ilahi, 2020). Idris et al. (2020) explain that the reason for this focus on private organisations is the need to constantly monitor that the performance of employees contributes to increased profits. On the other hand, public organisations serve their societies with less focus on profits, except to ensure that their performance is impressive enough to secure their government subsidy, donor funding and increased third-stream income. As a result, studies of this nature conducted in public institutions, such as public universities, are lacking (Gastearena-Balda et al., 2021). It seems to ignore that higher education institutions rely heavily on work performed by support departments for the success of their main operational functions (Idris et al., 2020). This support could be in the form of administrative duties for the executive management team, academic leaders in faculties and departments, students, and other stakeholders in the community. Other critical office duties are human resources, finance, registrar's office, procurement and central records. Furthermore, this group of administrative staff has not been a focus of previous studies, which have tended to investigate all employees within a private organisation.

Thus, perceptions of the physical environment comfort of the administrative staff at the public university that forms the context of this article have not been measured. Measuring administrative staff perceptions of physical environment comfort is at this juncture made critical because the physical environment has a bearing on employee well-being, safety and attitude (Ngcobo & Mhlanga, 2022; Ricciardelli & Carleton, 2022). It is particularly critical post the Covid-19 crisis which has triggered interest in how offices are physically organised. These important factors, then, warrant empirical research that measures the perceptions of administrative staff on their physical environment comfort. The article seeks to answer the following

questions: what are administrative staff perceptions of their office's physical environment comfort in a public university in South Africa? How do administrative staff perceive the physical environment's comfort to affect their performance? The answers to these questions are obtained by surveying administrative employees of a selected university that serves as a case study to obtain quantitative data that is analyzed and reported descriptively.

Literature Review

Physical Work Environment. Pracoyo et al. (2022) found that the physical work environment affects employee performance. However, their study interrogated a broad range of factors such as "a clear job description, challenging work targets, effective work communication patterns, work climate, and relatively adequate work facilities" (Pracoyo et al., 2022). In this sense, their study did not focus on one type of work environment. Hence, the current article seeks to report only on the physical work environment.

The article is guided by the distinction that has been made between physical and non-physical environmental factors in the workplace. On the one hand, physical environment refers to objects, situations, atmosphere and appearance in which employees work. On the other hand, the non-physical work environment can include relationships with colleagues and superiors (Prasastia, 2019; Arilaha et al., 2020; Siti et al., 2020). This distinction is different and more valuable than a definition of workplace environment which is everything surrounding the workstation that can influence various aspects of administrative staff productivity, job satisfaction, and morale (Vimalanathan & Babu, 2014; Chandra & Priyono, 2016). This article limits itself to physical environmental aspects as an area of research that has not received adequate attention in public organisations such as universities. Furthermore, previous studies have tended to investigate all employees, whereas this article pays attention to administrative staff to determine if the findings of previous studies hold in their situation.

Physical environmental factors such as lighting, colour, temperature, noise, office space, furniture layout and design, equipment, and fresh air have been identified as essential to employees' performance (Sarode & Shirsath, 2014; Raziq & Maulabakhsh, 2015; Appel-Meulenbroek et al., 2018; Athirah et al., 2019). For instance, van der Molen et al. (2018) found that poor air quality can lead to stress and burnout complications for administrative staff. Furniture in the form of chairs and tables or desks should provide comfort that enhances work performance and employee health to ensure they do not experience back and neck injuries (Ali et al., 2015). Chua et al. (2016) indicate a positive correlation between spatial arrangement and productivity due to the amount of space required for the enormous scope of office work to be performed whilst sitting and occasionally walking to deliver documents between workstations.

These tasks require an office with considerable space that can make movements from workstations possible because offices with limited space can affect employees' productivity. It points to the importance of favourable and healthy physical work environment, among other factors, if employee performance is to be enhanced (Chua et al., 2016; Mujtaba & Cavico, 2020; Priarso et al., 2018; Yuan & Ekhsan, 2020; Hamidi et al., 2020). However, Pawirosumarto et al. (2017) and Wulandari et al. (2021) caution that the role of leadership should not be underrated as it can be influential on employee performance rather than relying on the physical environment alone. It should be part of good leadership to ensure that an environment conducive to employees' good work performance is provided. Similarly, in examining the physical environment, the article seeks to establish the extent to which it is perceived to influence administrative employees' performance positively. At the same time, leadership from the university executive management and responsible managers in different support offices of a university are considered accountable for the provision of required satisfactory physical environment resources.

Physical environment factors, as they pertain to design, furniture, lighting, space, noise, and air in the atmosphere, are of interest because they can affect the quality and quantity of the work generated by employees, which, in turn, contribute positively on organizational efficiency and productivity (Naharuddin & Sadegi, 2013; Appel-Meulenbroek et al., 2018). An unfavourable physical environment would negatively impact both employees' satisfaction and organisational performance (Maulidiyah & Ilahi, 2020; Pracoyo et al., 2022). However, investigations of the direct relationship between physical environment features and employee performance have produced contradictory results in different contexts, making it necessary to conduct further research in this area (Kamarulzaman et al., 2011). Taking into consideration that a public organisation's excellent performance adds value to society and increases its reputation, factors that affect employee performance warrant empirical research (Muhammad et al., 2019).

Employee Performance. The review of different definitions of performance by Abun et al. (2022) led them to conclude that performance can be described as behaviour of employees that can be measured by how it contributes to or hinders the organization's success. Employee performance is, in this regard, the employees' contribution towards organisational success in achieving set measurable goals and standards when employees complete their tasks as expected (Idris et al., 2020; Wulandari et al., 2021). For such performance to occur, a favourable environment prompts employees to be motivated and enthusiastic about work leading to improved performance (Hadinata, 2020). It means that when the environment is pleasant, employees can increase productivity by focusing on their duties (Athirah et al., 2019). Employee satisfaction at the workplace is, therefore one of the critical attitudinal variables that should not be ignored by human resource management and researchers as it influences their performance to the benefit of the whole organisation (Gastearena-Balda et al., 2021).

It poses a challenge to managers in organisations as they must work hard to make the work environment attractive and pleasant for employees if they obtain the performance they require (Jackson, 2018; Ngirande, 2021). If employees work in an uncomfortable environment, they are likely to fall behind in their work schedule as they might find themselves constantly distracted. For instance, if the environment is noisy, the employees could struggle to concentrate on their work and commit errors that could be costly to an organisation (Parveen et al., 2012). Maulidiyah and Ilahi's (2020) review of previous studies confirms that satisfaction with the physical work environment contributes positively to employee performance.

Methodology and Research Methods

The study is informed by the Positivist paradigm, which is aligned with quantitative data collection and analysis (Kivunja & Kuyini, 2017). The approach and data collection technique are better suited for a study that examines perceptions based on the experiences and observations of respondents. The research design is descriptive because the study seeks to describe administrative staff perceptions of the physical environment comfort. The respondents who formed the target population in this case study were administrative employees in one higher education institution found in South Africa. The administrative employees were purposefully selected as the study's respondents because of the critical supportive role they provide to different stakeholders of the selected public university whose core business is academic. The study managed to administer the questionnaire to a sample of 81 administrative staff across different campuses.

A questionnaire was specifically developed for this study as guided by the objectives and reviewed literature. The questionnaire underwent pre- and post-testing. The utilized questionnaire comprised closed ended questions. The respondents had to tick their preferred answers from the provided statements. The statements addressed five workplace environmental factors: office furniture, noise, temperature, lighting and space. There were three statements on each factor. In collecting this quantitative data, a 5-point Likert-type scale with numerical ratings was used to measure employees' perceptions of physical work environment elements' comfort and their effect on their performance. The respondents had to choose strongly agree/ agree/ neutral/ strongly disagree and disagree. Strongly agree and agree – were interpreted as the same to mean that the respondents had positive perceptions. The same approach was adopted for strongly disagree and disagree to mean negative perceptions. Neutral responses were interpreted to mean the respondents were either uncertain or non-committal, if not disinterested in responding to the questionnaire.

After reviewing and piloting it with ten respondents in the same institution's different campuses, the questionnaire was designed to be user-friendly and clear. Moreover, the input from colleagues and mentors proved valuable in improving the quality and validity of the developed tool. These measures contributed to the validity and reliability of the research tool. The questionnaires were hand delivered and collected conveniently for the respondents. The resulting quantitative data were analyzed using descriptive statistical analysis. In this respect, the study relied on the Statistical Package for the Social Sciences (SPSS) version 25.0 to produce descriptive results. Most importantly, ethical considerations were observed regarding securing permission from the university and respondents. Data were collected in 2019, which was prior to Covid-19 restrictions. The respondents' rights to participate voluntarily in the survey were spelled out in the questionnaire. Privacy and confidentiality were promised; hence, the name of the South African university is withheld, and the respondents are not named.

Results

The research examined the perceptions of administrative staff on five main factors of the physical work environment and how their comfort or lack thereof had a role in their administrative work performance. These were furniture, noise levels, office temperature, lights, and office space, as outlined in the following sub-sections. The statements on these elements were arranged such that the first statement would be general, followed by two specific statements on the respondents' work environment. The specific questions were clarified by the word 'my'. The statements that follow are an example of how the questionnaire was designed. The following statements are based on office furniture as a factor to employee performance:

- *Office furniture comfort influences employee performance.*
- *Furniture in my office is comfortable enough so that I can work without being physically strained.*
- *My furniture is comfortable such that my performance is enhanced.*

The discussion on the results mentions the rest of the question statements before indicating how the respondents answered under each variable. The results are presented thematically using the variables that constituted the study. The questions on physical environmental factors were preceded by an inquiry into respondents' biographical information. As such, the discussion on biographical information is first presented before a discussion on physical environment factors at the higher education institution that informed the study.

Biographical Information. There was a good balance between females and males who responded to the study. In this case, 45 females and 36 males were willing to be part of the study. The majority indicated that they were well-experienced. It emerged that 42% had 6-10 years of experience, followed by 39.5% with 11-15 years of working experience. This high number of experienced respondents suggested that they were knowledgeable enough to contribute positively to the credibility of the study's findings.

Furniture. Previous studies indicate that office furniture's comfort and arrangement enhance employee performance (Ali et al., 2015). Hence, the first statement on furniture as a factor inquired about respondents' perceptions of office furniture comfort as influential on employee performance. Figure 1.1 indicates the results.

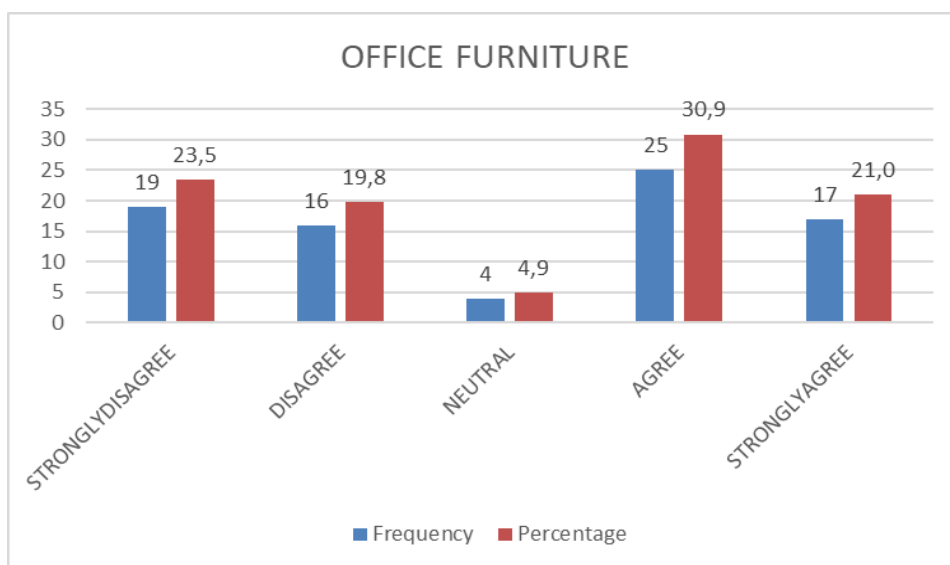


Figure 1.1. Office Furniture Influences Performance

Source: Mhlanga, 2021

The results indicate agreement by most respondents (30.9%) with the statement that office furniture comfort generally influences employee performance. It was followed by 21 % of those who strongly agreed, putting the total of the statement's affirmations at 52%. The respondents that strongly disagreed were 23.5% and those that disagreed were 19.8%. The overall number of respondents who disagreed was, therefore, 43 %. The gap between those who agreed (52%) and those who disagreed (43%) was minimal, suggesting a division in respondents' perceptions. A mere 4.9% of respondents were uncertain about this statement

regarding the connection between office furniture comfort and employee performance. The second statement on this factor inquired specifically about the employees' office furniture comfort. It was stated that their office furniture was comfortable enough not to cause them physical strain. The results are presented in Figure 1.2.

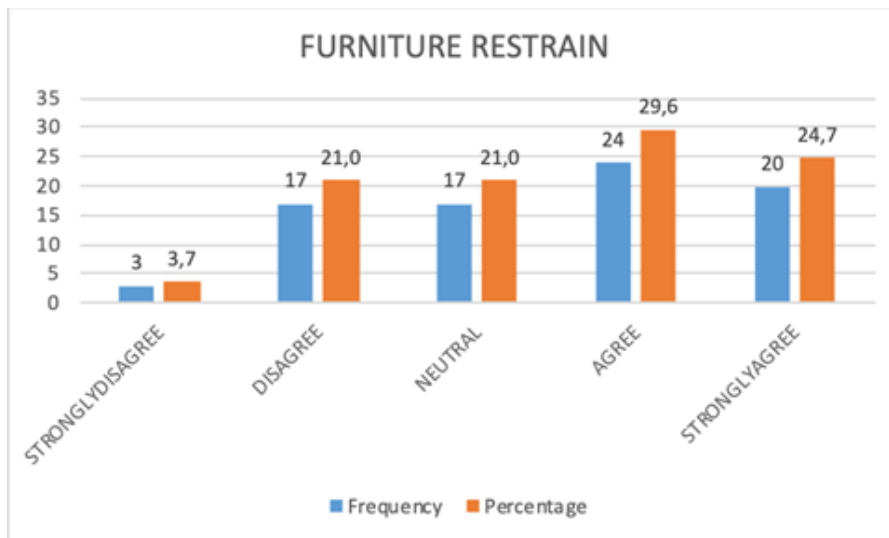


Figure 1.2. Furniture Restrain

Source: Mhlanga, 2021

A positive response emerged as the majority (55%) either agreed (29.6%) or strongly agreed (24.7%) with the statement that their office furniture did not cause them any strain in performing their duties. The group that disagreed was 24%, considering that only 2.7% strongly disagreed and 21.0% disagreed. The remaining 21% of respondents had a neutral view. The last statement on furniture as a factor sought respondents' perceptions regarding the role of office furniture comfort on their enhanced performance of their administrative duties at their institution. The responses are displayed in Figure 1.3.

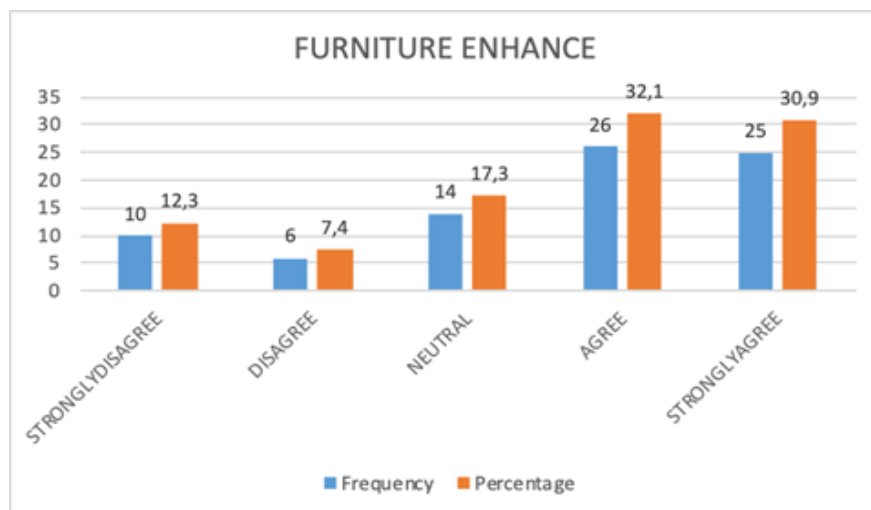


Figure 1.3. Furniture Enhances Performance

Source: Mhlanga, 2021

Again, there was a very high perception (63%) of the comfort of the furniture at their workplace as it benefits the employee's enhanced performance. It was evident in that 32.1% agreed and 30.9% strongly agreed. Opposing views were at 19% when those strongly disagreed (12.3%), and those that disagreed (7.4%) were combined. The respondents who selected neutral as their response were 17.3%.

Office Noise Level as a Factor. The examined second factor took a cue from Parveen et al. (2012), who assert that noise can be a source of dissatisfaction for employees because of its potential to contribute negatively to their productivity. Three statements garnered the views of the respondents on this factor. The first statement’s results, as shown in Figure 2.1, sought the general view of the respondents on noise levels as detrimental to efficient work performance. The first statement’s results suggest that the respondents perceived noise levels as contributing to poor performance in the office environment. As many as 60% of the respondents, 33% agreed, and 27% strongly agreed and concurred with this statement. A small number (23%) of respondents, which consisted of those who strongly disagreed (12%) combined with those who disagreed (11%), indicated that noise levels were not detrimental to work performance.

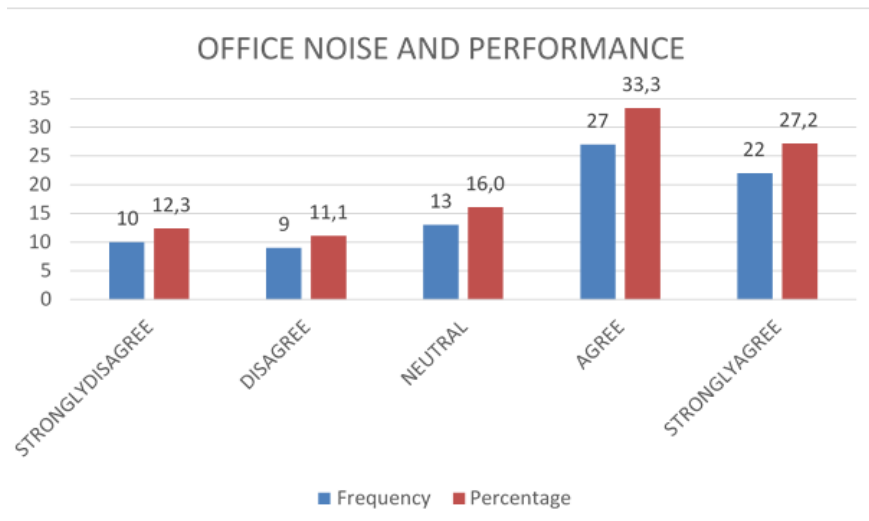


Figure 2.1. Office Noise and Performance

Source: Mhlanga, 2021

The remaining 16% preferred a neutral option, as displayed in Figure 2.1. The second statement was specific to the public university that formed the context of the study, as it insinuated that noise levels were high and distracting. The results are displayed in 2.2.

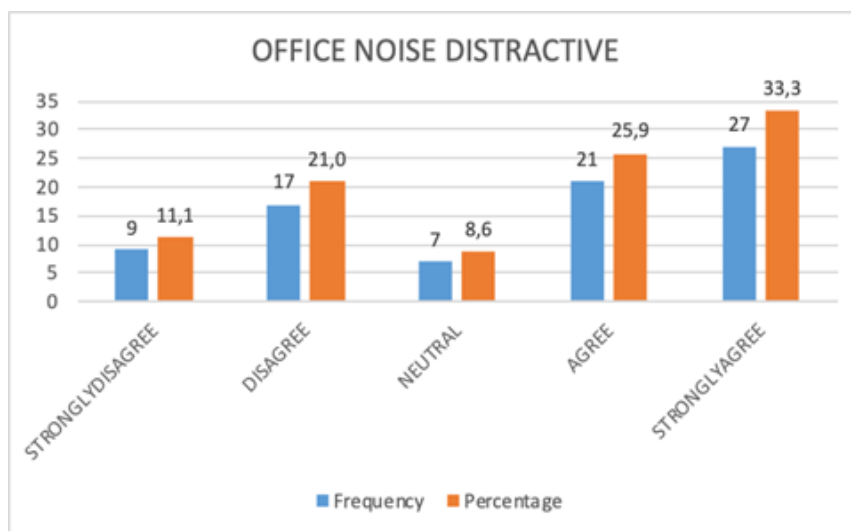


Figure 2.2. Office Noise Distractive

Source: Mhlanga, 2021

Most respondents (59%), when those who strongly agreed (33.3%) added those who agreed (25.9%), found noise levels to be distracting in their university work environment. It is to be expected in a university environment with a high student population that runs in thousands at each campus. However, the number (32%) of respondents that strongly disagreed (11.1%) and disagreed (21.0%) was taken to suggest that their office locations did not expose them to a high level of noise that would interfere with the performance of

their duties. The last statement in this sub-section declared that multi-tasking became difficult in an office environment with high noise levels. Figure 2.3 shows the results.

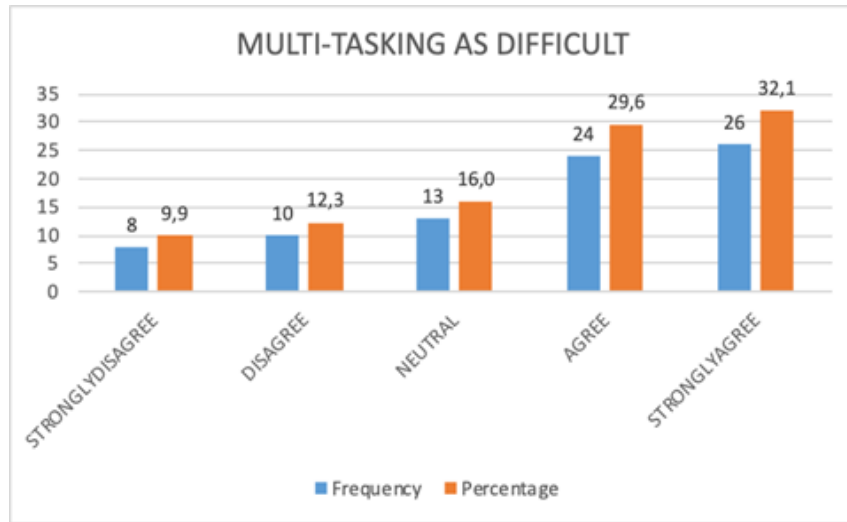


Figure 2.3. Multi-Tasking as Difficult

Source: Mhlanga, 2021

This third statement resonated with many respondents (62%) who strongly agreed (32.1%) and agreed (29.6%). These respondents perceived multi-tasking to be problematic when there was high noise in the office environment. About 22% of respondents indicated that they were not distracted by noise levels, in that 9.9% strongly disagreed and 12.3% disagreed. The remaining 16% chose a neutral response.

Office Temperature Levels as a Factor. 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 three statements was intended to understand the views of administrative staff who participated in the study, regarding the extent to which office temperatures could have a role on their performance. The first of these three statements declared that office temperature levels affect employees’ performance. Figure 3.1 displays the results.

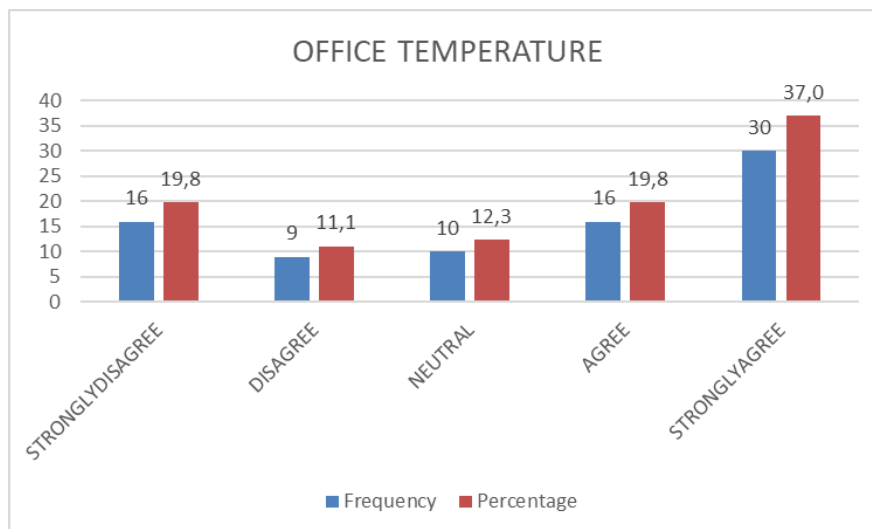


Figure 3.1. Office Temperature

Source: Mhlanga, 2021

The overall response shows that the majority (57%) of respondents found unfavourable office temperature levels to be an inconvenience in performing their duties. This was evident in that 37.0% strongly agreed and 19.8% agreed with the statement. The respondents who strongly disagreed were at 19.8% and those who

disagreed were at 11.1% which added to a low figure at 30%. Only 12% of respondents chose a neutral view. The second statement indicated that productivity suffers when it is too hot in the office. The responses are displayed in 3.2.

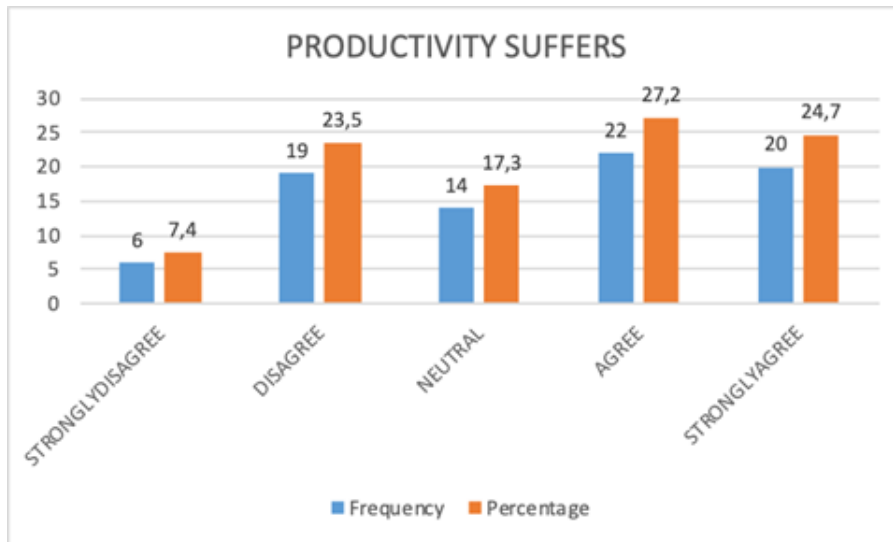


Figure 3.2. Productivity and Hot Temperature

Source: Mhlanga, 2021

The responses from the administrative staff who were part of this study shows that the majority (52%) affirmed this statement. In this case, 27.2% of respondents agreed and 24.7% strongly agreed with the statement that high temperatures can be detrimental to productivity. However, about 31% of respondents, in which 7.4% strongly disagreed and 23.5% disagreed, indicated that they are still able to work productively, despite high temperatures in their office environment. To add to this figure, 17.3% of respondents were neutral to the statement concerning productivity being disrupted by high office temperatures. To contrast the previous statement, the last statement referred to cool temperatures as being best suited for excellent work performance. The results are displayed in Figure 3.3.

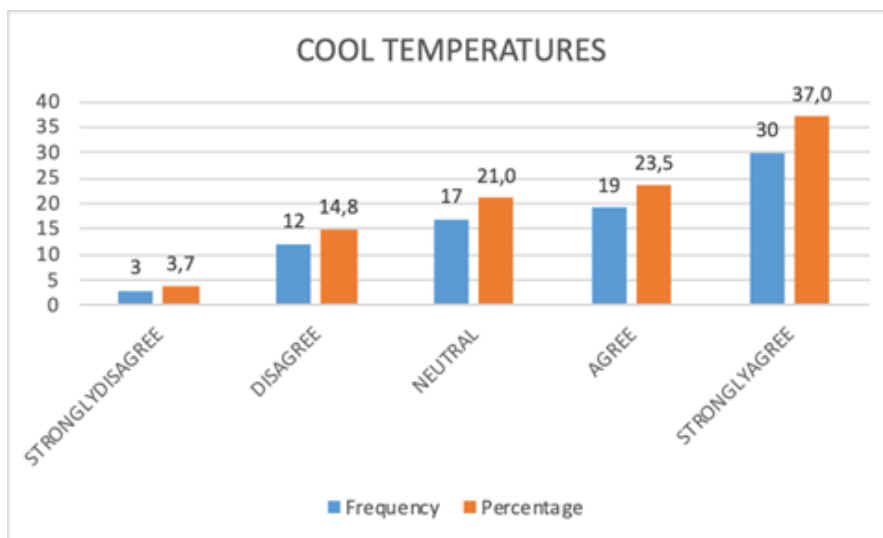


Figure 3.3. Cool Temperatures and Performance

Source: Mhlanga, 2021

The received responses show that 60% of respondents, 37% strongly agreed and 23.5% agreed, affirmed this statement. Very few (18%) respondents, of which 3.7% strongly disagreed and 14.8% disagreed, found cool temperatures to be an inconvenience to their performance. At the same time, 21% of respondents chose to take a neutral stance on the subject. The contrasting results that emerged throughout this section indicate normal different individuals' preferences of temperatures. Marín-Restrepo et al. (2020) explain that what

can be considered a comfortable temperature is not static because the preferences of individuals vary. As such, it is not always possible to satisfy multiple occupants of shared spaces. For example, health conditions can influence temperature preferences since individuals with high blood pressure have different temperature preferences compared to those with low blood pressure condition.

Lights as a Factor. Chua et al. (2016) and Silvester and Konstantinou (2010) identify lighting as a critical environmental factor affecting administrative staff performance due to the amount of reading and writing involved in their work. Hence, the first statement sought to establish whether respondents concurred with this view on lights as generally important for work performance. Figure 4.1. displays the findings.

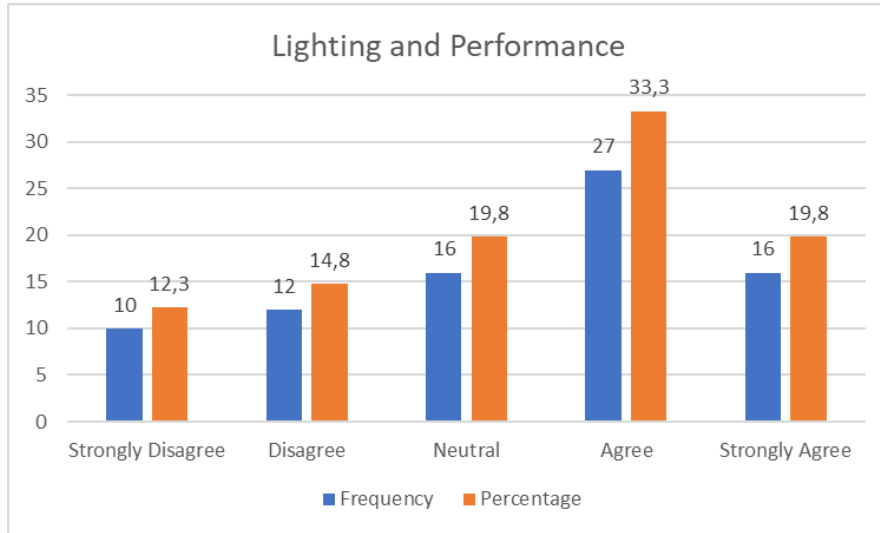


Figure 4.1. Lighting and Performance

Source: Mhlanga, 2021

The results show that the majority (53%) supported the view on the importance of sufficient lighting for improved work performance. This majority was made up of 33.3% of respondents who agreed and 19.8% who strongly agreed with the statement. The opposing respondents made up about 27% when combining 12.3% who strongly disagreed with 14.8% who disagreed. The remaining 19.8% were non-committal on their views regarding the effect of lighting on work performance because they chose neutral. The second statement inquired whether natural office lighting is a factor in employee performance at their higher education institution. The results are shown in 4.2.

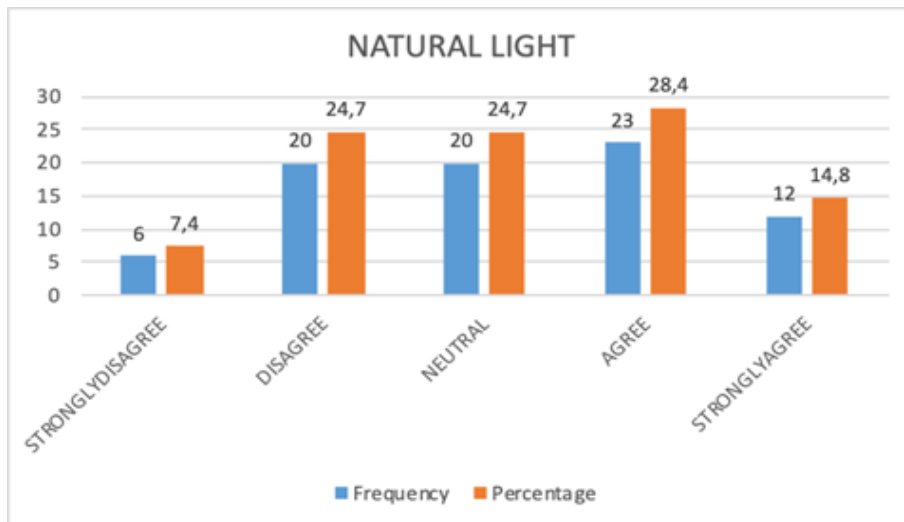


Figure 4.2. Efficient Natural Light

Source: Mhlanga, 2021

The displayed results show that 28.4% – agreed, and 14.8% – strongly agreed with the statement on the importance of natural light for enhanced performance. Therefore, 43% affirmed the effect of natural light on performance in the office environment. In contrast, 32% disagreed with that, 7.4% strongly disagreed and 24.7% disagreed with this statement. Only 24.7% chose neutral on this matter. The unfavourable and uncertain responses can be understood in the context where public universities commonly operate in old buildings that would have been there for decades. As such, these buildings would not be to the recent standards where natural lighting is emphasized to save on electricity bills and conserve the environment. The last statement sought to determine if electrical lighting in the office environment was adequate for staff’s uninterrupted performance of their duties. The responses to this statement are displayed in Figure 4. 3.

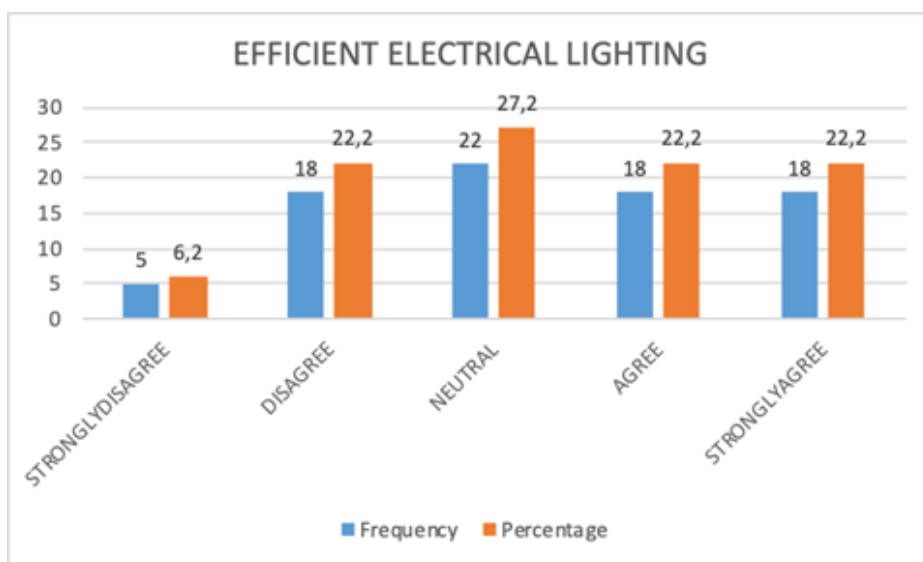


Figure 4.3. Efficient Electrical Lighting

Source: Mhlanga, 2021

Several respondents (44%) concurred with the statement that electrical lighting was sufficient, and it improved their performance. In contrast, 6.2% strongly disagreed, and 22.2% disagreed with the statement. Close to the number of respondents who disagreed (28%), as many as 27.2% had a neutral view of efficient electrical lighting. In other words, a combined large group (56%) consisting of respondents who disagreed and those who were neutral opposed the 44% of respondents who agreed (44%) that electrical lighting was efficient at their workstations. It was unclear if these divided views were linked to the university's poor maintenance or the general energy crisis in the country. It is worth noting that at the time of the study, the country had been experiencing rolling blackouts that started in 2007; this, therefore, made it difficult to ascertain the root cause of the mixed results on this statement.

Office Space Layout. Office space layout has been identified as important for efficient work performance and health because it can affect workers’ movement and interaction (Kamarulzaman et al., 2011; Saleem et al., 2012; Sugiyama et al., 2021). The issue of office space layout became more prominent during the Covid-19 pandemic when social distancing in the workplace was applied as one of the virus transmission preventative measures (Atika et al., 2020; Jason et al., 2022). Hence, the first statement was on the respondents’ perceptions of office space layout as a factor on employee performance. Figure 5.1 shows the results.

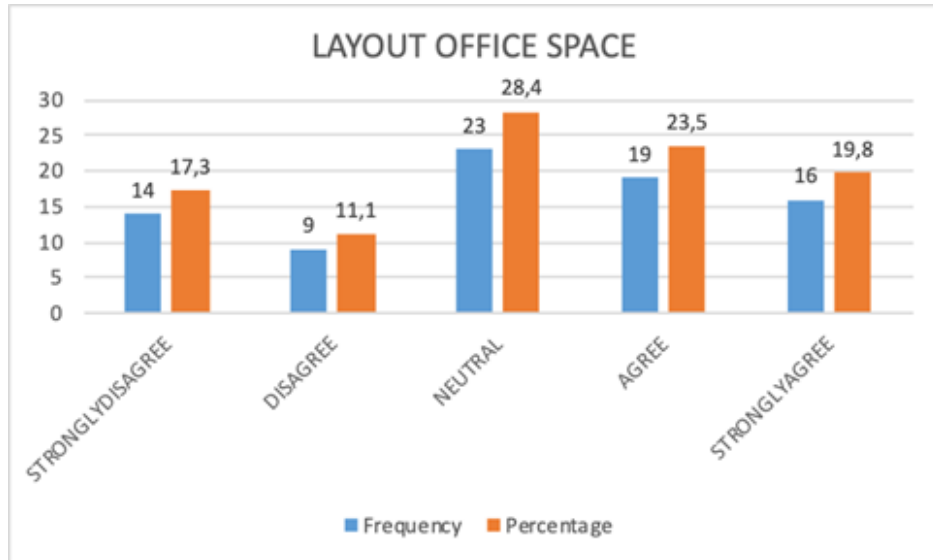


Figure 5.1. Office Space Layout

Source: Mhlanga, 2021

The responses produced a 43% favorable view of the importance of office space layout on administrative duties' performance. This 43% was made up of 23.5% responses of those who agreed and 19.8% of those who strongly agreed. The remainder of the respondents were split between those who had a neutral view (28%) and those who disagreed (29%). The 29% unfavorable view was obtained by combining the 17.3% of respondents who strongly disagreed with the 11.1% who disagreed. The number of respondents who concurred with the statement (43%) was not significant enough to be accepted as the general situation in this higher education institution. The split perceptions between those who disagreed (27%) and those who were neutral (28%) on this matter could be an indication of distinct physical environments in different buildings, departments and ranks of personnel who occupy different offices. According to Herbig et al. (2016) a congested office space leads to psychosomatic complaints, and emotional and cognitive irritation, which can all lead to poor performance of employees. Hence, the second statement was regarding employees' satisfaction with the amount of space in their offices at this selected higher education institution. The results are shown in Figure 5.2.

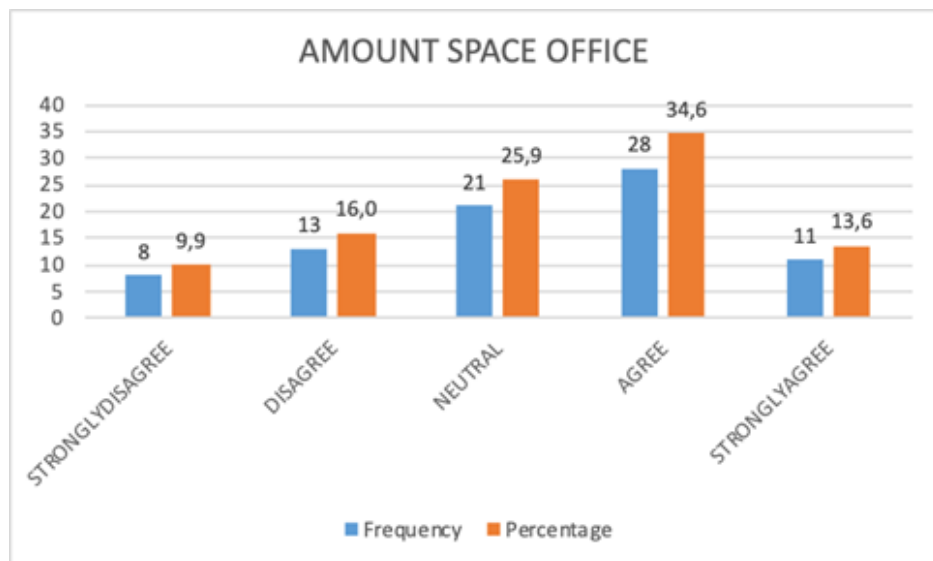


Figure 5.2. Amount of Space

Source: Mhlanga, 2021

Figure 5.2 shows that 48% of the respondents agreed, of which 34.6% agreed and 13.6 strongly agreed. The remaining respondents were divided equally between neutral (26%) and those who disagreed (26%). In this

case, the 26% who disagreed were determined by combining 9.9% who strongly disagreed and 16.0% who disagreed. The last and third statements inquired about the perceptions concerning the availability of privacy that would enable administrative staff to perform their duties with minimal interruptions. This statement was made where organisations tend to provide office spaces that can be shared (open plan) or used as individuals. The tendency is more toward the preference for shared office environment to efficiently utilize the limited available space by management. This preference is due to open-plan offices being considered beneficial to organizational productivity as they permit enhanced communication, creativity, collaboration and knowledge exchanges among employees (Smollan & Morrison, 2019). However, other factors, such as noise, distraction, and lack of privacy, can negatively affect productivity in open-plan offices (Haynes et al., 2017). Therefore, respondents' view was important to establish in respect of what transpired in their environment. Figure 5.3 displays the results.

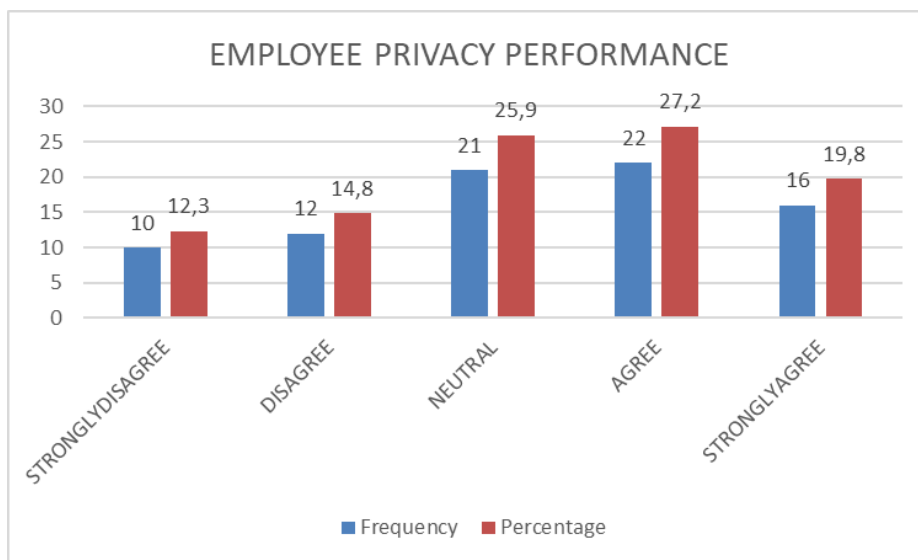


Figure 5.3. Employee Privacy and Performance

Source: Mhlanga, 2021

As many as 47% of respondents agreed with the statement on the availability of privacy. There was again an equal division of perceptions between those that were neutral (26%) and those who disagreed (27%), which is a combination of respondents who disagreed (14.8%) and those who strongly disagreed (12.3%).

Discussion

The study's results attest to the need for administrative staff physical environment comfort if they are to perform their duties at their best and meet the ever-changing demands of the stakeholders and society. The administrative staff perceived their office furniture as comfortable enough (55%) not to cause them to restrain in performing their duties. However, it was concerning to note that some respondents either disagreed (24%) or chose a neutral stance (21%) on this factor. Hafeez et al. (2019) study revealed the importance of a comfortable physical environment if employees' health and performance are to be maintained. It should therefore be a caution to organizations to aim for maximum staff satisfaction in their physical environment provision. The respondents (59%) had concerns with the noise levels at this public university, which they found inappropriate depending on the administrative staff location and what was happening on campus. The results resonate with the views expressed about noise being distracting to the point that it can affect cognitive workloads and employee performance (Nassiri et al., 2013; Samani, 2015; Azeez et., 2021; Manuj et al., 2021).

The overall response shows that most respondents (57%) found unfavourable office temperature levels at certain times inconvenient in performing their duties, especially where there were no temperature control mechanisms for individual offices. The findings match the results of studies by Ajala (2012), Bashir et al. (2020) and Nzewi et al. (2021) on the role of favourable workplace temperature for positive employee performance on tasks. Ali et al. (2015) also found that temperatures that is either too cold or too warm in the workstations of the universities they investigated left administrative staff uncomfortable, tired and unable to

concentrate, which contributed negatively to their productivity. It is worth noting that Marín-Restrepo et al. (2020) caution that temperature preferences are complicated for organisations to satisfy due to their dynamic nature among individuals who occupy shared workspaces. The conflicting responses and previous studies imply that organisations should aim for office-controlled temperatures. It would contrast with centrally adjusted temperatures that might not be favourable to many employees.

The issue of office space layout on employee performance was indicated by 43% of respondents as necessary for productivity and only 48% of them agreed that this was adequate in their workstations. It suggests that the environment did not allow many (52%) to have some privacy to enable them to perform their duties without unnecessary interruptions. Colenberg et al. (2021) review of research in this area of office space found similar concerns about the inadequate workspace. However, the issue of space is a common challenge in South African higher education institutions, especially those that have merged. There needs to be adequate land and funding for more infrastructure, which would assist in eliminating negative conditions that affect the provision of quality conditions for workers and students in higher education institutions (Badat, 2016; Azziz et al., 2019). It partly explains the preference for open-plan offices, which can permit enhanced communication, creativity, collaboration and knowledge exchanges among employees (Smollan & Morrison, 2019). It would be effective provided open-plan offices are well-managed to eliminate negative factors such as noise and distractions that are sometimes associated with shared offices (Haynes et al., 2017).

Overall, these findings are in congruence with previous studies conducted in different settings that point to the importance of a comfortable physical work environment and staff positive perceptions that can translate to good performance (Boerstra et al., 2015; Chua et al., 2016; Priarso et al., 2018; Yuan & Ekhsan, 2020; Hamidi et al., 2020; Pracoyo et al., 2022). Employers, therefore, need to invest in their employees' work environment comfort as this would positively impact employees' perceived organisational support (Unguren & Kacmaz, 2022).

Conclusions

Satisfactory performance of administrative duties is, amongst other factors, dependent on the staff's positive perception of their physical work environment. It is so because they spend most of their time confined to workstations. The benefits for an organization, through the departments tasked with such a responsibility, in attending to this need is that it can lead to productive administrative personnel. Employees comfortable in their workspaces are likely to increase their work performance. Public organizations such as universities need to give priority to this factor. The reported study was on one university with six campuses, as such, the physical work environment might not be the same throughout all campuses. Hence, the results of the study were not overwhelmingly in one direction. It is recommended that universities with multiple campuses strive for equity regarding the provision of physical environmental resources. A follow-up study could analyze the physical environment perceptions of different campuses, departments and offices separately from one another. The inquiry could be enriched by including observations of different offices.

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References

1. Abun, D., Macaspac, L.G.R., Magallanes, T., Catbagan, N.C., & Mansueto, J.M. (2022). The effect of organizational politics on the individual work performance. *International Journal of Research in Business and Social Science*, 11(2), 157-171. [\[Google Scholar\]](#) [\[CrossRef\]](#)
2. Ajala, E.M. (2012). The Influence of workplace environment on workers' welfare, performance and productivity. *The African Symposium: An Online Journal of the African Educational Research Network*, 12(1), 141-149. [\[Google Scholar\]](#)
3. Ali, A.S., Chua, S.J., & Lim, M. (2015). The effect of physical environment comfort on employees' performance in office buildings: A case study of three public universities in Malaysia. *Structural Survey*, 33, 294-308. [\[Google Scholar\]](#) [\[CrossRef\]](#)
4. Appel-Meulenbroek, R., Clippard, M., & Pfnür, A. (2018). The effectiveness of physical office environments for employee outcomes: An interdisciplinary perspective of research efforts. *Journal of Corporate Real Estate*, 20(1), 56-80. [\[Google Scholar\]](#) [\[CrossRef\]](#)
5. Arilaha M.A., Fahri, J., Nurlela, A., Jabid, A.W., & Buamonabot, I. (2020). Motivation, physical work environment, non-physical work environment, and work satisfaction (Study on the Government of Ternate City), *Proceedings of the 5th International Conference on Food, Agriculture and Natural Resources* (FANRes 2019), Atlantis Press, 419-423. [\[Google Scholar\]](#) [\[CrossRef\]](#)
6. Athirah, S., Shifaa, N., Michael, F.L., Sumilan, H., Lim, S.L.O., Jonathan, V., Hamidi, H., & Abg Ahmad, A.I. (2019). The relationship between working environment and employee performance. *Journal of Cognitive Sciences and Human Development*, 5(2), 14-22. [\[Google Scholar\]](#) [\[CrossRef\]](#)
7. Atika, Q., Qazi, J., Naseer, K., Zeeshan, M., Hardaker, G., Maitama, J.Z., & Haruna, K. (2020). Analyzing situational awareness through public opinion to predict adoption of social distancing amid pandemic COVID-19. *Journal of Medical Virology*, 92, 7849-7855. [\[Google Scholar\]](#) [\[CrossRef\]](#)
8. Azeez, M.F., Khudair, F.W., & Al-Fahham, A.A. (2021). Effect of noise on general health status of electrical generator workers in Iraq. *Indian Journal of Forensic Medicine & Toxicology*, 15(4), 1374-1378. [\[Google Scholar\]](#)
9. Azziz, R., Hentschke, G.C., Jacobs, L.A., & Jacobs, B.C. (2019). Strategic mergers in higher education. Johns Hopkins University Press. 304 p. [\[Google Scholar\]](#)
10. Badat, S. (2016). Deciphering the meanings, and explaining the South African higher education student protests of 2015-16. *Pax Academica*, 1(1), 71-106. [\[Google Scholar\]](#)
11. Baert, S., Lippens, L., Moens, E., Weytjens, J., & Sterkens, P. (2020). The COVID-19 crisis and telework: A research survey on experiences, expectations and hopes. *SSRN*. [\[Google Scholar\]](#) [\[CrossRef\]](#)
12. Bashir A., Amir, A., Jawaad, M., & Hasan, T. (2020). Work conditions and job performance: An indirect conditional effect of motivation. *Cogent Business & Management*, 7(1). [\[Google Scholar\]](#) [\[CrossRef\]](#)
13. Boerstra, A.C., te Kulve, M., Toftum, J., Marcel, G.L.C., Loomans, B.W.O., & Hensen, J.L.M. (2015). Comfort and performance impact of personal control over thermal environment in summer: Results from a laboratory study. *Building and Environment*, 87, 315-326. [\[Google Scholar\]](#) [\[CrossRef\]](#)
14. Chandra, T. & Priyono, P. (2016). The influence of leadership styles, work environment and job satisfaction of employee performance studies in the school of SMPN 10 Surabaya. *International Education Studies*, 9(1), 131-140. [\[Google Scholar\]](#) [\[CrossRef\]](#)
15. Chua, S.J.L., Ali, A.S., & Lim, M.E.L. (2016). Physical environment comfort impacts on administrative staff's performance. *MATEC Web Conferences*, 66, 00124. [\[Google Scholar\]](#) [\[CrossRef\]](#)
16. Chua, S.J.L., Myeda, N.E., & Yuan, X.T. (2022). Facilities management: Towards flexible work arrangement (FWA) implementation during Covid-19. *Journal of Facilities Management*, Vol. ahead-of-print No. ahead-of-print. [\[Google Scholar\]](#) [\[CrossRef\]](#)
17. Colenberg, S., Jylhä, T., & Arkesteijn, M. (2021). The relationship between interior office space and employee health and well-being – a literature review. *Building Research & Information*, 49(3), 352-366. [\[Google Scholar\]](#) [\[CrossRef\]](#)
18. Forbes, S., Birkett, H., Evans, L., Chung, H., & Whiteman, J. (2020). Managing employees during the COVID-19 pandemic: Flexible working and the future of work. United Kingdom Equal Parenting Project. Available at: [\[Link\]](#)
19. Gastearena-Balda, L., Olló-López, A., & Larraza-Kintana, M. (2021). Are public employees more satisfied than private ones? The mediating role of job demands and job resources. *Management Research*, 19(3/4), 231-258. [\[Google Scholar\]](#) [\[CrossRef\]](#)

20. Hafeez, I., Yingjun, Z., Hafeez, S., Mansoor, R., & Rehman, K.U. (2019). Impact of workplace environment on employee performance: mediating role of employee health. *Business, Management and Economics Engineering*, 17(2), 173-193. [\[Google Scholar\]](#) [\[CrossRef\]](#)
21. Hamidi, N.N.E.B., Mansor, F.A., Hashim, M.Z., Muhammad, N., & Azib, W.N.H. (2020). The relationship between physical workplace environment and employees' performance. *Journal of Contemporary Social Science Research*, 4(1), 56-67. [\[Google Scholar\]](#)
22. Haynes, B., Suckley, L., & Nunnington, N. (2017). Workplace productivity and office type: An evaluation of office occupier differences based on age and gender. *Journal of Corporate Real Estate*, 19(2), 111-138. [\[Google Scholar\]](#) [\[CrossRef\]](#)
23. Herbig, B., Schneider, A., & Nowak, D. (2016). Does office space occupation matter? The role of the number of persons per enclosed office space, psychosocial work characteristics, and environmental satisfaction in the physical and mental health of employees. *Indoor Air*, 26(5), 755-767. [\[Google Scholar\]](#) [\[CrossRef\]](#)
24. Idris, I., Adi, K.R., Soetjipto, B.E., & Supriyanto, A.S. (2020). The mediating role of job satisfaction on compensation, work environment, and employee performance: Evidence from Indonesia. *Entrepreneurship and Sustainability Issues*, 8(2), 735-750. [\[Google Scholar\]](#) [\[CrossRef\]](#)
25. Institute for Quality of Life (2018). The Impact of the physical workplace on performance: An introduction. Available at: [\[Link\]](#)
26. Jackson, L.T.B. (2018). Job demands and resources in employee attitudes in a national government department. *Journal of Public Administration*, 53(3), 731-749. [\[Google Scholar\]](#)
27. Jason, P.R., Edmonds, K.A., Aspiras, O., Kumar, M., Scamaldo, K., Richmond, J.R., Tull, T.M., & Gratz, K.L. (2022). The impact of stay-at-home orders on vulnerability assessments and precautionary intentions during a pandemic. *Psychology, Health & Medicine*, 1-12. [\[Google Scholar\]](#) [\[CrossRef\]](#)
28. Kamarulzaman, N., Saleh, A.A., Hashim, S.Z., Hashim, H., & Abdul-Ghani, A.A. (2011). An overview of the influence of physical office environment towards employees. *Procedia Engineering*, 20, 262-268. [\[Google Scholar\]](#) [\[CrossRef\]](#)
29. Kivunja, C. & Kuyini, A.B. (2017). Understanding and applying research paradigms in educational contexts. *International Journal of higher education*, 6(5), 26-41. [\[Google Scholar\]](#) [\[CrossRef\]](#)
30. Maulidiyah, N.N. & Ilahi, R.R. (2020). The impact of physical work environment on employee performance by job satisfaction as mediator. *International Journal of Research in Human Resource Management*, 2(1), 1-3. Available at: [\[Link\]](#)
31. Manuj, Y., Cabrera, D., Kim, J., Fels, J., & de Dear, R. (2021). Sound in occupied open-plan offices: Objective metrics with a review of historical perspectives. *Applied Acoustics*, 177. [\[Google Scholar\]](#) [\[CrossRef\]](#)
32. Marín-Restrepo, L., Trebilcock, M., & Porrás-Salazar, J.A. (2020). Adaptation by coexistence: contrasting thermal comfort perception among individual and shared office spaces. *Architectural Science Review*, 63(3-4), 235-247. [\[Google Scholar\]](#) [\[CrossRef\]](#)
33. Mhlanga, J.S. (2021). Measuring the perceptions of physical environment comfort on office employees' performance: a case study at the Durban University of Technology, South Africa. Available at: [\[Link\]](#)
34. Muhammad, K.S., Fong-Woon, L., Chuah, L.F., Jiri, J.K., & Bokhari, A. (2019). Integrating sustainability reporting into enterprise risk management and its relationship with business performance: A conceptual framework. *Journal of Cleaner Production*, 208, 415-425. [\[Google Scholar\]](#) [\[CrossRef\]](#)
35. Mujtaba, B.G. & Cavico, F.J. (2020). Ethical Analysis of office romance and sexual favoritism policies in the #MeToo Workplace and "Cancel Culture" era. *Socioeconomic Challenges*, 4(4), 132-150. [\[Google Scholar\]](#) [\[CrossRef\]](#)
36. Naharuddin, N.M. & Sadegi, M. (2013). Factors of workplace environment that affect employees' performance: A case study of Miyazu Malaysia. *International Journal of Independent Research and Studies*, 2(2), 66-78. [\[Google Scholar\]](#)
37. Nassiri, P.M.M., Dehaghi, B.F., Jundishapur, A., Abadi, L.I.G., Zakerian, S.A., & Azam, T. (2013). The effect of noise on human performance: A clinical trial. *International Journal of Occupational Environment Medicine*, 4(2), 87-95. [\[Google Scholar\]](#)
38. Neo, L.S., Tan, J.Y.C., & Chew, T.Y.C. (2022). The influence of COVID-19 on women's perceptions of work-family conflict in Singapore. *Social Sciences*, 11(2), 73. [\[Google Scholar\]](#) [\[CrossRef\]](#)
39. Ngcobo, S. & Mhlanga, J.S. (2022). Supervisors' provision of physical environment resources to support staff in a public university Application of Job Demands-Resources theory. *International Journal of Research in Business and Social Science*, 11(5), 423-431. [\[Google Scholar\]](#) [\[CrossRef\]](#)

40. Ngirande, H. (2021). Occupational stress, uncertainty and organizational commitment in higher education: Job satisfaction as a moderator. *SA Journal of Human Resource Management*, 19(0), a1376. [\[Google Scholar\]](#) [\[CrossRef\]](#)
41. Nzewi, H.N., Augustine, A., Mohammed, I., & Godson, O. (2021). Physical work environment and employee performance in selected brewing firms in Anambra State, Nigeria. *Journal of Good Governance and Sustainable Development in Africa*, 4(2), 131-145. [\[Google Scholar\]](#)
42. Parashakti, R.D., Fahlevi, M., Ekhsan, M., Hadinata, A. (2020). The influence of work environment and competence on motivation and its impact on employee performance in health sector. Proceedings of the 3rd Asia Pacific International Conference of Management and Business Science (AICMBS 2019). [\[Google Scholar\]](#) [\[CrossRef\]](#)
43. Parveen, A., Malik, M. H., & Aziz, R. (2012). Emotional intelligence and academic achievement of male and female adolescent students of district Budgam. *Journal of Education and Practice*, 3(15), 184-186. [\[Google Scholar\]](#)
44. Pawirosumarto, S., Sarjana, P.K., & Gunawan, R. (2017). The effect of work environment, leadership style, and organizational culture towards job satisfaction and its implication towards employee performance in Parador Hotels and Resorts, Indonesia. *International Journal of Law and Management*, 59(6), 1337-1358. [\[Google Scholar\]](#) [\[CrossRef\]](#)
45. Pracoyo, N.A., Tubastuvi, N., Santoso, S.B., & Wahyuni, S. (2022). Determinants of employee performance: The mediating role of job satisfaction. *International Journal of Research in Business and Social Science*, 11(2), 144-156. [\[CrossRef\]](#)
46. Prasastia, N. (2019). Analysis of physical and non-physical work environment PT. Kakiatna Indonesi to company performance. *Journal of Economics and Business UBS*, 8(1), 73-81. [\[Google Scholar\]](#) [\[CrossRef\]](#)
47. Priarso, M.T., Diatmono, P., & Mariam, S. (2018). The effect of transformational leadership style, work motivation, and work environment on employee performance that in mediation by job satisfaction variables in Pt. Gynura Consulindo. *Business and Entrepreneurial Review*, 18(2), 165-176. [\[Google Scholar\]](#) [\[CrossRef\]](#)
48. Putri, E., Vivin, M., Achmad, S., & Zaim, M. (2019). The effect of work environment on employee performance through work discipline. *International Journal of Research - Granthaalayah*, 7(4), 132-140. [\[Google Scholar\]](#) [\[CrossRef\]](#)
49. Raziq, A. & Maulabakhsh, R. (2015). Impact of working environment on job satisfaction. *Procedia Economics and Finance*, 23, 717-725. [\[Google Scholar\]](#) [\[CrossRef\]](#)
50. Ricciardelli, R. & Carleton, R.N. (2022). A qualitative application of the Job Demand-Control-Support (JDCS) to contextualize the occupational stress correctional workers experience. *Journal of Crime and Justice*, 45(2), 135-151. [\[Google Scholar\]](#) [\[CrossRef\]](#)
51. Saleem, A., Shah, A.A., Zaman, K. Arif, M. Shehzad, K., & Ullah, I. (2012). Impact of interior physical environment on academicians' productivity in Pakistan higher education institutes perspectives. *Iran Journal of Management Studies*, 5(1), 25-46. [\[Google Scholar\]](#)
52. Samani, S.A. (2015). The impact of personal control over office workspace on Environmental satisfaction and performance. *Journal of Social Sciences and Humanities*, 1(3), 163-172. [\[Google Scholar\]](#)
53. Sarode, A.P. & Shirsath, M. (2014). The factors affecting employee work environment and it's relation with employee productivity. *International Journal of Science and Research*, 3(11), 2735-2737. Available at: [\[Link\]](#)
54. Saltiel, F. (2020). Who can work from home in developing countries? *Covid Economics*, 7, 104-118. [\[Google Scholar\]](#)
55. Silvester, J.R. & Konstantinou, E. (2010). Lighting, well-being and work performance: A review of the literature. Philips. Available at: [\[Link\]](#)
56. Siti, A.S., Deswindi, L., & Indrajaya, D. (2020). Are physical and non-physical working environment effect employees' productivity with motivation as an intervening factor? *Advances in Economics, Business and Management Research*, volume 149. Proceedings of the 3rd Asia Pacific Management Research Conference (APMRC 2019) [\[Google Scholar\]](#) [\[CrossRef\]](#)
57. Smollan, R.K. & Morrison, R.L. (2019). Office design and organizational change: The influence of communication and organizational culture. *Journal of Organizational Change Management*, 32(4), 426-440. [\[Google Scholar\]](#) [\[CrossRef\]](#)

58. Stoddart (2016). The workplace advantage: The £20 billion key: Why the office environment is key to productivity. *The Stoddart Review*. London: Raconteur Custom Publishing. Available at: [\[Link\]](#)
59. Sugiyama, T., Hadgraft, N., Clark, B.K., Dunstan, D.W., Chevez, A., Healy, G.N., Cerin, E., LaMontagne, A.D., Shibata, A., Oka, K., & Owen, N. (2021). Office spatial design attributes, sitting, and face-to-face interactions: Systematic review and research agenda. *Building and Environment*, 187, 107426. [\[Google Scholar\]](#) [\[CrossRef\]](#)
60. Unguren, E. & Kacmaz, Y.Y. (2022). Innovations in management of hotel employees: the relationship between organizational resilience and work engagement. *Marketing and Management of Innovations*, 2, 141-150. [\[Google Scholar\]](#) [\[CrossRef\]](#)
61. van der Molen, H., Kuijjer, P., de Groene, G., Bakker, J., Sorgdrager, B., Lenderink, A., Maas, J., & Brand, T. (2018). Beroepsziekten in cijfers 2018 [*Occupational diseases 2018*]. Amsterdam: Nederlands centrum voor beroepsziekten. Available at: [\[Link\]](#)
62. Vimalanathan, K., & Babu, T.R. (2014). The effect of indoor office environment on the work performance, health and well-being of administrative staff. *Journal of Environmental Health Science and Engineering (JEHSE)*, 12, 113. [\[Google Scholar\]](#) [\[CrossRef\]](#)
63. Wulandari, R., Djawoto, D., & Prijati, P. (2021). The influence of delegative leadership style, motivation, work environment on employee performance in self-efficiency mediation in SNVT housing provision of East Java Province. *Budapest International Research and Critics Institute (BIRCI-Journal): Humanities and Social Sciences*, 4(3), 3294-3311. [\[Google Scholar\]](#) [\[CrossRef\]](#)
64. Yuan B. & Ekhsan, M. (2020). Effect of work environment and job satisfaction on employee performance in PT. Nesinak industries. *Journal of Business, Management, and Accounting*, 2(1), 85-91. [\[Google Scholar\]](#)