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Do work environments have an effect on productivity and creativity?

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CHAPTER 1

Introduction

<u>Background</u>

"*The mind and body need to be in a state of well being for work and concentration. This is a prime requisite for productivity*" Derek Clements –Croome, Derek .J. Croome (2000) "Creating the productive work place" Talor & Francis.

A vast amount of research has been conducted on work environments and their effects on employees. This particular research paper sets out to discover how organisations in a South African context can assist their staff in being more productive and creative. It will further look at the factors within the physical work environment that have an effect on productivity and creativity; lastly the study will focus on individuals within a retail fashion context.

Some of the physical factors within the office environment that may affect productivity and creativity include ergonomics, indoor air quality, view through windows, open-plan offices, noise, plants and lighting. A vast amount of research can be obtained around these factors, some of which will be included within this research paper. Although there is a large amount of research surrounding the physical work environment, there are some areas that have not been fully explored. Areas such as colour, use of art, technology and the anti-smoking legislation in South Africa, these too will be researched and added to this research paper.

Very little research could be obtained about South African companies and the physical factors that may influence employees. This paper sets out to obtain information about South African office environments and research will therefore be conducted in a South African Retail company, Millennium.

<u>Motivation</u>

Fjeld and Bonnevie (2002) give light to the concept that "…*the whole human evolution took place in close contact with nature and vegetation.*"   Today's environment has changed significantly; manmade objects dominate our physical surroundings. The study of the effect surroundings have on us is known as environmental psychology. This study shows that physical surroundings have an impact on our well-being. It is important to give attention to organisation's physical factors in office environments because improving these factors may assist in improving productivity and/or creativity. Some physical factors that are proven to affect creativity include lighting, colour, plants and perhaps furniture (Ceylan 2008). Studies conducted on plants, lighting, indoor air, temperature and even indirectly humidity all found to have an effect on productivity. (Fjeld and Bonnevie, 2002; Abdou, 2007; Mills et al., 2007; Cushman, n.d.; Tarran et al; 2007).

 Abdou's (2007) paper sheds light on building designs; he states that office spaces are to meet the requirements of the tasks performed by employees. It is of importance that office environments correspond with the needs of the organisation. It is also important to study the factors that hinder creativity / productivity so that organisations may have the knowledge to better understand the work environment they are providing for their staff and how to better it.

"*It is a much higher cost to employ people than it is to maintain and operate a building, hence spending money on improving the work environment is the most cost effective way of improving productivity because a small percentage increase in productivity of 0.1% to 2% can have dramatic effects on the profitability of the company*." (Clements-Croome; 2003) This statement shows that it is worthwhile not only for the employees but also for the company to improve and gain knowledge about the factors that improve or hinder creativity and productivity.

The purpose and main motivation of this research paper is to build on knowledge already acquired about the work environment.

Goals and research problem

- Aims: This study intends to discover the physical factors that affect companies in a South African fashion retail context and what affect these physical factors may have on employee's creativity and productivity. Furthermore to build on previous knowledge already acquired about work environments and the effects they may have on office employees.

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- Objectives: To fully indentify and explain physical factors within the work environment and how they may impact on staff's creativity and productivity. The objective of the study is also to provide explanations and recommendations for organisations so that productivity and creativity can be improved or to identify some of the physical factors that may hinder creativity and productivity.

- Overview of the research methodology:

  Maxwell states that "the strengths of qualitative research derive primarily from its inductive approach, its focuses on specific situations or people, and its emphasis on words rather than numbers." Therefore the best-suited research design for this study is qualitative, as people's feelings and opinions about their work environment will be questioned and captured.

  A randomly selected sample of eight participants will be drawn from the Retail Company, Millennium, and this will constitute the sample for the study.

  A series of face-to-face interviews will be used to obtain information about Millennium's office environment and the physical factors they may or may not increase worker productivity and creativity. Field notes will also be used during the interview process and this will provide additional non-verbal information that may be used in the data analysis.

- Definition of concepts:

  Creativity: Fitzgerald, Talbot & Joniak (2007) define creativity as the process of a "new theory, invention, idea, service; or a solution to a problem."

  Productivity: The Oxford English dictionary describes productivity as "capacity to produce, producing abundantly and effectiveness of the production effort…" it is therefore doing your tasks within the day effectively, with little error.

- Limitations of the study:

The diversity in culture posed a problem in some of the interview processes. The language barrier disallowed some of the participants to understand the questions and this may have affected their answers. The researcher sees creativity and productivity as two separate entities. Some of the participants did not see the two words as separate and this may have affected some of their answers.

Conclusion

The researcher will focus on the objectives of the study in attempting to achieve and realise the aim of the study.

CHAPTER 2

Literature Review

Introduction

Extensive research has been conducted on work environments and their effects on office workers. Factors such as lighting, noise, indoor air, colour and many others could impact on staffs' creativity and productivity. Some of this research has been analyzed and presented below.

One should first look at the difference between creativity and productivity. Fitzgerald, Talbot & Joniak (2007) define creativity as the process of a "new theory, invention, idea, service; or a solution to a problem." The Oxford English dictionary describes productivity as "capacity to produce, producing abundantly and effectiveness of the production effort…" it is therefore doing your tasks within the day effectively with little error. Productivity also involves the amount of work one is able to do. Creativity is described in the Oxford English dictionary as "all created things, a production of human intelligence especially of the imagination". Creativity and productivity work together in some cases but the researcher believes that they are still separate entities.

Building designs and other physical factors within the work environment should correspond with the function of the organisation and its staff. Abdou's (2007) paper sheds light on building designs; he states that office spaces are to meet the requirements of the tasks performed by employees. Some physical factors that are proven to affect creativity include lighting, colour, plants and perhaps furniture (Ceylan 2008). Studies conducted on plants, lighting, indoors air, temperature and even indirectly humidity all found to have an effect on productivity. (Fjeld and Bonnevie, 2002; Abdou, 2007; Mills et al., 2007; Cushman, n.d.; Tarran et al; 2007).

It is therefore important to give attention to organisation's physical factors in working environments because improving these factors may assist in improving productivity / creativity. It is also important to study the factors that hinder creativity / productivity so that organisations may have the knowledge to better

understand the work environment they are providing for their staff and how to better it. Some of these variables are elaborated on below.

Ergonomics

Ergonomics is defined as "*the understanding of how the interior environment interacts with the dimension and physical abilities of human beings is the field of human factors and ergonomics*." (Montgomery, 2004). It is further stated that it is the interactions with the design of the space and the individuals that inhabit this space. Scheidert (1985) in Montgomery (2004) states that using a computer puts the body in abnormal position. It then becomes important that the physical environments suit the individual and the task that needs to be conducted. If the environments are not suited, individuals have the risk of developing musculoskeletal disorders (Montgomery, 2004). These disorders have impact on productivity and may result in major financial losses to organisations. Organisations may also have to compensate workers for these disorders resulting in more financial losses (Montgomery, 2004). It becomes evident that not only do office environments have an impact on productively of their staff but also on health and well-being.

Indoor air

It is stated that 90% of city inhabitants spend their time indoors (Carvallo et al.; 1997; in Fjeld and Bonnevie's paper; 2002). For the greater part of the workforce the majority of this time could be spent in office spaces. It is therefore of vital importance to study the effects of indoors air on employees.

Numerous papers have shown that indoor air has more pollution than outdoor air (Brown 1997; Smith 1997; EA 2003 in Tarran et al; 2007). Indoor air pollution tends to be higher because of detergents, printers, air fresheners and office equipment, which cause indoor air pollution. These pollutants can cause "*building related illnesses such as headaches, sore eyes, nose and throat infections or nausea*" (Carre et al. 1999 in Tarran et al; 2007). Abdou (2007) expands the list of pollutants, adding more potentially harmful indoor pollutants including; "*radon, asbestos, inorganic, environmental tobacco smoke (ETS), organics, biologicals and non-ionizing radiation, the latter four primarily affecting productivity*." Other pollutants include virus and bacteria; this may affect employees' health and well-being. "In *an article on office pollution, Dubbs (1990) refers to studies that show as much as 50% of employee absenteeism is due to upper respiratory infections, some of which can result from indoor air pollution*." (Abdou; 2007). Grandjean (1980) in Abdou's (2007) states "air quality can affect job and environmental satisfaction."

Various studies have been conducted on indoor air quality and its effects on productivity, one of which cited by Abdou (2007) concluded that 19% (1 in 5 of 600 participants) of office workers were less productive because of poor air quality in their office. It was stated, "*on average, we find that air contamination levels indoors is between four and ten times higher than what you find outdoors*" (Woods; 1989; in Abdou; 2007). This statement shows itself in many research papers (Brown 1997; Smith 1997; EA 2003 in Tarran et al; 2007). Further Studies concluded that 11% of participants feel " *sleepy or tired*", 9% stated " *congested nose*", " *8% cited eye irritation* " and 8% stated *"difficulty breathing "*. All these symptoms are caused by poor indoor air quality. (Woods; 1989; in Abdou; 2007).

Plants and their affect on indoor air

Other studies have shown that plants reduce the amount of pollution in the air (Tarran et al; 2007). Researchers conducted studies on the effects of plants and indoor air quality. (Burchett et al., 2005; Wood et al., 2006; in Tarran et al paper, 2007). Three offices with three different planting systems were used. The study set out to show whether plants could reduce pollution indoors. Dangerous organic compounds were added into test chambers containing plants. It was found that plants were able to remove volatile organic compounds and that soil microorganisms were the main agents in removing these harmful compounds. The entire plant with all its microorganisms can be used "*as an air filtering system*" (Fjeld and Bonnevie 2002). Further studies will have to be conducted on the effects of artificial plants. Although they do not have the ability to cleanse the indoor air they may enhance the aesthetics of the office. The effects this will have on productivity and creativity will have to be studied further.

Temperature

"Indoor temperature is one of the fundamental characteristics of the indoor environment." (Seppänen; Fisk William & Lei, 2006). There have been contradicting statements about the optimum comfort temperature for humans. Bennett, (1977) in Abdou's (2007) paper states that the optimum temperature for a comfortable environment is twenty five degrees Celsius. Seppänen; Fisk William & Lei, (2006) disputes this saying that the optimum temperature for productivity is about twenty two degrees Celsius. Both sources agree that incorrect temperature decreases productivity and both suggest that temperature is an important factor to consider when analysing work environments. A Dutch study showed that absenteeism could be reduced by

thirty four percent when employees were able to control their own temperature in their environments. (Abdou 2007) It is therefore of importance to find the impact of an individual employee temperature requirements on the productivity of other their co-workers. Many offices today have air conditioning to help circulate air and also to cool down office environments. A study conducted in Washington found a nine percent improvement in productivity when air conditioning was introduced into the office (Abdou 2007). One should look at how individual temperature affects co-workers. This should be taken into more consideration in open plan offices, where choosing an individualistic temperature comfort may impact on other co-workers more greatly then in closed offices.

Humidity

Abdou (2007) states that it is of importance to study the effects of humidity on absenteeism. This section combines how plants affect relative humidity and also the effects of humidity on productivity. An article on the benefits of plants, Fjeld & Bonnevie (2002) and Abdou's (2007) journal provide reasons as to why plants are able to indirectly improve productivity by increasing the amount of humidity in the air. The article points out that the ideal humidity for humans is 30 – 60 percent and that dry air may cause staff to be more susceptible to illness, therefore reducing productivity. (Worcestershire (n.d.) Benefits of plants in the office http://www.worcestershire-office-plants.co.uk/benefits/; 2008/04/12). Abdou and Lorsch (1994) in Abdou (2007) add how illness may occur because of dry air. Low relative humidity dries out the mucous membranes in the nasal passages making us more susceptible to infection. It is for this reason that organisations should pay more attention to the relative humidity in offices as this may improve absenteeism rates. Fjeld and Bonnevie (2002) went one step further conducting tests that prove that plants increase the amount of humidity using their high transpiration rates. Fjeld and Bonnevie (2002) added further that humidity assists in holding together dust particles and therefore reducing the amount of dust in the air. Plants indirectly reduce dust. This reduction of dust may also reduce discomfort. Not only do plants reduce dust by increasing humidity but also by using their physicality; their large leave surface area absorb dust from the air. This reduction of dust improved the discomfort of office workers and this in turn my help improve productivity. No link between creativity and humidity was found in the literature; therefore more research will be needed in this area.

'View through windows'

Plants being able to rid the air of harmful pollution are not their only use. Fjeld and Bonnevie (2002) give light to the concept that "…*the whole human evolution took place in close contact with nature and vegetation.*" Today's environment has changed significantly, manmade objects dominate our physical surroundings. The study of the effect surroundings have on us is known as environmental psychology. This study shows that physical surroundings have an impact on our well-being. It shows that not only indoor air quality affects our well-being but also our physical environment. "…*the view through windows* …" may have an effect on well-being. According to Grahn (1993) in Fjeld and Bonnevie (2002), office workers who are able to view some kind of greenery instead of non-vegetative areas out their office windows are more likely to have reductions in stress. Biebaum (1992) in Abdou's (2007) paper also states that not only indoor air quality contributes to ill health at work. Factors such as ergonomics, lighting, stress, and even labour management can affect "work *comfort*" and the individuals' perception of the air quality. Biebaum (1992) is further quoted in saying "we *are getting away from using the Indoor air quality because we have found that you can solve the indoor air problem and not eliminate the symptoms. A lot of consequences of physiological stress are the same as what we might expect from poor air quality …… but we can't look at indoor air without considering other issues.*"

It therefore becomes evident that indoor air quality has an impact on productivity but it does not work in isolation, other factors have to be questioned and analysed. Research also does not show a link between indoor air quality and its affect on creativity. Perhaps more research is needed in this area.

Open plan offices

Arnerlöv & Bengtsson, (2007) define open plan offices as being "an office where employees are stationed in one room."

Open plan offices are said to be advantages because they allow smoothness of communication between co-workers (Arnerlöv & Bengtsson, 2007). According to the majority of the literature noise is said to be the most disruptive aspect of open plan offices (Arnerlöv & Bengtsson, 2007; Navai & Veitch, 2003). It becomes evident that the main purpose of having open plan offices is communication and this is the one element that is also seen as the most disruptive. Navai & Veitch (2003) suggest other disadvantages in having an open plan office; the lack of privacy, distractions and interruptions from other employees, rise in

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office temperature and the spreading of contaminates. According to Navai & Veitch (2003) problems tend to be worse in open plan offices because of the layout. It is further suggested that sound is able to move more freely because of the lack of barriers. Sound partitioning and ceilings that absorb noise may help ease the problem (Sundtom, 1986 in Navai & Veitch, 2003). Plants are also able to absorb noise (Worcestershire, n.d.) plants could therefore be an option in alleviating the noise in open plan offices.

Although open plan offices have advantages because they allow co- workers to freely communicate with one another they also have many disadvantages. It then becomes important to analyse the company and its needs to determine whether or not open plan offices are the best solution for the indoor environments.

Noise

"Noise is defined as a physiological concept involving unwanted sound perceived by the listener as being unpleasant, bothersome, distracting or physiologically harmful." (Cohen & Weinstein; 1982 in Navai & Veitch, 2003). Irregular sound such as speech is said to be the most bothersome. The hum of a computer is less stressful because it is a constant sound (Navai & Veitch, 2003). Glass et al. (1971) in Navai & Veitch, (2003) suggest that sound that is controlled by the individual is also seen as less stressful. Therefore conversations from co-workers and music are seen as more stressful because they are uncontrollable sounds (Navai & Veitch, 2003). Noise stemmed from communication is not the only cause of noise on office environments. External noise such as traffic and other external noises such as office equipment may also cause discomfort in office environments. A study conducted by Bitner 1992 in Arnerlöv & Bengtsson, (2007) found that vacuuming was problematic to employees, it was further suggested that vacuuming be done during times when employees were out of the office. Stone & Luchettic (1985) in Arnerlöv & Bengtsson, (2007) suggested that quiet zones be implemented into offices. For example, a quiet corner where employees will be able to read quietly, the purpose of these areas will be for employees to escape the office noise and allow themselves to relax for a period of time.

Plants have not only been studied for their effects on indoor air quality but also whether they have an effect on noise. Background noise can be reduced because plants are said to absorb noise. (Worcestershire (n.d.) Benefits of plants in the office http://www.worcestershire-office-plants.co.uk/benefits/; 2008/04/12) Costa and James (1999) proved this statement in studies conducted that proved potted plants were in fact able to reduce noise. Steelcase, (2002) in Montgomery's (2004) thesis stated that noise affects people's ability to concentrate and may also affect productivity. Montgomery (2004) further states, "Noise in the

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environment affects physical health." We are able to conclude that not only do plants benefit the work environment by cleansing the air but also indirectly by reducing noise, improving physical well-being and therefore also assisting in increasing work performance.

Noise in offices spaces can be problematic in that it disrupts work and is a cause for irritation in office environments. Further suggestions are needed to deal with office noises to prevent decreases in productivity.

<u>Greening office spaces</u>

According to Tarran et al (2007), a cost efficient way to increase productivity is to introduce plants into the workplace. "*This portable, flexible, attractive, low-cost technology can complement any engineering measures and can be used in any building "*(Tarran et al 2007). Plants are an easy cost efficient solution to increasing productivity, it is therefore of some importance to study the effects of plants on the well-being and creativity of employees. Many studies have been done and are presented below.

Fjeld (2000) and Bergs (2002) in Tarran et al (2007) all suggest that absenteeism can be reduced and general well-being can be improved by introducing plants into workspaces. Many studies have been conducted on the effects of plants and well-being; one of these studies took place from 1995 to1996 in 51 offices. Effects of indoor plants were tested on the health and discomfort of office workers. Two different sets of data were collected, first an office with no plants and secondly an office where plants were introduced. Questionnaires were based on possible symptoms regarding health and discomfort. Symptoms such as fatigue, headaches, dizzy-ness, concentration problems and so on were included. Of the twelve symptoms tested it was concluded that there was a 23 percent improvement on productivity in the period where plants were introduced into the office. Fjeld and Bonnevie (2002) *(see appendix 1 for results).*

Research shows that plants are very useful in the work environment. Not only do they cleanse air, rid the office of dust and increase humidity but studies have also shown that plants are able to lift people's moods (Larsen et al, 1998; in Ceylan 2008) and therefore assist in the creative process (Ceylan 2008). This statement is proven in research conducted by Ceylan (2008), whereby the effects of office environments on managers' creativity are studied. Tests showed that staff that work in an environment with plants are more creative than spaces without plants.

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The research therefore shows that plants are useful and may even be an inexpensive addition to a work environment. It has been proven that they increase creativity and by reducing dust, noise and improving indoor air quality they are therefore able to improve general well-being.

"From an economical point of view, it should be of great interest to include plants as a work environment asset, since only small investments are necessary in order to establish a "green environment." (Fjeld and Bonnevie; 2002).

Lighting

Employees use lighting for visual tasks. Indoor lighting is relied upon because of a lack of external or natural light inside office spaces (Mills et al. 2007). Therefore bad lighting can be defined as incorrect lighting for a particular task and 'good lighting' is said to increase productivity, reduce stress and it may also assist in making indoor environments more pleasant (Cushman. n.d.) and Mills et al. (2007). Studies conducted on lighting and its effects on office workers' productivity will be observed in this section.

Cushman. (n.d.) stated that problems caused by bad lighting include headaches, eyestrain, general bodily discomfort, rates of human error may increase and bad light may also reduce alertness. Taking these complaints into consideration it becomes possible to conclude that bad lighting may have an impact on the economics of the business. (Cushman, n.d.).

Cushman. (n.d.) revised a study conducted at a research centre, Rensselaer Polytechnic Institute. This study was conducted on office workers and the effect lighting had on their productivity. Results showed that workers had to take breaks more often due to the poor lighting conditions; this resulted in about 80 minutes of lost time per week for each worker. It was therefore concluded that improvements in lighting could increase productivity. Cushman; (n.d.) included a further study in his paper showing that "*a 16% improvement in productivity at a West Bend Mutual Insurance facility was attributable to a lighting up grade.*"

Park (1999) in Mills et al. (2007) states that light may also improve health during winter because of a lack of exposure to sunlight during winter months. A shortage of daylight that office workers experience could have a negative effect on health. This idea has created an interest in companies to pay more attention to the type of lighting being used in office environments (Mills et al. 2007). It is further added that the discovery of

"*non-visual retinal receptors*" indicates, on an anatomical basis, that light does have an effect on the body biologically. (Berson et al. (2002) in Mills et al. (2007)).

Natural light illuminate ranges from 2000 to 100 000 lux whereas typical indoor lighting illuminates at about 500 lux. Indoor lighting is also said to have less "short *wave length blue spectrum*" than natural light. (Mills et al. 2007) This short wave length light is said to be important in the biological effects of the body. The "short wave length blue spectrum" is also said to have a higher colour temperature. This temperature has been studied and has shown to increase mental activity. (Mills et al. 2007) "*…drowsiness has been observed to be higher under lower colour temperature lighting when comparing 3000k with 5000 k.*" (Noguchi et al. (1999) in Mills et al.; 2007). This could improve alertness and therefore increase productivity. (Mills et al. 2007). The purpose of Mills et al. (2007)'s research paper was therefore to test the effects of lighting on office workers in a real life context. "*With this background information in mind, it can be postulated that the new high correlated temperature lights would have significant effects upon feelings of wellbeing, alertness, concentration and possibly work performance in those exposed to it.*" (Mills et al. (2007))

Mills et al. (2007)'s study set out to show the effects of "*high correlated colour temperature fluorescent lights*" on work performance. The study was conducted in offices of Standard Life Healthcare offices in the UK. New lights with correlated colour temperature florescent lamps (ActiViva Active, Philips) were installed on the test floor. The new correlated colour temperature florescent lamps increased the amount of short light wavelength with a colour temperature of 17 000k. Questionnaires were sent to assess participant's "*alertness, performance and concentration*." (Mills et al. 2007) The intervention group showed a number of improvements in different areas such concentration, mood, energy, memory and also showed to have less fatigue. "*Within the group analysis yielded, an almost 20% increases in the mean work performance score in the intervention group, with only marginal changes within the control group.*" (Mills et al. 2007) Participants reported that the new lighting increased their feelings of well-being and therefore work performance. Cushman. (n.d.) adds to this study in saying lighting may have a considerable impact on productivity but other factors can also contribute to a decrease in productivity, these were not taken into account in the Mills et al. (2007) study. These other factors could include factors such as personal issues (relationships with Work Colleagues or at home) and a lack of sleep could also have an impact on

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productivity, Cushman (n.d.). Participants preferred the new high correlated colour temperature lighting. Some participants asked to keep the new lighting. According to Mills et al. (2007) further research is needed to study the cost efficiency of the new lighting. Cushman. (n.d.) included ways to reduce energy costs. Cushman (n.d.)'s methods include using natural lighting by introducing skylights and other design features that assist in bringing in natural light. Further studies in this area could possibly look at the addition of natural lighting and its effects on workers, perhaps in conjunction with the new correlated colour temperature lighting.

One can conclude that not only the lack of lighting but also the type of lighting used in an organisation has an effect on employees. Perhaps future studies could include affects of natural lighting on productivity. Organisations could also look at ways to incorporate natural lighting elements into the design process Cushman. (n.d.). This would bring in more natural light and perhaps save on energy costs. Lannquist (2000) in Mills et al. (2007) add other beneficial effects of lighting such as having positive effect on depressive symptoms. Amabile et al. (2005)'s studies showed that there is a definite link between a positive mood and creativity. Ceylan's (2008) research also found a link between lighting and creativity. Therefore one could say that not only does lighting improve productivity but also may have a positive effect on creativity.

Colour

If colour does have an impact on people's moods and perhaps even creativity, it would be beneficial to choose a colour that impacts positively. Thomas (2006) and Kwallek (2005) both agree that a lot more research is needed on the effects of colour on individuals. This idea of colour influencing people's moods is further explored within this section but far more research within this area is needed.

Thomas (2006) states that other more obvious issues within the workplace (such as ergonomics and time-management) may over shadow colour and its effects on individuals. Kwallek (2005) has been studying the effects of colour for over fifteen years and states that colour cannot be looked at in isolation and that other factors have to be considered. Kwallek (2005) found that there were differences in results on the influence of colour when employees had to screen or block outer distractions within the office environment compared with being placed in a coloured room and having to conduct tasks with no external stimuli. Kwallek (2005)

and Thomas (2006) both agree that the workplace should be designed in a way that individuals can adjust it to suit themselves. Although this is not always possible perhaps further investigation is needed to find feasible options as to how workstations can be changed to suit the individual.

Kwallek and Thomas (2006) both agree on the effects of certain colours within the workplace. *"Warm colours are more arousing than cool colours. Red, and to a lesser extent the other warm hues of orange and yellow, speed up motor reactions and impair the efficiency of work performance."* Thomas (2006) backs up this statement further in saying that red is known to increase blood pressure and the hormone adrenalin. Thomas (2006) adds further that "*Cool colours (blue and green) are helpful for work on complex tasks; warm colours more often tend to distract."* It is therefore evident that warm colours and especially red is not the best colour choice for offices, as it hampers performance.

Judging from the literature available in this area there seems to be no conclusive evidence on colour and its effects on employees. All references agree that there is a link between colour and people; but there is no evidence proving the exact affect. Further studies are needed in this area that may help in determining the effects of colour in the workplace.

Creativity at work

Creativity has become a new area to focus on in the workplace; extensive research has been conducted on the factors that hinder and assist creativity (Amabile et al. (2005). It is therefore important to study the effects of office spaces on individuals' creativity.

Creativity is known as the process of coming up with new solutions to problems or ideas. (Amabile et al. 2005). Ganster (2005); Scratchley and Hakstian (2000-2001) and Ceylan (2008) further explore this statement; they agree that problem solving is the ability to and resolve that "creativity explores different alternatives." Amabile's et al. (2005)'s paper suggests that ideas are not always completely new, they are built on something that already exists and the creative process is then changing this idea into something new. Dul and Ceylan (2006) in Ceylan's (2008) more recent paper suggest that creativity can be affected by mood. Mathematician Henri Poincare (in Amabile's et al. 2005) is said to have experienced his bursts of creativity while being relaxed and comfortable, e.g. on vacations. Mozart and Vernon (1970) both stated

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that they are most creative when they are in a positive mood. Perhaps organisations could apply this to their office spaces. It has been concluded that positive mood increases creativity therefore investigation into stimuli that enhances this mood would be beneficial to the organisation. This idea is explored further in (Amabile et al. (2005); positive affect leads to reaction in creativity e.g. positive emotions such as joy and love increase creativity and make people want to peruse more creative activities. It is therefore important to study the effects of a person's environment on their mood because this may be considered as a factor that increases creativity. If a positive working place puts a person in a more positive mood, then the physical environment may aid in the creativity process. It must however be noted that Kwallek (2005) found that there is no connection between mood and productivity. "*No link was found between worker mood and worker performance.*" *(Kwallek 2005)* It can therefore be concluded that a person's mood affects creativity but not necessarily productivity. More creative organisations, or rather organisations that require staff to problem solve, should look at ways in which they can enhance employees' moods by using their physical environment. Further research should also be conducted on ways in which mood can be improved within the work environments. It is important to view what increases creativity and also what hinders it. Harriman (2003) in Adams (2006) suggests that tight time deadlines and distrust can hinder the creative process. However physical factors that hinder creativity were not looked at.

Ceylan's (2008) research objective was to identify whether or not managers' physical office environments had an effect on creativity. Ceylan (2008) suggests that each manager may prefer a different space. Some may prefer "*a home like feel*" while others a more modern space. These different spaces may influence managers' abilities to think creatively. Vernon, (1970) in Amabile et al. (2005) adds to this "*When I am, as it were, completely myself, entirely alone, and of good cheer-say, travelling in a carriage, or walking after a good meal, or during the night when I cannot sleep; it is on such occasions that my ideas flow best and most abundantly.*" This shows that individuals' physical surroundings affect their creativity. This principal may also be applied in office environments.

Ceylan's (2008) research used a sample consisting of sixty managers in Bursa Turkey.
"*If you had a very special problem to solve and needed to generate a lot of new ideas, where would you most likely choose to go?*" (McCoy and Evens '2002; in Ceylan's '2008). This research question was posed

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to each manager; managers then chose a photograph that best suited their answer. The following variables were used to evaluate each photograph:

- Plants,
- natural elements,
- manufactured materials,
- colour
- light,
- complexity
- Furniture.

Results showed "that complex and dimly lit offices with few plants and warm colours are associated with low creative potential. Offices with low complexity, that are brightly lit, have cool colours, and have plants are associated with high creative potential." (Ceylan 2008) The study found that furniture and manufactured materials had no connection to creativity. Wooden furniture was placed in the offices with warm colours, and the results showed that warm colours had little effect on creativity; it is therefore not possible to provide a conclusion on the affects of wood and creativity.

The fact that this study was conducted in one country only was a limiting factor, and that perhaps in other countries cultural differences may affect the results of the study. Participants in a study conducted in Columbia, on cultures and their effect on creativity, stated that different cultures influence the "creative climate in their organisations." Perhaps further studies could be conducted in countries with cultural diversity such as South Africa. This way one would be able to further test the cultural differences and their impact on physical environments.

As pointed out before, the majority of literature points to the fact that positive moods and emotions lead to creative thoughts. On the contrary other theories suggest that a negative effect can lead to an even greater amount of creatively Amabile et al. (2005). It is suggested that people experiencing a positive mood will be less motivated to work because it is thought they have reached their goal and no more effort is needed. Amabile et al. (2005) further added that negative moods would be interpreted as a greater need to find creative solutions. As stated by Amabile et al. (2005) there is however more literature to support a positive rather than a negative relationship to creativity.

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Amabile et al. (2005) conducted a study that shed light on creativity, specifically looking at organisations. They set out to determine whether a negative or positive effect would lead to creativity. This study differs from Ceylan's (2008) study in that the physical environment was not taken into consideration. Perhaps future studies can include factors, the physical environment's impacts on creativity and also emotions and their effect on creativity.

The purpose of the study was to determine what precedes a successful performance. The central theme of the study was work creativity. Results concluded that 364 creative incidents occurred out of 63,789 events reported. This supports Poincore's (1921) in Amabile et al., (2005) theory that creative thought does not happen very often. Qualitative analysis aided in determining whether emotion or other events stimulated creativity.

The primary results showed that positive mood is connected to creativity. 71 of the creative thinking events suggested that there was a direct link to emotions. 86% of these events were said to have a positive emotion behind the creative thought and 14% of these events had a negative emotions linked to the creative occurrence. It was concluded that problem solving leads to positive emotions and feelings of joy. As stated before, Amabile et al. (2005) research paper did not include the physical environmental factors that may contribute to creativity, whereas Ceylan (2008) paper was primarily based on the physical environment. Perhaps future studies can include both these ideas. Amabile (1988, 1996) states that people are more creative if they are passionate and interested in what they are doing. Amabile et al. (2005) suggests that future studies could be conducted on specific emotions and their effects on creativity. E.g. frustration specifically and its effects on creativity. Amabile et al. (2005) and Ceylan (2008) both suggest that individual's personalities have an effect on creativity. Amabile et al. (2005) further suggests that more research could be conducted on creative thoughts themselves and the effects that cause them.

The use of art

The idea of the introduction of art or wall hangings into the workplace and its effects on productivity and creativity are scarce. A study conducted on patients in a hospital found that "*nature imagery and photographs of nature scenes reduces anxiety and relaxes patients.*" (Montgomery, 2004) It is not possible to assume that office workers will have the same response to wall hangings. Further research is required to test the effects of wall hangings on creativity and perhaps even productivity.

Technology

Office environments today rely heavily on computers. Garsten & Wulff (2003) state that ":.. *it may not be until their computer breaks down that they realise how dependent they have become on it.*" It is therefore necessary to analyse the effects computers and other technology has on productivity in the workplace. Various studies have been conducted on technology in the workplace and its effects on productivity. Weckert (2005) states that reducing online activities such as 'chat sites' is said to increase productivity. On the contrary Griffiths' (2000) in *Anadarajan* & Simmers', (2004) book suggest that not all internet usage abuse can affect workers negatively. They further suggest that if internet increases worker satisfaction then this would also increase worker performance and that therefore internet usage should be based around employees' performance. The type of restrictions put onto internet in office environments need to be considered because Griffiths' (2000) in *Anadarajan* & Simmers', (2004) suggest that not all internet usage can affect performance. ASID (2002) in Montgomery (2004) conducted a study on office workers and determined that thirty percent of employees said that the most important factor within the work environment is access to equipment they might need. Other technologies within the office could have impacts on employee productivity. For example the availability of technology and its effects on productivity (Distance to the printer or insufficient equipment to carry out tasks). More research in this area is needed.

Anti-Smoking legislation

The South African Anti-Smoking legislation and its effects on workplace productivity is another factor that should be considered when analysing the workplace. The prohibition of smoking in workplaces could have an effect on productivity. One should look at these affects from smokers and also from non-smoker's perspectives. A press release in May 1999 (South Africa) stated that new Anti smoking legislation was signed. This legislation stated that smoking is to be banned in all public areas including workplaces. The implementation of tobacco law in South Africa was brought about because it was said that non-smokers have the right to clean air. There is not much literature on the effects of Anti-smoking legislation and its effects on South African office workers. A Swedish study however found that smokers are more inclined to take sick leave. (Lundborg, 2007) It was concluded that deterioration of health of smokers caused them to take more leave. More research will be needed to further test the effects of the Anti smoking law in the South African workforce and study whether or not it has an impact on productivity.

Conclusion

There is a large amount of literature available on the effect that office environments have on workers. Some of this research has been presented within the literature review.

Office environments do not only have an impact on productivity but on the health and well-being of employees. Office furniture, the South African Anti-smoking policy, noise and even indoor air have an effect on the heath of employees. Organisations are able to implement healthy environments that will increase productivity and perhaps even wellness. It was found that plants have many benefits within a work environment. It was further concluded that plants increase wellness, productivity, reduce noise and cleanse the air of pollutants. A link between plants and creativity was proven in a study conducted by Ceylan (2008). Although plants where found to aid the creative process, no evidence showed that indoor air has any affect on creativity. Further studies may have to be conducted to find whether or not there is a correlation between indoor air and creativity. Lighting was proven to have a significant impact on productivity and also has an effect on creativity. Certain types of lighting may have healing affects on office workers. This lighting mimics sunlight and it therefore becomes evident that ways to incorporate natural light into building designs should be looked at. Colour and wall hangings proved to be a difficult area to find conclusive proof about its affects on office workers. More research is needed to establish its affects on productivity and creativity.

Not much literature was available on the effects of the work environment in a South African context. Further research is required in this area to test whether South Africans are as affected by their work environments. Not much literature was found on the fashion industry in particular, this is usually a place where a lot of creative thought happens. It would therefore be useful to conduct research in this area.

Although vast number of research has been conducted on work environments and their effects, gaps are still evident.

CHAPTER 3

Research Design and Methodology

<u>Introduction</u>

This chapter will focus on how the research will be conducted and the method or design that will be used to collect data. It will further explore the sampling process and also describe the research tool. This section will highlight some of the envisioned limitations and validity issues that may arise in conducting the research.

<u>Research Design</u>

Maxwell (1996) states that the methods and approaches used in research should be determined "by the research questions". This paper sets out to build on previous research already obtained about work environments and how they impact on the productivity/creativity. Maxwell (1996) states that qualitative and quantitative are different ways to achieving the same results. Maxwell further states that "the strengths of qualitative research derive primarily from its inductive approach, its focuses on specific situations or people, and its emphasis on words rather than numbers." Therefore the best-suited research design for this study is qualitative as people's feelings and opinions about their work environment will be questioned and captured.

<u>The process of Qualitative Research</u>

Maxwell (1996) states that purpose, the conceptual context; validity, methods and research questions act as interlinking components in qualitative research. Methods and the envisioned validity issues of the research are explored in the following sub headings:

- Data collection
- Sampling
- Development of the research tool
- Recording the data
- Data analysis

Do work environments have an effect on productivity and creativity?

- Validity
- Results

Data collection

Data collection is the action whereby information is gathered from the participants of a study using a specific tool. The tool that will be used in this study will be a process of face-to-face interviews conducted on respondents to obtain information about the effects of office environments. Face-to-face interviews will give the researcher the ability to physically observe the responses of the participants allowing the interviewer to gain greater insight into the data being collected. The interviewer is required to observe verbal data and also view non-verbal data. This non-verbal data may provide insight and may add information about the participants' feelings, this may add to the findings. Field notes are written extras taken during the interview process; these additional notes record the non-verbal data that the researcher is receiving from the respondent. Field notes will therefore be a tool to record the respondent's non-verbal feelings and emotions in this research paper. The disadvantage of using the tool of interviewing is that there is no way to judge whether participants will answer truthfully. Untruthful responses will affect results. This must therefore be highlighted as a validity concern. Validity concerns should all be stated within the research paper. This would enable the reader to view the findings by being aware of the validity concerns. Validity is an important aspect to consider because studies are essentially based upon validity. If a study is not seen as credible it will not be considered valuable information that can be used it build on previous research, and this is essentially the purpose of a research paper. It is therefore of importance to carefully consider validity when carrying out a research paper.

Sampling

Maxwell (1996) states, "*Qualitative researchers typically study a relatively small number of individuals or situations …*" A small number of participants will be used as the sample; eight participants will be drawn from the Retail Company, Millennium. This company operates in South African's Fashion industry and its primary function is to import denim and twill bottoms from factories in China and deliver these goods to the respective customers in South Africa. The interviews are to be carried out at Millennium's office in Johannesburg. This provides a convenient venue for respondents. Permission from Millennium will be obtained before the interviews are carried out. (Permission was obtained from Millenniums management) The estimated time allocation for each interview is approximately forty five minutes. (After conducting the

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interviews it was realised that the interview process took less time to conduct than anticipated, interviews took an average time of 10 min) A randomly selected sample is a non-bias method of selecting participants; however the ratio of males to females may have to be considered when randomly selecting participants. The researcher has observed that there are a greater number of females within the office environment at Millennium. Males will be selected less randomly to ensure that a varied sample of males and females are selected. This sample will consist of a selected participant from each department within Millennium, namely: management, accounts, team leaders, planners, merchandisers, designers, co-ordinators and other. Selecting participants from each department will ensure that a varied sample is obtained from all employees at Millennium. This will provide a platform for all divisions within Millennium to comment on their work environment and how it affects them.

A brief breakdown of the job descriptions from each division: (this information is based on the researcher's personal observations of the company and its structures)

- Managers – "For years the manager, the heart of and organization, has been assumed to be like an orchestra leader, controlling various parts of his organization…" (Reynolds, 2002) Similar to the text Millennium has managers allocated to each section of the organization. These sections include sourcing manager, sales manager, financial manager and a human resource manager.

- The accounts department is the financial section of the organization. This department controls the monetary aspects of the organization.

- Team leaders generally oversee the merchandisers and deal with large problems that may arise within the team. Team leaders go on overseas trend trips; they buy new styles that can be manipulated for different customers. They also communicate with the buyer and help in pricing negotiations.

- Merchandisers are responsible for follow-ups of samples, negotiating prices, communication with buyers and liaising with the factories in China. The merchandiser also prepares for meetings. In the meetings with the buyers styling of the garments are discussed.

- Designers are responsible for sample requests (requesting new samples from China). A sample request entails putting together the size specifications; trim card and designing artwork on the garment, if applicable. Measuring and checking samples is also the designers' responsibility. Depending on the team and its needs, designers may also be responsible for following up on samples.

- Planners make sure the shipments of goods run on schedule. They deal with the planners of the customer and place new orders with China. Planners also communicate closely with Durban warehouse. In this way they can keep track of containers arriving in South Africa.

- Coordinators are responsible for ordering price tickets from the customer and sending them to the respective factories. Coordinators assist the planners and therefore also deal with the placing of new orders. Coordinators are also responsible for sending information concerning each style to the Durban warehouse so that the order can go through a QA (quality assurance) process in Durban.

- Others include all the remainder of the staff at Millennium. These job descriptions may include receptionist, manager's assistants, drivers and parcel receiving clerk.

(Note: that job description was not asked as part of the interview process. The process of selecting participants from the various departments was purely to obtain a varied sample of Millenniums staff.)

Eight of Millenniums staff will constitute the sample for the research. A varied sample of Millenniums' staff will be selected from all departments within Millennium. The sample will be questioned on their interpretation of the workplace and also the factors within the workplace that affect productivity/creativity.

Development of the research tool

The interview schedule is constructed by the analysis of previous literature. The purpose of the research paper is to expand and answer questions in already existing literature. Therefore the interviews should include questions that will aid in building this knowledge, answering unknowns and could also be used to validate or discredit previous research.

The interview should first establish demographics of the participants. The remainder of the interview schedule will be divided into themes, surrounding the literature already obtained. Questions that will aid in building knowledge will also be added to the interview schedule.

Interviewer Skills

The interviewer may require certain skills to carry out a successful interview.
The following factors should be considered when carrying out interviews:

- The interviewer should relay the questions in a coherent manner.

- Interviewers should be conscious of the non-verbal responses of their participants, as this may add to the final results.
- The researcher is required to gather information from the participant. This should be done with the effective use of the interview schedule rather than deviating from the schedule to extract information.
- The interviewer should not manipulate the participant into providing the 'correct' information but rather to focus on the participant's points of view.
- The participant should feel that they are able to answer freely without intimidation.

Interviewing participants will provide valuable information. Interviews should be carried out carefully in order to obtain accurate information. The above factors should be taken into consideration.

Recording the data

To prevent information being lost or misinterpreted, audio recordings of the interviews will be used. These recordings will then be transcribed so that this data can then be analyzed. Written field notes may provide further insight into the participants' emotions and reactions, these may add to the final findings.

Data analysis

The analysis of the data will be conducted using the transcribed answers of each of the interviews and the field notes. Each question will be compared and analysed against the other respondents. This information will then be presented in the research paper.

Validity

"The strength of qualitative research lies in validity (closeness to the truth)—that is, good qualitative research, using a selection of data collection methods, really should touch the core of what is going on rather than just skimming the surface." (Greenhalgh and Taylor, 1997 in Maxwell; 1996)

Validity may be the "strength" of the study as the whole study is based on it. If the study is not seen as reliable it defeats the researcher's purpose of conducting the research and it cannot build on previous knowledge. The purpose of carrying out this research paper is to build on the knowledge of the past literature in a credible way. The researcher could ensure this reliability by stating all validity concerns up

front. Recording data accurately, not manipulating results and influencing participants are other ways in which the researcher can ensure that the paper is credible. The researcher is a fourth year student at the organisation Millennium and has built relationships with some of the employees. It is of vital importance that the researcher remains neutral and unbiased. (Ashleigh Cohen, course supervisor, was able to validate the research data by comparing the transcribed interview schedules to the analysed data document.)

Results

The results of this paper will include factual data that will be collected from Millenniums staff about their work environment and how it may affect productivity/creativity. One could draw conclusions in the analysis of the data generated by the interview and also by comparing these findings to previous research conducted in this field. This will also provide recommendations to the company and industry as a whole. There are many variables that may have to be considered as they may affect these results.
The following variables may affect the results of the study:
- The language of the participant should be considered in that the participant may not fully understand the questions.
- One could also look at the availability of the participants for the interview; perhaps conducting the interviews at the time of year where employees are more present and not away during the more festive times of the year.
- The actual environment where the interview is carried out may impact on the participants. Making sure that all interviews are conducted in similar environments in order to not influence the participants in any way. For example, participants may feel more at ease at a coffee shop compared to a boardroom. This may impact the results. (Interviews were carried out at Millenniums head offices in Johannesburg, participants were interviewed in various locations in and around the office.)
- Accuracy of the answers provided by the participant.
- How the interview is conducted, is the participant able to answer freely?
- The capturing of the data. Whether or not errors have been made when the information is transcribed.
- The males to female's ratio, this may impact the research as it adds another variable to the study.
- The age of participants may be considered.

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- The nationality of the participants and how this impacts on the study.

- The time they spend within the office environment.

- Time keeping of the interviews, one must ensure that all interviews are given the same time allocation.

These variables need to be considered when carrying out the research as these variables may impact the validity and the results of the research.

Conclusion

Many factors have to be considered when breaking down the design methodology such as research design, data collection, sampling, the research tool, recording the data, data analysis and most importantly validity of results. The chosen research design for this paper is the process of qualitative research. This is the process of collecting data in the form of opinions and feelings, therefore a series of face-to-face interviews will be conducted on staff at Millennium to gather data about their work environment. These interviews will be recorded and additional field notes will be obtained. The recordings will be transcribed making it possible to analysis the data providing results and recommendations about office environments in the retail industry. It is of importance that the study remains validated, as the research has the opportunity to build on already existing literature.

CHAPTER 4

Data analysis and presentation

Introduction

The purpose of this research paper is to build on previous knowledge surrounding work environments and there effects on staff. It sets out to show what aspects within the work environment will or will not affect employee's productivity and creativity. This particular section will focus on new data collected about office environments in a South African fashion retail context; this data has been analyzed and is presented below.*

As stated in chapter three, eight employees were randomly selected from the fashion retail company, Millennium. The face to face interviews were conducted on two consecutive days (2009/01/13 - 14). Four interviews were conducted each day. Field notes where obtained during the interview process and this allowed the researcher to obtain more non-verbal data from the respondents. **

The main purpose of the interviews was to gain information and data about Millennium's work environment and the physical factors that may or may not be affecting its staff.

Appendixes

Refer to appendix 2 for the data analysis document.

**Refer to appendix 3 for a copy of the interview schedule used in conducting this piece of research.

**Refer to appendix 4 for transcribed interview sheets and field notes.

Demographics

Five of the eight participants interviewed fell into the age category 26-30, the remainder of the respondents fell into the age groups, 21-25; 31-35 and 41-45 respectively. As stated in chapter three, the ratio of male to female participants had to be considered when making the random selection for the sample. The researcher had observed that there were a greater number of females than males at Millennium. Males were therefore taken as preference for the sample. Eight participants made up the sample. Of these 50%

were males and 50% were females. Race and nationality was also questioned in the interview process. Results showed that the majority of the participants were Black (4 out of 8), the remainder of the participants fell into the race groups White, Indian and Asian. To show the multi diversity of the sample, nationality and culture were also taken into consideration. This proved to show how culturally diverse South Africa and Millennium is. The sample consists of the following nationalities: Sotho, Pedi, Setswana, Taiwanese, Chinese, South African and Ethiopian.

Limitations

This diversity in culture posed a problem in some of the interview processes. The language barrier disallowed some of the participants to understand the questions and this may have affected their answers. Field notes were taken and the interviewer did state whether a language barrier posed a problem to certain participants. One must note that all participants have acquired some type of tertiary education and therefore one can conclude that it was only the language barrier that posed the problem in some of the interviews.

As discussed in the literature review the researcher sees creativity and productivity as two separate entities. Some of the participants did not see them as separate and this may have affected some of their answers.

Data analysis

It is of importance to first identify the amount of time Millennium employees spend within their office space. Carvallo et al.; 1997; in Fjeld and Bonnevie's paper; 2002 state that 90% of city dwellers spend the majority of their time indoors. Therefore the important question becomes how much of this time is spent within the office environment.

6 of the participants spend 8 hours of the day in their office spaces, the remainder of participants spend more time at the office. The majority of these participants spend 5 days a week at work. Therefore, the majority of the participants are spending 40 hours a week in their office space.

Hours spent in office environment in one working week.

40 hours

120 hours

■ Amount of hours spent in the office in a week

■ Hours in a working week consisting of 5 working days

When looking at the graph it appears a small portion of the week to spend at work, but if one calculates these hours over a year maybe even a few years, the time an employee spends at work becomes significant. It is for this reason that it becomes important to study the effects of office environments on employees.

The first step to identifying the effects of the work environment on staff is asking whether or not they feel the effects of their office environment and how it may or may not affect them. The next sections break down and analyze the results obtained from the interviews.

Ergonomics

As stated in the literature review, ergonomics is defined as "the understanding of how the interior environment interacts with the dimension and physical abilities of human beings is the field of human factors and ergonomics." (Montgomery, 2004). It then becomes clear that if an office environment is impacting negativity on staff's well-being it may in turn affect their productivity. If an employee is taking off work because of illness, it is said to be a loss in productivity. One should then look at the physical work environment and its effects on staff. The question was raised whether Millennium staff feel more ill at work or on holiday. This question was asked in order to determine whether the work environment can contribute to illness.

The participants answered as follows:

	Participants
At work	2
On holiday	3
Never feel ill	3

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It became evident that most participants do not feel ill at work. Results showed that 3 of the participants never feel ill and the other 3 participants feel more ill on holiday. It must however be noted that out of these three participants that stated they feel more ill on holiday; two of them attributed this illness to their work. (One participant stated that he feels ill because he is worrying about work and the other stating that it was a virus caught in the work environment.) The two participants that feel ill at work both attributed this to stress and pressure and not to the physical environment. It can therefore be stated that 4 out of the 8 participants attributed illness to the work environment. One then asks; does Millennium's physical environment have an impact on the well-being of staff and therefore on creativity and productivity?

The question was then asked whether or not the office furniture has an impact on staff. 5 of the 8 stated that it has no effect on them. Although the majority of the staff stated that the furniture does not affect them, 2 participants stated that they get back ache and this was attributed to their chairs and another participant stated that he has a broken seat. The literature highlights the severity of incorrect environments for tasks that need to be performed by the organisations. If the environments are not suited, individuals have the risk of developing musculoskeletal disorders (Montgomery, 2004). These disorders have an impact on productivity and may result in major financial losses to organisations. Organisations may also have to compensate workers for these disorders resulting in more financial losses (Montgomery, 2004). It is therefore of importance to study the effects of office furniture on office workers. It is also of interest that the majority of the participants do not feel that office furniture have an effect on them in any way yet the literature places such emphasis on the effects of physical environments.

The research did show that in some cases, Millennium staff are affected by their physical interior surroundings (even if they do not fully realize its affects) and this may affect their well-being and then perhaps their productivity. The next chapters will unpack what other physical factors may or may not have an effect on staff productivity/creativity.

Ventilation and temperature
"Indoor temperature is one of the fundamental characteristics of the indoor environment." (Seppänen; Fisk William & Lei, 2006). 6 of the 8 participants stated that the temperature in their work space affects them. Some of the respondents suggested that the heat makes them "dizzy" and "sleepy". Therefore, according to

the literature and the majority of the participants, temperature becomes an important factor to consider in work environments.

In Abdou's (2007) paper a Dutch study showed that absenteeism could be lessened by 43% if they are able to control the temperature of their environments. The fact that some offices are open plan may have an effect on office workers and their individualistic temperature requirements as considerations may need to be made because of co-workers. When the question was asked, 60% of the participants stated that they are not able to control the temperature within their office environments. Participants were also asked whether they work in open plan or closed offices, as this could impact whether or not participants are able to control their temperature requirements because of co-workers. 6 of the 8 respondents stated that they work in an open plan office environment, but the majority of the participants stated that their co-worker's temperature requirements do not affect them. This then rules out co-worker's affect on individual temperature requirements.

It also becomes apparent that staff at Millennium are not fully satisfied with the temperature within their office environment. As stated before, half of the participants stated that they are hot, two of these participants stated that heat makes them "sleepy" and one other stated that the heat makes him "dizzy". Navai & Veitch (2003) stated that one of the disadvantages in having an open plan office is rise in office temperature. As previously stated the majority of participants work in open plan offices, this therefore could be a contributing factor to the rise in the office temperature.

Temperature and ventilation can work conjointly in that good air circulation could bring in cooler fresher air. In Abdou's (2007) paper, a study showed that productivity was improved when air-conditioning was introduced into a work environment. Participants were asked whether their office spaces are naturally ventilated or air-conditioned. The majority of the participants stated that their offices are air-conditioned. The more important question to ask seemed to be whether employees at Millennium preferred air-conditioning or naturally ventilated office spaces. The Majority of the participants stated that they would prefer air-conditioned work environments. Here it seems that the work environment suits the needs of the office workers but as stated before, the majority of the participants are not happy with the temperature

within their office environment. One participant did state that the air-conditioning does not work sometimes but this cannot be assumed for all participants.

Ventilation can also be created by opening windows or doors allowing fresh air to enter the work space. When participants were questioned how near to a window they are seated, the majority of these participants stated that they do not sit near to a window. One can conclude that opening windows and doors in this office environment may not be the best solution to cooling down the temperatures, mainly because it will not benefit all of the employees. One can also note that 60% of the participants stated that sitting near or far to a window will not have an effect on their creativity or productivity.

Further research will have to be conducted on why the majority of participants are not satisfied with the temperature within their office space and how best to resolve the situation.

Humidity

An article on the benefits of plants in a work place, states that dry air may cause office workers to be more susceptible to illness, therefore reducing productivity. (Worcestershire (n.d.) Benefits of plants in the office http://www.worcestershire-office-plants.co.uk/benefits/; 2008/04/12). When participants were asked about the humidity within their office space, 60% of the participants stated that the office air is dry. The participants were also asked whether or not the humidity within the office has an effect on them in anyway, 60% of the participants answered no. As stated previously the majority participants stated that they do not feel ill at work and the participants that stated they do feel ill at work, did not attribute this to dry air. One can therefore conclude that although majority of the office workers feel the office air is dry, the majority of them state that it has no effect on their well-being and therefore their productivity.

'The view through windows'

As previously discussed majority of the participants in the study do not sit near to a window in their current office space. Of the participants that can see out a window, it was stated that the view consists of trees, another office and a construction site. Almost all of the participants state that a view from a window has no effect on their creativity or productivity. As stated by Grahn (1993) in Fjeld and Bonnevie (2002), it is written that office workers who are able to view some kind of greenery instead of non-vegetative areas out their

office windows are more likely to have reductions in stress. Reduction in stress was not included in the questioning of the study but it can be concluded through the results of the interviews, that the view through windows has no effect on creativity or productivity of the participants. It is however important to note that if participants had to choose a view that they thought would make them most productive 60% stated that they would like to see some kind of nature scenery.

Plants

Majority of the literature available on plants highlight there benefits to office environments. Research showed the benefits of plants in reducing dust, improving air quality, lifting people's moods, increasing creativity and even increasing well-being. Participants in this study however contradicted some of this research.

Three questions were asked to the participants involving plants:
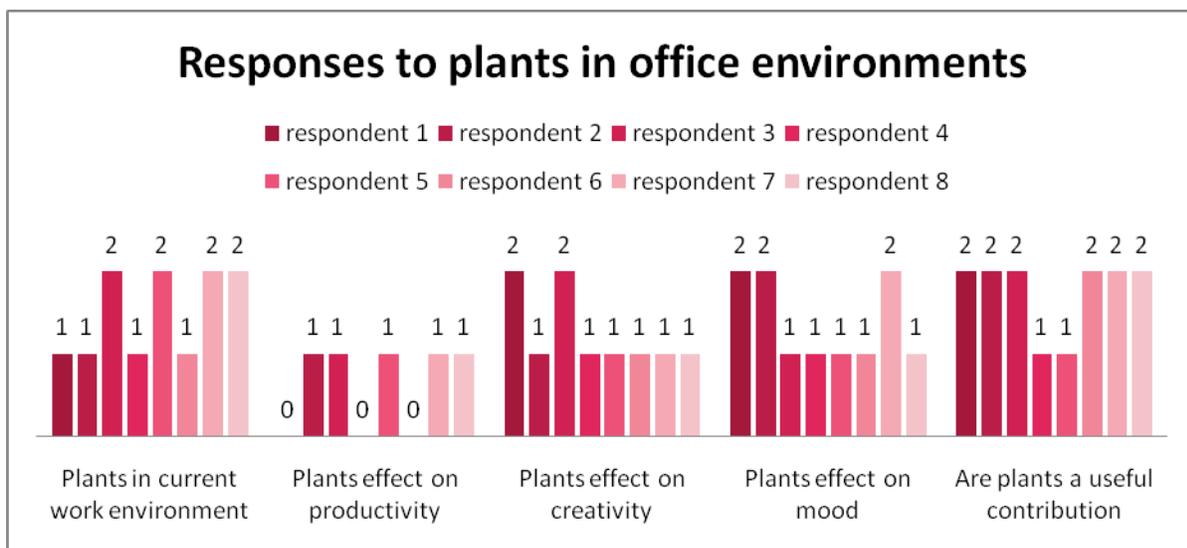
Are there any plants within your work environment?

Do you feel these plants have an effect on your productivity?

Do plants in your physical work environment make you more creative? Why?

Does having plants in your physical office space affect your mood? How?

Reference for graph: No – 1

Yes – 2

N/A – 0

Responses to plants in office environments

50% of participants stated that they have plants in their office environment. After analyzing the data, participants that have plants in their office environment, stated that the majority of these plants are natural. When respondents were asked if these plants have an effect on their productivity all of the relevant participants answered no. (No is represented as 1 on the graph, only participants that have plants in their physical work environment were asked). Furthermore when respondents were asked if plants have an effect on their creativity, 70% of the respondents stated that plants have no effect on their creativity. Lastly participants were asked if plants have an effect on their mood, 60% of participants stated that plants have no effect on their mood. When however participants were asked if plants are a useful contribution to office environments, the majority of them answered yes. When asked why the plants are a useful contribution 60% stated that they add visual value to the work environment.

One can therefore conclude that the majority of the participants feel that plants have no effect on their productivity, creativity and on their mood, however the majority of these participants stated that plants are a useful contribution to work environments. 60% of participants suggested that plants add value visually; therefore participants feel that plants are visually valuable but have little effect on their creativity and productivity. This contradicts the majority of the literature found around plants and their effects on office workers.

One could argue that participants do not have enough plants within their office environment to realize or experience their effects as only half of the participants have plants in their work environment. It was stated that plants can be used as a filtering system ridding the air of pollution (Fjeld and Bonnevie ;2002). Perhaps one could say that because some of the benefits that plants provide are not visible, participants therefore do not acknowledge their effects. More research is needed at Millennium in this regard.

Open plan offices and noise

It has been established that the majority of the participants within the study have open-plan office spaces. Open plan offices have been described as advantageous because they allow a flow of communication between co-workers. (Arnerlöv & Bengtsson, 2007) Although open plan offices are useful in that they allow communication flow, they were also found to be noisy and disruptive. (Arnerlöv & Bengtsson, 2007).

In determining whether open plan offices are noisier and how noise may or may not impact on participants a series of questions were asked. The following diagram illustrates the number of participants that work in open plan offices compared with closed offices and whether or not there is noise in their offices environment.
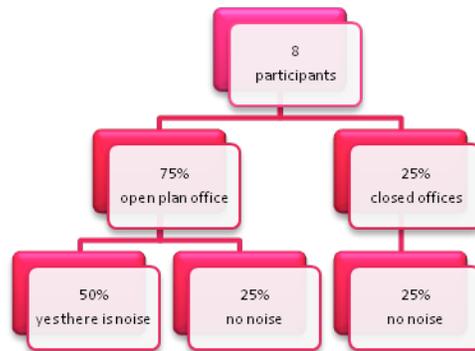
From this diagram one is able to visualize that the majority of the participants work in open plan offices. One can also see that the majority of these participants stated that their offices have noise. This corresponds with the research that states that open plan office spaces tend to be noisier because of the lack of barriers. (Navai & Veitch; 2003) It is also important to note that the participants working in closed offices stated that they have no noise within their office environment; this further corresponds with the research. The literature further states that co-worker's conversations and music is seen to be the most stressful type of noise because it is uncontrollable. (Navai & Veitch; 2003). When participants were asked what type of noise they find most disruptive within their office environment 6 out of the 8 stated that vocal noises from colleagues are the most disruptive.

One can conclude that open plan offices tend to be nosier according to the participants, together with the literature. One can also conclude that vocal noise from co-workers is seen as the most disruptive type of noise and the literature states that this type of noise is also seen as the most stressful. The basis of the study is however to determine the factors that may and may not contribute to a productive and creative work place. Therefore participants were questioned how noise impacts their productivity and creativity. It was found the noise has an impact on 70% of the participants' productivity and half of the participants' creativity. Participants were also asked what work space would make them feel most creative and half of

the participants stated that they would feel more creative in a close office space. Therefore one can conclude that open plan offices may not be the best solution for Millennium's office environment.

Lighting

A vast amount of literature is available about the influences of office lighting on employees. Many studies analysed in the literature review showed that lighting can have a positive effect on physical well-being, creativity, productivity and even have a positive effect on depressive symptoms. When participants were asked about lighting, participants contradicted or supported some of the literature available.

Participants were asked a series of questions relating to the lighting within their office environments. Firstly, participants were asked what type of lighting they currently have within their office environment.

The results were as follows:

	Participants
Naturally lit	1
Artificially lit	5
Both	2

Majority of the participants stated that they have artificially lit offices spaces. Participants were also asked if they would prefer more natural light in their office spaces, 6 of the 8 participants stated yes they would prefer more natural light. It then became important to find out how the lighting within the office space affects the participants.

The following questions were asked:
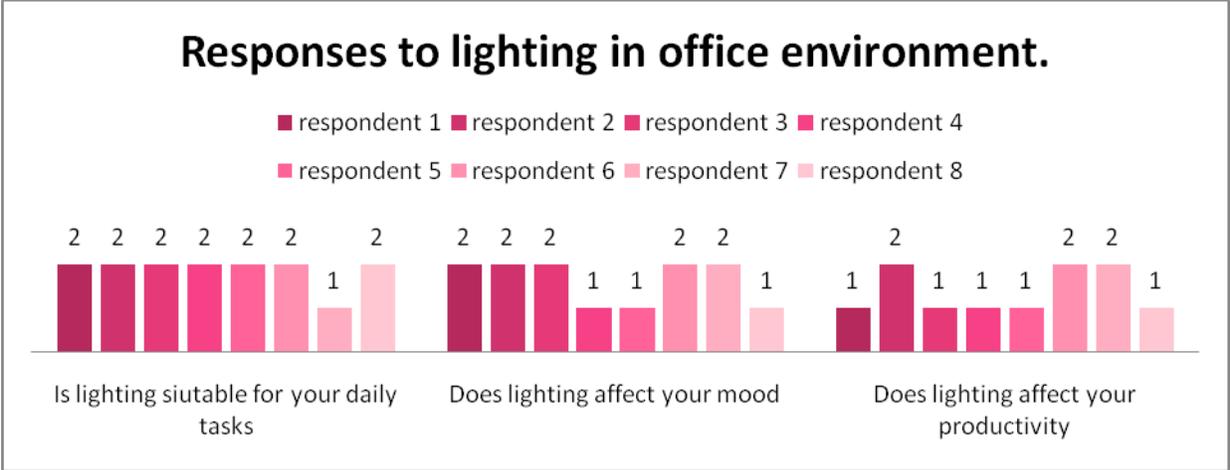
Is this lighting suitable for your daily tasks?

Does lighting affect your mood in anyway?

Does lighting affect your productivity in anyway? How?

Reference for graph: No – 1

Yes – 2

N/A – 0

Responses to lighting in office environment.

respondent 1 ■ respondent 2 ■ respondent 3 ■ respondent 4
respondent 5 ■ respondent 6 ■ respondent 7 ■ respondent 8

Is lighting siutable for your daily tasks

Does lighting affect your mood

Does lighting affect your productivity

Although participants would prefer more natural light, the results show that the light that the participants have is currently sufficient for their daily tasks.

Majority of the participants stated that lighting has an effect on their mood. Amabile et al. (2005) proves that positive mood has a positive effect on creativity. The majority of participants stated that the lighting affects their mood and the literature has made the connection between positive mood and creativity. Millennium should therefore look at introducing light that is going to lift employee's moods because one can then state that lighting can indirectly make employees more creative. Ceylan's (2008) research also found a link between lighting and creativity. Kwallek (2005) stated that *"No link was found between worker mood and worker performance."* Therefore no correlation between lighting, mood and productivity can be found however studies conducted on light in the work place did show that there is a definite link between productivity and lighting.

When participants were asked if lighting affects their productivity, majority of them answered that it does not. This contradicts theories within the literature review. Cushman's. (n.d.) study revealed that workers had to take breaks more often due to the poor lighting conditions; this resulted in about 80 minutes of lost time per week for each worker. It was therefore concluded that improvements in lighting could increase productivity. This contradicts the majority of the respondents stating that lighting does not affect productivity.

One can therefore conclude that participants of the study are satisfied with the current lighting within their office environments although they would prefer more natural lighting. Majority of participant's state that lighting has an effect on their mood, therefore combined with the literature, one can say that lighting can affect creativity. Majority of the participants also contradict the literature in saying that lighting has no effects on their productivity.

Colour

Literature on the effect of colours in the work place is scarce. Although not much research has been conducted both Kwallek and Thomas (2006) stated and agreed on the effects of some colours. Warm colours were said to distract individuals and have a negative effect on worker performance, whereas cooler colours allow for more concentration.

It was important to first establish a basic colour scheme within the participant's current office space. Majority of the participants stated that their offices have a light neutral colour scheme. Some of the more common colours that where stated were white, cream and grey, two of the participants also mentioned blue. Participants were also asked whether or not colour has an effect on their creativity and productivity. Majority of the participants responded no to both of the questions. Participants were also asked if they had to repaint their offices what colour would they choose and why. 4 out of the 8 participants stated that they would repaint their offices white. Three of the 4 participants stated that they would do this because white is a bright colour. If one were to analyse the colour choices of the participants more generally 6 out of the 8 participants stated they would repaint their offices in neutral colours. Only 2 participants stated that they would repaint their offices in bright colours.

The results showed that majority of participants feel that colour does not affect their creativity and productivity, more research is needed in this regard. One can conclude that majority of the participants would prefer neutral colours for their office environments. Kwallek (2005) has been studying the effects of colour for over fifteen years and states that colour cannot be looked at in isolation and that other factors have to be considered.

Wall hangings

Much like colour in the work place, available research on the effects of wall hangings on worker creativity and productivity is scarce. A series of questions revealed what some of the participants feel about wall hangings and their effects.

Participants were questioned firstly on whether or not they have wall hangings within their office environment. 5 out of the 8 participants stated that they do not have wall hangings within their current office environments. Of the 3 participants that stated they do have wall hangings within their current office environment, 2 of these participants stated that the wall hangings have no effect on them in any way. More importantly participants were asked if they had to choose a series of wall hangings for their office environment what would they select and why. Two main themes were evident in the participant's responses:

- One was the nature theme, 2 of the 8 participants stated that they would choose nature inspired wall hangings.
  A study conducted on patients in a hospital found that "*nature imagery and photographs of nature scenes reduces anxiety and relaxes patients.*" (Montgomery, 2004) The effects that these wall hangings would have on participants were not concluded. More research will need to be conducted on whether, as in the hospital patients, nature inspired wall hangings would reduce anxiety.
- The second theme was fashion images, 3 of the 8 participants stated that they would choose wall hangings that convey fashion imagery. Millennium is a fashion retail company operating in a South African market. All of these participants stated that the fashion wall hangings would give the impression and provide the statement that the company truly is a fashion retail company.

Technology

It is necessary to analyse the effects computers and other technology have on productivity in the workplace, mainly because work environments rely heavily on computers. Garsten & Wulff (2003) state that ":.. *it may not be until their computer breaks down that they realise how dependent they have become on it.*" Although majority of participants stated that their office furniture has no effect on them, Scheidert (1985) in Montgomery (2004) states that using a computer puts the body in an abnormal position. One can conclude that not only the actual computer and its settings have an effect on office workers, but also the actual positioning.

When participants were asked if their computer affects their productivity, majority of the participants stated that it does. 3 of the 8 participants stated that personal internet usage increases their productivity. None of the participants stated that computers and their positioning have an effect on their body, they only commented on the actual functioning of the computer that affects their productivity.

There are two contrasting thoughts about personal internet usage and its effects on productivity. Weckert (2005) states that reducing online activities such as 'chat sites' is said to increase productivity. On the contrary Griffiths' (2000) in *Anadarajan* & Simmers', (2004) book suggest that not all internet usage abuse can affect workers negatively. 6 of the 8 participants stated that they are able to conduct personal activities on the internet. Of these, 3 stated that this personal activity makes them more productive. This result corresponds with Griffiths' (2000) in *Anadarajan* & Simmers', (2004) book.

Anti-smoking legislation

The effect of the anti-smoking legislation in South African and its effects on office workers would still need to be researched further. Majority of the participants stated that they do not smoke. 7 of the 8 participants stated that smoking does not affect their creativity in any way; furthermore the majority of the participants stated that the anti-smoking legislation does not affect them in any way. From the results conducted from the study, the anti-smoking legislation does not seem to impact office workers greatly.

Cleanliness

Literature surrounding cleanliness within work environment and it affects on offices workers is limited. It was found plants can aid in the removal of dust and therefore improve well-being. (Larsen et al, 1998; in Ceylan 2008) No conclusive evidence however was found on the effects of general cleanliness of office environments and their effects on office workers. Participants of the study were asked if they were to design a work place that they were able to work their best in, 3 of the 8 participants made reference to a clean office space. The effects cleanliness on worker productivity and creativity may be a new area to investigate in future studies.

Conclusion

The purpose of this study is to build on previous knowledge already obtained about work environments and their affects on office workers. This chapter analysed and presented new data that has added, contradicted and supported previous research already conducted in this particular field of study. Chapter five conclude and provide recommendations.

CHAPTER 5

Conclusion and recommendations

Introduction

"The purpose of the Conclusion is to create an overview of the highlights from the Analysis in order to emphasize the most important aspects found in the process ..." Arnerlöv & Bengtsson, (2007)

The purpose of this chapter will be to conclude all the information already presented and analysed in the previous chapters. It will further provide recommendations and highlight gaps that are still evident within this research area.

Ergonomics

There is a vast amount of literature available concerning work environments and their affects on office workers. Judging from participant's responses to the interview questions, one can conclude that participants did not fully realise the impact of their work environment on their productivity, creativity and their physical well-being. When participants were asked about their office furniture, the majority of them stated that it does not affect them. The literature however places more emphasis on the effects of furniture. It is further stated that the physical work environment can cause musculoskeletal disorders. It is for this reason that companies should research work stations and their effects on staff. This may not only reduce the amount of strain onto the human body but may also increase worker productivity and satisfaction and therefore may even increase profits.

Indoor air quality

The literature concluded that air pollution tends to be higher indoors than outdoors. The literature further states that indoor pollution can have an impact on productivity and the general well-being of employees. It was found that most participants do not feel ill at work, although half of the participants attributed illness to the work environment. One can conclude that although the literature places emphasis on the effects of poor air quality on offices workers, this was not realised or does not affect participants of the study.

Temperature

Indoor temperature was described as "one of the fundamental characteristics of the indoor environment." (Seppänen; Fisk William & Lei, 2006). The literature concluded that incorrect temperatures can decrease worker productivity. It was found that participants were not fully satisfied with the current temperatures within their office environments. Majority of the participants stated that the office temperatures has an effect on them; it then becomes more important to establish why participants are not satisfied. It was also found that productivity could be improved when workers are able to control the temperatures within their offices spaces. Majority of participants stated that they are not able to control the temperature within their offices spaces. Perhaps further research needs to be conducted on methods that will allow offices workers to control the temperatures within their office spaces without affecting the requirements of co-workers. More research is needed within this regard.

Temperature and ventilation can work conjointly in that good ventilation could bring in cool fresh air. Majority of the participants stated that their office spaces are air-conditioned. More importantly it was found that majority of participants prefer air-conditioned office spaces. The literature found that productivity can be improved when air-conditioning is introduced into office environments. Although the majority of participants stated that their office space is air-conditioned and this corresponds with what they prefer, majority are still not satisfied with the indoor temperatures. It was also further established that opening a window may not be the best solution for allowing more ventilation into the office space because majority of participants are not seated near to a window. More research is needed to identify why it is that participants are not satisfied with the indoor air temperatures and research is needed as to what method can be introduced to better cool down temperatures.

Humidity

Majority of the literature found, highlights the effects of humidity on worker productivity. Majority of participants stated that the air within their office environment is dry. The literature states that dry air can cause staff to be more susceptible to illness but majority of the participants stated that humidity has no effect on them. Perhaps staff are feeling the effects of dry air and they are not attributing the symptoms to humidity, more research is needed in this regard.

Plants as stated in the literature review are able to increase the moisture in the air. Therefore a recommendation to the organisation is to introduce plants into the office environment as this may moisten the indoor air.

'The view through windows'

Studies show that our physical surroundings have an impact on our well-being. It was further stated that greenery seen through windows, may cause reductions in stress. No conclusive literature was found on the effect of 'view through windows' on productivity/creativity on office workers. Majority of participants found that the view through windows has no effect on their productivity or creativity. It was also discovered that if participants had to choose a view that would make them most productive, the majority of them stated that they would choose nature. If organizations are able to make adjustments to the 'view through windows' they should include nature, as most of the participants within the study stated that they would prefer to see nature, but one must note that it was found to have no effect on creativity or productivity.

Plants

Plants in the literature were found to increase productivity, reduce pollution, reduce dust and increase creativity. Majority of participants however stated that plants have no effect on their creativity and productivity. Majority of participants stated that plants are beneficial only because they add visual value to office environments. One can argue that only half of the participants have plants within their office environments and perhaps participants do not realise the effects plants may have on their well-being. More research is needed at Millennium in this regard.

Open plan offices and noise

It was established that majority of the participants work in open plan office spaces. The literature states that open plan offices are advantageous because they allow communication between co-workers. Open plan offices where also said to have disadvantages. Navai & Veitch (2003) suggest other disadvantages in having an open plan office; the lack of privacy, distractions and interruptions from other employees, rise in office temperature and the spreading of contaminates. Majority of participants stated that open plan offices do have more noise. The literature further states that the most stressful type of noise is one that is uncontrollable. Majority of participants stated that vocal noises from colleagues are the most disruptive. A

possible solution to the noise within office spaces was stated in the literature review. Studies showed that potted plants were in fact able to reduce noise. As stated before only half of the participants stated that they have plants within their office environment. Perhaps by adding plants into the office environment at Millennium, one could reduce noise levels. Further research will have to be conducted at Millennium in this regard.

The literature further suggested that quiet zones be implemented into office environments as this will give employees an area free of noise and gives employees time to de-stress. Majority of the participants stated that they would feel most creative in closed office spaces. Therefore partitioning and screens may be looked at as a solution to open plan office environments. It will reduce noise, providing barriers that prevent noise travel and it will give participants more privacy.

Lighting

Bad lighting has been described by the literature as the incorrect lighting for tasks that need to be conducted by that organization. The literature found that 'good lighting' was able to reduce stress, increase physical well-being, increase productivity and creativity and even have a positive effect on depressive symptoms. It was established that the majority of participants have artificially lit offices spaces. Majority of participants stated that they are satisfied with the lighting within their office space, although they would prefer more natural lighting. Majority of participants also stated that lighting has an effect on their mood. The literature found connections between creativity, mood and lighting, therefore organizations can look at lighting that will enhance employees' mood and therefore increase creativity.

Colour

Literature on the effect of colours in the work place is scarce. Although not much research has been conducted both Kwallek and Thomas (2006) agreed that warm colours have a negative effect on worker performance, whereas cooler colours allow for more concentration. Majority of participants stated that the colour scheme used within their office environment currently is neutral. Majority of participant's stated that colour has no effect on their creativity and productivity. Majority of participants also stated that they would choose neutral colours if they were to repaint their offices. The literature stated that colour cannot be looked at in isolation, other factors within the office environments need to be studied and looked at in

conjunction with colour. The literature did state that far more research is needed in this area. From the research obtained from the study at Millennium, one can conclude and recommend that majority of the participants would prefer more neutral colours within their office environments.

Creativity in the workplace

According to the literature, creativity is seen as the process of coming up with new ideas or even building on something that already exists and changing it into something new. It was found in some cases that creative processes happen when individuals are relaxed and at ease. Organizations should therefore look at ways to reduce stress and create a more relaxed atmosphere so that employees are able to increase their creative thought.

Positive mood is also said to increase creative thought. Therefore finding physical factors that enhance this mood can be looked at in organizations that are looking to increase creative thought. Lighting, as stated before, can be linked to an individual's mood and therefore to creativity. No link however has been found between mood and worker performance, further research is needed in this regard. Ceylan's (2008) research gives an overview on factors that he found to affect creativity most: "… complex and dimly lit offices with few plants and warm colours are associated with low creative potential. Offices with low complexity, that are brightly lit, have cool colours, and have plants are associated with high creative potential." Of the data collected from participants one can conclude that only lighting could be linked to creativity.

The thought that creativity could be linked to different cultures was not evident with in this study. Participants were not asked whether their culture affects their creativity or productivity. This leaves room for further research.

The use of art/wall hangings

No conclusive evidence was found in the literature about wall hangings and their effects on productivity and creativity. This research however did bring some clarity. It was found that majority of the participants do not have wall hangings in their current work environment, but of the ones that do, majority state that they do not have an effect on them in any way. It was further established that participants would either choose

nature inspired wall hangings or fashion related images if they were to select a series of wall hangings for their office space. Further research is needed on the effects of wall hangings on employees.

Technology

Office environments today rely heavily on computers. It is therefore necessary to analyse the effects computers and other technology have on productivity in the workplace. Studies have been conducted on technology in the workplace and its effects on productivity. There are two contrasting ideas about the effects of personal internet usage on productivity. One suggests that online 'chat sites' may decrease productivity and the other suggests that personal internet activities enhance worker satisfaction therefore increasing productivity. Only some of the participants stated that personal internet usage increases their productivity. More research is needed in this area so that one can establish conclusively whether or not personal internet usage affects productivity and also determine its affect on creativity.

Anti-smoking legislation

Not much conclusive research could be found on the effects that anti-smoking legislation have on productivity and creativity. From the results conducted in the study, the anti-smoking legislation does not seem to impact greatly on participants.

Cleanliness

Literature surrounding cleanliness within work environment and its affect on offices workers was limited. Participants made reference to clean office space when they were asked to state an office space that they would work at their optimum. The effects of cleanliness on worker productivity and creativity may be a new area to investigate.

Summary of Recommendations

The following recommendations have been taken from previous literature and include new found information obtained from this study.

- Majority of participants stated that they prefer air-conditioned office spaces.

- More research is needed to identify why it is that participants are not satisfied with the indoor air temperatures within the studied organisation. Research is needed as to what method can be introduced to better cool down temperatures.

- Plants, as stated in the literature review, are able to increase the moisture in the air. Therefore a recommendation to the organisation is to introduce plants into the office environment as this may moisten the indoor air.

- If organizations are able to make adjustments to the view through windows they should include nature, as most of the participants within the study stated that they would prefer to see nature, but one must note that it was found to have no effect on creativity or productivity.

- A possible solution to the noise within office spaces was stated in the literature review. Studies showed that potted plants were in fact able to reduce noise.

- The literature further suggested that quiet zones be implemented into office environments, as this will give employees an area free of noise and give employees time to de-stress.

- Majority of the participants stated that they would feel most creative in closed office spaces. Therefore partitioning and screens may be looked at as an option for open plan office environments. It will reduce noise, provide barriers that prevent noise travel and it will provide more privacy.

- Majority of participants also stated that lighting has an effect on their mood. The literature found connections between creativity, mood and lighting. Organisations can therefore look at lighting that will enhance employees' mood and therefore increase creativity.

- Companies could look at ways of incorporating more natural light into their building designs, or perhaps when looking for office spaces to rent looking at places that have more natural light. For companies that have already obtained offices space, perhaps looking at window treatments for example opening blinds daily to allow more natural light in. Look at ways to reposition furniture so that large pieces of furniture are not placed in front of windows and block out light. The introduction of more natural light into building designs will also save energy costs.

- From the research obtained from the study at Millennium one can conclude and recommend that majority of the participants would prefer more neutral colours within their office environments.

- Look at ways to reduce stress and enhance mood so that employees are able to increase their creative thought.

- It was further established that participants would either choose nature inspired wall hangings or fashion related images if they were to select a series of wall hangings for their office space. This recommendation applies mainly to retail companies.

 Conclusion

Results showed that not all physical factors affected participant's creativity and productivity. Office furniture, humidity, sitting near of far from a window, the view through the window, plants, colour, wall hangings and the anti-smoking legislation had no effect on participant's productivity or creativity.

Air-conditioning, temperature, noise, lighting and computers had effects on participants in various ways. Noise was said to reduce creativity and have some effect on productivity. Closed offices were said to increase creativity. Lighting was said to affect mood therefore it can be linked with creativity. Lighting however was said to not affect productivity in any way. Computers were said to have an effect on productivity in that if they do not work well, productivity would be reduced. The link between computers and creativity was not made.

It was found that participants spend on average 40 hours of the week at work. When worked out over months and then years, the amount of time employees spend within their work environment becomes considerable. Therefore it becomes important to study the effects that office environments have on employees. It is my hope that this research paper has provided new information about work environments but also raised more questions and provided new areas for further research.

References

Books

Anadarajan,M. & Simmers,A.C. (2004) Personal Web Usage in the Workplace. *A Guide to Effective Human Resource Management*. (p.p .255). USA: Information science Publishing.

Garsten, C & Wulff, H. (2003) New Technologies at Work. *People, Screens, and Social Virtuality*. (p.p .3,). USA: Berg Publishers.

Maxwell, J.H. (1996) *Qualitative research design: An interactive approach*. Dickens, G. (Ed.), (pp 4, 15, 17,) England: Sage

Reynolds, J. (2002) *The Managing Care Reader.* In Reynolds, J.; Henderson, JS.; Chalesworth, J & Bullman, A. (Eds), (pp. 289). New York: Routledge

Weckert, J. (2005) Electronic Monitoring in the Workplace. *Controversies and Solutions.* (p.p 3,)**.** USA: Idea group publishing.

Internet sources

Ecognosis (2006) colour in the workplace http://www.ecognosis.org/library/workplacecolor.pdf (2008/11/13) (Written by Thomas Anderson, M.A.)

ErgoSense issue 16 (n.d.) lighting Ergonomics and Economics http://www.details-worktools.com/media/scms/ISSUE-16.pdf (2008/10/05) (written by Cushman.H.W.)

Implications (2005) colour in office environments www.informeddesign.umn.edu (2008/11/13) (Written by Nancy Kwallek, Ph.D)

Plants in buildings (n.d) the effect of healthy workplaces on the well-being and productivity of office workers http://www.plants-in-buildings.com/documents/Symposium-Bergs.pdf (2008/10/05)

Press Releases 1999. (1999) South African Anti-Smoking Laws to Stay http://www.who.int/inf-pr-1999/en/pr99-wha5.html (2008/11/22)

Southern-Botanical-Inc (2008) Healthy green office plants improving your indoor work environment!. http://directory.leadmaverick.com/Southern-Botanical-Inc/DallasFort-WorthArlington/TX/10/2733/index.aspx (2008/10/11)

The Human imprint (2007) does the work environment you provide affect employee performance? http://thehumanimprint.typepad.com (2008/09/24)

U.S. department of labour (2008) computer workstations http://www.osha.gov/SLTC/etools/computerworkstations/ (2008/04/12)

Worcestershire (n.d.) Benefits of plants in the office http://www.worcestershire-office-plants.co.uk/benefits/ (2008/04/12)

Journals

Abdou, A.O; Kholy, El.M & Abdou, A.A (2007) Correlation between Indoor Environmental Quality an Productivity in Buildings. *Journal of architectural engineering* **3,** 1-15

Amabile,M.T ;Barsade,G.S; Mueller,S.J & Staw ,M.B (2005) Affect and Creativity at Work *Administrative Sciebce Quarterly* **50** *,367-403*

Ceylan,C ;Dul ,J ; & Aytac 'S (2008) Can the Office Environment Stimulate a Manager's Creativity? *ERIM Report Series Research in Management* **ERS-2008-059-LIS**,1-33

Mills, R.P.; Tomkins, C.S & Schlangen, JM.L (2007) The effect of high correlated colour temperature office lighting on employee wellbeing and work performance. *Journal of Circadian Rhythms* **5**:2, 1-9.

Seppänen, O; Fisk William, J & Lei, Q.H (2006) Effect of Temperature on Task Performance in Office Environment. **LBNL- 60946**

Other

Adams.k. (2006) *The sources of innovation and creativity*. A paper commissioned by the National center on education and the economy from the new commission on skills of the American workforce.

Arnerlöv, K & Bengtsson, C (2007) *Open-Plan Offices: the Importance of the Ambient Conditions' Characteristics for Employee Satisfaction*. Bachelor thesis

Clements-Croome, Professor Derek (2003) Environmental *quality and the productive work place* Research paper: The University of Reading, The School of Construction Management and Engineering, Reading, RG6 6AW, United Kingdom

Fitzgerald, J .C.; Talbot R .J. & Joniak, A.J. (2007) *Potential Explanations of Climate Factors that Help and Hinder Workplace Creativity: A Case from Selected Colombian Companies.* unpublished paper

Fjeld, T & Bonnevie, C. (2002) *The effect of plant and artificial day-light on the well- being and health of office workers, school children and health care personnel.* Seminar report: reducing health complaints at work plants for people, Int.Hort. Exhib. Floriade.

Lundborg, P. (2007) Does smoking increase sick leave? Evidence using register data on Swedish workers. Published Research paper, BMJ Publishing Group Ltd

Montgomery, F. Kathy (2004) *Understanding the Relationship Between the Design of the Workplace Environment and Wellness: a thesis in environmental design*

Do work environments have an effect on productivity and creativity?

Submitted to the Graduate Faculty of Texas Tech University in Partial Fulfillment of the Requirements for the Degree of Master of Science.

Navai, M. & Veitch, J.A. (2003) *Acoustic Satisfaction in Open-Plan Offices: Review and Recommendations*. Research Report RR-151

Tarran, J; Torpy, F; & Burchet, M (2007). *Use of pot plants to cleanse indoor air research review: research review. Faculty of science, University of technology Sydney (UTS)*

Do work environments have an effect on productivity and creativity?

Appendix 1

Appendix 1

Percent reduction in complaints
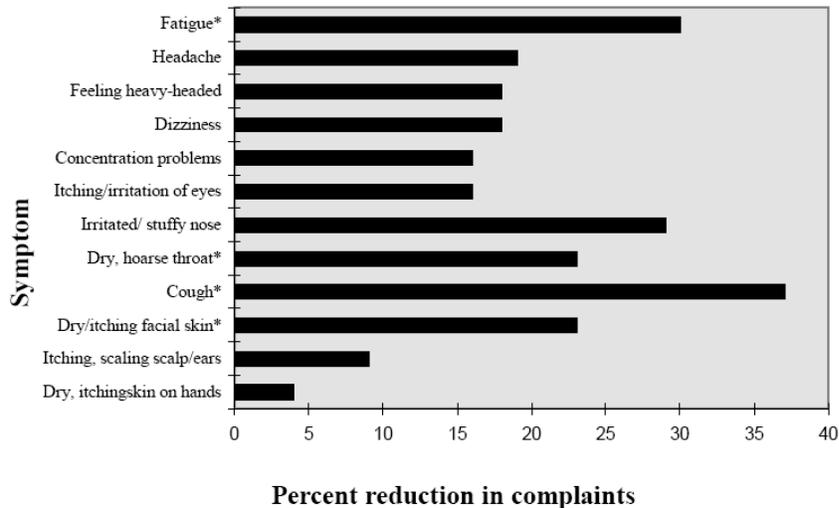
Fig. 1. Percent reduction in complaints of 12 health and discomfort symptoms during the period. *: Significantly reduced (Significance level 5%). (Fjeld et al. 1998).

Reference

Fjeld, T & Bonnevie, C. (2002) *The effect of plant and artificial day-light on the well- being and health of office workers, school children and health care personnel.* Seminar report: reducing health complaints at work plants for people, Int.Hort. Exhib. Floriade.

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Appendix 2

Data analysis

Date of interview: interviews were conducted on two consecutive days. 4 interviews were conducted each day. 2009/01/13 and 2009/01/14

Interview number: 8 interviews were conducted in total

1. **Please state your age:**
   16-20 - 0

   21-25 - 1

   26-30 - 5

   31-35 -1

   36-40 - 0

    41-45 -1

   46-50 - 0

   51-55 - 0

   Older - 0

Majority of the participants interviewed fall into in the age bracket 26-30 (5 of the 8). The other three respondents fall into the following age groups: 21-25; 31-35; 41-45

2. **Please state your gender:**
   Male - 4

   Female – 4

4 of the Respondents were male the other half were female there is an equal ratio of males to females.

3. **Please state your race:**
   Black- 4

   White- 1

   Indian-1

   Coloured-0

    Asian-2

4 of the respondents were not-white and the other respondents included 1 white, 2 Asian and 1 Indian individual.

4. **Please state your nationality or culture? E.G. Chinese, Portuguese ect.**
The participants varied in their nationalities and cultures. This showed that the participants were made up of different cultures namely:

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South African - 2

Ethiopian -1

Chinese-1

Taiwanese-1

Setswana-1

Pedi -1

Sotho-1

This also shows the multi cultural nature of South African.

5. **What is your educational background?**

All of the participants had studied further after matric and had gained various tertiary qualifications.

1) Diploma in accounting (certified public accountant) – currently studying towards degree
2) Diploma from a university- non specific
3) Majored in computers in a university in China
4) Matric and a diploma- not specific

5) B.A. degree- not specific

6) Diploma in fashion

7) Call centre management courses and IT courses.

8) Diploma in IT.

6. **How many hours do you spend at the office every day?**
8 hours- 6

Varies 8-9 hours - 1

11 hours -1

Two of the participants stated that they work from 8am to 5pm. These two participants where added into the 8 hours category assuming that they take a 1 hour lunch break.

7. **How many days do you work a week?**
5 days- 7

5-6 days - 1

Majority of participant's state they spend 5 days of the week at the office except one participant that stated it varies between 5 to 6 days of the week at work.

8. **Do you feel more ill at work or on holiday?**
At work- 2

On holiday: 3

Never feels ill - 3

3 of the 8 participants say they don't feel ill in general. 3 of the eight participants suggested they feel more ill on holiday. The one participant attributed this illness to a virus she caught within the work environment. The other participant feels more ill on holiday because he is worrying about work. The last participant in this category says that drinking during the holiday period contributes to his illness on holiday. The two participants that feel ill at work both attribute this to stress and pressure levels.

9. **What do you attribute that to?**

See above

10. **Do you have sufficient equipment to carry out your necessary daily tasks?**
    Yes- 6

    No- 2

Majority of the participants state that they have sufficient equipment to carry out their daily tasks. Although one of the participants stated that she does have sufficient equipment did mention that she does not have enough stationery.

11. **Does your office furniture have an effect on you in anyway?**
    No – 5

    Yes 3

The participant that answered that the -office furniture doesn't really affect her (put under no) - did mention that she has a problem with back ache that she attributes this to the chairs. This amounts to less than half of the participants saying that the office furniture affects them but one of the employees that said that her furniture does not affect her did complain of back ache. Therefore two participants complain of back pain and the other states he has a broken seat. The last participant in this category suggests that the office furniture affects her because it is not hygienic. Participant 6 also suggests that he has spacing issues. The other 5 of the 8 participants state that the office furniture does not affect them in any way.

12. **How does it affect you?**
    N/A- 4

    Back ache because of chairs- 2

    Spacing issues, space not being user friendly, not enough equipment in terms of camera, seat not comfortable (broken) - 1

    Not neat and tidy, not hygienic - 1

(See above question 11)

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13. **Is your office air-conditioned or is it naturally ventilated?**
    Air-conditioned- 5

    Naturally ventilated - 1

    Both - 1

    No air at all – 1

Although 5 of the participants stipulated that the office is air-conditioned: note that the one of these participants did suggest that the air conditioning sometimes does not work and they then open a window, this participant again suggests that where he is sitting is dirty.

14. **Do you prefer your office to be air-conditioned or naturally ventilated?**
    Naturally ventilated- 2

    Air-conditioned - 5

    Airflow is ok where he is – 1

Majority of the participants of the study prefer their offices to be air-conditioned. One of the participants interpreted the question incorrectly, stating how he feels about the current airflow in his work area.

15. **How do air-conditioned or naturally ventilated offices affect you?**
    1) Breathing, airflow, temperature (coolness)
    2) Finds old air conditioners to be noisy, prefers naturally ventilated spaces.
    3) States that the air flow is fine, comfortable.
    4) States that there is no air-conditioning, she gets hot and sweaty.
    5) Air conditioning dries up the air, can feel this especially at the end of the day, having the heater on in winter months makes the space stuffy in the afternoons.
    6) Suggests that work colleagues temperature requirements may have an effect on him, like illness. When it is hot or cool the air-conditioning is needed so that the air can be stabilized.
    7) Stipulates that in her particular building they cannot have air- conditioning.
    8) States that both air conditioning and naturally ventilated area will not affect him.

It is difficult in this question to group the conclusions, because all the reasoning is different.

16. **Are you able to control the temperature within your work space?**
    No - 5

    Yes - 3

More than half of participants state that they are not able to control the temperature within their work space. One of these participants did say she is able to open the door therefore the participant is able to control the temperature to some extent.

One of the participants that stated that she is able to control temperature did however state that her college's temperature requires may differ to hers and this will have to be considered.

17. **Does the temperature in your work space affect you in any way?**

Yes- 6

No- 2

Of the 8 participants 4 stated how the temperature affects them. All 4 stated that it makes them hot and 2 of the 4 stated that the heat makes them sleepy. One participant also suggested that the heat makes him feel dizzy. Respondent 5 stated the extremes of temperature: gets stuffy and makes you want to sleep and in the winter it is too cold. Respondent 6 suggests that the temperature needs to be stabilized so that he is able to work effectively.

18. **Do your co-workers temperature requirements affect you?**

No - 4

Yes - 3

All have same temperature requirements; all agree that there is no air circulation – 1

Majority of participants state that their office works temperature requirements don't have an effect on them in anyway.

19. **How would you describe the humidity within your office space? (Is the air moist or dry?)**

Dry- 5

Moist – 0

Normal - 1

Not sure – 2

5 of the 8 participants stated that the air is dry in their office space. 1 of these participants attributed this dry air to the air-conditioning being on for too long.

20. **Does the humidity in your office space affect you in any way?**

No - 5

Yes -2

Not answered *(answered in previous question) - 1

Although majority of participants stated in question 19 that the air was dry, the majority of the participants in this question state that humidity does not affects them.

21. **Do you sit close to a window?**

Yes - 3

No – 5

Majority of participants do not sit near to a window in their current office space.

Interview 1 was conducted in the individuals' office and the researcher noticed a window behind the individual even though in his response he stated that he does not sit near to a window.

22. Are you able to open this window or not?

Yes - 3

No - 1

N/A- 4

If one looks at the data, the previous question does not tie up with this one. Respondent three stated that she does not sit near to a window and answered that she is able to open a window in this question.

23. Does sitting near or far to a window affect your creativity?

Yes -1

No – **5**

Was not able to derive an answer from these participants- 2

Two of the respondent's answers were not able to be taken into consideration, as their responses did not correspond with the questions. (Respondent 5 and 7)

24. Does sitting near or far to a window affect your productivity?

No - 5

Yes – 2

Not answered – 1

25. What kind of view do you see through this window?

N/A – 4

Trees – 2

Another office – 1

Construction site – 1

Some of the participants had answered that they do not sit near a window, therefore the question was not asked to these participants except in one instance. Respondent 3 stated that she does not sit near to a window but she can view trees. One can assume that she does not sit near to the window but she is able to see from it.

2 participants stated that they can view trees from a nearby window.

26. Does the view through windows affect your creativity?

Yes - 1

No – 7

One of the participants that stated that the view through the window does not affect her creativity did state that her back is to the window.

Majority of participants state that the view through windows has no effect on their creativity.

27. Does the view through windows affect your productivity?

Yes – 1

No – 7

Participants did not recognize a difference between productivity and creativity. This may have influence the results.

28. What view would make you feel most productive?

Nature- 5

View does not have an effect - 1

Not sure - 1

The view that you are at work to do your job so you should do it to the best of your ability - 1

Majority of the participants feel that nature (trees, mountains and beach) will make them feel most productive.

Participant 7 misunderstood the question providing her point of view on what makes her most productive in the work environment. "I think with a view you are here to do your job so you should do your best."

29. Are there any plants within your work environments?

Yes - 4

No - 4

50% of the participants stated that there are plants within their work environment but two of these participants stated the following:

Respondent 5: a work college has a small plant on her desk

Respondent 7: stated that there is a couple within the work environment but not near her desk.

Respondent break down:

1) No   2) No   3) Yes   4) No   5) Yes   6) No   7) Yes   8) Yes

30. Are these plants natural or artificial?

Natural - 2

N/A - 4

Both - 1

Mostly natural - 1

The plants that are available in the participants work environment are a combination of natural and artificial but majority state that there are more natural plants then artificial.

31. Do you feel these plants have an effect on your productivity?

N/A – 3

No - 5

Yes - 0

Majority of the participants feel that plants do not have an effect on their productivity.

Respondent break down:

1) N/A   2) No   3) No   4) N/A   5) No   6) N/A   7) No   8) No

32. Do plants in your physical work environment make you more creative? Why?

Yes - 2

No - 6

Majority of the participants state that plants in their work environments have no affect on their creativity.

Respondent 4 stated that plants have no effect on her creativity they just make the office look nicer.

Respondent 6 stated that plants in the interior of the work environment has no affect on his creativity only that the view outside makes him more productive.

Respondent break down:

1) Yes   2) No   3) Yes   4) No   5) No   6) No   7) No   8) No

33. Do you feel that plants are a useful contribution to office environments? Why?

1) "Yes. Peace of mind, tranquillity."
2) "Yes. Because they purify the air and when you see it it is beautiful and those things." {adds value visually}
3) "Yes. Everybody like green things."
4) "They are not really, but they do look pretty." {adds value visually}
5) "I think it's kind of like makes it pretty I guess. That's as far as it goes." {adds value visually}
6) "Yes, because they are breathing and I think they can actually help this environment in a way."
7) "I think they do lighten up the place a bit and make it look more alive." {adds value visually}
8) "Yes. It make the office look professional." {adds value visually}

Yes – 6 (6 of the 8 participants state that plants are a useful contribution to work environments)

Adds value visually - 5 (5 of 8 participants suggested that plants adds visual value to work environments)

34. Does having plants in your physical office space affect your mood? How?

Yes - 3

No - 5

Majority of the respondents feel that plants do not affect their mood. However one of the respondents stated that plants do not affect her mood but plants do have a calming effect on the individual. Two other respondents stated that plants add tranquillity and help relieve stress.

Respondent break down:

1) Yes   2) Yes   3) No   4) No   5) No   6) No   7) Yes   8) No

35. **Describe the space you have to do your work?**
    1) "Sufficient."
    2) "I've got one table and a chair. Around me there are two other employees working with me. There's a bunch of ??? around me."
    3) "I just feel very nice place, very nice people, everything fine for me. It's nice space for me it is safe there for me to go hang around."
    4) "It's a desk that's full of stuff, a very dirty floor, samples all over the floor, but it doesn't really affect me in any way. I don't mind my mess."
    5) "Dirty, quite scattered with stuff, but that's just the nature of our work."
    6) "I think the space has to be user-friendly, it must be clean. My current work space is not clean and everything is cramped, sometimes you can't move around and sometimes you nearly fall because there is not enough space."
    7) "It's just desk and it must be arranged."
    8) "Like most of things IT stuff are on my table, computers, anything technical."

3 of the 8 participants suggested that their work space is dirty.

4 of the 8 participants state that there is a lot of "stuff" in their work space. Two of these participants suggested they need more space or to be better organized.

36. **Is your office open plan or closed offices?**
    Respondent 1 - Closed office

    Respondent 2 - Closed office

    Respondent 3 - Open plan

    Respondent 4 - Open plan

    Respondent 5 - Open plan

    Respondent 6 - Open plan

    Respondent 7 - Open plan

    Respondent 8 - Open plan

    Open plan – 6

    Closed office - 2

A majority of the participants work in open plan offices.

37. Do you feel you are more creative in an open plan or closed office?

Open plan – 3

Closed office – 4

Both - 1

Respondent 5 states that she is more creative in a closed office and is able to concentrate more but also stated that in open plan offices one is able to get feedback from colleagues.

Majority of participants state that they feel more creative in a closed office.

38. Is there noise in your office?

Yes – 4

No – 4

Half of participants state that there is noise in their work environment.

Link between open plan offices and noise was made in the literature. Results below

Respondent 1 - Closed office – no noise

Respondent 2 - Closed office – no noise

Respondent 3 - Open plan – no noise

Respondent 4 - Open plan – yes there is noise

Respondent 5 - Open plan – yes there is noise

Respondent 6 - Open plan – no noise

Respondent 7 - Open plan – yes there is noise

Respondent 8 - Open plan – yes there is noise

From the above data one can conclude that closed offices are quiet as both participants that work in closed offices state that they do not have noise in their work environment.

Of the 6 participants that work in open plan offices majority (4 of the 6) of these participants stated that there is noise in their office environment.

39. What type of noise do you find most disruptive within your office environment?
1. "Screaming."
2. "Noise, it disrupts me. Maybe it there is this fluorescent light there is some kind of noise sometimes."
3. "I don't think so."
4. "Chinese people screaming on the telephone."

5. "I would say that sometimes just everyone talking is sometimes a bit amazing and it can be quite …"
6. "Sometimes people talk louder distracting you but most of the people respect each other."
7. "Screams."
8. "Shouting."

Vocal noise coming from work colleagues – 6 (4 of the 6 state screaming and shouting)

Fluorescent lights - 1

Does not affect – 1

Majority of the participants state that vocal noise coming from work colleagues is the most disruptive.

Participant 2 stated that he finds the noise from the fluorescent lights to be the most disruptive.

40. Do you feel that this noise affects your productivity in any way?
Yes - 4

No - 4

Half of participants state that noise affects their productivity.

41. Does noise have an impact on your creativity?
Yes – 6

No – 2

Majority of participants find noise has an impact on their creativity. One can therefore conclude that noise has more of an impact on creativity than it does on productivity.

42. Is your office space naturally or artificially lit?
Naturally lit - 1

Artificially lit – 5

Both – 2

60% of the participants have artificially lit offices.

43. Would you prefer a more natural light?
Yes – 6

No – 1

Not answered - 1

Although the majority of participants prefer natural light 60% of participant's offices spaces are artificially lit.

Respondent break down:

1) Yes   2) Yes   3) Yes   4) Yes   5) Yes   6) Not answered   7) Yes   8) No

44. Is this lighting suitable for your daily tasks?
Yes – 7

No – 1

Although participants would prefer more natural light according to the above data 90% of participants state that the lighting is suitable for their daily tasks.

Respondent 4 stated that the lighting is suitable but taking pictures is a problem.

Respondent break down:

1) Yes   2) Yes   3) Yes   4) Yes   5) Yes   6) Yes   7) No   8) Yes

45. Does lighting affect your mood in anyway?
Yes- 5

No - 3

60% of the participants stated that lighting affects their mood.

Respondent 2- stated that he prefers brighter light.

Respondent 3 stated that she likes sunlight.

Respondent 7 stated that office lighting does affect her mood and taking pictures is a problem because the lighting affects the detail of the pictures. This is the second responded that has stated taking pictures in their office environments is a problem because of the lighting.

Respondent break down:

1) Yes   2) Yes   3) Yes   4) No   5) No   6) Yes   7) Yes   8) No

46. Does lighting affect your productivity in anyway? How?
Yes - 3

No - 5

Majority of the participants stated that lighting does not affect their productivity.

Respondent 2 stated that the lighting does affects his productivity and also stated that the dark lighting strains his eyes.

Respondent 6 stated that the lighting does affects his productivity and that seeing the sun outside provides inspiration.

Respondent 7 stated that the lighting does affects her productivity by slowing it down.

Respondent break down:

1) No   2) Yes   3) No   4) No   5) No   6) Yes   7) Yes   8) No

47. What is the basic colour scheme in your office?
Respondent 1 – "Cream, beige."

Respondent 2 - Grey.

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Respondent 3 - Blue.

Respondent 4 – "Does isn't one count? I don't think we have a colour scheme. Everything is wooden and natural and colourful samples all over the place."

Respondent 5 – "Grey/white/navy."

Respondent 6 – "White."

Respondent 7 – "None."

Respondent 8 – "White."

Respondent 4 and 7 suggest that there is no colour scheme within their office environments.

5 of the 8 respondents suggest that their office colour scheme is neutral consisting of the colours: grey, white, beige and cream.

Respondents 3 and 5 suggested blue is also part of their offices colour scheme.

48. Does colour affect your creativity? How?

Yes - 2

No – 6

Respondent 3 – yes, suggests that a particular colour is calming, therefore it is assumed that colour does affect her creativity.

Respondent 5 – no, states that colour does not affect her that much but she would like to work in an environment that has more bright colours.

Respondent 6 – yes, states that neutral colours are good for offices because they appeal to everyone, but feels that creative environments can make their walls more interesting.

Respondent 7 – no, this participant believes you get used to your office.

49. Does colour affect your productivity? How?

Yes – 2

No - 6

Majority of participants suggests that colour does not affect productivity.

Respondent 5 –the respondent believes that bright colours and creative "stuff" can inspire one to be creative.

Respondent 6 – this respondent believes that colour does affect your creativity but you can make the choice to not let it affect you and look for inspiration elsewhere, like the internet or music.

50. If you had to repaint your offices what colour would you chose and why?

Respondent 1 – I would choose pastel colours, it's more accepted, more soothing.

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Respondent 2 - White because it is something it's a bright colour so it makes me bright also

Respondent 3 - I like white, very bright.

Respondent 4 – I would keep it natural otherwise it clashes with everything else. So I would keep like a stony colour

Respondent 5 – I would go for red, yellow and orange type of colours because those colours are more bright and fun. I know yellow kind of takes energy from you because after a while you get exhausted of looking at yellow but I mean it's also kind of brightens it up and it's more energetic in the beginning.

Respondent 6 – Regarding this business I would still paint it white. Sometimes buyers come here, sometimes other special people come here and they are corporate and the company needs to be corporate when people come inside so I would still paint it white.

Respondent 7 – I'd go for lime green. I think it is more alive

Respondent 8 – White because it's bright.

4 of the 8 participants would paint their offices white. 3 of these participants suggested white because it is a bright colour.

6 of the 8 participants would go for neutral or natural colours in their offices spaces.

2 of the 8 participants would go for brighter colours such as lime green or red, yellow, orange.

51. **If you had to design a work space where you would be able to work at your optimum\best what would it look like?**

    Respondent 1 – "A lot of space, a lot of modern features, plants, good desk, computer."

    Respondent 2 – "Properly ventilated and where you have got a place for putting every paper and every file where you can put it properly."

    Respondent 3 – "I can't say anywhere exact, next to door"

    Respondent 4 – "I don't mind our workspace. I just wish it would be cleaner and the rubbish would be taken away but otherwise I don't really mind it."

    Respondent 5 – "Well the Reception area would be yellow, but the rest of the office I would like it to be more blue and green like you know that whole not zen, but it's just more neutral it's more relaxed and obviously firstly I would clean up the office and get rid of all of its scatter"

    Respondent 6 – "It will have user-friendly space, where I can move around. It should be clean, it should have spaces for dummies and the carpets should be clean. I would make it to be very

friendly. Maybe I could change the curtains because the walls are already white they could make them black or blue, just play around with colour"

Respondent 7 – "I think we would have cubicles with privacy."

Respondent 8 – "I'm not sure but I prefer my office to look professional like only work with the computes and stuff. To make it simple like if I'm saying to put like everything on the computer so I can access everything in one office"

3 of the 8 participants suggested a clean working environment.

3 of the 8 participants suggested space and organization in the ideal office environments.

2 of the 8 participants suggested that they would add blue to their work environments.

2 of the 8 participants mentioned computers in their ideal office environment.

52. Are their wall hangings in your office environment?
Yes – 3

No – 5

60% of the participants do not have wall hangings in their office environment.

53. Describe these wall hangings?
Respondent 1 – "There's a picture of an elephant."

Respondent 2 – N/A

Respondent 3 – "I like a happy face on my wall"

Respondent 4 – N/A

Respondent 5 – N/A

Respondent 6 – N/A

Respondent 7 – N/A

Respondent 8 – "Just paintings"

5 of the respondents were not asked the question as they do not have any wall hangings.

54. Do they have an impact on you in any way?
Respondent 1 – no

Respondent 2 – N/A

Respondent 3 – Yes, make me good mood.

Respondent 4 – N/A

Respondent 5 – N/A

Respondent 6 – N/A

Respondent 7 – N/A

Respondent 8 – no

Only one participant of the three participants that have wall hangings states that the wall hanging has an impact on her.

55. If you where to select a series of wall hangings for your office space what would you select? Why?

Respondent 1 – "A lot of art from famous painters."

Respondent 2 – "Maybe I prefer those paintings with the light colours, maybe not colours like red and those things. I think it is natural, I like those things"

Respondent 3 – "I like nature scene, just close to nature because you feel not sitting in office, you look sitting outside"

Respondent 4 – "I think I might select fashion pictures or magazine pictures or clothing pictures purely because it is a clothing company"

Respondent 5 – "I would select, have you seen those big posters of the latest fashion trends for 2009, those kind of pictures because I just think they are you know that whole sense of fat people trying to teach you aerobics or try to teach you how to go on diet and you don't believe them because they are fat. So it's the same thing, you want your office to represent what we do otherwise it's just not believable even for the workers there. I mean if I have to come to work every day in tracksuit pants and takkies people won't think I'm a fashion merchandiser because you are not really representing what you do. So I think for the office as well like I just wanted more of that feel, vibe to it so then people can know exactly what you do, not just judge you by how much garments are on the floor"

Respondent 6 – "I will select encouraging wall hangings which assist productivity which assist inspiration. I would hang around inspiring words such as inspirational things"

Respondent 7 – "I would select fashion designs because we are in a design environment to give it that impression that you are in a designing space"

Respondent 8 – No I would put my personal pictures just to remind me of memories forever

3 of the 8 participants suggested that they would put up fashion inspired wall hangings. They all commented that the company they work for is a fashion company and the fashion wall hangings will give the impression that it truly is a company that deals with fashion.

2 of the 8 respondents suggested nature as their selected wall hangings.

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56. Do you work colleagues affect your mood in any way?

Yes - 5

No - 2

N/A- 1

Majority of the participant's colleagues have an effect on their mood.

57. Do other people's personalities have an effect on your creativity? How?

Respondent 1 – "no."

Respondent 2 – "Yes. For example if you have got a boss who's personality is somewhat aggressive, who always orders you to do something who always wants you to do those things and who doesn't give you the chance to be creative that then affects me."

Respondent 3 – "Yes, I don't like people angry to me. If my boss shout at me I don't want to work."

Respondent 4 –"Yes. If they are moody and they don't want to be here then it just makes you irritated."

Respondent 5 – "I wouldn't say so but other people's creativity I would say yes because I think that's what this work is all about. You bounce ideas and you use other people's creativity and your own and you come up with new things. But I don't think personality that much. But obviously I suppose their personality affects their creativity. Some people are more out-spoken and give you ideas and some people don't"

Respondent 6 – N/A

Respondent 7 – "No"

Respondent 8 – "No"

Yes - 4

No - 3

N/A - 1

Half of the participants suggested that other people's personalities have an effect on their creativity. 2 of the 4 participants said that their bosses' aggressiveness has an impact on their creativity.

58. Does your computer affect your productivity in any way? How?

Respondent 1 – Yes. The faster the computer the faster time I react basically.

Respondent 2 – no

Respondent 3 – Yes, if my computer not go smoothly it going to delay my work

Respondent 4 – Yes. Because sometimes it doesn't work

Respondent 5 – No, I think it's just a tool.

Respondent 6 – Yes for the past time it has been affecting me badly because I was using a very, very old keyboard. Sometimes I will type and it will not type what I want it to type or it will be broken like now so I've just borrowed somebody's keyboard. And sometimes I come early in the morning and try to switch on my computer and it doesn't switch on. So I always have to struggle with those things like computer which is not good

Respondent 7 – Yes. It slows me

Respondent 8 – No.

Yes - 5

No - 3

Majority of the participants stated that their computers affect their productivity.

59. Are you able to conduct personal activities on the internet?

Yes - 6

No – 2

70% of the participants are able to conduct personal activities on the internet.

60. Do you feel more or less productive because of this personal internet usage?

N/A - 2

More - 3

Less - 1

Does not affect - 2

3 of the 8 participants stated that they feel more productive because of personal internet usage.

61. Are you a smoker?

Yes – 2

No – 6

Majority of the participants are non-smokers.

62. Does this affect your creativity or productivity in any way?

Respondent 1 – no

Respondent 2 – no

Respondent 3 – yes (does not like smoking)

Respondent 4 – no

Respondent 5 – no (does not smoke at work)

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Respondent 6 – no (does not need to smoke to get focused)

Respondent 7 – no

Respondent 8 – no

Yes -1

No -7

Almost all of the participant's stated that smoking doesn't not affect their creativity or productivity in any way.

63. Has the Anti-smoking in public places legislation affected you in your work environment in any way?

Respondent 1 – No.

Respondent 2 – Yes, those guys who want to smoke they don't smoke inside so they go out and smoke so they don't smoke near me.

Respondent 3 – No.

Respondent 4 – Yes, because people can't smoke inside.

Respondent 5 – No, I still see lots of people out in the parks and smoking

Respondent 6 – Not really

Respondent 7 – No.

Respondent 8 – No

No - 6

Yes – 2

Majority of the participants stated that the legislation has no effect on their work environment.

Appendix 3

Interview schedule

Date of interview: _____   Interview number: _____

Please state your age:

16-20 ☐   21-25 ☐   26-30 ☐   31-35 ☐   36-40 ☐ 41-45 ☐   46-50 ☐   51-55 ☐   Older ☐

Please state your gender:

Male ☐   Female ☐

Please state your race:

Black ☐   White ☐   Indian ☐   Coloured ☐   Asian ☐

Please state your nationality or culture? E.G. Chinese, Portuguese ect.

_____

What is your educational background?

_____

How many hours do you spend at the office every day?

_____

How many days do you work a week?

_____

Do you feel more ill at work or on holiday?

_____

What do you attribute that to?

_____

Do you have sufficient equipment to carry out your necessary daily tasks?

_____

Does your office furniture have an effect on you in anyway?

_____

How does it affect you?

_____

Is your office air-conditioned or is it naturally ventilated?

_____

Do you prefer your office to be air-conditioned or naturally ventilated?

_____

How do air-conditioned or naturally ventilated offices affect you?

_____

Are you able to control the temperature within your work space?

_____

Does the temperature in your work space affect you in any way?

_____

Do your co-workers temperature requirements affect you?

_____

How would you describe the humidity within your office space? (Is the air moist or dry?)

_____

Does the humidity in your office space affect you in any way?

_____

Do you sit close to a window?

_____

Are you able to open this window or not?

_____

Does sitting near or far to a window affect your creativity?

_____

Does sitting near or far to a window affect your productivity?

What kind of view do you see through this window?

_____

Does the view through windows affect your creativity?

_____

Does the view through windows affect your productivity?

_____

What view would make you feel most productive?

_____

Are there any plants within your work environments?

_____

Are these plants natural or artificial?

_____

Do you feel these plants have an effect on your productivity?

_____

Do plants in your physical work environment make you more creative? Why?

_____

Do you feel that plants are a useful contribution to office environments? Why?

_____

Does having plants in your physical office space affect your mood? How?

_____

Describe the space you have to do your work?

_____

Is your office open plan or closed offices?

_____

Do you feel you are more creative in an open plan or closed office?

_____

Is there noise in your office?

_____

What type of noise do you find most disruptive within your office environment?

_____

Do you feel that this noise affects your productivity in any way?

_____

Does noise have an impact on your creativity?

_____

Is your office space naturally or artificially lit?

_____

Would you prefer a more natural light?

_____

Do work environments have an effect on productivity and creativity?

Is this lighting suitable for your daily tasks?

_____

Does lighting affect your mood in anyway?

_____

Does lighting affect your productivity in anyway? How?

_____

What is the basic colour scheme in your office?

_____

Does colour affect your creativity? How?

_____

Does colour affect your productivity? How?

_____

If you had to repaint your offices what colour would you chose and why?

_____

If you had to design a work space where you would be able to work at your optimum\best what would it look like?

_____

Are their wall hangings in your office environment?

_____

Describe these wall hangings?

_____

Do they have an impact on you in any way?

_____

If you where to select a series of wall hangings for your office space what would you select? Why?

_____

Do you work colleagues affect your mood in any way?

_____

Do other people's personalities have an effect on your creativity? How?

_____

Does your computer affect your productivity in any way? How?

Are you able to conduct personal activities on the internet?

Do you feel more or less productive because of this personal internet usage?

Are you a smoker?

Does this affect your creativity or productivity in any way?

Has the Anti-smoking in public places legislation affected you in your work environment in any way?

Appendix 4

Interview schedule

Date of interview: 2009/01/14   Interview number: 1

Please state your age: 29

16-20 ☐   21-25 ☐   26-30 ✓   31-35 ☐   36-40 ☐   41-45 ☐   46-50 ☐   51-55 ☐   Older ☐

Please state your gender:

Male ✓   Female ☐

Please state your race:

Black ☐   White ☐   Indian ✓   Colour ☐   Asi ☐

Please state your nationality or culture? E.G. Chinese, Portuguese etc.

South African

What is your educational background?

Diploma in Accounting, Degree (almost there) and I am a Certified Public Accountant.

How many hours do you spend at the office every day?

It varies, but I try to make it 8 to 9

How many days do you work a week?

Five.

Do you feel more ill at work or on holiday?

On holiday.

What do you attribute that to?

Because I am worried about work.

Do you have sufficient equipment to carry out your necessary daily tasks?

Yes.

Does your office furniture have an effect on you in anyway?

No.

How does it affect you?

N/A

Is your office air-conditioned or is it naturally ventilated?

Air-conditioned.

Do you prefer your office to be air-conditioned or naturally ventilated?

Air-conditioned.

How do air-conditioned or naturally ventilated offices affect you?

Breathing, coolness, atmosphere.

Are you able to control the temperature within your work space?

No.

Does the temperature in your work space affect you in any way?

Yes.

Do your co-workers temperature requirements affect you?

No.

How would you describe the humidity within your office space? (Is the air moist or dry?)

Dry.

Does the humidity in your office space affect you in any way?

Yes.

Do you sit close to a window?

No.

(Perhaps did not understand the question, as the interviewer I can physically see the window, the interview was conducted in the individuals office)

Are you able to open this window or not?

N/A

Does sitting near or far to a window affect your creativity?

No.

Does sitting near or far to a window affect your productivity?

Not answered

What kind of view do you see through this window?

N/A

Does the view through windows affect your creativity?

No.

Does the view through windows affect your productivity?

No.

What view would make you feel most productive?

Nature.

Are there any plants within your work environments?

No.

Are these plants natural or artificial?

N/A

Do you feel these plants have an effect on your productivity?

N/A

Do plants in your physical work environment make you more creative? Why?

Yes. Nature.

Do you feel that plants are a useful contribution to office environments? Why?

Yes. Peace of mind, tranquillity.

Does having plants in your physical office space affect your mood? How?

Yes. Tranquillity again, peace, more oxygen in the room.

Describe the space you have to do your work?

Sufficient.

Is your office open plan or closed offices?

Closed.

Do you feel you are more creative in an open plan or closed office?

Closed.

Is there noise in your office?

No.

What type of noise do you find most disruptive within your office environment?

Screaming.

Do you feel that this noise affects your productivity in any way?

Yes.

Does noise have an impact on your creativity?

Yes.

Is your office space naturally or artificially lit?

Naturally.

Would you prefer a more natural light?

Yes.

Is this lighting suitable for your daily tasks?

Yes.

Does lighting affect your mood in anyway?

Yes.

Does lighting affect your productivity in anyway? How?

No.

What is the basic colour scheme in your office?

Cream, beige.

Does colour affect your creativity? How?

No.

Does colour affect your productivity? How?

No.

If you had to repaint your offices what colour would you chose and why?

I would choose pastel colours, it's more accepted, more soothing.

(Respondent had trouble answering this question- respondent opened up after this question seemed to ease the tension)

If you had to design a work space where you would be able to work at your optimum\best what would it look like?

A lot of space, a lot of modern features, plants, good desk, computer.

Are their wall hangings in your office environment?

Yes.

Describe these wall hangings?

There's a picture of an elephant.

Do they have an impact on you in any way?

No.

If you were to select a series of wall hangings for your office space what would you select? Why?

A lot of art from famous painters.

Do you work colleagues affect your mood in any way?

Yes.

Do other people's personalities have an effect on your creativity? How?

No.

Does your computer affect your productivity in any way? How?

Yes. The faster the computer the faster time I react basically.

Are you able to conduct personal activities on the internet?

No.

Do you feel more or less productive because of this personal internet usage?

N/A

Are you a smoker?

No.

Does this affect your creativity or productivity in any way?

No.

Has the Anti-smoking in public places legislation affected you in your work environment in any way?

No.

Field notes

Respondent gave very short, direct and precise answers.

Respondent seem to want to get through the interview quickly.

Respondent seemed to open up towards the end of the interview.

The respondent was occupied with work it was difficult for the respondent to find the time to answer the questions.

Interview schedule

Date of interview: __2009/01/14_____   Interview number: 4

Please state your age: 26

16-20 ☐   21-25 ☐   26-30 ✓   31-35 ☐   36-40 ☐   41-45 ☐   46-50 ☐   51-55 ☐   Older ☐

Please state your gender:

Male ☐   Female ✓

Please state your race:

Black ☐   White ✓   Indian ☐   Coloured ☐   Asian ☐

Please state your nationality or culture? E.G. Chinese, Portuguese etc.

South African.

What is your educational background?

Matric and a Diploma.

How many hours do you spend at the office every day?

About 11.

How many days do you work a week?

5 or 6.

Do you feel more ill at work or on holiday?

I don't really feel ill at all. I like to work and I don't ever do holidays.

What do you attribute that to?

N/A

Do you have sufficient equipment to carry out your necessary daily tasks?

Yes, I just don't have stationery.

Does your office furniture have an effect on you in anyway?

It gives me backache because my chair is not good.

How does it affect you?

Is your office air-conditioned or is it naturally ventilated?

No, it has no air at all.

Do you prefer your office to be air-conditioned or naturally ventilated?

Air-conditioning.

How do air-conditioned or naturally ventilated offices affect you?

Well, our office has no air at all so it makes me hot and sweaty.

Are you able to control the temperature within your work space?

No, we open a door that brings in some wind.

Does the temperature in your work space affect you in any way?

It makes me hot.

Do your co-workers temperature requirements affect you?

They all have the same temperature requirements as me because we don't have any air.

How would you describe the humidity within your office space? (Is the air moist or dry?)

I don't actually have any idea.

Does the humidity in your office space affect you in any way?

No.

Do you sit close to a window?

Yes.

Are you able to open this window or not?

No, but we have a sliding door that can be opened.

Does sitting near or far to a window affect your creativity?

Not really.

Does sitting near or far to a window affect your productivity?

No.

What kind of view do you see through this window?

Another office.

Does the view through windows affect your creativity?

No, because my back is to the window so I can't really see it.

Does the view through windows affect your productivity?

No.

What view would make you feel most productive?

A view doesn't really affect me.

Are there any plants within your work environments?

No, they would all die because it is a disgusting work environment.

Are these plants natural or artificial?

N/A.

Do you feel these plants have an effect on your productivity?

N/A.

Do plants in your physical work environment make you more creative? Why?

I don't think so, it just makes the place look nicer but it doesn't really affect creativity.

Do you feel that plants are a useful contribution to office environments? Why?

They are not really, but they do look pretty.

Does having plants in your physical office space affect your mood? How?

No.

Describe the space you have to do your work?

It's a desk that's full of stuff, a very dirty floor, samples all over the floor, but it doesn't really affect me in any way. I don't mind my mess.

Is your office open plan or closed offices?

Open plan.

Do you feel you are more creative in an open plan or closed office?

Open plan only for the reason that there are more people to talk to and more noise to hear.

Is there noise in your office?

Yes.

What type of noise do you find most disruptive within your office environment?

Chinese people screaming on the telephone.

Do you feel that this noise affects your productivity in any way?

Yes because I can't hear anything.

Does noise have an impact on your creativity?

No.

Is your office space naturally or artificially lit?

A bit of both.

Would you prefer a more natural light?

Yes.

Is this lighting suitable for your daily tasks?

It's okay, you just can't really take pictures with the camera.

Does lighting affect your mood in anyway?

No.

Does lighting affect your productivity in anyway? How?

No, unless it's the camera that you can't use in this light.

What is the basic colour scheme in your office?

Does isn't one count? I don't think we have a colour scheme. Everything is wooden and natural and colourful samples all over the place.

Does colour affect your creativity? How?

No.

Does colour affect your productivity? How?

No.

If you had to repaint your offices what colour would you chose and why?

I would keep it natural otherwise it clashes with everything else. So I would keep like a stoney colour.

If you had to design a work space where you would be able to work at your optimum\best what would it look like?

I don't mind our workspace. I just wish it would be cleaner and the rubbish would be taken away but otherwise I don't really mind it.

Are their wall hangings in your office environment?

No.

Describe these wall hangings?

N/A

Do they have an impact on you in any way?

N/A

If you were to select a series of wall hangings for your office space what would you select? Why?

I think I might select fashion pictures or magazine pictures or clothing pictures purely because it is a clothing company.

Do you work colleagues affect your mood in any way?

Yes.

Do other people's personalities have an effect on your creativity? How?

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Yes. If they are moody and they don't want to be here then it just makes you irritated.

Does your computer affect your productivity in any way? How?

Yes. Because sometimes it doesn't work.

Are you able to conduct personal activities on the internet?

No.

Do you feel more or less productive because of this personal internet usage?

N/A

Are you a smoker?

No.

Does this affect your creativity or productivity in any way?

No.

Has the Anti-smoking in public places legislation affected you in your work environment in any way?

Yes, because people can't smoke inside.

Field notes

A willing and interested respondent.

Respondent is clear and to the point.

Respondent seems to be happy and positive.

Able to answer questions openly and freely.