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## The influence of open plan work-environments on the productivity of employees: the case of engineering firms in Cape Town

### Abstract

More large organizations are moving away from traditional private offices and adopting open plan work-environments. This is mainly done to save space and money since office space is limited in both size and usability. Prior research suggests that large organizations in the United States of America and the United Kingdom make use of open plan work-environments as emphasis is placed on cost-effectiveness, but not necessarily on employee satisfaction. Since the advantages of open plan work-environments (e.g. sharing ideas, improved communication, etc.) largely outweigh the disadvantages of open plan work-environments, it provides justification for the global 'trend' of open plan work-environments. Notwithstanding the above, organizations should be mindful as to how open plan work-environments may impact on its employees' morale and the overall effectiveness of its employees, among other areas. This research study was conducted with the main intent to determine how employees, in a South African dispensation, are influenced by open plan work-environments, particularly in relation to employees' productivity and job satisfaction. This research study was empirical in nature and followed a mixed methods approach whereby data were collected from 32 respondents situated in two engineering firms, in Cape Town, through means of questionnaire-tools. All respondents had to adhere to a strict set of delineation criteria in order to constitute a valid response. It was found that the majority of respondents who were situated in open plan work-environments preferred private offices as opposed to open plan offices, especially since it had an adverse influence on employees' concentration, privacy and emotional well-being.

**Keywords:** office environment, work-environment, employee productivity, open plan office, private office, employee satisfaction.

**JEL Classification:** M10.

### Introduction

In any business, situated in any industry, it is clear that all sorts of work-environments will be evident. Holistically speaking the term "work-environment" can be defined as follows:

"[A] work-environment involves the physical geographical location as well as the immediate surroundings of the workplace, such as a construction site or office building" (Business Dictionary, 2014).

In addition Armstrong (2012) avers that the term "work-environment" does not only include the physical location of an office or the area around an office building, but also involves the office design, office culture and the practices shared between employees in relevant offices. As such, stemming from the latter, and for the sake of this paper, the term "work-environment" can be viewed as the physical geographical location and immediate surroundings, including office culture and office collaboration between colleagues. As such, it is no surprise that the World Green Building Council (2014) found that the work-environment of any organization has a large impact on the health, wellness and productivity of its employees.

Out of an array of work-environments that can be adopted by organizations across the globe, open plan

work-environments enjoy preference by most employers as approximately 70% of employees in the United States of America are currently working in open plan work-environments (Wong, 2013). In a Chinese dispensation, open plan work-environments are also becoming more common (Zhang et al., 2012). According to Reynolds (2013) one probable reason for the 'favorable attitude' towards open plan work-environments, especially in developed economies, include 'space-saving initiatives'. Essentially it is believed that open plan work-environments acts as a catalyst to encourage better collaboration with colleagues (Reynolds, 2013).

Despite the popularity of open plan work-environments Kim and De Dear (2013) intonate that although open plan work-environments dominates modern workplaces, there is little solid evidence that such work-environments actually improve interaction between co-workers. Therefore it is imperative that its potential and/or actual influence on employees' efficiency and productivity are taken into account before it is adopted as an official and formal work-environment in a respective business. This view is substantiated by Brown (2013) who is of the opinion that open plan work-environments has a detrimental influence on employees' abilities to concentrate, leading to lower levels of productivity. Jahncke et al. (2011) conforms with the latter when mentioning that open plan work-environments tends to be 'noisy';

resulting in employees having lower concentration levels during work time.

Stemming from the above the authors formulated the perception that the adoption of open plan work-environments, in an organization, particularly in a Southern African dispensation, may have an adverse influence on the productivity of its employees.

In order to solve and/or mitigate the afore-mentioned problem statement the following research questions were asked:

- ◆ How are employees influenced by open plan work-environments?
- ◆ How effective is an open plan work-environment when compared to a private office 'setup'?

## 1. Literature review

**1.1. Understanding the concept of an effective work-environment.** The term "effective" can be defined as being successful in producing a desired or intended result (Oxford, 2014). In the same vein, effective work-environments, in effect, culminate to the physical geographical locations and immediate surroundings, including office culture and office collaboration between colleagues, which aid in the attainment of a business relevant objectives.

As businesses have different needs, operate in different industries and have different functions (types of jobs to be completed), it is imperative for a business management to take into consideration all practical factors before formally implementing a certain work-environment (Becker, 2000). Research conducted by Veitch et al. (2007) found that there are at least seven key 'practical factors' which should be considered before any work-environment is formally implemented: 1) the amount of noise other colleagues' conversations will cause, 2) the number of potential general distractions that can be caused by colleagues, 3) the degree of enclosure by walls and/or office furniture, 4) the level of visual privacy, 5) the proximity between colleagues from one workstation to the next, 6) the amount of background noise that can be heard at workstations, 7) the size of employees' personal workspace, and 8) the function being performed by employees.

More often than not the work-environments should be designed for both functionality and style as achieving an 'optimum mixture' for the latter should contribute towards employee satisfaction (Dansoh, 2006); resulting in better employee productivity and, eventually, in the attainment of business objectives. The last-mentioned can be viewed as ergonomics. Better put, ergonomics is the scientific discipline concerned with the understanding of the

interactions among humans and other elements of a system, with the main intent to optimize human well-being and the overall performance of the particular system (Radjiyev et al., 2015).

**1.2. The impact of open plan work-environments on ergonomics.** Regardless of the work-environment(s) deployed by employers, the chosen work-environment(s) should be of such a nature that it compliments the physical space available, as well as the functions of their employees (Elsbach, 2003). With the ever-increasing popularity of open plan work-environments (Wong, 2013; Reynolds, 2013) it has now become a phenomenon pertaining to a 'landscape setting' where workstations are either: 1) grouped together and equally divided with partitioning, or 2) grouped together with no partitioning (Smith-Jackson et al., 2009). Idealistically speaking, such 'landscape settings' should facilitate communication and improve interaction between colleagues as it offers flexibility and customization based on both organizational needs and employee needs (Maher et al., 2005).

More often than not open plan work-environments benefits employers more than its employees. This sentiment is supported by Lee (2010) who avers that the pragmatic impact of such 'landscape settings' has a very negative influence on employees as less individual control is given to employees over their work-environment. Notwithstanding the above prior research also shows that open plan work-environments also have a detrimental influence on ergonomics. During the early 1990s, in a study by Sundstrom et al. (1991) it was found that since open plan work-environments cultivate an 'open environment', it resulted in disturbing noise levels which, in turn, lead to severe stress as employees could not clearly focus, with the required concentration on tasks at hand. Two decades later Jahncke et al. (2011) posit that open plan work-environments, in general, are still much more noisy than ordinary closed-office work-environments which adversely impacts on the concentration-levels of employees (Zhang et al., 2012). With regard to 'privacy', in the mid 1970s, Mehrabian (1976) mentioned that there is a greater need to more privacy in complex jobs. Even though open plan office-environments evolved over the years and now provide more opportunities to for improving communication between employees (and ultimately resulting in the reduction of costs for employers) it still brings about much unwanted interaction and distractions within the office-setup (Maher et al., 2005). The latter, in turn, also affects that motivation-levels and morale-levels of employees.

Since office space is very expensive, and subsequently also very limited, it is paramount that businesses find customized ways of optimally

utilizing their available space with custom designed work-environments (Vogel, 2013).

**1.3. Understanding the situation at the cases: Engineering firm A and Engineering firm B.** At the time of the data collection, engineering firm A was situated in Stellenbosch and had mostly private offices for its employees. During the period of data collection, it was found that Engineering firm A would be moving to new premises very soon which would majorly comprise of an open plan work-environment.

Engineering firm A employed 105 employees comprising of Support Technicians, System Administrators, Engineers, Software Developers and Business Analysts.

Since the announcement of the move, the morale of employees has been adversely affected, especially with the thought of having a shared office space as opposed to a private office space.

Engineering firm B was situated in Durbanville and had semi open work-environments for its employees. During the course of 2014 Engineering firm B merged with another business and, as a result, now has to deal with more employees operating in the same amount of available space as before the merger.

Engineering firm B employed 30 employees of which Administrative Staff and Consultants.

## 2. Research design and methodology

According to Collis and Hussey (2009) the design of any research study can be categorized through means of its purpose, process, logic and outcome. The research design of this research study was as follows:

- ◆ Purpose: This research study was deemed as descriptive in nature as the authors wanted to describe a certain phenomenon, as identified in the research problem, at hand.
- ◆ Process: The research study fell within both the positivistic research paradigm and the interpretivistic research paradigm as both quantitative and qualitative data were gleaned to help mitigate and/or solve the identified research problem at hand. A questionnaire-tool, consisting of 15 close-ended question and 2 open-ended questions, was used to collect data from respondents.
- ◆ Logic: This research study was deductive in nature as the initial perception of the authors (i.e. the research problem) was formulated by consulting existing literature on a certain phenomenon at hand.
- ◆ Outcome: This research study was regarded as basic research as the authors wanted to 'shed light' on a certain phenomenon at hand; possibly assisting, in a theoretical dispensation, in the potential solving and/or mitigating of a relevant research problem.

This research study was also regarded as survey research (Leedy & Ormrod, 2010) as a certain sample of respondents, stemming from a certain population, was approached to collect data through means of a questionnaire-tool. Non-probability sampling techniques were used to target a total of 50 employees from engineering firms in Cape Town, particularly that of purposive sampling and convenience sampling. The main reasons for the latter are that: 1) the authors resided in Cape Town which made the collection of data more convenient, 2) this study was conducted over a period of 4 months with data being collected by only three field-workers, 3) the authors wanted to obtain rich data pertaining to a certain phenomenon at hand. In total, only 32 respondents responded positively to the disseminated questionnaire-tool.

In addition, all respondents should have adhered to the following delineation criteria before their responses would be regarded as 'valid':

- ◆ All employees had to be based in an engineering firm in Cape Town.
- ◆ All employees had to be either office administrators and/or managers.
- ◆ All employees had to work in a division that consisted of between 1 and 150 employees.
- ◆ All employees had to be between 20 years of age and 65 years of age.
- ◆ All employees had to have between 1 and 35 years of service.
- ◆ All employees had to have at least a certificate, diploma or a degree.

Moreover, relevant ethical considerations were taken into account for this research study.

## 3. Data analysis and discussion of findings

The findings made from the research study are presented under the following headings: 1) general findings, 2) the influence of open office work-environments, and 3) the effectiveness of open office work-environments.

**3.1. General findings.** Respondents were asked an array of questions to ascertain whether they adhere to the afore-mentioned delineation criteria. Firstly, respondents were asked about the current position that they are fulfilling in their respective organizations. The following dispensation emerged in Table 1:

Table 1. The current position of respondents

Value label	Value	Frequency	Percent	Valid percent	Cumulative percent
Administrator	1	26	81.25	81.25	81.25
Manager	2	6	18.75	18.75	100.00
Total		32	100.0	100.0	

Source: Authors' fieldwork (2014).

From the table it is evident that 81.25% of respondents were classified as ‘Administrators’ while 18.75% of respondents were classified as ‘Managers’. In core it was also established that all Managers had some sort of decision-making power relating to their office work-environment.

Respondents were also asked about their highest qualification. A total of 40.63% of respondents had listed ‘Certificate’ as their highest qualification, 25% of respondents listed ‘Diploma’ as their highest qualification and 34.38% of respondents listed their highest qualification as ‘degree’. Furthermore, 12.5% of respondents were between 20 and 30 years of age, while 34.38% of respondents were between 31 and 40 years of age. The remaining 53.13% of respondents were between 41 and 65 years of age.

When respondents were asked how long they have been working at their current employer, a total of 50% of respondents indicated their length of service between 0 and 5 years, 40.63% of respondents indicated their length of service between 6 and 20 years while 9.38% of respondents indicated their length of service between 20 and 35 years.

To ascertain more information on the size of the employer, respondents were asked to indicate the number of employees that were based in his/her division (department). A collaboration of the responses is shown in Table 2 below.

Table 2. The size of the division (department) in which respondents were based

Value label	Value	Frequency	Percent	Valid percent	Cumulative percent
1-30 employees	1	18	56.25	56.25	56.25
31-40 employees	2	1	3.13	3.13	59.38

Table 4. The perception of respondents regarding open office work-environments

Statement given to respondents	Strongly agree	Agree	Disagree	Strongly disagree	Standard deviation	Mean
Ergonomics are important to consider when designing an office space	62.50%	37.50%	0%	0%	0.49	1.38
Open space offices should be assigned according to function, not status	46.88%	53.13%	0%	0%	0.51	1.53
Office space designs impacts how visitors perceive a business	50%	43.75%	6.25%	0%	0.62	1.56
Employees should be involved with the planning of new office space	43.75%	53.13%	3.13%	0%	0.56	1.59
Closed offices offer a sense of security and more privacy	37.50%	62.50%	0%	0%	0.49	1.63
Employees face more health issues in open plan offices	43.75%	46.88%	9.38%	0%	0.65	1.66
The main reason why organizations are moving away from private offices is to save and/or reduce costs	37.50%	53.13%	9.38%	0%	0.63	1.72
Open plan offices allow for better communication and team work and promote collaboration	31.25%	53.13%	9.38%	6.25%	0.82	1.91
Open plan offices support learning and encourage mentoring opportunities	28.13%	53.13%	12.50%	6.25%	0.82	1.97
Employees are more productive in closed offices and less productive in open plan	25%	40.63%	34.38%	0%	0.78	2.09
Average	0.637			1.704		

Source: Authors’ fieldwork (2014).

41-150 employees	3	13	40.63	40.63	100.00
Total		32	100.0	100.0	

Source: Authors’ fieldwork (2014).

In essence, close to 59.37% of respondents were part of divisions consisting of between 1 and 40 employees while 40.63% of respondents were part of divisions consisting of between 41 and 150 employees.

In addition, respondents were also asked to provide more insight as to their current work-environment. A summary of the findings are shown in Table 3 below.

Table 3. The current work-environment respondents

Value label	Value	Frequency	Percent	Valid percent	Cumulative percent
Open plan	1	21	65.63	65.63	65.63
Semi-open plan	2	6	18.75	18.75	84.38
Private office	3	5	15.63	15.63	100.00
Total	32	100.0	100.0	100.0	100.0

Source: Authors’ fieldwork (2014).

From the table above it is evident that 65.63% of respondents were based in an open plan work-environment, while the remaining 34.37% of respondents were either in a semi-open plan work-environment or in a private office.

**3.2. The influence of open office work-environments.** Respondents were asked to rate an array of statements in the form of a 4-point Likert scale (1 = strongly agree, 2 = agree, 3 = disagree, and 4 = strongly disagree). A summary of each statement, along with the responses received, are shown in Table 4 below.

From the table above it is evident that majority of respondents (84.38%) believed that open plan work-environments promote and encourage teamwork. Albeit the favorable latter response, 62.50% of respondents did not prefer to work in open office work-environments while 68.75% of respondents agreed that open-plan work-environments cause conflict between colleagues and 53.13% of respondents agreed that colleagues in private offices enjoy a greater 'status' than those working in open-office environments.

When respondents were asked to elaborate on their answers provided in Table 5, the following was mentioned as justification for their preference for private office work-environments:

- ◆ "... especially if small patterns of behavior or "things" start to irritate you. Or when the other person's work ethics or personality (for example a 'chatterbox') results in you not being able to deliver on your own work ... such a frustration which can affect your own performance" (Employee A).
- ◆ "... because you are in such close proximity together you are often in each other's space, which can cause conflict if not managed ..." (Employee B).
- ◆ "... lowers my concentration and raises my frustration levels ..." (Employee C).
- ◆ "Though I work in an open office work-environment my job allows me to work flexi time ... I do get more done when it is quiet and tend to work after hours because I can concentrate when I am alone in the office" (Employee D).
- ◆ "... private space means fewer interruptions and higher productivity, more privacy, less noise, less gossip, less infectious diseases, can regulate temperature in office, less odours" (Employee E).

The responses above do not necessarily mean that open office work-environments are a "no" for businesses in general. Although there are issues pertaining to privacy, health and safety, among others, it is important to take various factors (e.g. job functions, personalities, culture, etc.) into account before 'grouping' colleagues together in an open office work-environment. The comment made

by one employee encapsulates the crux of the matter at hand:

- ◆ "... you don't always want to be isolated, or alone in an office, learning and finding solutions to issues is mainly based on communication and visually seeing solutions and ideas from co-workers' projects ... open office work-environments can work if managed and set up correctly" (Employee F).

## Conclusion

From the findings made it is evident that majority of respondents agreed that open plan work-environments promote and encourage team work however, most respondents still preferred a private office space as opposed to an open plan work-environment. This can be attributed to the nature of respondents' work, respondents' expected levels of concentration, respondents' need for privacy and the different types of personalities of respondents, among other factors. Furthermore, other justification for seeking private office space include to experience a reduction in noise levels and to reduce the number of physical disturbances by colleagues and/or customers.

In addition, from the research conducted it is evident that respondents regarded ergonomics, job functions, privacy and security as major factors which should be taken into account when management decides on whether to adopt open office work-environments as a formal and/or official work-environment or not.

Lastly, majority of respondents agreed that colleagues in private offices enjoy a greater 'status' than those working in open-office environment (based on their personal perceptions). It is therefore important for both Engineering firm A and B to allocate staff in open plan work-environments if their function(s) can be effectively performed in an open plan work-environment. As an example, teams working on similar projects could be situated close together, while incorporating smallish meeting rooms for private meetings as opposed to meetings which are held in open plan work-environments.

In essence, open plan work-environments can be effective when compared to a private office environment if it is managed appropriately by the management of a business.

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