

Reducing Stress Levels through Landscape; A Study of Senior Staff of the Federal University of Technology, Minna, Nigeria.

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Abstract: The senior staff members of the Federal University of Technology Minna (F U. T) are placed with the enormous task of directing students towards their future aspirations. The accumulated strain caused by the daily activities carried out by the staff members leaves them tired and stressed. This state of mind could evolve and may cause deep psychological problems like high-blood pressure, sleep deprivation and aggressive or anti-social behaviours. The advancement in medical technology has provided various means to cure most of these ailments associated with stress. Although one does not disregard these orthodox and conventional therapies or remedies, rather one sees a possibility to alleviate stress related problems of senior staff by evoking the senses in an environment whose visible features have been modified through landscaping. Pertinent information collected from the University's academic planning office showed that the staff/student ratio was higher in most departments than the required standards stipulated by the Nigerian Universities commission (N.U.C). This indicates a high probability that senior staff members are overworked. Results obtained in the field work provided interesting results. The responses provided by staff tallied significantly with general data provided by researched sources and the conclusion arrived at shows that introducing a carefully planned landscaped environment designed to incorporate selected plants and features will have restorative effects on staff members by stimulating their emotions positively thereby alleviating the incurred stress levels.

Keywords: evoking, landscaping, orthodox, restorative effects, strain, stress,

I. Introduction

It is virtually impossible not to experience stress in the various facets of an adult's life. Unfortunately, finding a means to quantify stress and providing an objective means or comparison is very difficult especially when the numerous signs and symptoms of stress could be explained by medical professionals to be caused by other factors.

We all encounter stress in our day to day routines and activities. However, how we react to stress differs from person to person. Daily activities and routines may sometimes pose as challenges thereby, creating obstacles that may seem overwhelming at times. When these obstacles become too much to bear, we then say we experience stress.

Stress becomes unhealthy only when in excess. In little measures it can be a beneficial motivator to push you to do your best, stay focused and alert. It prepares you for presentations and the days' work. In excess, stress can become a threat to our physical and emotional well-being.

Stress is psychological and physiological response to events that upset our personal balance in some way (Ellen. *Jet ai*, 2007). The body responds to stress whether physical or emotional in a process known as "fight or flight" response *ibid*. A racing heart, breathing faster and muscle tension are the body's way of responding to stress.

This response, which is said to be biological in nature, is meant to alert, protect and support us. It helped our Stone Age ancestors survive life or death situations. The modern man rarely faces these life or death situations in this day and age. What we face is more psychological in nature. Unfortunately, the human body does not know this.

Whether we are faced with a pending dead line, an argument with a friend, or how to pay for accumulated bills, our bodies respond by going into automatic over drive *ibid*.

When this occurs frequently, our bodies may be running on stress a good portion of the time. This then creates a problem because, the more the stress response is activated, the harder it becomes to shut down. Thereby creating a situation where, instead of mellowing down after the crisis has passed, the hormones, heart rate and blood pressure remain elevated.

This paper is aimed at alleviating the stress levels of senior staff members and shows that the resultant strains and pressures can considerably be reduced by the restorative effects of a landscaped environment.

II. Conceptual Frame Work

According to S. Smith and J. Pergola (2002), stress is the body's response to demands and pressures; these demands, commonly called stressors include life changing events like, the birth of a child or the death of a loved one. They also include long term strains like, living under unemployment or the daily pressures caused by work. The demands may even include occasional strains like servicing a car or caring for a sick child. Stress should be handled to avoid conditions that may be detrimental to health therefore, knowing the signs and symptoms of stress and how to recognize it in one self is very important however, the specific signs and symptoms may vary from person to person. The following table (Table 1) lists some of the most common warning signs of stress.

TABLE 1. STRESS WARNING SIGNS AND SYMPTOMS

PHYSICAL	EMOTIONAL	MENTAL	SOCIAL
Head aches	Anxiety	Forgetfulness	Isolation
Teeth grinding	Frustration	Poor concentration	Loneliness
Fatigue	Nervousness	Low productivity	Lashing out
Insomnia	Depression	Negative attitude	Clamming up
Back aches	Worrying	Confusion	Lowered sex drive
Stomach problems	Tension	No new ideas	Nagging
Colds	Mood swings	Lethargy	Fewer contact with friends
Neck aches	Easily discouraged	Boredom	Using people
Shoulder pains	Crying spells		
Increased use of drugs	irritability		

Source: NASD Review: 0412002

However, it must be noted that some of the signs and symptoms of stress can also be caused by medical and psychological problems. These warning signs and symptoms should not be taken lightly as, recent research have shown that anywhere from 60 to 90 percent of illness is stress related (Ellen. J *et ai*, 2007). The damaging effects of stress can include damage to the cardiovascular system, reduce the body's immunity to diseases, affect the digestive system, create difficulty to conceive and can even affect a child's ability to grow. Stress may also cause or aggravate many medical conditions. Some of them include: Diabetes, Ulcer, Asthma, Obesity, Infertility, Heart disease, Skin problems, chronic pains and Migraines.

III. Landscape and stress

Landscaping refers to any activity that modifies the visible features of an area of land, including but not limited to: Living elements, such as Flora or Fauna, Natural elements such as Land forms, terrain shape and elevation, or bodies of water, Human element such as structures, buildings, fences or other materials and abstract elements such as lighting conditions (Landscape architecture, 2006).

Very few people will deny the claim that being outdoors in parks and green areas is good for human health. According to Ulrika and Ian-Eric, (2005), their results show a significant relationship between frequency and length of stays in urban green spaces and frequency of perceived space. The result showed that the more often and longer you visit a park or garden, the fewer occasions of stress you suffer. The findings also showed that this phenomenon is independent of sex, age, or socioeconomic status.

Landscaping was used in the past as a therapeutic instrument before the advances in medical technology. However, recent events in alternative medicines have once again, introduced the use of gardens as a healer. Research carried out to promote the therapeutic benefits of gardens found that viewing natural scenes or elements foster stress recovery by evoking positive feelings, reducing negative emotions, effectively holding attention interest, and blocking or reducing stressful thoughts (Ulrich, 2000 in SULIS, 2006). It was also discovered that when viewing vegetation as opposed to urban scenes, test subjects exhibited feelings of being wakefully relaxed.

Therefore, designs must follow certain principles to achieve the necessary results. Since the problem being solved is the issue of stress, the landscape has to be simply designed, because, a complex landscape will add to the stress. It is also very essential that the senses are stimulated by a design that would include a variety of form, texture, seasonal interests and colour. This aids in distracting its users from the burdens that they bear. Focal points should also be provided to create emphasis thereby, providing a means for distraction from daily routines. A smooth blend from one area of the landscape to another by creating sequence should be created as sudden changes can be very disturbing. In general, elements on the landscape should not be totally contrasted from one another.

The use and type of soft landscape element must be given some thought

especially in regards to plant selection. Plants should be selected that have evocative meanings to the users being served. Plants that engage the senses should be used; using a variety of textures, scents, colours, as well as plants that make pleasant sounds as wind rustle their leaves.

Engaging the senses using colour, smell and sound

Colour sensations affect the unconscious mind and most people are unaware of the great influence colour has on them. A person may be unconscious of the colours around him and yet be profoundly affected by them in regards to mood, temperament and behaviour (New standard Encyclopedia, 1984). There is need to point out the difference between the symbolic effects of colour and the psychological effects of colour, the latter having primary bearing on this paper. Colours have been known to portray symbolic meanings which are by no means universal; for example black is the colour for mourning in Western countries but parts of Asia associate mourning with white.

Physical reactions can be stimulated by colour sensations. Colours derived from blue- the "cool" colours have a sedative effect and have proved calming to highly nervous people, however, less excitable people may become depressed in surroundings of strong blue and have their spirits lifted by "warm" colours- those derived from reds and yellows. The effects of certain colours on human emotions are shown in Table 2 below.

TABLE 2 PSYCHOLOGICAL EFFECTS OF CERTAIN COLOURS

Red	A warm colour; it is the colour of energy, excitement and vitality, Red, used in a large space, can be welcoming, energizing and invigorating, but it can radiate aggression. Red in small space, can be cozy intimate, or claustrophobic.
Orange	Orange promotes feelings of excitement, can make you feel vibrant, improves appetite, and enhance social interaction
Yellow	Yellow is a warm colour and the colour of intellect and it is used for mental stimulation, it will help you think quicker. It is also the colour of clarity and insight. It is warm and cheerful and stimulates activity, communication, circulation and appetite. However it is not a good colour for nery people easily agitated.
Green	Green is the colour of harmony and balance. It is good for tired nerves and it helps with the heart area. It will balance the emotions and bring about a feeling of calmness. Green is a good general healing colour. Green is a restful colour so will aid sleep.
Blue	Is the colour of truth, serenity and harmony, by helping to soothe the mind. Blue is good for cooling, calming, reconstructing and protecting. Blue, if diluted to a lighter hue, can reduce stress and relieve tension. Is a colour of peace, tranquility and wisdom and can generate a sense of well-being.
Purple	Purple is good for mental and nervous problems. It will assist very well with rheumatism and epilepsy. Purple is a calming colour and can comfort and relive strain.
Pink/Mauve/ Lavender	The colour's of equilibrium. Lavender can help with spiritual healing and is used as a tranquillizer. All can aid sleep. Lavender is the colour of replenishing and rebuilding, whilst pink and mauve are restful and calming. Being a tint of red may be considered an energizing colour, pink is the most calming. Being a tint of red, pink also affects us physically, but it smoothes, rather than stimulates. (Interestingly, red is the only colour that has an entirely separate name for its tints.
White	Regarded as restful and clean, but too much will appear stark. White symbolizes light, triumph, innocence and joy and it gives the effect of enlarging a space and creates an atmosphere of coolness.
Black	Black represents an absence of light and colour, but can be a deep and restful contrast. It is sophisticated, elegant, dramatic and formal and gives a feeling of solid strength. It can be powerful, aloof and intimidating.

Smell is one of the chemical senses, the other being taste (Tim, 2007). The environment is surrounded by information which is sampled by these senses. These senses are continuously the quality of air we breathe which alerts us to potential dangers like smoke as well as informing us on other relevant information like the presence of food, scents or another individual.

It is a common notion that smell affects emotion and mood, however, research carried out by Bone and Ellen, (1999) had often reported effects of smell on emotion and mood as most likely to be rare, much more common are minor mood effects and mild effective states (*ibid*). The mood effects are likely to parallel the nature of the odour. Pleasant odours give rise to pleasant mood states while unpleasant odours give rise to unpleasant mood states.

Sound can be soothing or disturbing depending on the view point of the listener. What may be relaxing

to an individual may be annoying to another. Unwanted sounds are often regarded to as noise and may cause annoyance. The effects of noise may cause psychological effects like aggression, stress, anxiety and even high-blood pressure. However, sounds may also be soothing and have restorative effects on people. A general survey will need to be done to determine what sounds are preferred to a group of individuals.

IV. Research Methodology

It was stated earlier that there is a difficulty to quantify stress since its symptoms can be explained by a range of other medical conditions. However, a number of means can be used to ascertain whether senior staff members of Federal University of Technology Minna are under some form of stress. Data was collected from the academic planning of F.U.T Minna in 2008 to ascertain the staff/student ratio. The data provided a means for comparison with the standard provided by the Nigerian Universities Commission (N.U.C) on student/staff ratio. According to the N.U.C guidelines on staff/student ratio, a ratio of 1:20 shall apply (*Benchmark and minimum standards*). The data collected from the academic planning office showed some very interesting results. The figures collected were interpolated and the results were tabulated as shown in Table 3

TABLE 3. STAFF STUDENT RATIO IN F.U.T. MINNA.

	SCHOOL/DEPARTMENT	TOTAL NO OF STAFF	TOTAL NO OF STUDENTS	STAFF/STUDENT RATIO
1	S.A.A.T			
	Animal Production	15	395	1/26
	Agric, economics	15	547	1/37
	Crop production	13	209	1/16
	Food science	5		
	Soil science	10	131	1/13
	WAFT	11	126	1/12
2	S.E.T			
	Architecture		427	1/18
	Building	12	425	1/35
	Estate Management	18	769	1/43
	Land survey	11	257	1/23
	Quantity survey	15	534	1/36
	U.R.P	17	539	1/32
3	S.E.E.T			
	Agric Engineering	16	615	1/38
	Chemical Engineering	31	774	1/25
	Civil Engineering	21	720	1/34
	Electrical Engineering	22	906	1/41
	Mechanical Engineering	25	773	1/31
4	S.S.S.E			
	Biochemistry	12	308	1/26
	Biology	9	212	1/24
	Chemistry	18	236	1/13
	Geography	19	465	1/25
	Geology	14	528	1/38
	I.T.E	20	261	1/13
	L.I.T	10	467	1/13
	Maths computer	26	1024	1/48
	Microbiology	11	294	1/39
	Physics	22	743	1/27
	Science Education	16	272	1/17

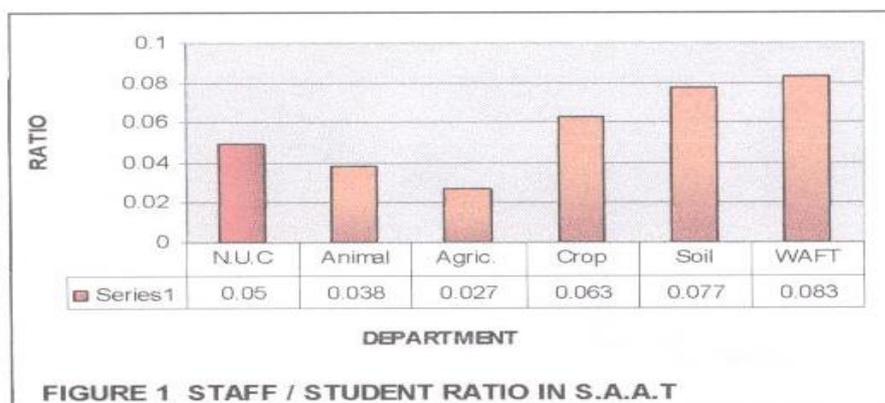
Source: Author's Field work 2008

The data clearly shows that, a good number of departments do not comply with the standard given by the N.U.C (staff/student.1/20). This clearly shows that there are more students apportioned to individual staff members. Therefore, staff members are obviously working a great deal more than they should normally work if, the

required standards were being adhered to. An exhausting workload is caused as a result of work stressors and can be a cause of chronic stress which is a perpetual stress that wears on people continuously (AP.A, 2004).

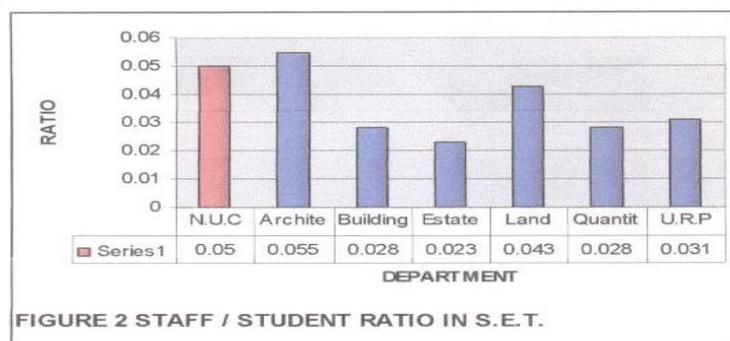
V. Data Analysis And Research Findings

The data collected was also used to provide a pictorial representation that will show clearly the ratio between staff and students in the various departments in F.U.T Minna. Figure 1 clearly shows the results derived from S.A.A.T.



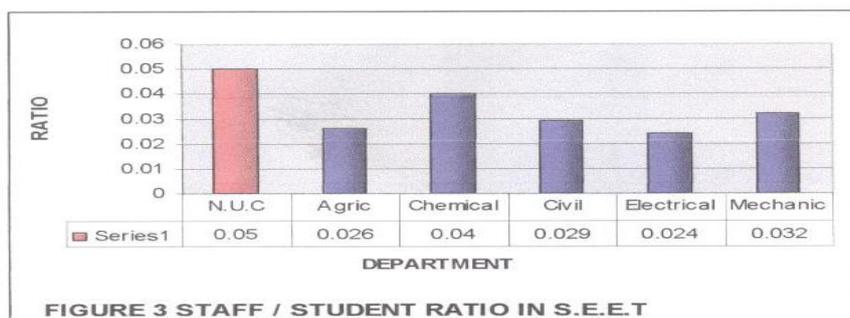
The data shows that two (2) departments in S.A.A.T fall below the required N.U.C standard however; three (3) departments have more than the stipulated requirement. This is because, fewer numbers of students are being short listed into the school of Agriculture and Agricultural technology. The departments of Animal production and Agricultural economics have a larger number of students gaining admission into S.A.A.T. hence, the resultant increase in staff /student ratio.

The results derived from the school of environmental Technology (S.E.T) are shown in Figure 2 below.



The results clearly show that only the department of Architecture has a staff /student ratio of 0.055 or 1/18 which is below the required ratio of 0.050 or 1/20 as stipulated by N.U.C. The other departments do not meet this required standard probably due to the increased numbers of students. Past experience has shown that although the department of Architecture is the most sort after course in the school, it is the hardest to get into and therefore students are pushed to other departments with lower entry requirements. This could be the probable cause of the reduced staff / student ratio in the department of architecture.

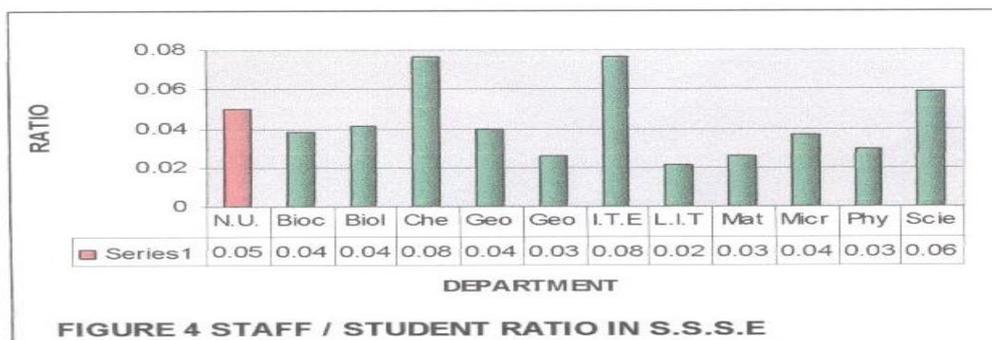
The results from S.E.E.T have been pictorially represented and shown in Figure 3 below.



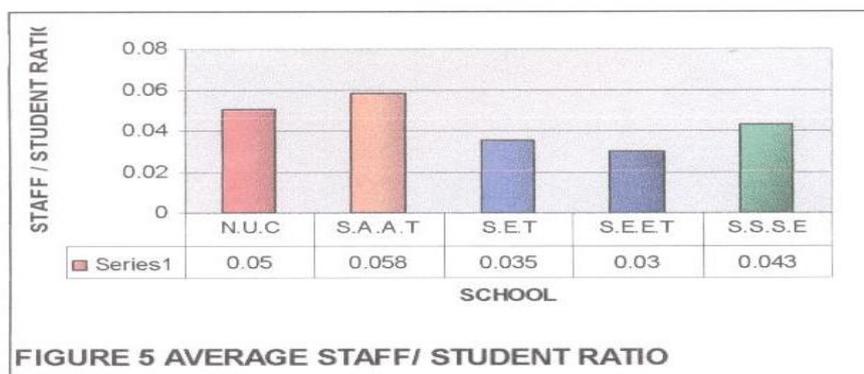
The data shows that all the departments in the School of Engineering and Engineering Technology (S.E.E.T) do not meet the standard N.U.C. requirement. The departments of Chemical

and Mechanical Engineering however, show a lower staff /student ratio nearing the required standard given by N.U.C. Table 2 clearly showed that this decrease in staff /student ratio is due to a higher number of staff employed.

The data collected from the school of Science and Science Education (S.S.S.E) has been represented in Figure 4 below.



The figure clearly shows the departments of Chemistry, ITE and Science Education as the only departments who have their staff / student ratio higher than the N.U.C standard. It can be seen from Table 2 that the cause of this is the lower population of students in these three (3) listed departments. This is the cause of the present significant reduction in the staff / student ratio. The various results from the Figures above were used to get an average staff/student ratio for the respective schools. This was done to determine which schools have fallen short of the standard established by the N.U.C. The results are shown in Figure 5 below



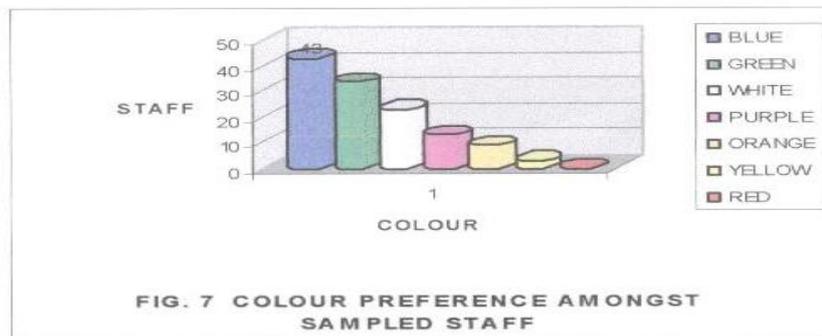
The results clearly show most that of the schools fall below the bench mark of 0.050 (1/20 Staff/student ratio). The only school that meets the required standard is the School of Agriculture and Agricultural Technology (S.A.A.T) The cause of this is the considerable low numbers of students seeking admission into these departments. These departments are looked upon as for the less privilege students; creating a stigma as though students who gain admission to these departments are dull or unserious. This school is therefore less likely to be affected by work stress because the students are few can be handled by the present staff.

Staff reaction to their environment

A landscaped environment should evoke positive reactions in man; therefore, one sees a possibility of stimulating positively the minds of senior staff members of F. U.T. Minna through landscaping, in order to reduce the negative effects of stress. To explore this, a questionnaire on the effects of the environment on staff was prepared and administered. A total of ninety (90) questionnaires were distributed to determine staff response to certain situations. The method adopted tries to use landscaping to reduce the effects caused by stress. This is achieved by using the general principle of landscaping and the careful selection of landscaping elements- especially soft landscape elements. Using a general knowledge of plant species and selecting appropriate plants with beautiful colours, scents and produce beautiful and seemingly calming sounds to create the required effect.

The proposal uses three basic elements perceived by the human senses. These elements are planned for, and incorporated into the landscape thereby providing an ecosystem within the environment. These basic elements are: colour, scent and sound which are perceived by the sense of vision, smell and hearing respectively.

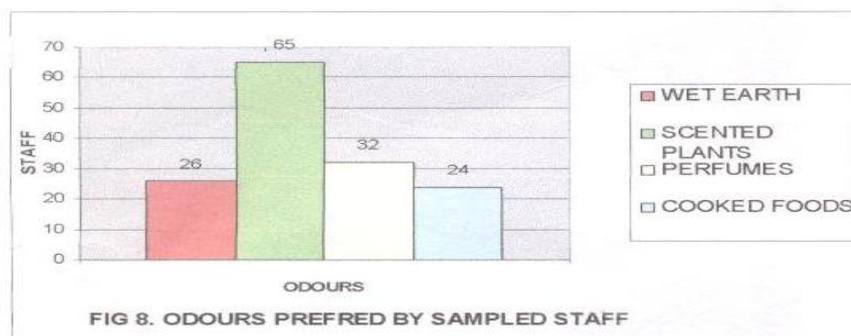
The results taken from the sampled staff on their response to colour, smell, and sound preference are illustrated in Figure 7 below.



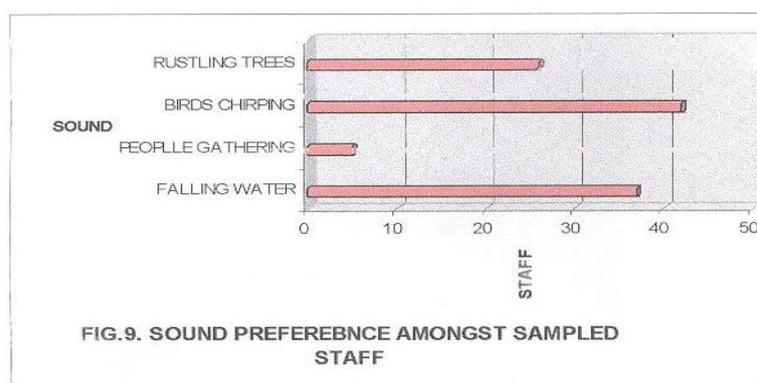
The results clearly show a strong correlation to data collected from researched sources on the psychology of colour. Most chosen colour was "Blue" a cool colour. The probable significance of this is its calming effect. The colour red was not chosen by staff members probably due to its psychological effects (red being an energizing colour, and a colour of excitement). The probable explanation as to why the colour red and yellow were least chosen is that senior staff members are easily prone to stress caused from a number of factors which include work, relationships or marital issues or even as result of debts or bills. These colours have the psychological ability of mental stimulation as in the case of "yellow" or the ability to create excitement or radiate energy-caused from the colour "red". People under excess stress should not be over excited as this will cause an increase in heart rate, increase breathing rates and tense muscles. The effects of which may have negative results on health, creating medical conditions like high-blood pressure and anxiety.

The landscaped environment with its array of plant forms, texture and colours is also designed to stimulate the sense of smell and sounds. This can be achieved through the selection of specific plants and features.

The sense of smell is considered to have personal effects on individuals. However, it is believed that smells are only responsible for minor mood effects and mild effective states (*Bone and Ellen, 1999*). The mood effects are likely to parallel the nature of the odour. It was essential to collect data from sampled staff on preferred smells. The results are shown in Figure 8.



The chart shows that the scents perceived from "scented plants" are generally preferred by a larger number of staff to stimulate positive feelings. Since the effects of landscaping on human emotions has been clearly stated earlier, it then provides a basis to introduce landscaping as a therapeutic instrument in relieving stress levels of staff. There was also a need to determine staff reactions to yet another element perceived by the senses in order to validate the need and use of landscaping in F.UT Minna as a stress relieving tool. Therefore, data was also collected from staff on their preference to certain everyday sounds. Sounds are often known to have effects on people however, sounds affect people in different ways. Some people may find a particular sound soothing whereas other may find similar sounds disturbing and may attribute these sounds to noise. These was therefore a need to discover what sounds were most preferred by senior staff members. The results were represented in figure 9.



The result show that the most preferred sounds perceived by senior staff are caused by “birds water” and “rustling trees” The significance of this is that, provision of a landscape environment will be welcome by senior staff of the University because; these sounds are part and parcel of a properly landscape environment.

VI. Conclusion

Landscaping practices have been going on over centuries with the main essence of creating an aesthetic value; a backdrop to an existing structure. However landscaping can have deeper effects on the sub-conscious mind. The effects of landscaping and the effective use of landscaping principles can be used to create a visually stimulating and relaxing atmosphere which will have psychological influences in curbing the effects of pressure activated stresses. The proper use and selection of plant species can have these required effects. It has been shown that human senses can be stimulated to a certain degree by colours, sound and smell. These colours, smells and sounds can be derived from landscaping. It is then safe to suggest that landscaping can be used as a tool to ease the pressures caused by stresses and can have the resultant effect to induce relaxation.

The results from the field work revealed that a landscape environment with its array of plants and features will be welcomed by staff members (Figure 6). The results also showed that colours that radiate energy or stimulate mental processes like those derived from shades of red or yellow were not preferred by majority of staff but colours that stimulate a state of calmness like those derived from shades of blue and green were generally preferred (Figure 7). This provides a basis for planning and selecting plant species thereby reducing those species of plants that produce leaves or flowers with "warm" colours and incorporate those plants that produce leaves and flowers with "cool" colours. The results derived from trying to establish preferred scents and sounds amongst staff also revealed interesting results (Figure 8 and 9). The results clearly showed that the most preferred scent was the one derived from scented plants whereas the sounds most soothed by, are those caused by the sound of rustling trees, falling water and the sounds of chirping birds. These sounds and scents can be felt within a properly landscaped environment therefore this clearly means that a properly designed and planned landscaped environment will contain all the necessary features to stimulate positively the minds of staff members thereby alleviating stress levels of staff members who come into such an environment.

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