Architectural Design Model for office interior to suit Personality types and to enhance Productivity

Zara Poursafar, Lewlyn L R Rodrigues, Sriram K V

Abstract*: *Preferred colour choices and pleasant lighting conditions makes the makes the office ambience conducive to work. Reaction of individuals to their ambience differ based on their personality types. Awareness about employee's personality types will help the designer develop appropriate strategies for the office interior environment. These strategies and plans must meet the employee's preferences of colour and lighting, particularly in their workstation. This study is based on the theoretical and empirical works. The study revealed the employee's preferences about architectural elements – especially colour and lighting- to improve the Productivity in office atmosphere. The findings from this part were categorized based on four Personality groups as defined by Myers Briggs Types Indicators (MBTI). The conclusions of the study signified that there are preferences for each personality group in case of colour and lighting. Every employee in all personality groups identified a combination of architectural elements in his/her individual work station and mentioned that their productivity and quality of life in this desired work environment will significantly improve.

Index Terms*: *Architecture; Personality; Colour; Lighting; Architects' Offices; Productivity; Personality groups; Myers Briggs
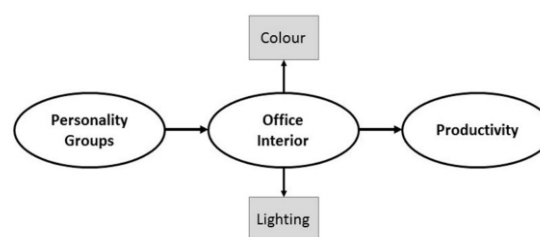
I. INTRODUCTION

Work place environment contributes to employee's emotions, wellbeing, comfort and a sense of belonging [1]. A good interior motivates people to work better. Office spaces impact people's interaction with others, gives a sense of value and meaning in life [2]. Hence it is imperative to create spaces with interiors that will match individual's personality traits. Office employees work quite hard to connect with the environment and other co-workers. In this connection, personalization and personal control over the workplace would help to create a psychological connection to workplace

Dr. Zara Poursafar*, Assistant Professor, Islamic Azad University of Fouman & Shaft, Guilan, Iran.

Dr. Lewlyn L. R. Rodrigues, Professor, Department of Humanities and Management, Manipal Institute of Technology, Manipal Academy of Higher Education, India

Dr. Sriram K.V*(Corresponding Author) Associate Professor, Department of Humanities and Management, Manipal Institute of Technology, Manipal Academy of Higher Education, India

and enhance the occupant's satisfaction along with Productivity. In the Architect's Offices, personalization with respect to architectural elements makes work space more familiar and will eventually extract favourable responses from the architects. As indicated by [3] personalization is not only about the temporary items, it rather refers to the application of worker's preferences regarding architectural features of the workplace.

This study focuses on the architects' offices. Architects' offices are places with creative minds working together to create better ambiences. The work place selected for this study provides services that includes drawing, planning and consulting in for the design and construction of buildings. The success of office design depends on how to find solutions for the problems inside the spaces, including environmental and psychological factors. Architects and designers should take into consideration the psychological requirements of employees, besides the functional requirements of these buildings. The objectives of this study are

I. To develop a design model with respect to architectural elements (colour and lighting) and employee's personality to enhance Productivity.

II. To identify the qualitative and quantitative factors

involved in office Productivity.

Figure 1 shows the research framework, which focuses on connection between personality groups and office interior design to improve the level of Productivity in the individual workstation.

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II. LITERATURE REVIEW

There are numerous factors that govern a person's efficiency and happiness at the office atmosphere but, psychologists have acknowledged that physical environment has a significant influence on the employee Productivity and satisfaction [4].

Employees are very sensitive to space and frequently unhappy with their workplace psychological and physical conditions [5]. The physical condition of the Architects' offices need careful consideration due to the fact that the space users are fully aware about the design specifications and acknowledge the quality of space as well. Thus their workplace will be more satisfactory if the features come from their own interests.

Two important elements of design namely colour and lighting are the focus of this study. Colour is an important element in the environment as it promotes human adaptation to surroundings and enhance spatial form [6]. According to Gifford et al., [7] lighting influences work efficiency particularly when it is not properly lit or improperly placed or has inappropriate colour. The earlier research on the consequences of lighting mainly targeted on functional aspects like exposure and visible convenience. Earlier in 1960's and 1970's scientists and designers of light began to probe into lighting and its effect on people's subjective opinions of the environment around them [8].

A previous study by Mahnke [9] colour can influence people's feelings, thoughts and choices. The study further concluded that colour has influence on the individual's views and vary their subjective opinions regarding their physical surroundings. In addition, Guest & Laar [10] reported that colour will make spaces more attractive, pleasant and efficient, when that is linked to the preferences of occupants of the spaces. Kwallek [11] did a study to find out the difference in productivity of workers under different lighting conditions. He concluded that colour alone did not seem to have an impact on productivity by individual's perception to those colours matter. Kwallek et al., [12] did a comprehensive study on the workers' productivity under different interior colours and concluded that the effect of colour on individual depends on his stimulus screening ability and the time of exposure to interior colours. Kamaruzzaman [13] in a study in Malaysia concluded that the designers in Malaysia lack awareness about colour combinations in office spaces. They felt that this affects the productivity of the individuals. Öztürk et al., [14] is of the opinion that chromatic colour spaces do offer a better environment, pleasant feeling and satisfaction than an achromatic interior. Savavibool [15] in their review paper concluded that there is a strong association between colour and performance. In fact several previous studies in this area have revealed a strong association between colour and emotions. In a research [16] conducted experiments among college students and proved that different colour evoked different emotions. These studies did not consider individual personality types and its impact on productivity.

The present research is carried out to investigate the employees' preferences in architects' offices and to create a proper workplace suited to their Personality types. Personality assessment for personnel selection has become significantly popular for the organizations, since personality is one of the factors which should be considered for having a successful business [17]. As indicated by Gough & Bradley [18] it helps to classify individuals according to their similarities and differences and provides a basis for understanding their actions and performance. The Personality assessment used in organizations must have adequate reliability and validity [19]. The present study applied MBTI Personality model since the reliability and validity of this model is tested by [20]. Although many researchers have

clearly investigated the architectural elements and the psychological effect in work environment, there exists a gap in the research with respect to the theories related to design of interiors and psychological issues, since the personality consideration has been completely neglected in studies of interior design.

III. METHODOLOGY

The method of this research is qualitative with implications being drawn from interpretation of qualitative data. The data was sourced through a self-administered survey questionnaire to study the respondents' preferences and also their productivity on the research issues that pertain to the model under question. The subject population included the employees classified according to the employee's population per office.

The representative random sampling technique was used to collect the data regarding the employees' preferences and to evaluate their existing work environment. The survey questionnaires were distributed at the offices of architects in Iran and India and feedback was obtained. Table 1 shows the distribution of the questionnaire in the Architects' Offices in both the countries, categorized according to the number of employees.

Table 1, Organizational Demographics

Country	Type of offices (according to number of employees)			Total
	N<5	05-Oct	N>10	
Iran	4	7	2	13
India	7	6	2	15
Total	11	13	4	28

The aim of research is to establish relationships between the various constructs of the model and thereby make suggestions to enhance the productivity. The questionnaire administered for this study had four parts:

1. The demographic information of the employees, gathered from 100 employees,
2. The standard questions of Myers-Briggs scale, identifying the Personality types of the employees,
3. Respondents' preferences in terms of colour and lighting in form of the 'multiple-choice questions.
4. Questions in this part are about their existing work environment with respect to productivity.

IV. FINDINGS

The first part of the questionnaire is concerned with the demographic data of the respondents. According to the findings from this part, most of the respondents are Indians (55%). Around 54% of the respondents were male and 52% of the respondents were between 25 to 34 years old. About 57% of the respondents had Bachelor's degree (UG) in Architecture.

The second part of the questionnaire incorporates standard questions of Myers-Briggs model to identify the respondents' Personality types, in association with research objectives. This study focuses on the Myers Briggs model of Personality. According to Myers et al., [21] the model is based on four preferences:

Dominant Intuitive Types (DIT)	INFJ, INTJ, ENFP, ENTP
Dominant Sensing Types (DST)	ISFJ, ISTJ, ESFP, ESTP
Dominant Thinking Types (DTT)	ISTP, INTP, ESTJ, ENTJ
Dominant Feeling Types (DFT)	ISFP, INFP, ESFJ, ENFJ

Table 2, Personality groups (Source: [26]Jung, 1971)

E or I (Extraversion or Introversion) T or F (Thinking or Feeling) S or N (Sensing or Intuition) J or P (Judgment or Perception)
There are 16 distinct Personality types, which are resulted from combination of the first letter of preferences in each class. Table 2 shows these Personality types categorized in four group.
According to the findings of the study in this part the populated Personality Types are DTT (43), followed by DST (29) and DFT (20). DIT with the frequency of 8 is the rarest group in the sample.
The third part of the questionnaire concerns with the respondents' preferences in case of colour and lighting and collected their selection and choices regarding colour contents and lighting conditions in their individual workstation. The variable of the study in this part summarized in Table 3.

Content	no. of questions	Variables
Colour	5	Colour preferences (most preferred (C_1) and least preferred (C_2)) , Scheme preferences (C_3), Neutral colours (C_4), Colour combination (C_5)
Lighting	2	Type of lighting (L_1), Colour of light (L_2)

Table 3, Architectural variables of the questionnaire

Finally in the last part of the questionnaire the respondents were asked about their existing working environment with consideration of productivity improvement. The survey is conducted based on qualitative approach and the perception-based data was gathered from the respondents to determine the qualitative parameters involved with the Productivity from the architects' perspective. Questions in this part were concerned about the physical and non-physical aspects of the employee's current working condition. Important variables in this part are working hours, completion status and non-completion of the assignments in working hours and their reasons (P_1) - to eliminate them in case of physical problems-, most effective elements in their current environment (P_2) and improving their Productivity by making changes in their physical environment (P_3). The word of Productivity here, refers to the measurable output of their job.

The overall findings of the study in the third and fourth part of the questionnaire lead to build and determine the research model for each Personality group, which is presented in Figures 2 to 5.
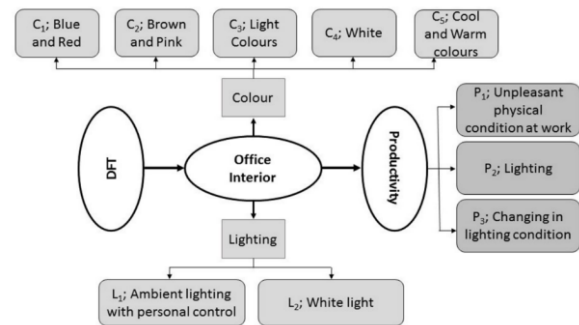

Fig 2, The design model for DFT group with respect to architectural elements and Productivity

The colours considered in this investigation are a set of 11 basic colour words, Red, Yellow, Green, Blue, Orange, Purple, Pink, Brown, Grey, Black and White [22]. According to research findings in the colour section, Blue and Red colour are the most favourites for DFT groups, since they chose the combination of warm and cool colours for their work setting. Light colour scheme was reported as a favourite of the preferred colour scheme in the survey. This study hypothesized that employees working in the light colour scheme would experience greater job satisfaction and achieve higher productivity. Other options in this part were bright, dark and dull colours scheme. Respondents in the Architects' Offices also highlighted white colour as their favourite neutral colour, in comparison with Black and Grey colour.
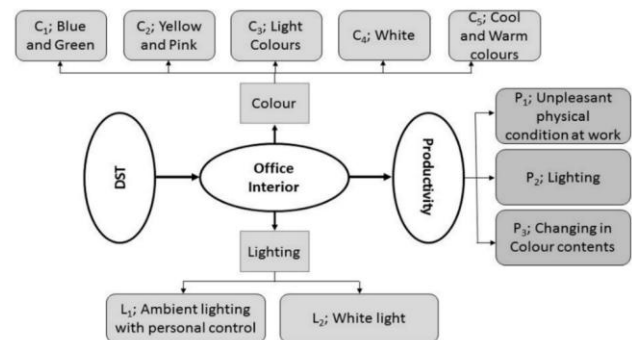

Fig 3, The design model for DIT group with respect to architectural elements and Productivity

As per the above model (Fig. 3) Blue and Green were the most favourite colours for DIT group. Green and Blue have calm effects on the environment, but incorporating too much of these two colours might reduce the Productivity of the employees. Incorporating a small range of Orange, Red or Yellow in this environment would improve the energy circulation and increase Productivity [23].

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Light colour schemes are more preferred in this group, which is the result of adding white to the colour's hue. Hue is the basic name of the colour. Red, Yellow and Blue are primary hues. Adding White will create a tint making the colours lighter and more airy like pastels. Adding Black will make colours dull and muted. White is the most favourite neutral colour for this group. Thus combination of Blue and White may help to create the pleasant environment for this group. According to [24]using neutral colours, especially the White colour to a great extent inside spaces with colours of the warm hues creates a kind of activity and excitement inside these spaces.
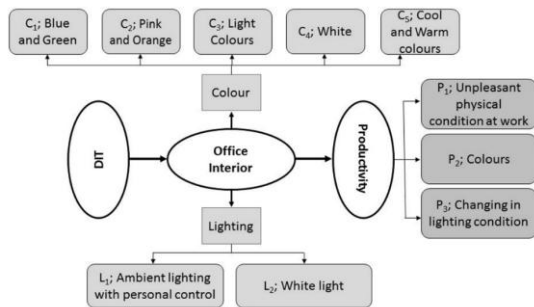

Fig 4, The design model for DST group with respect to architectural elements and Productivity

According to this model, with respect to the choice of colour, respondents in DST group like Blue and Green more than other colours and also dislike Yellow and Pink, in their work environment. Hence the presence of this colour in their work environment should be minimum to eliminate the negative effects on the employee's mood and feelings. The respondents in the DST group followed the DFT and DIT groups for the colour scheme and neutral colours preferences they picked out 'White' among Black and Grey as their favourite neutral or achromatic colour, which literally means a colour 'without colour'. They also have a strong agreement on light colour scheme over the bright, dull and dark.
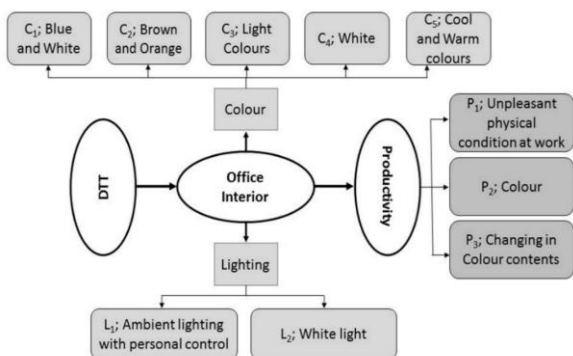

Fig. 5, The design model for DTT group with respect to architectural elements and Productivity

As shown in Fig. 5, most of the employees in the DTT group selected Blue and White as their most favourite colour, and they would like to live their work-life in an environment coloured by dimension of Blue colour combined with White. Brown and Orange are the least favourite colour for this category and it has to be minimum in their work space.

The DTT respondents preferred 'White' colour in the section of neutral colours and they like to work in an environment, which was painted with the combination of warm -Red, Yellow and Orange- and cool colours- Green, Blue and

Violet-. 'Light colour scheme' was the favourite colour scheme for this group among the survey's options.

There are many factors relevant to lighting adjustment in any room, like colour temperature, colour rendering, level of luminance, glare, reflectance of the surfaces, etc., but all these factors were through the standards and electrical policies. The large percentage of occupants in the Architects' Offices preferred 'Ambient Lighting' especially with the advantage of personal control. It gave the occupants the ability to control their own light level and distribution through work hours. 'White' colour of light was also more preferred by the respondents in comparison to Yellow and Blue. According to Figures 2 to 5 unpleasant working condition is the strong reason for non -completion of their assignments. This result shows most of the respondents were not satisfied with their existing working environment. Lighting has a great impact on Productivity for DFT and DST groups. For DIT and DTT groups this effect was coming through the colour contents. In an overall evaluation, 'changing in colour of work environment' for DTT and DST groups was an important issue in office interior design which had the greatest impact on their Productivity improvement. For DFT and DIT groups lighting level and quality was a major factor involved with their Productivity.

Fig. 6, shows arrangement of the favourite colours in Architects' Offices interior, according to the respondent's preferences.

Fig. 6, Popularity of colours in the respondent's view (N=100)

Besides the parameters that were discussed during these model developments, there were some other factors, which influence the Productivity of any organization including the Architects' Offices.

Productivity is generally identified as a percentage of a quantity assess of output to a measure of input utilized in production [19]. As outlined by [25] Productivity measures, including multiple factor Productivity, labour Productivity or investment Productivity are specifically essential in the financial and statistical evaluation of a state.

Labour Productivity = volume measure of output / measure of input use

This study focuses on Productivity of employees in their individual work station which can be defined as a variety of labour Productivity.

According to data gathered from the survey, there was a list of factors in two forms of qualitative and quantitative, which directly affected the input sector of Productivity;

a) Materials (Quantitative factor); in the Architects' Offices material refers to all drawing material like pens, sheets and professional drawing accessories. Accesses to latest technology, new and modern software and high speed and quality devices are other items in this category, which can have an effect on quality of assignments.

b) Manpower (Qualitative factors); there are other issues in the work area, which does not appear in the form of numbers, like motivation, training, team work engagement, communication, involvement, satisfaction, layout and planning. These factors are controlled by the management, thus can be assumed as job inputs.

c) Environmental features (qualitative and quantitative factors); layout & planning and also space quality can be placed in this category. Quality of work environment, particularly physical environment as the main focus of present study influences the employee's satisfaction, will reduce absenteeism and increase job engagement. As per data collected from the survey, working in their desired environment (based on the combination of their favourite colour and lighting) will increase the level of interpersonal relationship in the work area and will enhance the amount of quantitative output of the job.

V. CONCLUSION

Architects offices employ people who are experts in spatial design. The employees here are qualified to understand the nuances of architectural elements and the benefits of its presence in office space. This study thus gains importance because the respondents happens to be creative people who are fully aware of the importance of this study. The study is of interest to architects because personality traits are not being considered as a factor in interior designing. Personality type as a psychological factor is an important parameter in architectural design project, especially indoor environment. Any living place dealing with occupants their needs and characteristics should be considered to expand the fulfilment and pleasure in the spaces. The study revealed that people with different personality traits differed in their colour choices. This understanding opens up avenues in future to design interiors based on the personality traits. The architects in future can design work environment to increase level of satisfaction and increase productivity. Therefore, this research revealed a new direction for future work regarding environmental aspects and psychological influences of workplace on productivity of the workers. The research will continue with analysis of extraneous components of physical setting and investigation of other psychological factors of occupants in the office area.

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AUTHORS PROFILE

Dr. Zahra Poursafar is an assistant professor in Islamic Azad University of Fouman & Shaft, Guilan, Iran. She is a post graduate in advanced design (M.Arch) and PhD in Architecture from Faculty of Architecture, Manipal University, Manipal. Her areas of research interest include interior spaces, particularly office interior spaces with consideration of psychological issues. She can be contacted at z.poursafar@yahoo.com

Dr. Lewlyn L. R. Rodrigues is a Professor at the Department of Humanities and Management, Manipal Institute of Technology, Manipal Academy of Higher Education. He has B.E. (Mechanical Engineering), M.Tech. (Production Engineering) and Ph.D. (System Dynamics). His areas of research interests include System Dynamics, Total Quality Management, Knowledge/Technology Management, Manufacturing, and Human Resource Management. Dr. Rodrigues has over 150 papers in various journals and conferences. He has successfully guided 10 Ph.Ds. and currently guiding 5 Ph.Ds. He can be contacted at rodrigusr@gmail.com

Dr. K. V. Sriram*(Corresponding Author) is as an Associate Professor in the Department of Humanities & Management, Manipal Institute of Technology, Manipal Academy of Higher Education where he teaches Marketing Management and Financial Management. He holds a doctoral degree in Marketing. He has more than 20 years of experience in the retail industry in area of marketing and franchisee management. His subject interests range from brand management, brand loyalty, franchisee management and consumer behaviour. He can be contacted at kvsriram@yahoo.com/kv.sriram@manipal.edu.

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