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SENSE OF COHERENCE IN THE WORKPLACE: DESIGN FOR WELL-BEING IN THE WORKPLACES OF ACADEMICS

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Abstract: Workplace productivity can be improved by ensuring a sense of well-being and coherence in the workplace. The design of work- places needs to consider the type of work, behaviours, cultural differences, and backgrounds of its users which are associated with individual well-being. Design plays a key role in creating suitable work environments. But often the end-users' sense of well-being is neglected and instead, design decisions are driven by attempts to maximise capacity and economic gain. However, the prefer- ences for design and sense of well-being will vary among different workgroups. Academics play a key role in the dissemination of knowledge and academics' workspaces have not gained much attention in the past. This study is focused on workspaces used by "academics" as a knowledge worker. A sample of six academics is selected from varying work settings. In-depth Interviews, ques- tionnaires, checklists, and observations are done to explore the design features that are important for sense of wellbeing and co- herence of academics. Findings show that privacy, accessibility, workplace fitting workstyle, biophilic design, informal (social) gathering and supporting personal identity expression to have a positive association with sense of wellbeing and coherence, and therefore are vital when designing workspaces for academics.

Keywords: *Workspace design; a sense of coherence; a sense of wellbeing; knowledge workers.*

1. Introduction

Work is a salient feature of a human being, and the artificial separation of life and work creates a gap in life leading to an individual feeling less alive at work [Alexander as cited in Salingaros (2011)]. Human beings have the right to an emotionally enriching workplace as the associative perceptions of one's physical environment are associated with one's sense of well-being. Therefore, an unsatisfactory work environment will hinder work capacity (Croom, 1999). Furthermore, Salingaros (2011) shows that cost- cutting and lack of investment in emotionally enriching spaces create oppressive spaces whereas Soltani,et al. (2015) state that physical, mental, and social associations are made with workspaces during work are important for the sense of well-being.

Well-being in the workplace is not merely the absence of occupational risks, accidents, and dis- eases. The "quality" of the workspace is important for well-being. In the western world, well-being rests on the continuous cooperation and dialogue between individuals and groups in an office environment. Safe, healthy, and productive work needs to be coupled with well-led organisational values and a competent work community, who can see their jobs as meaningful and rewarding (Ruohomäki et al., 2015) which would lead to better personal motivation with the competence to continue tasks (Clements- Croome et al., 2019). The quality of a workplace is important for the well-being of the workplace. Studies on workplace user well-being are studied in terms of quantitative aspects such as luminance levels on worktops, ambient temperature, air temperature as well as healthy material usage in interiors. Different indexes such as the WELL Building standard are currently used to measure the qualitative aspects of the environment to ensure user well-being. Furthermore, studies tend to overlook the qualitative elements of space that are not quantifiable. The "Flourish" model is presented by Clement-Croome et al., (2019) where the qualitative aspects of a sense of well-being are defined as the "sparkle layer" and most important for the sense of well-being.

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Roskams and Haynes (2019) describe the sense of wellbeing as the salutogenic potential of a space to provide its user's resources to cope with stressful situations in the workplace and are measured by their sense of coherence and strategies are presented to generate an in- dividual sense of coherence. Although the studies and theoretical models show promise in exploring de- sign that enhances well-being in workplaces, there is a lack of empirical studies to support how design can be implemented in a specific context to evoke a sense of well-being.

Traditional workspaces are often hindering the category of "knowledge workers" whose work is largely "invisible" in nature, taking place inside their heads. A notable group within this category are academics in higher education, as they simultaneously would be in an array of workspaces to acquire, process, present knowledge and educate [(Erlich and Bichard, 2008) as cited in (Greene and Myerson, 2011)].

2. Design for Sense of Well Being in the Workplace

Occupants' perception and understanding of their workplace are important for workplace productivity, satisfaction, and a sense of well-being. The design in a workplace plays a key role in accommodating the personal associative understandings. Designing for the sense is beyond responding to the five human senses (Clement – Croome, 2019). The "Interoception" or sense of "Self" or "Self-Awareness" is the most important sense in terms of well-being, and design should cater to the sense of Interoception. Clements- Croome et al., (2019) explored three design models, namely SIN Model Barrett et al. (2010,2012), Product and Service Satisfaction Model – Kano (1984) and Kim and de Dear (2012) study on 351 office buildings. These provided the basis for the **'Flourish Model,'** which suggests designers go beyond the standard user-controlled comfort levels and focus on spatial qualities such as views of nature, daylight, colour, décor, layout, aesthetics, and the green spaces around the building, the collective of which he named the **'Sparkle Layer.'** As the concept of human flourishing associates itself with positive psychology such as moral values, strengths, virtues of an individual and how these can be developed in human life (Boniwell and Zimbardo, 2015) a space should not only consist of quantitative requirements such as adequate temperature, sound, light, ventilation but also qualitative requirements such as a sense of the place, social climate, and biophilic design elements,

Similar to this model is the construct of the **salutogenic model**. The Salutogenic approach to enhancing well-being was primarily implemented for the design of healthcare architecture. As described by [Antonovsky (1987) as cited in (Roskams and Haynes, 2019)], **Salutogenesis** is the introduction of re- sources to an environment for the ease of health and combating disease or **pathogenesis.** An individual's health can shift from health-ease to disease due to everyday stressors or **generalised resistance deficits**. Shifting back to health ease can be achieved through generalised resistance resources. Salutogenic well-being can be achieved through overall functional, social, and psychological dimensions (Ruohomäki et al., 2015). The functional dimension supports work tasks and work processes are ergonomically fitting and accessible to all and enhance workflow and work engagements. The social dimension enables communication, collaboration, and mutual learning while the psychological dimension enables privacy, personal need for space and strengthens control over space.

2.1 SENSE OF COHERENCE

The crux of Salutogenesis comes from the idea of a 'Sense of Coherence' (SOC) which is the individual's perceptions regarding the events occurring in the environment around them and perceptions deter- mine individuals the ability to manage generalised resistance deficit [(Antonovsky, 1987) as cited in (Roskams and Haynes, 2019)]. According to Ruohomäki et al., (2015) and Roskams and Haynes (2019) Comprehensibility, Manageability and Meaningfulness are criteria that are needed in the workspaces to bring about a sense of well-being through the practice of Salutogenesis. The three criteria, as well as environmental qualities that would help or hinder Sense of Coherence, under each criterion are discussed below.

Comprehensibility: Stimuli of the environment need to be as ordered, predictable and explicable as possible, lack thereof could lead to a psychological deficit of "learned helplessness" (Evans and Sticker, 2004) as cited in (Roskams and Haynes, 2019)]. Roksams and Haynes (2019) point out through a number of studies on modern offices, that open plan designs lack personal Privacy, making users feel violated. Hearing irrelevant speech leads to lower productivity (Loewen., Suedfeld, 1992) as cited in (Kamarulzaman etal., 2011), and Separating panels provide better acoustic privacy [Bradley 2003 as cited in (Veitch, 2011)]. Attractive workspaces reported reduced discomfort with increased

discomfort for places with nature views that were not as attractive (Aries, Veitch, and Newsham, 2010) as cited in (Veitch, 2011). Employeesderive the greatest benefits from their workplace when they perceive an elevated level of "fit" with their personal work style. (Gerdenitsch et al., 2018) as cited in (Roskams and Haynes, 2019), and employees where their company allowed them to decide when or where they work, work were more likely to be satisfied with their jobs (Ruohomäki et al., 2015). Good Accessibility within the workplace on physical and psychological dimensions, making the space predictable to user.

Manageability: Roskams and Haynes (2019) point out that when the office is highly manageable, theemployees easily develop personal competency. Biophilic Design and Biophilia have Inherent stress- reduction properties (Ulrich et al., 1991) Micro-restorative experiences (Kaplan, 1993, 1995) "In Restorative effect (Beute and de Kort, 2014), making offices highly manageable. Sunlight, Increased mood and improved healthy cognition and reduced employee discomfort (Vietsch and McColl, 2001; Aries, Veitch, and Newsham, 2010; Leather, Pyrgas, Beal, and Lawrence, 1998). Exposure to Greenery enhanced recovery from stressful experiences (Veitch, 2011), Images and painting of natural scenes (passive viewing of nature) increased concentration and attention (Berto, 2005) and Plants (active viewing of nature) in- creased pro-social behaviour (Weinstein, Przybylski, and Ryan, 2009). Social cohesion in the workplace caused higher job satisfaction, higher morale, and Lower absenteeism and reduced turnover intentions (Lowe et al., 2003). Physical activity in the workplace reduced sedentary behaviour in the workplace which is beneficial for health (Karakolis and Callaghan, 2014; Owen et al., 2008). It also prevented desk- based work and poor physical health (Karakolis and Callaghan, 2014; Makkonen et al., 2017; Straker et al., 2013). A workspace, especially with modern technology should be able to sense the "multimodal in- teraction between users and space, react to user needs and enhance their endeavours" (Ruohomäki et al., 2015). Hence a proficient level of inclusion is important in the workplace.

Meaningfulness*:* Meaningfulness concerns the extent to which experiences are perceived as challenges worthy of investment. (Roskams and Haynes, 2019). Ninety per cent employees decorate their offices with personal items (Wells and Thelen, 2002), so Supporting Personal Identity Expression gives a sense of meaning to the workplace (Brunia and Hartjes-Gosselink, 2009). Focus on communicating or- ganisation value to stakeholders (Dik et al., 2013) is important for Meaningfulness, therefore space should Exhibit Organisational Purpose. Innovation within work Environment is good to attract and in- spire people, which is important for team wellbeing (Ruohomäki et al., 2015).

Ruohomäki et al., (2015) further draws qualities that are needed in workspaces to bring out sense of well-being through the practice of Salutogenesis. These qualities are not categorised according to sense of comprehensibility, manageability, or meaningfulness but in functional, social, and psychological dimensions

Functional Qualities - *Accessibility is important for a functional workspace*, which includes Physical (Ability for users to reach, enter, move through building freely, and psychological accessibility (Ability for building to invite potential users through clear functional zoning, orientation, recognisable entrances etc.) Spaces should also be ergonomically fitting to support work functions. (Ruohomäki et al., 2015) These qualities are applicable to a general population in the work force and not critically exclusive to academics or the larger pool of knowledge workers. *Space should be supportive to work task and processes*, in line with type of work and organisational values. Companies allowing employees to pick such individual workspaces, were more likely to retain their staff, and therefore shows subjective sense of control is preferable to objective sense of control. (Ruohomäki et al., 2015) this quality is extremely importance to academics. Workspace should also contribute to *workflow and engagement*, providing a Sense of territory (in individual and group basis) and sense of privacy, providing perception of control based on social status. (Ruohomäki et al., 2015). In hindsight, Privacy and Engagement in the physical environment should work in unison to generate uninterrupted workflow. It is tricky in the case of academics, as sense of territory generated through functional roles can also be hindering to generating creative engagement,

Social Qualities - *Workspaces enabling communication, collaboration and mutual learning* are beneficial to social engagement. For example, generating innovative working learning spaces can attract and inspire people, and add to organisational value. In the present context, *carefully integrating physical and virtual spaces, with social spaces for meeting and greeting are also thoroughly required*, leading to supportive collaboration and team wellbeing. Formal physical spaces such as conference rooms, offices due diligently provide tele conferencing, video, and other effective communication methods, but informal social spaces such as coffee rooms, lunchrooms, game rooms are lacking

thereof within long distance virtu- al communication and therefore lacks social integration with long distance virtual workspaces, and therefore integration of social conversation in physical and virtual dimensions are important.

Psychological - Privacy and Sense of Control and important to create a safe workplace for an individual. Both privacy and communality are essential. Worker should be able to adjust privacy level when tasks that require concentration is needed. Regulation of such privacy helps people maintain an optimal level of social contact. Acoustical Privacy is needed when freedom of perceiving auditive stimuli is re- quired (isolation from unwanted sound) Visual Privacy is freedom of perceiving visual stimuli (isolation from unwanted observation). Elevated level of job control (choice and autonomy) enables a willingness to dedicate effort to their jobs. (Has energising and motivating effects). Therefore, a respect for privacy and personal need for strengthens sense of control. Employees should be empowered to design their own office space. Perceived control over tasks / Scheduling and methods of work / Ability to make work decisions /Degree of autonomy and personal influence. Control of indoor environment allows overall employee satisfaction with environment.

2.2 RESEARCH AIM

The research aims to identify the qualities that are important for SoC among academics based ontheir perceptions and explore design elements for enhancing sense of well-being.

2.3 METHOD OF STUDY

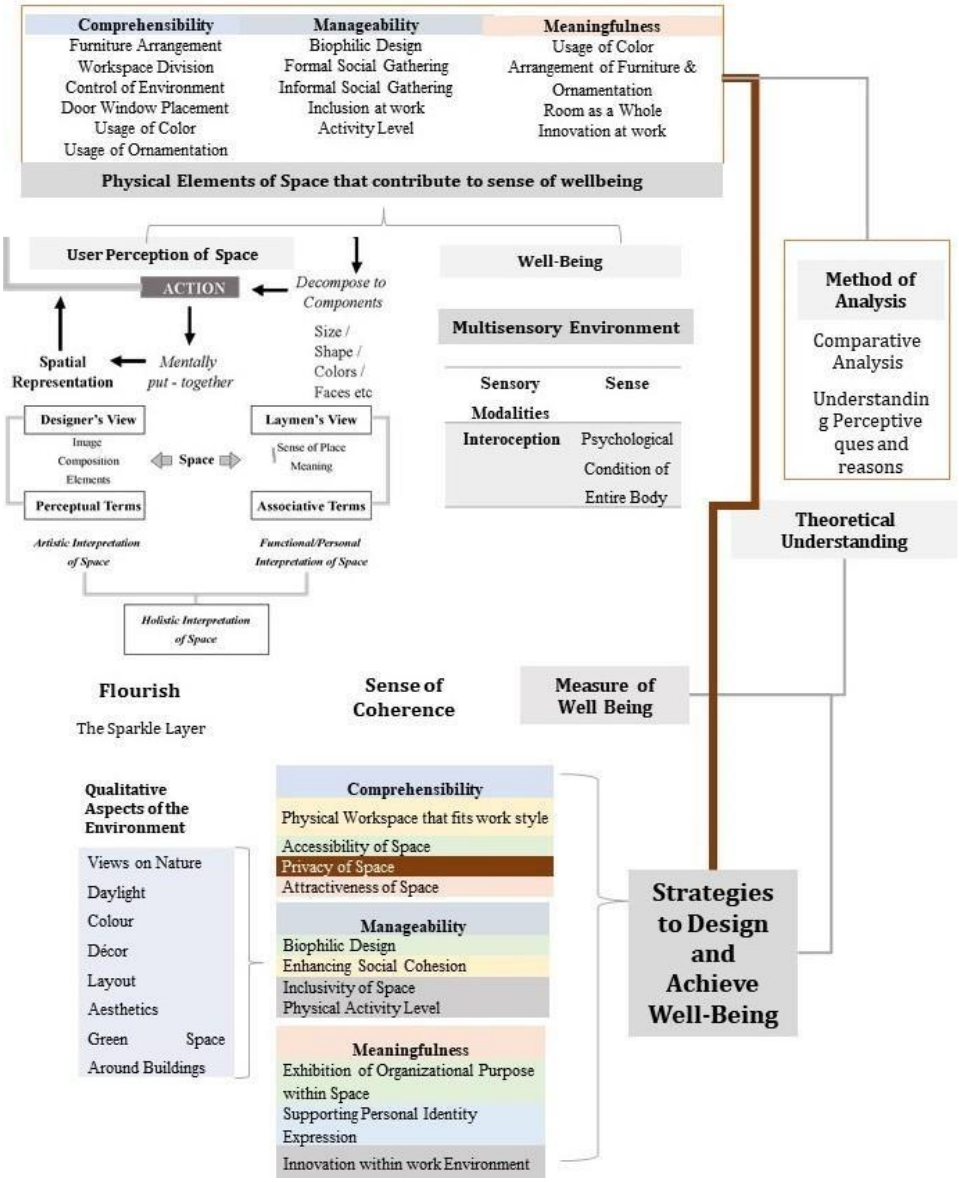

Figure 1: Summary of Methodology for Research based on Theoretical Framework

This study adopts a mixed method to explore the associative perceptions to space among academics and how the physical environment impact their sense of well-being. Academics are unique in their approach to work schedules and methods compared to other groups of workers. Hence academics would require unique design interventions, for enhancing sense of well-being in their work-spaces. Six academics working in four different Departments but engaging in similar type of work and work culture within the same faculty and institute was chosen for the study. Their workspaces differed in the location, layout, size, and interior arrangement. The study was limited to interviews with academics who continued to use the university workspaces during the pandemic, hence only a limited number ofrespondents were approachable. The six academics were coded as follows based on department within the faculty; L1, L2, A1, A2, D1 and T1 and a total of five spaces were evaluated.

Working hours, occupancy, participant's views on their workspace and the contribution of workspace elements to sense of wellbeing were gathered through the closed ended questions and check-lists. The questionnaire included a SoC Short Scale (Vogt et al., 2013) to rate the sense of coherence of each space. The office spaces were rated by staff for comprehensibility, manageability, and meaningful- ness on a 1-7 rating scale. Respondents' perceptions and opinions on design elements of their work- spaces and the impact on sense of well-being was further explored through open ended questionnaires and in-depth online interviews. Systematic observations, photographic survey was used to explore the physical nature of space.

Sense of Coherence of each space was assessed based on Comprehensibility, Meaningfulness and Manageability. Physical elements of the built environment were rated by participants based on how eachwould contribute to their sense of wellbeing and compared with the ratings for Comprehensibility, Meaningfulness and Manageability as shown in table 1.

Table 1: Comprehensibility, Manageability and Meaningfulness assessed in terms of elements of the Physical Environment

SOC	Tangible Element Type	In-tangible Element Type
Comprehensibility	➢ Furniture Arrangement ➢ Workspace Division ➢ Control of Environment ➢ Door Window Placement ➢ Usage of Color ➢ Usage of Ornamentation	
Manageability	➢ Biophilic Design ➢ Formal Social Gathering ➢ Informal Social Gathering	➢ Inclusion at work ➢ Activity Level
Meaningfulness	➢ Usage of Color ➢ Arrangement of Furniture and Ornamentation ➢ Room as a Whole	➢ Innovation at work

3. Analysis and Discussion

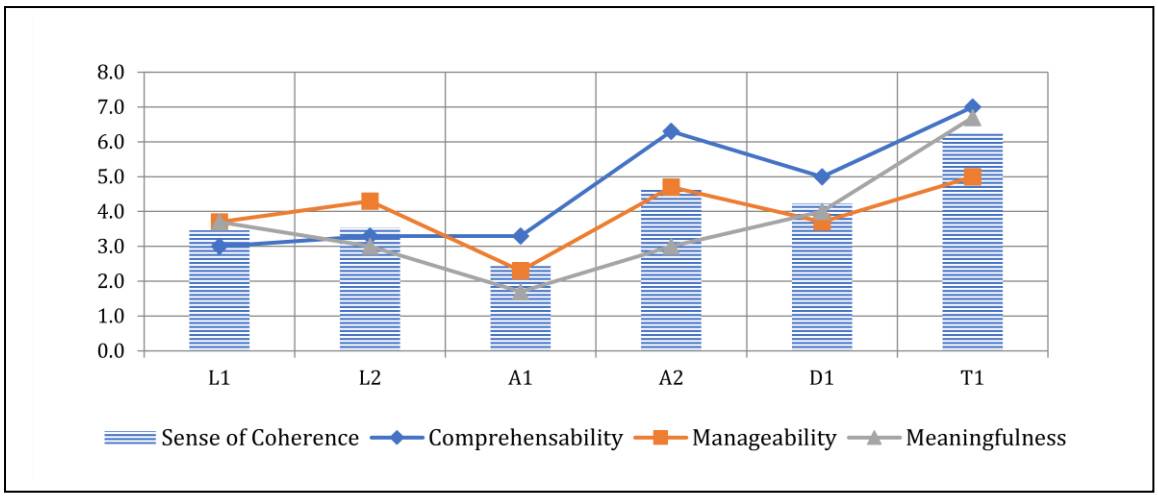

Figure 2: Comparison of overall SOC values with corresponding rating for SoC criteria of the six respondents and their respective workspace

First step was to identify the relative correspondence between overall score of SoC, and the values ofthree main components of SoC. The figure 2 shows that each three values correspond with the overall SoC scores, of participants. Highest overall SoC scores are observed in T1 space while the lowest scores are observed in A1 space.

In the second step, individual scores for each physical element within the SoC components (table 1) were compared (figures 3, 5, 7). Line graphs compare between the observation data and respondent scores. The line graphs show overall SOC values and its association with scores for quality of each space. Spider charts (figures 4, 6, and 8) further explores the associations between the SoC vales and qualities of space. Systematic observations and respondent views were used to explain the findings.

3.1 SOC LEVELS AND SPATIAL QUALITIES IN OFFICE SPACESCOMPREHENSIBILITY:

Comprehensibility:

Results show that higher levels of comprehensibility are shown when spaces score high in privacy, accessibility and when workplace fits work style However, attractiveness of the spaces does not show a positive association with high level of Comprehensibility (figure 3).

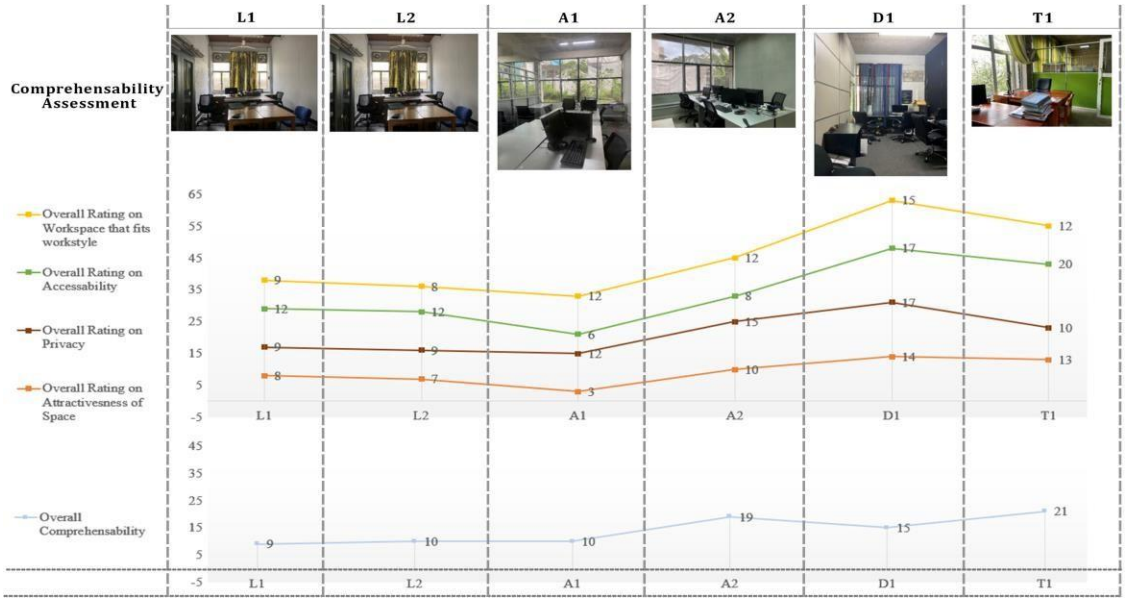

Figure 3 - Comprehensibility Assessment of Office Space

Discussion: A reduced number of people in the workplace and higher location dependency when doing work tasks, increased individual Comprehensibility levels. In terms of tangible spatial elements, participants did not associate furniture arrangement with comprehensibility while horizontal divisions be- tween work desks and provision to personally control their environment contributed to higher ratings. In addition, proper door and window placement, furniture arrangement and adequate privacy through strategies such as work desks facing outdoor views, and corner work desk arrangements with circulationarranged at the center of space, further contributed to higher ratings. However, the use of color did not have a notable positive association.

Results (Figure 4) shows that attractiveness of space, accessibility, col- or, ornamentation, , furniture arrangements, internal divisions, views, and autonomy to control the space(windows/doors) are shown high rating in space where the over-all SoC and comprehensibility is high in the case of T1).

The case of A1 only shows high ratings for two of these, workspace fit-ting work style and autonomy for control of doors/windows, hence a low comprehensibility score and low SoC score overall. The aforementioned elements bringhigher predictability and order to the environment.

Manageability:

Results show that higher levels of manageability are seen when biophilic design, and informal gathering in spaces are scored high. However, level of inclusion and physical activity does not show positive association overall (Figure 4).

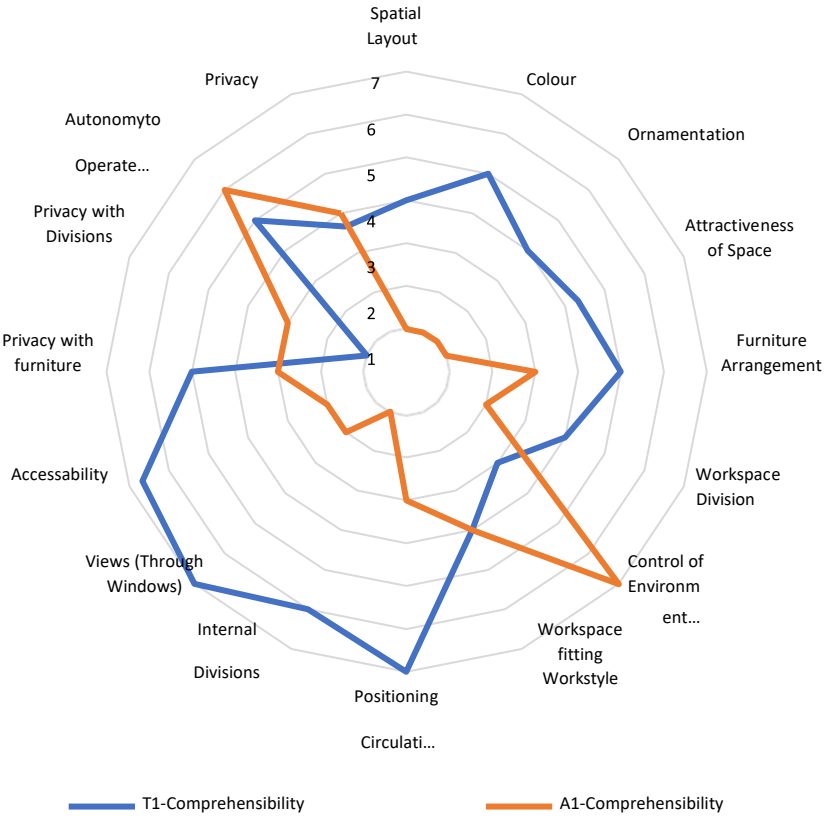

Figure 4: Comparison of Comprehensibility values and design element types of T1 and A1 user and workspace

Discussion: Higher ratings are observed when biophilic design such as use of natural colors and views of greenery are observed. Lowest ratings are observed for the use of synthetic fabrics and materials in the space. Manageability is not positively associated with formal discussions and social gathering and physical activity levels was subjective to each participant.

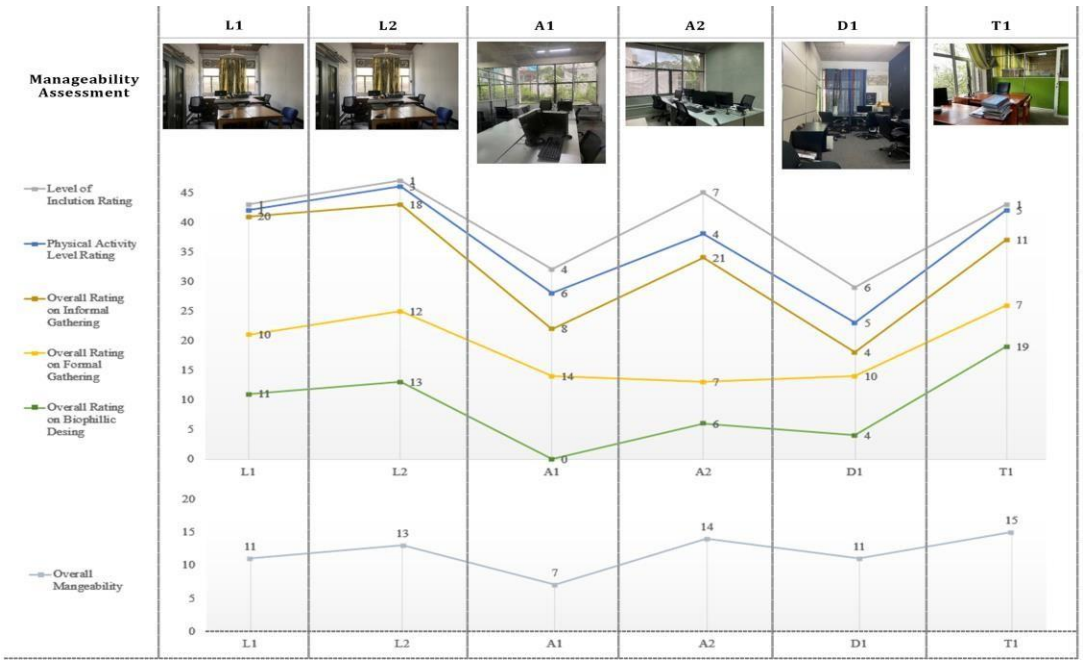

Figure 5: Manageability Assessment of Office Space

T1 space with highest level of overall SoC and manageability shows that biophilic design elements such as sun- light,

views to natures, indoor plants,images of nature, the use of natural materials are dominant in the T1 space. In addition, the opportunity for formal and informal interactions, discussions, social gathering, and physical activity also scores high.

A1 space with lowest overall SoC and manageability show that only views to nature, physical activity, formal and in- formal activity are scored high while allother elements have scored low.

These elements are important to bring higher personal competency for an in- dividual,

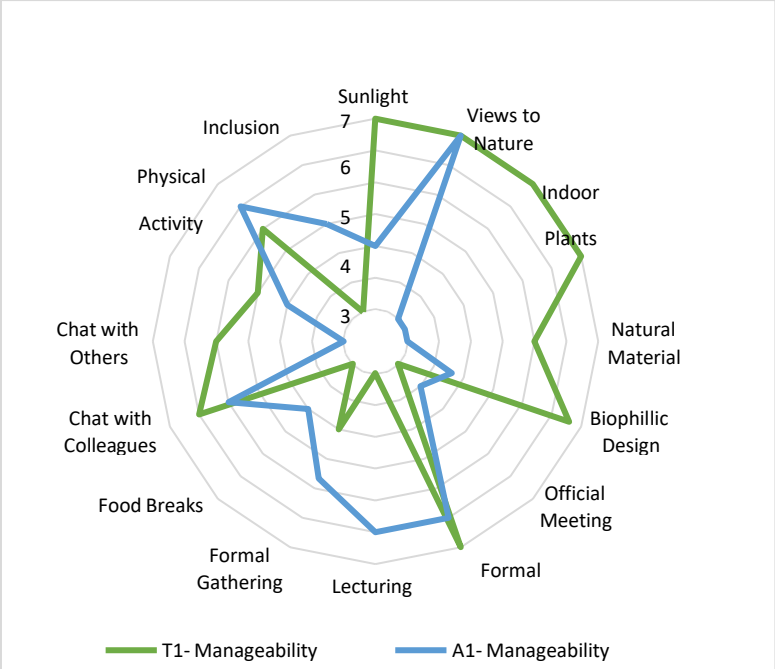

Figure 6: Comparison of Manageability values and design element types of T1 and A1 user and workspace

Meaningfulness:

Results show that higher levels of meaningful-ness are shown when spaces score high in exhibiting organisational purpose, supporting personal identity expression. However, the contributions from level of innovation to overall score is insignificant (figure 7).

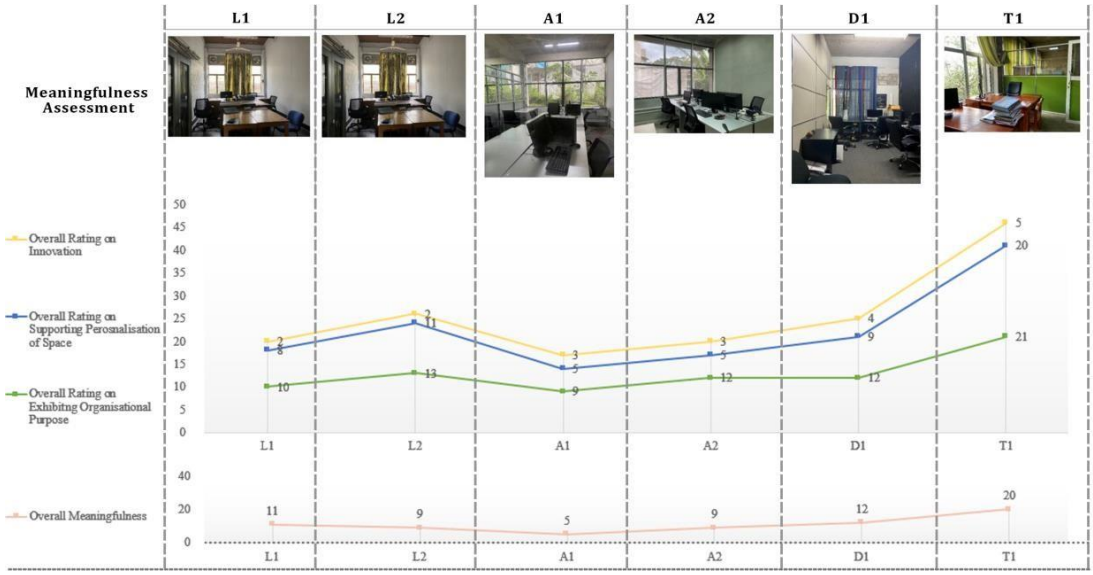

Figure 7: Meaningfulness Assessment of Office Space

Discussion: Color did not significantly contribute to the ratings while furniture and ornamentation con-tributes but provides overall lower ratings. The level of innovation is higher in more personalised spaces.

Comparison of scores for meaningful- ness, across T1 and A1 show that , T1 space with highest level of SoC and meaningfulness shows high scores for elements such as innovation, Colour, furniture and ornamentation, arrangements of the office, organisational opportunity, furniture ornamentation, personal workspace arrangements, support for personal identity in comparison to A1 space. The interior elements in T1 space support the meaningfulness proper- ties of the space.

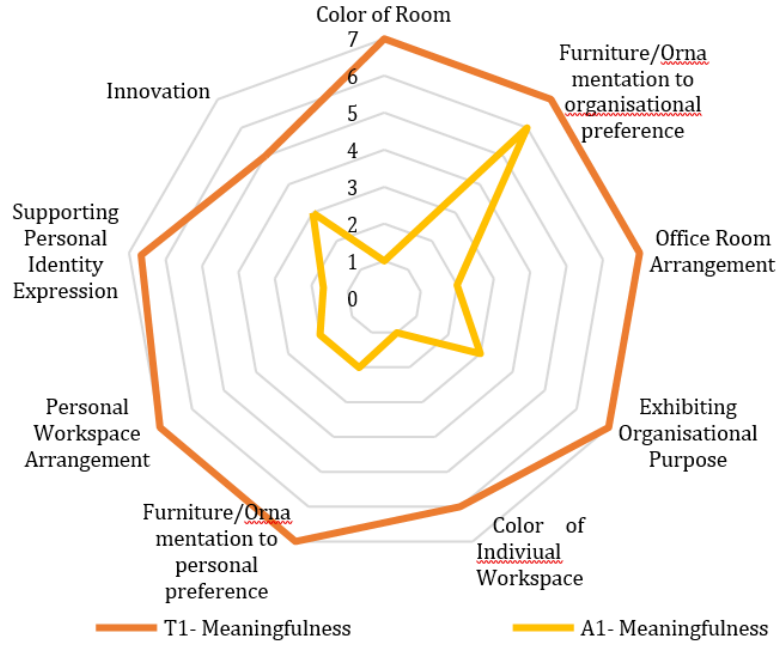

Figure 8: Comparison of Meaningfulness values and design element types of T1 and A1 user and workspace

4. Conclusions

The research intended to identify the qualities that are important for SoC among academics based on their perceptions and explore design elements for enhancing sense of well-being. results showed that privacy, accessibility, workplace fitting workstyle, biophilic design, informal (social) gathering and exhibiting personal identity expression, as the qualities considered most important for SoC among academics. Study further showed that comprehensibility, manageability, and meaningfulness are important for SoC and wellbeing. The design features shown as important for SoC under each of this are discussed below

Comprehensibility: Study shows that providing proper accessibility and circulation for physical movement within space, as well as psychological accessibility to outdoor environments through views are re- quired for achieving Comprehensibility. Lack of proper internal divisions, lack of attractiveness of space, lead to a low comprehensibility. This shows that Comprehensibility can only be achieved through a legible environment that has achieved “attractiveness” through order and good design, hence it needs to be considered when designing academic environments. As discussed in theory, Functional Qualities such as Accessibility and ergonomics, as well as expansion requirements must be thought of at initial stages of planning and design. Another factor to consider was the sense of privacy and connection simultaneously, as discussed under psychological qualities, are further important to bring good comprehensibility into academic workspace design.

Manageability: Biophilic design, through active and passive viewing strategies of nature, heavily con- tributed to higher manageability, leading to better optimism and creativity to the user. Social gathering, through chatting with colleagues was also a contributor, (as opposed to formal gathering - official meetings), as discussed in chapter 2 as social qualities to be obtained in space. As Manageability requires higher competency, which involves spaces that are rich with relaxing atmospheres that mimic nature or are connected to nature, are highly beneficial to academic workspaces. In addition, a social climate that provides fun and carefree atmospheres, are also required, as formal

environments reduce manageability in academic workspaces.

Meaningfulness: Results were subjective to participant view of space. Exhibition of organisation purpose, through furniture arrangement, colour was beneficial, only when participant had the provision to personalise space such as arranging work desk, furniture, and ornamentation around to support personal needs, therefore, personalisation should be considered in design of academic workspaces. Meaningful-ness is portrayed by an individual's motivation to take challenges and offering provision for evoking sense of personality to their primary individual workspace (i.e., work desks) without hindering functionality of space or organisational requirements are important in workspace design for academics.

As sense of coherence is the amalgamation of comprehensibility, manageability and meaningful- ness, a space that lacks the multitude of qualities and elements as discussed above, can hinder the sense of well-being of an academic, and considering as many of the above qualities will support SoC and a sense of well-being.

In addition to shedding light on design features in response to SoC and wellbeing among aca- demic work groups the framework developed through this study can be used to assess workspaces to promote SoC and wellbeing among other types of work groups and types of workspaces. It can also be used to study different work groups from different occupations and organisational structures to assess and establish the types of work environment for optimising the SoC and well-being. Framework can assess different work groups even within the same organisation but performing different tasks.

5. Limitations and Future Work

Due to restrictions pertaining to the Covid-19 pandemic the participants had to be restricted to a single faculty within one university. Most of the data collection methods were done remotely and understanding the lived experience of the participant was challenging. The study was limited to the verbal accounts of space. Future studies can expand to larger samples and other different occupation and types of work- spaces.

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