

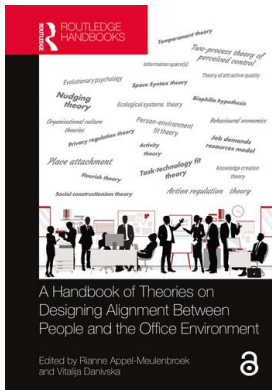
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Flourish Theory

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14

FLOURISH THEORY

A model for multisensory human-centric design

*Derek Clements-Croome****1 Background**

This chapter is based on an evolving body of research that is starting to account for non-optimised design in terms of health life years lost (Shrubsole et al., 2015), presents empirical studies that reveal the impact of poorly designed workplaces (British Council for Offices [BCO] studies, 2012; 2014; 2015; 2017; 2018) and makes links between the research and applied design thinking.

The flourish approach is rooted in the established conceptual theories of ‘flourish’ and ‘well-being’ (Barrett, Barrett, & Zhang, 2015; Diener & Biswas-Diener, 2008; Huppert & So, 2013; Kim & de Dear, 2012; Maslow, 1943; Seligman, 2011). The flourish model has been developed and is described in BSRIA (2019), Clements-Croome (2018, 2020), Clements-Croome, Turner and Pallaris (2019) and the UK Green Building Council [UKGBC] (2016, p. 14) on health and wellbeing in homes and by earlier viewpoints of the author and presented in the World Green Building Council publications (World Green Building Council [WGBC], 2014, p. 31).

Flourish goes beyond comfort and towards a more holistic understanding of how sensory change from stimuli diversity around us can help to stimulate health and wellbeing, which are the roots of human energy that fires creativity and productivity (Clements-Croome, 2018, 2020; BCO, 2017). The flourish approach was the framework for the BCO report called *Wellness Matters* (BCO, 2018). Flourishing refers to the experience of life going well. It is a combination of feeling good and functioning effectively. Flourishing is synonymous with a high level of mental wellbeing and epitomises mental health (Huppert & So, 2013).

Fredrickson (2001) writes that *flourishing is an optimal state of human functioning* and all the positivity which is implied by that. Huppert and So (2013) describe a European survey – 43,000 subjects in 23 countries – which aimed to define what is meant by flourishing, and this resulted in defining 10 attributes of positive wellbeing or flourishing. These were *competence, emotional stability, engagement, meaning, optimism, positive emotion, positive relationships, resilience, self-esteem and vitality*.

One can see how these factors are part of personal motivation. Many of these attributes are described in the classic work of Maslow (1943) or Diener & Biswas-Diener (2008) and Seligman (2011).

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1.1 The multisensory experience

To design spaces that benefit our wellbeing requires knowledge of how the body and mind respond to the diversity of stimuli they receive from the environment. The nature of the stimuli can be people, work focus, objects, the look and feel of the space and the atmosphere that is created. The brain does not perceive environmental stimuli in isolation but rather embraces the whole pattern of stimuli as they change in time unless, particularly, extremes occur in any of the stimuli. The primary stimulus is the task being undertaken but the surroundings provide peripheral stimuli which we are aware of but not to the point of being distracted. As our attention waxes and wanes according to our mind fatigue patterns, these peripheral stimuli like colour or views out on to nature, for example, provide sensory contrast breaks from work focus. A mixture of sitting, standing and walking provide healthy movement for the body, so ways of doing this by walking in gardens, meditating or other means all add contrast in the sensory experience that people can enjoy.

Architecture is for humanity. The buildings it enshrines reflect the spirit of a particular age. At a basic level they shelter people from a range of climates and let them carry out an array of functions in their living and working lives. Often, they are judged for their functionality and their visual appearance. Beauty, however, is not only what the eyes see; it is also how the building interior affects the human senses in terms of feelings, emotions and affect. So sound, touch, smell and sight all react in particular ways and can result in a feeling of happiness, contentment or spiritual uplift if the architecture has been designed with imagination and respect for human sensory needs. Barbara Erwine (2017) in her book *Creating Sensory Spaces* writes about architecture of the invisible or what may be called a total sensory aesthetic. In her book *Urban Smellscapes* (2013), Victoria Henshaw writes about the reactions of people on smellwalks, and others have described soundwalks (Behrendt, 2018), but these reactions are explained as being like layers of the senses. You see something but smell, sound and touch elevate your feelings about it whether you are inside or outside a building.

A multisensory design approach termed synesthetic design offers an alternative to traditional visual sensory bias by providing the systematic incorporation of all five senses. The aim of synesthetic design is “to coordinate all sensations stimulated by an object in a manner that results in a pleasant, harmonious overall appearance while coinciding with the particular function(s) desired” (Haverkamp, 2012, p. 14).

1.2 Empirical studies on workplace design

The 2014 British Council for Offices survey of 2,000 UK office workers showed that one in four believed their work environment did not support their physical wellbeing (BCO, 2014). Dissatisfied respondents were particularly unhappy with a lack of colour (80%), a lack of greenery (64%) and a lack of art (61%) in their workplaces (BCO, 2015). On a global scale, the Human Spaces Survey (Cooper & Browning, 2015) found that 58% of 7,600 office workers in 16 countries (of which 85% of offices surveyed were located in an urban environment) did not report having plants in the office and 47% reported no natural light. Just under half (47%) reported having felt stressed in their workplace within the last three months and 28% of respondents reported that they did not have a quiet space to work in their office. The five elements most desired in the office revealed by the survey were inherently linked to nature and the sensory experience of the workplace and these were natural light, views on to natural landscapes, bright colours, indoor plants and quiet working spaces.

1.3 Beyond environmental comfort

The word *comfort* is perhaps overused. It has a neutral but long-term durable quality. It is usually seen as a pleasant or relaxed state of a human being in relation to their environment, but surely that is only part of what we need for the concentrating mind. Is one highly attentive when comfortable, or is there a danger of being bored, losing attention or even falling asleep? Cabanac (2006) writes about pleasure and joy and their role in human life and indicates how transients are important in providing variety and contrast for the human sensory system to respond, to reiterate the description about multisensory environments given earlier. During the day we hope for and seek joyful moments – perhaps a tree in blossom, pleasant air movement or changing light patterns. There is an echo of this in Maslow's book *Religions, Values, and Peak Experiences* (1964) when he writes about peak experiences which can be transitory, momentary or longer term but can trigger happiness and uplift in mood. Cabanac (2006) introduced the term *alliesthesia*, which means a stimulus may give rise to a pleasant or unpleasant sensation depending on the internal state of the person (de Dear, 2011). Our experience of the environment is the result of an interplay of heat, light, sound and many other factors, not just of single elements like thermal comfort, for example. Buildings should provide a multisensory experience. The senses need stimulation to react to, otherwise boredom sets in.

Malnar and Vodvarka (2004) comment, "The problem with most of the research on the thermal environment is that it has centred on thermal comfort or thermal neutrality. They go to quote other work." Wilson (1984) states, "As with the auditory area of research, the approaches concentrate on preventing feelings of discomfort, rather than producing positive responses – such as interesting, invigorating – to thermal conditions."

Human performance has been defined as depending on motivation, ability or competence and opportunity offered by amenities and support systems (Fogg, 2009). So here we can see the link between people's feelings and their work performance and how the environment in which they are located affects this.

Vitality is about human energy, and much has been written about how this can be sapped by poor atmospheres lacking good air quality, natural lighting or temperature control, for example. Drab environments devoid of colour, views or greenery lead to dull, unstimulating hours of work, however interesting that might be.

These findings underlie the flourish model.

2 Applicability to workplace studies

2.1 The flourish model

The aim is to create an environment in which people thrive. The author has based the reasoning for this model on the work of Zhang and Barrett (2012) and Kim and de Dear (2012), which goes beyond comfort and reaches out towards acquiring the ideal state of wellbeing as described by Diener & Biswas-Diener (2008), Maslow (1943) and Seligman (2011). The model is based on three issues – *the environmental factors, the perceptions and feelings* people have in various environmental settings and the *economic consequences* of the environments created (WGBC, 2014, 2016).

The impact of the environment on people is difficult to predict because the environment has an effect which is more than the sum of its parts (Bluyssen, 2014; de Dear, 2011). Another complication is that sensory modalities interact. They also compensate one another, for example as happened with Evelyn Glennie, who although deaf became a world-class percussionist by

sensing the vibrations through her feet, lower body and hands. A few years ago, at a seminar on multisensory dining held by Professor Charles Spence at Oxford University, he invited attendees to taste a ginger biscuit whilst gliding their hand over a smooth surface and then again over a rough surface. For the majority the ginger flavour was more intense when the hand was passed over the rough surface. Sense modalities interact.

Barrett (2018) believes that there is no real understanding of the holistic impacts of built spaces on people despite the huge amounts of knowledge there is on individual aspects like heat, light and sound. The outcome of his *Holistic Evidence and Design* (HEAD) project is the SIN model, which has three main dimensions – stimulation level, individualisation and naturalness.

Stimulation arises from the amount of information in the setting in which stimulants such as colour, aromas, greenery or things that are changing such as formal or informal social contacts or changes in the natural setting give variety, context and interest. An example of a building designed to be enjoyable and uplifting is the atrium in the Kajima office in Tokyo described by Takenoya (2006), in which aroma and bio-music are used intermittently to provide variety and stimulation. Complexity, colour and texture, for example, give contrast and make the environment more interesting. Overstimulation can give confusing and hectic signals which can increase stress levels, whereas too little stimulation can be boring (Bluyssen, 2014).

Individualisation is the occupants' personal environment and includes factors like personal control, flexibility and one's identity with a space. *Naturalness* is the basic environmental setting, and this where the comfort backdrop forms an important foundation. The holistic multisensory experience is the interplay between these three dimensions of stimulation, individualisation and naturalness.

Kano, Seraku, Takahashi and Tsuji (1984) proposed a model of product and service satisfaction in the 1980s which defines three essential attributes (see also Chapter 13 The Theory of Attractive Quality):

- Threshold attributes: customers expect these as a fundamental set of requirements (comfort criteria).
- Performance attributes: these increase customers' enjoyment, though some may not be absolutely necessary.
- Excitement attributes: these provide the extra sense of surprise and enjoyment (bonus factors).

These are a dynamic, interactive set of attributes.

Kim and de Dear (2012) adapted these and described Kano et al.'s (1984) classification in terms of *basic factors*, *bonus factors* and *proportional factors*. From their survey of 351 different office buildings, they identified basic and proportional factors, which are adapted here to suit the COVID-19 pandemic situation in 2020:

- Basic factors: levels of temperature and sound, amount of space, visual privacy, flexible furniture, colours and textures and workplace cleanliness. These are minimal requirements, but with the COVID-19 virus we need to add infection risk, which affects spacing, layout and patterns of air distribution, cleaning processes and maintenance.
- Proportional factors: air quality, light, visual comfort, sound privacy, ease of interaction, ergonomic comfort of furniture, cleanliness and building maintenance. Satisfaction tends to increase linearly as these elements improve.
- Bonus factors: colour, social climate, greenery, views and changing daylight.

These factors act like triggers that can impact mood and add pleasure to one's experience. Other factors are aesthetics and décor, which give the look and feel of a space.

One can see a connection here with the thinking behind the SIN model as the stimulating element corresponds to the bonus factors in the Kano et al. (1984) model; naturalness corresponds to the basic factors; individualisation corresponds to the proportional factors and includes personal control. The first is a *normal* layer featuring standard comfort health and safety guidelines for temperature, sound, light and ventilation (for the waking and sleeping states). Various codes, guides and handbooks prescribe these. Design and operation of ventilation is now a critical factor in dealing with infection risk so is undergoing deep scrutiny since COVID-19 appeared worldwide. The second layer is one which recognises that people prefer to have some degree of personal control over their environmental settings. Also, there is a relationship between health and some of the factors we are dealing with in a proportional way. For example, as ventilation increases from 8 l/s person to 25 l/s person, illnesses decrease as the research shown by Fanger (1970, 2002), Wargocki et al. (2006) and Wargocki and Wyon (2007). So there is not a single number or narrow band to choose for design like temperature, for example, but rather an *individual* or *proportional* layer in which a choice has to be made. In selecting a figure, one has to study the evidence for offices, schools, retail outlets or homes. Often the decision is made on low energy and cost, but this has to be offset by the savings accrued by better health and productivity as evidenced by less absenteeism and presenteeism, and now infection risk has become a primary concern.

Third, there is the *sparkle* or '*wow*' layer which includes things like views on nature, daylight, colour, décor, layout, aesthetics and green space around the building. These features are mainly non-quantifiable but still important. These seemingly small factors can suddenly make one feel better in spirit – a bit like getting up in the morning and feeling a little sluggish then opening the curtains on to a beautiful sunny morning and feeling quivers of happiness. Some of the research is beginning to give some design data such as for biophilic design (Browning, 2012) (see also Chapter 15 The Biophilia Hypothesis), but in general we should consider the sparkle factors in design even though they are 'soft' metrics and not quantifiable. We do know, however, that homes with sea or country views, for example, fetch premium prices. Buildings in cities are particularly challenging but with careful creative thought they can be lovable, joyful and soulful places for people to live and work.

We need to capture all three layers if we are going to provide buildings in which people thrive and flourish for living or work. Figure 14.1 (Clements-Croome, 2016, 2018, 2020) shows the advantages of using the flourish model for various stakeholders. How occupants feel in the environmental setting they occupy influences their motivational energy to do work and make decisions (Clements-Croome, 2018).

Figure 14.2 shows how objective and subjective factors impact people's feelings and as a consequence the economics of the workplace. Flourish echoes the checklists proposed by Dolan and Bernheimer. In his book *Happiness by Design* (2014), Dolan proposes the SALIENT mnemonic:

- S Sound
- A Air
- L Light
- I Image (look and feel)
- E Ergonomics
- N Nature
- T Tint (colour)

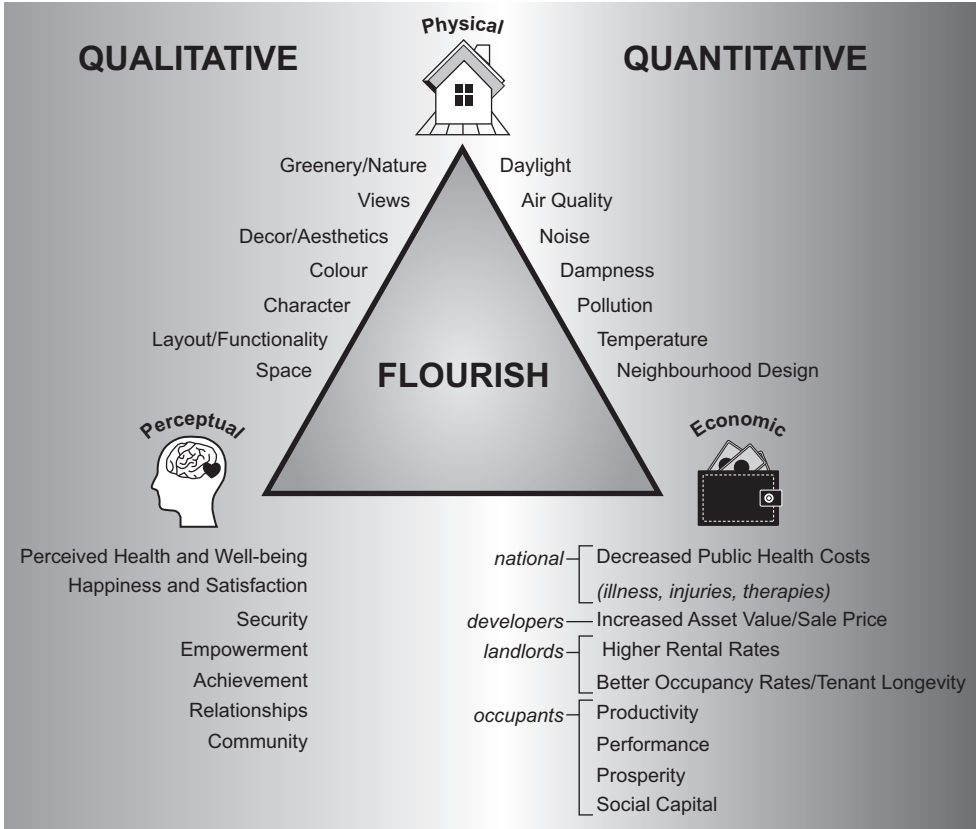


Figure 14.1 Flourish model (Clements-Croome, 2018, 2020)

Bernheimer in her book *The Shaping of Us* (2017) proposes a BALANCED space checklist.

- B Biophilia – natural materials, views and patterns
- A Atmospheric – light, air quality, temperature and smell
- L Layout – space quality, circulation
- A Amenities – nutrition, movement, ergonomics
- N Noise
- C Cohesion – community, communication
- E Energy – resources and waste
- D Design – colour, shape, materials, proportions, detail and style

The WELL version 2 rating system has 10 factors to consider for health and wellbeing:

- Air
- Water
- Light
- Nourishment
- Movement
- Thermal comfort
- Sound

- Materials
- Mind
- Community

These three independent total environment user-centric approaches have many similar aspects and add support to the underlying aims of the flourish model. To reiterate – the evidence for flourish is rooted mainly in the psychology research of Maslow (1943, 1964), Cabanac (2006), Diener and Biswas-Diener (2008), Huppert and So (2013) and Seligman (2011), together with later evidence described by Dolan (2014) and Bernheimer in Clements-Croome (2018, 2020). It is important to realise that the findings from this work can enrich architectural design and make workplaces better for health and wellbeing. The aim is to go beyond the traditional comfort approach and achieve environments in which people thrive, benefiting both creativity and productivity. Two case studies demonstrating the flourish approach are cited later.

3 Methodology

Using flourish involves several steps:

- Work with client mapping needs with flourish.
- Use a sample survey of occupants using questions based on the flourish wheel in Figure 14.2.
- Work with human resources (HR) on economic factors like sickness absence and staff retention rates.
- Use Kansei or other multifactor decision-making approaches (Huda & Hadiana, 2020).
- Analyse results and derive a predesign flourish map using the flourish wheel.
- At the post-occupancy evaluation (POE) stage, collect data from the physical environment, HR on absenteeism and staff retention rates, and people's psychological and physiological responses via questionnaires and wearables.
- Reiterate the analysis.
- Recommend any changes.

Figure 14.2 shows how objective and subjective factors can affect people's feelings and consequently the economics of the workplace. The flourish model can be used in setting and evaluating success criteria for projects besides aiding POE. BSRIA BG 74/2019 *Success Criteria for Soft Landings* provides more information on success criteria. Human Resources departments can provide data for the economic quadrant on the economic area.

Data is derived from questionnaires which are based on the following general factors as described in BCO (2017, 2018) and Clements-Croome (2020):

- Type of work – range of work.
- Location – city/rural, nature, accessibility.
- HR data on absenteeism, staff turnover rates, medical problems.
- Physical data plus facilities managers (FM) experience.
- Occupants feedback plot on flourish wheel.
- Simple rating scales for health/wellbeing (see Appendix in Clements-Croome, 2020).
- Other factors that arise in interviews with users.

The workplace is ever changing and has implications for how we should design the next generation of workplaces. Whether in old refurbished buildings or new ones, health and wellbeing

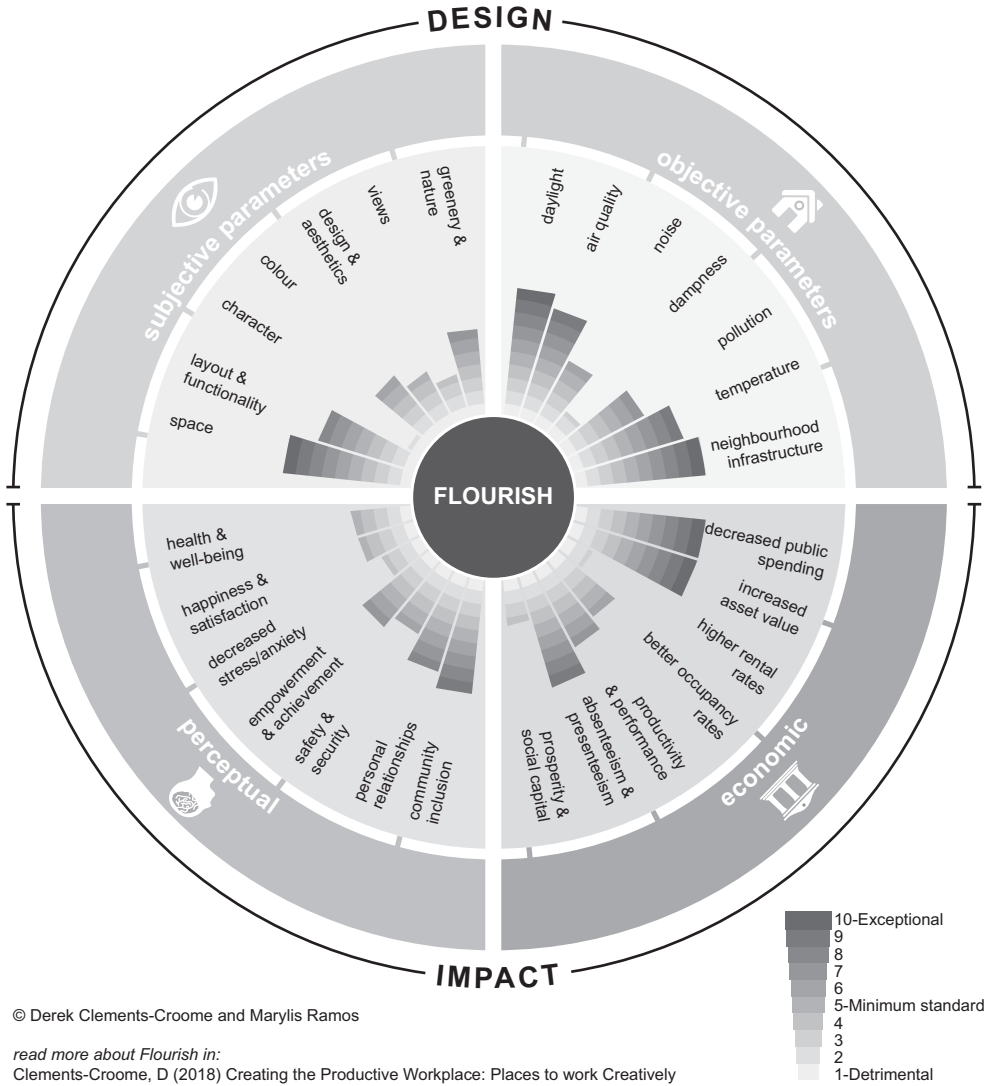


Figure 14.2 The flourish wheel

will be emphasised in architectural design and will continue into the construction and operation of buildings in practice. The responses of office workers in various surveys by the BCO suggest that even current practice and value sets are not realising the creativity and productivity potentials that workplace design can yield. The roots of productivity are in health and wellbeing, and these determine the energy we each have to work and live.

There is already a wealth of knowledge about the sensory response of the human body. Wearable technology offers the opportunity for further enhancing our knowledge of how design decisions affect employees' physiological and psychological wellbeing, at both the individual and the collective level. Such technology will have implications for the way we design, refurbish and build workplaces, placing an even greater emphasis on the human-centric, experiential

perspective, a perspective embedded at the heart of a multisensory approach to workplace design (Clements-Croome, Aguilar, & Taub, 2015).

4 Limitations

The model relies on collecting data. It is easy to measure factors like air quality and temperature using traditional instrumentation. Assessing subjective environmental data involves interviewing and administering questionnaires. Currently the use of wearables enables the assessment of many factors that affect people physiologically and psychologically. However, the compiling of economic data on absenteeism, presenteeism and staff retention rates is more difficult and depends on how effective HR departments are at gathering this.

5 Theory relevance to practice: case studies

Employers are realising that greater consideration of their staff within workplace design has multiple rewards, enabling them to provide a healthier working environment whilst simultaneously improving profitability and staff retention. After the COVID-19 pandemic, we will perhaps see greater flexibility between home and office working besides taking a much more human health-centred approach to planning for lower occupancy densities, ventilation and air movement patterns, cleaning routines and processes, and maintenance.

Designing with this sensory approach in mind might at first encounter cost hurdles. This approach can be seen as potentially resulting in higher investment requirements, with higher design fees allocated for additional employee engagement and for other elements of office redesign. However, health and wellbeing is not a luxury; it is an investment. Beyond this, ignoring infection risk, for example, can cause deaths. We know that indoor and outdoor pollution can contribute to deaths too. A traditional workplace valuation approach considers costs in terms of occupancy per square footage. This approach is no longer viable.

The flourish model offers an impacts framework against which design considerations can be assessed and the resulting outcomes evaluated. If the workplace is not delivering the productive, enticing, healthy environment they need to undertake their work, employees will have a well-informed basis upon which to express dissatisfaction and act. Also, illness absenteeism can increase and staff retention rates decrease with poor environments. The workplace of the future must rapidly transition to incorporate environments conducive to our sense of wellbeing. This can only be achieved by creating workplaces that enable employees to flourish. Measurement will be key in obtaining the data we need to deepen our understanding.

5.1 The biophilic classroom, Putney High School, London, by Clare Bowman, RCZM Architects

The following is a study into the restorative benefits of biophilic design through the role of nature in a space and nature's analogue patterns (Gillis & Gatersleben, 2015) to support health and wellbeing. The research is based on the flourish model theory of creating natural and harmonious environments to stimulate the alpha brain waves (high relaxation) and lower the beta brain waves (high stress), with the aim to calm the mind to improve attention and create the space for the imagination to thrive (Clements-Croome, 2018, 2020).

'Nature in space' was introduced to a maths classroom in the form of plants and visual 'natural analogue' in the form of a woodlands photo mural to an English classroom. Comfort was monitored for temperature, humidity, CO₂, various particles and gases. User surveys included perception of

design, comfort, health, attention, and cognitive and emotional wellbeing. Further observational studies of attention and engagement used the Leuven scale for wellbeing developed by Professor Ferre Laevers at Research Centre for Experiential Education at Leuven University in 2005.

Internal air quality results revealed that the maths classroom with plants improved air quality by an average of 10% and humidity by 8% above the English classroom. The study also found consistency of comfort and freshness with the passive ventilation system set to 750ppm.

Occupant surveys revealed plants had a closer association with cognitive wellbeing and the mural of nature had a stronger relationship with emotional wellbeing. Head Mistress Suzie Longstaff stated, “The findings have shown that the subtle reintroduction of nature can enhance the quality of learning environments to benefit health, productivity, cognitive and emotional wellbeing.”

5.2 The biophilic workplaces: “second home” by Youmna Dmour

The Second Home Company have regenerated an old building in East London, which is an appropriate case to study the impact of the biophilic design features in workplaces as it recognises the advantages to health and wellbeing of having internal landscaping. This workspace is quoted in *AnOther* magazine as a place “where nature acts as a catalyst for creative sanctuary and innovation” (Hawkins, 2016).

Buildings in large densely populated cities are challenging, but with creative and imaginative thinking, they can be joyful, cheerful and soulful spaces for people to live and work. If the designer is going to deliver buildings in which individuals thrive and flourish for living or work, there is a need to capture the holistic environment of the building design as well as the user experience. The flourish model is a way of achieving a holistic design.

This research interviewed 10 occupants in the Second Home Spitalfields building in East London and generated a matrix that explains, first, the factors of indoor environmental quality (IEQ) in the office environment that mostly affected occupant’s wellness. Second, these factors, which include biophilia, also show their impact on feelings that occupants perceive besides the economic benefits such as reduced absenteeism. The interviews in this study focused on the occupants’ perceptions and some economic issues, so this research will present a holistic view of the building both physically and psychologically.

In conclusion, it was clear that using biophilic design made a huge difference in the occupants’ satisfaction and wellness. The occupants’ responses show two main points. The first one is that using biophilic design features alone are not enough to reach the best environmental quality for health and wellbeing. The second point is to integrate biophilic features with the ability to control the indoor environment quality for satisfactory thermal, air, lighting and sound conditions together with a suitable spatial layout of the office. This has been especially important since March 2020, when the COVID-19 virus began posing a risk of severe infection. Biophilic design enhances and adds great value to a holistic environmental design.

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