MULTI-SENSORY DESIGN for Intelligent Creative and Productive Workplaces

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Environmental Design Affects Health and Well-Being of People Physically, Mentally and Socially
Cities and Buildings

What is the city but people
Shakespeare in *Coriolanus*

But what are cities built without the wisdom of people
Bertolt Brecht in *Coriolan*
A City—or building--should be built to give its inhabitants security and happiness

Aristotle
Intelligent Buildings and Cities should provide a multi-sensory experience

Multi-sensory experience from array of stimuli

- People
- Space—looks, feel and senses
- Indoor Environmental Quality
- Work focus
- Social
Amanda Levete (architect)

To live in a great space inspires you and lights your spirit. *The environment in which you live and work has a tremendous capacity to change your mood and affect the way you live your life.* Space, volume and natural light are vital for good living.

Levete, A, Architecture at Future Systems, To live in a great space that inspires you, Financial Times, 16.02.08
Architecture and the multi-sensory experience
Our existence is enlivened every waking moment by a symphony of stimuli from people, objects, building spaces, task interest and Nature. This rich array of inputs to the mind and body generates the multi-sensory experience which can colour and enrich the environment for people to live and work in. Like in music the notes of melodies, harmonies and rhythms magically combine in a myriad ways to inspire the mind so too in multi-sensory design which weaves a tapestry and diversity of experience for people to flourish in.

*Derek Clements-Croome 2016*
Sensory Garden

Enable young children to be immersed in the scents, textures and colours of flowering and fragrant plants and grasses.

#TransformTheseusBoreas
synaesthesia is an effect where one sense is described in terms of another and so specific sensory qualities of objects are mixed and confused with other qualities. Examples in language and in literature: “warm/cool colours”, “the smell of money”, “taste of revenge” and so on.

Synaesthesia is also a neurological condition in which stimulation of one sensory or cognitive pathway leads to automatic, involuntary experiences in a second sensory or cognitive pathway.

Sereševskij, a research subject studied by Lurjia, presented with a tone pitched at 2,000 cycles per second and having an amplitude of 113 decibels, said: “It looks something like fireworks tinged with a pink-red hue. The strip of colour feels rough and unpleasant, and it has an ugly taste – rather like that of a briny pickle . . . You could hurt your hand on this.”

Even numbers remind me of images. Take the number 1. This is a proud, well-built man; 2 is a high-spirited woman...”

Paolo Fabiani University of Florence 2016
Sounds and Smells

- Forest Bathing—fragrance of resins, leaves
- Sounds of Nature —sea, rustling leaves, birdsong
- Touch and visual beauty add to these calming environments

To Offset Brutality of city noise, pollution and smells
In this world where time ever shortens we need to stop and—

- Feel
- Savour
- Reflect
- Let time breathe and expand
“sensory reality” booth allow stressed workers to sit in and be transported to their own enchanted forest or tropical island. The pod is designed to stimulate more of the body’s senses than virtual reality goggles do alone, so “employees can mentally travel to any destination”.

Sensiks, a start-up based in Paddington and Holland, claims its 240cm high, 140cm wide pod helps “recall memories from the past” to reduce stress, will leave the user feeling “recharged and re-energised”, and can even “provoke a euphoric state of mind”.
OUR SENSES EVOLVED TO WORK TOGETHER,

WHICH MEANS THAT WE LEARN BEST IF WE STIMULATE SEVERAL SENSES AT ONCE.

- BRAIN RULES BY JOHN MEDINA
Year 4 Finalist of The Mental Health in the Workplace Challenge by AIA

The pulse-activated sensory experience designed to help people with pain, anxiety, stress disorders, PTSD, and recovery as well as those seeking relaxation and to help them understand their barriers of the experience.

In the immersive reality experience, users are linked between personal reality, VR cinema, and their immersed virtual world combined with color, sound, and movement at flow, adventure, duty, and light frequencies, resulting in an immersive virtual reality experience.

Feedback on stress levels is received from a biometric headband measuring brain waves, measurement of heart rate and skin conductance.

mentaalbeter ÅIA BARCLAYS
HAPPINESS BY DESIGN by Paul Dolan 2014

- MINDSPACE-Enable, Engage, Encourage, Exemplify to Explore and Evaluate

- SALIENCE-attention drawn to what is novel and relevant
SALIENT MNEMONIC

- SOUND
- AIR
- LIGHT
- IMAGE (Look and Feel)
- ERGONOMICS
- NATURE
- TINT (Colour)
BALANCED CHECKLIST

- B Biophilia-material, 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

Bernheimer 2017 The Shaping of Us
BCO RESEARCH PROJECTS

- Productivity Report 2017 by MacTavish and Greenhill (Currie Brown)
- Wellness Matters Report 2018 by Perkins-Will; Elementa; Sentinel; Imperial College and Reading University/QMUL Team (Garrod; Poole; Pack; Cullan; de Mateis; Clements-Croome)
WELL version 2 2018

- Water
- Light
- Nourishment
- Movement
- Thermal comfort
- Sound
- Materials
- Mind
- Community
CREATIVITY
Carson in her book *Your Creative Brain* 2010 argues for seven brain sets to maximise imagination, productivity and innovation:

- *Absorption or engagement by being open to ideas; envision using imagination; connect by divergent thinking to generate multiple solutions; reason with logic; evaluate by critically reviewing evidence, ideas and concepts; remembering that creativity can spring from negativity and streaming thoughts to allow a harmonious systemic flow of ideas.*

Research in management and leadership describe conditions for stimulating creativity:

- *Facilitating collaboration; having a vision; delegating responsibility; showing how a company cares for employees; letting people arrange their workspace; fostering brainstorming sessions in and outside the workplace.*

Among all these factors one can see that creativity is part of human flourishing and needs a physical, mental and social climate to do this.

In his book *The Origin of Creativity* 2017 E O Wilson simply says we enrich our knowledge by allowing the sciences and humanities to intermix in our endeavours. This is exactly what the Flourish model does by bringing together objective and subjective measures when designing or managing workplaces within an organization. Now we can survey peoples feelings about their work environment but can measure how their body is responding to that environment too so identifying the total state of being of an individual at a particular time and place.
Huppert and So 2013 in Social Indicators Research 2013,110, 837--861 describe a European survey —43,000 subjects in 23 countries— which aimed to define what is meant by flourishing. This resulted in defining 10 attributes of positive wellbeing or flourishing: 

`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 or Diener and Seligman.

**Human performance** underlying productivity has been defined as depending on *motivation, ability or competence and opportunity* offered by amenities and support systems. 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.**
QUALITATIVE
- Perceived Health and Well-being
- Happiness and Satisfaction
- Security
- Empowerment
- Achievement
- Relationships
- Community

PHYSICAL
- Greenery/Nature
- Views
- Decor/Aesthetics
- Colour
- Character
- Layout/Functionality
- Space

QUANTITATIVE
- Daylight
- Air Quality
- Noise
- Dampness
- Pollution
- Temperature
- Neighbourhood Design

PERCEPTUAL
- Perceived Health and Well-being
- Happiness and Satisfaction
- Security
- Empowerment
- Achievement
- Relationships
- Community

ECONOMIC
- Decreased Public Health Costs (illness, injuries, therapies)
- Increased Asset Value/Sale Price
- Higher Rental Rates
- Better Occupancy Rates/Tenant Longevity
- Productivity
- Performance
- Prosperity
- Social Capital
The FLOURISH WHEEL
An assessment tool for health and well-being

DESIGN

subjective parameters
- design & aesthetics
- layout & functionality
- space
- character
- color

objective parameters
- light
- air quality
- noise
- dampness
- pollution
- temperature
- neighbourhood infrastructure

perceptual
- health & well-being
- happiness & satisfaction
- decreased stress/anxiety
- empowerment & achievement
- safety & security
- personal relationships
- community inclusion

economic
- decreased public spending
- increased asset value
- higher rental rate
- better occupancy rate
- productivity
- profitability
- presentation & attractiveness
- aesthetics & presentation

IMPACT

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read more about Flourish in:

LEGEND
- 10 - Exceptional
- 9
- 8
- 7
- Minimum standard
- 6
- 5
- 4
- 3
- 2
- 1 - Detrimental
FLOURISH METHOD

- Work with client mapping needs with Flourish
- Use a sample survey of occupants using questions based on Flourish
- Work with HR on economic area
- Use Kansei analysis of results to get a predesign Flourish map
- At POE stage collect data from environment and people repeat analysis
- Recommend any changes
KANSEI

Kansei engineering parametrically links the customer's emotional responses (i.e. physical and psychological) to the properties and characteristics of a product or service. In consequence, products like buildings for example can be designed to bring forward the intended feelings.
Post Occupancy Evaluation

- BUS- building user studies using satisfaction scores
- Leesman Index- e-survey data from office users
- BSRIA-Building Performance Evaluation in Non-Domestic Buildings BG63/2015 by Michelle Agha–Hossein et al.,
- WELL Standard
- ProWell
- Flourish model
Should building designers undertake a Hippocratic Oath promising to put Health and Wellbeing as the primary focus of their designs?
WHAT WE CALL THE BEGINNING IS OFTEN THE END

AND TO MAKE AN END IS TO MAKE A BEGINNING

THE END IS WHERE WE START FROM

T.S. ELIOT -- FOUR QUARTETS -- LITTLE GIDDING