Building Sustainably
Biophilic Design Workshop

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Building a better world together
Questions for you

http://etc.ch/wDtW

OR
Moving beyond green to create truly sustainable buildings
What defines a great indoor environment?
<table>
<thead>
<tr>
<th>CHARACTERISTICS LINKED TO COMFORT</th>
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<tbody>
<tr>
<td>Temperature</td>
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<td>Humidity</td>
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<td>Acoustics</td>
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<td>Light</td>
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<td>VOC’s</td>
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<td>Colours</td>
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<td>Surfaces</td>
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Luukku House, Aalto University
Assessing Health and Wellbeing in Buildings
Alignment between BREEAM and the WELL Building Standard™

Chris Ward & Alan Yates - BRE
Jaclyn Whitaker, Shalini Ramesh & Nathan Stodola - IWBI
Evidence from Offices

- 15% increase in reported levels of well-being
- 6% more productive
- 15% more creative
- reduction in absenteeism
Q-Free office, Trondheim

- Noise reduction
- Modern aesthetic
- Promote health and creativity
Think of a place where you feel relaxed and inspired?
Think of a place where you feel relaxed and inspired?

a. At home
b. In a forest
c. By the sea
d. In the office
e. In the mountains
f. On my bike
g. On the train to Ecobuild
– Biophilia hypothesis, idea that humans possess an innate tendency to seek connections with nature and other forms of life.

– German-born American psychoanalyst Erich Fromm in The Anatomy of Human Destructiveness (1973)

– Harvard Professor of Biology, multiple Pulitzer prize winning author and world authority on social insects Edward O. Wilson in his work Biophilia (1984), which proposed

Our genetic connection to nature
Question 2

Which of the following might provide the best “connection to nature”?

a. Plants
b. A painting
c. View from a window
d. Diversity of pattern
e. Daylight
f. Colour
g. Texture
h. Sound
i. Air
j. Scent
• Grow and deepen the evidence base for health, wellbeing and productivity impacts of restorative office refurbishment
The questions

• What **practical interventions** can office owners implement to improve health and wellbeing?
• Can these be **quantified** as part of the decision making process?
• Can **products** used in the refurbishment of a building be measured for their “health and wellbeing potential”?
• Measures of occupant **productivity**?
• Provision of practical **guidance** to engage refurbishment contractors, real estate owners and designers.
• **Evidence** building for offices and products
The building

- 1980s concrete framed office
- Civil service cellular offices
- ‘Standard’ refurbishment heating, lighting and ventilation strategy and controls
Experimental Plan

– November 2017 to November 2018 (baseline)
– December 2018 to March 2019 (refurb)
– April 2019 to March 2020 (impact)
– Monitoring the indoor environment
– Monitoring the outdoor environment
– Monitoring the occupants
Materials and services inventory
Continuous monitoring using Tinytag loggers
  o Temperature and RH
  o CO$_2$ level

Periodic monitoring
  o Ventilation rate (ACH - using tracer gas)
  o VOC (total and individual compounds by ISO 16000 & 16017 methods)
Computer modelling of daylight:
- Daylight distribution across office space
- Annual profiles of daylight illuminance at eye level, working plane level and window level

Daylight monitoring:
- Outdoor level of daylight – roof-mounted light sensor plus internally mounted power supply and data logger
- Indoor level of daylight
Modelling of acoustic environment:
  • Reverberation time

Characterising acoustic environment
  • Walk through survey

Noise monitoring:
  • Decibels in office
  • Background
  • External
Psychology: Questionnaires, tools, cognitive tasks, interviews
Physiology: Biomarkers, wearables
Productivity measures

Choose the figure that completes the series.

a  b  c  d  e
Question 3

Thinking of your current main workplace - what change would make a positive difference to your working day?

a. Reduced noise distraction
b. Improve access to daylight
c. More plants and greenery in the office
d. Access to views of the sky
e. A diverse colour palette
f. Ability to move subject to my task
g. Fruit
Your feelings for your main workplace?

a. Depressing  
b. Boring  
c. Uplifting  
d. Inspiring  
e. Warm  
f. Cold  
g. Proud  
h. Fun
Question 5

Where do you feel most productive?

a. In a single occupant office
b. In an open plan office
c. In a public space
d. At home
e. In a coffee shop
Question 6

Do you think biophilic design is a step in the right direction to improve health and wellbeing?

   a. Yes
   b. No
   c. Maybe - but needs more evidence
Think of a place where you feel relaxed and inspired?

- At home: 21.9%
- In a forest: 25%
- By the sea: 34.4%
- In the office: 0%
- In the mountains: 15.6%
- On my bike: 3.1%
- On the train to Ecobuild: 0%
Which of the following might provide the best “connection to nature”? 

- Plants: 34.4%
- View from a window: 31.3%
- Daylight: 12.5%
- Colour: 3.1%
- Sound: 6.3%
- Air: 12.5%
- Smell: 0%
- A painting: 0%
- Diversity of pattern: 0%

Results
Thinking of your current main workplace - what change would make a positive difference to your working day?

- Reduced noise distraction: 34.8%
- Improve access to daylight: 30.4%
- More plants and greenery in the office: 8.7%
- Access to views of the sky: 4.3%
- A diverse colour palette: 4.3%
- An ability to move subject to my task: 17.4%
- Fruit: 0%
Results

Feelings for your main workplace?

- Depressing: 12.3%
- Boring: 31.6%
- Uplifting: 5.3%
- Inspiring: 12.3%
- Warm: 10.5%
- Cold: 12.3%
- Proud: 3.5%
- Fun: 12.3%
Results

Where do you feel most productive?

- In a single occupant office: 20.7%
- In an open plan office: 37.9%
- In a public space: 10.3%
- At home: 20.7%
- In a coffee shop: 10.3%
Results

Do you think biophilic design is a step in the right direction to improve health and wellbeing?

- Yes: 86.2%
- No: 0%
- Maybe - but needs more evidence: 13.8%
Thank you

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