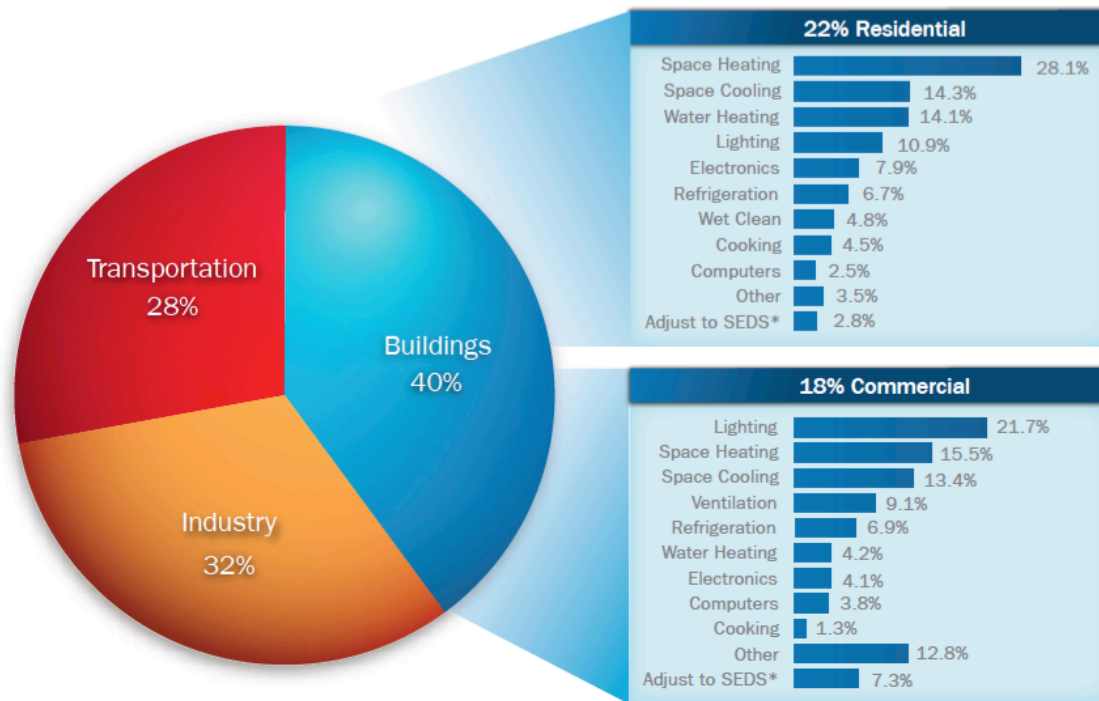


The Value of Variance

The *Energy - Comfort - Health* Nexus...

"Buildings don't use energy: people do!"

Janda, Arch Sc Rev, 2011, 54: 15:22

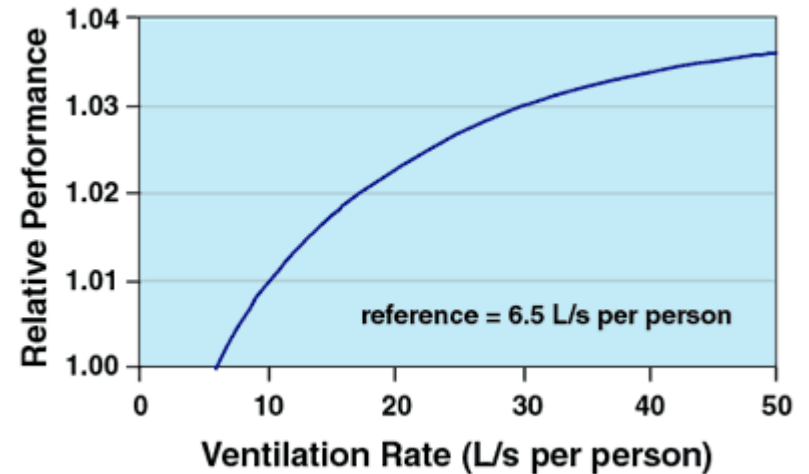
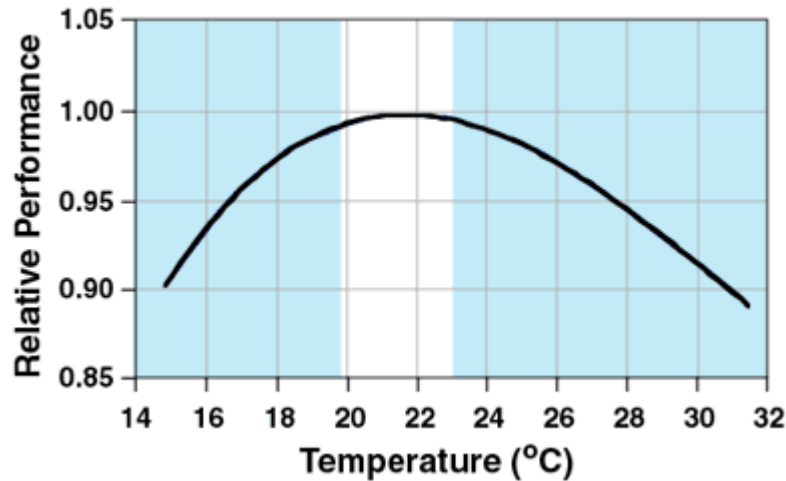


US DOE, 2011, *Quadrennial Technology Review*

Energy vs Salaries



IEQ and Office Work Performance



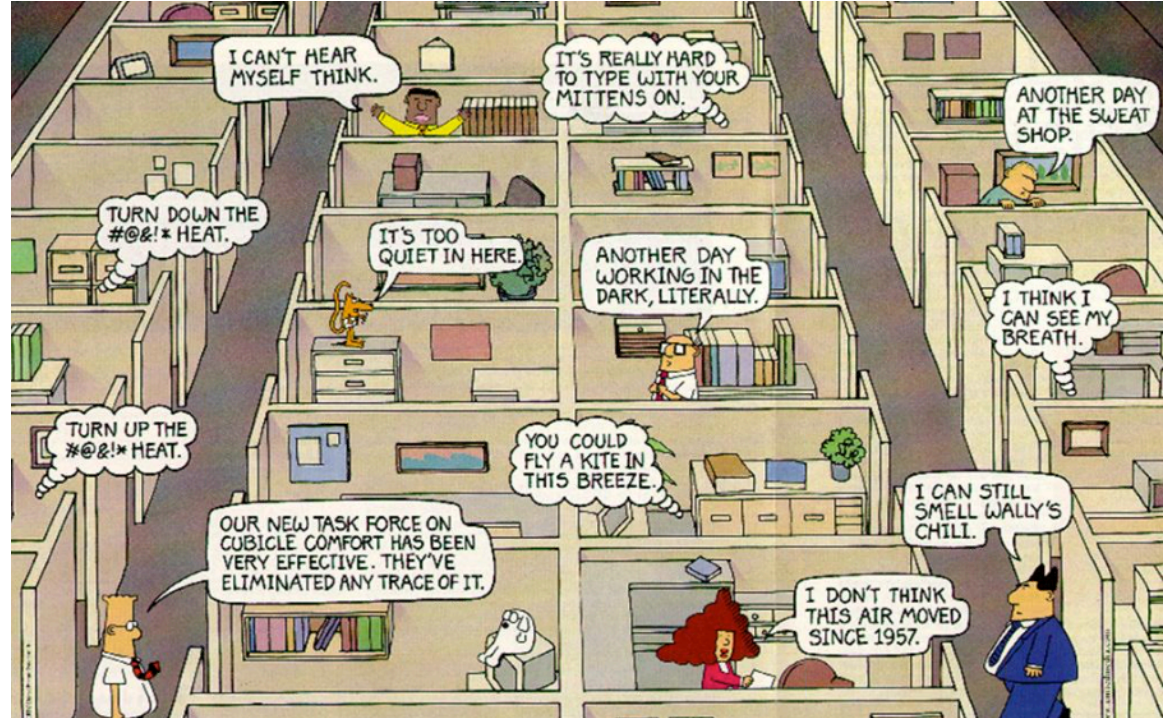
Comfort and Satisfaction

Standards cannot always provide comfort and satisfaction for all

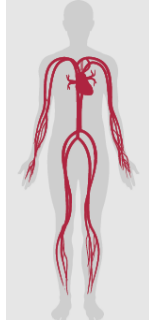
The *standard average user* is an idealization

Comfort and health might be driven by different needs

Image credits: CBE Berkeley



More than just the absence of disease...



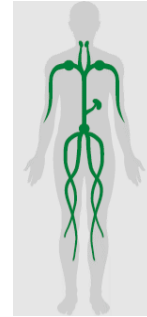
Cardiovascular



Digestive



Endocrine



Immune



Muscular



Nervous



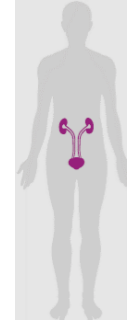
Reproductive



Respiratory



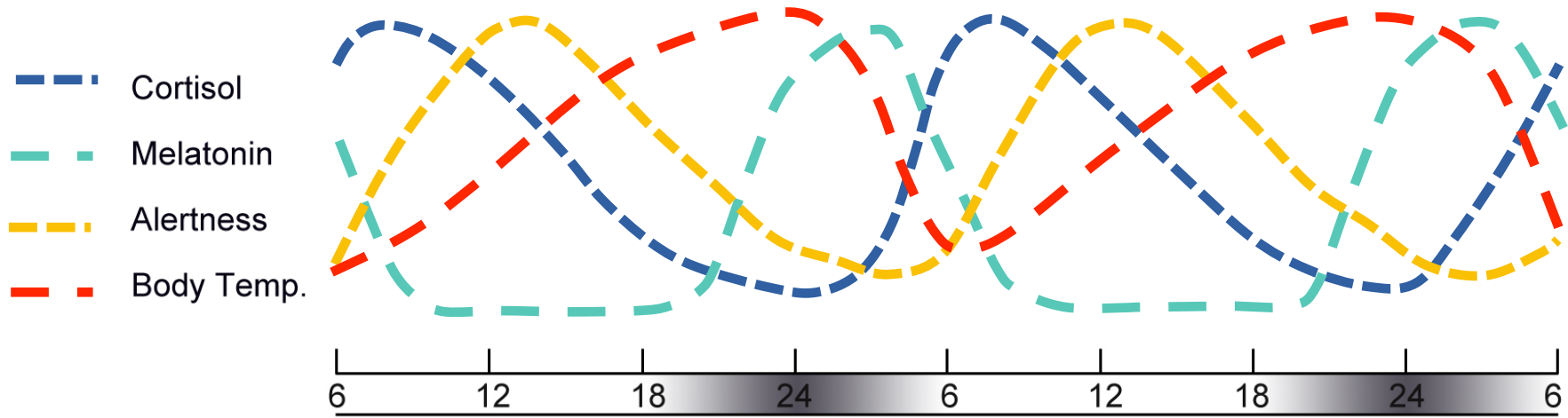
Skeletal



Urinary

Image credits: DELOS

Inter- and Intra-individual variability



Healthy excursions outside the comfort zone...

- Static and uniform conditions might lead to *experiential monotony*
- *Neutrally-acceptable* environments might reduce opportunities for control and adaptation
- *Sensory variability* may benefit cognitive performance, experiential delight and health
- From *risk reduction* to health promotion

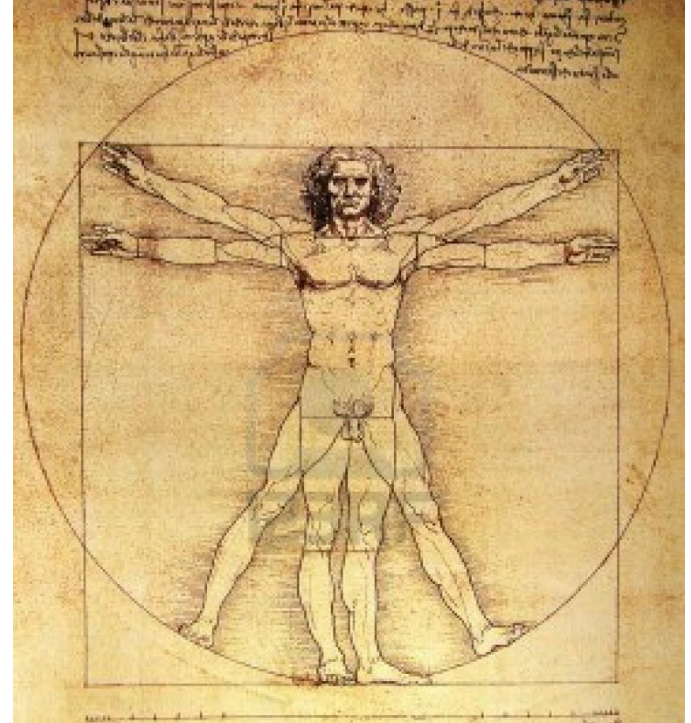


Image: Leonardo da Vinci, *The Vitruvian man*

A Motivation

BUS Non-Domestic survey:

Productivity at work

Please try to evaluate this building with respect to your experience of using buildings in general.

Please estimate how you think your productivity at work is decreased or increased by the environmental conditions in the building?

Productivity Decreased by ... Please tick one point on the scale Productivity Increased by ...

-40% or less -30% -20% -10% 0 +10% +20% +30% +40% or more

1 2 3 4 5 6 7 8 9

Comments about productivity

BUS Wellbeing survey:

Wellbeing Overall

Please imagine a ladder with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you, and the bottom the worst.

On which step of the ladder would you say you personally feel you stand at this time?

Worst 0 1 2 3 4 5 6 7 8 9 10 Best

On which step do you think you will stand five years from now?

Worst 0 1 2 3 4 5 6 7 8 9 10 Best

Reflecting on your experience yesterday...

Did you experience a lot of stress? Yes No

Did you smile or laugh a lot? Yes No

Did you experience the following feelings during a lot of the day yesterday?

Enjoyment Yes No

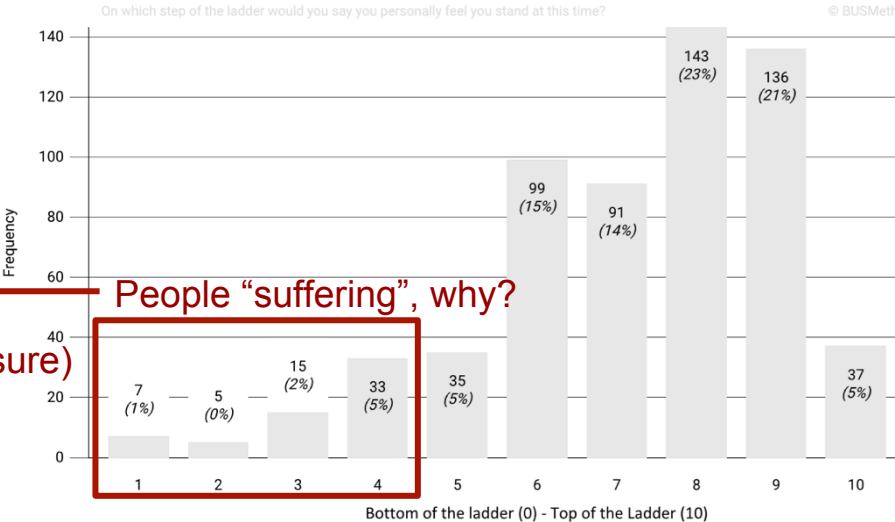
Sadness Yes No

Worry Yes No

Anger Yes No



On which step of the ladder would you say you personally feel you stand at this time?



Life evaluation, not a hedonic (pleasure) measure

Figure 2: Frequency of responses

Productivity to Performance

Healthy City Design 2019

A Proposition

Systematic Productivity Problems

Your goal

Have you the freedom to choose yours?



How “useful” is an activity to help you perform?

Is it useful to buy this ball to practice towards your goal?..



(Your goal defines your rule for judging)

How much did everyone else appreciate your goal?

Performance (*scored!*) -> Productivity

Some quantitative methods to gain insight:

- Stock exchanges (commodities)
- Hedonic regression (planning)
- Satisfaction surveys (planning + indoors)

= value neutral (but value laden) outcomes.



A process of satisfying most people with least resources = more “pop” culture?

How well do you identify with popular culture?...

A Process to Develop Performance (A Critical Reflection)

What makes understandable goals for engineers?

Extension of humanities = human understandable

- *“I want to help with an immediate distress.”*
- *“I want to spend more time identifying with my religion.”*
- *“I want to make as many people happy as I can.”*

(... political, if non-individuated)

Explaining uncertainty in
setting requirements is
diligent and impressive

Extension of physical sciences = human confusion

- *“... net domestic production GWP_{CO_2} at 2050AD == 0...”*
- (... why precisely?... a requirement to justify, not

Bertrand Russell (“What I Believe”, 1925), from Wikiquote...

We are and irrefutable arbiters of value, and in the world of value Nature is only a part. Thus in this world we are greater than Nature. In the world of values, Nature in itself is neutral, neither good nor bad deserving of neither admiration nor censure. It is we who create value and our desires which confer value. In this realm we are kings, and we debase our kingship if we bow down to Nature. It is for us to determine our good life, not for Nature – not even for Nature personified as God.

Understandings of “well-being”: a relevant goal

Arup's organisational culture seeks to support Sustainable Development whilst returning a robust 10% revenue profit...

This is what Sustainable Development means to me in terms of a goal:

“Promote intergenerational well-being, whilst treating all humanity with minimum decency.”

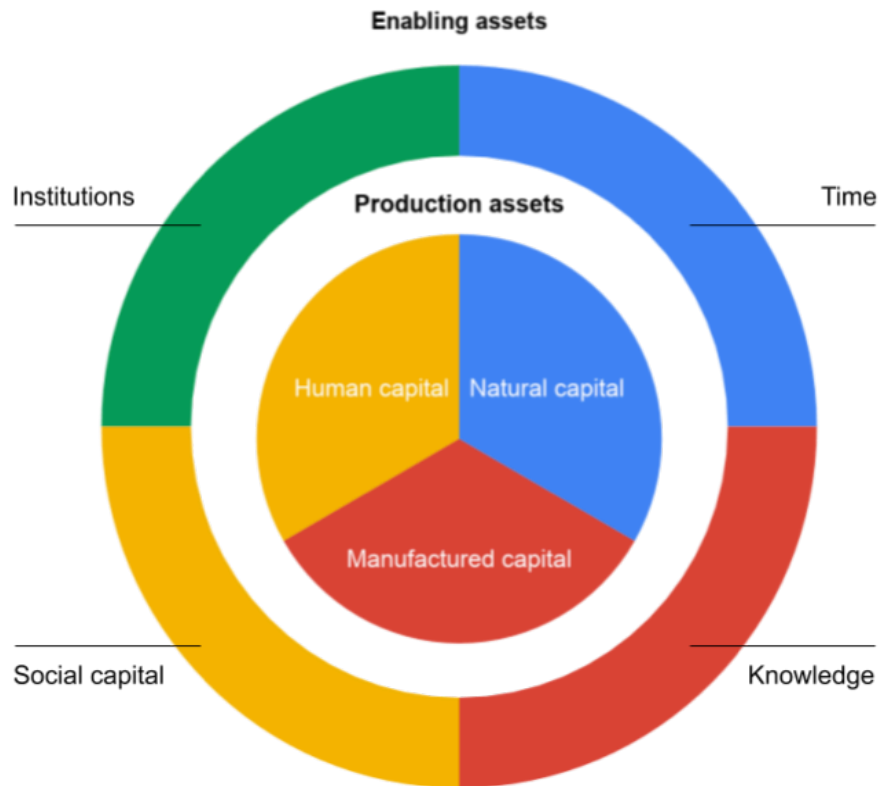
(...a combination of values and rights...)

Have I achieved this? Not convinced...

Means: How can I influence human well-being?

I am cautious. By developing enabling assets, I can help society be more precise with their influence on physical (production) assets.

Enabling assets may be defined as code and released as software for global application.



Evaluation: How might I be more sustainable?

Relevant key performance indicators

Service to personal well-being vs my understanding of sustainable development

- Positional goods (eg. use of luxury items and awards to confer status);
- Conservative reinforcement (ie. social bias created by property ownership);
- Accessibility (ie. universal design);
- Environmental externalities (ie. am I fairly compensating for my pollution?).

**“Good” is essentially indefinable and often depends on the target audience.
I need to respect that, particularly if employed to do so.**

Something to think about...

The modern workplace and its links to health

1. Is job productivity the correct measure of a successful workplace design?
2. What are the adequate measures of a successful workplace design?
3. How should workspaces be designed, organised, lived and appropriated?