
Neuroscience for better space

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CONSCIOUS
CITIES

HU
ME

HUMAN
METRICS
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Conscious Cities is a new field of research and practice focusing on **people-centric** environments that are aware and responsive: using Data Analysis, AI, Tech, and **Cognitive Science in Design**

Cognitive neuroscience is concerned with the study of the biological processes and aspects that underlie cognition.



1. Why is neuroscience a valuable tool for real estate investors?
2. Where is neuroscience most effective in project development?



Future-proofing developments





14% don't want to work in a traditional office. PWC: 'The future of work: A journey to 2022

1/3 British workers unhappy with their work environment. Steeplechase Poll 2016

Layout



Open Plan

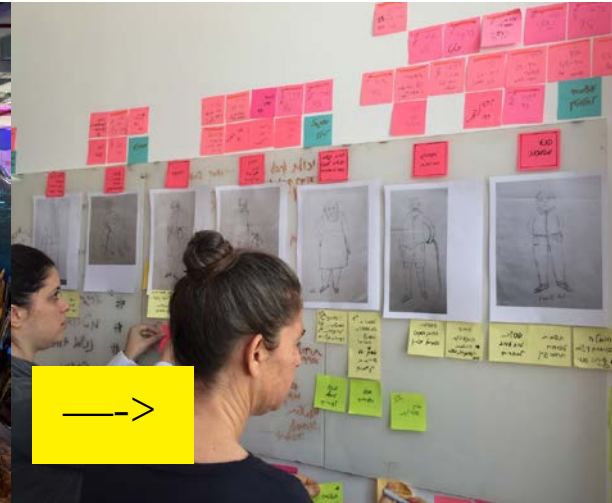
- 28% of productive time lost due to interruptions and distractions.
- Legibility of space and adjustability of furnishings accounts for as much as 25 per cent of the ability to focus.

- Designing for FocusWork, Haworth



Flexible

- Too much choice: 49% of “workers who can’t choose where to work depending on the task”. - Steelcase study
- Less inclusive than is assumed - reinforces power of influencers.



Activity Based Working (ABW)

- Areas designed for specific working activities such as brainstorming, or focused attention.

Light



Artificial light



Natural light

- Workers slept 46 minutes longer per night than those without access to natural daylight.
- More physical activity. - Boubekri (2014)
- Nurses exposed to >3 hours daylight reported less work-related stress and higher levels of job satisfaction. - Alimoglu MK (2005)



Task related dosage

- Light affects non-visual brain responses showed that light can optimise brain function during specific cognitive tasks, especially those requiring sustained attention. - SteeKase (2011)
- But not for all tasks...

Creating a better offer

METRO

What is Sick Building Syndrome (SBS) and have you got it – or have you just caught the office cold?

 **Miranda Larbi** for Metro.co.uk Tuesday 27 Dec 2016 4:07 pm



The Science Of Buildings

02/10/2017 17:00 BST | Updated 03/10/2017 17:00 BST



 **Ansel Camargo**
Cognitive neuroscientist, Lab Director at The Centrex Lab

Science is a tool, which has been used to help commercial industries become more effective and productive. Its influence is everywhere from engineering, manufacturing, technology to athletics. Catapulting each industry to a higher realm of thinking as well as innovation. Imagine, an athlete like Michael Phelps without science shedding light on the physiology and dynamics of movement? Or engineers trying to launch a rocket without understanding gravity or physics?

HARVARD MAGAZINE

RIGHT NOW | ATMOSPHERIC BALANCING ACT

Cognitive Benefits of Healthy Buildings

by OSET BABÜR

MAY-JUNE 2017



BBC



By Michael Bond
6 June 2017

"We shape our buildings and afterwards our buildings shape us," mused Winston Churchill in 1943 while considering the repair of the bomb-ravaged House of Commons.

More than 70 years on, he would doubtless be pleased to learn that neuroscientists and psychologists have found plenty of evidence to back him up.

We now know, for example, that buildings and cities can **affect our mood and well-being**, and that **specialised cells in the hippocampal region of our brains** are attuned to the

Forbes

Business #ThinkSmart
06.07.2017 8:00 AM 1,001

The World's Top Neuroscientists Are Helping Shape The Future Of Cities

WRITTEN BY
Mike Phillips

In communist East Germany, urban planners deliberately designed towns, streets and buildings to grind down the sense of individuality of residents, and make them feel like they were constantly under scrutiny.

Architects, developers and public authorities have always used the built environment to create specific feelings. Such a movement is growing across the globe, intersecting leading-edge science, design and thinking about the built environment.

theguardian

A manifesto for conscious cities: should streets be sensitive to our mental needs?

Rapid developments in behavioural science and data technology offer the prospect of urban streetscapes helping to alleviate ailments such as stress, anxiety and boredom - and even reducing the likelihood of crowd trouble





The first generation that needs science to tell us that nature of healthy.

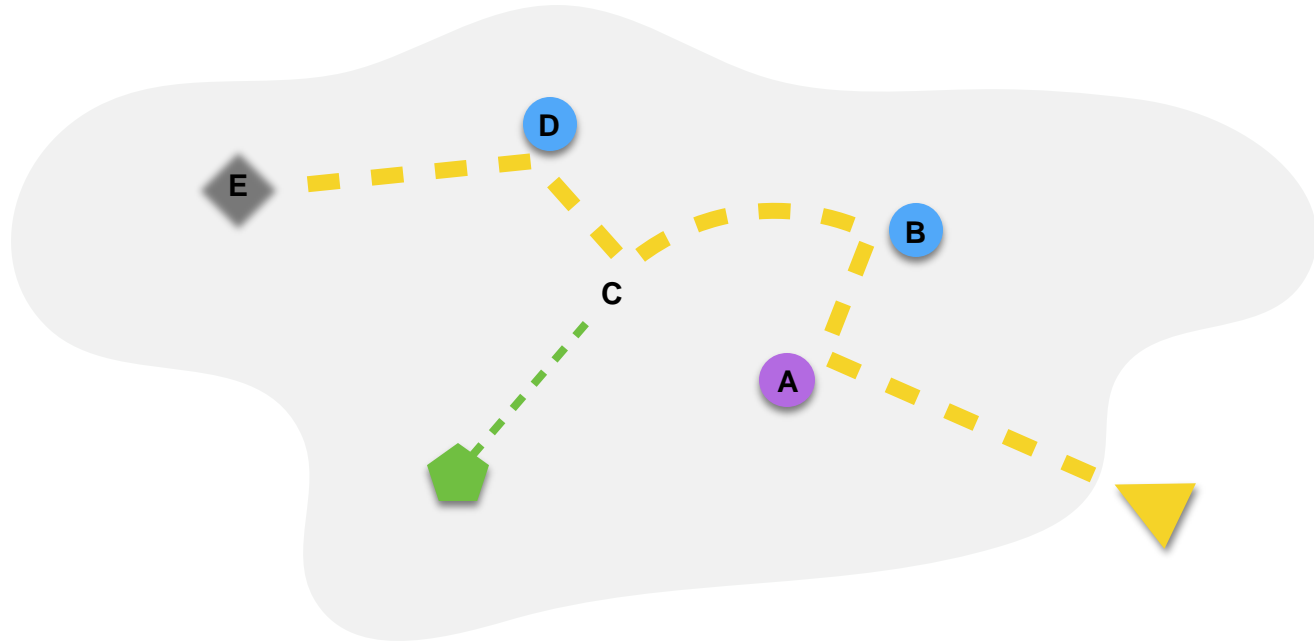
... but also, the generation that will be expecting more of buildings.

Sense of Place / Place Attachment

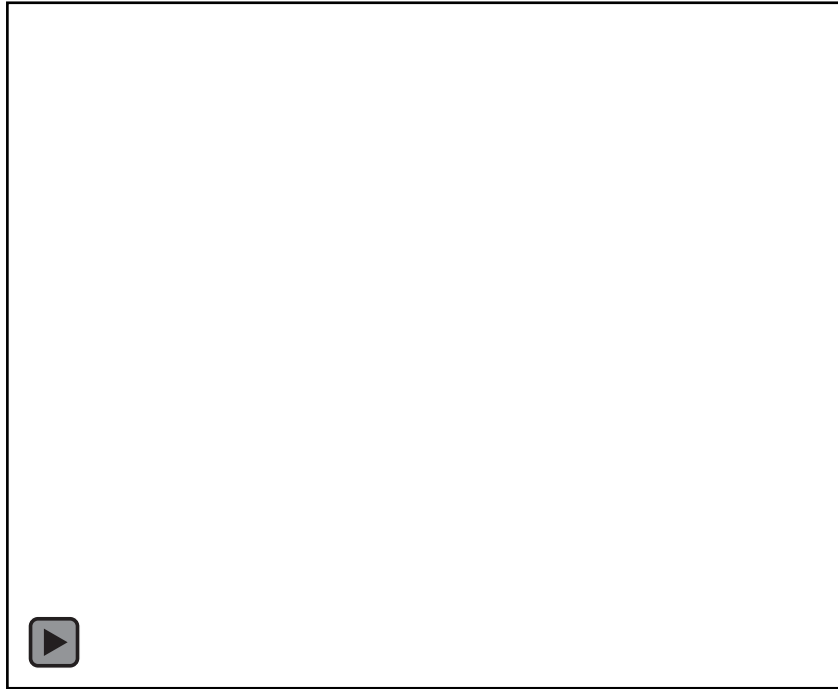


Defining features of a Cognitive Journey

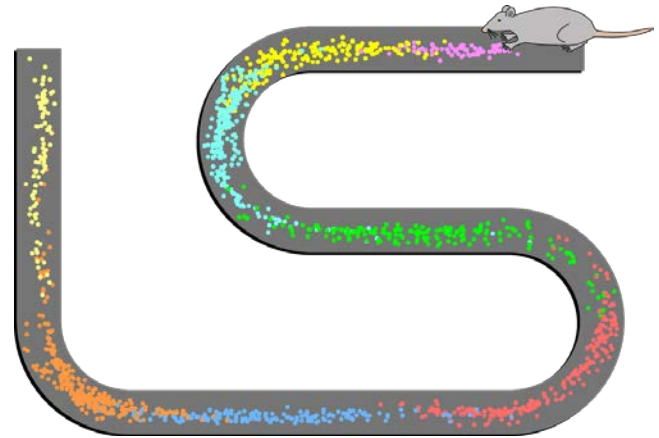
Choice points, memorable events, rewards



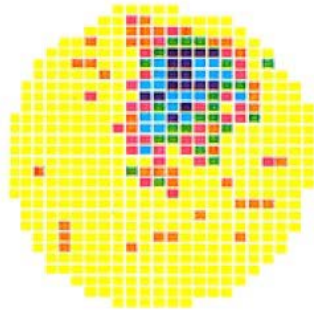
Why Place matters...



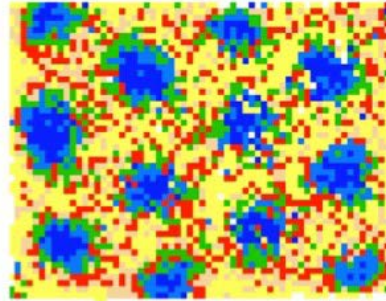
Credit: Loren Frank et al / UCSF



Why Place matters...



Place Cells



Grid Cells



Boundary Cells

Place: The hippocampus is the locus of the brain's internal map of the spatial environment.

Memory: place cells express the location of the animal in combination with information about events that take place or took place there... place cells express past experience.



Physically Constructed

Experiential Model

Experiences linked to environment because of certain characteristics.

These enable or constrain a range of experiences that shape meanings.



Place Satisfaction

The place supports my objectives and answers to my needs.



Place Attachment

I feel that I can really be myself there
I really miss it when I am away too long
I feel happiest when I'm there
It is the best place to do the things I enjoy
It is my favourite place to be

(Stedman 2003)

Cognitive Map

Place Satisfaction

Positive Place Attachment

Office Worker



Wellbeing - Increased productivity
Workforce retention

Visitors



Return visits builds cultural centre

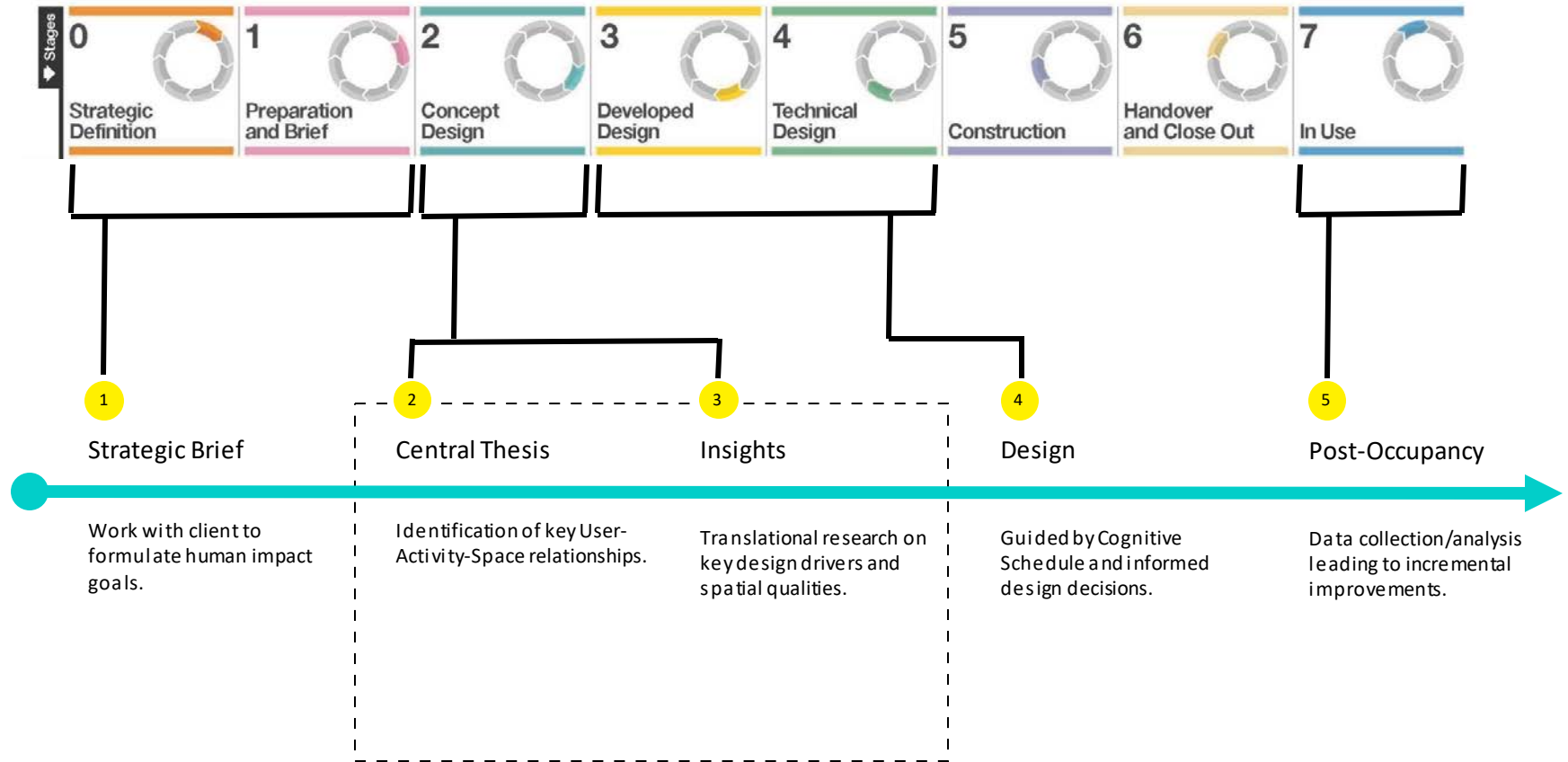
Locals



Civic pride
Pro-environmental behaviour



Where does this fit in project development?

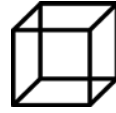




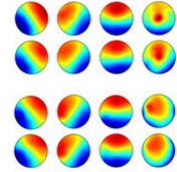
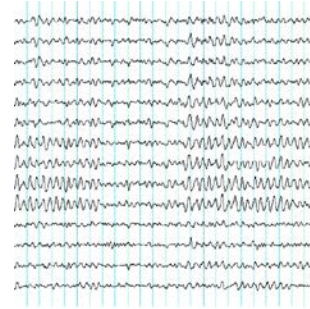
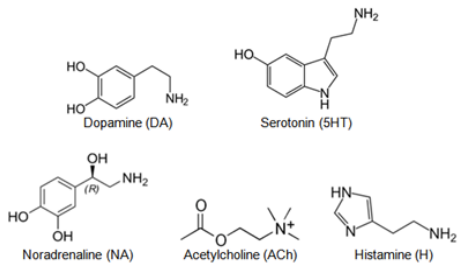
User



Activity



Space

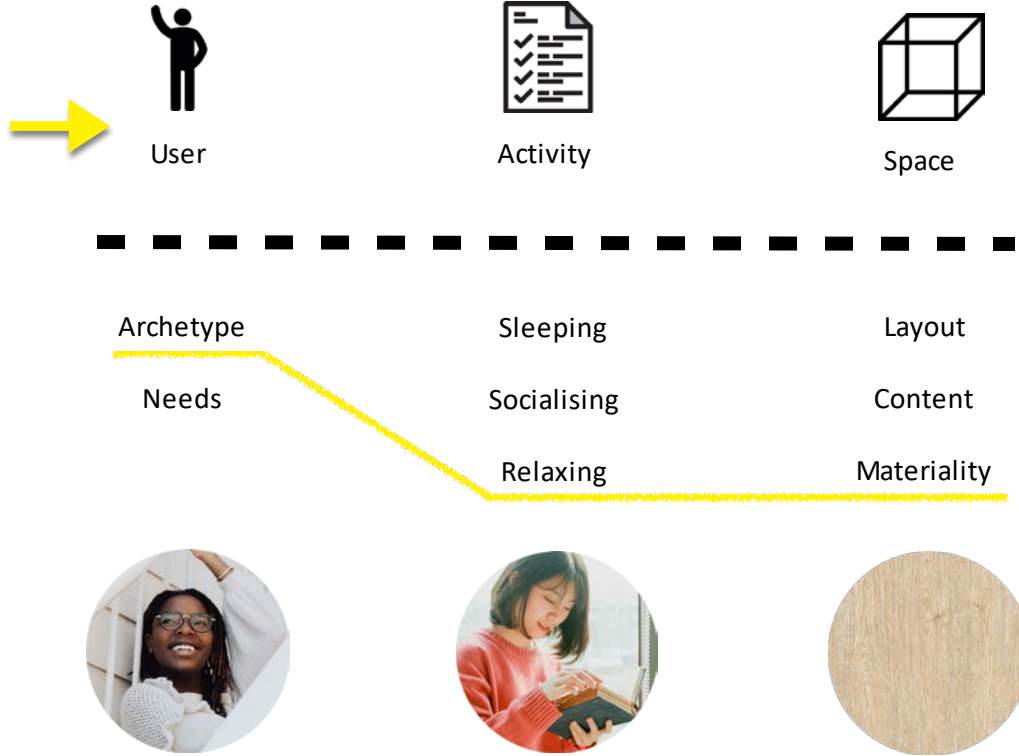


User



“Brain networks are much more about who you are than what you're thinking about.”

Functional Brain Networks Are Dominated by Stable Group and Individual Factors, Not Cognitive or Daily Variation. Neuron Apr. 2018

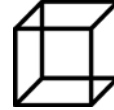




User



Activity



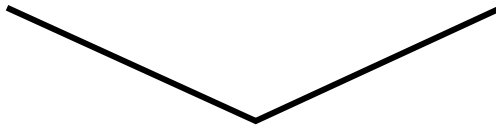
Space



Archetype

Relaxing

Materiality



Measurables

Restorative effect
measured through
cognitive task

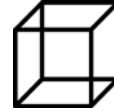
Variables
A/B/A



User



Activity



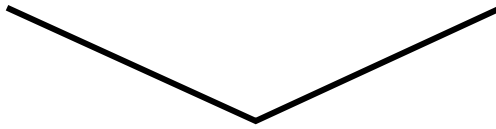
Space



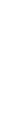
Archetype

Socialising

Materiality

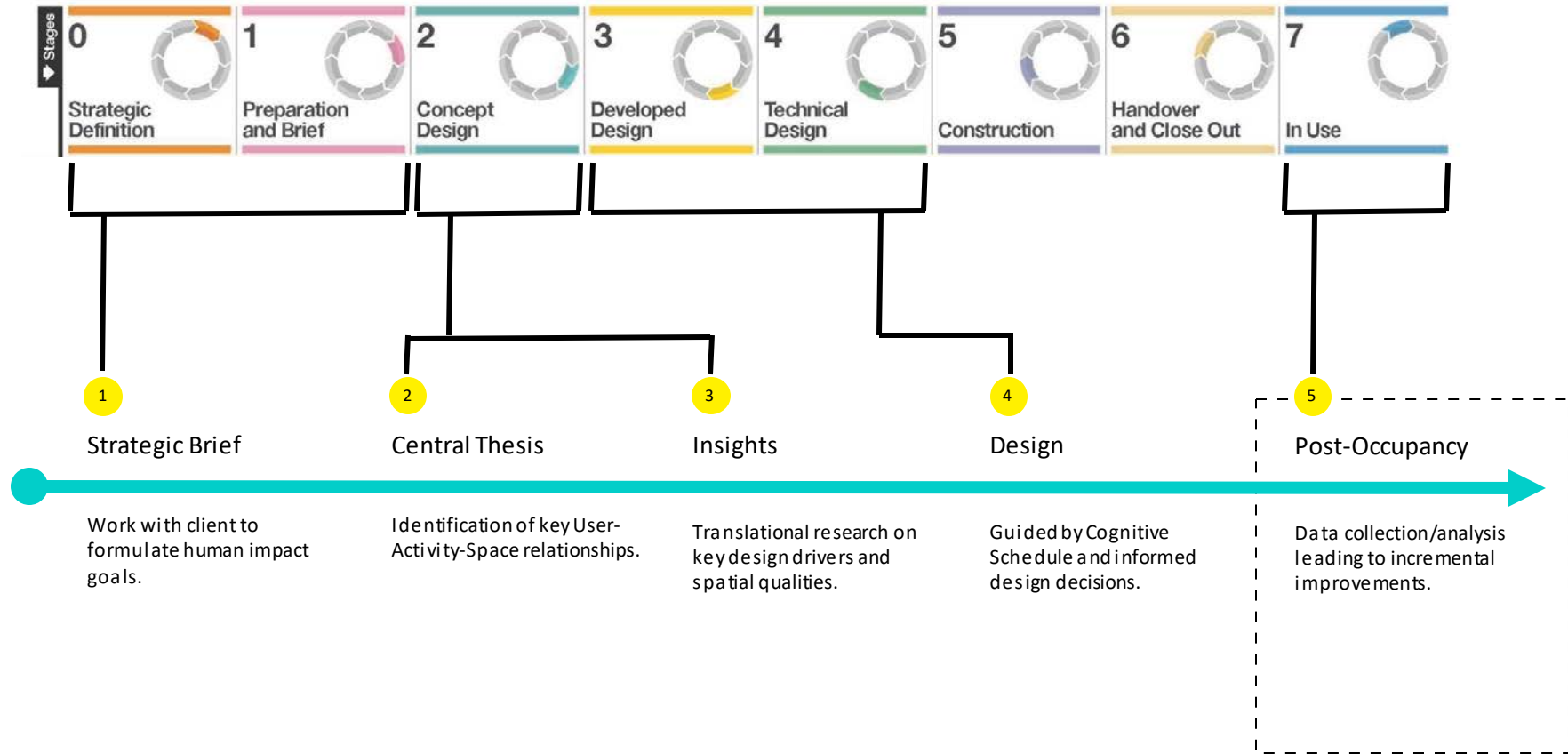


Loneliness
measured through
subjective perception



Variables
A/B/A

Measurables





Learning
Outcomes



PerceivedW
ellbeing



WorkplacePr
oductivity

“We shape our buildings; thereafter they shape us”

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