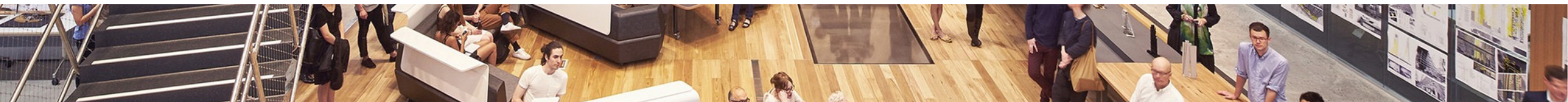




CIBSE: Back to the Future Seminar

Brendon McNiven
The University of Melbourne

12th September 2023



Introduction

- Observations on Design (We have forgotten more than we know)
- The Importance of Integration
- The Importance of Crossing Over
- Possible ways forward

We have forgotten
more than we know

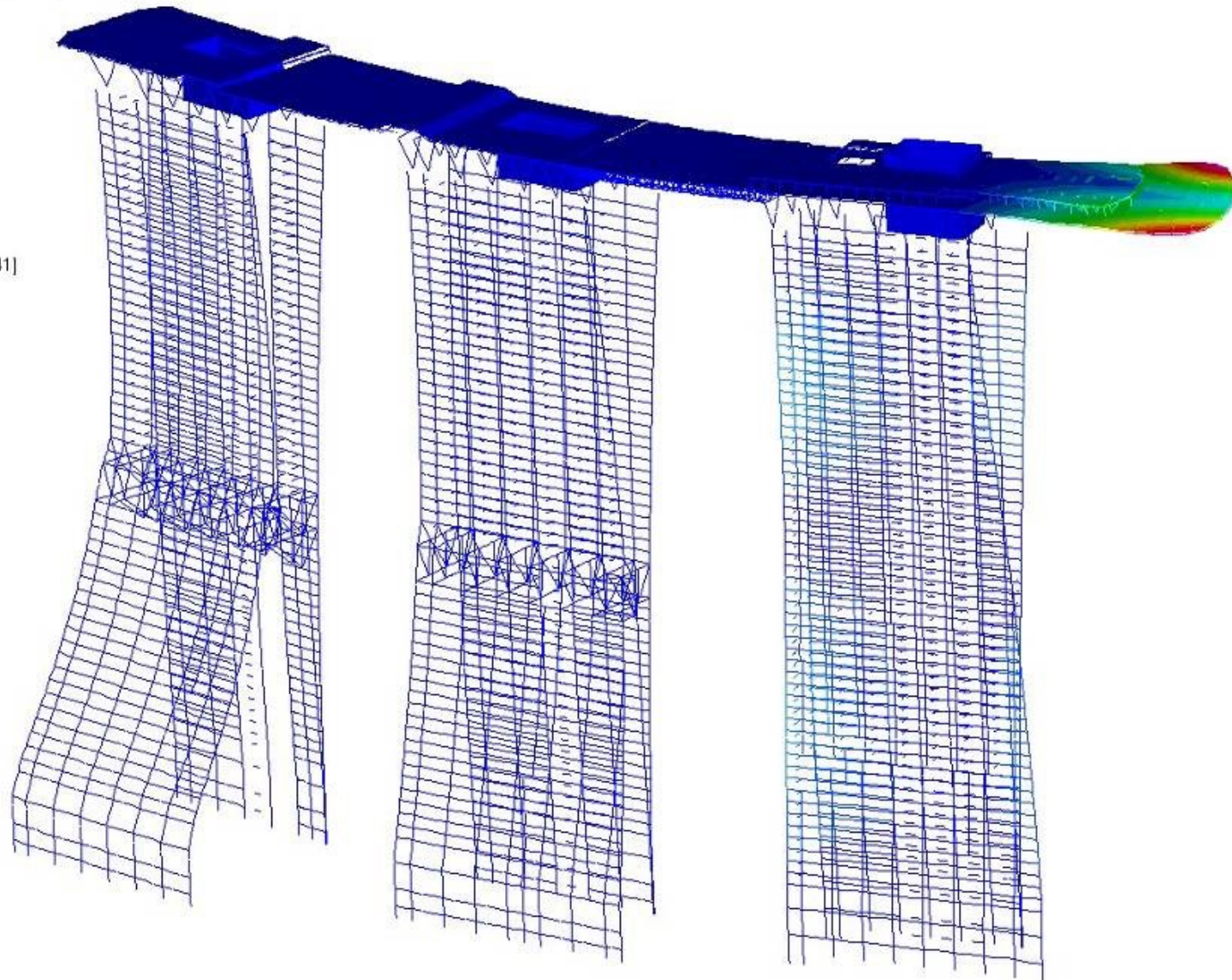
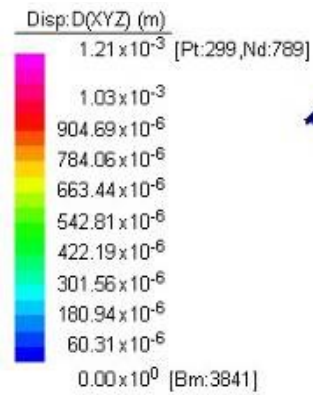


Marina Bay Sky Park Dynamics Singapore



Image Courtesy: Marina Bay Sands

Dynamics

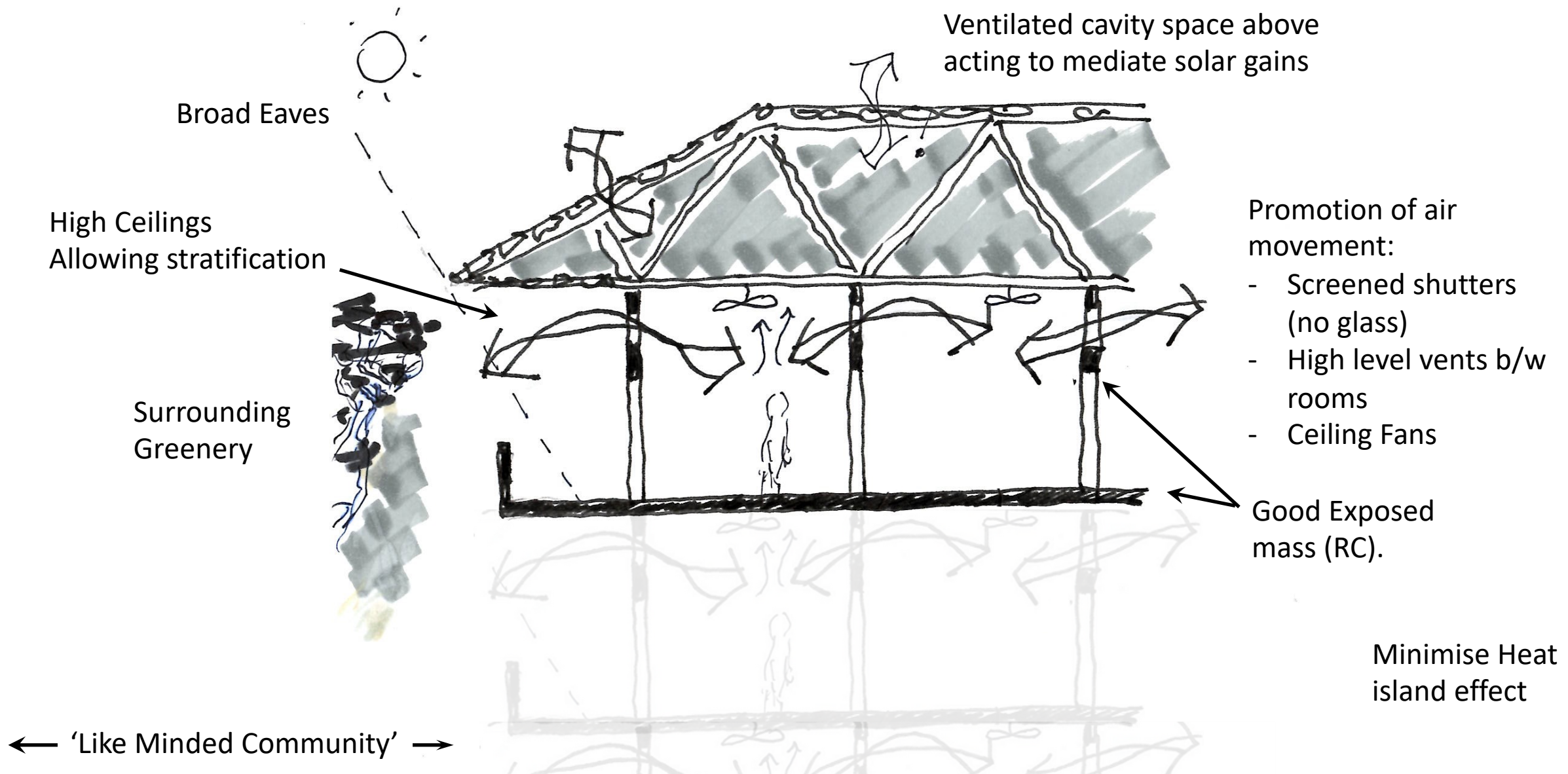


Wind
Seismic
Human









TRADITIONAL 'BLACK + WHITE' RESIDENTIAL ARCHITECTURE SINGAPORE

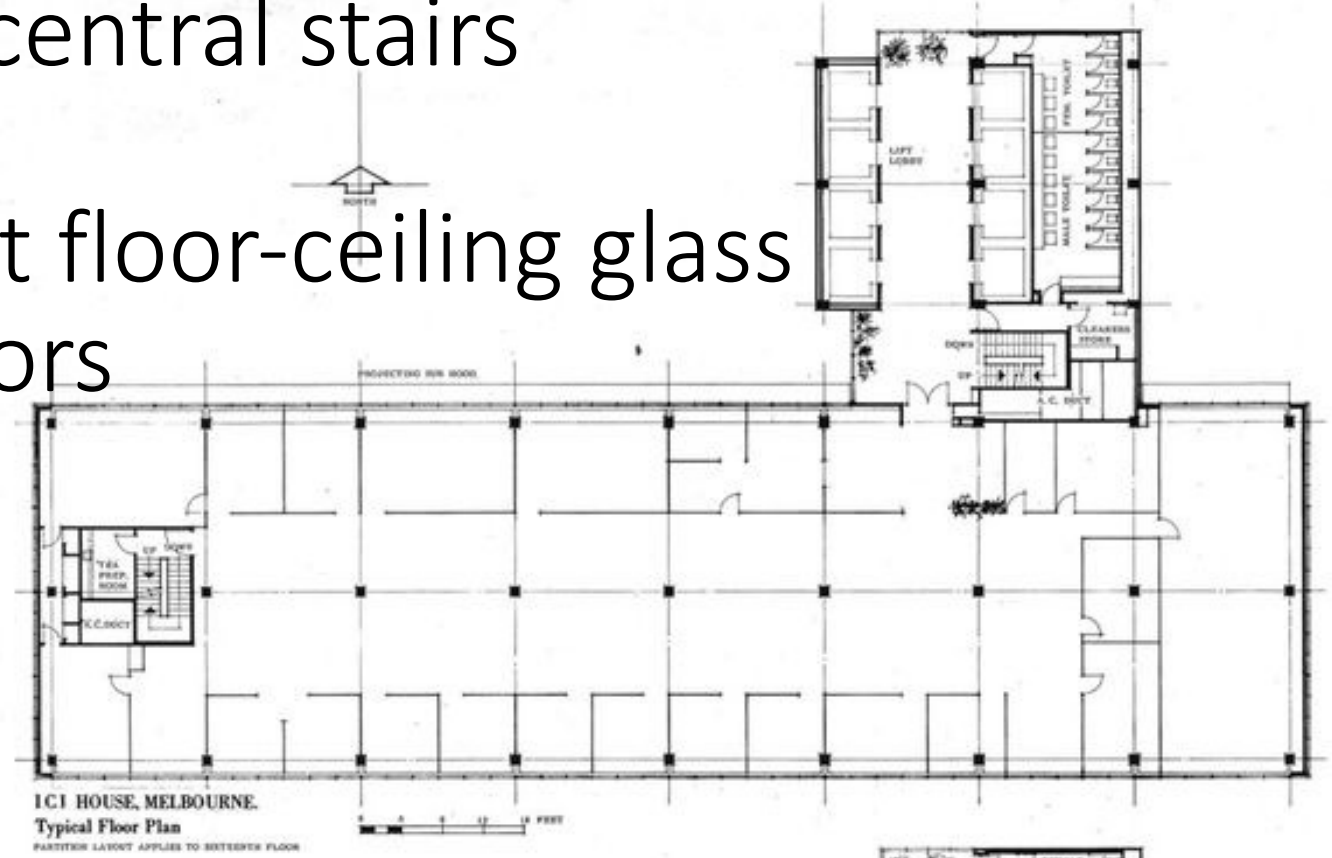
We have forgotten
more than we know



Full East West Shading
Small Horz. shades to North
No shading to South
Side Cores



Inter-storey connecting central stairs
<10m from solar access
Panoramic views without floor-ceiling glass
Steel frame / Precast floors



Enduring (& good) design
works on many levels

Integration is key

- Problems don't come in disciplines
- The whole becomes greater than the sum of the component parts
- Appreciate systems & complexity - avoiding over rationalisation and unintended consequences.
- Achieve understanding & 'buy in'

Figure 4.2.1 the base form of the relational map

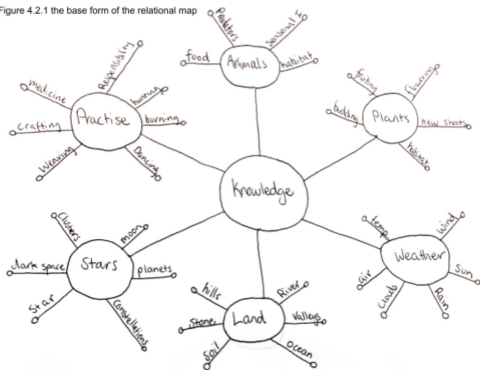


Figure 4.2.2 showing what interacts.

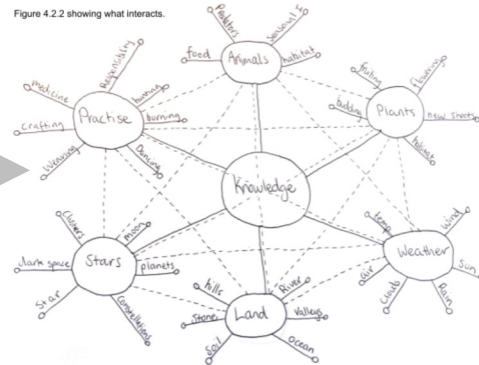


Figure 4.2.3 an example of the complexity.

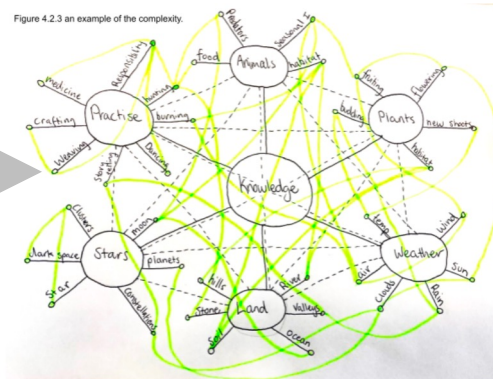
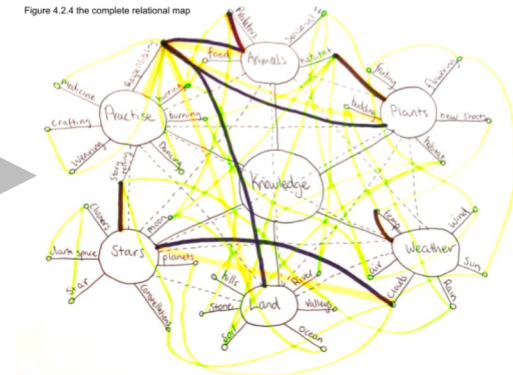


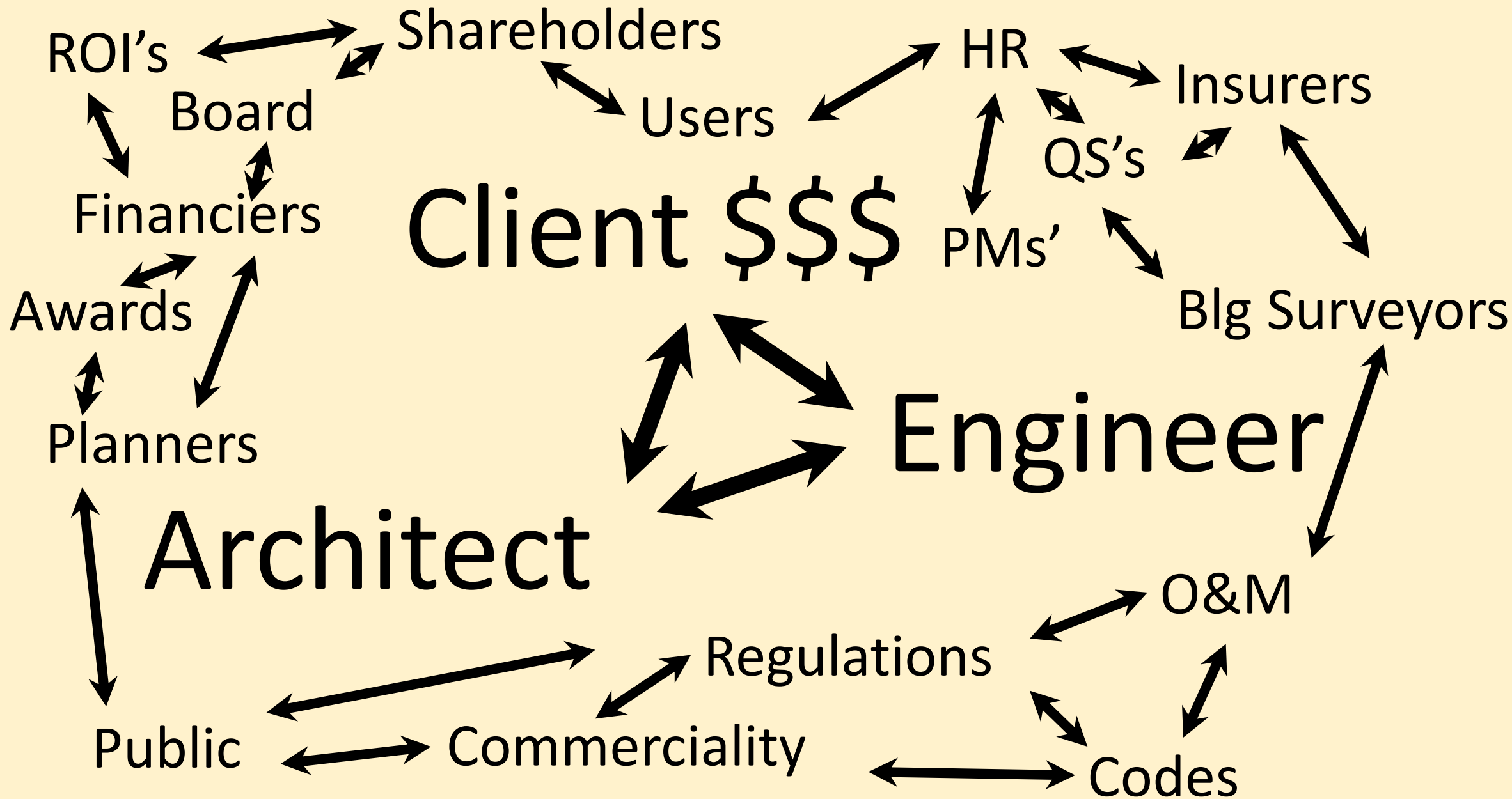
Figure 4.2.4 the complete relational map



Gunditjmara Eel Trap Seasonal Library

Student Project: Ana Assis, Charlie Crawley, Eugene Beissel,
Joshua Sol, Madi Mercer, Oscar McMahaon

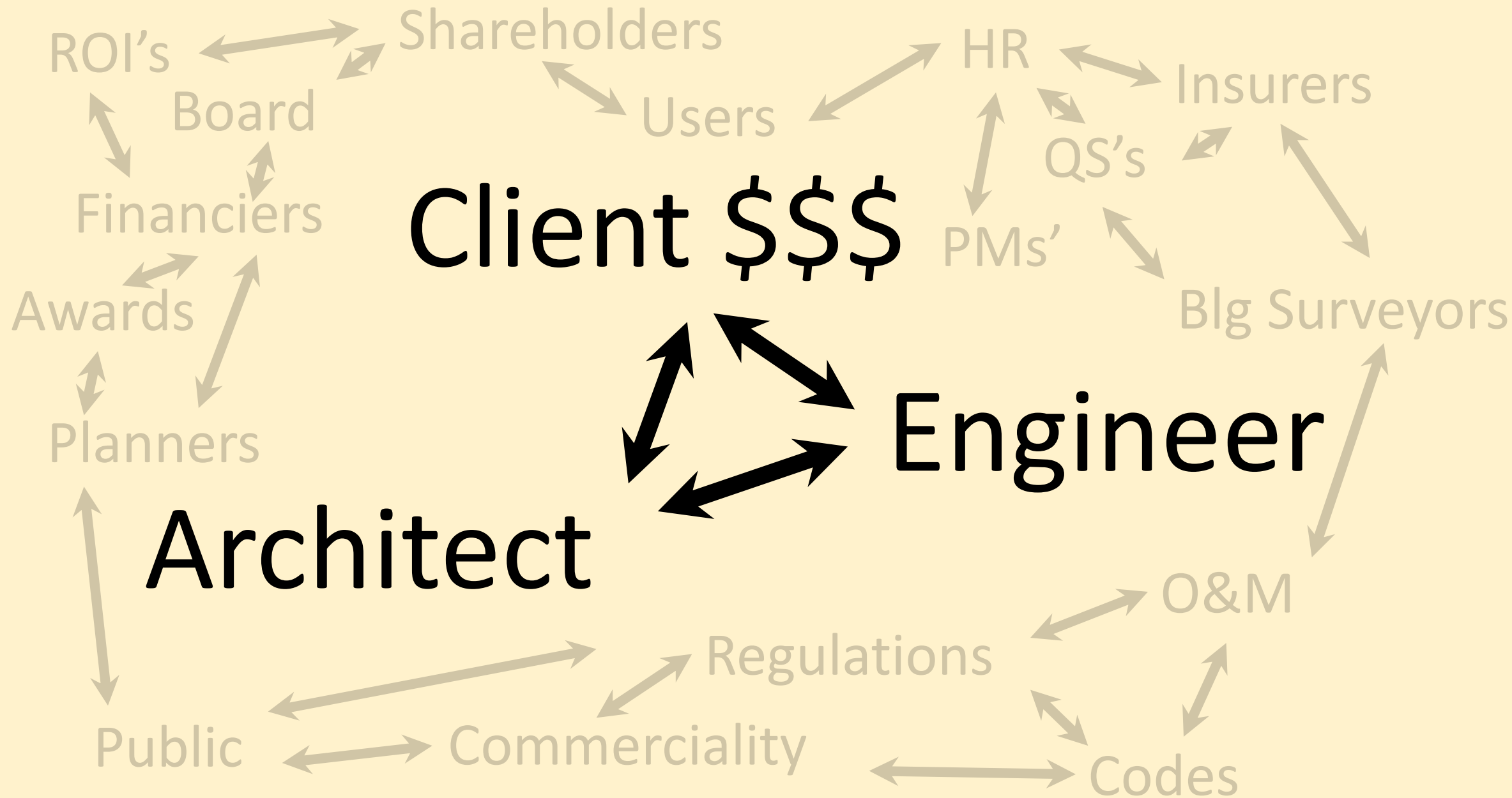
Good technical
design is not enough





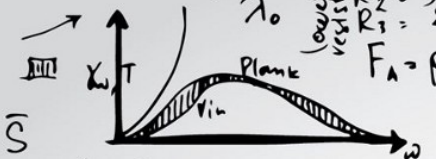



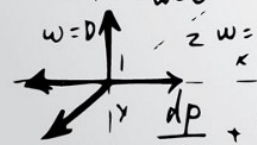

Crossing Over to the Other Side

(Big Business is very wise)



$U = EB$
 $R_1 = 13,5 \Omega$
 $R_2 = 3 \Omega$
 $R_3 = 20 \Omega$
 $F_A = \rho g V$
 $w = D$
 $w = BC$
 $w = 0$

$P = \bar{S}$
 $x = h \frac{C}{\lambda_0}$
 Plank
 V_{in}
 $x = x_n$
 $q = \dots$
 $\rho = \sqrt{x^2 + y^2}$
 $x = x_0 + mt$
 $y = y_0 + nt$
 $z = z_0 + pt$
 Formula for's
 $1) T = \frac{t}{n}$
 $2) v = \frac{t}{t}$
 $3) T = \frac{1}{D} = \frac{v}{T}$
 $4) T = \frac{2\pi}{v}$
 $5) v = \frac{2\pi r}{T}$
 $6) v = \frac{v}{2\pi r}$
 Physics - 10
 Resistance
 $w = BC, \dot{w} = 0$
 $w = D, \dot{w} = A$
 $\frac{dp}{p} + \gamma \frac{dv}{v} = 0$
 $I = \frac{U}{R}$
 $\sum_{n=0}^{\infty} \exp(-nDw/kT)$
 $R = \frac{\rho \cdot l}{S}$
 $A^2 + B^2 + C^2$
 $\sqrt{m^2 + n^2 + p^2}$
 $\sqrt{A^2 + B^2 + C^2}$


Who are We
 How do we learn
 How do we operate

 <p>1. Persisting <i>Stick to it!</i> Persevering in task through to completion; remaining focused. Looking for ways to reach your goal when stuck. Not giving up.</p>	 <p>2. Managing Impulsivity <i>Take your time!</i> Thinking before acting; remaining calm, thoughtful and deliberative.</p>	 <p>3. Listening with understanding and empathy <i>Understand others!</i> Devoting mental energy to another person's thoughts and ideas; Make an effort to perceive another's point of view and emotions.</p>	 <p>4. Thinking flexibly <i>Look at it another way!</i> Being able to change perspectives, generate alternatives, consider options.</p>
 <p>5. Thinking about your thinking <i>(Metacognition)</i> <i>Know your knowing!</i> Being aware of your own thoughts, strategies, feelings and actions and their effects on others.</p>	 <p>6. Striving for accuracy <i>Check it again!</i> Always doing your best. Setting high standards. Checking and finding ways to improve constantly.</p>	 <p>7. Questioning and problem posing <i>How do you know?</i> Having a questioning attitude; knowing what data are needed & developing questioning strategies to produce those data. Finding problems to solve.</p>	 <p>8. Applying past knowledge to new situations <i>Use what you learn!</i> Accessing prior knowledge; transferring knowledge beyond the situation in which it was learned.</p>
 <p>9. Thinking & communicating with clarity and precision <i>Be clear!</i> Strive for accurate communication in both written and oral form; avoiding over-generalizations, distortions, deletions and exaggerations.</p>	 <p>10. Gather data through all senses <i>Use your natural pathways!</i> Pay attention to the world around you. Gather data through all the senses. taste, touch, smell, hearing and sight.</p>	 <p>11. Creating, imagining, and innovating <i>Try a different way!</i> Generating new and novel ideas, fluency, originality</p>	 <p>12. Responding with wonderment and awe <i>Have fun figuring it out!</i> Finding the world awesome, mysterious and being intrigued with phenomena and beauty.</p>
 <p>13. Taking responsible risks <i>Venture out!</i> Being adventuresome; living on the edge of one's competence. Try new things constantly.</p>	 <p>14. Finding humor <i>Laugh a little!</i> Finding the whimsical, incongruous and unexpected. Being able to laugh at one's self.</p>	 <p>15. Thinking interdependently <i>Work together!</i> Being able to work in and learn from others in reciprocal situations. Team work.</p>	 <p>16. Remaining open to continuous learning <i>Learn from experiences!</i> Having humility and pride when admitting we don't know; resisting complacency.</p>

www.habitsofmindinstitute.org

Habits of Mind

Habits of Mind – Profession Ideals

***Rated highly for both
Architects & Engineers***

***Rated more highly for
Architects than
Engineers.***

***Rated more highly for
Engineers than
Architects***

Thinking Flexibly

Creating, imagining,
and innovating'

Striving for accuracy

Questioning and Problem
Posing

Listening with empathy
and understanding

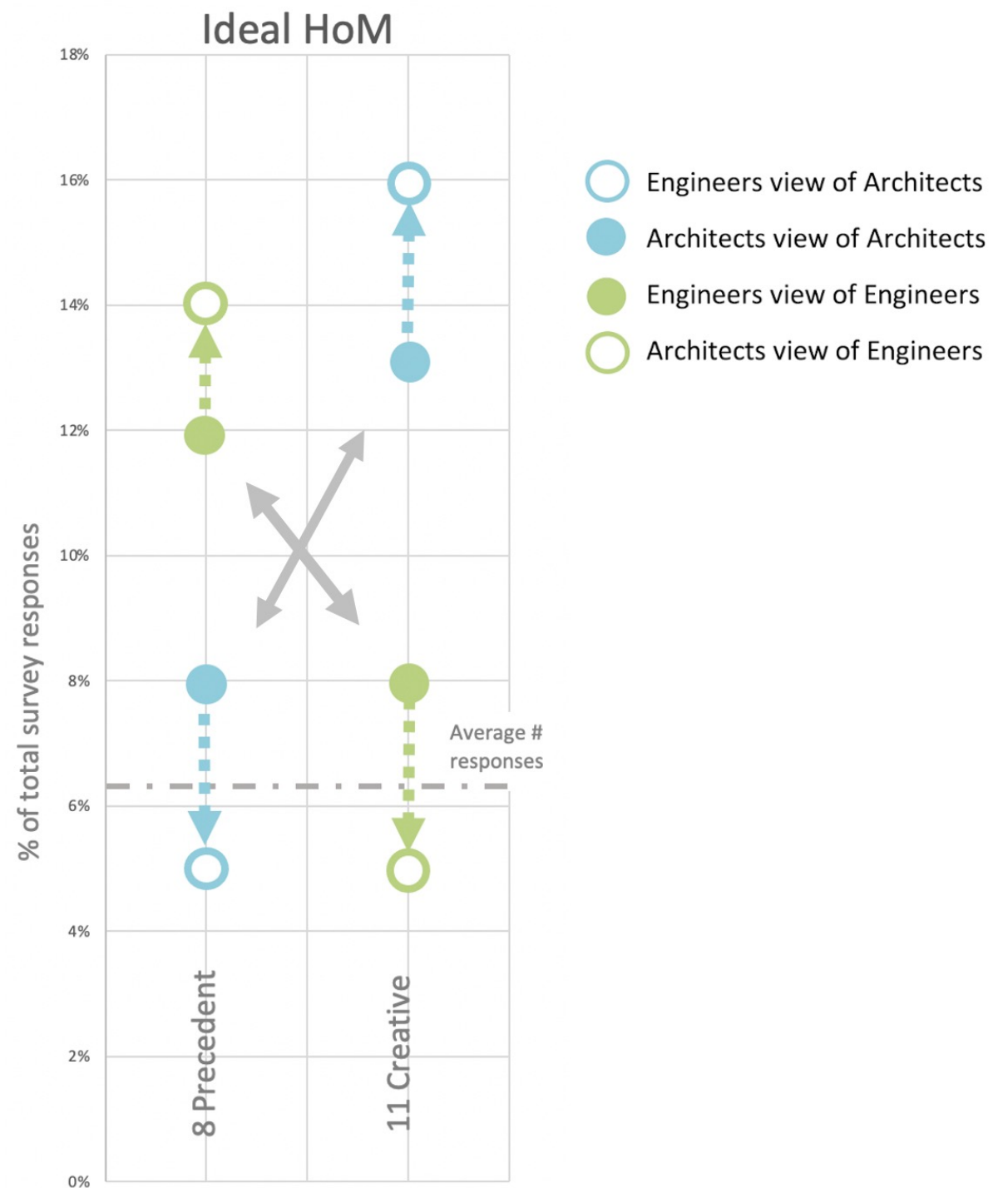
Precedent Thinking:
applying past
knowledge to new
situations

Thinking and
communicating with
clarity and precision

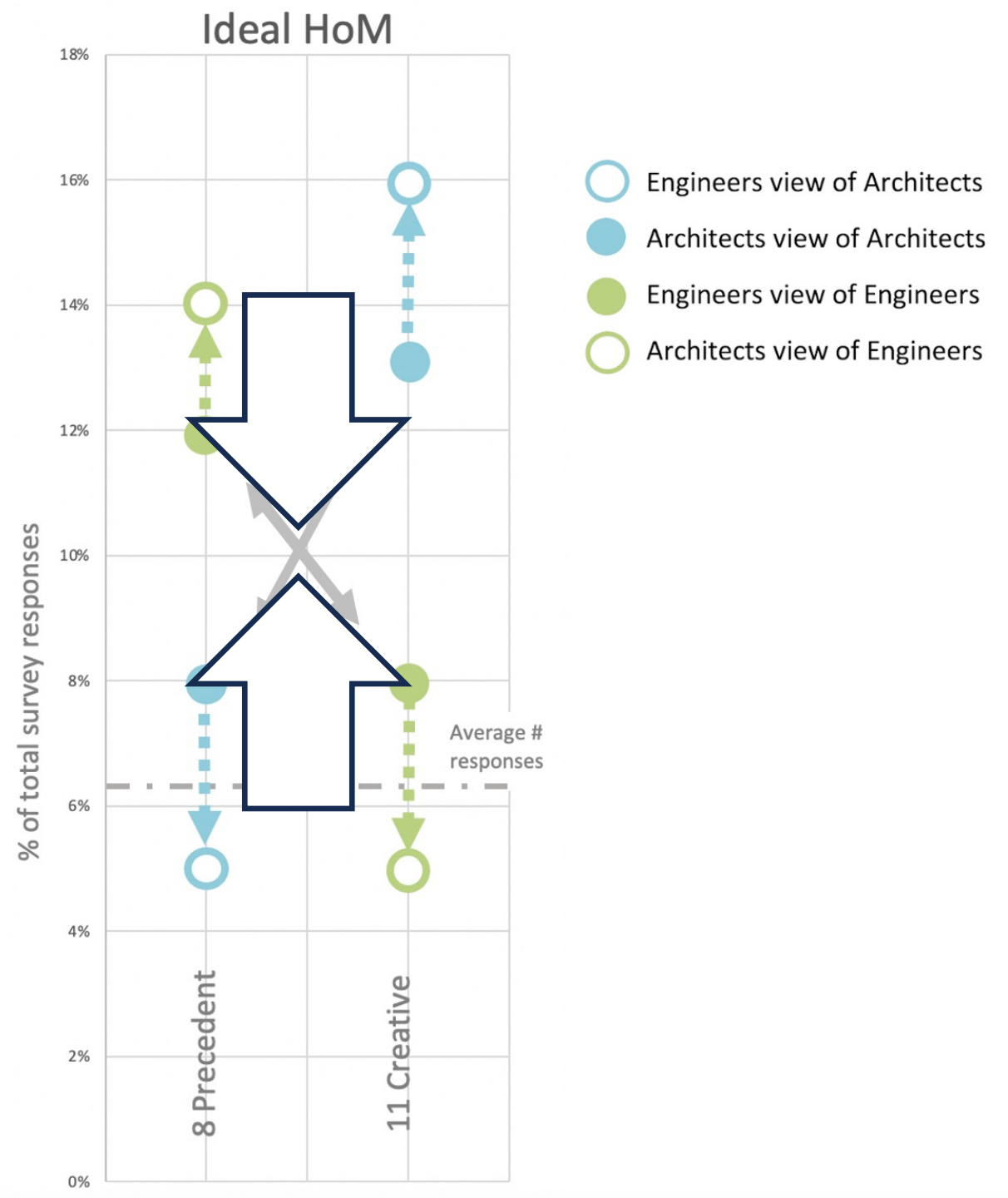
Habits of Mind – Profession Ideals

<i>Rated highly for both Architects & Engineers</i>	<i>Rated more highly for Architects than Engineers.</i>	<i>Rated more highly for Engineers than Architects</i>
Thinking Flexibly	Creating, imagining, and innovating'	Striving for accuracy
Questioning and Problem Posing	Listening with empathy and understanding	Precedent Thinking: applying past knowledge to new situations
Thinking and communicating with clarity and precision		

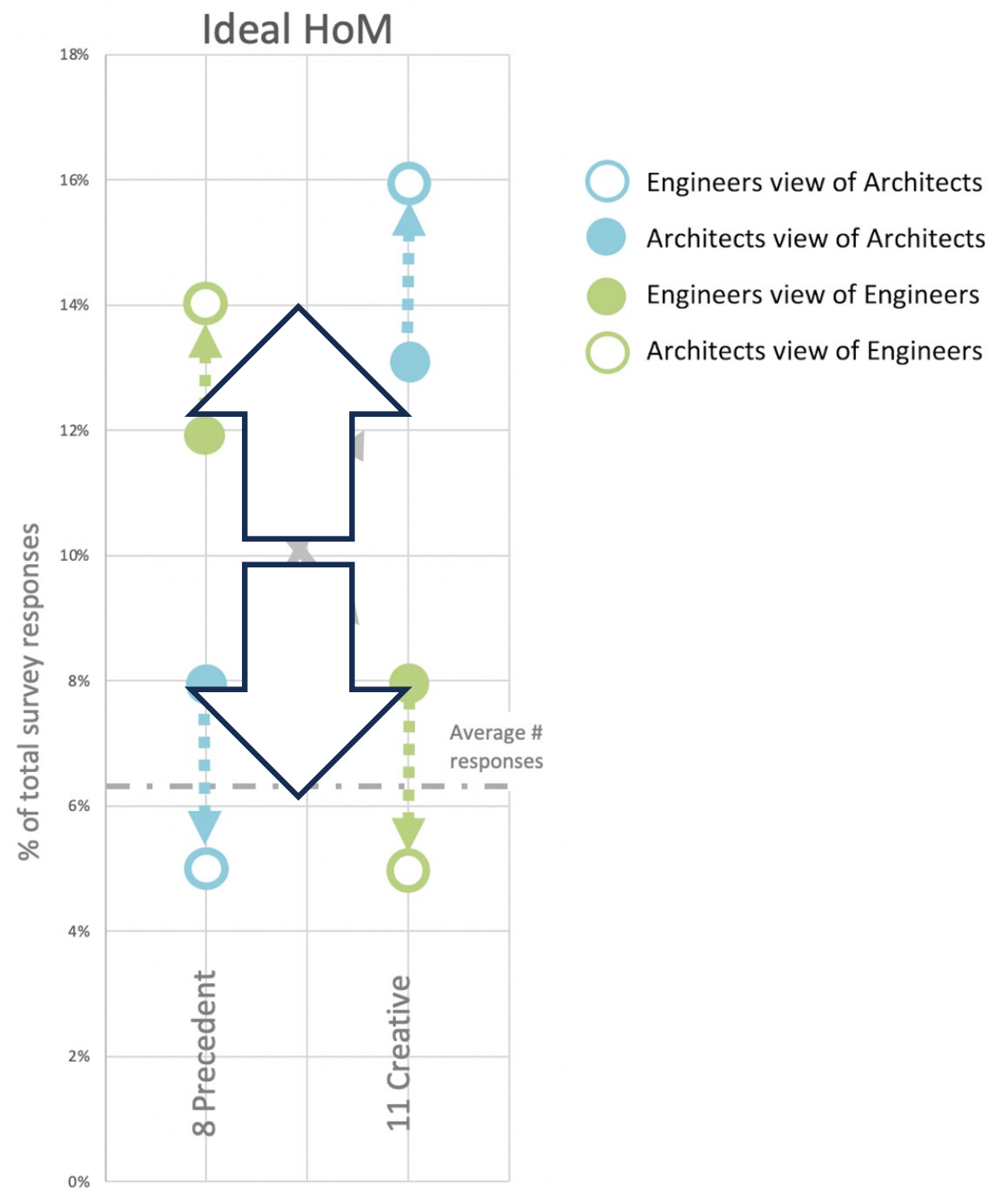
Natural
Inclination to
maintain
pre-conceived
views of
others



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Natural
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maintain
pre-conceived
views of
others



How to integrate as a designer...



Architect and Engineer
(Yutaka Saito and Peter Rice, Tokyo, 1990)
Photo: Koji Kobayashi, courtesy Arup

50%

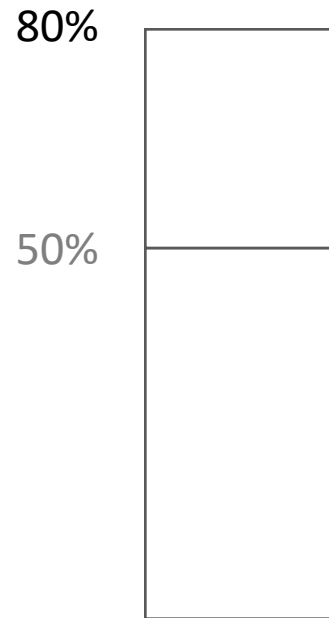


TALK TO EACH OTHER

How to integrate as a designer...



Architect and Engineer
(Yutaka Saito and Peter Rice, Tokyo, 1990)
Photo: Koji Kobayashi, courtesy Arup



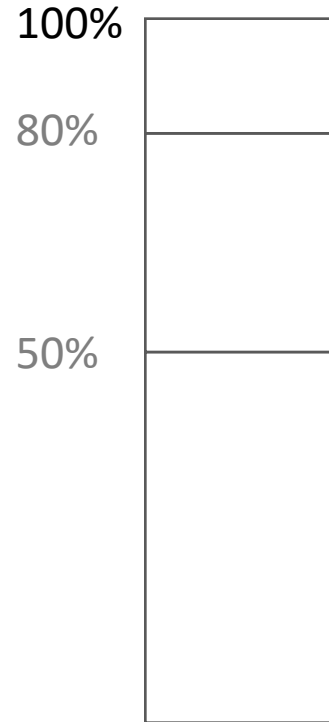
**UNDERSTAND WHAT THE
OTHER DOES, AND VALUE IT**

TALK TO EACH OTHER

How to integrate as a designer...



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(Yutaka Saito and Peter Rice, Tokyo, 1990)
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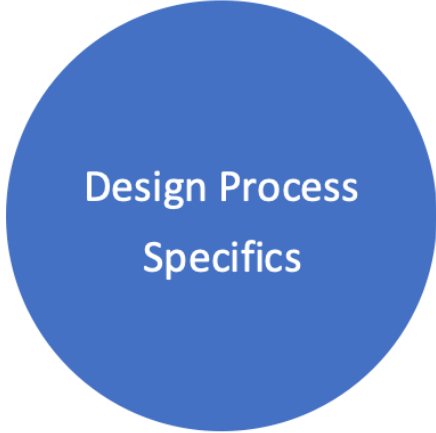
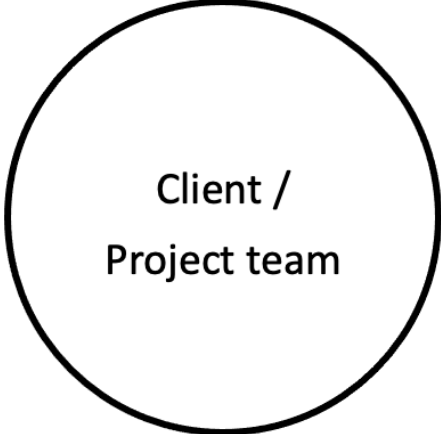


DO IT WELL

**UNDERSTAND WHAT THE
OTHER DOES, AND VALUE IT**

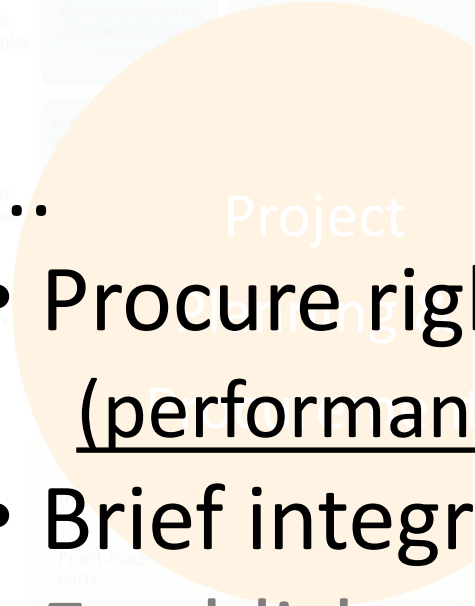
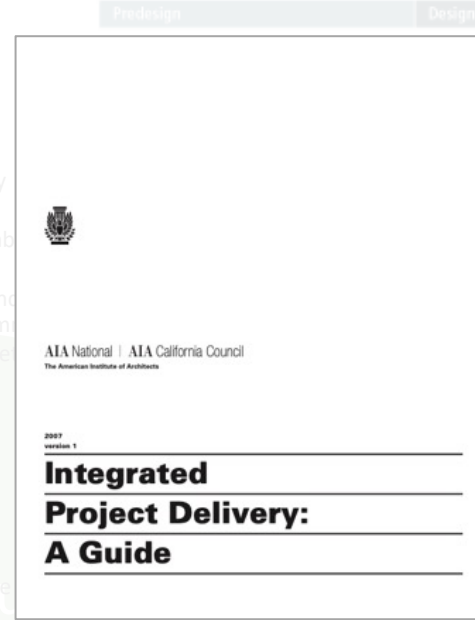
TALK TO EACH OTHER

HOW TO IMPLEMENT INTEGRATED DESIGN ON A PROJECT



Integrated design review...

Clear intentions
Write Integrated Design into brief
Software platforms (communication / common design models)
Procure on the basis of behaviours
Performance linked fees (Alliance contracting etc.)
Multi-disciplinary consultants
Integrated Project Delivery Contracting Models
Nominate 'Integrated Design manager'
Understand limitations of traditional design
Explain why we are doing this
Explain challenges and why different designers see differently
Instil an Integrated Culture
All of team involvement (Client / QS / Contractor / PM...) establish a common vision
Establish a common vision
Set specific goals/quantitative targets, joint ownership over information
Identify and remove barriers between designers. develop common goals
Facilitate a creative environment. Designers working on some of the same things
Big Picture Views
Decision mapping and communication
Be clear on the whys
Allow flexibility to adapt/change
Co-location
Project Offices / Design Spaces
Face-Face relationship building
Allow every participant to understand what's important to the project
Senior people time allocation (ensure BAU starting point)
Facilitate 'individual' and 'team' design forums
Apply systems thinking
Practice Mutual Learning
Allow for personalities and preferred design methods
Look for clarity/simplicity, multi-functionality, systems thinking
Ensure alignment between architectural and engineering goals.
Only after BAU reached.
Personality dependent - not one size fits all.
Recognise and communicate A & E different ways of thinking.
Considering the A&E extremes helps.
Everyone an author – more difficult than sounds.
Active third-party curation.
Task specific co-work as well as high level aspirations.



- Procure right behaviours
(performance based fees/alliancing/IPD/multi-disc...)
- Brief integrated design
- Establish common design environment
- Instil third party integrated design facilitator

Design Process

Specifics

Integrated Project Delivery: A Guide

The key to enduring design is integration

Technical merit is not enough on its own

We need to expand integration
to cross over to other stakeholders

Procurement is a potential enabler



Architectural discourse from the illustrated French Dictionary of Architecture (1856), by Eugène Viollet-le-Duc