

Experiences convening 'Unravelling Complexity' – an interdisciplinary capstone course

From chardonnay to classroom



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With the person next to you:

How would ***you*** prepare your students to solve the complex challenges of the future?

Subject: New course

Date: Tue, 16 Jun 2009 15:29:24 +1000

From: Ian Chubb <vc@anu.edu.au>

To: students.all@anu.edu.au

Dear Students,

The ANU is introducing a unique course in semester two this year that can count towards any degree. UGRD3001 is aimed at high achieving students with an interest in approaches to solving complex real world contemporary problems.

In 2009 the course will focus on the theme of 'collapse'. Academics from across ANU will collaborate to present case studies from their cutting-edge research on; global financial crises, the collapse of empires, contemporary 'failing' states, pandemics, network failures and the moral and legal dimensions of these issues. The connections between the economic, historical, social, legal, scientific, engineering and environmental and moral dimensions of these complex problems will be explored through expert-panels and student discussions.



The Feynman algorithm
for solving problems...

1. Write down the problem.



The Feynman algorithm
for solving problems...

1. Write down the problem.
2. Think real hard.



The Feynman algorithm
for solving problems...

1. Write down the problem.
2. Think real hard.
3. Write down the solution.

Generation by generation universities serve to make students think: [to] learn progressively to identify problems for themselves and to resolve them by rational argument supported by evidence; [to] learn not to be dismayed by complexity but to be capable and daring in unravelling it.

Boulton, G., & Lucas, C., 2008, What are universities for?

League of European Research Universities ([download it and read it for some inspiration!](#))

Problems & evidence



Satirical responses to Greg Hunt's approach to evidence in October 2013.

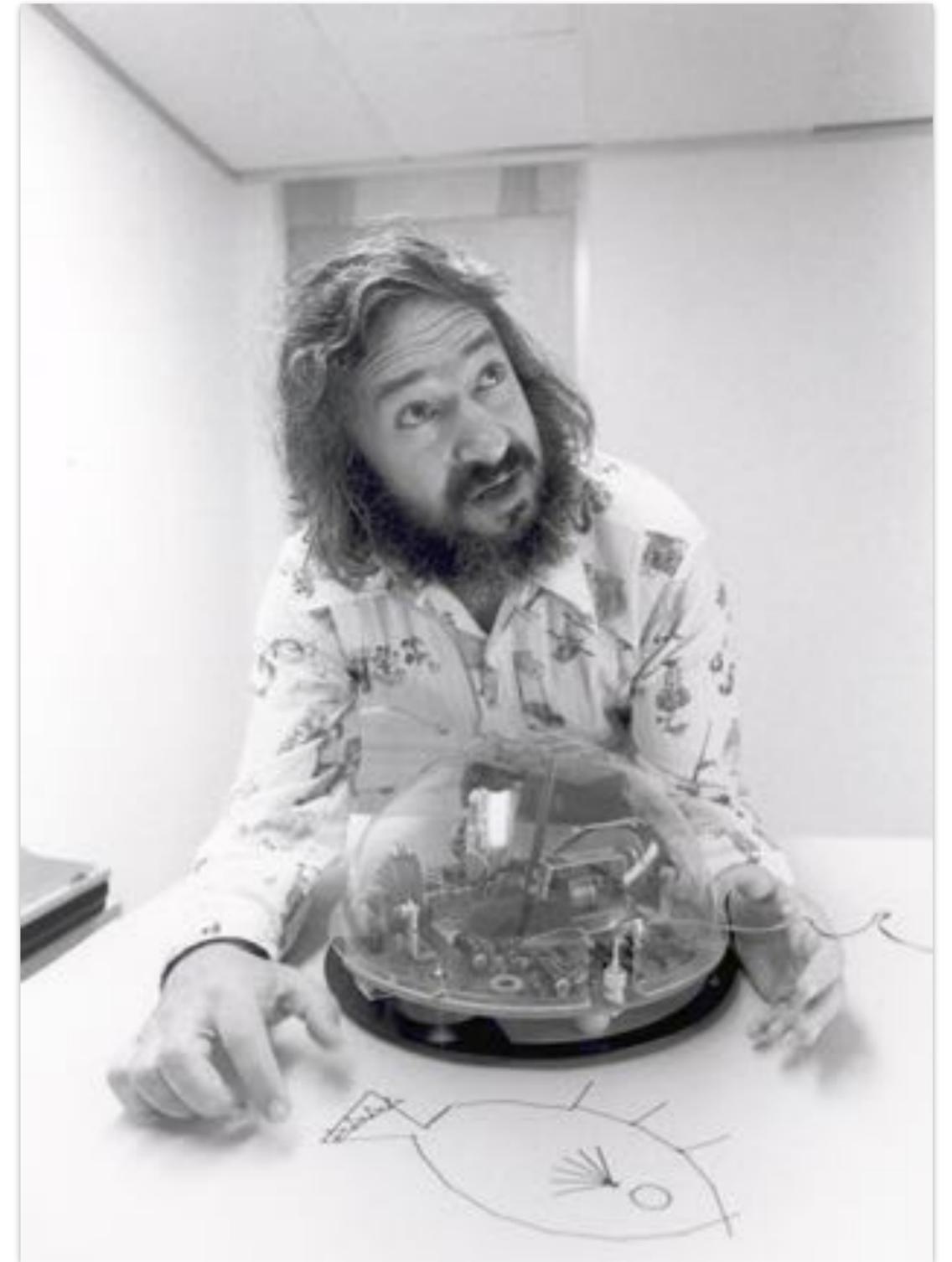
Bold in Unravelling Complexity

Cathy Wilcox in *The Sydney Morning Herald*, 3 October 2013

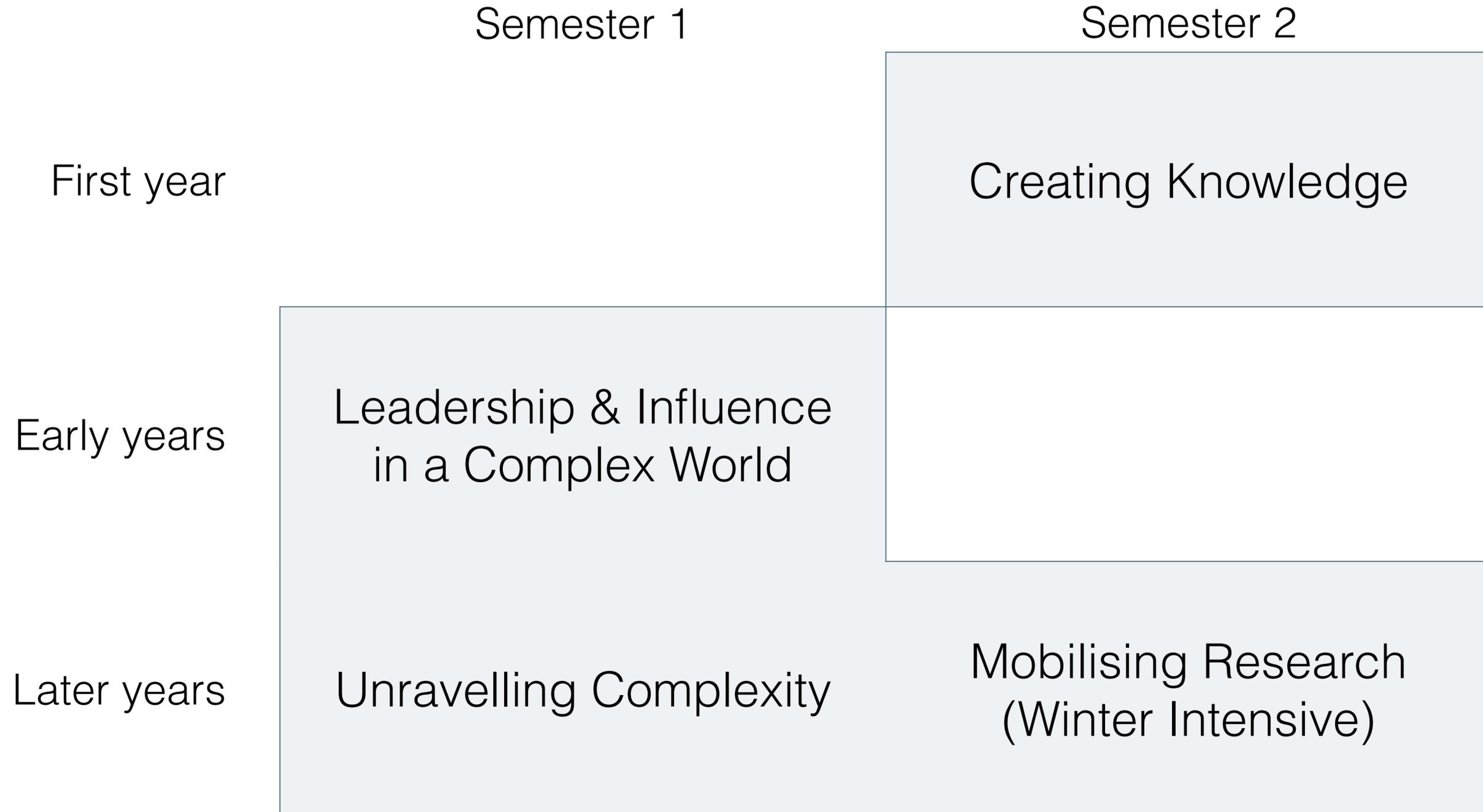


I think it's an exaggeration, but there's a lot of truth in saying that when you go to school, the trauma is that you must stop learning and you must now accept being taught.

- Seymour Papert in discussion with Paulo Freire



Minor in Leadership & Research

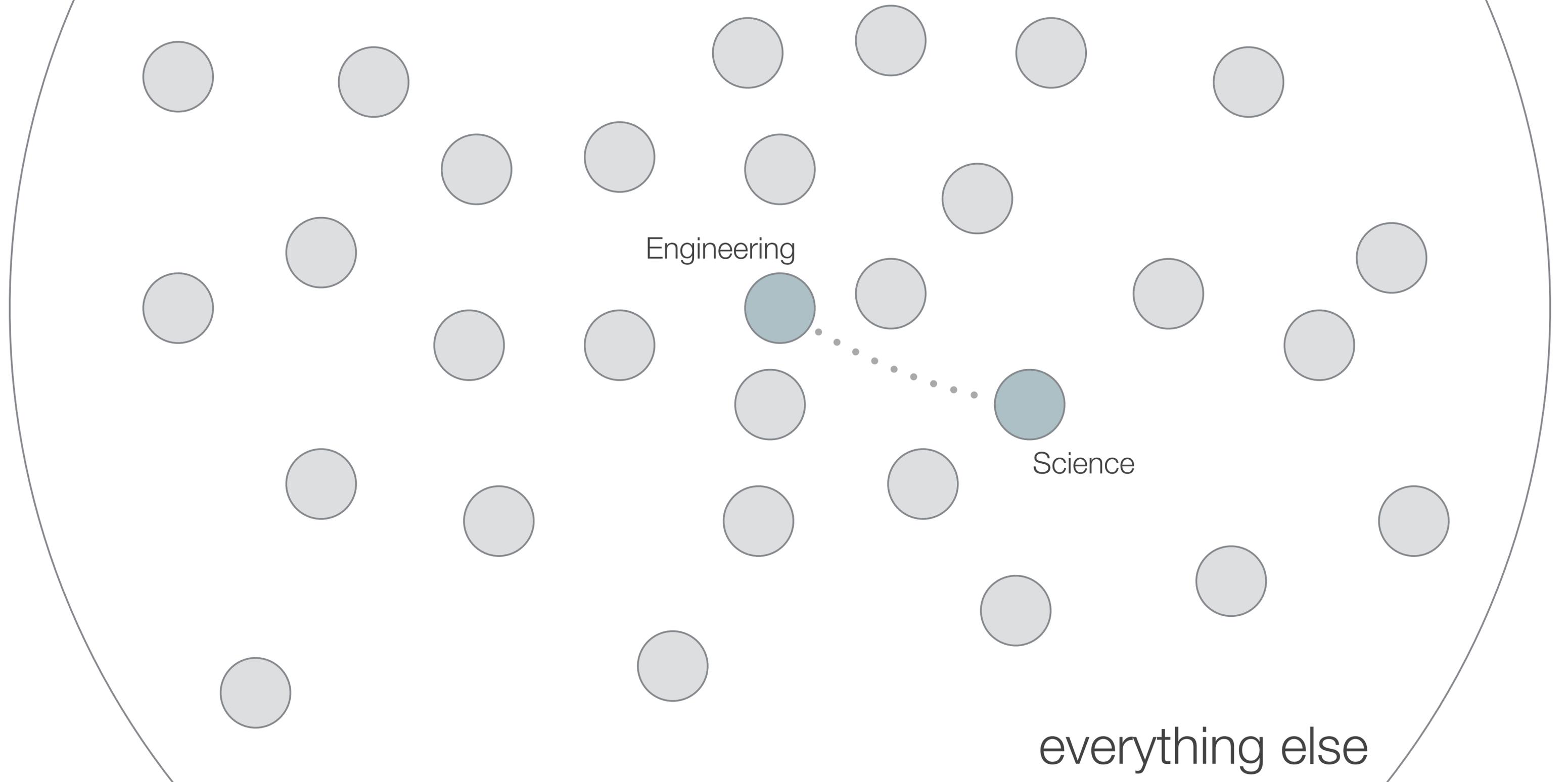


How do we prepare our students?

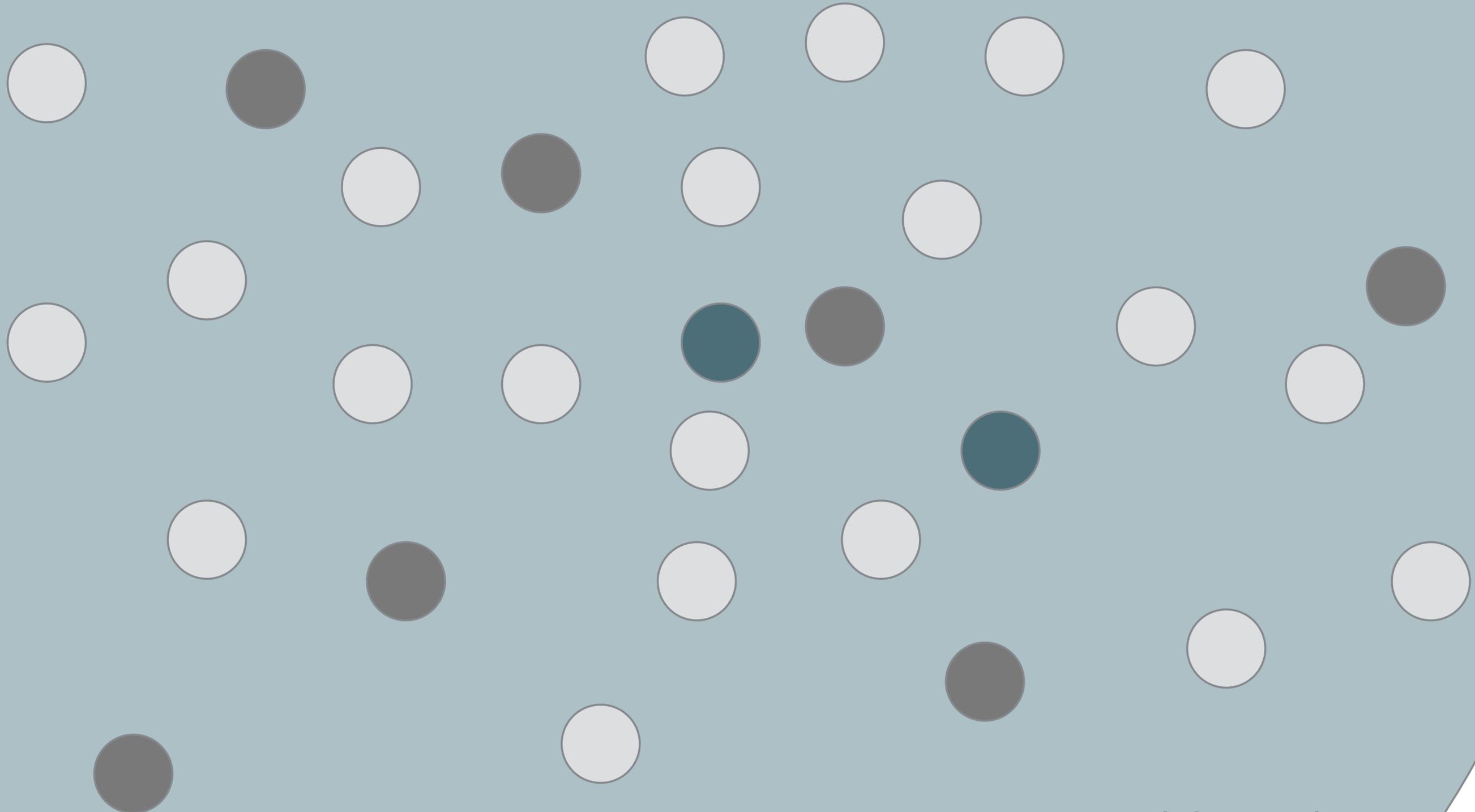
discipline
knowledge → ●
(eg Engineering)

everything else

How do we prepare our students?

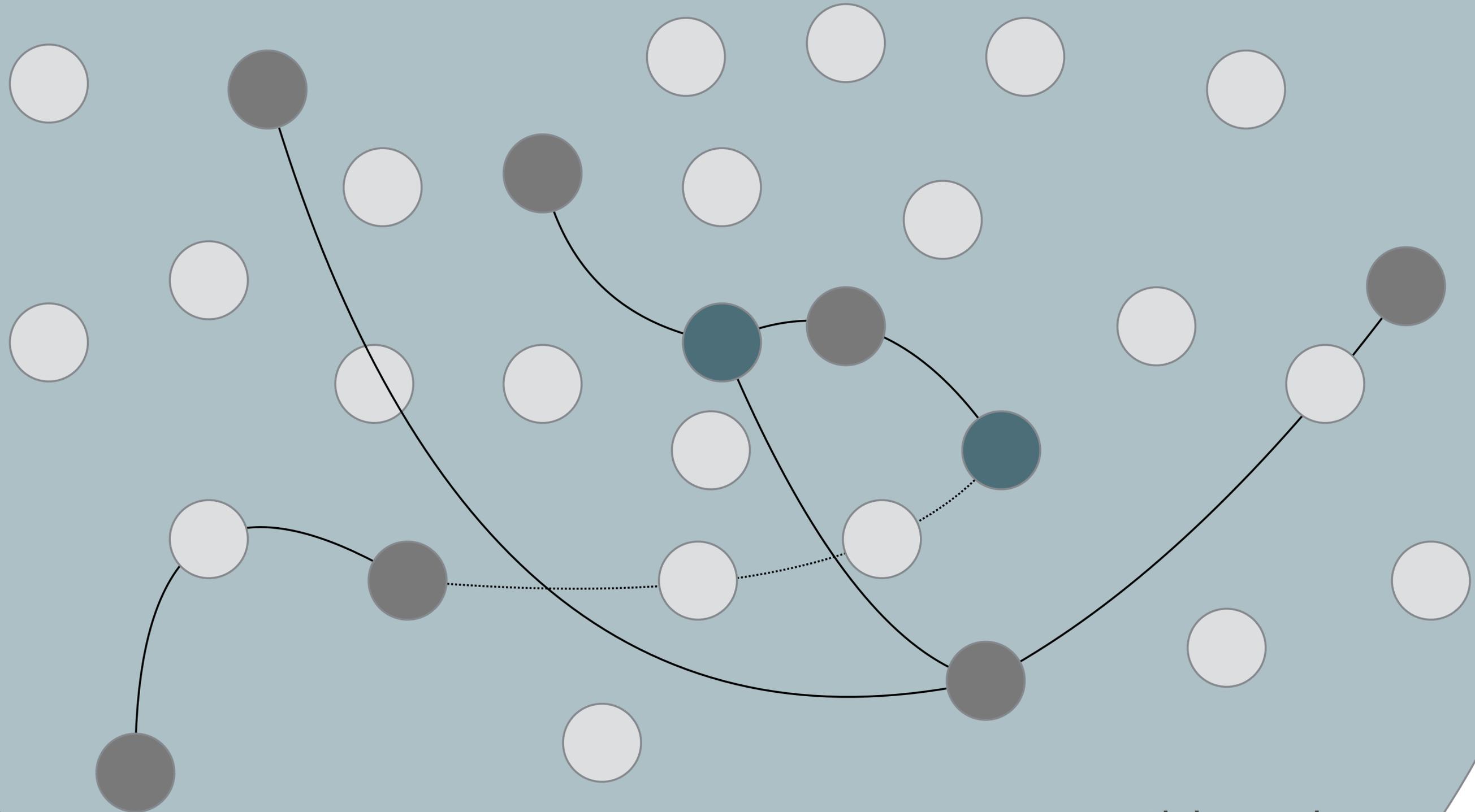


How do we prepare our students?



everything else

How do we prepare our students?



everything else

Starting a discussion about complex problems

	Single stakeholder	Multiple stakeholders	Multiple stakeholders, multiple perspectives
Problem known Solution known			
Problem known Solution unknown			
Problem unknown Solution unknown			Wicked problems

Starting a discussion about complex problems

February 2015



Food standards

(ongoing, really)



Lacklustre leadership

2014-on



Ebola outbreaks

16 December 2014



Sydney seige

2014 Olympics



Laws of figure skating

Starting a discussion about complex problems



Course topics

Complex problems

Complex systems

Space and time

Narratives

Visualising complexity

Ignorance & uncertainty

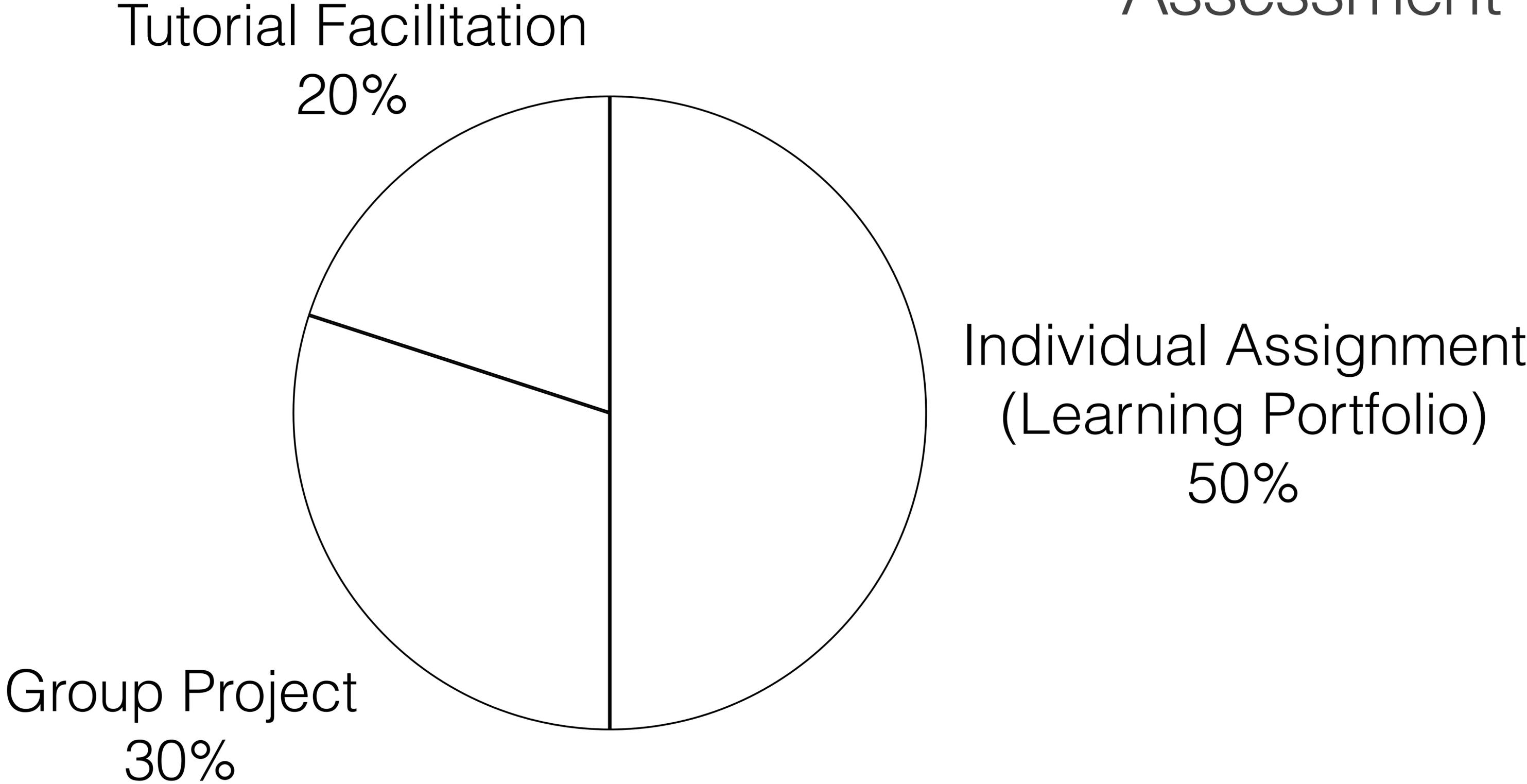
Framing & archetypes

Identity myths

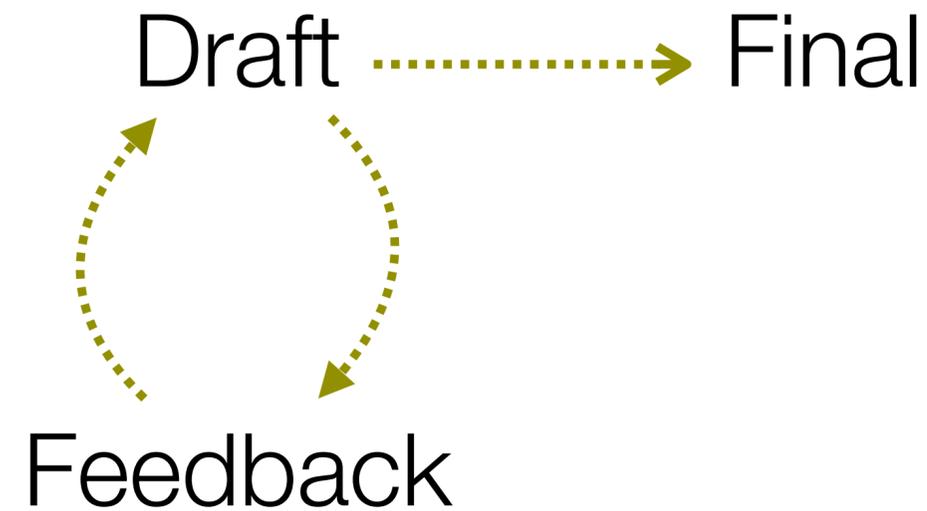
Entropy

Scenario planning

Assessment



Key considerations



Each assessment
needs formative feedback



Each assessment
should encourage HOTS

The magic is in the connections



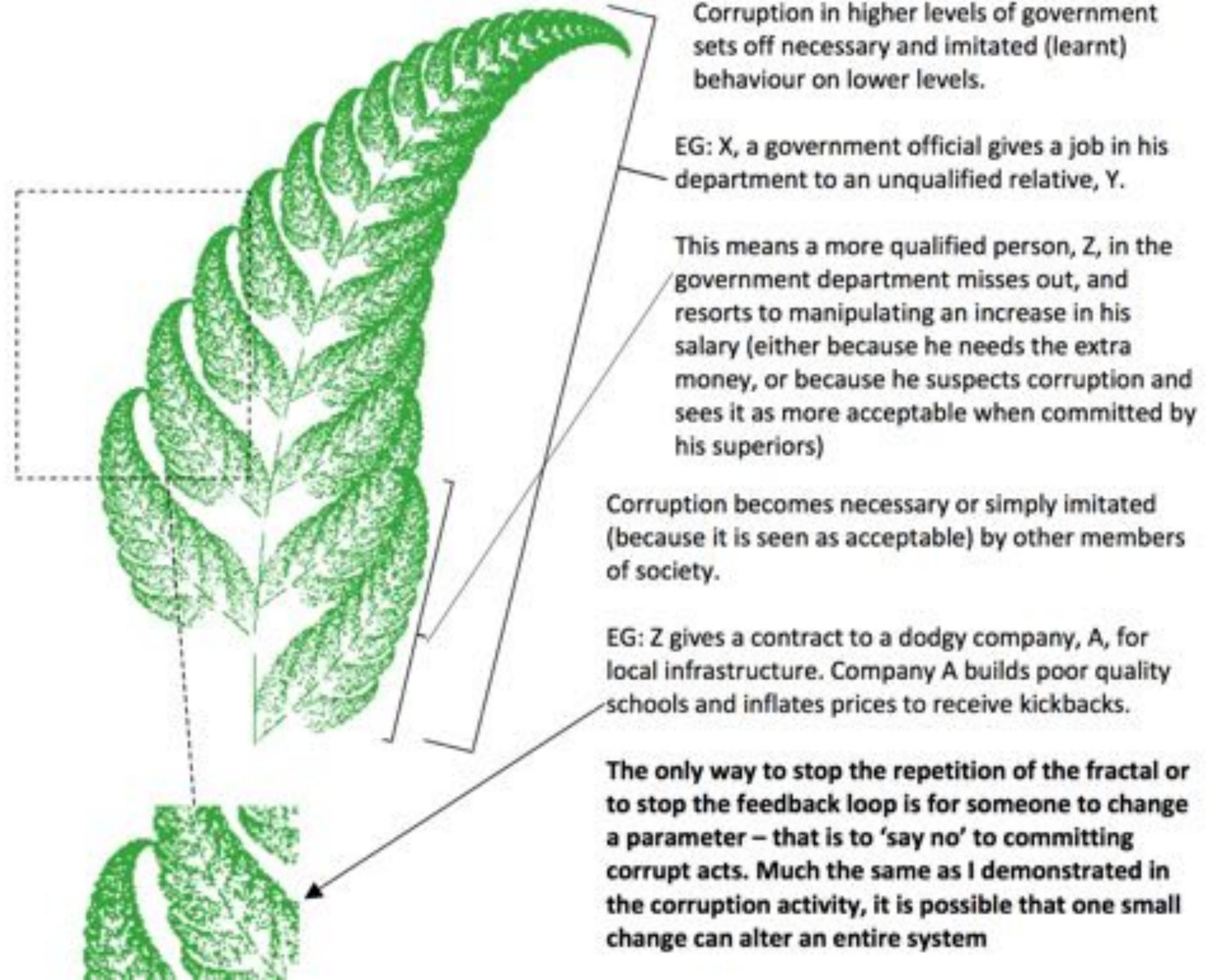
The Bansley Fern

Cat

Complexity Student, 2009

Complexity in Maths

Cat used the Barnsley Fern to demonstrate the repeating nature of corruption in developing economies



Group Project

2013

Stakeholder engagement:

Male members in the group engaged with research and found the most effective leverage point for breast feeding was convincing male partners.



'A Chance'

The Story of Coal Seam Gas
Mining in Northern NSW
Claire, 2014 student



There was a home-grown farmer
he was known as ruse's son,
His days were filled with cotton modules,
crops and cattle runs.
He woke early in the summer
to chip and irrigate the fields,
And in autumn by the stars
he picked and calculated yields.
He didn't dream of big bank cheques
or holidays on distant shores,
His heart was set on a simple life;
producing meat and barley stores ...

Words and photography by
Catherine Leedon



Tackling the Invisible: *the hidden world of* *'invisible illness'*

It may surprise you to know that almost 90% of disabilities are not visible and that almost half of people afflicted have more than one diagnosed issue¹. To fit into this invisible category, the individual must have a chronic physical and/or mental impairment which affects their ability to function at a 'normal' capacity, in some or all aspects of their life and are either undetectable or unknowable to others². This covers a broad range of health issues from chronic pain disorders to diabetes and depression³.

As someone personally suffering with seven invisible illnesses, this is an area of research that hits very close to home and drives me to address it. However, acknowledging that I alone am insufficient a cause for further investigation, I will draw your attention to the estimated 15% of Australians who are living with disability at any given time¹, 90% of which is invisible; this equates to 3.3 million people, too large a number of people to be overlooked. There are numerous campaigns that are seeking to raise awareness and having

[1] Australian Network on Disability, www.and.org.au, sourced 18/05/2015.

invisible-disability/, Invisible Disabilities Association, sourced 18/05/2015.

disability/types/invisible/ Disabled World, sourced 18/05/2015.

[2] 'What is an Invisible Disability', www.invisibledisabilities.org/what-is-an-

[3] 'Invisible Disabilities: List & Information', www.disabled-world.com/

Challenges and take-homes

- It's hard to transition from a one-off course to a program
 - Students are challenged in unpredictable ways (sometimes unfairly)
 - Academic champions are precious and need to be nurtured
 - College (and other) support can be hard to negotiate
- ...but a significant proportion of students come up to me and say that this was the most important course they have ever taken.

More Information

<http://vc-courses.anu.edu.au>

Particularly: Unravelling Complexity > Example Work