Student Participation in Large-group Settings

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Plan

(1) Conceptualise the problem of participation in large groups

(2) Consider how to support students to engage with lectures in an active, inquisitive way, ask better questions and give better answers

(3) Examine and evaluate some TEL strategies for improving engagement

TEL support:

- Extended Classroom Forum
  Tuesday 24th March 2020 10-12pm, Teaching Grid - Main Library

- PGA Technology Enhanced Learning

- Technology Enhanced Active Learning Festival
  Monday 11th to Friday 15th May 2020.

- Academic Technology's "Recipes for Excellent Teaching"

1. Active learning and lectures

What is “active learning”?

“[Active] learning is characterized by active learning techniques that push students to be responsible participants in their own education”

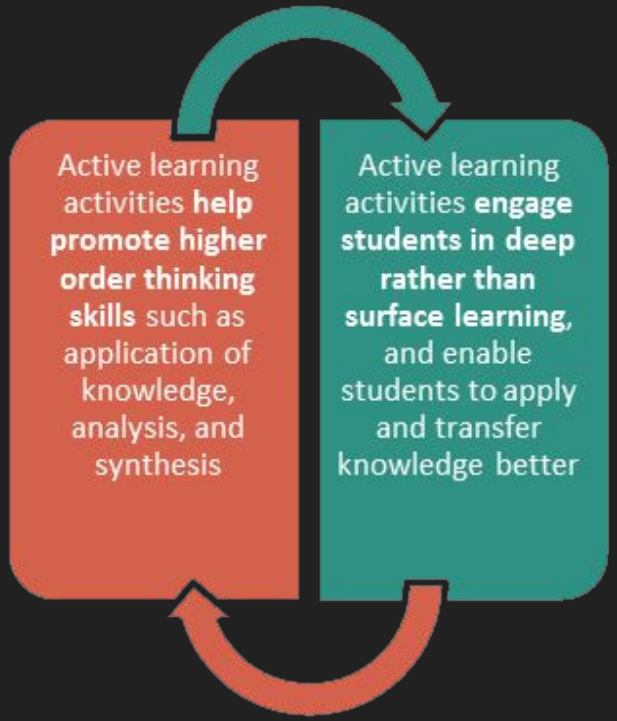
(Machemer & Crawford 2007, p.10)

“Without taking away from the important role played by the teacher, it is helpful to remember that what the student does is actually more important in determining what is learned than what the teacher does… [E]ffective teachers must know how to get students actively engaged in learning activities that are appropriate for the desired outcome(s).”

(Schuel 1986, p.429-430)

Why active learning?

- Improved student motivation/commitment (Armbruster, Patel, Johnson, & Weiss, 2009)
- Improved student satisfaction with learning (Cavanagh 2011)
- Conducive to “deep learning” strategies (de Caprariis et all, 2001)



What would ideal active learning in your classroom look like?

Why do we lecture?

Why do we lecture? Some thoughts:

- More control; more predictable content delivery
- Efficiently meets the requirement to provide contact hours for large numbers of students
- Develops the students' ability to learn by listening
- Allows you to "tell a story"; present a (relatively) complete treatment of an issue or a framework for understanding

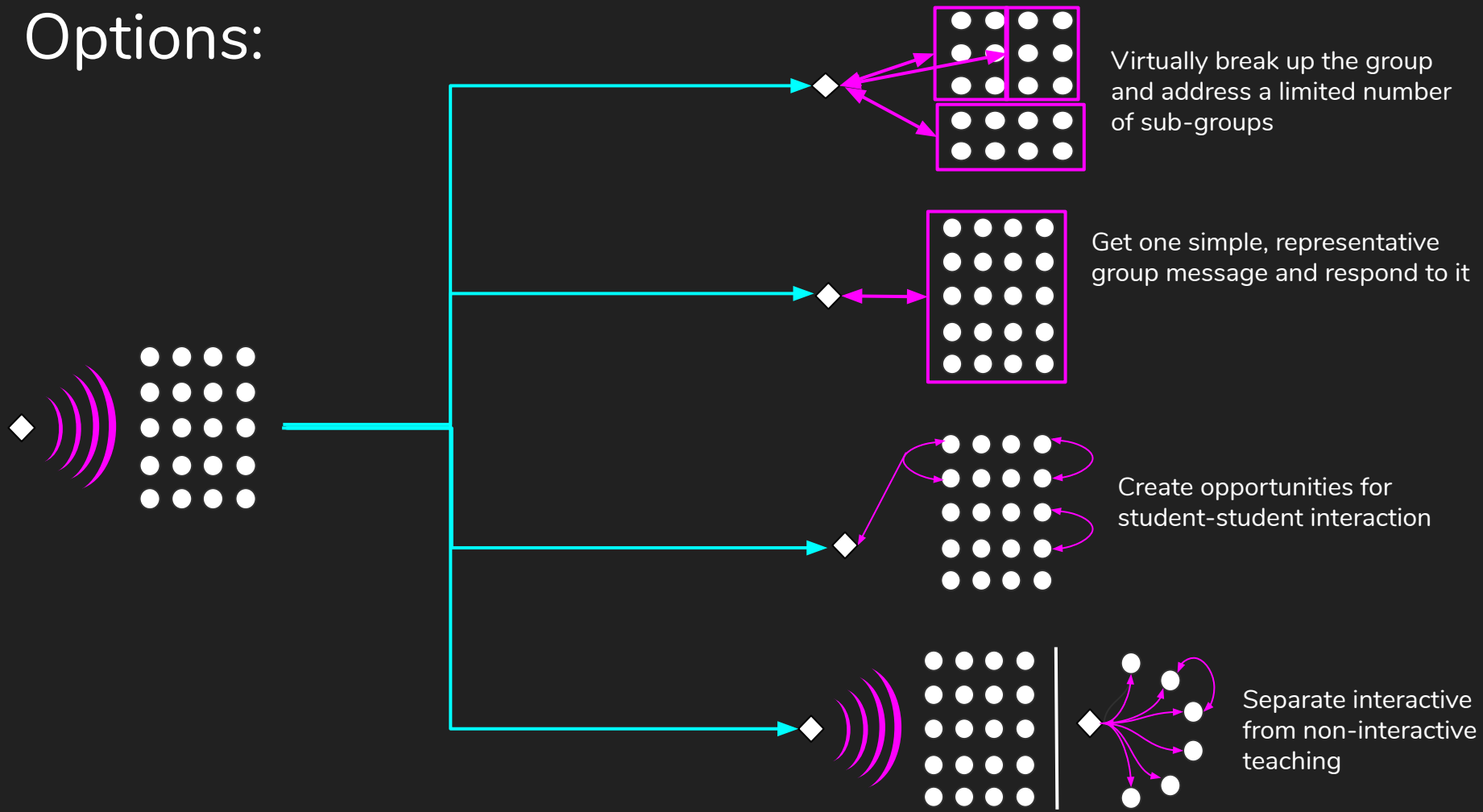
Understanding the Problem:

In large groups, we cannot usually tell if students are engaging or not, because a lot of engaged learning behaviour is very had to observe

Observable active learning changes the course of the lesson; so some time has to be invested in allowing it to play out, and responding

So, lecturing is in tension with observable active learning

Options:


Virtually break up the group and address a limited number of sub-groups
Get one simple, representative group message and respond to it
Create opportunities for student-student interaction
Separate interactive from non-interactive teaching

2. Improving the quality of student interaction

What factors govern a student’s willingness to participate in class?

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What factors govern a student's willingness to participate in class?

Staff-side factors:

- Clear opportunities
- Enough time
- Good Qs/tasks
- Encouragement (Ridge and Islania 2020)

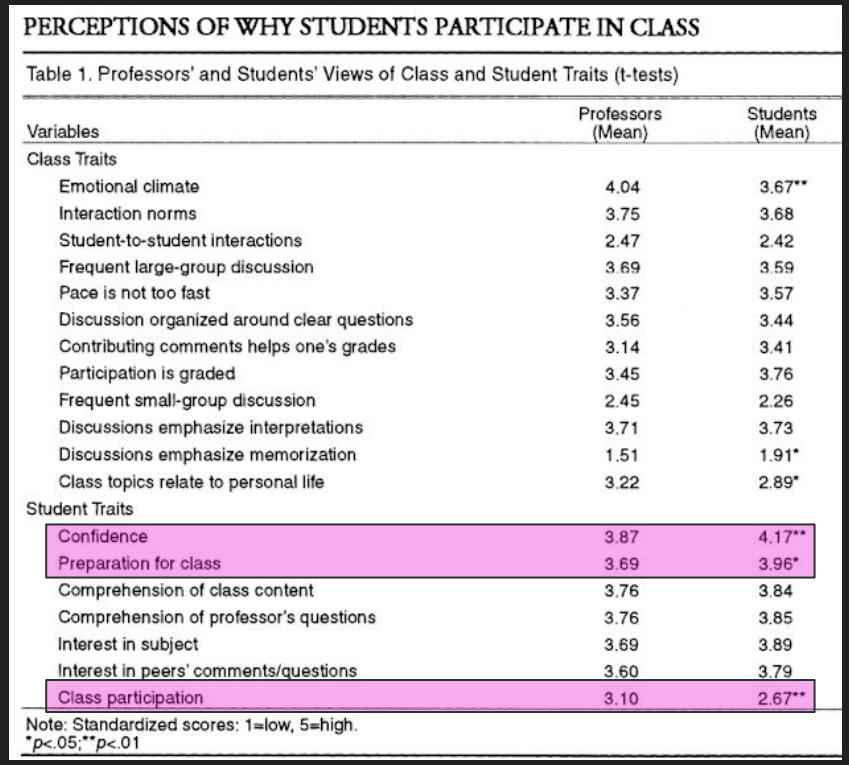
Shared factors:

- Time/pace Norms of interaction (Fessinger 1995, p.28)
- Emotional climate
- Class size

Student-side factors:

- Self-efficacy (Mahyuddin *et al* 2006)
- Responsibility for own learning (Abdullah *et al* 2012)
- Motivation
- Confidence
- Preparedness

2. Improving the quality of student interaction



PERCEPTIONS OF WHY STUDENTS PARTICIPATE IN CLASS

Table 1. Professors' and Students' Views of Class and Student Traits (t-tests)

Variables	Professors (Mean)	Students (Mean)
Class Traits		
Emotional climate	4.04	3.67**
Interaction norms	3.75	3.68
Student-to-student interactions	2.47	2.42
Frequent large-group discussion	3.69	3.59
Pace is not too fast	3.37	3.57
Discussion organized around clear questions	3.56	3.44
Contributing comments helps one's grades	3.14	3.41
Participation is graded	3.45	3.76
Frequent small-group discussion	2.45	2.26
Discussions emphasize interpretations	3.71	3.73
Discussions emphasize memorization	1.51	1.91*
Class topics relate to personal life	3.22	2.89*
Student Traits		
Confidence	3.87	4.17**
Preparation for class	3.69	3.96*
Comprehension of class content	3.76	3.84
Comprehension of professor's questions	3.76	3.85
Interest in subject	3.69	3.89
Interest in peers' comments/questions	3.60	3.79
Class participation	3.10	2.67**

Note: Standardized scores: 1=low, 5=high.
*$p<.05$;**$p<.01$

"Professors and students had contrasting opinions of three student traits: professors viewed students as less confident, less prepared, and more involved in class participation than did students."

(Fessinger 1995, p.28)

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Think-pair-share (a.k.a. breakout groups)

Pros:

- Helps to facilitate peer discussion
- Fairly easy to organise or plan for
- Possible to implement spontaneously in response to feedback

Cons:

- Does not by itself produce interaction at group level
- Requires some investment of class time
- Hard to tell what is actually going on in individual groups

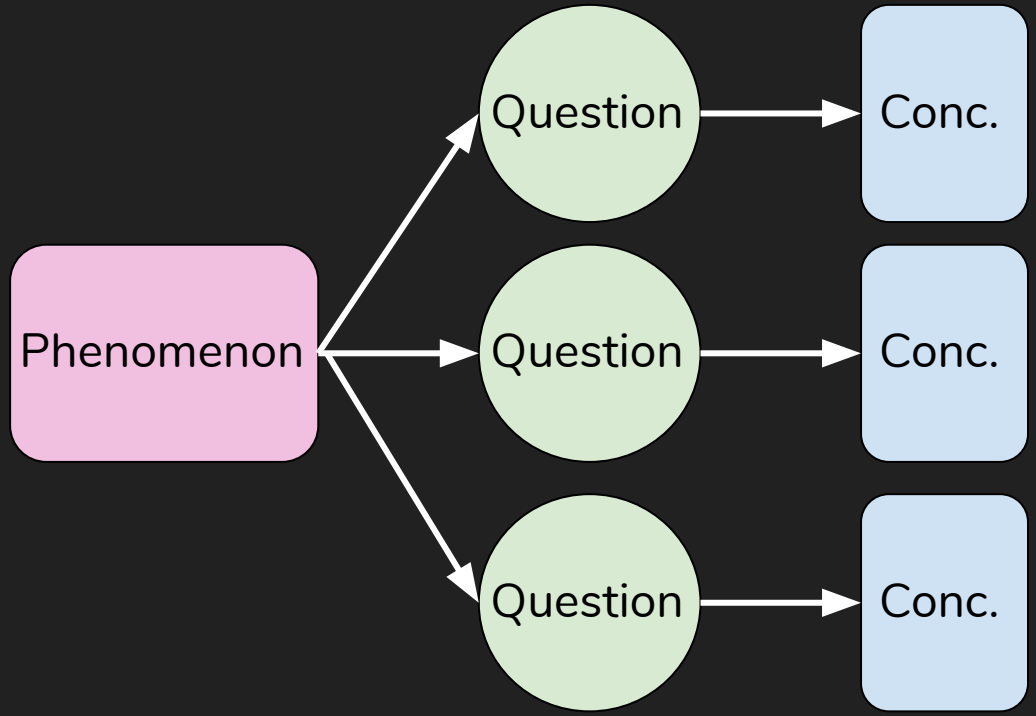
2. Improving the quality of student interaction

How do we support more students to make imaginative, interesting contributions to learning activities?

“Focusing on questions rather than answers can challenge students to develop an attitude of inquiry rather than an intention to simply produce an answer.”

(Dyche and Epstein 2011, p.666)

Models of investigation



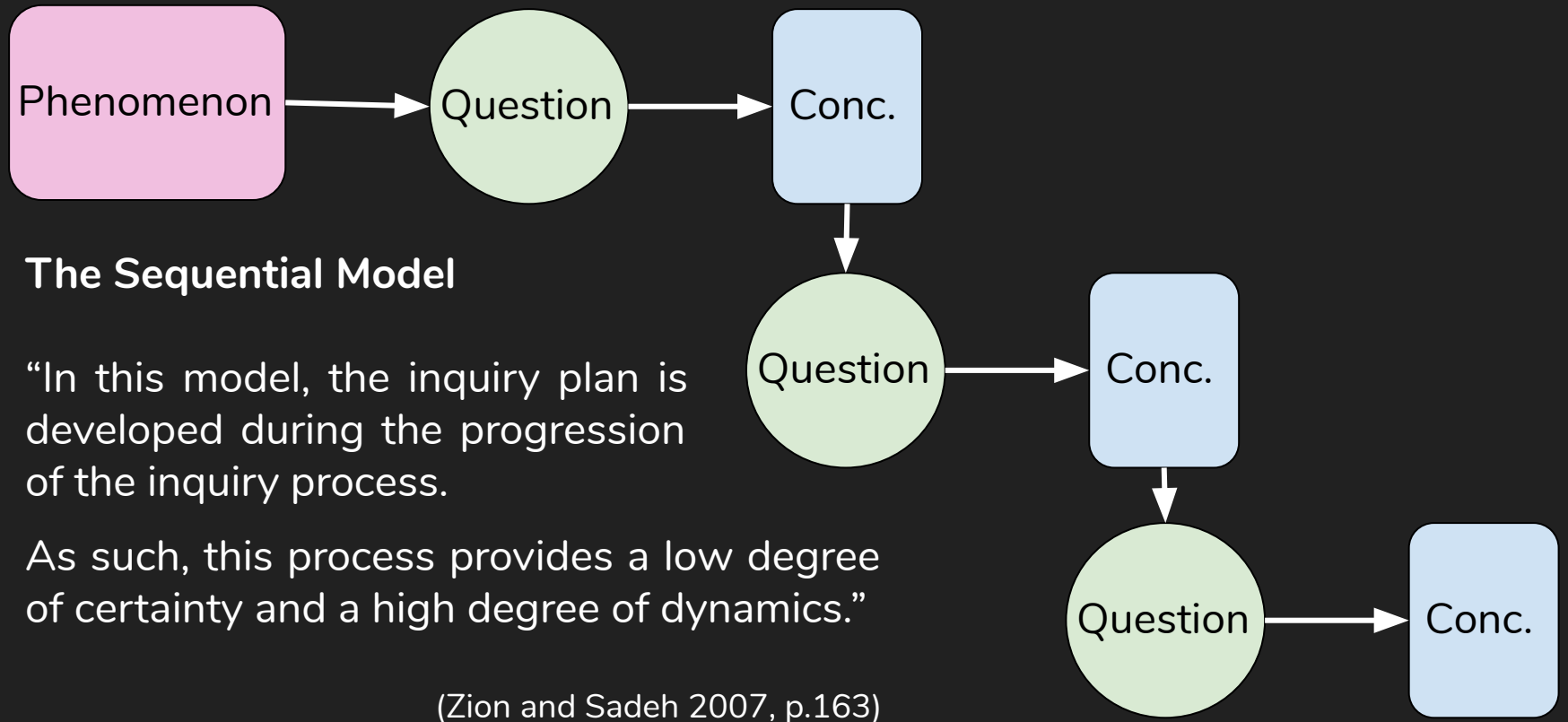
The Parallel Model

"The PM model [*sic*] presents a situation in which the inquiry plan is known at the beginning of the inquiry process.

The process provides a high degree of certainty and a low degree of dynamics."

(Zion and Sadeh 2007, p.163)

Models of investigation



The Sequential Model

“In this model, the inquiry plan is developed during the progression of the inquiry process.

As such, this process provides a low degree of certainty and a high degree of dynamics.”

(Zion and Sadeh 2007, p.163)

Function First strategy

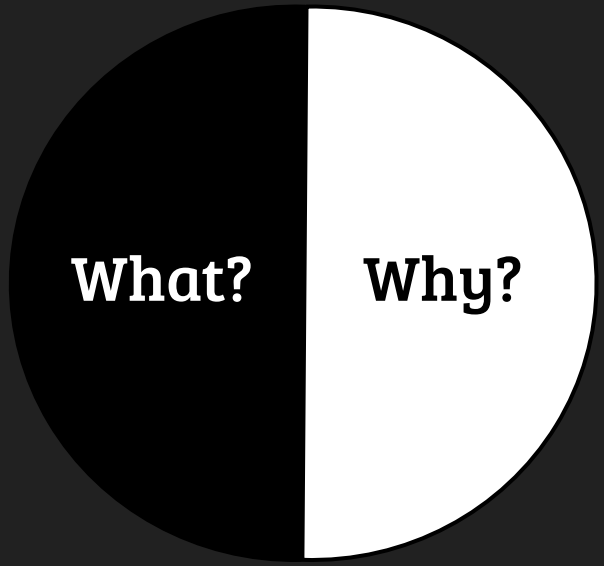
What happened?

What is this object?

What are its features?

What is this concept?

What is its content?



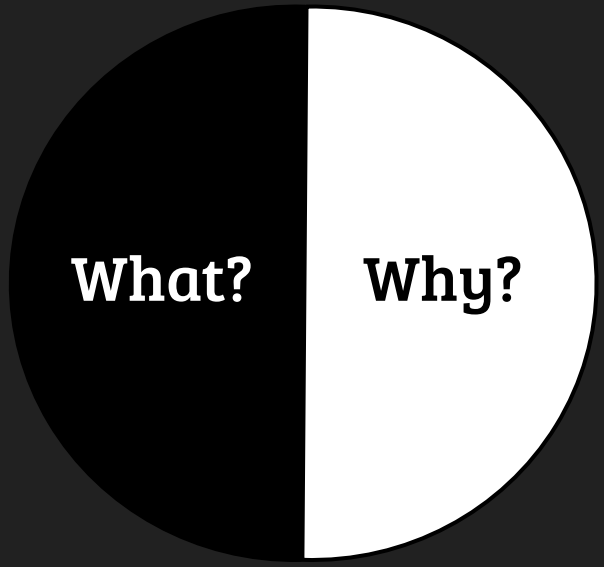
What factors led up to this event?

What forces or purposes shaped this object?

What is this concept used to explain or clarify?

(Janssen et *al* 2013, p.79)

Function First strategy

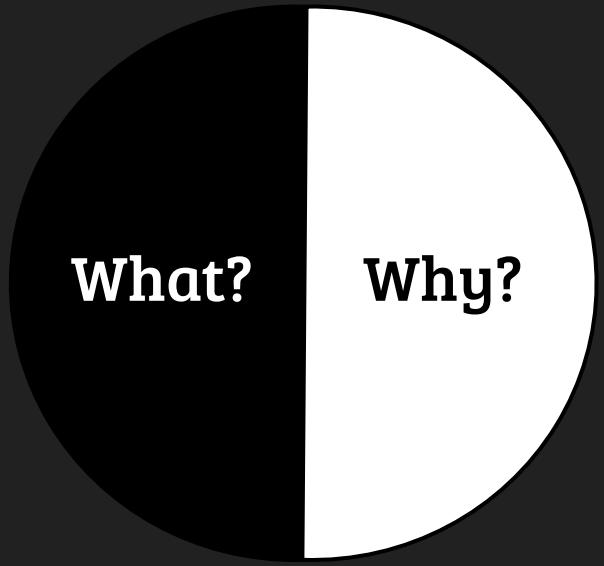


“Function Last” approach:

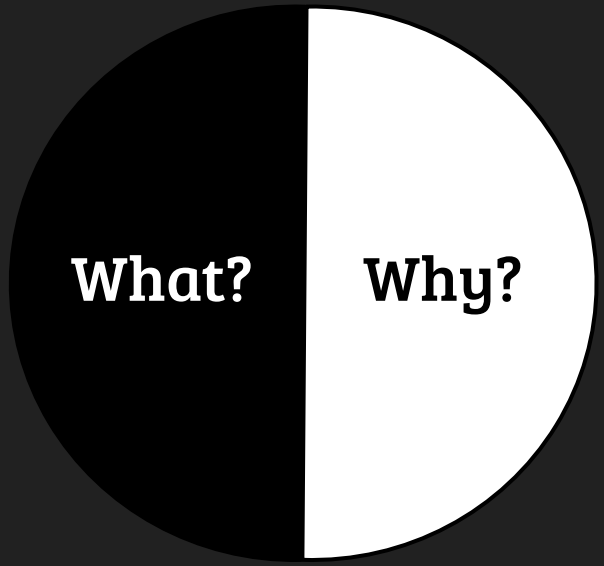
“Mangrove trees are found in coastal wetlands in the tropics. They have characteristically tall, stilt-like roots which mean that a large proportion of the root system is not buried, but exposed to the air; and the upper leaves of the tree are raised up higher than they would be if the tree had a conventional root structure. They are also able to secrete salt through the exposed portion of the root.

These features are evolutionary adaptations in response to the tree’s environment. Coastal wetlands are frequently inundated with seawater, meaning the tree has to cope with limited access to soil and oxygen, and exposure to salt.

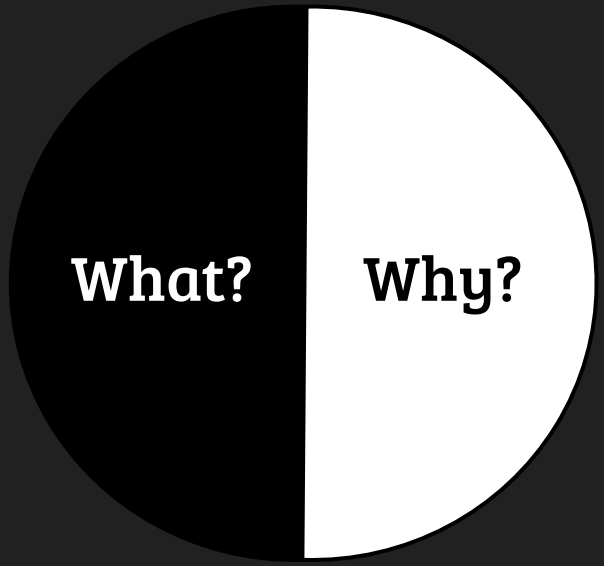
Function First strategy

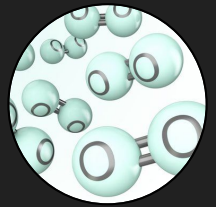


Function First strategy

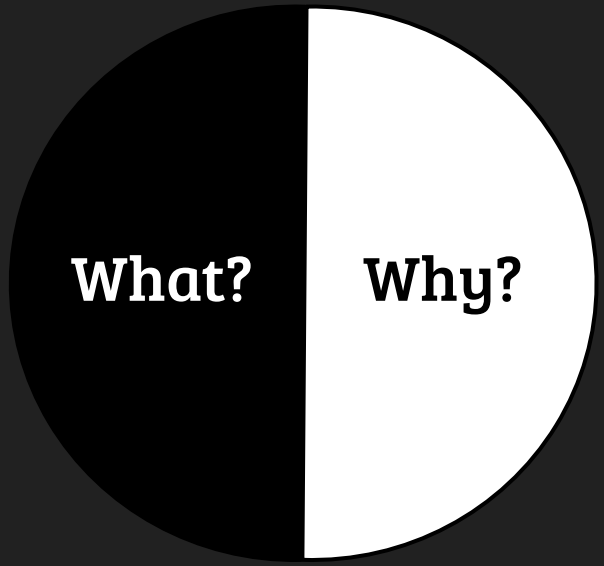


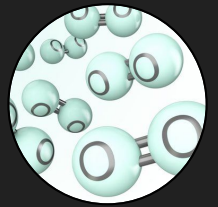
Function First strategy





Function First strategy





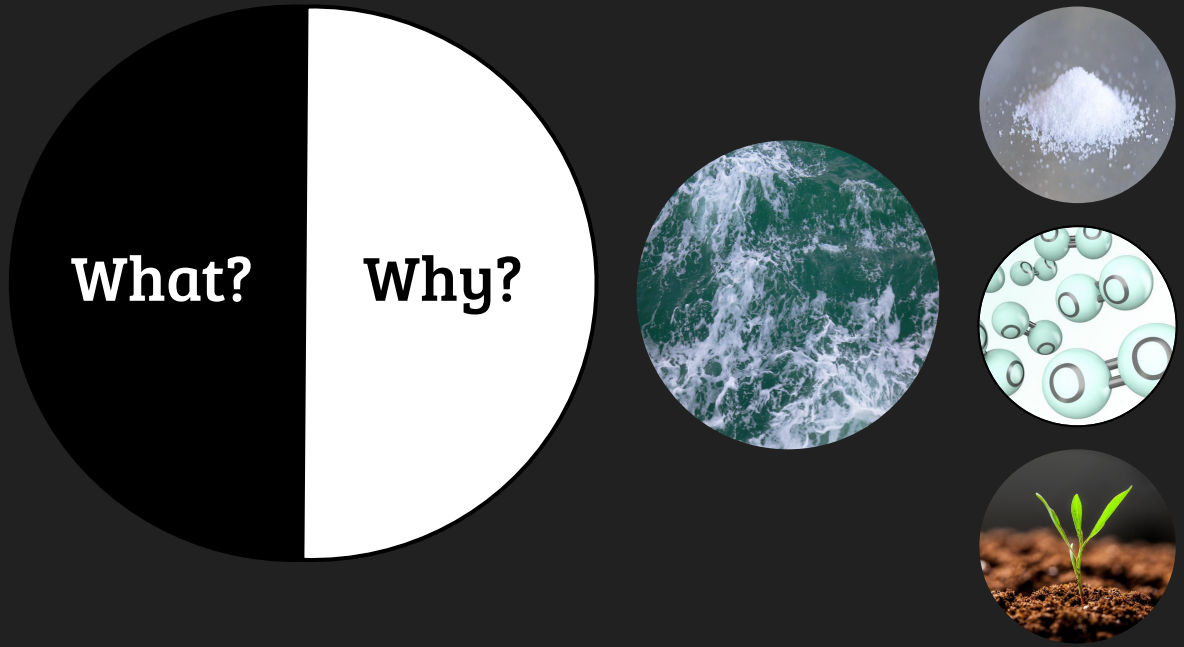
Function First strategy

Start with the problem!

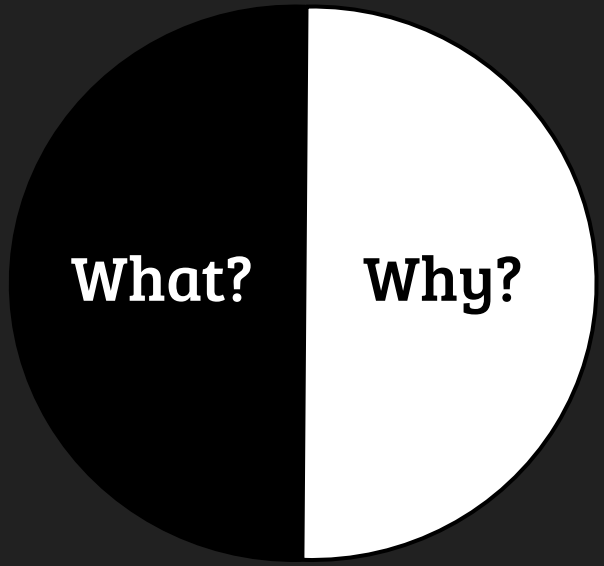
“Coastal wetlands in the tropics are frequently inundated with seawater, meaning plants inhabiting them have to cope with limited access to soil and oxygen, and exposure to salt.

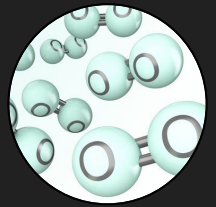
“What features would enable a plant to survive in this environment?”

→ *depending on the context, this could be a rhetorical question which structures your lecture content; or it could be directed to students.*



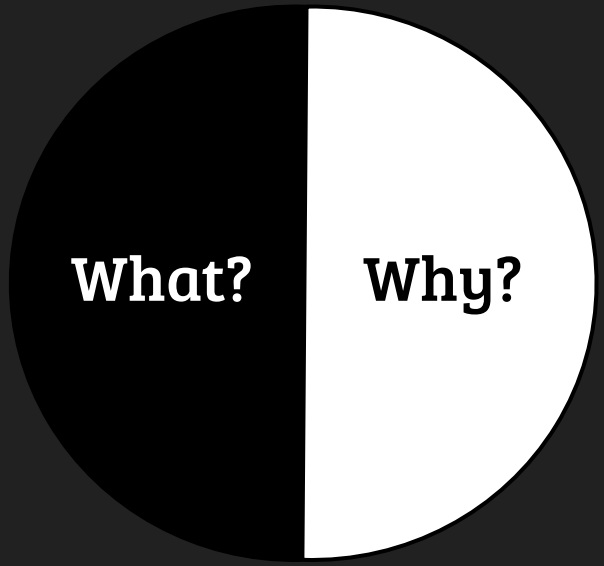
Function First strategy

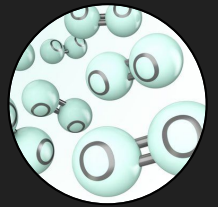




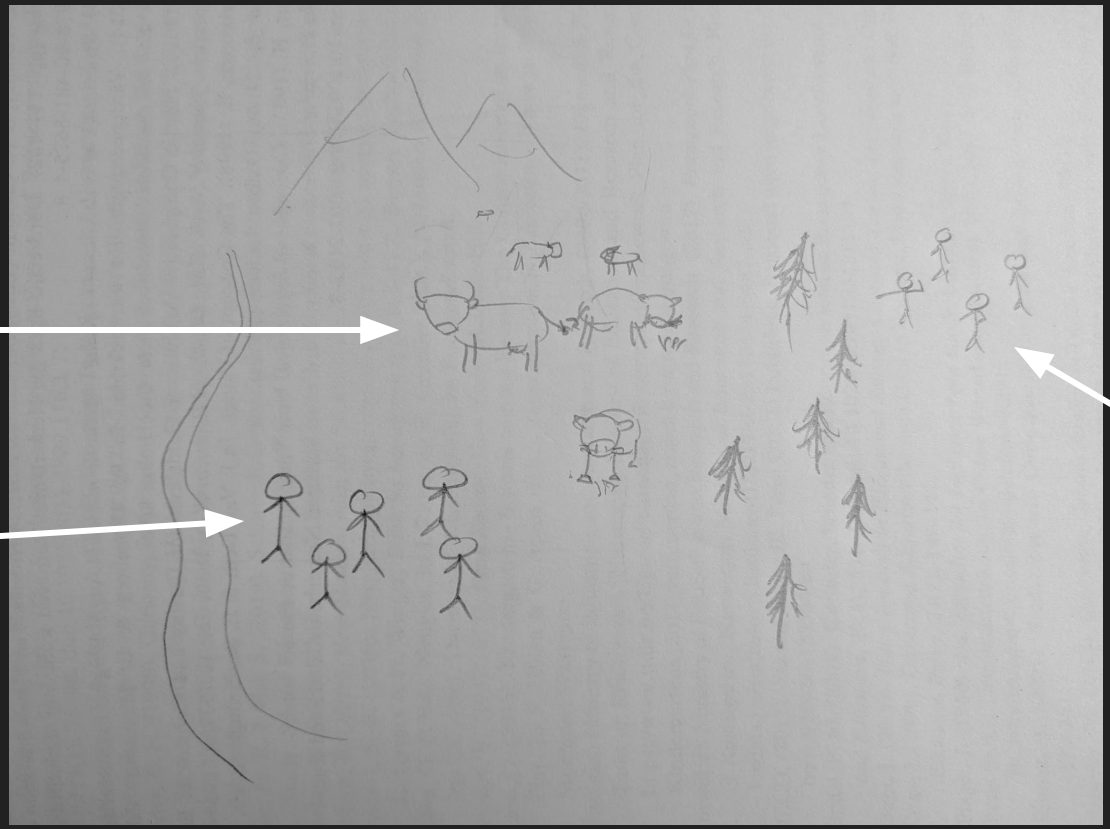
Students (or existing, classic/historical research!) might provide wrong or suboptimal answers - in this case, the floating lily still has to cope with the salt content of the sea water. The next step is to draw attention to this problem and help students to devise better optimised solutions, step by step.

Function First strategy

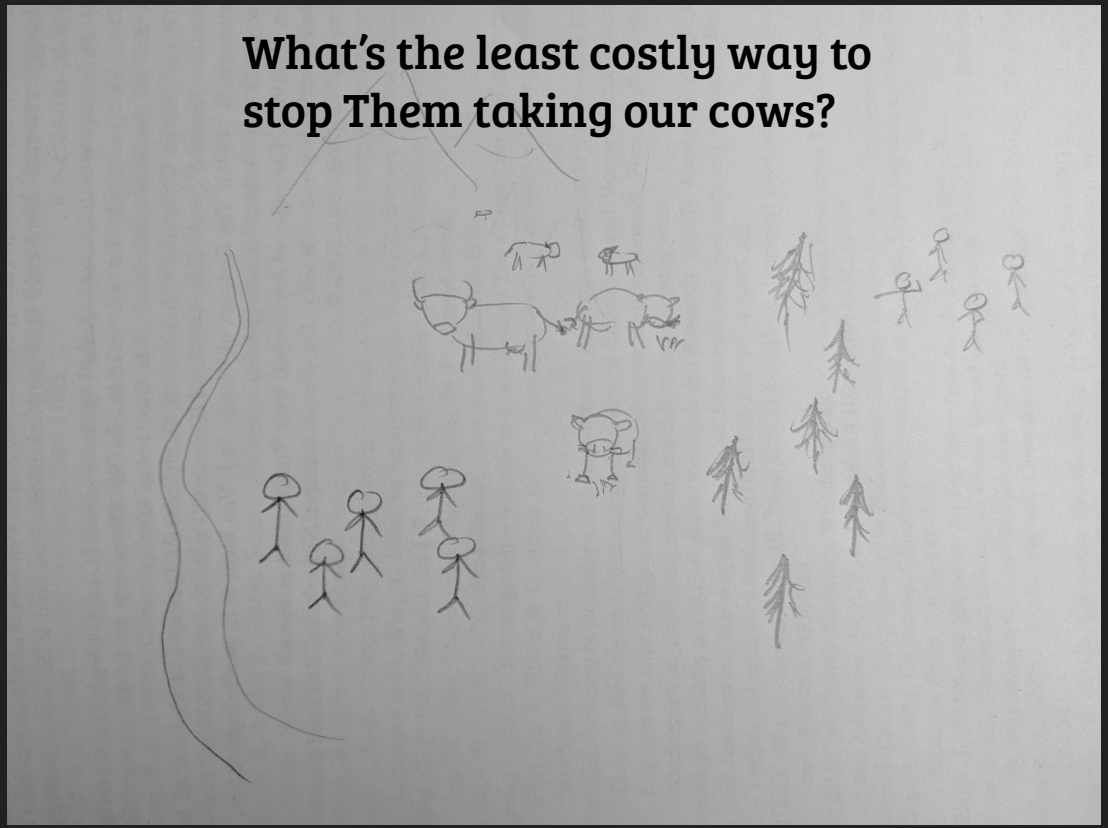




Example Activity

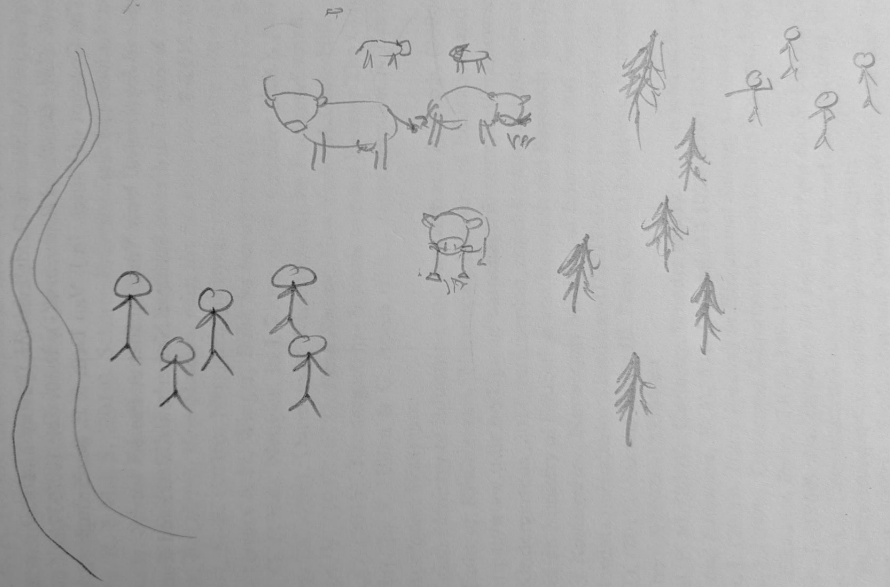


FFS works well outside of STEM. Here's an example I have used successfully with first-year philosophy students. The next few slides run through likely answers to the question posed below, in order to generate an incrementally optimised solution to the problem. This solution, and the path taken to reach it, helps to illustrate some elements of the work of a well-known political theorist; the connection can be set up before the exercise and analysed afterwards.



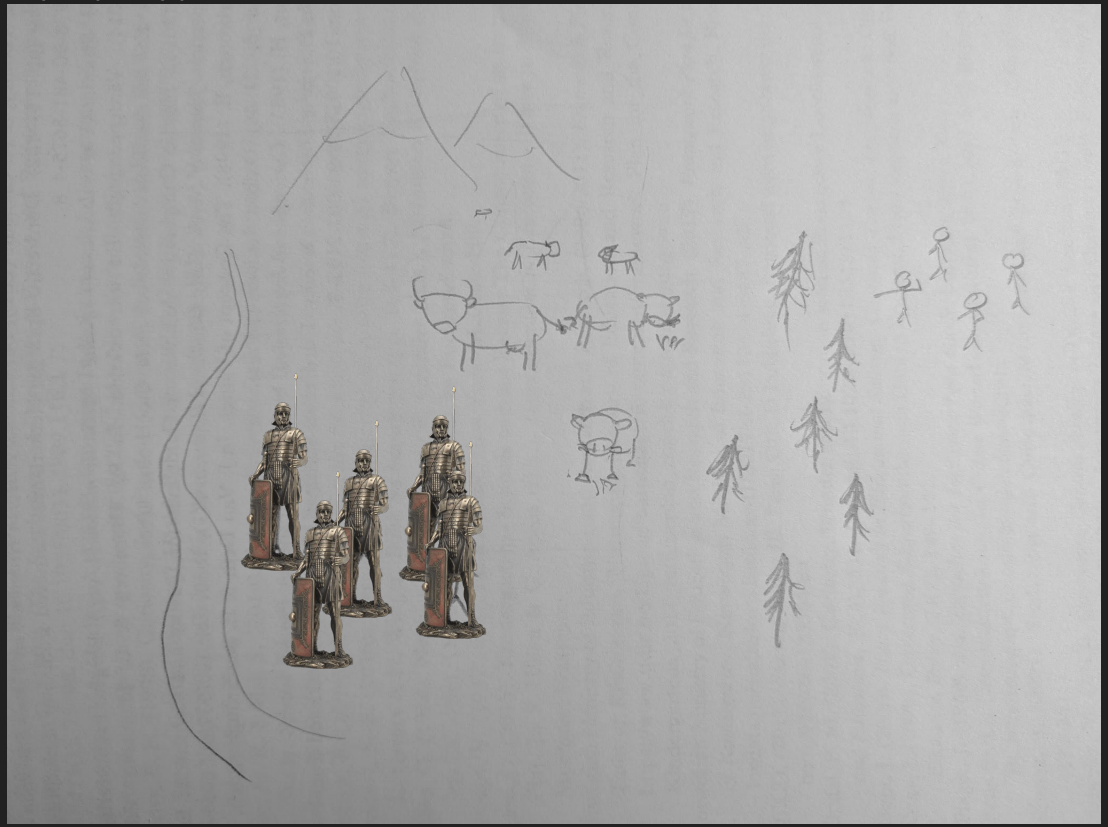
Option 1: Build A Wall!
Ok, but walls are costly in terms of labour and resources, and not terribly effective. They also have to be maintained in the long run, and invite attempts to breach them.
Is there a more efficient solution which does not rely on a physical barrier?

What's the least costly way to stop Them taking our cows?

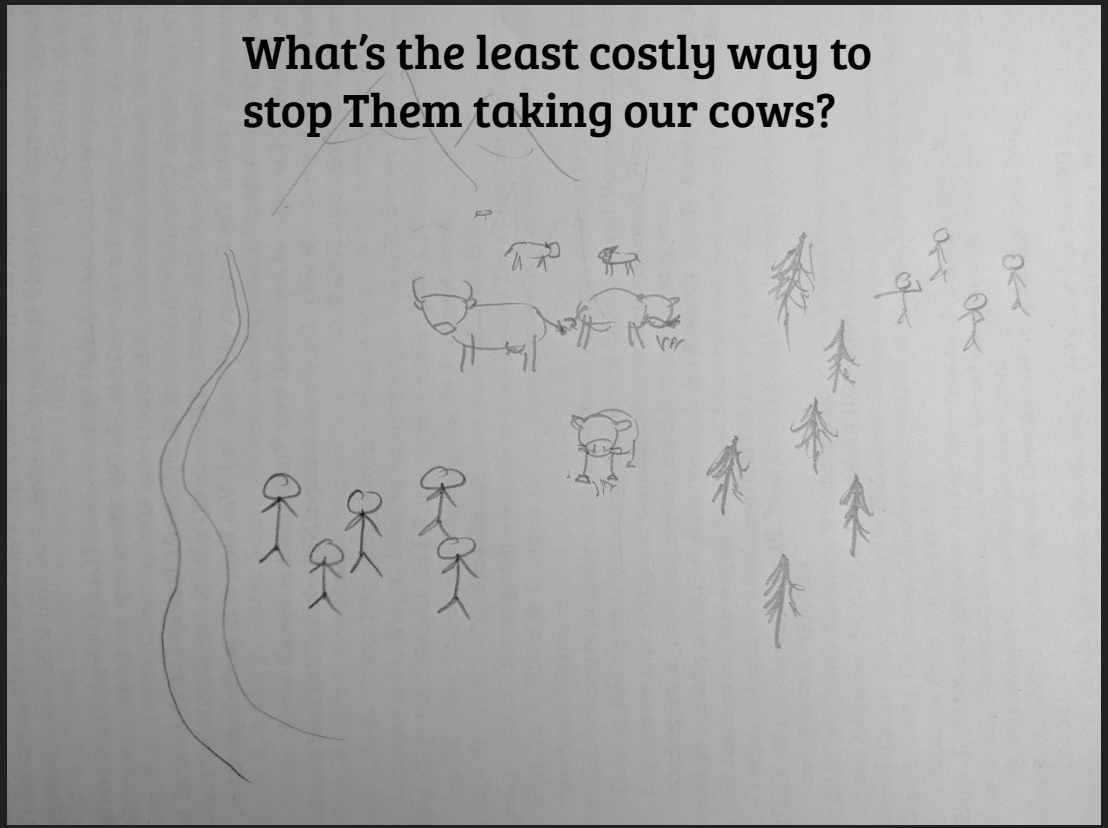


Option 2: Show of Force

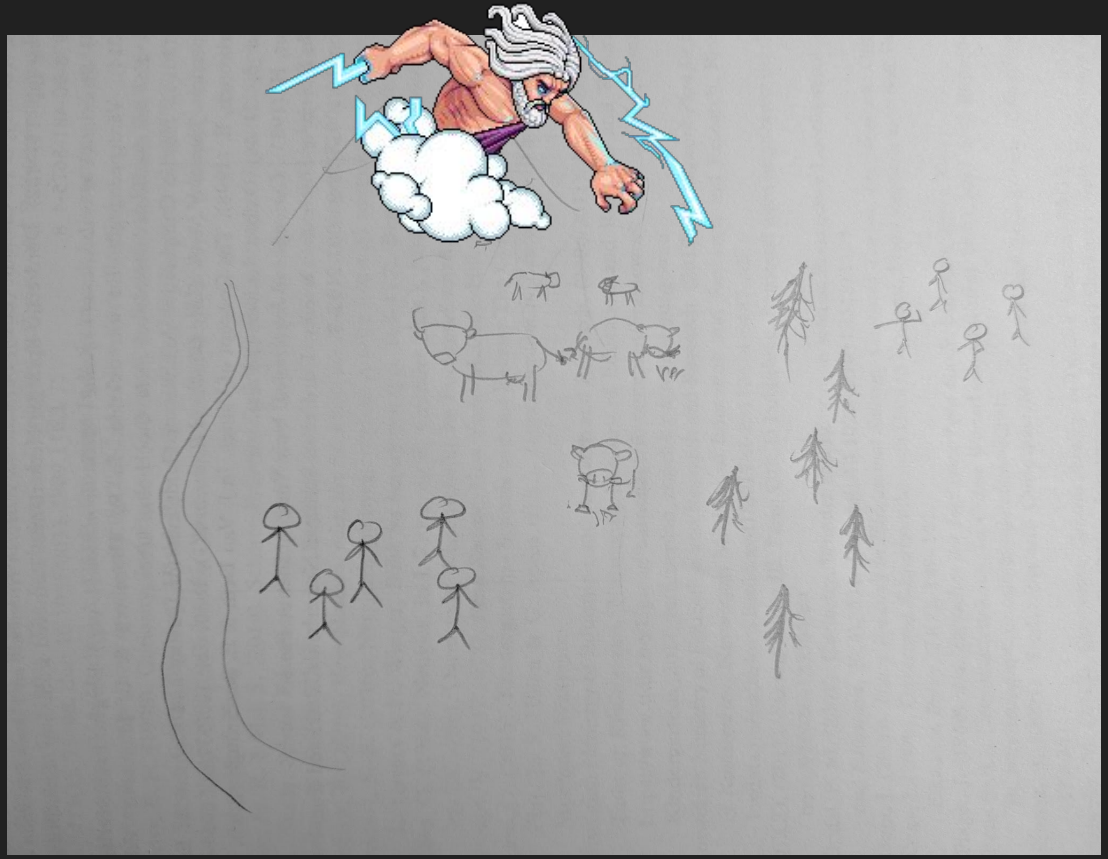
Ostentatious displays of power might work better as a deterrent, and maintaining an army might pay for itself in other ways. So, this seems better than a wall. But it does involve quite a lot of risk; what if They outnumber us? What if our show of force is not threatening enough, and they come for our cows anyway? And there is still a cost associated with a standing army. Could we have the threat/deterrent effect without the need for soldiers?



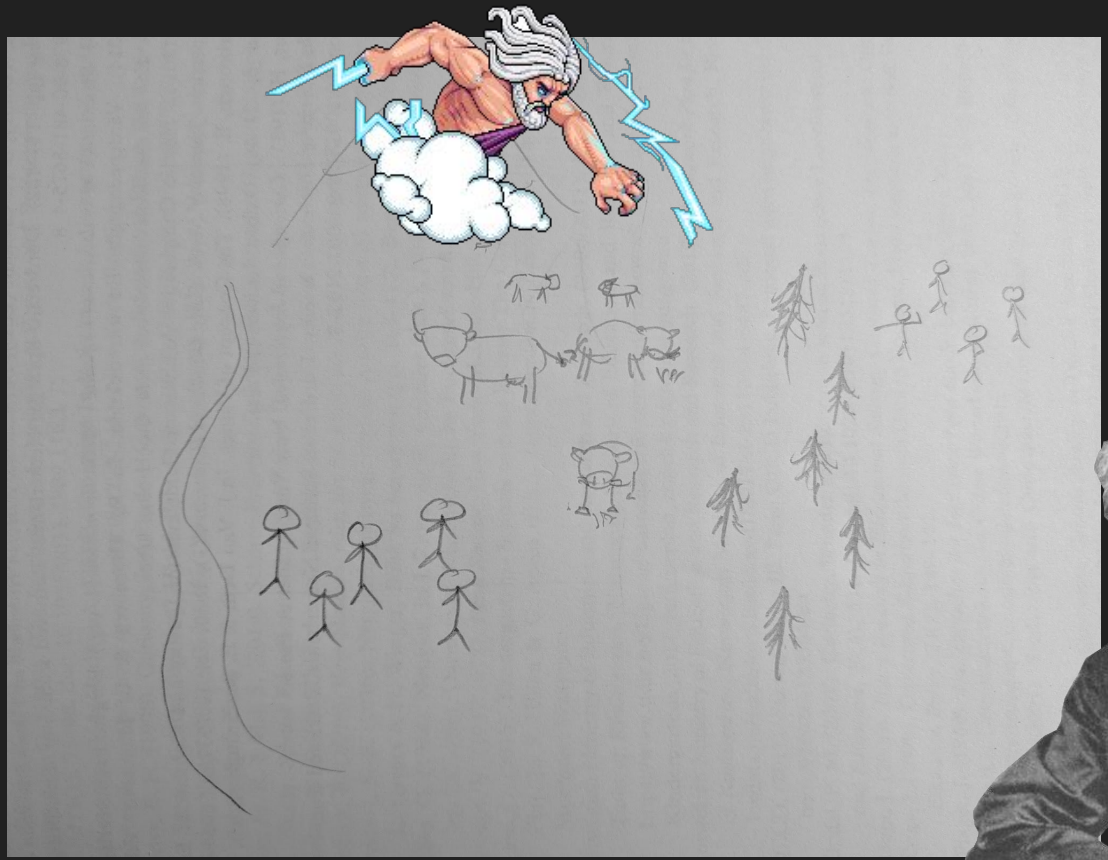
Wouldn’t it be great, from our point of view, if They thought that cattle rustlers would be ruthlessly punished, but not by us..?

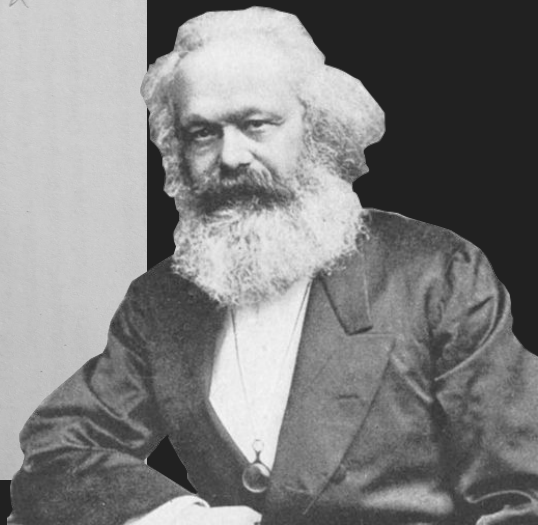


Option 3: Vengeful Deity!
If They can be convinced that Zeus (or whoever) will punish them for their transgressions, then we do not need a wall or an army to protect our cows, just a few charismatic demagogues. Very efficient!



The example, and the line of thought, illustrates the basic ideas behind Marx’s critique of religion...



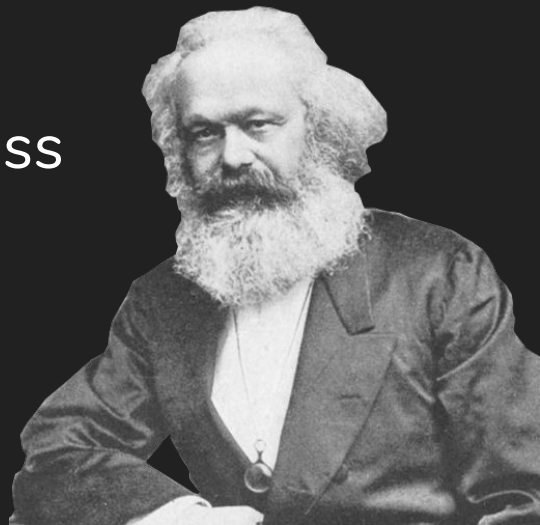


Marxist critique of religion:

Belief and practice is explained by economic forces

Stands in a mutually supporting relationship with economic conditions

Prevents attainment of class consciousness



Example Activity

- Started with a problem not a “solution”
- Invited possible solutions and problematised them to generate further engagement
- Arrived at a conclusion which could be elaborated and clarified by appeal to the target literature

Conclusions

How do we support more students to make imaginative, interesting contributions to learning activities?

Curiosity:

- Attention to novelty
- Positive response to uncertainty or ambiguity
- Persistent investigation in the face of failure

(see Day 1982, p.21)

3. Using TEL to improve engagement

Polling

Pros:

- Instant feedback for students
- Easy to plan
- Quick to implement

Cons:

- Might require students to have/use devices
- Pre-determined content

Digital Backchannels

Pros:

- Not time-limited
- Student determines the content
- Some programmes allow comment rating - more representative

Cons:

- Could become a source of distraction
- Requires students to have and use a laptop/smartphone

Examples inc. Audience Tools in Google Slides; Padlet; Mentimeter and others

Flipping the Classroom

"Two phase" model of learning: conceptual understanding + implementation

Relatively passive
Support less necessary
Outside the classroom

Relatively active
Support most needed
In class time

Works cited

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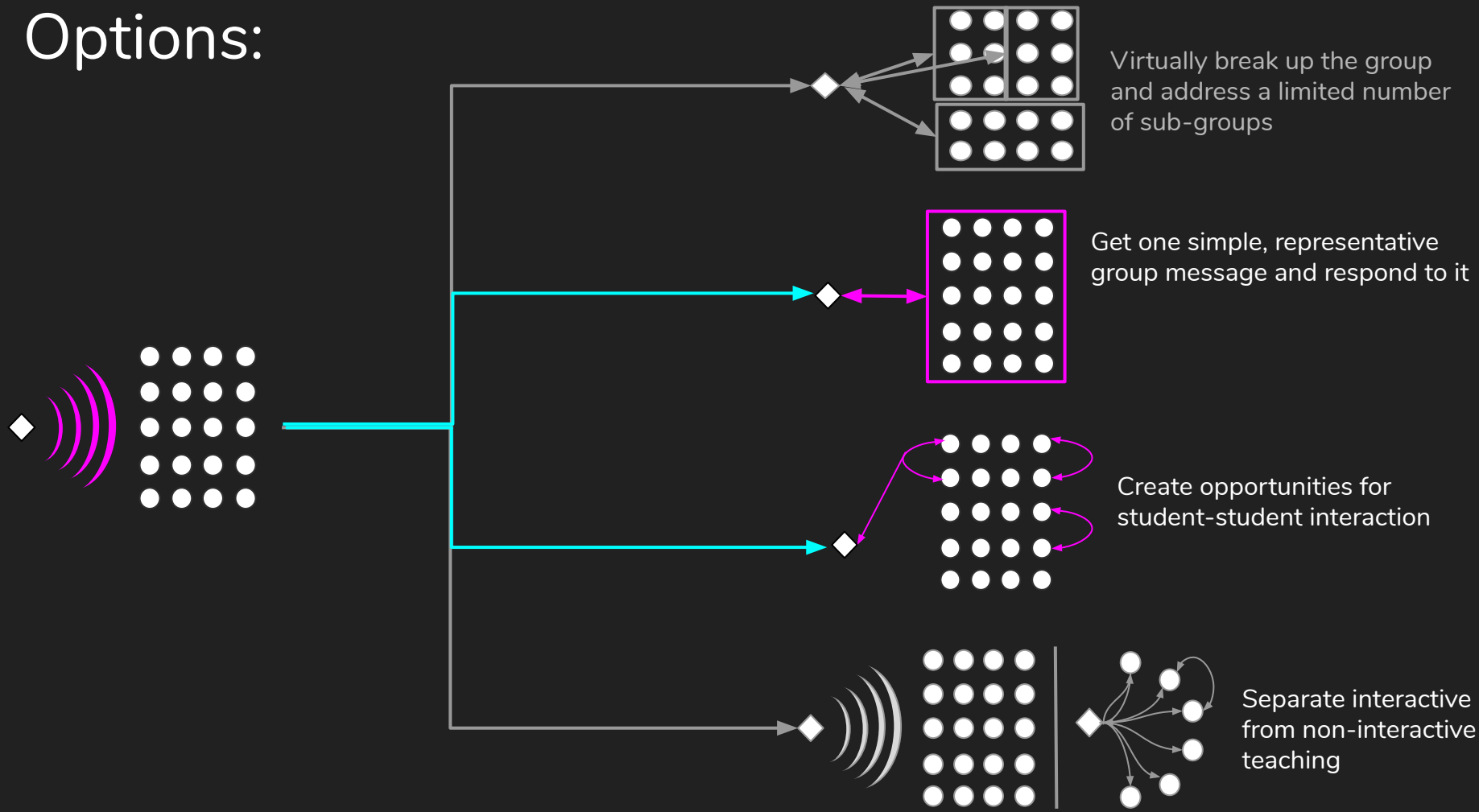
Options:


Virtually break up the group and address a limited number of sub-groups
Get one simple, representative group message and respond to it
Create opportunities for student-student interaction
Separate interactive from non-interactive teaching

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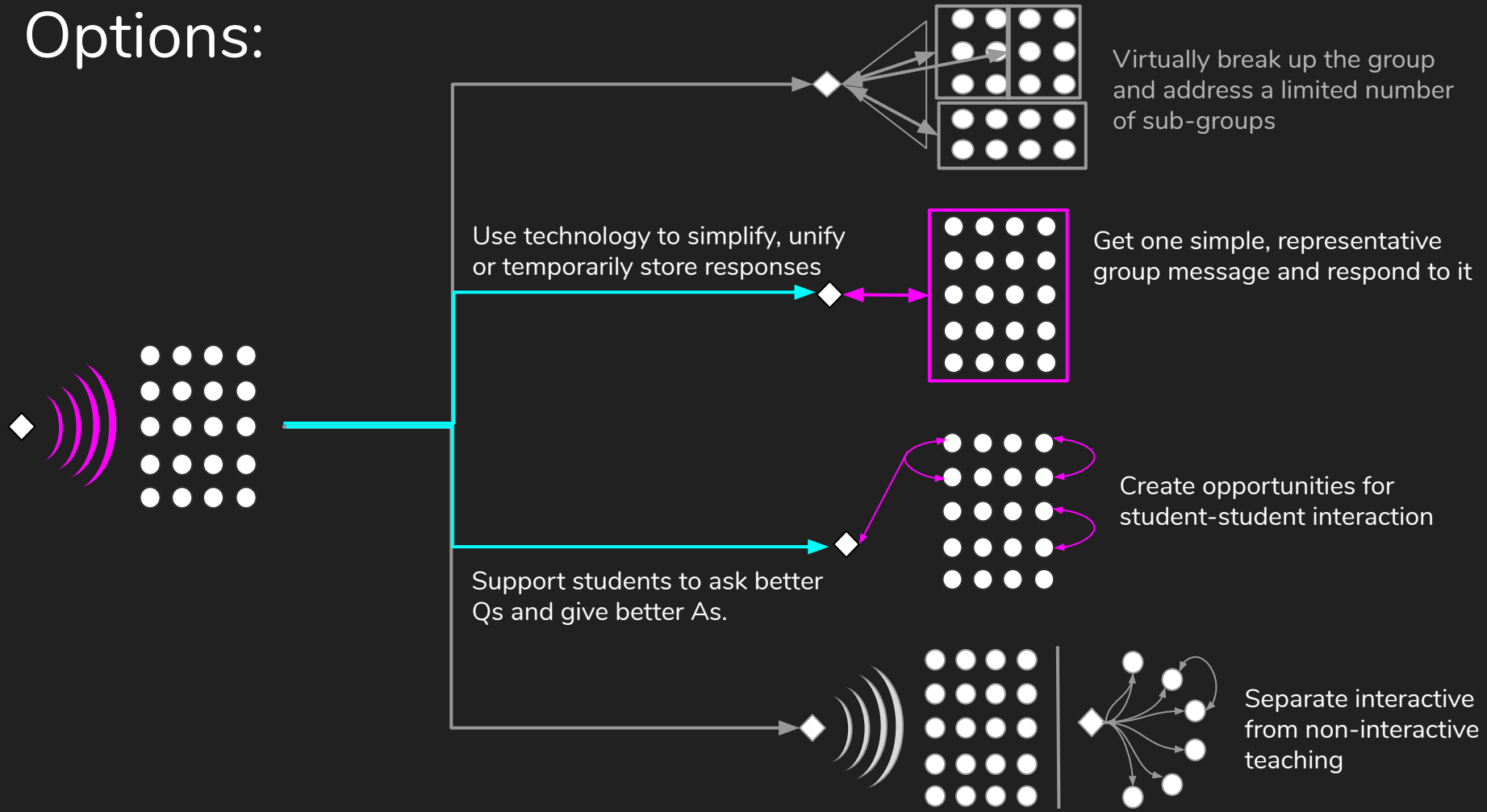
Virtually break up the group and address a limited number of sub-groups
Use technology to simplify, unify or temporarily store responses
Get one simple, representative group message and respond to it
Create opportunities for student-student interaction
Support students to ask better Qs and give better As.
Separate interactive from non-interactive teaching

Function First strategy

Notes:

The purpose of the FFS is to help you configure lecture content in a way that models the kind of inquisitive, imaginative engagement that characterises research, and encourage students to adopt an attitude of enquiry (c.f. Dyche and Epstein).

Rather than starting with information about the features of the phenomenon (ie., whatever the lecture is about), the FFS has you start with the problem that the phenomenon faces or addresses, and then introduce its features in the context of that problem.

It's easier to see how this works in the case of the natural sciences, but with a little imagination it can work well in a variety of contexts.