A programme of research-led interdisciplinary learning for all level 2 students: "10bn" at the University of Sheffield.

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Outline

We have an interdisciplinary L&T case study to share with you…

What does interdisciplinarity mean in L&T?

Why would you want all students to learn about how to be interdisciplinary?

How can it be done in a "universal" way?

Show and tell "10bn - how can we all live together?"

Different kinds of "interdisciplinary" degrees

Start broad to allow for specialism later

Engineering ➜ (e.g.) mechanical engineering

Natural science ➜ (e.g.) physics

Study multiple (complementary) subjects

Combined honours

(e.g.) Physics and philosophy
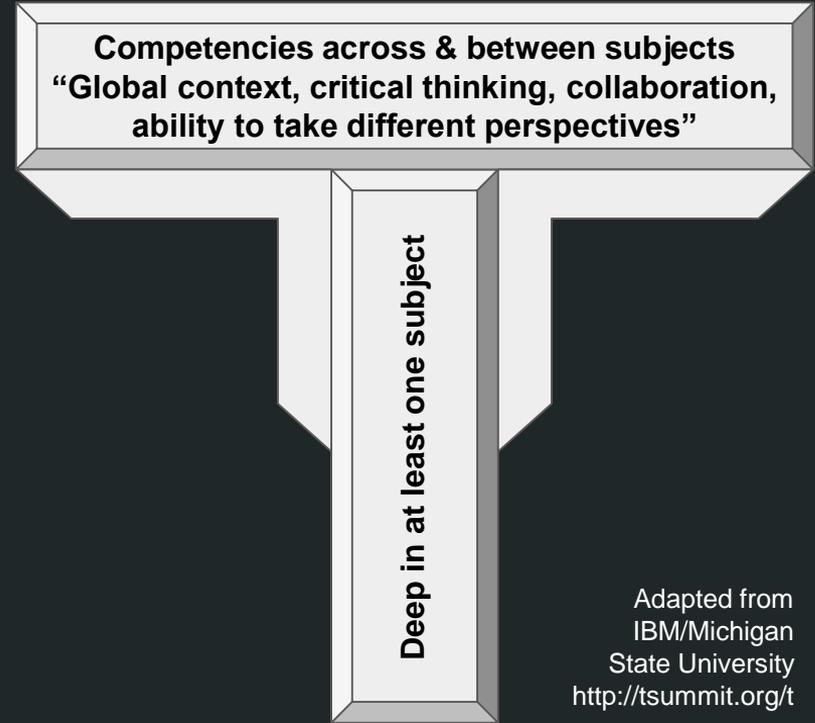
Study integrated specialism

(e.g.) Environmental science

These examples are trying to get the right balance of depth and breadth

As well as breadth and depth they try and promote knowledge and skills integration.

- In a L&T context interdisciplinarity means integration.
- But (in these programmes) integration is often left to the student.

We believe (integrative) interdisciplinarity is something all students should be learning.

Competencies across & between subjects
"Global context, critical thinking, collaboration, ability to take different perspectives"

Deep in at least one subject

Adapted from
IBM/Michigan
State University
http://tsummit.org/t

Why?

Good for students

Upon graduation, students should be able to handle information from multiple sources, advance professional relationships across different organizations, contribute innovatively to organizational practices, and communicate with understanding across social, cultural, economic and scientific disciplines. Tomorrow's workers will build their careers in a globally interconnected and constantly changing world with smarter technologies in an effort to effect positive global change.

http://tsummit.org/t

Good for the world

If we go through a list of some of the main *problematiques* [1] that are defining the new Century, such as water, forced migrations, poverty, environmental crises, violence, terrorism, neo-imperialism, destruction of social fabric, we must conclude that none of them can be adequately tackled from the sphere of specific individual disciplines. They clearly represent transdisciplinary challenges. This should not represent a problem as long as the formation received by those who go through institutions of higher education, were coherent with the challenge.

Max-Neef Foundations of transdisciplinarity
Ecological economics 53 (1) 2005

But don't they/we do this anyway?

Project work, context rich learning, problem based learning, thematic learning...

Integrative learning is happening already - yes - maybe (intro-subject) between thermal physics and mechanics or (inter subjects) between economics and politics.

We want something that works universally - that says it's important to step back and look at issues from perspectives that have been left at secondary school - this was the last time that truly integrative learning approaches were possible.

How - Ethos and unhoming

'Before recalling law, morality or value, ethos indicates the abode [*séjour*]. Further, it indicates <mark>the way of being which corresponds to this abode, the way of feeling and thinking which belongs to whoever occupies any given place</mark>. It is in fact this which is at issue in the Platonic myths. Plato recounts <mark>stories which prescribe the way in which those who belong to a condition must live it</mark>'.

Ethos: the ways of thinking and feeling that correspond to a certain place and to collective harmony

A distribution of roles; a regime of belief …. a discipline

(Jacques Rancière, 'Thinking Between Disciplines: An Aesthetics of Knowledge', *Parrhesia*, no. 1 (2006), pp. 1-12).

Ethos

The correspondence of know-how *and* knowledge of one's condition.

A discipline? 'A way of defining an idea of the thinkable, an idea of what the objects of knowledge themselves can think and know.

'Disciplinary thought says: we have our territory, our objects and the methods which correspond to them'.

(Jacques Rancière, 'Thinking Between Disciplines: An Aesthetics of Knowledge', *Parrhesia*, no. 1 (2006), pp. 1-12).

Unhoming

'It is this arrangement [*dispositif*] that aesthetic experience deregulates'.

'A disjunction between an *occupation* and the *aptitudes* which correspond to it'.

'Aesthetic dissensus, the dehiscence between the arms and gaze of the carpenter'.

Undoing the organised distribution / prescription of place - and with this, ways of seeing, feeling, doing, thinking

Dis-organising stable relations; disruption

In-disciplinary thought

(Jacques Rancière, 'Thinking Between Disciplines: An Aesthetics of Knowledge', *Parrhesia*, no. 1 (2006), pp. 1-12).

Unhome to become interdisciplinary

Normally (particularly in the UK) students have to wait until they've moved on and got a job to become interdisciplinary and experience the vast complexity of the world...

We believe that we can use university research to provide an authentic taster:
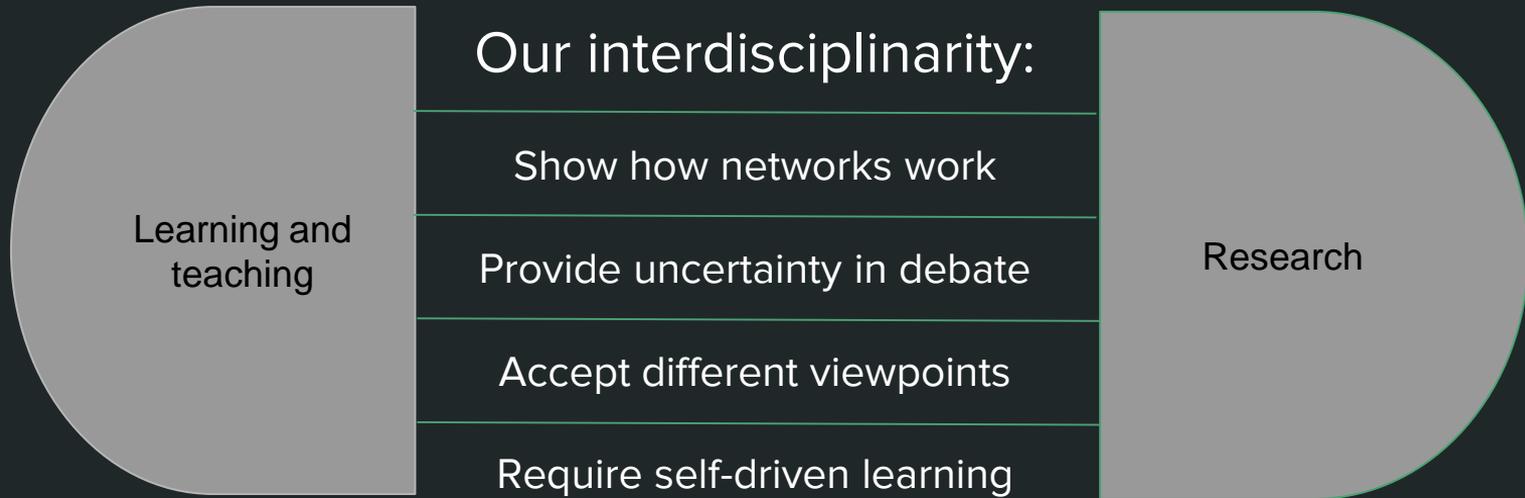
   Inspiration to want to be unhomed

   Experiences that start to unhome

To create an strong universal framing we use "10 bn - how can we live together?"

https://vimeo.com/191783321

How to unhome using university research?

Our interdisciplinarity:

Learning and teaching

Show how networks work

Provide uncertainty in debate

Accept different viewpoints

Require self-driven learning

Research

What does that mean in practice?

A 3-week online course about 10 bn - so anyone can take part in their own time

Introduce the big issues of 10 bn

Show exemplar research networks

Conclude with a reflective activity

A 3-week series of events - that builds in existing lectures and research seminars

To reinforce the online learning

To provide additional optional examples

To inspire by showcasing the research of the university

Achieve More: How will we live in a world of 10bn?

https://www.futurelearn.com/courses/tenbillion/1/todo/3572

To do | Activity | Progress

WEEK 1 — 13 Feb | WEEK 2 — 20 Feb | WEEK 3 — 27 Feb

WEEK 1: VISIT THE SPACES IN BETWEEN

Welcome to Achieve More: 10bn
In this first chapter, we explain what's coming up over the next three weeks and invite you to introduce yourself to your fellow learners. 10bn is both the name of the course and the projected population of the planet.

1.1 ACHIEVE MORE: HOW WILL WE LIVE IN A WORLD OF 10BN? ARTICLE
1.2 GETTING TO KNOW YOU DISCUSSION

Population 10 billion
We explain why we have called this course 10 billion and begin to explore the issues that are raised by a population of this size. We've devised some 'quick win' solutions - do you think these could work?

1.3 WHERE DID THE NUMBER 10 BILLION COME FROM? ARTICLE
1.4 SO, WHAT'S THE ANSWER? DISCUSSION
1.5 THE WICKED PROBLEMS OF 10 BILLION VIDEO (05:15)
1.6 IS THIS A WICKED PROBLEM? QUIZ

Working in the spaces in between
No single subject can offer a solution to the issues of 10bn. We need multiple interpretations and a broad range of knowledge across all different subjects. We need to work in the spaces in between.

1.7 THE SPACES IN BETWEEN VIDEO (01:46)
1.8 BUILDING INTERDISCIPLINARITY IN THE SPACES IN BETWEEN ARTICLE
1.9 WHAT ARE YOUR INTERESTS OUTSIDE OF YOUR SUBJECT? DISCUSSION

Understanding research
University research is crucial for addressing the problems of 10bn. In this chapter, we introduce you to research; what is it? how does it happen? where does it take place?

1.10 HOW DOES RESEARCH HAPPEN? VIDEO (03:22)
1.11 MAKING CONNECTIONS VIDEO (04:24)
1.12 LET'S CREATE OUR OWN SPACE IN BETWEEN DISCUSSION

Looking ahead to next week
In this week's final chapter, you have an opportunity to check your understanding of the course topics so far. We'll then look ahead and

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WEEK 1 — 13 Feb | WEEK 2 — 20 Feb | WEEK 3 — 27 Feb

WEEK 2: GET THE REAL STORY OF COLLABORATIVE RESEARCH

Introducing our research
This week, we'll introduce you to real research happening in the spaces in between disciplines. You'll have a chance to discover how a research project is formed and explore how different teams work together.

2.1 INTRODUCING OUR RESEARCH ARTICLE

Migration: Representing migrants
The number of international migrants is growing faster than the world's population. In this chapter, we'll explore what the media is telling us about migration and how academics and artists are challenging this representation.

2.2 MIGRATION IN A POPULATION OF 10BN? ARTICLE
2.3 HOW ARE MIGRANTS REPRESENTED IN THE MEDIA? DISCUSSION
2.4 RESEARCH PROJECT: THE LONGER STORY, THE BIGGER PICTURE ARTICLE
2.5 HOW DID THIS PROJECT COME ABOUT? VIDEO (06:10)
2.6 EXPLORE THE RESEARCH ARTICLE

Ageing population: Robotic homes
In 15 years there will be 50% more over 65s than there are today. Assistive robots could help us to overcome many of the problems associated with an ageing population.

2.7 COULD ROBOTS HELP US TO LIVE INDEPENDENTLY FOR LONGER? ARTICLE
2.8 RESEARCH PROJECT: THE INTELLITABLE VIDEO (05:41)
2.9 DESIGNING YOUR OWN SMART HOME DISCUSSION
2.10 THE CAREFREE HOME ARTICLE
2.11 EXPLORE THE RESEARCH ARTICLE

Food security: Using technology to secure our food future
A growing population demands more food. But as land and water resources are limited, and crops become increasingly resistant to herbicides and pesticides, how can we ensure food security for future generations?

2.12 FOOD SECURITY FOR 10BN: CHALLENGES AND OPPORTUNITIES ARTICLE
2.13 RESEARCH PROJECT: DRONES AND DATA VIDEO (05:56)
2.14 HOW CAN WE INNOVATE? DISCUSSION
2.15 EXPLORE THE RESEARCH ARTICLE

WEEK 1 — 13 Feb | WEEK 2 — 20 Feb | WEEK 3 — 27 Feb

WEEK 3: OUR UNIVERSITY AND THE ISSUES OF 10BN

Introduction to this week
In this final week, we'll explore how our University is connected to the issues of 10bn and encourage you to reflect on the skills you have gained from spending some time outside of your discipline.

3.1 WHAT'S HAPPENING THIS WEEK? ARTICLE

Connecting our university to the issues of 10bn
We reflect on last week's research stories and discuss how these examples connect to the theme of 10bn.

3.2 WHAT DID YOU DISCOVER ABOUT THE ISSUES OF 10BN? DISCUSSION
3.3 COLLABORATING TO MAKE A REAL WORLD IMPACT VIDEO (05:28)
3.4 CONNECTING OUR UNIVERSITY TO THE ISSUES OF 10BN ARTICLE

Completing 10bn: your written assignment
Self-reflection is an important part of learning and is a skill that you will benefit from at university and in the world of work. In this chapter, we'll guide you through the process of writing and submitting a reflection.

3.5 REFLECTING ON 10BN: YOUR WRITTEN ASSIGNMENT ARTICLE
3.6 SUBMITTING YOUR ASSIGNMENT ASSIGNMENT
3.7 GIVING FEEDBACK REVIEW
3.8 FEEDBACK ON ASSIGNMENT REFLECTION
3.9 WHAT DID YOU LEARN FROM THIS ASSIGNMENT? DISCUSSION
3.10 MAKE GOOD USE OF YOUR ASSIGNMENT ARTICLE

Farewell and next steps
In this last chapter, we'll look at where you can go from here. We'll explain where to submit your online course completion record and how you can take your involvement further.

3.11 SUMMING UP AND LOOKING AHEAD ARTICLE
3.12 TAKING YOUR INTEREST FURTHER ARTICLE
3.13 WE VALUE YOUR FEEDBACK ARTICLE
3.14 THANKS AND ACKNOWLEDGEMENTS ARTICLE

Events timetable

Availability: ● Undergraduate only ● University of Sheffield ● Open to the public

Week 1

Event	Time	Title	Location
SATURDAY 11th February (and Saturday 18th February)			
WORKSHOP	9.30am–4.30pm	The New Venture Creation module. Hands-on team-based workshops that guide students through the process of creating and refining an idea for a new social or commercial venture.	The Diamond WR1 and WR3
Monday 13th February			
TALK	1.30–2.15pm	What is Interdisciplinary? // Alastair Buckley & Wyn Morgan	HRI
TALK	2.15–3pm	Negative space and the unseen campus // Amanda Crawley Jackson & Cristina Cerulli	HRI
KEYNOTE	5.30–6.30pm	Who are the 10bn?: Demographics and dilemmas // Tony Ryan & Paul White	SU Auditorium
TUESDAY 14th February			
TOUR	11am–12pm	Tour of the unseen campus	Meet in SU foyer
KEYNOTE	5.30–6.15pm	Health Futures: Universal healthcare in a world of 10bn // Marco Viceconti	SU Auditorium
WEDNESDAY 15th February			
TOUR	11am–12pm	Tour of the unseen campus	Meet in SU foyer
KEYNOTE	5.30–6.30pm	Art Futures: Days of Future Past // Jackie Labbe	SU Auditorium
THURSDAY 16th February			
TOUR	11–11.30am & 11.30–12pm	Tours of Arthur Willis Environment Centre (AWEC)	Reception AWEC, Northumberland Rd
SHOWCASE	5–7pm	SURE Showcase	The Octagon
KEYNOTE	6.15–7.15pm	Justice Futures // ICC Judge Morrison	SU Auditorium
FRIDAY 17th February			
ART WORKSHOP	10am–12pm	Drawing negative space at UoS	ICOSS Conference Room
KEYNOTE	16:00–17:00	10 Billion: Future prospects and current thinking // Danny Dorling & Carl Lee	Diamond LT01

Week 2

Event	Time	Title	Location
MONDAY 20th February			
EXPERIMENT	10am–4pm (Drop in)	Driving in a world of 10bn // School of Architecture	Arts Tower, 19th floor, room 19.4
FILM	6–8.30pm	Dara – A film of a play by the National Theatre, London and the Ajoka theatre, Lahore // SIIBS	SU Auditorium
TUESDAY 21st February			
TALK	11am–1pm	Migration: The longer story, the bigger picture // Amanda Crawley Jackson	Alfred Denny Conf Room
WORKSHOP	3–4pm	Food injustice: Effects of economic policy on families // Megan Blake	IC 1:20

Week 2 (right column)

Event	Time	Title	Location
TUESDAY 21st February			
DEBATE	6.30–8pm	Can we have a fully renewable energy future? // Multi-faculty panel	Diamond LT 03
WEDNESDAY 22nd February			
WORKSHOP	10am–12pm	Migration and the Bible: What can refugees teach us? // Casey Strine	IC 1:20
TALK	2–3pm	Alien life: 'Is there anybody out there?' // Simon Goodwin	Diamond LT02
TALK	3.15–4pm	Green impact and 10bn // Dimitra Pilichou	Diamond LT02
THURSDAY 23rd February			
WORKSHOP	10am–12pm	How can student households improve energy efficiency? // Robert Marchand	IC 1:20
DEBATE	2–4pm	Water futures // Sheffield Water Centre, Nexus Network and The Grantham Centre	Firth Court LT F02
FRIDAY 24th February			
TALK	10am–12pm	Visions of nature in a 10bn world // Tom Webb	Firth Court Council Room
WORKSHOP	2–3.30pm	New antibiotics: From visualising molecules to developing new drugs // Jon Sayers	Alfred Denny PC Room

Week 3

Event	Time	Title	Location
MONDAY 27th February			
SEMINAR	10–11am	Medical Humanities Sheffield // Annamaria Carusi & Chris Millard	IC 1:20
WORKSHOP	12–2pm	Writing your reflective assignment // Careers Service	IC 1:20
SEMINAR	3–4.30pm	Driving in a world of 10bn // School of Architecture	IC 1:20
TUESDAY 28th February			
WORKSHOP	2–4pm	Social futures: What kind of society do we want? // Rowland Atkinson	IC 1:20
WORKSHOP	4–6pm	Writing your reflective assignment // Careers Service	IC 1:20
WEDNESDAY 1st March			
READING & DISCUSSION	10am–12pm	Migration and the Bible // Casey Strine	IC 1:20
SEMINAR	1.30–3.30pm	PhD scholarship at the Grantham Centre for Sustainable Futures	IC 1:20
THURSDAY 2nd March			
DROP IN DAY	9am–5pm	Feedback, discussion & online course completion	IC 1:20
FRIDAY 3rd March			
ADVISORY SESSION	10am–12pm	World of work // Careers Service	IC 1:20
ADVISORY SESSION	2–4pm	World of work // Careers Service	IC 1:20

What sort of research are we making examples of?

Anything that explains a network involved in an issue of 10 bn.

Energy, food, migration, water, healthcare, nature, international law,

Representations of migration

Insilico medicine - future of healthcare - Insigneo

Ethical energy futures through participatory approaches

Robots for assisted living

Understanding / overcoming / living with the crop yield plateau

(etc.)

What have we learned so far?

We've had to recruit students to volunteer into an uncredited programme

250 students participated.

High levels of online interaction via FutureLearn platform.

10 hrs online participation. ~2-3 talks attended.

There is a lot of interest in the course. No one is negative towards the concept.

Students have a lot to negotiate in order to attend.

Student feedback

A few key quotes…

➔ It [10bn] went over a broad range of different studies - the arts side and then the technical side - so I enjoyed the mixture of things that I wouldn't normally do on my course.

➔ I liked how we got a greater appreciation of the interdisciplinary research the University does, as at very little point outside of your department do you get an idea of what the University does outside of student research. It was great to see it really is interdisciplinary in so many different areas.

➔ I think it allows you to be a lot broader with how you work and how you do research - definitely for next year and going on to post graduate work as well.

➔ Everything I hoped for but was not bold enough to expect … it was riveting.

➔ It meant that you really saw yourself considering things which are outside of your usual course remit… I really enjoyed that

➔ It really opened your eyes to how lots of other subjects were coming into developing different things

➔ It [reflective assignment] is a good way to reflect on what you have perceivably learned.

➔ Sometimes you might just think you've learned "this" but you don't get chance to consolidate your thoughts, so it's good to think about what did you get from this.

➔ I think [the peer feedback] was useful. It was nice to read others' thoughts and as it was a fairly short piece of writing,
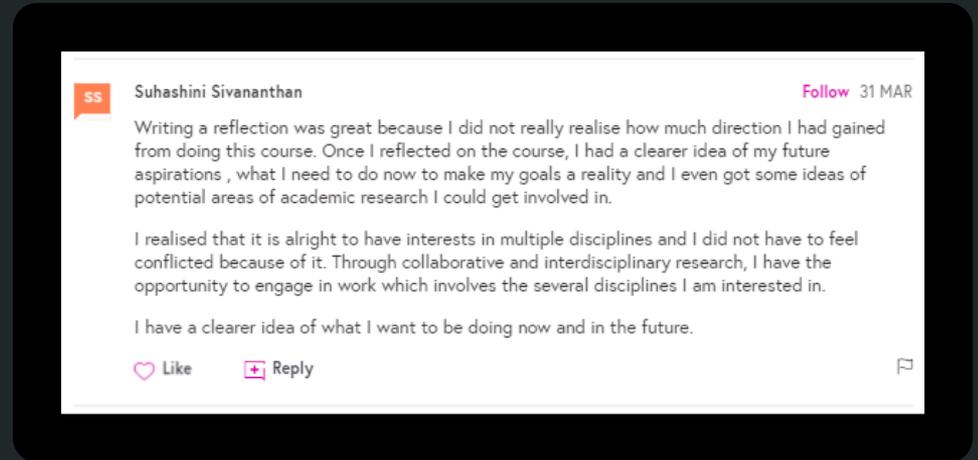
Conclusions

An interdisciplinary course that:

Is accessible/scalable for all

Negotiates inter departmental
   timetabling constraints

Gives student choice but at the
   same time uses a core narrative
   as a scaffold

Uses reflection as an
   interdisciplinary learning tool

SS   Suhashini Sivananthan   Follow   31 MAR

Writing a reflection was great because I did not really realise how much direction I had gained
from doing this course. Once I reflected on the course, I had a clearer idea of my future
aspirations , what I need to do now to make my goals a reality and I even got some ideas of
potential areas of academic research I could get involved in.

I realised that it is alright to have interests in multiple disciplines and I did not have to feel
conflicted because of it. Through collaborative and interdisciplinary research, I have the
opportunity to engage in work which involves the several disciplines I am interested in.

I have a clearer idea of what I want to be doing now and in the future.

♡ Like   Reply

Thanks for listening