

MANCHESTER
1824

The University of Manchester

Designing Sustainability at Scale: A Collaborative Model for Interdisciplinary Learning

Michelle Feng, Annabel Robson & Amélie Mons

UCIL

University College for
Interdisciplinary Learning



Today's discussion

- Who we (UCIL) are
- The journey of tailoring a sustainability course for a new student audience
 - Who? What? Why? How?
 - Collaborative aspects
- Key features of the resulting course
- Looking forward: from a pilot course to a scalable framework

UCIL

University College for
Interdisciplinary Learning



Interdisciplinary, credit-bearing units



Variety of topics



Available to students across the University
of Manchester



Functions as a bridge across disciplines



Creates opportunities for collaboration

UCIL portfolio

UCIL
University College for
Interdisciplinary Learning



ARE WE ALONE?

The Search for Extraterrestrial Life

UCIL
University College for
Interdisciplinary Learning



TRUST AND SECURITY IN A DIGITAL WORLD

From Fake News to Cybercriminals

UCIL
University College for
Interdisciplinary Learning



EQUALITY, DIVERSITY AND INCLUSION

Your Role in Shaping a Fairer World

UCIL
University College for
Interdisciplinary Learning



UNDERSTANDING MENTAL HEALTH

UCIL
University College for
Interdisciplinary Learning



CREATING A SUSTAINABLE WORLD

21st Century Challenges and the Sustainable Development Goals

UCIL
University College for
Interdisciplinary Learning



MEDICINE AND THE MEDIA

UCIL
University College for
Interdisciplinary Learning



LEADERSHIP IN ACTION

UCIL
University College for
Interdisciplinary Learning



WHY CHINA MATTERS

UCIL
University College for
Interdisciplinary Learning



VISUALISING INFORMATION

Uses and Abuses of Data

Unit being repurposed specifically for students in the
School of Biological Sciences (SBS)

ARE WE ALONE?
The Search for E

TRUST AND SECURITY

Passwort

EQUALITY, DIVERSITY

UCIL

University College for
Interdisciplinary Learning

UCIL
University College for
Interdisciplinary Learning

UNDERST
MENTAL H

UCIL
University College for
Interdisciplinary Learning

LEADER
IN ACTION

CREATING A SUSTAINABLE WORLD

21st Century Challenges and the Sustainable Development Goals



MATTERS

INFORMATION
Uses and Abuses of Data

Repurposing an interdisciplinary unit for a new audience

Aim

Creation of a bite-sized course on Sustainability for all 1st year SBS students

How?

Adapting the established UCIL unit, *Creating a Sustainable World* (CaSW), to the disciplinary context of biological sciences

Why?

New QAA subject benchmarks require all disciplines to integrate **Education for Sustainable Development**.

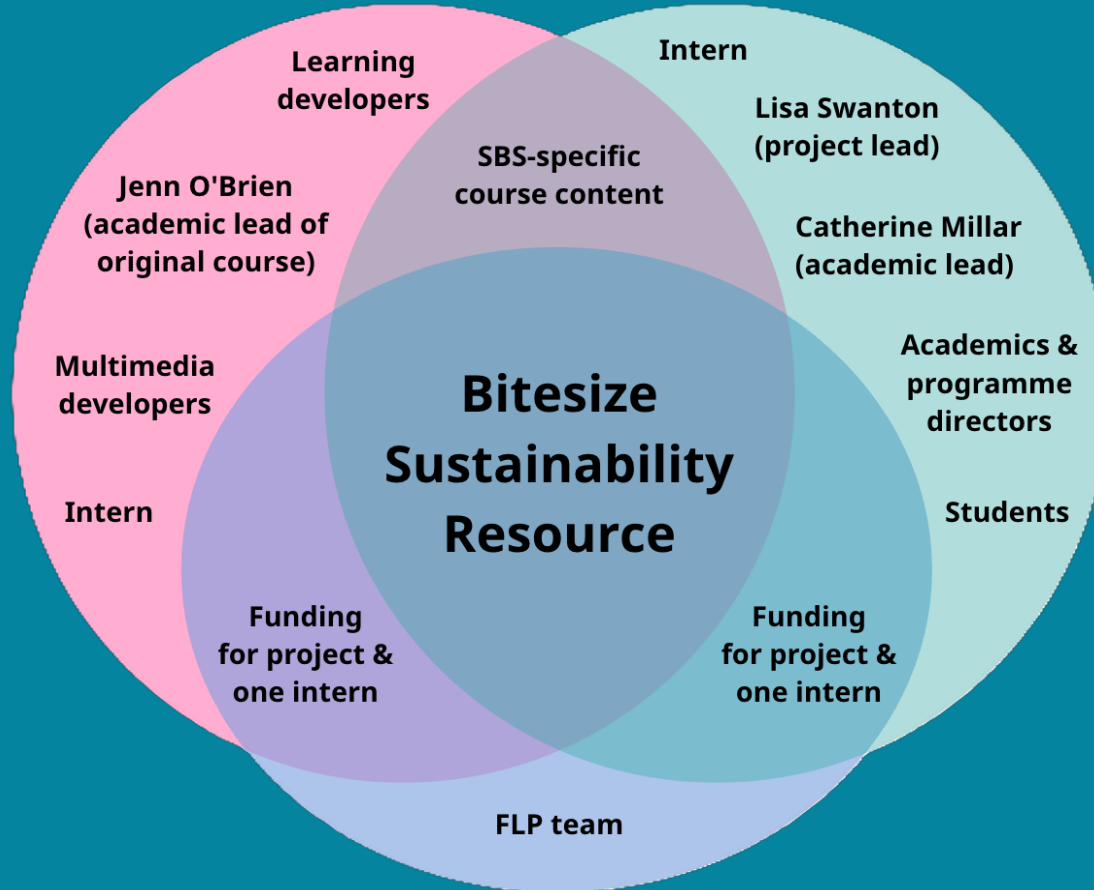
Who?

A collaboration between **UCIL**, **SBS academics** and **SBS students**.

The result: a bite-sized sustainability course

- Online course
- Introduces the 'what' and 'why' of sustainability and sustainable development
- Embedded within the first-year SBS tutorial unit
- Supports summative sustainability poster assignment
- Three chapters (3-4 hours total)

UCIL



SBS

Flexible Learning Programme

**The process:
design by team
approach**

Second workshop

Reviewing and designing online learning activities suited to the needs of SBS students.

Scenario 1	Scenario 2	Scenario 3
<p>Description</p> <p>CRISPR edited - fine tuning organisms to evaluate natural 'low-dose' technology about resistance to antibiotic resistance. SDG 1, 3, 8, 10</p> <p>Environmental impacts (planet)</p> <ul style="list-style-type: none"> - Extinction of native species ENV. - Consequence on local ecosystem. + Less usage of natural drug (antibiotic, wide disposal) <p>Social impacts (people)</p> <ul style="list-style-type: none"> + Anticipation - human + - awareness - Education, fear, mass, social comp. etc + Ethical considerations <p>Economic impacts (profit)</p> <ul style="list-style-type: none"> + Reduced reliance from treatment / research ECON + Job days of work <p>Which discipline(s) would this most relate to?</p> <p>Genetics, biochem, med biol, etc</p> <p><u>ALL @</u></p>	<p>Description</p> <p>ENGINEERING BACTERIA TO MAKE DRUGS (OTHER LABEL (ANTIBIOTICS))</p> <p>Environmental impacts (planet)</p> <ul style="list-style-type: none"> + Large amount of waste associated ENV - with production - Creating new species with unknown implications - Increased use of antibiotics = emergence of resistance <p>Social impacts (people)</p> <ul style="list-style-type: none"> - Reduced disease <p>Economic impacts (profit)</p> <ul style="list-style-type: none"> + Reduced disease burden - > increases economic activity - Increased use of a population <p>Which discipline(s) would this most relate to?</p> <p>Biochem, microbiology, genetics, Pharm</p>	<p>Description</p> <p>GM crops / production</p> <p>Environmental impacts (planet)</p> <p>Social impacts (people)</p> <p>Economic impacts (profit)</p> <p>Which discipline(s) would this most relate to?</p>

How can my discipline...

be affected by sustainability challenges?	contribute to sustainability challenges?	help study/monitor an issue relevant to one or more SDGs?	provide solutions/mitigations/adaptations to sustainability challenges?
<p>Microplastics affecting reproductive health</p> <p>CLIMATE CHANGE - SKIN CANCER</p> <p>EXTREMELY HEAT ON NEUROLOGICAL FUNCTION 'HEAT STROKE'</p>	<p>Plastic waste in labs</p> <p>ANTIBIOTICS IN THE ENVIRONMENT</p> <p>ANTIBIOTICS IN THE ENVIRONMENT</p>	<p>Daphnia as fresh water bioindicators</p> <p>BIOLOGICAL FOR EARLY DETECTION OF DEEPSEA</p> <p>PROTEIN SENSORS FOR CHEMICALS</p>	<p>'Plastic-eating' bacteria</p> <p>BIOFUELS</p> <p>SYNTHETIC BIOLOGY (e.g. ALGAE + DISTURBED ECOSYSTEM)</p>

	Activity 2	Activity 3
Step 1	<p>not about how to produce a good application for funding! About the sustainability aspect.</p> <p>CHAPTER 3: Great applicants with sustainable ideas take application - get them to think about how it could be improved. (think about how to change minds of people to say / convince better)</p> <p>Provide content to students</p>	<p>the main of drug development: discovery - tests - trials - registration - the sales</p>
Step 2	<p>You've been asked to identify areas of strengths/weakness about sustainability</p> <p>Ask students to reflect</p>	
Step 3	<p>Provide suggestions for a more sustainable alternative</p> <p>Ask students to comment</p>	
How will this speak to all SBS students, regardless of discipline?	<p>Ask for some examples (like water)</p> <p>Disease based best as speaks to everyone</p>	

<p>Description of the opportunity 1 please include the relevant discipline(s) in your description</p> <p>Student union-led projects Lego FRS Upcycling shop Volunteering / Studyfy</p> <p>Placements (?) Steve Richardson</p>	<p>Tick the opportunity</p> <table border="1"> <tr> <td>Study and/or lab</td> <td>FYP</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Career</td> <td>Other</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	Study and/or lab	FYP	<input type="checkbox"/>	<input type="checkbox"/>	Career	Other	<input type="checkbox"/>	<input type="checkbox"/>	<p>How can students be empowered by sustainable thinking when exploring these opportunities?</p>
Study and/or lab	FYP									
<input type="checkbox"/>	<input type="checkbox"/>									
Career	Other									
<input type="checkbox"/>	<input type="checkbox"/>									
<p>Description of the opportunity 1 please include the relevant discipline(s) in your description</p> <p>iGEM - depending on topic Green spaces on campus?? Stapford Guild Museum roof bees</p> <p>LEAF / ER Student Volunteers</p>	<p>Tick the opportunity</p> <table border="1"> <tr> <td>Study and/or lab</td> <td>FYP</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Career</td> <td>Other</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	Study and/or lab	FYP	<input type="checkbox"/>	<input type="checkbox"/>	Career	Other	<input type="checkbox"/>	<input type="checkbox"/>	<p>How can students be empowered by sustainable thinking when exploring these opportunities?</p>
Study and/or lab	FYP									
<input type="checkbox"/>	<input type="checkbox"/>									
Career	Other									
<input type="checkbox"/>	<input type="checkbox"/>									
<p>Description of the opportunity 1 please include the relevant discipline(s) in your description</p> <p>We need to test students! Tree trail (UoM) Local initiatives</p> <p>Clubs and societies</p>	<p>Tick the opportunity</p> <table border="1"> <tr> <td>Study and/or lab</td> <td>FYP</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Career</td> <td>Other</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	Study and/or lab	FYP	<input type="checkbox"/>	<input type="checkbox"/>	Career	Other	<input type="checkbox"/>	<input type="checkbox"/>	<p>How can students be empowered by sustainable thinking when exploring these opportunities?</p>
Study and/or lab	FYP									
<input type="checkbox"/>	<input type="checkbox"/>									
Career	Other									
<input type="checkbox"/>	<input type="checkbox"/>									

Key principles of development

- ✓ Interdisciplinarity
- ✓ Interactivity
- ✓ Student focused

Key principles of development



Interdisciplinarity



Interactivity



Student focused

Freeform Question: Discipline and definition of Sustainability
e.g Zoology: My personal definition of sustainability is...

Biomedical sciences: I think sustainability is a concept that can be applied to anything and is rooted within the obvious. it is something that is sustained. In the context of STG's, sustainability is the main method of ensuring our world is positively sustained for the generations to come.

Biology: To me, sustainability means the ability for us all to use resources and just exist in a way that allows us to keep doing so without causing harm or making drastic changes to the environment/ecosystems, without running out of said resources.

immunology - To me, sustainability is the 3Rs (Recycle, Reuse and reduce). To protect our planet not just for ourselves but also the rest of the organisms residences.

Biochem: My definition of sustainability is goal for people to work together for. This goal encompasses the protecting of the planet by finding long term solutions and adaptations to human actions

Neuroscience: my personal definition of sustainability is retraction. Retracting what

Biotechnology: Minimize negative effects on the environment, promote social

Cognitive Neuroscience and Psychology: Sustainability in my opinion is

genetics to me sustainability is when you can continue doing the same

+ Post

Presenting diverse, and at times contrasting, perspectives.

Key principles of development



Interdisciplinarity



Interactivity



Student focused



Integrating a wide range of online, activity-based learning experiences.

Key principles of development



Interdisciplinarity



Interactivity



Student focused

Student Feedback

1. Which elements of core modules 1 and 2 from CaSW should be included in the bitesize unit?

“It is important to include ‘Introduction: Understanding Sustainable Development’. When doing the full CaSW unit this was a very helpful background in sustainability as someone who comes from a bioscience background where this is not taught much.”

“Most of ‘The Sustainability challenge facing humanity in the 21st Century’ should be included but with less emphasis on COVID-19. This section would have benefited by introducing a wider range of current sustainability challenges rather than having a large focus on COVID-19. It does not accurately reflect the breadth of sustainability challenges we face currently by focusing on COVID-19.”

“All of ‘Origins and core principles of sustainable development’ should be included as this was important in providing historical background”

“Content from ‘SDG17: Partnerships for Sustainability and the SDGs’ and ‘The University of Manchester and the SDGs’ should be greatly reduced in size. Though these topics are important, I found myself wanting to know more about sustainability issues and current solutions/work within bioscience/biotechnology and thought the full CaSW unit as a whole was lacking such”

“Conclusion is always good to get the key points across”

Drawing on student feedback and a learner-centred design approach, with a clear and coherent narrative.

Final product


A collaborative model

Chapter 1: Introduction to sustainability

Introduction


 Academic lead welcomes students to this course

Sustainability as an interdisciplinary concept

 Freeform question: personal definitions of sustainability

From sustainability to sustainable development


Socio-economic contexts of sustainable development

 Drag-and-drop: understanding the triple-bottom line within your discipline (scenario-based activity)

'The Great Acceleration': the rapid increase in the use of resources


The trade-offs of sustainability

The trade-offs of sustainability in your discipline

 Academics discuss trade-offs within home disciplines

Chapter 2: The SDGs

Introduction


 Redesign of existing interatives

The SDGs as a framework and 'thinking device'

Targets and indicators

The interlinking of the SDGs: synergies and trade-offs / complexities and contradictions

Sustainability and your discipline

 Flashcards: different perspectives on how your discipline relates to sustainability

Face to face
Session



Chapter 3: Who can drive/create change

Who is responsible for sustainable development


The partnership between governments, businesses, environmentalists, and scientists


The importance of technology and data for sustainable development

The University of Manchester and sustainable development


 Academics explain why sustainability matters for UoM

What can you do?

 Examples in disciplinary curriculum that relate to sustainability / sustainable practices

 Academics discuss opportunities in home School for students to get involved

Conclusion

 Academic lead concludes the course

Evaluation

First rolled out September 2025 (750+ students, 14 disciplines)

Students' feedback

Improved understanding in:

- Sustainable development as a whole
- How sustainable development relates to their discipline
- How to practice sustainability during their degree

Next steps

A reusable framework to be shared with other schools for further collaboration.

Conclusion

1. Existing sustainability resources can be meaningfully adapted for **new student contexts.**

2. **Collaborative design** enables more relevant and engaging interdisciplinary learning.

3. A successful pilot that has paved the way for **further interdisciplinary teaching and learning experiences** across the University

Chapter 1



Thank you for listening!

Any questions?

We'd love to hear from others with similar experiences

Annabel.robson@manchester.ac.uk

Michelle.feng@manchester.ac.uk