

Part 2. Developing and interdisciplinary sustainable energy course

Wageningen DEEM team

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Content 1.5 days

Developing a new course in two steps

- Step 1. Creating a basic understanding of interdisciplinary real-life cases
 - Link to morning session
- Step 2. Development of a Student-Centred Interdisciplinary Energy Course
 - Course alignment: learning outcomes, activities and assessment
- Present course + reflection

Programme

- Day 1: afternoon
 - Step 1 + start with step 2
 - Group peer feedback
- Day 2: morning
 - Finalise step 2
- Day 2: afternoon
 - Presentations/discussions
 - Reflection
 - Wrap up/follow-up

Flip the classroom!

- Flipping the classroom is a new way of teaching, taking a radically student-centred approach.



- Principles

- Teacher prepare materials (readings, videos, etc)
- Students study these (and other information) and take the lead in the session
- Thus
 - Limited traditional lectures
 - Teachers help students learn (facilitate)

Flip the classroom! (3)

The Flipped Classroom

DURING



Students practice applying key concepts with feedback

IN CLASS

GOAL

GOAL

GOAL

Students prepare to participate in class activities

BEFORE



OUT OF CLASS

AFTER

Students check their understanding and extend their learning



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For quality of life

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Flip the classroom! (3)

- In this workshop, we will adopt a flipped classroom perspective
- No lectures, mainly group work
- Handbook as key reference
- Facilitated by DEEM team members
- Requires active participation and feedback

Formation of groups

- Make groups of 3-5
- Ensure different disciplinary inputs
- Work across institutions

- Divide roles in the group:
 - Chair
 - Note-taker
 - Facilitator (DEEM team member)
 - Presenter(s)

Products/outcomes of the workshop

- **Answers to the questions in step 1 and 2** (Word file)
- **Presentation**
 - Based on your group work, we expect you to present (in ~10 min):
 1. Your course idea
 - Main topic
 - Interdisciplinarity
 - Type of course (general)
 2. The table with learning outcomes, activities, assessment and role of the teacher
 3. How you can further develop/institutionalise this idea
- **Intermediate products:** posters, notes, etc

Step 1. Creating a basic understanding of interdisciplinary real-life cases

In small teams you will discuss the questions below and share your answer to the last question in a plenary session.

- How do you understand this term? And how do you feel about interdisciplinary collaboration?
- In what ways do you think commissioners/society could gain from interdisciplinary collaboration with your education institute?
- In what ways do you think students could gain from interdisciplinary collaboration?
- What are some hurdles and/or hardships in recruiting interdisciplinary real-life cases?

Step 1. Creating a basic understanding of interdisciplinary real-life cases (2)

- From your experiences and by answering the questions above:

What do you think are important elements of the real-life cases to create interdisciplinary learning environments for students?

- *Discuss and present your answer to the last question and insights from the other questions*

Step 2. Development of a Student-Centred Interdisciplinary Energy Course

- See questions on the handout
- Discuss each question in your group and write down your answers in English (laptop or flipchart)
- Make a poster of the main table in the handout (see next slide)

- When necessary, we will have short plenary intermezzos

Table

Learning outcomes	Learning activities	Learning Assessment	Consequences for the 'teacher role'

Table

Learning outcomes WHAT is it that you want your participants to develop during this course?	Learning activities HOW are you going to provide participants with opportunities to develop the intended learning outcome?	Learning Assessment Have your learning outcomes been reached? (may include formative and summative assessment)	Consequences for the 'teacher role' (teacher = expert, coach, facilitator, workshop leader etc.)
<u>Prerequisite:</u> Include higher levels of learning outcomes related to analysis, evaluation or creation (see BLOOM taxonomy)	<u>Prerequisite:</u> Use a variety of learning activities, including student-centred ones.	<u>Prerequisite:</u> Make sure your learning outcomes are aligned with your assessment methods.	
<i>An example: - Discuss, report, present and defend a case of sustainable technology development within a chosen field in the Netherlands.</i>	<ul style="list-style-type: none"> ✓ <i>group-based research assignment</i> ✓ <i>meetings with supervisor</i> ✓ <i>a group excursion</i> ✓ <i>Etc</i> 	<ul style="list-style-type: none"> ✓ <i>assessment of group paper 90%</i> ✓ <i>presentation 10%</i> 	<i>The teacher will play the role as expert, organiser, assessor, and facilitator of the group work</i>

Step 2. Questions

1. What is the interdisciplinary or transdisciplinary energy related topic you are focussing on? What is the real-life energy related case that you would like to use for this course?
 - A topic related to sustainable energy
 - Include more than only engineering related knowledge, e.g. including scenarios/futures, socio-economic or political aspects, environmental aspects
 - Open-ended
 - Action-oriented
 - Student can learn how to participate and collaborate with peers and stakeholders of the energy sector
 - Stimulate the development of research skills, systemic thinking, problem solving skills and critical thinking
 - Related to the professional working field of the students

Step 2. Questions (2)

2. What processes and resources will you use to gather information to support course development (e.g. needs assessment, recommendations from a review, advisory committee, feedback, employers, etc.)?
3. What relevant stakeholders are you thinking about to engage with while developing and implementing this student-centred interdisciplinary course?
4. Who are the learners in the course? (briefly describe their educational level, typical characteristics and number of expected participants):
5. What are the broad areas of knowledge, skills and abilities that are necessary for students to learn in this course? What prerequisite knowledge and skills are important for learners before taking this course?

Step 2. Questions (3)

6. What role do you want to play and do you want your learners to play in the learning situation?
7. How many sessions will your course involve and what is the duration of each session?
8. What is the context or setting for this course (e.g. classroom, in the field, online, blended, etc.)? Is it an optional or obligatory course?
9. Based on the information above, write a course description (100 word maximum).
10. How will you evaluate if the course set-up, the learning outcomes, the learning activities, and the learning assessment? How will you evaluate to what extend they were effective for your learners?

Final presentation

- Based on your group work, present in ~10 min:
 1. Your course idea
 - Main topic
 - Interdisciplinarity
 - Type of course (general)
 2. The table with learning outcomes, activities, assessment and role of the teacher
 3. How you can further develop/institutionalise this idea

- Other groups/participants provide feedback on each of these aspects

Reflections/feedback

- Interdisciplinary course development
 - How can you use/institutionalise your course/module?
 - How/what other courses can you develop in this way?
 - What are the advantages and challenges?
- Flipped classroom
 - What do you think about the flipped classroom?
 - What are the advantages and challenges?
- Other issues/ideas next trainings
- Please fill out the electronic survey!