

The boundary-crossing rubric

A new tool to support inter- and transdisciplinary learning

Karen Fortuin, Judith Gulikers, Carla Oonk



Who are we?



Karen Fortuin

Environmental Systems Analysis



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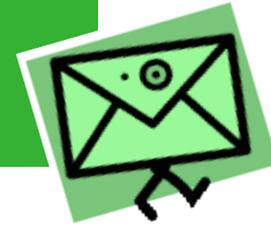


Carla Oonk

Education and Competence Studies

A multi-disciplinary team working on inter- and transdisciplinary education

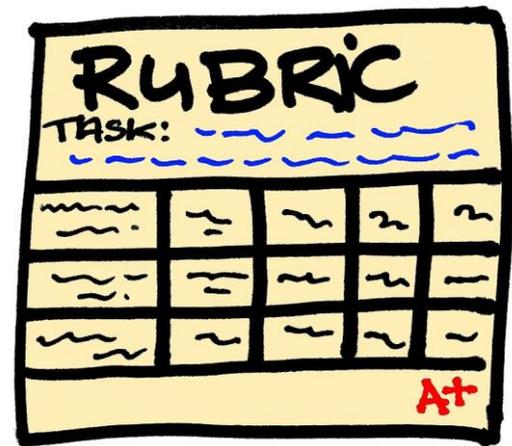
Take Home Message



- Inter- and transdisciplinary project-based courses largely vary in learning objectives and assessment strategies
- A **rubric** based on **boundary crossing** theory is expected to support student learning in an inter- or transdisciplinary learning setting
- We show you a **rubric-under-construction** and appreciate to further co-create this instrument!

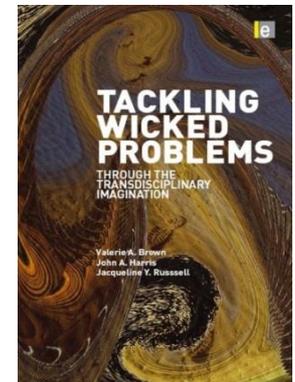
What's on the program? A boundary crossing rubric

1. The WHY of a rubric
2. The context: two transdisciplinary learning environments
3. Theoretical approach: Boundary Crossing Theory
4. Exploring the rubric-under-construction



The WHY of a boundary crossing rubric (1/2)

- Life science professionals face complex, “wicked” societal issues (e.g. climate change, food security) (Rittel & Webber, 1973)
- Complex issues require co-creation of new transdisciplinary knowledge through intense collaboration across boundaries of (Scholz & Steiner, 2015)
 - Disciplines
 - Perspectives and practices (e.g. academic and community)
- Life science professionals need “boundary crossing competence”
- Developing boundary crossing competence is not an easy task and should be facilitated in education (Engeström *et al*, 1995; Wenger, 2000).



The WHY of a boundary crossing rubric (2/2)

- **Research finding:** conducting workshops to explicitly support students to cross boundaries during their TD projects resulted in more boundary crossing working and learning (Oonk, 2016)
- However...learning outcomes and assessment strategies:
 - largely vary;
 - are often not 'stakeholder-proof';
 - are often not explicated to the students (Oonk, 2016).
- Our **aim:** relating learning processes to learning outcomes and assessment
- Our **hypothesis:** a boundary crossing rubric supports student learning in an inter- or transdisciplinary learning setting.

The learning settings: Two Transdisciplinary Learning Environments in Dutch Life Sciences Education

The **Regional Learning Environment** in Dutch 'green' education



The **European Workshop** at Wageningen University



The Regional Learning Environment

- ✓ A real world multi-stakeholder environment within a geographical region
- ✓ Real world, transdisciplinary problems with an unknown answer identified by actors in the field
- ✓ Students work in groups (4-6 studs)
- ✓ Collaborative knowledge construction by students, teachers and multiple stakeholders
- ✓ The product is relevant for the external problem holder and contributes to sustainable regional development
- ✓ No clear and univocal assessment strategy



In the EUW, an MSc student

- collaborates with ca. 30 students with different disciplinary and cultural backgrounds
- on an authentic complex problem for a client outside the Netherlands (Terms of Reference)
- in an intensive period of 8 weeks (2 wks field work)
- produces one concise report (ideally representing the various disciplines and perspectives).



Student assessment in EUW is based on

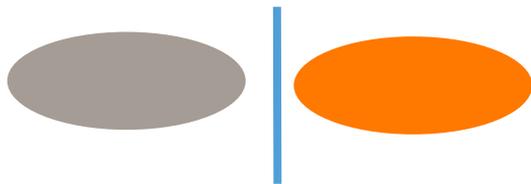
- Synthesis report (25%)
- Geo-group report (25%)
- Individual performance in plenary session and group sessions (25%)
- Reflection paper (25%)
 - Four separate **Rubrics** are used



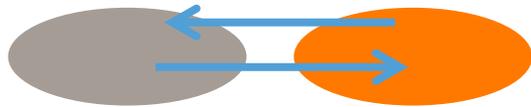
3. Theoretical approach: boundary crossing

(Akkerman & Bakker, 2011)

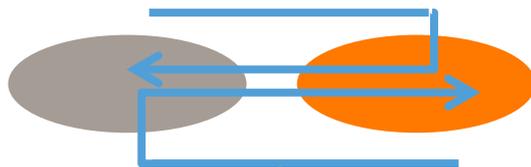
- Boundary Crossing = the ability to operate and communicate across different practices (Walker & Nocon, 2007)
- Boundary Crossing Learning Mechanisms =



Identification = questioning of the own and other's core identities (often without actual collaboration)



Coordination = seeking for effective means to collaborate



Reflection = perspective making and taking



Transformation = working towards new hybrid practices and creation of new knowledge and practices

4. Exploring the rubric-under-construction the building process



Starting point

- Students work in multi-disciplinary student groups
- Students work on inter- and/or transdisciplinary project assignments

Question 1.

How to operationalize the 4 boundary crossing learning mechanisms in observable behaviour?

Question 2.

What makes a student a good 'boundary crosser'?

Question 3.

Which levels of growth/development do we distinguish?

The **result**: a boundary crossing rubric

	A The student...	B The student...	C The student...	D The student...
Identification 1: Identify one's own expertise and one's own limitations	Does not explicate which expertise (s)he possesses and which expertise might be missing to execute the project successfully.	explicates his/her own expertise in terms of knowledge, skills and network that can contribute to the project.	previous cell + identifies his/her own limitations regarding expertise needed to execute the project.	relates his/her own expertise to that of the other members of the project team and maps what kind of expertise is missing to execute the project successfully.
Identification 2: Identify other perspectives relevant for the project and problem at hand	does not actively explore other perspectives.	shows being aware of the existence of various perspectives, but does not explicitly address these different perspectives in the light of the project.	identifies people including their interests, perspectives, expertise and mutual relations relevant for executing the project.	Previous cell + the student explicates for which aspects of the project he/she needs other people and plans actions to contact these other people.
Coordination 1: Contact other people	does not take any action to contact other people or does take action, but only because it is a requirement of the course.	contacts a small number of other people that are close to the problem and easy to address (e.g. given by the teachers). prefers to contact external people in a digital way.	develops active and face to face contact with relevant others people.	initiates and organises collaborative meetings with relevant other people with the intention to collaboratively share ideas, develop new ideas and tune own ideas.
Coordination 2: Collaborate purposefully with other people	does not actively and purposefully collaborate with other people or is merely frustrated by the challenges that emerge in this collaboration.	carries out activities to discuss a limited number of other perspectives, closely related to his/her own background.	aims at purposeful collaborations with various relevant people to the project. Discovers and /or contributes to the development of a boundary object (BO) relevant for people involved to facilitate collaboration for executing the project.	Previous cell + uses the BO actively to accommodate multi-, inter- or transdisciplinary collaboration and checks whether everybody really contributes to the project. If not, (s)he takes action.



The result: a multifunctional tool

The rubric could be used:

- to **design** transdisciplinary **learning environments**;
- to collaboratively define **learning outcomes** for a project (together with students and stakeholders);
- **expectation management**;
- individual and group **reflection** during and after the project;
- formative and summative **assessment of students**.

	A The student...	B The student...	C The student...	D The student...
Identification 1: Identify one's own expertise and one's own limitations	Does not evaluate which expertise (s)he possesses and which expertise might be missing to execute the project successfully.	explicates his/her own expertise in terms of knowledge, skills, and network that can contribute to the project.	previous cell + identifies his/her own limitations regarding expertise needed to execute the project.	reflects his/her own expertise to that of the other members of the project team and maps what kind of expertise is missing to execute the project successfully.
Identification 2: Identify other perspectives relevant for the project and problem at hand	does not actively explore other perspectives.	shows being aware of the existence of various perspectives, but does not explicitly address these different perspectives in the light of the project.	identifies people including their interests, perspectives, expertise and mutual relations relevant for executing the project.	Previous cell + the student explicates for which aspects of the project he/she needs other people and plans actions to contact these other people.
Contribution 1: Contact other people	does not take any action to contact other people or does take action, but only because it is a requirement of the course.	contacts a small number of other people that are directly related to the problem and easy to address (e.g. given by the teachers), prefers to contact external people in a digital way.	develops active and face to face contact with relevant other people.	initiates and organizes collaborative meetings with relevant other people with the intention to collaboratively share ideas, develop new ideas and take ownership.
Contribution 2: Collaborate purposefully with other people	does not actively and purposefully collaborate with other people or is merely frustrated by the challenges that emerge in the collaboration.	carries out activities to discuss a limited number of other perspectives, closely related to his/her own background.	sets up purposeful collaborations with various relevant people to the project, discusses and/or contributes to the development of a boundary object (BO) relevant for people involved to facilitate collaboration for executing the project.	Previous cell + uses the BO actively to accommodate multiple, inter- or transdisciplinary collaboration and checks whether everybody really contributes to the project. If not, (s)he takes action.

Next step: use of the rubric in different educational contexts

- Teachers (HE and Secondary vocational education) enthusiastically responded to the rubric:
 - *'This tool enables me to give words to what I see my students learn.'*
 - *'By using this tool, I will discuss with the students which basic attitude is needed to work in a transdisciplinary setting.'*
 - *'I will align our competence matrix with the rubric.'*
- **Next step:** use in practice including monitoring and evaluation



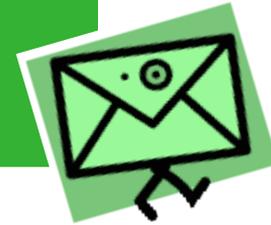
Active follow-up in Input Lounge (14:25 – 15:25)

Is the boundary crossing rubric useful for your own educational practice?

- Discuss the usefulness of this rubric for your own inter- or transdisciplinary educational practice.
 - Do you think the performance criteria are applicable to your educational context?
 - At which levels do your students perform (and towards which levels do you expect them to grow?)
- The discussion is meant to improve the rubric for its use in various educational contexts.



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Thank you for
your
participation!

See you in the
Input Lounge!

Further information
and pdf version of the
rubric:

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