Mapping progression in education for sustainable development (ESD)

1. **Choose a suitable unit of analysis**, depending on your teaching roles and responsibilities. For example, if you teach full courses, you can choose to map elements of ESD* across one course. If you are a program director, you may choose to map elements of ESD across an entire program instead. You can also choose to focus on a single lesson and map elements of ESD across different parts of the lesson.

2. **Read Wiek et al. (2015)** and the tables taken from Greig and Priddle (2019)*** (the latter are reproduced on page 3 in this document). The article by Wiek et al. outlines levels of progression for ESD key competencies, and the tables from Greig and Priddle outline levels of progression for pedagogical approaches.

3. You can choose to work in the large table on page 4 and/or on the three separate tables on pages 5-7. **Fill in the table(s)** according to the following instructions:

   Content: List separate pieces of content you teach. Evaluate whether a specific content relates to ecological, social, or economic sustainability, or whether it addresses all three dimensions in an integrated manner. Add each piece of content to one of the rows in the table(s) on pages 4 and/or 5. Evaluate the conceptual difficulty of the content and add the level of difficulty (1-3) to the table(s). You can also add a short comment about the level of difficulty for each piece of content.

   ESD competencies:

   - *If you choose to work with the table on page 4*, identify which competencies students train when they learn about each piece of content you added in the second column. Then use Wiek et al. (2015)** to evaluate the level of competency mastery for the five ESD key competencies they address, and use your own judgment to evaluate the level of competency mastery for the other three competencies. Add the levels (1-3) to the table.
   - *If you choose to work with the table on page 6*, identify which competencies students train when they engage in specific learning activities. Then evaluate the level of competency master and connected learning objectives for the five ESD key competencies addressed in Wiek et al. (2015)**.

   Pedagogical approaches:

   - *If you choose to work with the table on page 4*, use the tables taken from Greig & Priddle (2019)*** (reproduced on page 3 in this document) to evaluate the levels for ways of learning, ways of teaching and assessing, and disciplinarity in the pedagogical approach you use for each of the pieces of content that you added in the second column. Add the levels to the table. You can also add a short comment for that/those pedagogical approache(s) that is/are used with each content.

- *If you choose to work with the table on page 7*, list the teaching and learning activities you use in the analyzed unit. For each learning activity, use the tables taken from Greig & Priddle (2019)*** to evaluate the levels for ways of learning, ways of teaching and assessing, and disciplinarity. Add the levels to the table. You can also add a short comment for that/those pedagogical approache(s) that is/are used in each activity.

4. **Look across the table(s) you have created**. They should provide a good sense of the overall level of difficulty of the pedagogical unit you have analyzed. You can also use each separate data point to fine-tune the difficulty for students with regard to each piece of content, ESD key competency, and pedagogical approach used in the unit. This way, you can build in progression within the analyzed unit, but also across several units (e.g., across an entire program).

5. If you have any feedback on this document, especially if you have ideas for how it could be rendered more useful for mapping progression in ESD, please send me an email: johanna.lonngren@umu.se!

Notes

**Elements of ESD* = elements of a pedagogical practice that are a necessary (but not sufficient) condition for ESD. For example, if a lecture addresses economic aspects of renewable energy, the element "economic SD" is present. (E)SD = (Education for) sustainable development. Remember that ESD requires that all three content dimensions (ecological, social, and economic) must be addressed simultaneously and in an integrated manner. Also remember that all students should get an opportunity to train all key competencies during their studies, but they don't need to become experts in all of them.

** Wiek, A., Bernstein, M., Fouley, R., Cohen, M., Forrest, N., Kuzdas, C., Kay, B., & Withycombe Keeler, L. (2015). Operationalising competencies in higher education for sustainable development. In M. Barth, G. Michelsen, M. Rieckmann, & I. Thomas (Eds.), *Handbook of Higher Education for Sustainable Development* (pp. 241–260). Routledge.

*** Tables adapted from: Greig, A., & Priddle, J. (2019). Mapping Students' Development in Response to Sustainability Education: A Conceptual Model. *Sustainability*, *11*(16). https://doi.org/10.3390/su11164324

Levels of difficulty for ESD pedagogy***

Levels for ways of learning:

Table 2. A continuum of learning in the context of sustainability education.

Level	Ways of Learning	Looks Like
1	Factual recall	Cognitive and passive: Learning is passive, comprising assimilation and recall of factual material
2	Understanding and interpretation	Cognitive and active: In addition to factual recall, learning engages with underlying processes, enabling extension and generalization. Learning literacies emerge and are reinforced.
3	Analytical and experiential	Cognitive and psychomotor *: Learning is active and is based on authentic experience and higher-level skills, with reduced emphasis on knowledge and information by comparison with analysis and interpretation. Personal development as a lifelong learner.
4	Emotional and reflexive	Cognitive, psychomotor and affective **: Learning is also immersive and social, with a high level of personal engagement and personalization. Personal development as a lifelong learner and an agent for change.

* Psychomotor learning involves practical engagement with the subject, either intellectually or physically, and is associated with, and reinforced by, exploration, analysis and the application of knowledge, perhaps leading to the creation of knowledge or artefacts. ** Affective learning, in contrast, is strongly personal and reflective, and is more concerned with attitude and values than with absolutes of knowledge and understanding.

Levels for ways of teaching and assessing:

Table 3. A simple continuum of teaching and assessment (compare with Tables 1 and 2).

Level	Ways of Teaching and Assessing	Looks Like
1	Transmissive, 'assessment of learning'	Teacher-led, didactic, asks 'has it been learned?'
2	Facilitation, 'assessment for learning'	Fostering active learners, supporting learning skills such as criticality, asks 'what has been learned?'
3	Co-production, 'assessment as learning'	Learner-led. A learning community, peer support, assessment as reflexive process, asks 'how do we know?'

Levels for disciplinarity:

Table 1. Disciplinarity—the categories are seen here as forming a continuum. The 'locus' is a label for the position of the learner on that continuum.

Level	Disciplinarity	Looks Like
1	Single discipline	All learning takes place within a prescribed subject area
2	Multidisciplinary	Learning includes elements from different subject areas, but remains compartmentalized.
3	Interdisciplinary (also cross-disciplinary)	Learning includes elements from different subject areas that are used to construct coherent learning activities which sit at or between subject boundaries.
4	Transdisciplinary	Learning embodies the cultures of different subject areas to develop emergent properties which provide new approaches to complex or 'messy' problems.

	Specific content (e.g., a concept, theory, framework)	**Difficulty level** 1: basic/concrete 2: intermediate 3: advanced/abstract
Ecological SD		
Social SD		
Economic SD		
Integrated SD		

	Learning activity (e.g., stakeholder analysis, personal reflection, lecture, …)	**Level of mastery** 1: novice 2: intermediate 3: advanced	**Learning objectives** (c.f., tables 16.1-16.5 in Wiek et al., 2015)
Systems thinking			
Anticipatory competency			
Normative competency			
Strategic competency			
Interpersonal competency			
(Other relevant competencies)			

Specific activity (e.g., a lecture, group discussion, role play, ...)	**Ways of learning** 1: Factual recall 2: understanding & interpretation 3: analytic & experiential 4: emotional & reflexive	**Ways of teaching** 1: Transmissive 2: Facilitation 3: Co-production	**Disciplinarity** 1: Single discipline 2: Multidisciplinary 3: interdisciplinary Transdisciplinary

	Specific content (e.g., a concept, theory, framework)	**Content difficulty** 1: basic/ concrete 2: intermediate 3: advanced/ abstract	**Level of competency mastery:** 1: novice, 2: intermediate, 3: advanced								**Ways of learning** 1: Factual recall 2: understanding & interpretation 3: analytic & experiential 4: emotional & reflexive	**Ways of teaching** 1: Transmissive 2: Facilitation 3: Co-production	**Disciplinarity** 1: Single discipline 2: Multidisciplinary 3: interdisciplinary 4: Transdisciplinary
			Systems thinking	Anticipatory	Normative	Strategic	Inter-personal	Intra-personal	Implementation	Integrated problem-solving			
Ecological SD													
Social SD													
Economic SD													
Integrated SD													