



Co-funded by the  
Erasmus+ Programme  
of the European Union



619285-EPP-1-2020-1-FI-EPPKA2-CBHE-JP

Multilevel Local, Nation- and Regionwide Education and Training in  
Climate Services, Climate Change Adaptation and Mitigation

# **“Sustainability competencies’ frameworks: emerging teaching and research developments”**

**Dr. Gisela Cebrián Bernat**

Department of Pedagogy, Universitat Rovira i Virgili



# CONTENT

- Competence-based education
- Sustainability competencies – existing frameworks
- Assessment of competencies
- Educators' ESD competencies
- Sustainability competencies of education leaders and managers

# Competence-based education

*Jacques Delors (1996) “**L’éducation: un trésor est caché dedans**”*

Lifelong learning is based on four pillars of learning:

- Learning to know
- Learning to do
- Learning to live together, learning to live with others
- Learning to be

It is necessary to conceive education as a whole

# Competence-based education

## EU Council Recommendation on Key Competences for Lifelong Learning

8 key competences needed for personal fulfilment, a healthy and sustainable lifestyle, employability, active citizenship and social inclusion:

- Literacy
- Multilingualism
- Numerical, scientific and engineering skills
- Digital and technology-based competences
- Interpersonal skills, and the ability to adopt new competences
- Active citizenship
- Entrepreneurship
- Cultural awareness and expression



# Competence-based education

## EU Council Recommendation on Key Competences for Lifelong Learning

The key competences are a combination of knowledge, skills and attitudes.

- **Knowledge**

Knowledge is composed of the concepts, facts and figures, ideas and theories which are already established, and support the understanding of a certain area or subject.

- **Skills**

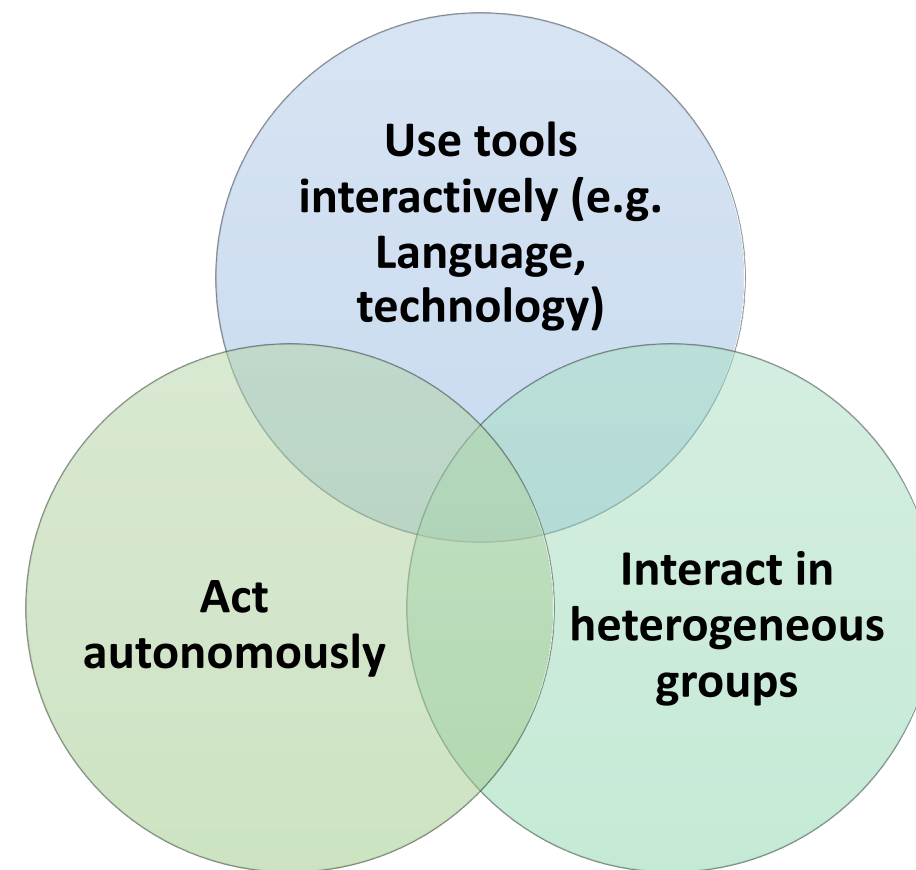
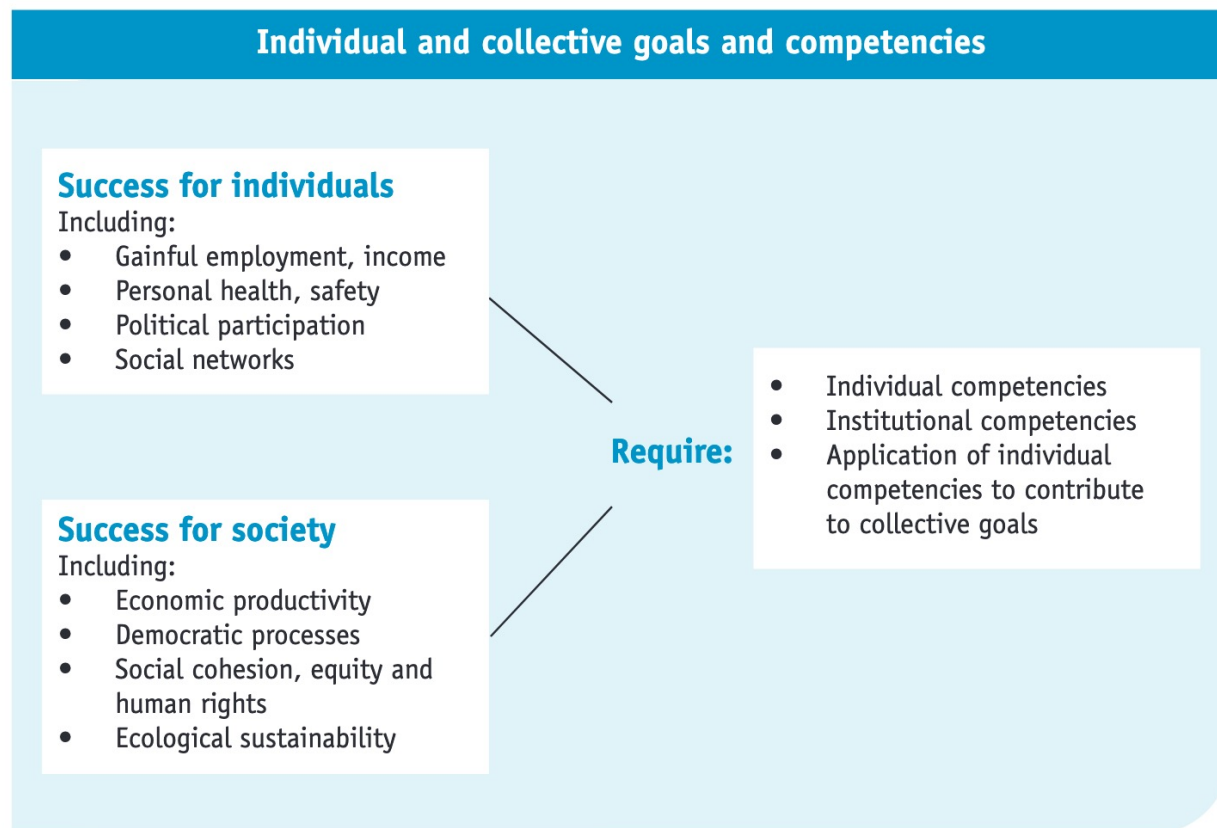
Skills are defined as the ability to carry out processes and use the existing knowledge to achieve results.

- **Attitudes**

Attitudes describe the disposition and mindset to act or react to ideas, persons or situations.

<https://op.europa.eu/en/publication-detail/-/publication/297a33c8-a1f3-11e9-9d01-01aa75ed71a1/language-en>

## Competencies in 3 categories



OECD Program Definition and Selection of Competencies: Theoretical and Conceptual Foundations (DeSeCo)

<https://www.oecd.org/pisa/35070367.pdf>

# Competence-based education

“the mobilization of cognitive and practical skills, creative abilities and other psychosocial resources, such as attitudes, motivation and values” that are mobilized to achieve an effective action (DeSeCo, OECD, 2002)

Any situation or goal can demand a **constellation of competencies**

In a holistic and dynamic model of competencies these do not exist independently of the **context** and of the **action**.

OECD Program Definition and Selection of Competencies: Theoretical and Conceptual Foundations (DeSeCo)

<https://www.oecd.org/pisa/35070367.pdf>

# Competence-based education

**FROM**



**TO**

**TEACHING-CENTRED LEARNING**

**LEARNER-CENTRED LEARNING**

- ☐ Knowledge transmission
- ☐ The teacher schedules content and the student listens and memorizes
- ☐ Content not relevant to students
- ☐ Textbook
- ☐ Written evaluation and content repetition

- ☐ Programming tasks
- ☐ Teacher proposes/schedules tasks and the student learns to do something
- ☐ Start from students' personal and social interests
- ☐ Use a variety of materials that are authentic
- ☐ Teamwork
- ☐ Assessment integrated within the realisation of tasks

# Competence-based education

## CURRICULUM

- Integration of knowledge and **dialogue between disciplines**
- A true **articulation between theory and practice**.
- **Active methodologies**: project-based learning, problem-based learning, teamwork, learning through collaboration, experiential learning, participatory learning, etc.
- Integration of different **assessment tools**.

## EDUCATORS

- **Networking** and collaborative spaces
- **Mobilising the available resources** to solve problems, for decision making and project monitoring. **Leadership and teamwork skills** must be strengthened.
- A **formative assessment** including **self-assessment**.
- **Combined training** that takes place in the university and in different practical professional internships.
- Promotion of **reflective practice**, including worldviews, decision-making and action competencies.

# Sustainability competencies

## **Need to foster sustainability competencies amongst students** (Wals, 2010, p. 386)

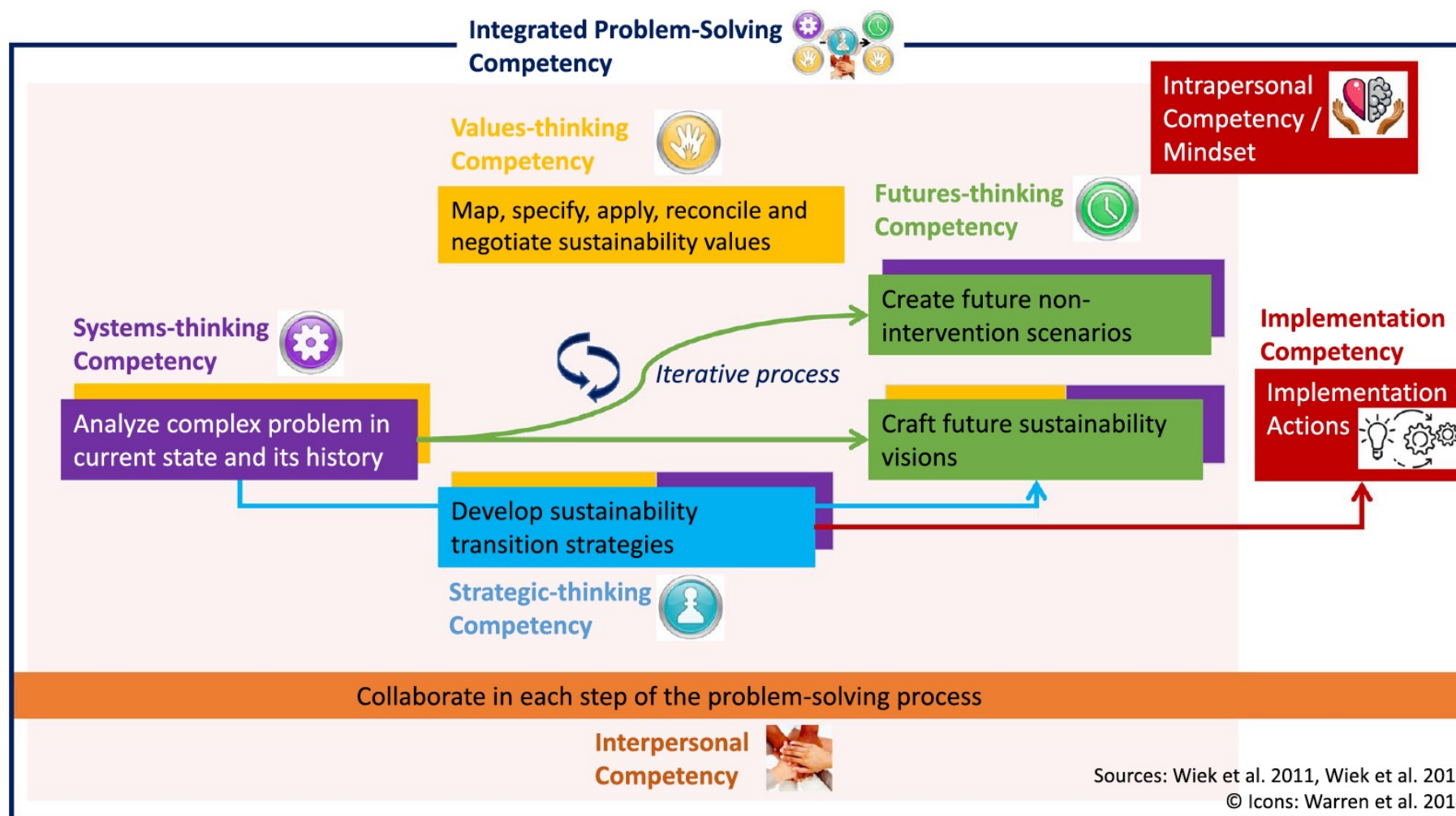
- ✓ Competence to think in a forward-looking manner, to deal with uncertainty, and with predictions, expectations and plans for the future
- ✓ Competence to work in an interdisciplinary manner
- ✓ Competence to achieve open-minded perception, transcultural understanding and cooperation
- ✓ Participatory competence
- ✓ Planning and implementation competence
- ✓ Ability to feel empathy, sympathy and solidarity
- ✓ Competence to motivate oneself and others
- ✓ Competence to reflect in a distanced manner on individual and cultural concepts

# Sustainability competencies

## **Integrative framework on key sustainability and problem solving competencies** (Weik et al., 2011, p. 205)

- ❖ Systems-thinking competence
- ❖ Anticipatory competence
- ❖ Normative competence
- ❖ Strategic competence
- ❖ Interpersonal competence

# Sustainability competencies



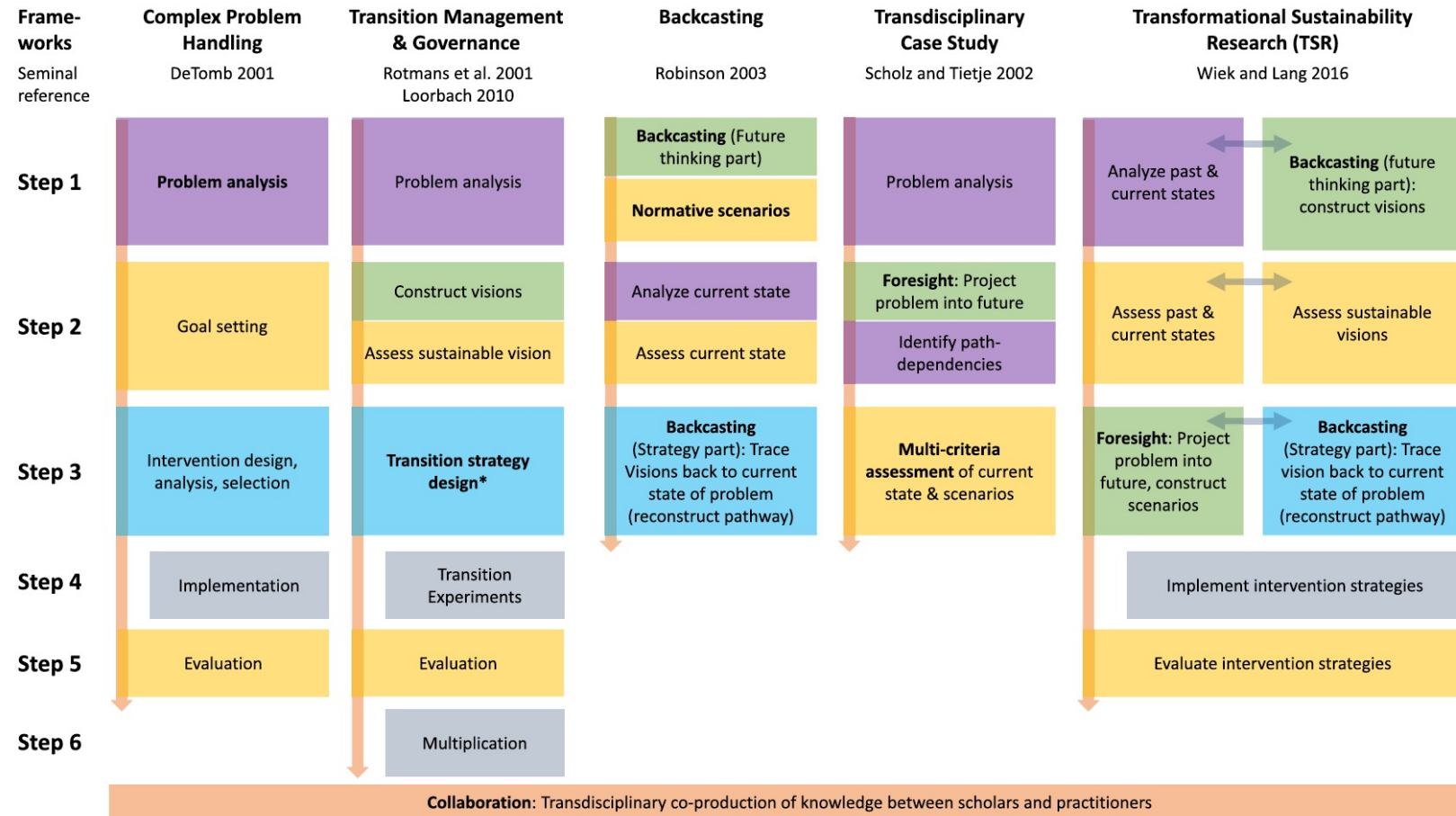
Brundiers, K., Barth, M., Cebrián, G. *et al.* (2021). Key competencies in sustainability in higher education—toward an agreed-upon reference framework. *Sustainability Science*, 16, 13-29



# Sustainability competencies

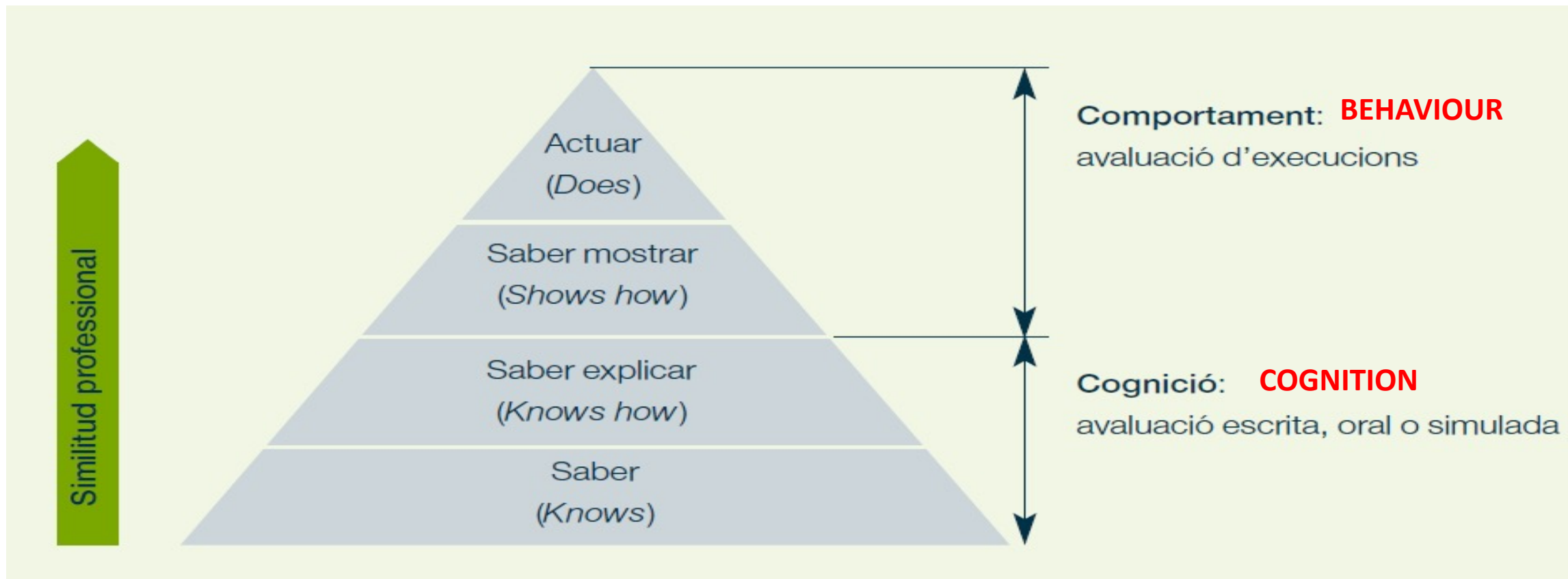
20

Sustainability Science (2021) 16:13–29



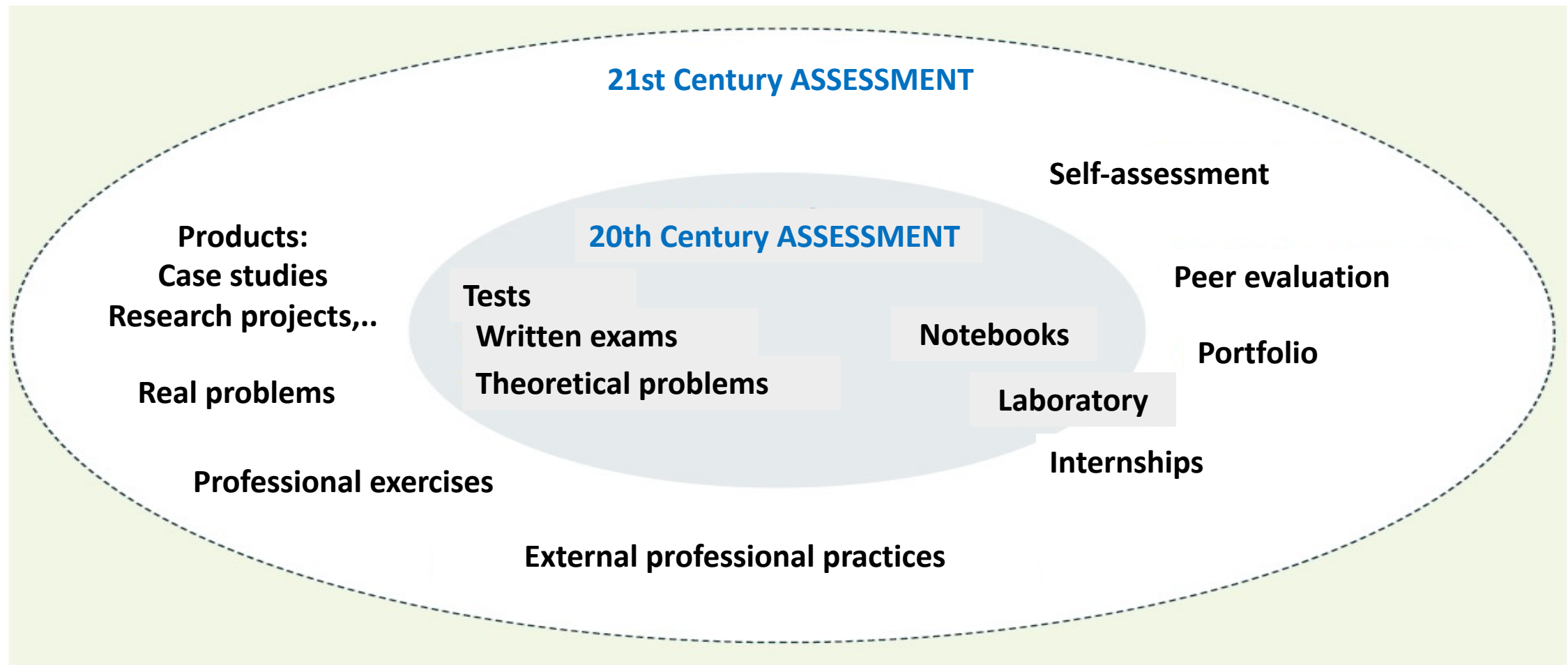
**Fig. 2** Overview of integrated sustainability problem-solving approaches adapted from Wiek and Lang (2016, p.35), with per- (ency). Grey boxes depict implementation, which, so far, is done by practitioners outside the collaborative research process. The TSR

# Assessment of competencies



(Miller, 1990)

# Assessment of competencies



(Prades, 2005)

# Assessment of competencies

Redman, Wiek and Barth (2020) provide a **typology of eight sustainability competencies' assessment tools** divided into three groups:

## 1) SELF-PERCEIVING

- Scaled self-assessment
- Reflective writing
- Focus group/interview

## 2) OBSERVATION

- Performance observation
- Regular course work
- Conceptual mapping

## 3) TEST-BASED APPROACHES

- Scenario/case test
- Conventional test

*(Prades, 2005)*

# Assessment of competencies

## EXAMPLE OF A RUBRIC

Garcia, M.R., Junyent, M. & Fonolleda, M. (2017). How to assess professional competencies in Education for Sustainability?: An approach from a perspective of complexity. *International Journal of Sustainability in Higher Education* 18(5), 772-797

	Learning to do <i>In your teaching action ...</i>			
	Novice	Beginner	Advanced	Expert
Critical thinking	<i>Competency:</i> The educator is capable of facilitating reflection and critical assessment of the consequences of decisions and actions and to inspire a sense of urgency in order to foster a shift towards SD			
	In their teaching action, the educator does not facilitate spaces of reflection between the individual's actions and assumptions and their responsibility for SD	In their teaching action, the educator acts to facilitate spaces of reflection between the individual's actions and assumptions and their responsibility for SD, but only occasionally	In their teaching action, the educator acts to facilitate spaces of reflection between the individual's actions and assumptions and their responsibility for SD	In their teaching action, the educator acts to facilitate spaces of reflection between the individual's actions and assumptions and their responsibility for SD and promotes a sense of urgency and change towards SD
Uncertainty	<i>Competency:</i> The educator is capable of offering spaces of student participation and involvement and adapting their teaching action to any possible uncertainty this might spark			
	In their teaching action, the educator is not capable of adapting their action to the context but instead reproduces what they have planned The educator leaves no room for student productions or interventions	In their teaching action, the educator leaves a little room for student productions or interventions but does not take them into account when planning lessons	In their teaching action, the educator leaves room for student productions or interventions	In their teaching action, the educator is capable of integrating student productions or interventions in the lesson such that every lesson is unique in its dialogue between planning and the uncertainty of the context



# Professional competencies in ESD

## Some **limitations**:

- ESD is essentially considered as a school education
- Lack of a global institutional approach
- Lack of a systemic approach
- Little attention to training and VET institutions
- ESD is not part of pre-service teacher education
- **Absence of a common definition on ESD competencies**

*6ème Conférence Ministerielle “Un environnement pour l’Europe” (Belgrade, octobre 2007)*

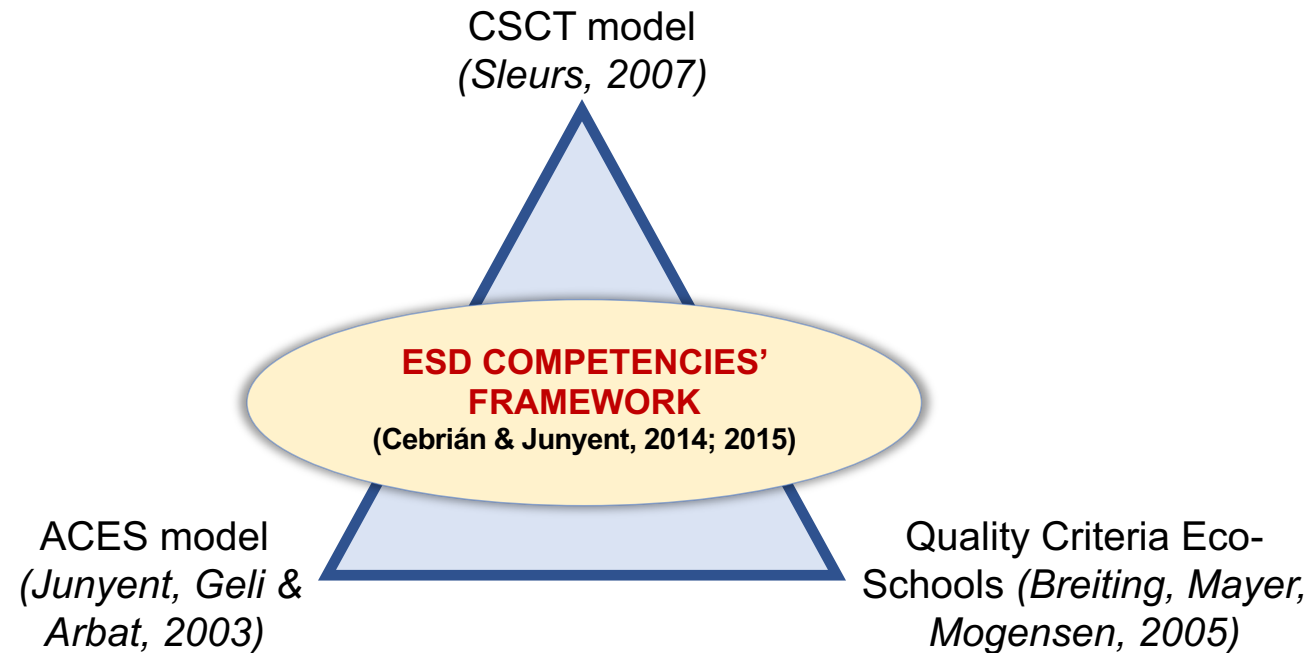
# Professional competencies in ESD

## Some **limitations**:

- The lack of a specific competencies' framework for educators is often an obstacle for improving the quality of education in terms of ESD.
- The development of these competencies should from now on be one of the priorities of the implementation of the UNECE Strategy for Education for Sustainable Development

*6ème Conférence Ministerielle “Un environnement pour l’Europe” (Belgrade, octobre 2007)*

# Professional competencies in ESD







Quality criteria regarding the quality of teaching and learning processes	Quality criteria regarding school policy and organisation	Quality criteria regarding the school's external relations
<ol style="list-style-type: none"> <li>1. Area of teaching-learning approach</li> <li>2. Area of visible outcomes a school and in local community</li> <li>3. Area of perspectives for the future</li> <li>4. Area of a 'culture of complexity'</li> <li>5. Area of critical thinking and the language of possibility</li> <li>6. Area of value clarification and development</li> <li>7. Area of action-based perspective</li> <li>8. Area of participation</li> <li>9. Area of subject matter</li> </ol>	<ol style="list-style-type: none"> <li>10. Area of school policy and planning</li> <li>11. Area of school climate</li> <li>12. Area of school management</li> <li>13. Area of reflection and evaluation of ESD initiatives at school level</li> </ol>	<ol style="list-style-type: none"> <li>14. Area of community cooperation</li> <li>15. Area of networking and partnerships</li> </ol>

# Professional competencies in ESD

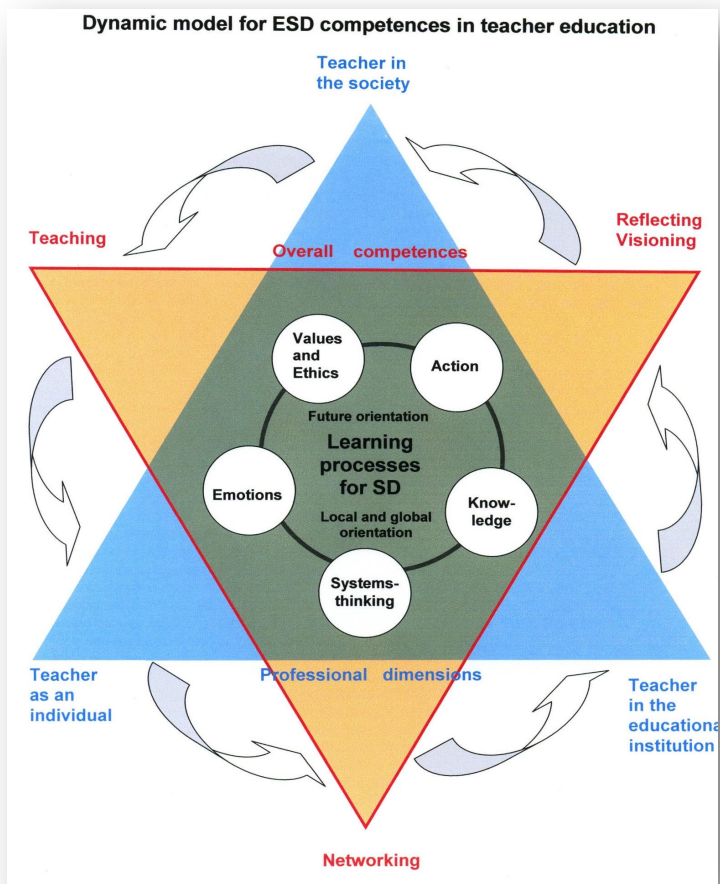
## Quality criteria in the area of the teaching-learning approach

- The teachers listen to and value the concerns, experiences, ideas and expectations of the students, and their plans are 'flexible' and open for changes.
- The teachers encourage cooperative learning and experiential learning.
- The teaching takes into account the value of practical activities by linking them to students' concept development and theory construction.
- The teachers facilitate students' participation and provide contexts for the development of students' own learning, ideas and perspectives.
- The teachers search for ways to evaluate and assess students' achievement consistent with the above mentioned criteria.
- .....

## Quality criteria in the area of the action perspective

- The students' work on issues and actions are regarded by the teacher for their educational value and not only as a way to solve real problems.
- The students participate in decisions on action to influence the problem, and they are learning from reflecting on their experiences.
- The teaching focus lies on authentic action strategies, on action possibilities and on experience from real actions.
- The students' involvement in action is accompanied by reflections on local and global effects, comparing risks and possibilities of alternative decisions.
- .....

# Professional competencies in ESD



## CSCT project (Sleurs, 2007)

- Focus on interdisciplinary practice and on action-research
- Thirteen European teacher education institutions
- **Global competencies in ESD:** teaching and learning, reflection and visioning, networking
- **Five domains:** knowledge, systems-thinking, emotions, ethics and values, and action
- **3 professional dimensions:**
  - Teacher as an individual
  - Teacher as member of the educational institution
  - Teacher in the society

<http://www.csct-project.org/>



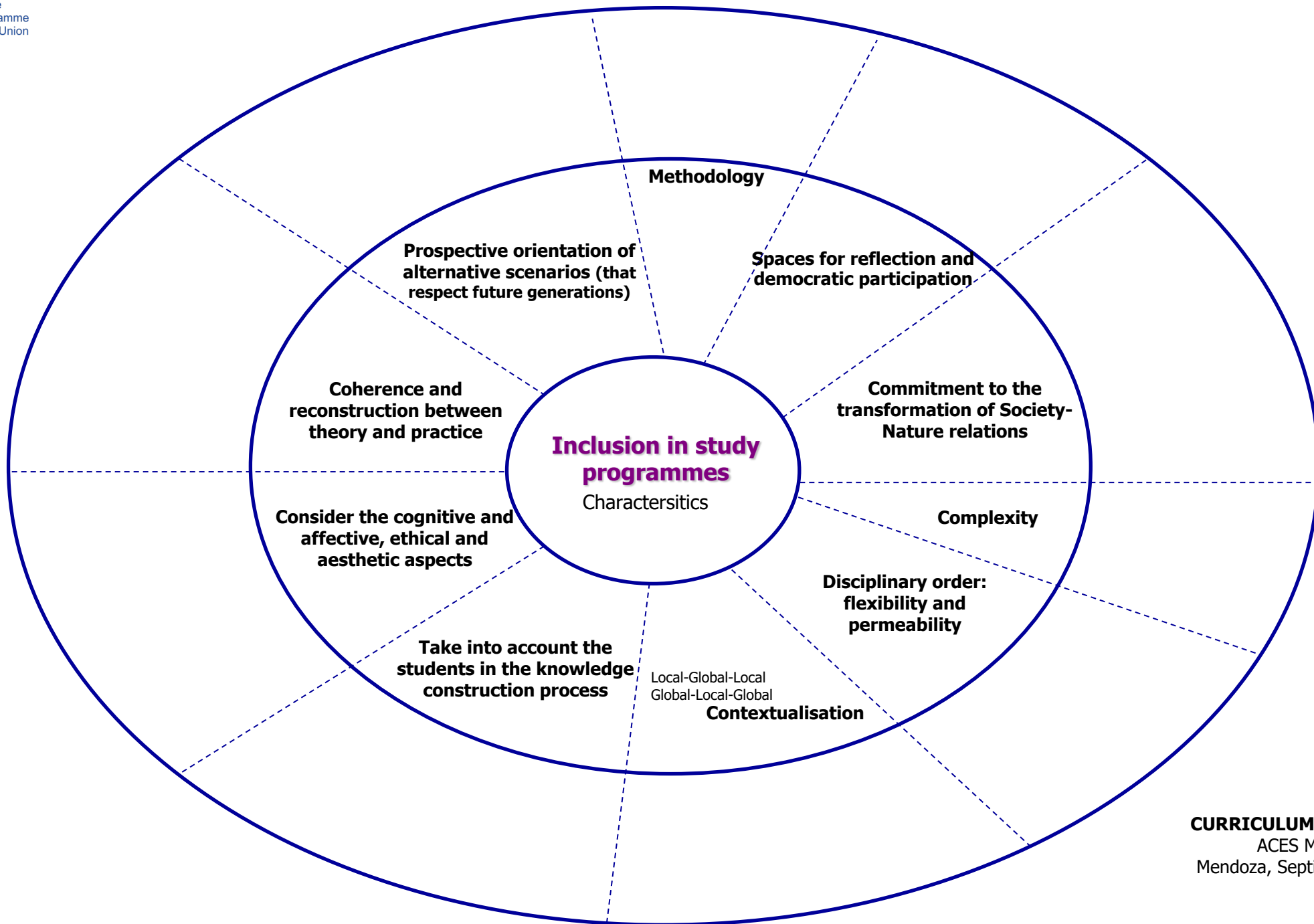


# ACES Model (Curriculum Greening - CG)

CG is a **reflexive and action-oriented process** aimed at achieving Education for Sustainable Development in the curriculum, linked to the management of the educational centre and aimed at promoting a more just, supportive and participatory society.

CG must allow the **analysis of the socio-environmental reality** and the **search for alternatives** consistent with the values of sustainability. The CG covers the **different knowledge areas or disciplines** and encourages actions in **collaboration** with different institutions and stakeholders.

CG involves acquiring **global thinking skills** in relation to the environment and promoting **responsibility, commitment and action** of the educational community towards the development of environmental identity traits.



# Professional competencies in ESD

"The competence of educating citizens to build a more just, equitable and sustainable world.

The combination of practical skills, knowledge, motivation, ethical values, attitudes and emotions and other social and behavioural components that are mobilized together (DeSeCo, 2002) in a challenge of sustainability in social, environmental and economic level in a cultural context.

These are the competences that should contribute towards improving the quality of life and support efforts to build a sustainable society through education."

(Cebrián & Junyent, 2014; 2015)

# Professional competencies in ESD (Cebrián & Junyent, 2014; 2015)



**Interdependent  
elements**

**3 levels of  
teacher  
educational  
action *(Sleurs, 2007)***



**AS A MEMBER OF  
THE SCHOOL**

# Professional competencies in ESD



*United Nations Economic Commission for Europe (2012)*

- Emphasis on knowledge and abilities of all educators to lead ESD in formal education settings
- Essential characteristics of ESD:
  - Holistic approach
  - Envisioning change – alternative futures
  - Achieving transformation
- According to:
  - Learning to know (understanding)
  - Learning to do (developing practical skills and action competence)
  - Learning to live together (partnership and collaboration)
  - Learning to be (personal attributes)

*Learning the treasure within (UNESCO, Delors report, 1996)*



# The Competences for educators in education for sustainable development

## Learning to know The educator understands....

### ENVISIONING CHANGE Past, present and future

- The root causes of unsustainable development
- That sustainable development is an evolving concept
- The urgent need for change from unsustainable practices towards advancing quality of life, equity, solidarity, and environmental sustainability
- The importance of problem setting, critical reflection, visioning and creative thinking in planning the future and effecting change
- The importance of preparedness for the unforeseen and a precautionary approach
- The importance of scientific evidence in supporting sustainable development

### ACHIEVE TRANSFORMATION People, pedagogy and education system

- Why there is a need to transform the education systems that support learning
- Why there is a need to transform the way we educate/learn
- Why it is important to prepare learners to meet new challenges
- The importance of building on the experience of learners as a basis for transformation
- How engagement in real-world issues enhances learning outcomes and helps learners to make a difference in practice

### HOLISTIC APPROACH Integrative thinking and practice

- Actively engage different groups across generations, cultures, places and disciplines

### ENVISIONING CHANGE Past, present and future

- Facilitate the emergence of new worldviews that address sustainable development
- Encourage negotiation of alternative futures

### ACHIEVE TRANSFORMATION People, pedagogy and education system

- Challenge unsustainable practices across educational systems, including at the institutional level
- Help learners clarify their own and others worldviews through dialogue, and recognize that alternative frameworks exist

## Learning to do The educator is able to....

### HOLISTIC APPROACH Integrative thinking and practice

- Create opportunities for sharing ideas and experiences from different disciplines/places/cultures/generations without prejudice and preconceptions
- Work with different perspectives on dilemmas, issues, tensions and conflicts
- Connect the learner to their local and global spheres of influence

### ENVISIONING CHANGE Past, present and future

- Critically assess processes of change in society and envision sustainable futures
- Communicate a sense of urgency for change and inspire hope
- Facilitate the evaluation of potential consequences of different decisions and actions
- Use the natural, social and built environment, including their own institution, as a context and source of learning

### ACHIEVE TRANSFORMATION People, pedagogy and education system

- Why there is a need to transform the education systems that support learning
- Why there is a need to transform the way we educate/learn
- Why it is important to prepare learners to meet new challenges
- The importance of building on the experience of learners as a basis for transformation
- How engagement in real-world issues enhances learning outcomes and helps learners to make a difference in practice

## Learning to be The educator is someone who...

### HOLISTIC APPROACH Integrative thinking and practice

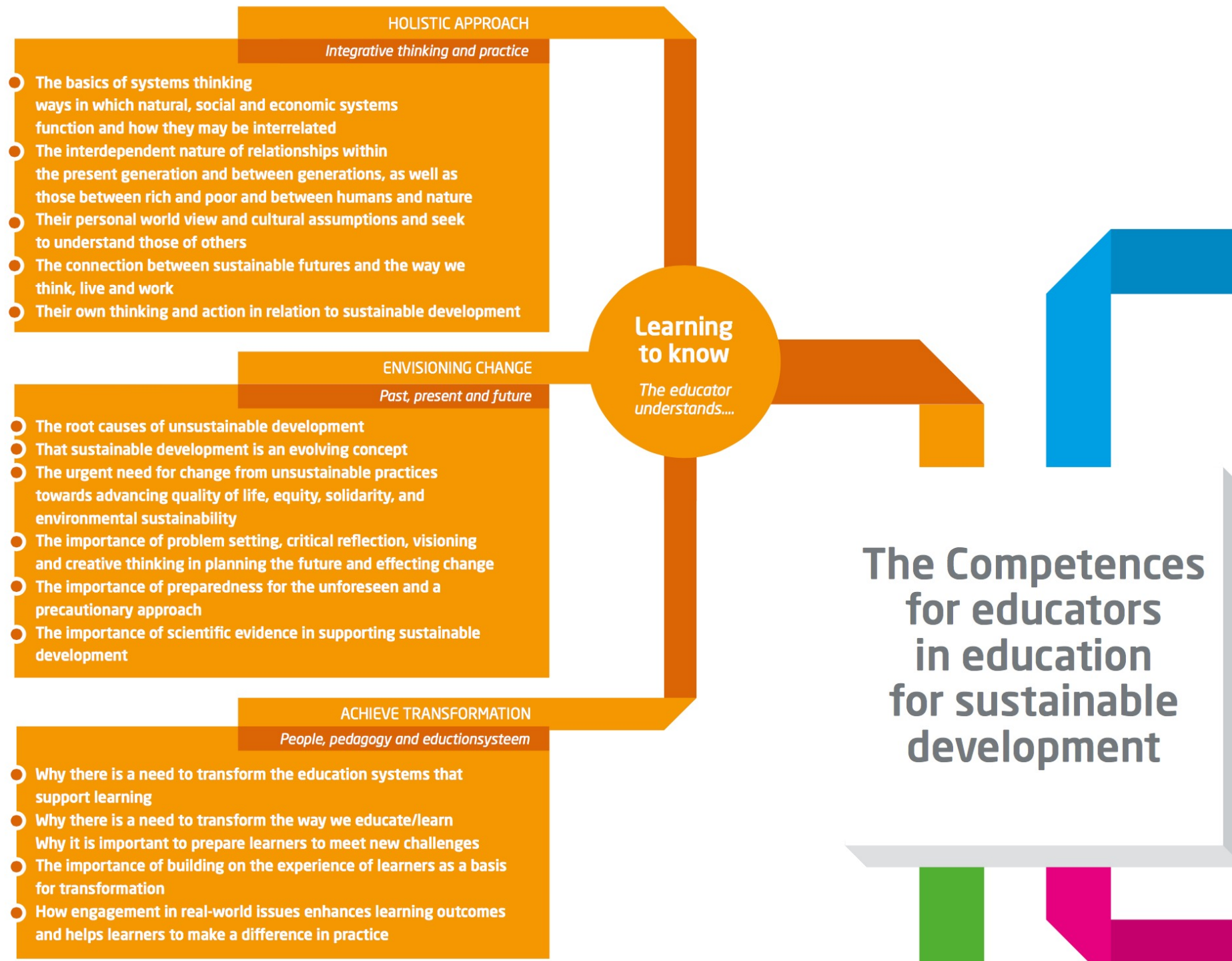
- Is inclusive of different disciplines, cultures and perspectives, including indigenous knowledge and worldviews

### ENVISIONING CHANGE Past, present and future

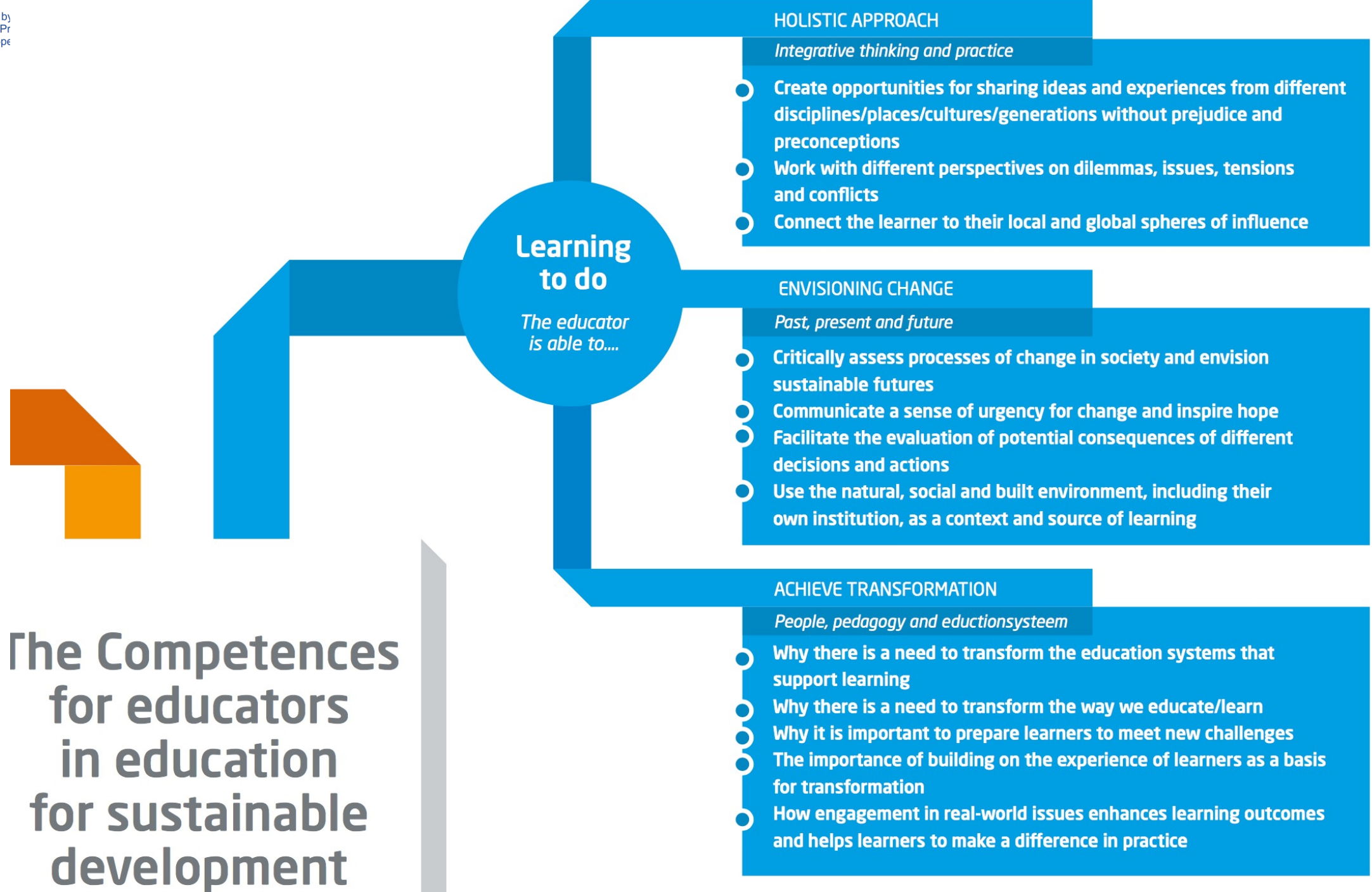
- Is motivated to make a positive contribution to other people and their social and natural environment, locally and globally
- Is willing to take considered action even in situations of uncertainty

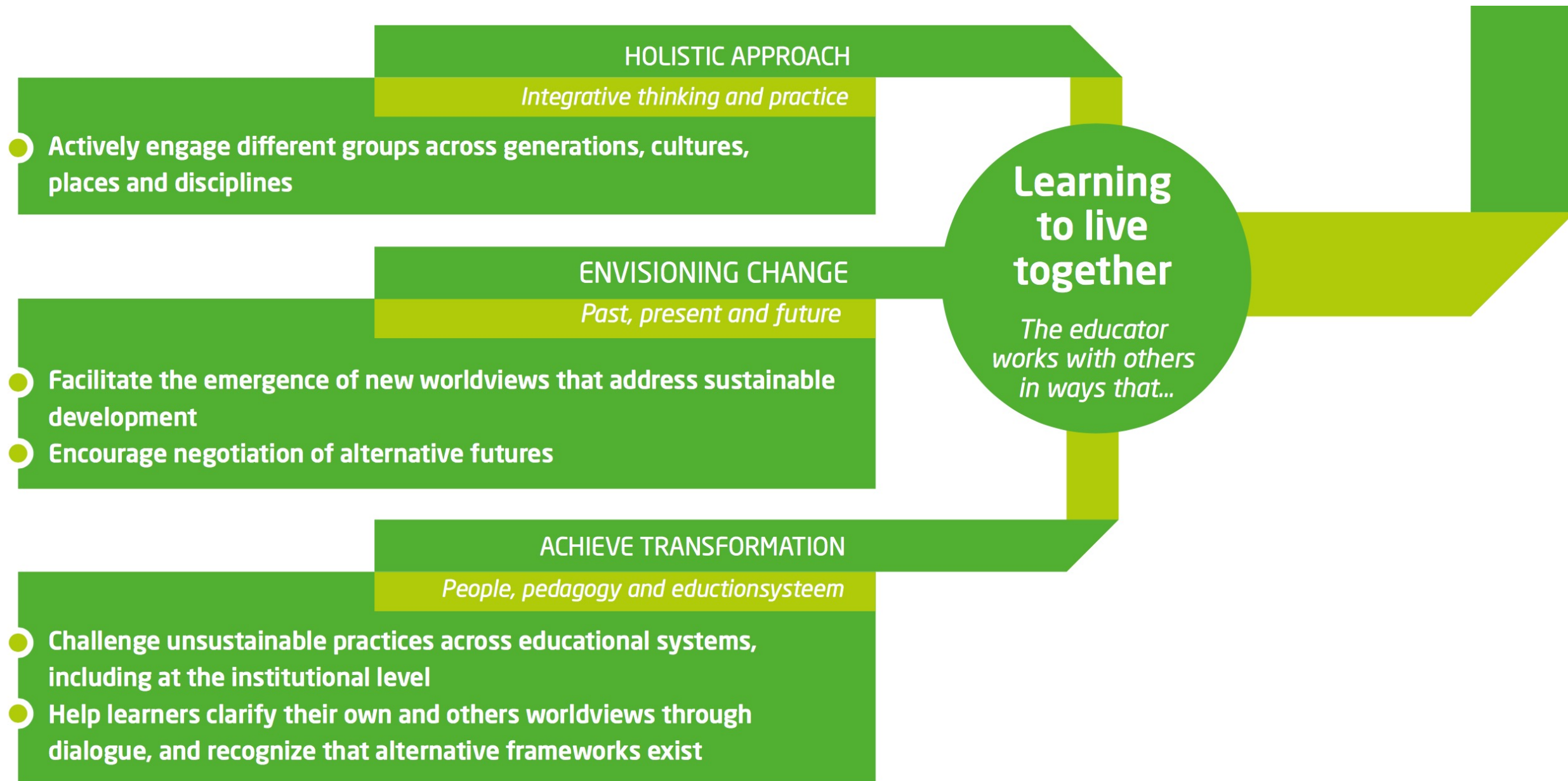
### ACHIEVE TRANSFORMATION People, pedagogy and education system

- Is willing to challenge assumptions underlying unsustainable practice
- Is a facilitator and participant in the learning process
- Is a critically reflective practitioner
- Inspires creativity and innovation
- Engages with learners in ways that build positive relationships









# Learning to be

*The educator  
is someone  
who...*

## HOLISTIC APPROACH

*Integrative thinking and practice*

- Is inclusive of different disciplines, cultures and perspectives, including indigenous knowledge and worldviews

## ENVISIONING CHANGE

*Past, present and future*

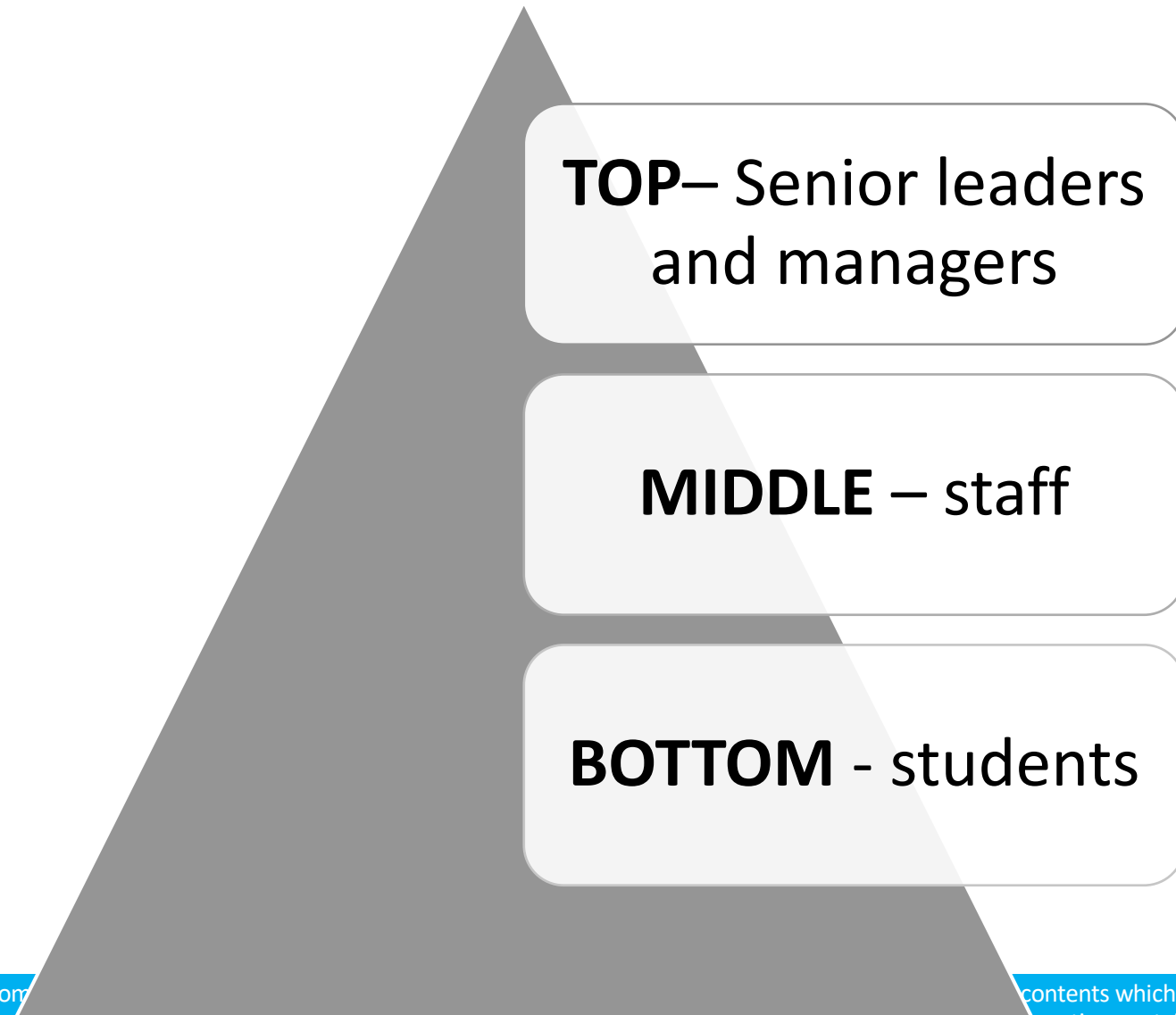
- Is motivated to make a positive contribution to other people and their social and natural environment, locally and globally
- Is willing to take considered action even in situations of uncertainty

## ACHIEVE TRANSFORMATION

*People, pedagogy and educationssystem*

- Is willing to challenge assumptions underlying unsustainable practice
- Is a facilitator and participant in the learning process
- Is a critically reflective practitioner
- Inspires creativity and innovation
- Engages with learners in ways that build positive relationships

# Sustainability competencies' education leaders





# Sustainability competencies' education leaders



- (1) Acknowledge the **distinctive challenges and complexity** of ESD leadership
- (2) Sharpen the **focus and understanding of ESD** as it applies in higher education
- (3) **Context counts:** ensure organisational integration and system alignment to support ESD and its leaders
- (4) Track and improve **ESD program quality** more systematically
- (5) Put in place the **right incentives**
- (6) **Engage** the disengaged and the institution's senior leadership
- (7) Apply the key lessons on **successful change management** in higher education
- (8) Focus on the **change leadership capabilities** identified in this study

# Final reflections

- How do you perceive having a common, agreed and reference ESD or sustainability competencies' framework?
- What do you think as an educator or education professional of the ESD competencies' framework/s?
- What do you see as strengths and/or opportunities?
- What are the challenges that you could face/envision in your institution or in your country?
- Are your studies contributing to the development these competences?  
What do you think that could be done differently?



# Final reflections

## Do we need to rethink..

- .. the role of education?
- .. the role of educators?
- .. teaching and learning content? methods?
- .. School-community collaboration?
- ...





Co-funded by the  
Erasmus+ Programme  
of the European Union



# We cannot build a future we cannot imagine

David Elgin (1991, p.77) *Creating a sustainable future.*

## Thank you!

[gisela.cebrian@urv.cat](mailto:gisela.cebrian@urv.cat)