Challenges of transdisciplinarity – based framework in designing educational programs for adults

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Topicality of the issue

Universities are facing tremendous transformation processes in the society and higher institutions need to go ***ahead of time*** and need to become **agents of societal changes and transformations**.

Still, **adult educational programs** are built from a **single discipline perspective,** do not foster adults' sustainability competencies and system view of societal issue by not encouraging adult to become agents of change.

Traditionally, cultural transmission representatives understand curriculum as a content of knowledge or **cumulative wisdom that some authorities believe that need to be taught to adult learners** to reinforce disciplinary knowledge, skills and competencies.

Transmission mode of knowledge arrangement is very narrow and limiting. The adult is seen as passive and not able to make choices or having affective and spiritual needs.

Orienting adult education toward the future … a huge challenge

- Adults will be confronted with many unsustainability issues during their lifetimes

- These are unpredictable, serious and complex by nature

- These developments challenge not just our technologies but our organisations, values and way of living and interacting
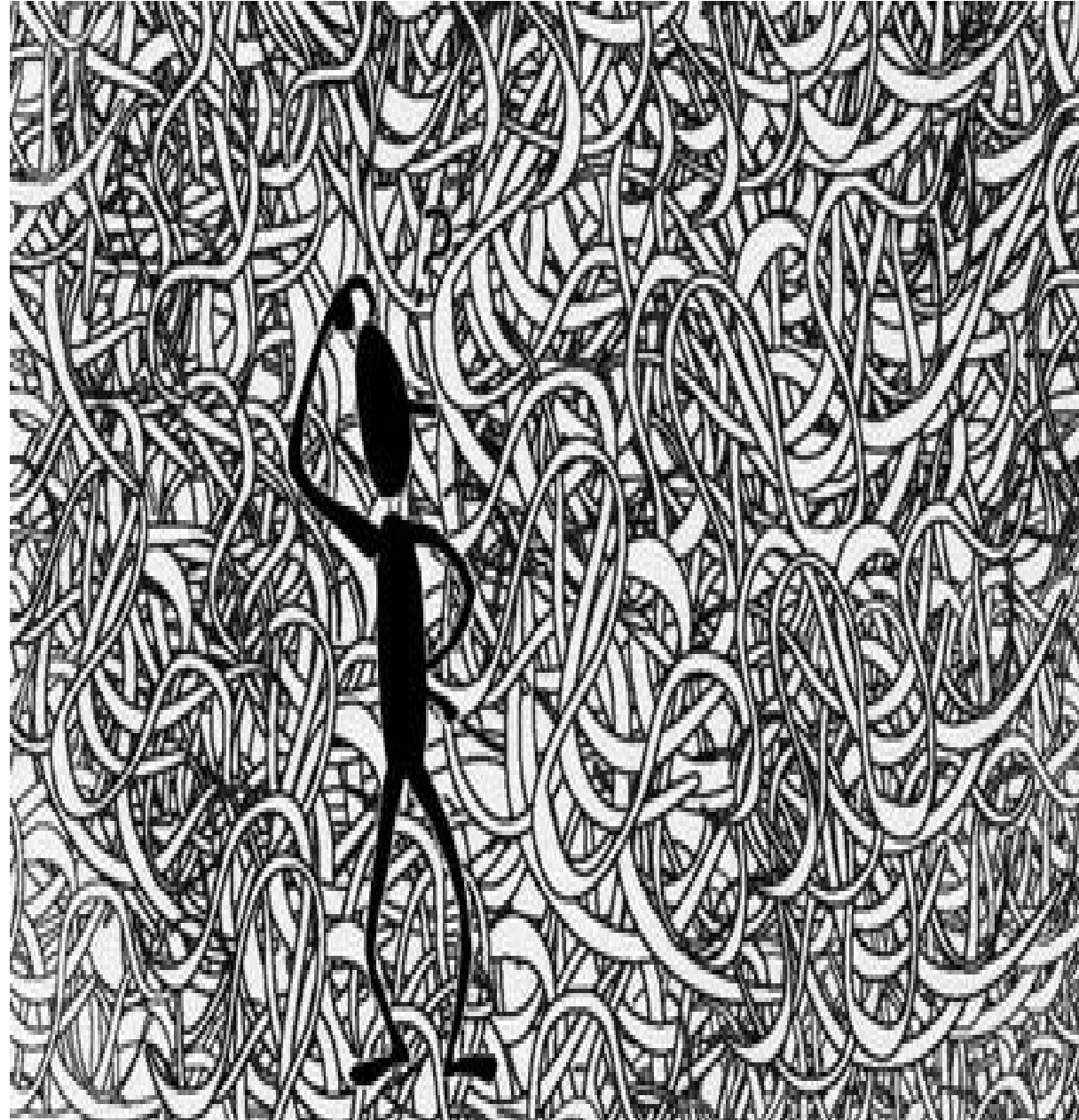
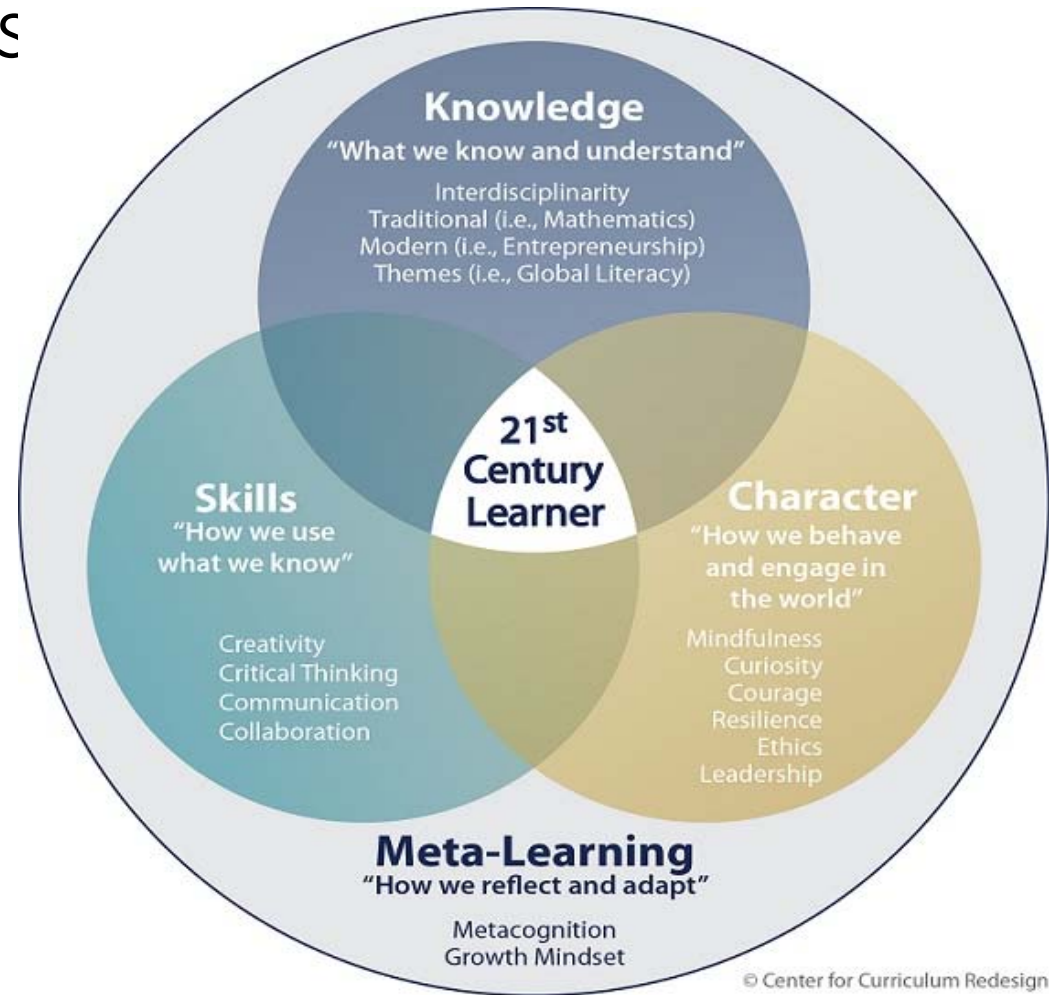# Why change is needed towards ESD and transdisciplinarity?

- ***What kind of comptencies adults need to work with complex and unsustaiable issues***?

Key competencies to work with complex unsustainable issues

- **Think holistically** – causal factors, interconnections, social dimension

- Develop innovative and flexible approaches

- **Work across agency boundaries**

- Be accountable in a way that doesn't constrain innovation

- **Engage stakeholders and adults** in the issue and in identifying solutions

Curriculum design by meeting the needs of the adults of 21st century and working with complex issues

- **Transdisciplinary skills**:

- **Cognitive** (metacognition, dialectical thinning skills),
- **Social skills** (conflict resolution, collaboration),
- **Research skills** (questioning, observing)

- being able to solve complex problems

Knowledge
"What we know and understand"
Interdisciplinary
Traditional (i.e., Mathematics)
Modern (i.e., Entrepreneurship)
Themes (i.e., Global Literacy)

21st Century Learner

Skills
"How we use what we know"
Creativity
Critical Thinking
Communication
Collaboration

Character
"How we behave and engage in the world"
Mindfulness
Curiosity
Courage
Resilience
Ethics
Leadership

Meta-Learning
"How we reflect and adapt"
Metacognition
Growth Mindset

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Competencies dealing with «Wicked and complex issues»

• Growing complexity and uncertainty requires

• a dialogue across disciplinary boundaries aimed at creating **more sustainable practices.**

• This involves development of hermeneutical skills and a **dynamic communication in the adaptive** and evolving environment of multiple stakeholders.

Adults' ESD Comptencies (Tilbury, 2016)

ESD involves:

- Critical thinking
- Open, transdisciplinary, inquiry-based approach
- Clarification of values
- Being an agent for change, in interaction with other actors (action research, social learning processes)
- Working with real issues outside the academy
- High level of disciplinary and transdisciplinary quality

LEARNING FOR THE FUTURE

Competences in Education for Sustainable Development

ESD Educator Competences
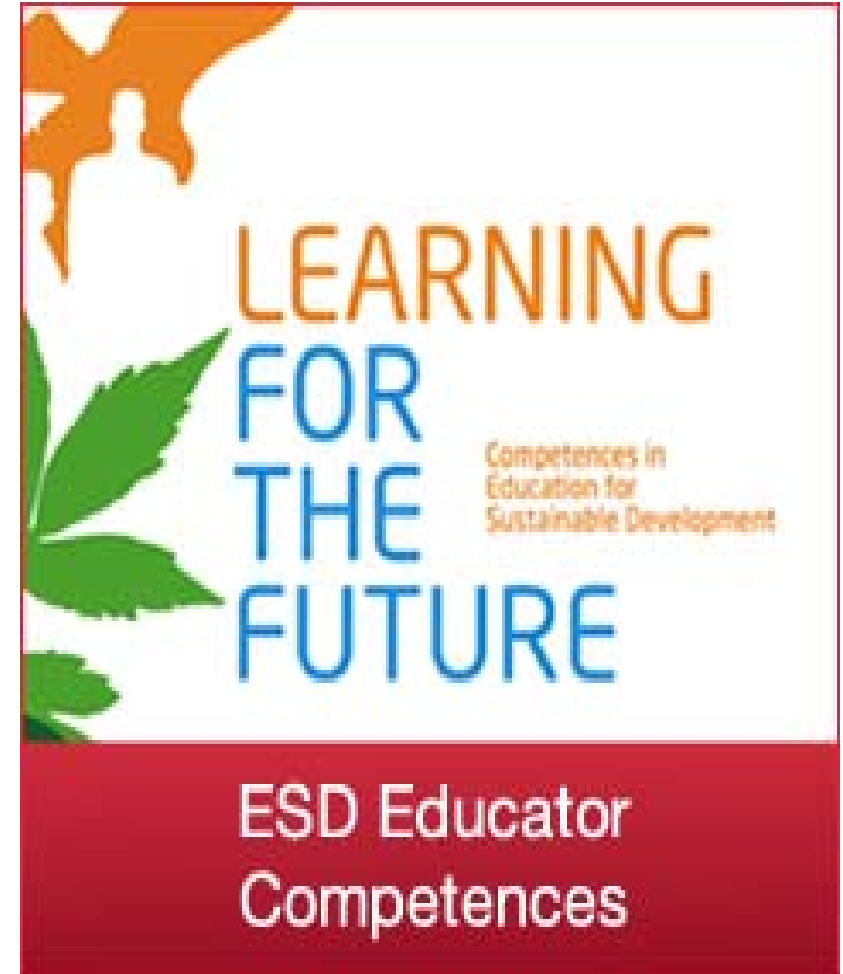
Center for Environment and Development in Uppsala (CEMUS) (Jakob Grandin 2011)

Interdisciplinary understanding

Critical and creative thinking

Systems thinking

Ethics and values

Power relations

Problem-based learning

Mustea, A., Mureşan, M., Herman, C., *Integrating E-Learning into the Transdisciplinary Methodology as a Solution to the Challenges of 21st Century Society*, International Conference Teachers for the Knowledge Society, Romania

TABLE I. The four pillars of education from traditional and transdisciplinary perspective

	Traditional education	Transdisciplinary education
Learning to know	Knowing	Understanding
Learning to do	Doing/ acting	Creating
Learning to live together	In society	In society and in the universe
Learning to be	Existing	Being

# Tentative attempts to inroduce changes in desiging programms for adults

- Tentative attempts have been made to re-orient adult educational programs towards sustainability since the United Nations Conference on Environment and Development Rio Summit that was held 20 years ago.

- A paradigm shift is possible only when sustainability becomes a whole institutional approach (Barth et al., 2014).

- The vision of Education for Sustainable Development is a world where
  - *all have an opportunity to benefit from **quality education** and learn values, behavior and lifestyles for a sustainable future and **societal transformations*** (UNESCO, 205; Hopkins & McKeown, 2002).

Attempts to integrate sustainability in higher education

United Nations Decade of Education for Sustainable Development (2005 - 2014)

- UNECE Strategy for Education for Sustainable Development

- GAP (Global Action Program) (2015)

- Post - 2015 framework
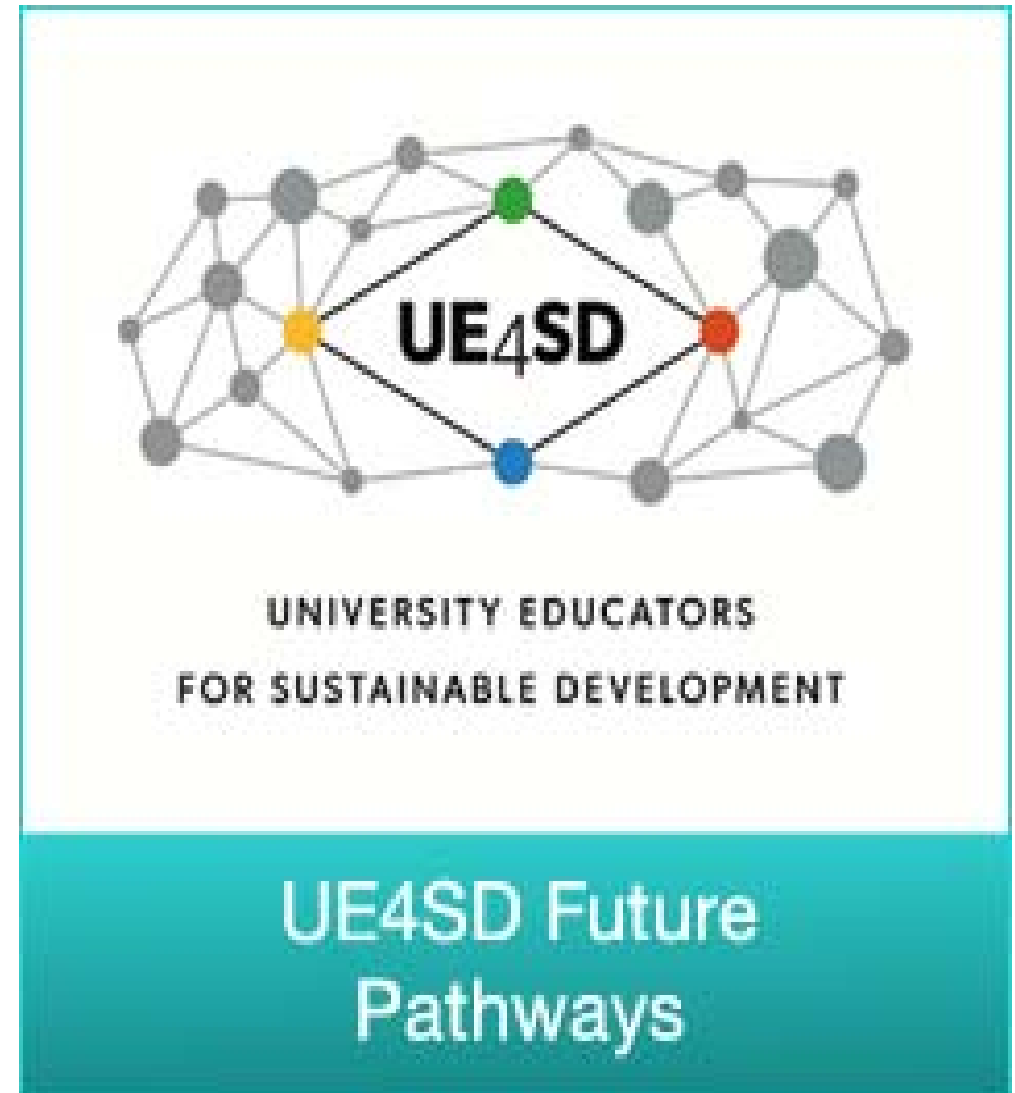
Need of transformations the adult educational programms

- Transdiscipinarity may as a valuable frame to develop **innovative solutions to real life issues**.

- By engaging adult learners in **solving real world issues**,

- educational programs will contribute to engaging adults in solving community issues, thus shaping adults as problem solvers, change agents and transition managers

Transdisciplinary approach to curriculum design

- Transgress disciplinary boundaries leading towards transdisciplinary engagement (McWilliam, Hearn, & Haseman, 2008; Davis, & Sumara, 2008; Russel, 2005).

- **Requires going beyond disciplinary boundaries** by dealing with real life issues.

- **Requires a transformative dimension** when adults work together to make their own practices more "**just, rational, coherent, and sustainable**"
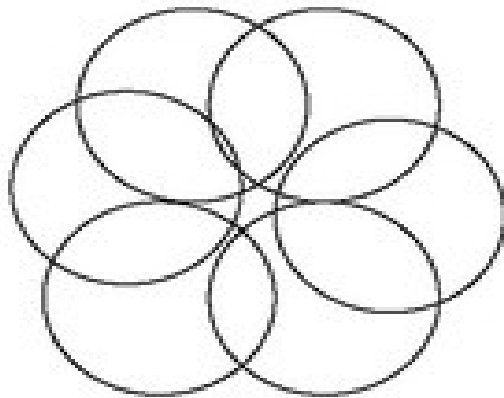
Generic
(Pooled interdependence)
"MULTIDISCIPLINARITY"
Co-ordination by standardization
(system-wide)
Investment into the whole system
(systemic goals)

Sequential
Interdependence
"INTERDISCIPLINARITY"
Co-ordination by planning
(Inter-systemic goals)

Reciprocal
Interdependence
"TRANSDISCIPLINARITY"
Co-ordination based on integrated
input/output (individual and systemi
goals in dialogue) Investment into th
uncertainty generated by pooled an
sequential interdependence

A.

B.

C.

Information inputting
-Each stakeholder <u>represented</u>
-Multiple closed systems
interacting within an open
system
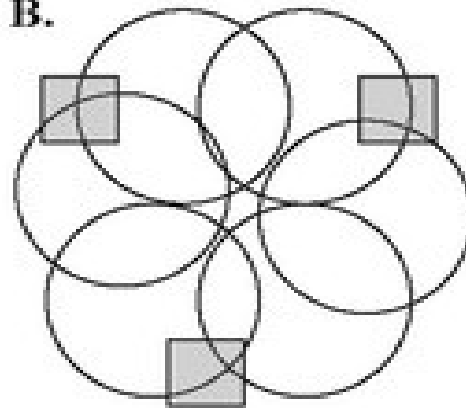
Throughputting
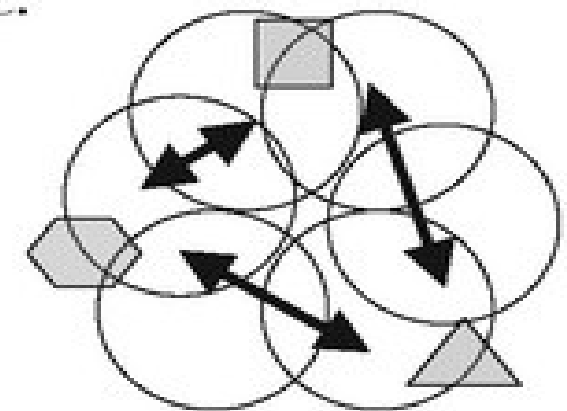-Each stakeholder <u>contributing</u>
-Planned disciplinary interaction

Homeostasis
-Each stakeholder
<u>affecting</u>
-Reorientation.

Complex dynamic systems (**Wells** (2013)

- 1) Nonlinearity showing that **small initial changes** can lead to large outcomes.
- 2) Feedback a process of circular causality by which the output of the system is fed back to the input.
- 3**) Networks - dynamical systems consisting** of nodes with links of interactions between them.
- 4) Hierarchy - interrelated nested systems where each of the subsystems is subordinated to the system to which it belongs.
- 5) Emergence is a process by which relatively simple rules lead to complex pattern formations;
- 6) Self-organization as the central feature of emergence of global structure out of local interactions (Heilighen, 2008, p. 6).

The epistemological level: *The structure of the totality of levels of Reality are in a complex structure: every level is what it is because all the levels exist at the sametime.*
(Basarab Nicolescu, "isciplinary Boundaries - What Are They and How They Can Be Transgressed?"

- Levels of organization – Levels of structuring– Levels of integration
- Levels of confusion – Levels of language –Levels of interpretation
- Physical levels – Biological levels –Psychical levels
- Levels of ignorance – Levels of intelligence– Levels of contemplation
- Levels of objectivity – Levels of subjectivity– Levels of complexity
- Levels of knowledge – Levels of understanding– Levels of being
- Levels of materiality – Levels of spirituality– Levels of non-duality

Comparison of disciplinary and transdisciplinary education:

- Disciplinary education:
- One level of Reality
- Accumulation of knowledge
- Analytic intelligence
- Binary logic (absolute truth / absolute falseness)
- Oriented towards power and possession
- Exclusion of values

- Transdisciplinary Education:
- Several levels of Reality
- Understanding
- New type of intelligence - harmony between
- Included middle logic (relative truth);
- Oriented towards astonishment and sharing
- Inclusion of values

Tentative attempt to work towards transdisciplinarity: the case of good practice in teacher in-service programms

1. **High lev**el of **disciplinary and interdisciplinary** knowledge

2. **Able to think holistically**

   Understand context, causes and consequences - elements of and interactions in a larger, societal system that is dynamic

3. **Able to think critically**

   Question dogma, methodology, reasoning or established truths, critically evaluate priorities and alternatives, etc.

4. **Able to solve problems**

   Able to define and analyse problems, formulate alternative solutions, evaluate these from multiple perspectives and form a well-founded opinion including sustainability

Tentative attempt to work towards transdisciplinarity: **the case of good practice in teacher in-service programms (Syntheses)**

5. **Able to innovate**

   This includes ability to fantasize, imagine and explore possibilities in addition to ability to plan and implement new initiatives

6. **Able to clarify the values dimension**

   of a development,issue, problem, conflict of interest, action, etc., includes social, economic and ecological values/standpoints/worldviews

7. **Can promote innovation, creativity and change**

   through effective oral and written communication, cooperation and management/organisation

8. Can **access information from various sources** and assess the qualities of the information

Tentative attempt to work towards transdisciplinarity: the case of good practice

9. **Can conduct action research** (social, inquiry-based learning)

   to generate new knowledge, get an unified overview of a complex field in cooperation with others, and evaluate development and the impact of actions

10. Demonstrates initiative, engagement, drive for change and entrepreneurial spirit

11. **Can work flexibly and adapt**

   to various kinds of dynamic work environments, organisational forms and cooperative relationships

12. **Exhibits intellectual curiosity** and motivation for lifelong learning, and is able to steer own learning in a lifelong perspective.

Concluding remarks

- The future of the world depends on the competences of adults to think and live sustainably, make sustainable choices and difficult decisions in the context of rising uncertainty, insecurity and ambiguity.

- Moreover, the arena of education has always been fraught with miriades of factors, networks, contexts associated with unpredictability, adaptation, self-organization, etc. depending of large number of stakeholders and their relationships.

Concluding remarks

- Oriented toward the change of educational paradigm, current Sustainability education (SE) still holds a lot of contradictions and dichotomies like one between behaviorism and constructivism in learning theory and content/process as well as transmission/transformation in terms of methodology (Sterling, 2004).

- The integrated and theoretically sound description of SE key points suggests that SE is based on realist/ idealist (relational) ontology, **participatory epistemology** and **participative/systemic theory of learning**.

- Based on intrinsic and transformative values, SE stresses the transformative learning experiences and pedagogy focusing on meaning making according to context while seeking wholeness and sustainability.