Moving towards a Circular Economy: Educate – Why and How?

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Circular economy

"where the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimised."

(EU Action Plan, 2015)

Systemic change

Two progressive elements:

- Need for a systemic change, removing the overemphasis on individual action
- A new model for the economy, patterned after natural cycling

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Circular economy

- Requires innovations:
  - technological

  (e.g. in the production process and in product design)
  - economic

  (e.g. secondary raw materials market, new business models, industrial symbiosis, new consumption behaviours)
  - socio-cultural

  (e.g. consumption attitudes and values, conception of wastes and of relations of humans with nature and natural resources, and conception of role and proper behaviour of industries)

Circular economy

- "The significant problems we face cannot be solved at the same level of thinking that we used when we created them."

—Albert Einstein

➔ Paradigm shift! –

a circular, sharing economy and a cooperative and caring society

→ Organizational and cultural changes

=> Significance of education

Education for Sustainability (EFS)

- Started in 1970s as Environmental Education
- Education for Sustainability (EFS) or Education for Sustainable Development
  - Interdisciplinary & Integrative
  - Goal: change in attitudes and behaviors

Characteristics of EFS practice:

- Combines knowledge, sentiment and emotional involvement, and a purpose (education on – in – for the environment)
- Critical thinking;
- Analysis & synthesis of different bodies of knowledge
- Skills for cooperation – connection etc. (group work)
- Active citizens – skills for problem solving

EFS - Achievements

Social Achievements

- Awareness about environmental issues
- Basic knowledge on environmental issues

Achievements in education:

- Active learning - experiential learning, problem solving
- Connection with local reality and problems
- Increased awareness of connections between local and global problems

EFS - Present Challenges

But….

- Why are we still far from sustainable waste management?
- How should education be organized to lead to value changes but also behavioral changes?

Needed ….

- Empowerment for change
- More emphasis on “big picture” – systems focus

Education for Transformation

- Critical pedagogy (Paulo Freire)
  - Purpose: to support the growth and liberation of all participants; praxis – continuous reflection – critical analysis of own culture
  - Reflective facilitation of learning

Transformative learning:

- Generates knowledge, mobilizes feelings and develops socio-political skills
- Empowers learners and mobilizes them to action

Education for Transformation

Learning environment:

- Redefinition of the roles in the learning environment: all creators of knowledge and instructor as facilitator.
- Democratic dialogue: collaborative construction of the learning process; students & instructor as researchers.
- Students' experiences as basis for classroom learning: implicit valuing of students' experiences.

Critical pedagogy: Principles for education from experience (Ada, 2007)

- "…we learn better in an environment that offers love and respect, and allows us to experience and honor the truth of our thoughts, emotions and feelings."
- "… we learn better in an environment that allows us to learn at our own pace and in our own way, that honors what we care about, and that builds on what we have already learned from our life experience."
- " Racism, as well as other forms of prejudice and oppression …are pervasive in our world and influence all of us in unconscious ways. Therefore we need to begin by recognizing prejudice and oppression in order to unlearn them."
- "… we learn better in an interactive, supportive and non-competitive environment. As we live in a competitive society, it takes intention and effort to establish a co-creative atmosphere."
- " ...To be most effective, [needed] improvement [in a culture] needs to come from within the culture or in partnership with it, rather than imposed upon it."

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Education for Circular Economy: How?

It should

- broaden the "possible" (**creativity, innovation**);
- promote systemic thinking, including understanding of how power inequalities work and how they interrelate (**systems analysis**);
- cultivate "circular" thinking (exploration of **cycles in environment and life**);
- cultivate social and environmental responsibility (**service learning**);
- prepare "global citizens", including critical appraisal of rights and obligations, justice and fairness and political literacy [5] (**citizenship responsibility and skills**);

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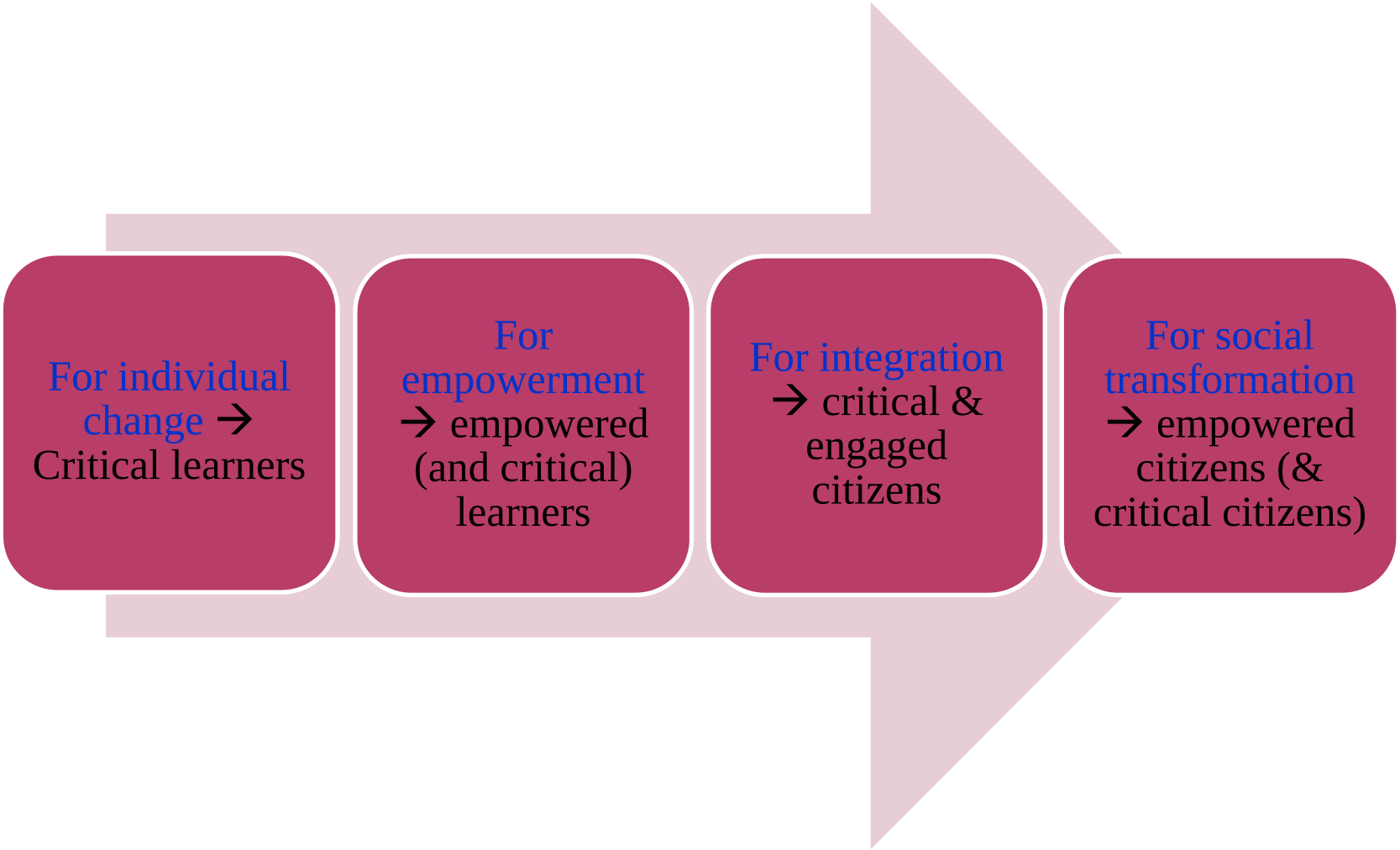
Education for Circular Economy: How? (2)

It should

- be **integrative** – integrating different bodies of knowledge, different experiences, different viewpoints;
- reveal the connection between **individual issues/action and social problems;**
- be an ongoing exploration (**action research**);
- foster **trust and openness** in the educational context

Design considerations for EFS



Characteristics /skills targeted; learning context / teaching methods; instructional tools; key outcomes

Design guidelines for ECE (1)

Teaching / Learning purpose	**Characteristics / skills targeted**	**Learning context - Teaching methods**	**Instructional tools**	**Key outcomes**
For individual change → Critical learners	- Critical thinking - Creativity & innovation - Knowledge creation	- Case study analysis - Dialogic classes - Problem analysis - Class as a "democratic forum"	Case studies Audio visual materials Role playing Laboratory activities (guided)	Critical knowledge Analytic ability Synthetic ability
For empowerment → empowered (and critical) learners	- Real problem solving - Desire to act on knowledge - Sense that you can cause individual and social change - Political literacy - Systems thinking	- Real life problem solving - Investigating connection of individual issues & social problems ('personal is political') - Service learning (offer your services and learn) - Experiential learning (learning concepts by doing) - Class as a "think tank"	Projects on problems/questions seeking answers Group activities in class & outside Experiments Field work Work in a NGO Internet searches – use of knowledge data bases	Problem solving Systems thinking Research ability

Design guidelines for ECE (2)

Teaching / Learning purpose	**Characteristics / skills targeted**	**Learning context - Teaching methods**	**Instructional tools**	**Key outcomes**
For integration → critical & engaged citizens (and critical & empowered learners)	- Integration of different bodies of knowledge - Integration of experience & diverse sources of knowledge - Circular logic - Local and global connections	- Integrative projects, diverse sources - Multicultural exchanges - Investigation of end-of-life uses - Multi-scalar analysis (local to global) - Class as a "research group"	Group activities Different groups - on a multi-faceted problem Local / international problems Social media / web based tools Internet –based synchronous & asynchronous tools	Wholistic – circular – transdisciplinary thinking Connection & relations Communication ICT skills
For social transformation → empowered citizens (and critical citizens, critical & empowered learners)	- Understanding socio-political, economic and cultural context / dynamics - Collective action, social responsibility & participa-tion in community affairs	- Action research (local problem, investigation, collaboration with community, policy implications) - Democratic decision making in class	Group work Working on a local problem/issue Collaboration with local community & other experts People research On line tools (ICTs) - for connectivity	Social responsibility Socio-political savvy Action research capabilities

Challenges in education/EFS/ECE today (1)

- Systemic and "circular" thinking,
- Critical knowledge capacity,
- Collaborative skills, and
- Socio-political literacy

- Go beyond its emphasis on the individual (individual behaviours, individual change, etc.) towards collaboration, socio-political skills, social responsibility and connection / common good
- "Personal is political"

Challenges in education/EFS/ECE (2)

Method - tools:

- Critical pedagogy, action research, active learning
- Real life problem solving & problem posing; multi-scalar analysis; service learning; integrative modules
- Combination of individual and group activities; face-to-face and ICT-based activities

Tools for ECE - ICTs

- ICTs can facilitate:
  - interaction,
  - communication,
  - integration of diverse bodies of knowledge,
  - Local-global connections.
- But only tools!
  - should be used with a clear understanding of the purpose;
  - in a democratic process of decision making and power distribution.

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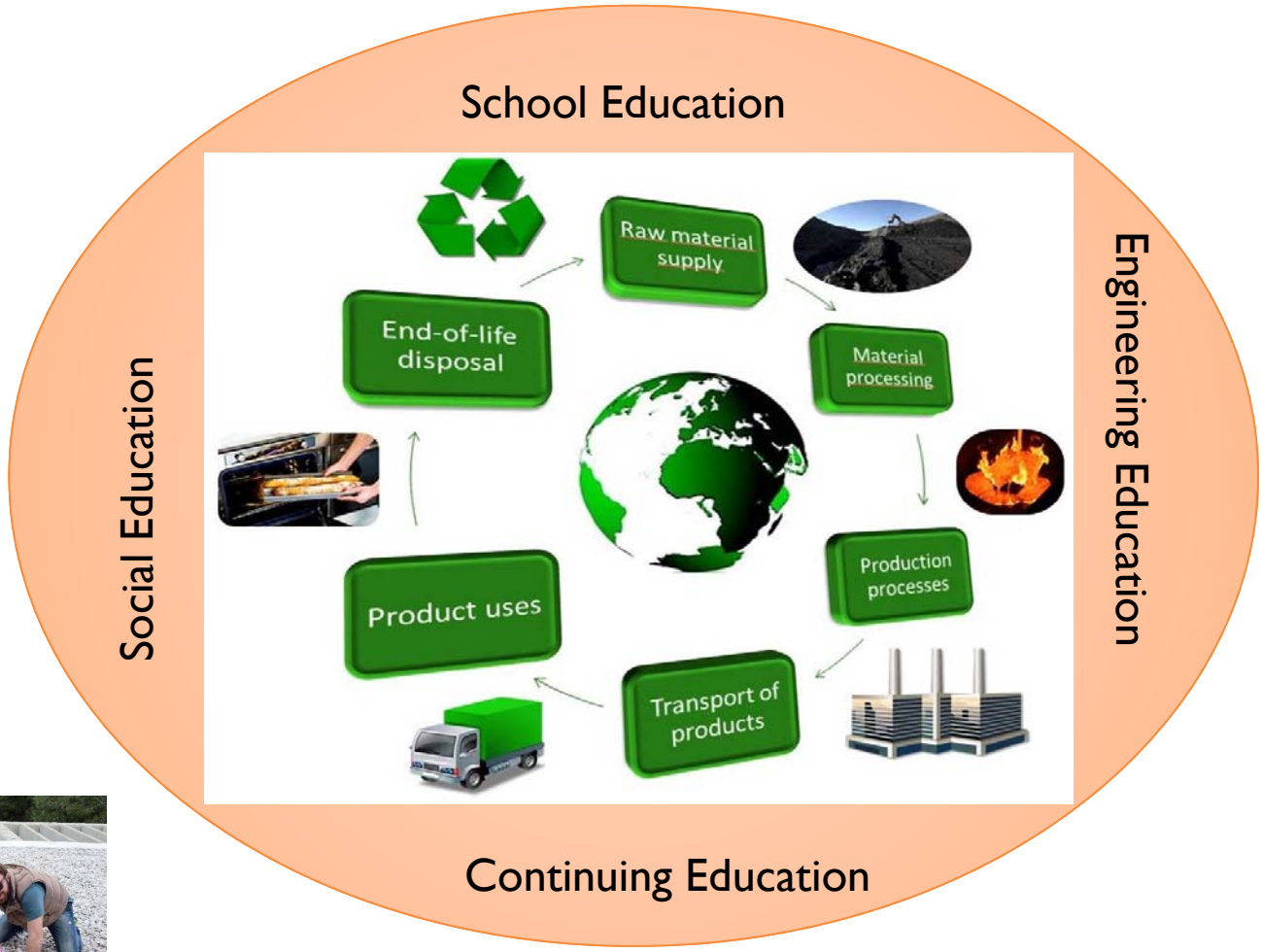
Challenges in education/EFS/ECE (2)

Main challenges and goals in education for circular economy:

- Individual issues / actions ⟷ social problems (personal is political)
- Local ⟷ global concerns

- Engineering education that is interdisciplinary, holistic/integrative; doing the above too



Thank you

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