ICT in Education for Sustainability: Contributions and Challenges

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Outline & goals of talk

- Sustainability
- Education for Sustainability (EFS) – aims, approaches, challenges
- Empowering education
- ICTs and Education for Sustainability

Main questions:

- How can ICTs support the purposes of EFS? What challenges could they pose for EFS? How should they be incorporated/used?

Sustainability

- Several definitions
- All the definitions have to do with:
  - Living within natural limits
  - Interconnections (economy, society, and environment)
  - Equitable distribution of resources and opportunities

Integration and **balance** between environment, economy and society / culture; **connections**; **limits**

➔ **Social change**: structures, culture, behaviors
  → **Paradigm shift** needed

➔ Education for new worldviews and ways of being

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

EFS: Approaches

Emphasis on pedagogy – significance for purpose

Approaches:

- Reaction to traditional pedagogy
  - Active learning

- Propose an alternative pedagogy
  - Empowerment
  - Action research
  - Citizen science

EFS: Characteristics

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
- Social responsibility
- Skills for cooperation – connection etc.
- Active citizens – empowerment- skills for social action

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

- Better connection between individual behavior & social problems
- Empowerment for change
  - Mobilizing alternative worldviews and behaviors
  - Translation of awareness into new lifestyles
  - Development of socio-political skills

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- Creating sustainable societies

Empowering education

- Critical pedagogy (Paulo Freire)

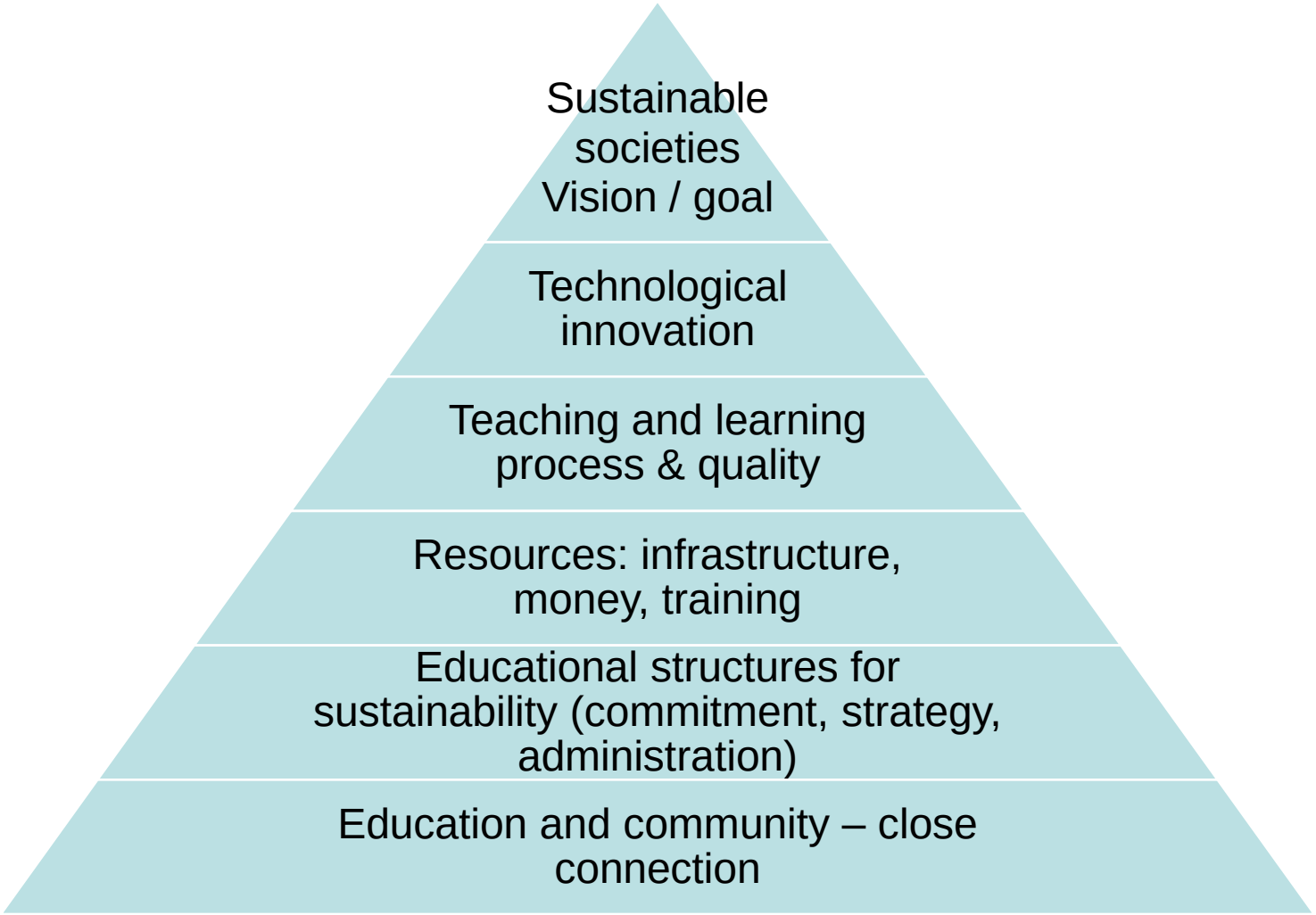
- Redefinition of the roles in the learning environment: all creators of knowledge and instructor as facilitator.
- Democratic dialogue: collaborative construction of the learning process; students & instructor as researchers.
- Students' experiences as basis for classroom learning: implicit valuing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

EFS as Empowering education

EFS pedagogy – to empower students to change worldviews and behaviors:

- Firmly situated in students' & community experiences; students posing questions of interest to them
- Teaching research methodology
- Interactive, promoting cooperation between instructor and students, students and students
- Characterized by democratic dialogue
- Class as a "think tank" and instructor as a scholar who contextualizes and produces knowledge
- Based on the concept of "network"
- Promoting individual issues as social problems

Critical components for success in EFS



ICTs for Sustainable communities

- ICTs
  - Data bases, synchronous & asynchronous connecting technologies, social media, data mining, GIS, decision support tools, cloud computing, mobile networks, sensor networks, etc.

- Benefits
  - Enhanced access to shared resources in learning repositories
  - Increased connectivity between students and instructor and amongst students
  - Increased ability for integration of knowledge
  - Enhanced ability to make connections between local problems and global dimensions

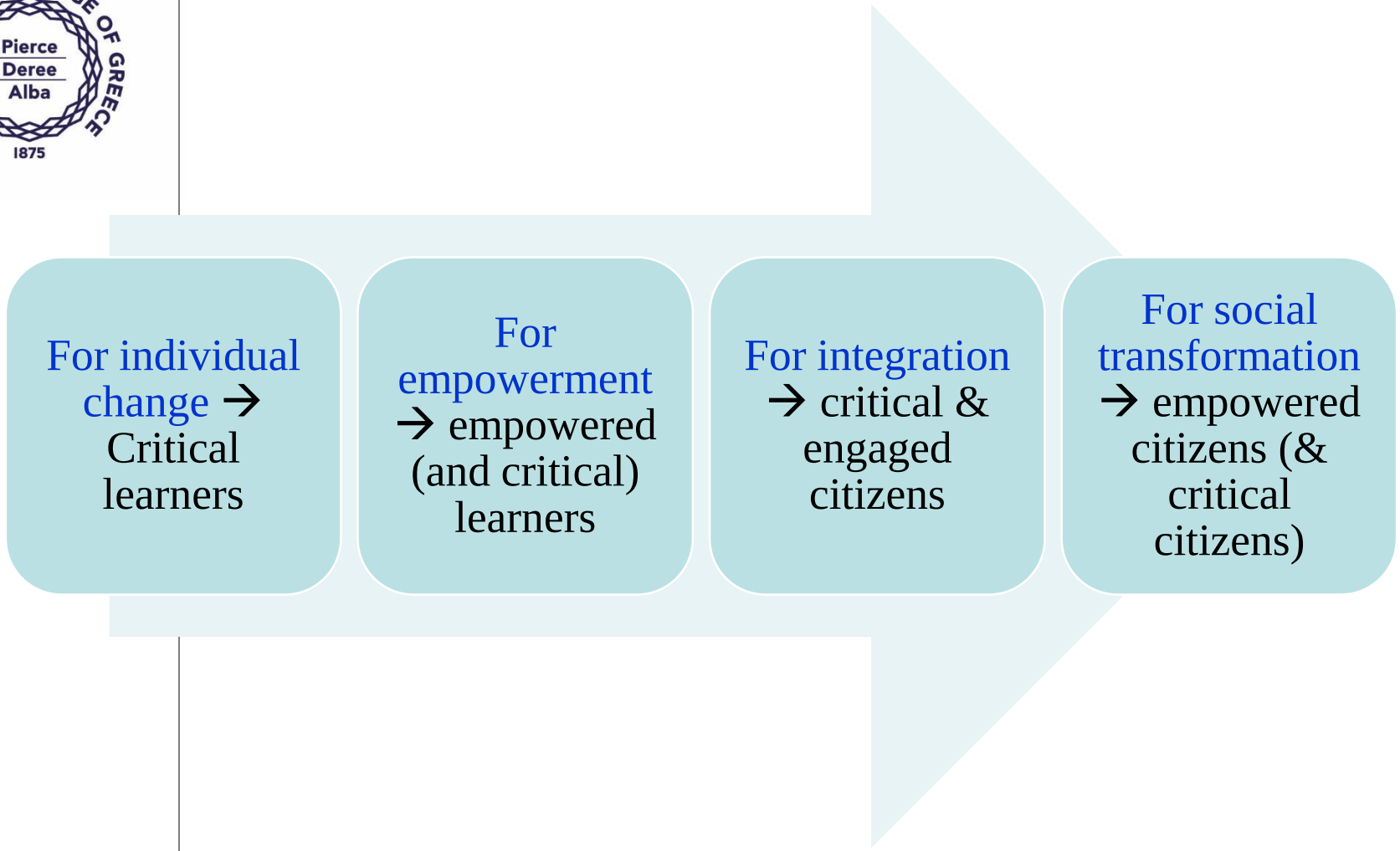
ICTs for Sustainable communities: Concerns

- "The disadvantage comes from the power that ICT products and services have in taking commerce, service provision, and governance away from communities that have been unable to bridge the digital divide."

(Stewart Marshal, Wanjira Kinuthia and Wal Taylor, Bridging the knowledge divide: Educational technology for development. EBSCO publishing, 2009)

- Social inequalities should be addressed before technical means – innovations can assure equal access and benefits for all

Design considerations for EFS



Design guidelines for EFS

Teaching / Learning purpose	Characteristics / skills targeted	Learning context - Aims	Instructional tools / ICTs	Issues to consider
For individual change	Critical thinking Creativity & innovation Knowledge creation	Case study analysis Bringing different views together Dialogic classes Problem analysis	Case studies Audio visual materials Internet search Online tools for exchanges	→ Critical learners
For empowerment	Real problem solving Desire to act on knowledge Sense: you can effect change Political literacy Systems thinking	Real life problem solving Investigating connection 'personal is political' Service learning (offer your services & learn) Experiential learning (learning by doing) Class as a "think tank"	Internet searches – use of knowledge data bases Online tools for exchanges GIS Decision support tools E-games	→ empowered (and critical) learners

Design guidelines for EFS (cont'd)

Teaching / Learning purpose	Characteristics / skills targeted	Learning context - Aims	Instructional tools / ICTs	Issues to consider
For integra-tion	Inter- or trans-disciplinarity Integration of experience & knowledge Systemic logic Local & global connections	Holistic thinking Connection & relations Communication Class as a "research group" Integrative projects Mobilize sentiment	Social media / web based tools Internet –based synchronous & asynchronous tools E-hub for networking	→ critical & engaged citizens (and critical & empowered learners)
For social transfor mation	Understanding socio-political, economic and cultural context Social responsbility & community engagement	'Personal is political' Socio-political savvy Action research capabilities Democratic decision making in class	ICTs for connectivity, exchanges, mobilization of resources, collective decision making E-hub for networking	→ empowered citizens (& critical citizens, critical & empowered learners)

ICTs for EFS

- “Innovation with a purpose” – not as a tool for individual or market benefits

- ICTs as means to the sustainability vision / goal
- ICTs – appropriate for teaching / learning context - process

Further research

- Investigate uses of ICTs in EFS and relation with purposes of EFS programs
- Investigate effective uses of ICTs in EFS: that have brought about changes in behaviors / social practices

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THANK YOU FOR YOUR ATTENTION

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