Digital Ecosystems and SEED Co-Innovation in Education

Achim P. Karduck
Furtwangen University, Germany
Sustainable Development Defined

„Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs”.

Definition by the UN Commission on Environment and Development, 1987

Gro Brundtland, the former prime minister of Norway and author of the Brundtland report, titled “Our Common Future,” at the World Sustainability Forum in Manaus:

“We’re not going to overcome the financial crisis that has shaken the world if we don’t think about long-term development.”
Factor 5 Possible

Director Wuppertal Institute
17 years German Bundestag
Son of Carl Friedrich von Weizsäcker
2006-2008 Dean of Bren School of Environmental Science and Management, Santa Barbara, USA.
President of the Club of Rome since 2012

increasing the resource productivity by factor 5
Factor 5

- transforming the global economy on an economic path that is environmentally sustainable by increasing the resource productivity by factor 5 in various sectors in the industrialized regions
- being economically more profitable and balancing quality of life priorities.
- for developing regions, their development path could consequently take place in a much less resource inefficient way than for industrialized regions in the past.
“The worlds innovators 100 years ago could hardly glimpse the world they were contributing to build (...). The electrical and digital revolutions accelerated this progress to the point that now the human race covers much of the habitable land on the planet and harnesses resources from all of its four corners. In the 21st century, we stand at a crossroad, where the size of the impacts from our global community is now rivaling the size of our home’s ability to cope”.

Education and resource awareness
Factor 5: Waves of Innovation

Kondratiev waves: supercycles or the long economic cycle

Factor 5 leads to a new Kondratiev cycle
Awareness about Energy

How many KW (Kilowatt) is needed, To carry a 10kg bucket of water From sea level to the peak of Mount Everest (8850 m)?

$\frac{1}{4}$ Kwh
Digital Ecosystem Evolution

Where are we at?

--- 30 Years of ICT Evolution

Professor Elizabeth Chang
The „Propellers“ of Innovation Adoption

3 Ps

- People (grassroot organizations, etc.)
- Private (corporations)
- Public (government organizations)

www.community-intelligence.com
Evolution of SEED Digital Ecosystems

3 Ps

Evolution

Domain specific:
- focus on quality
- socio-economic focus

Co-innovation for high impact
Sovereign Self-Unfolding Education

Aim: to promote kids after school by an individual, project oriented education, to allow them to fully explore and flourish their potential.

“Sovereign Education is the natural process of personality development from the early childhood. Sovereigns create synergistic networks around their interests to develop the full range of their own potential throughout life. In synergistic networks, sovereigns get all necessary means to boost the development of their own profile: information, materials, partners, etc. This process begins in the family, continues in close neighborhood until it manifests in the global sphere environment. To organize this process systematically, there is a specific logistics online: The Cleverly Navigator.” EDEJU
Cleverle Project and Process Support

Cleverle at work

Cleverle Process Support

Navigator: Education emphasis in 4 dimensions
Workbench: Market for tools and components
Window: Cleverle expert involvement
Profile compass: Comparison of profiles

Cleverle profiles evolve over time

Visitors from Menlo Park
„Clever Kids“ at Work

More than 800 Cleverle Clips on Youtube

www.edeju.de
Cleverly Navigator Support and Co-Innovation

Cleverle Process Support

**Navigator:** Education emphasis in 4 dimensions
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Cleverle profiles evolve over time

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Technology Portfolio

**DE Innovation**

forms

enables

strategy

Domain Specific DEs

impact

iFOSSF Inclusion Process

Learning
Education with „All Senses“

www.aktion-lebensraum.de/

Nature
Weekly Excursions
Technology
Cross-generation
Kindergarten and visitors from Japan

Hand in Hand with Innovation Academy

Renewable Technologies & Education

http://www.innovation-academy.de/
Seamless Media Design

Hiroshi Ishii, MIT Media Lab (formerly NTT, Clearboard Project)
Next Wave
Opening Invitation Sep. 21, 13
Local-Led Co-Innovation

Excursion by the kids: hands on experience & Hand in Hand projects
Aim: eMarket/GRID-IT for decentralized energy supply

Professor Eicke R. Weber is Director of the Fraunhofer Institute for Solar Energy Systems ISE. 1983-2006 he lectured at the faculty of the Department of Materials Science and Engineering of the University of California, Berkeley - since 1991 as Professor of Materials Science.

www.isi.fraunhofer.de
Miracle of Wenchi

Self-teaching experiment of Matt Keller and Nicholas Negroponte in the Ethiopian village of Wenchi

“Keller, MIT, believes that computer programs can be self-instructing and children who he describes as "autodidacts" can learn on their own and from each other as they play around with the computer.”

“Keller is excited about the results of this experiment: millions of poor children around the world with no access to schools and teachers can learn on their own if they have access to computers loaded with teaching apps”
Factor 5, Education, and Awareness
d.school

“Human values are at the heart of our collaborative approach. We focus on creating spectacularly transformative learning experiences. Along the way, our students develop a process for producing creative solutions to even the most complex challenges they tackle. This is the core of what we do.”

Besides the “hunger for innovation” for SEED, d.school aims to prepare students to rise with the challenges of our times.
Innovators, not Innovation

“In a time when there is hunger for innovation everywhere, we think our primary responsibility is to help prepare a generation of students to rise with the challenges of our times”

Way of Working

“At the d.school, we learn by doing. We don’t just ask our students to solve a problem, we ask them to define what the problem is.”

Real-world projects

“Students want to put their efforts into problems that matter. Real-world problems, constraints and commitments accelerate learning more than hypothetical classroom exercises.”
Social, Economic and Environmental Development (SEED)

SEED Framework @ IEEE DEST 2013
dest2013.digital-ecology.org/index.php/seed-inauguration-workshop
A Generation Project for SEED