



PROBLEM-BASED LEARNING

APPLIED TO

ECONOMIC EDUCATION FOR SUSTAINABILITY

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Introduction

1. Recent socio-ecological context and challenges for economic education
2. Economic education for sustainability. UNFU experience
3. Problem-based learning in economic education

Conclusions

Introduction

Aichi-Nagoya Declaration on ESD (UNESCO, 2014a).

UNESCO roadmap for implementing the global action programme on ESD (UNESCO, 2014b).

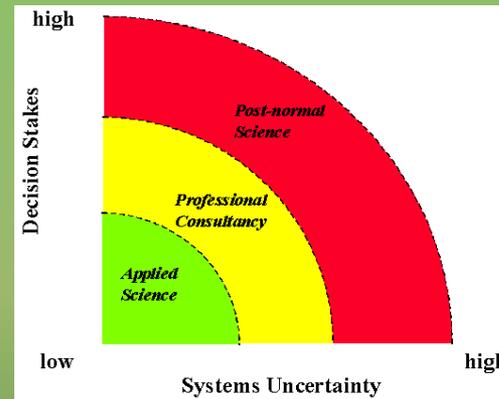
Planetary boundaries (Rockström et al., 2009; Steffen et al., 2015)

VUCA world:

- Volatility,
- Uncertainty,
- Complexity and
- Ambiguity

The emergence of post-normal science (Funtowicz & Ravetz, 1993)

- facts are uncertain,
- values in dispute,
- stakes high and
- decisions urgent.



1. Recent socio-ecological context

- The world has **grown out** of the planet:
 - Overshoot day in 2020 was August 22
- For the first time in human history, we face the emergence of a single, tightly coupled human, food, water, materials and energy **nexus**
- Globally, approximately 50% of the primary production is still not utilized, but wasted (Lange et al., 2016)

The European Green Deal (2019)

How to make Europe the first climate-neutral continent by 2050

- boosting the economy
- improving people's health & quality of life
- caring for nature, and
- leaving no one behind



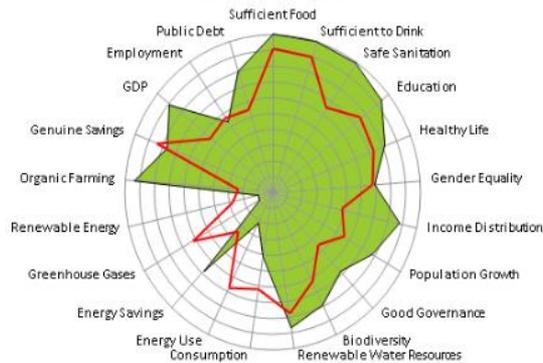
EC will prepare a European **competence framework** to help develop and assess knowledge, skills and attitudes on CC&SD. It will also provide support materials and facilitate the exchange of good practices in EU networks of teacher-training programmes.

The **Skills Agenda** and the **Youth Guarantee** will be updated to enhance **employability** in the green economy.

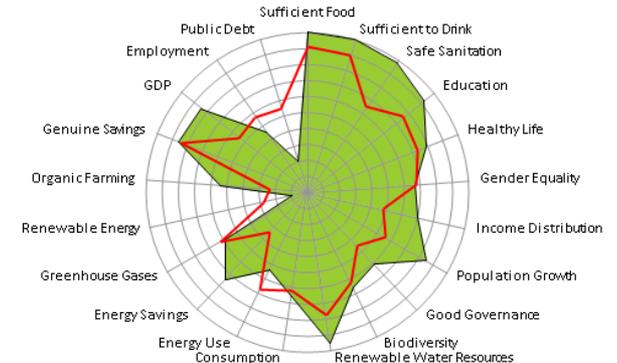
Sustainable Society Index'2016 (SSI)

<http://www.ssfindex.com/>

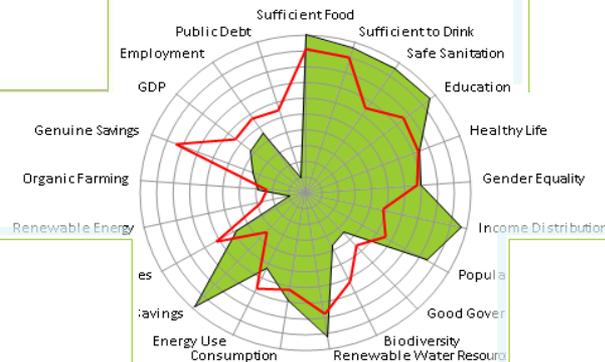
Czech Republic



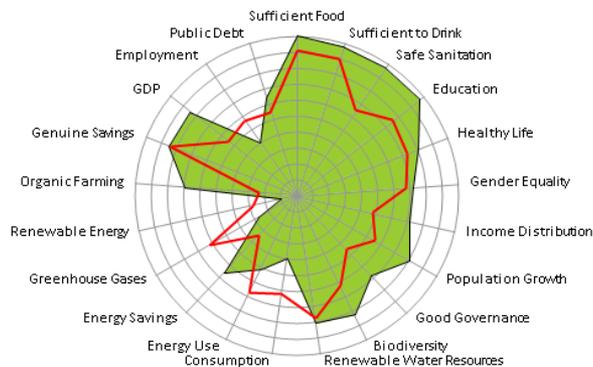
Hungary



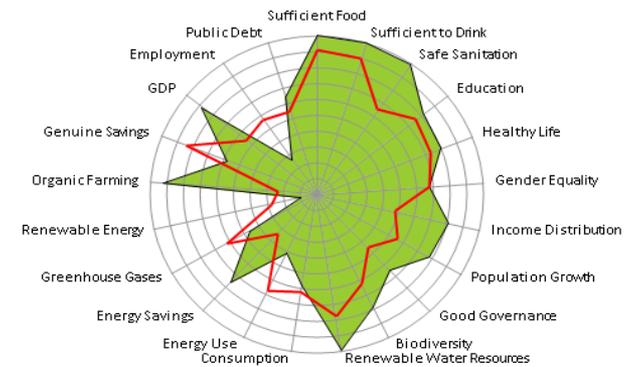
Ukraine



Poland



Slovak Republic



The spiderweb shows the score of each of the 21 indicators of the country in green, on a scale of 1-10 (10=sustainable, 1=not sustainable). The red line is the weighted average score of all countries

Challenges for Countries according SSI

	Human Wellbeing						Environmental Wellbeing						Economic Wellbeing					
	2006	2008	2010	2012	2014	2016	2006	2008	2010	2012	2014	2016	2006	2008	2010	2012	2014	2016
Finland	1	1	1	1	1	1	133	127	127	127	128	122	7	8	9	9	10	20
Germany	9	10	2	5	4	2	128	128	124	130	130	130	26	25	38	34	25	15
Burundi	125	120	120	119	119	118	30	24	12	3	1	1	154	153	148	151	145	143
Togo	138	140	142	149	148	145	15	5	2	44	23	2	151	149	149	148	151	149
Norway	5	4	4	4	5	5	114	124	137	143	125	119	6	4	2	1	1	1
Switzerland	15	16	16	17	13	14	87	86	86	83	70	65	1	1	1	2	2	2
Czech Republic	13	12	13	13	12	11	146	140	134	132	132	129	11	9	6	8	7	5
Hungary	11	11	9	16	22	23	100	92	91	75	71	70	27	40	59	69	57	47
Poland	29	25	24	23	17	16	99	103	108	114	110	104	58	38	23	20	15	14
Slovak Republic	16	13	10	22	20	20	101	89	101	92	89	83	31	21	12	25	24	27
Ukraine	33	31	27	31	30	36	106	98	97	102	102	85	44	44	48	61	102	130

Universities as One of Stakeholders in Reshaping Development Process

There is a need for a systemic change in our economic model

Universities are appealed together with other ones:

- to bridge education with environmentally sound economic growth;
- to provide didactic models, which are highly capable to support an innovative concept of education for sustainable development.

Education for sustainability

- Explorative framework for ascribing student teachers' responsibility (Nikel, 2007):
 - agency: individual or social priority
 - principled or pragmatic decision-making
- Pros and cons of different approaches to integrate sustainability in higher education (Rusinko, 2010):
 - new structures vs. existing structures
 - discipline-specific vs. Cross- disciplinary courses/programmes.

2. Economic education for sustainability.

Experience of the Ukrainian National Forestry University

Education for Sustainability

All levels of education:

- Bachelor programmes
- Master programmes
- PhD programme

New vs. adapted programmes / courses:

- Disciplinary
- Interdisciplinary
- Transdisciplinary

Masters programme on Environment and NAatural Resource **E**COnomics (ENARECO) under the EC Tempus Programme

to prepare high-level specialists
who can combine ecology with economics





Peculiarities of ENARECO programme

- How economic and societal demands can be rendered **compatible** with the requirements of environmental conservation;
- Dealing with various **sectors** of economy;
- The central concern is a **practice-oriented** education;
- Program was open to graduates from a **variety** of different fields in their **bachelor** training.



ENARECO Structure (Essmann et al., 2000)

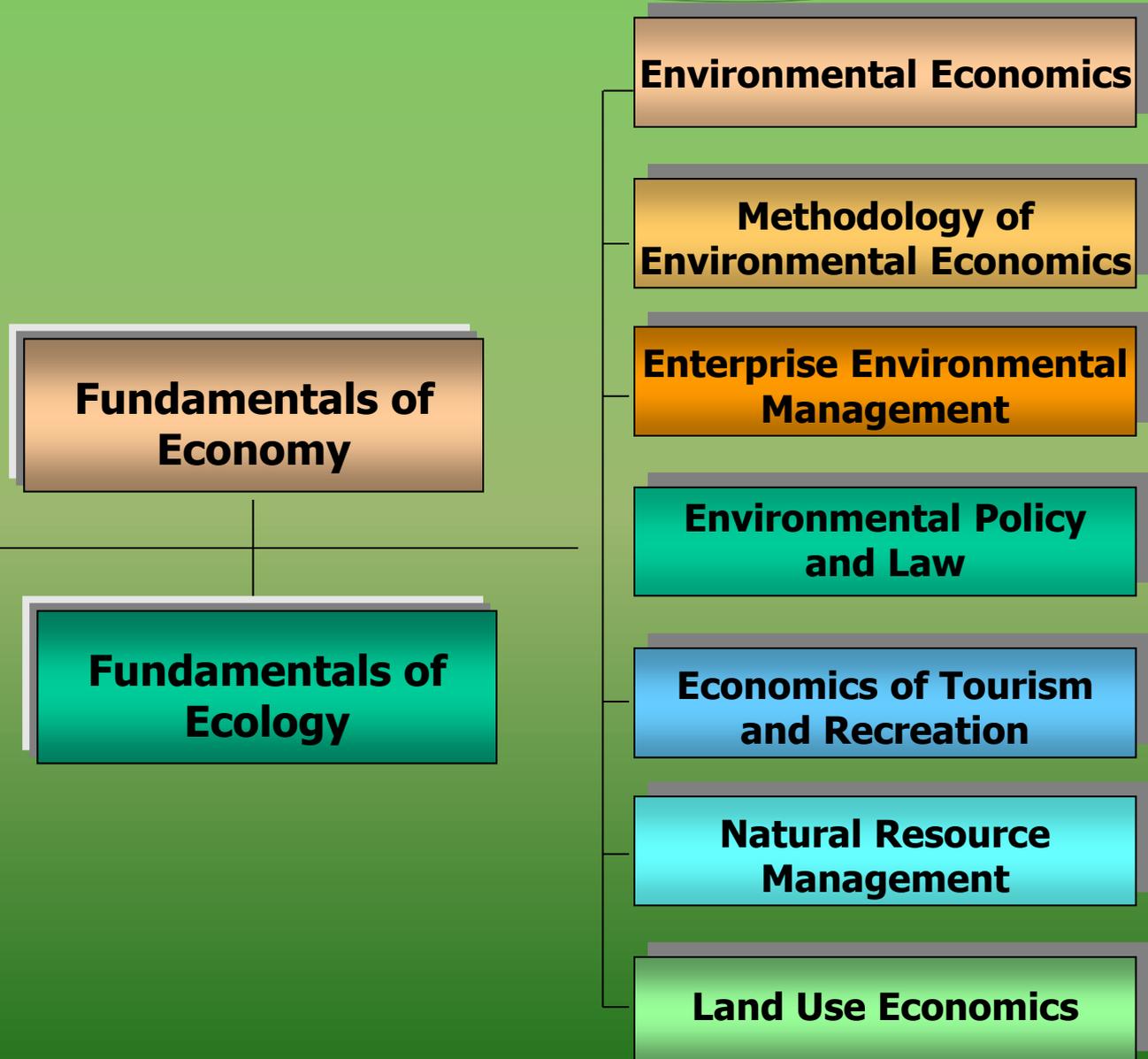
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Conceptual model of ecological economics

(Zahvoyska, 2010, based on Farley et al., 2005)



3. Problem-based learning in economic education

3.1. Ecosystem services

Project-based approach

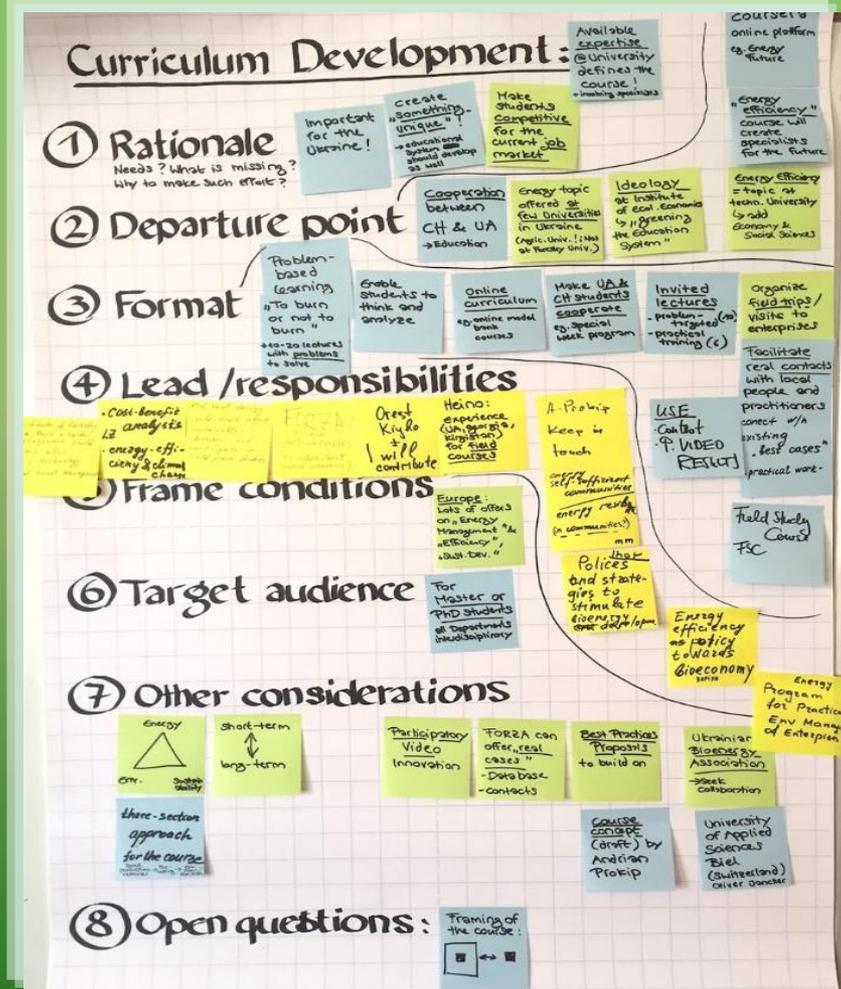
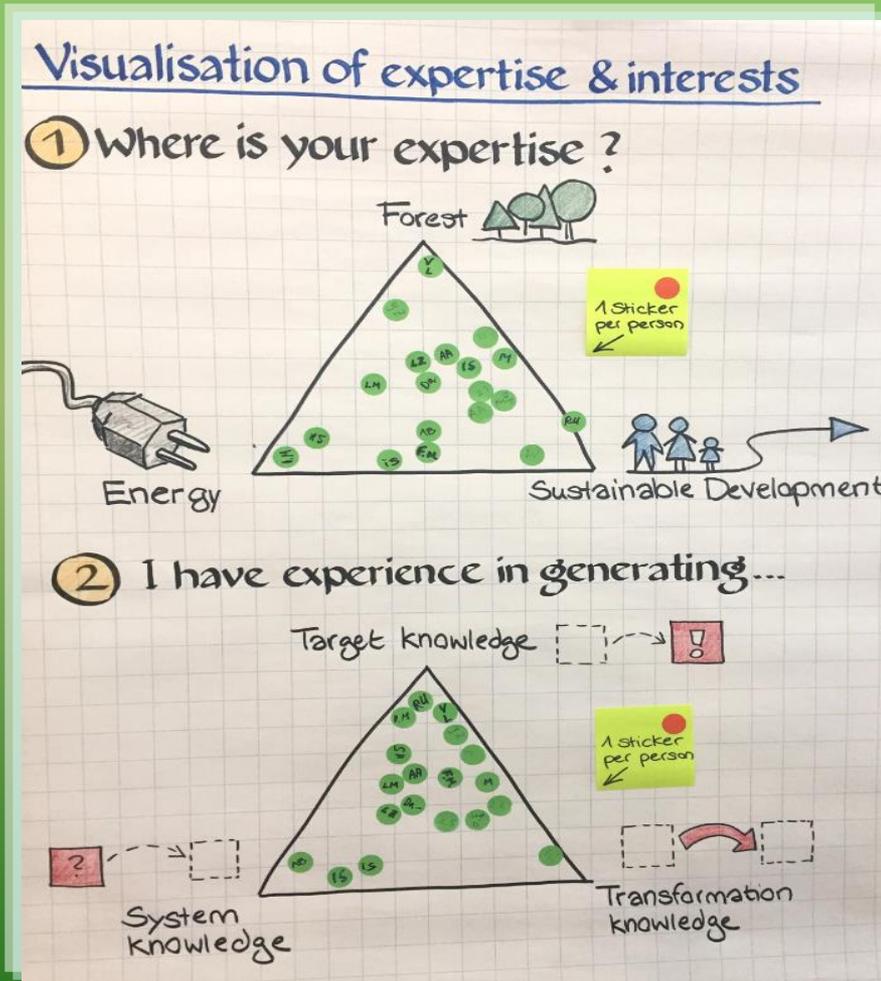
Integration of this paradigm into:

- Existing courses
- Master thesis
- PhD thesis
- Students' and teachers' publications

3.2. New Courses in the Curriculum:

Sustainable Bioenergy (Soloviy et al., 2019)

in cooperation with Swiss Federal Research Institute



- Pictures prepared by A. Björnsen Gurung, Swiss Federal Institute for Forest, Snow and Landscape Research WSL

Participatory Video

Boryslav - On the Way to an Energy Independent Community

(<https://www.youtube.com/watch?v=kDBcj-y7Ly8>)

InsightShare developed the participatory video in cooperation with:

- Swiss Federal Research Institute,
- University of Bern,
- FORZA NGO,
- UNFU,
- Stiftung Wirtschaft und Ökologie.



How can Participatory Video enhance your field research?

Two exciting international workshops. You are welcome to join!

In June 2018, the UK-based organization *InsightShare* together with partners of the Green Energy Option for the Ukrainian Carpathians project (WSL, CDE, FORZA and UNFU) conduct a Participatory Video intervention in Boryslav. This activity aims at giving local people a voice, thereby helps to render research more societally relevant.

➔ **Participatory Video: Concepts & Tools**
(in English)
Sabine Hellmann (*InsightShare*), and Astrid Björnsen (WSL)
Monday, June 11, 2018, 9³⁰ - 11⁰⁰
Administrative UNFU building, Gen.Chuprynyk-Str. 103, Lviv, Room 41 (2nd floor)

➔ **Participatory Video produced by the community of Boryslav**
(Video in Ukrainian, Discussion in English)
Sabine Hellmann (*InsightShare*), Mariana Melnykovich (UNFU), Astrid Björnsen (WSL)
Monday, June 18, 2018, 11³⁰ - 13³⁰
Administrative UNFU building, Gen.Chuprynyk-Str. 103, Lviv, Room 41 (2nd floor)

 Sabine Hellmann from *InsightShare* will present:
- how Participatory Video works,
- why it is a valuable tool for researchers, and
- how it can be used to build a bridge between communities and research.
She is a documentary filmmaker and Participatory Video facilitator at *InsightShare*, based in Edinburgh, UK. She coordinates and facilitates Participatory Video workshops since 2013.

www.insightshare.org, info@insightshare.org, www.insightshareuk.com, www.youtube.com/c/insightshare

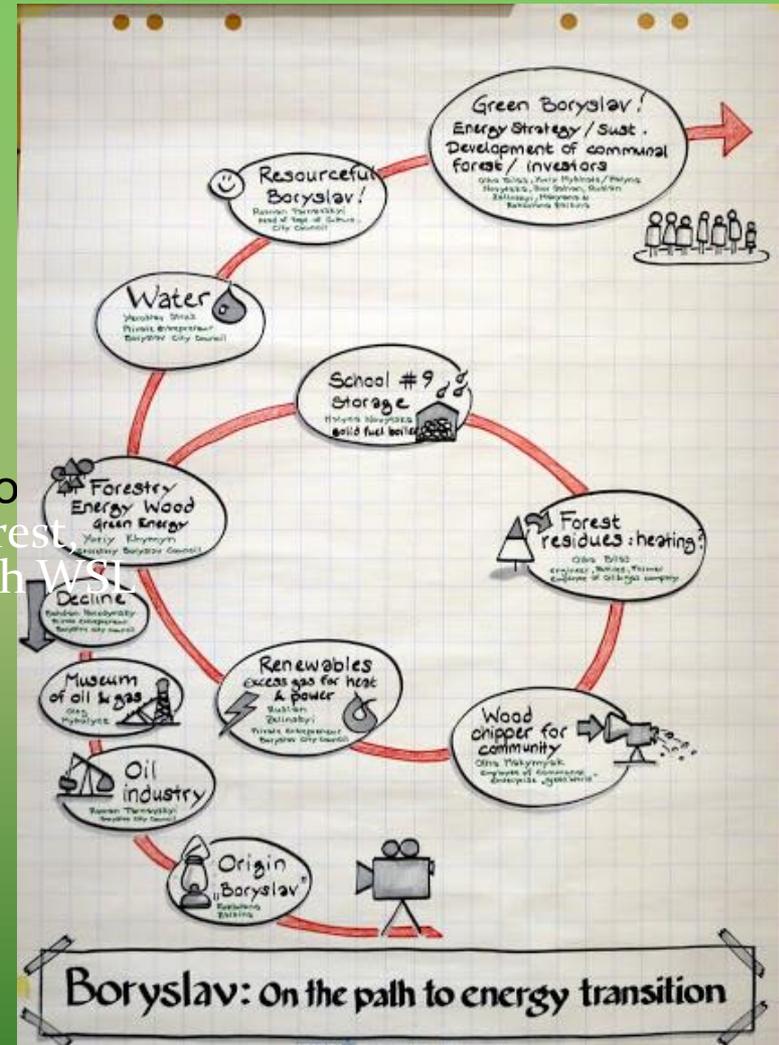
Contact: Astrid Björnsen, astrid.bioernsen@wsl.ch, Lyudmyla Makymiv, makymiv@ukr.net, or Mariana Melnykovich, mariana.melnykovich@ukr.net, +38096216085



Boryslav - On the Way to an Energy Independent Community



Swiss Federal Institute for Forest, Snow and Landscape Research WSL



Picture prepared by A. Björnsen Gurung, Swiss Federal Institute for Forest, Snow and Landscape Research WSL

3.3. Experience of Problem-based Learning

Scientific /Educational Ateliers (Farley et al., 2008)

A research and training institutions, as well as research, learning, and service.

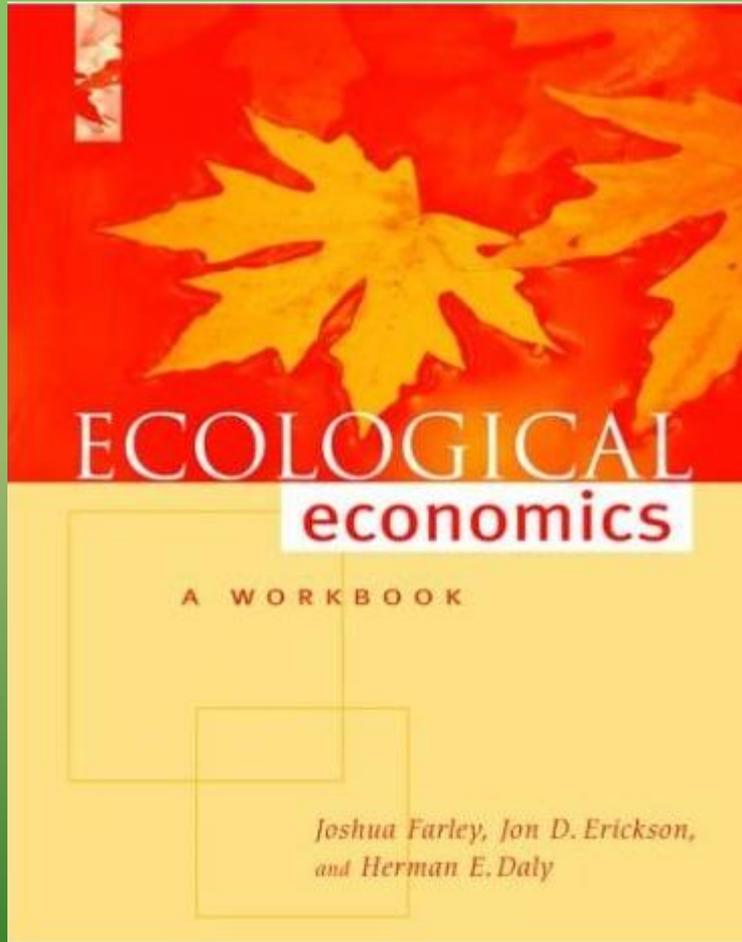
A self-designing, collaborative process for solving real world problems that occur where human and ecological systems meet.

It is aimed to:

- develop much-needed scientific skills and problem-solving capabilities
- communicate scientific findings among stakeholders
- integrate insights across disciplines

Methodology of transdisciplinary ateliers

The Gund Institute for Environment, Vermont University, USA



- Instructor as the “guide on the side’, **not** the “sage on the stage”
- Build the problem base
- Analysis
- Synthesis
- Communication

Atelier management scheme

(Farley et al., 2009)

Spadework

Choosing a problem
Crystallizing atelier idea
Announcing atelier
Panel lecture on scientific environment regarding a case study
Familiarization with a case study
Enrolling students
Selecting scientific team
Developing relevant net??
Designing atelier web-site
Building appropriate internet-based curriculum
Self-regulated learning
Preliminary preparation (questionnaire, techniques, database etc)

Atelier

Scientific conference
Brainstorming
Field trips
Discussion and interviews with stakeholders
Team learning
Data collection
Team discussion
Scientific expertise
Preparing draft of recommendations
Discussion of further investigation
Debates on future publications

Final work

Research
Recommendations for a real world problem solving
Papers
Books
Publication of main results on a web-site
Conference



Ecological Economics and Sustainable Forest Management in the Ukrainian Carpathians



Key educational benefits (Farley et al., 2009):

- Pioneering and improvement of **innovative forms** of teaching sustainability science;
- Stimulating **self-learning** about sustainability issues and improving one's capacity to self-teach;
- Facilitating the exchange of **cross-institutional** knowledge;
- Capacity building and **enrichment** of curriculum and didactics in sustainability science;
- Greater **experience** in a **blend** of academic lecturing, problem-based learning and internet-based education;
- Improved design and implementation of **interdisciplinary** and **collaborative** teaching models for mutual academia and societal learning; and
- Creation of web-sites that serve a repositories of knowledge on the subject matter and are readily available to other **communities** and **institutions** dealing with similar issues.

Scientific benefits (Farley et al., 2009)

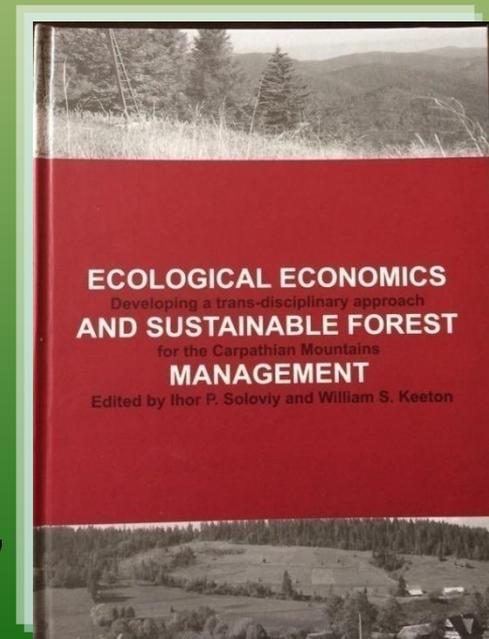
- **New findings** (approaches, tools, and techniques) resulting from conceptualized case studies of specific phenomena caused by human activity in ecological-economic systems;
- Scientific knowledge complemented by **traditional knowledge** (society, community, stakeholders);
- Strengthened **relationships** between university education and science.

Social benefits of the Atelier (Farley et al., 2009)

- An important surge of knowledge, ideas, and scientifically-grounded recommendations towards **implementing eco-innovations** in business, government, and personal environments for communities involved in the ateliers;
- The establishment of stronger **links** between communities and academia;
- Student familiarization with **real-world problems** and community capacity building **tools** they can apply throughout their future careers; and
- Improved **cross-cultural relations** between institutions and communities.

Outreach of findings

- New courses in curriculum;
- Information bridges into traditional courses;
- Workshops and conferences;
- Papers, like
- Farley, J., Zahvoyska, L., & Maksymiv, L. (2009). Transdisciplinary paths towards sustainability: new approaches for integrating research, education and policy. In: *Ecological economics and sustainable forest management: developing a transdisciplinary approach for the Carpathian Mountains*. I.P.Soloviy, W.S. Keeton (Eds.). Liga-Press, Lviv, 55-69.



Conclusions

Universities play crucial role in implementing ideas of sustainable development through:

- Educational activity;
- Scientific research;
- Informative background;
- New values system;
- Behavioral models

Problem-based learning brings a lot of benefits for shaping skills and competences .

It improve students' skills and competences, enables their employability and success in transformation towards sustainable development.



Problem-based Learning applied to Economic Education for Sustainability

Thank you for your attention!

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- **Astrid Björnsen Gurung,**
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- Snow and Landscape Research WSL

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