Curriculum Change - How do I transform my module or our program with sustainability-promoting learning approaches?

Topics: General knowledge and understanding of sustainable development

Nº	Subject Area	Description
1.	Concepts of sustainability	• Definition(s) and objectives of Sustainable Development • Dimensions of Sustainable Development • Different sustainability concepts and their basic prerequisites (strong vs. weak sustainability)
2.	Nature-society-economy interactions and dependencies	• Understanding systems: types, boundaries, elements, interactions, feedback, balances, tipping points, complexity • Concept of ecosystems and natural resources • Important human-environment interactions and dependencies • Historical development of interactions
3.	SDGs and key challenges	• Sustainable Development Goals (SDGs) and their interdependencies • Global and local key challenges of Sustainable Development, especially: • Biodiversity: goals, instruments and fields of action • Climate change: goals, instruments and fields of action • Population growth and increasing migratory movements • Inequality of opportunity
4.	Growth and boundaries	• Concept of Planetary boundaries • Doughnut Economy • Types of economic growth • Economic growth and well-being
5.	Solution strategies and transformation	• Consistency • Efficiency • Sufficiency • Combined approaches (e.g. circular economy) • Transformation of companies, sectors and societies

6.	Political aspects	• Political obstacles and opportunities • Policy instruments (bans, internalisation of external costs, financial incentives or penalties, ...) • Governance for sustainability • Democracy, human rights and Global citizenship approach
7.	Philosophical and historical aspects	• Fundamentals of the human-environment relationship • Historical development of the human-environment relationship • Cultural and linguistic aspects • Justice and ethical aspects • Philosophical concepts of the good life
8.	Psychological and sociological aspects	• Environmental Psychology • Perceptual psychology • Media Psychology • Behavioural psychology • Learning processes and education • Sociological factors and interrelationships
9.	Megatrends and sustainability	• Definition and meaning of megatrends • Unterstanding megatrends: Gender shift, health, globalisation, connectivity, individualisation, mobility, new work, neo-ecology, security, urbanisation, silver society, knowledge culture* • Influence of megatrends on sustainability
10.	Concept of system transformation	• Understanding system transformation, differences to adaptations • Causes and drivers of transformations, social tipping points • Historical system transformations • The need for a sustainability transformation • The role of politics, business, civil society, education and the media • Pathways, challenges and dependencies

ESD Competences

People in today's world need to be creative and self-organised as the complexity of situations exceeds basic problem-solving processes. Thus, also students must learn to understand the complex world in which they live. They need to be able to collaborate, express their opinions and advocate for positive change. To achieve this, students need to have certain key competences that allow them to engage constructively and responsibly within today's world. Competences describe the specific attributes individuals need for action and self-organization in various complex contexts and situations. In the context of sustainable development these key competences include:

1. **Competence in systems thinking**: the ability to recognize and understand relationships; to analyse complex systems; to think of how systems are embedded within different domains and different scales; and to deal with uncertainty.
2. **Anticipatory competence**: the abilities to understand and evaluate multiple futures – possible, probable and desirable; to create one's own visions for the future; to apply the precautionary principle; to assess the consequences of actions; and to deal with risks and changes.
3. **Normative competence**: the abilities to understand and reflect on the norms and values that underlie one's actions; and to negotiate sustainability values, principles, goals, and targets, in a context of conflicts of interests and trade-offs, uncertain knowledge and contradictions.
4. **Strategic competence**: the ability to collectively develop and implement innovative actions that promote sustainability at the local level and further afield.
5. **Collaboration competence**: the abilities to learn from others; to understand and respect the needs, perspectives, and actions of others (empathy); to understand, relate to and be sensitive to others (empathic leadership); to deal with conflicts in a group; and to facilitate collaborative and participatory problem solving.
6. **Critical thinking competence**: the ability to question norms, practices, and opinions; to reflect on one's own values, perceptions and actions; and to take a position in the sustainability discourse.
7. **Self-awareness competence**: the ability to reflect on one's own role in the local community and (global) society; to continually evaluate and further motivate one's actions; and to deal with one's feelings and desires.
8. **Integrated problem-solving competence**: the overarching ability to apply different problem-solving frameworks to complex sustainability problems and develop viable, inclusive, and equitable solution options that promote sustainable development, integrating the abovementioned competences.
9. **Target competence:** the ability to identify, concretise and communicate the objectives relevant to sustainable development - and to identify objectives that run counter to sustainability.
10. **Transformation competence:** the ability to initiate, advance and evaluate the social, economic, and political transformations necessary for sustainability - and to deal with resistance, setbacks and conflicting goals.

Teaching/learning methods that promote ESD objectives

ESD objective areas and competences	Suitable teaching/learning methods	Fundamentals and disciplines
A) Teaching/learning approaches to promote **critical and systemic thinking** *Systems thinking competence* *Anticipatory competence* *Strategic competence* *Critical thinking competence*	1. Inquiry-based learning, Research-based learning 2. Experiential Learning 3. Case-based learning with analysis on lines of argumentation 4. Systems analysis and Scenario analysis 5. Game-based learning, Simulation, Serious games, Narrative-based learning	Cognitive psychology and philosophy (especially logic), systems theory, communication and media studies, relevant basic science(s) for the respective fields of practice
B) Teaching/learning approaches to promote **reflection on values and emotions** *Normative competence* *Collaboration competence* *Self-awareness competence* *Target competence*	1. Role-play-based learning with a change of perspective 2. Inner Development Goals approaches 3. Transformative Learning 4. Critical service learning with a threefold perspective 5. Mindfulness exercises (also in nature, with music or art)	Philosophy (especially ethics), emotional and social psychology, inter- and transculturality, moral history, Concept of Inner Development Goals (IDG)
C) Teaching/learning approaches to promote **action skills** for sustainable development *Strategic competence* *Collaboration competence* *Integrated problem-solving competence* *Transformation competence*	1. Problem Based Learning 2. Project Based Learning 3. Action Learning 4. Service Learning 5. Learning in Living Labs and Design Thinking (also for Start-up foundation, Socio-political engagement, and other real-world projects)	Business and organizational science (especially strategy, concept development, project management); motivational and action psychology, sociology, political science, communication, and digital sciences
D) **Interdisciplinary** approaches in the context of sustainable development *Systems thinking competence* *Normative competence* *Integrated problem-solving competence* *Target competence*	• Interdisciplinary modules • Contributions from lecturers and exchange with lecturers from different disciplines • Project work with students from different disciplines • Joint reflection on the different disciplinary perspectives, areas of tension and opportunities of interdisciplinary approaches	Sustainability sciences, systems sciences, history and philosophy of science on the emergence of the disciplines Other discipline(s) for short introduction(s) to the chosen topic
E) **Transdisciplinary** approaches in the context of sustainable development *Systems thinking competence* *Normative competence* *Collaboration competence* *Transformation competence*	• Transdisciplinary modules • Contributions from (various) non-university stakeholders and exchange with non-university stakeholders • Projects by students in collaboration with (various) practice partners • Joint reflection on the different perspectives, areas of tension and opportunities of transdisciplinary approaches	Sustainability sciences, systems sciences, innovation and transformation sciences (especially social innovation) Practical and experienced knowledge from the respective field of practice

Teaching/learning approaches to promote critical and systemic thinking

1. Inquiry-based learning, research-based learning

Inquiry-based teaching is a university didactic format in which students conduct their own research as part of seminars or projects. As students acquire knowledge independently and thus construct it, inquiry-based teaching belongs to the group of constructivist forms of teaching and learning.
Most universities in the German-speaking world use Ludwig Huber's definition as a working definition of inquiry-based teaching: "Inquiry-based teaching is distinguished from other forms of learning by the fact that the students (co-)design, experience and reflect on the process of a research project aimed at gaining knowledge that is also of interest to third parties in its essential phases – from the development of questions and hypotheses to the selection and execution of methods and the examination and presentation of the results as independent work or through active participation in an overarching project." Levels[1]:

1. Students are provided with questions, methods and materials and are encouraged to discover relationships between variables
2. Students are given a research question, but the research method is developed by the students
3. Phenomena are suggested but students must develop their own questions and research methods to discover the relationships between the variables
4. The specific learning processes that people go through during enquiry-based learning include:

- Asking their own questions
- Obtaining supporting evidence to answer the question(s)
- Explaining the evidence collected
- Linking the explanation to the knowledge gained through the enquiry process
- Creating an argument and justification for the explanation

2. Experiential Learning

Experiential Learning Model/Cycle, according to David Kolb

The Kolb Experiential Learning Theory[2], developed by David A. Kolb, is widely recognized and influential framework that describes how people learn through experience. Since learning is the primary process used to navigate life, people can use this process for all forms of learning, development, and change. Learning occurs in any setting and continues throughout life. The experiential learning process supports performance improvement, learning and development.
David Kolb described the ideal process of learning in a four-step Experiential Learning Cycle:
Experiencing – Reflecting – Thinking – Acting.

1. Experiencing (Concrete Experience): Learning begins when a learner uses senses and perceptions to engage in what is happening now.
2. Reflecting (Reflective Observation): After the experience, a learner reflects on what happened and connects feelings with ideas about the experience.
3. Thinking (Abstract Conceptualization): The learner engages in thinking to reach conclusions and form theories, concepts, or general principles that can be tested
4. Acting (Active Experimentation): The learner tests the theory and applies what was learned to get feedback and create the next experience.

3. Case-based learning with analysis on lines of argumentation

developed by Harvard Law School

In a case study[3], students are presented a "case" which describes a problematic situation (real or fictional). The students are given the task of working out a solution or making a decision. Case studies are often used to enhance lessons. The solution is usually left open and the students are expected to work out a plausible result themselves. There are also case studies that provide the solution and encourage the students to discuss it and look for alternatives. A case study is therefore a description of a situation and its influencing factors that has been prepared for teaching purposes and that aims to achieve both an active examination of the content as well as specific action by the student. A case study is therefore not synonymous with an "example".
A distinction can be made between the following case types[4]:

- Problem-finding case
- Decision-making case
- Assessment case
- Information case
- Investigation case

The learning effects of each case type differ as follows:

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[1] Wikipedia (English)
[2] Institute4 for Experiental Learning: What is Experiental Learning?
[3] Harvard Law School: The Case Study Teaching Method
[4] Wikipedia (German)

- Information: the data relevant to the case solution can be complete, incomplete or not available at all.
- Problem: the problem or problems underlying the case study can be explicitly specified. In contrast, the student may also be required to identify the problems independently and evaluate their relevance.
- Solution: the student has to search for alternative solutions and may be asked to choose one. The solution can also be anticipated and made the subject of discussion.

Argumentation includes various forms of dialogue such as deliberation and negotiation which are concerned with collaborative decision-making procedures. It also encompasses eristic dialog, the branch of social debate in which victory over an opponent is the primary goal, and didactic which serves teaching purposes. This discipline also studies the means by which people can express and rationally resolve or at least manage their disagreements.
Case studies (or media articles) can be used to critically analyse the lines of argumentation presented and to discover implications, hidden messages, connections and contradictions.

4. Systems analysis and scenario analysis

Systems analysis is the process of studying a procedure or business to identify its goal and purposes and create systems and procedures that will efficiently achieve them. Another view sees system analysis as a problem-solving technique that breaks down a system into its component pieces, and how well those parts work and interact to accomplish their purpose.

The basis can be Case studies (see above), system descriptions from the literature or fields of practice examined.
Steps:[5]

1. Survey and analysis of a given problem
2. Specification of a general objective
3. Defining the system boundaries to differentiate between the system and the environment
4. Determine those system elements that are considered relevant to the problem
5. Determine the relationships between the system elements that are considered relevant to the problem
6. Determine the system properties at the macro level
7. Determine the relationships of the system to the environment or to other systems, if the system is considered as an isolated or closed system instead of an open system

The presentation can be quantitative, semi-quantitative or qualitative.

Scenario analysis[6]: Our future is not predictable; nevertheless, long-term planning security is of great relevance for various disciplines. Based on concrete research questions the scenario method develops different possible future projections of complex and uncertain systems with the aim to:

- assess middle and long-term changes,
- estimate required future states and be able to plan accordingly,
- assess possible catastrophes and negative changes,
- sharpen common awareness and co-creation of knowledge.

Scenarios allow a better understanding of complex correlations in future contexts. Complex systems are being reduced to essential components but without losing sight of their interconnectedness.

A scenario is defined as “a coherent, internally consistent and plausible description of a possible future state of the world. It is not a forecast; rather, each scenario is one alternative image of how the future can unfold”. Hence it is not enough to develop and analyse only one scenario, but multiple scenarios need to be developed in order to demonstrate the diversity of potential future developments.

Scenarios…

- are simplified descriptions of a potential future,
- are based on a consistent set of assumptions and not on probabilities,
- are group-subjective,
- do not predict the future but present a systematic consideration of the future.

Five steps of scenario analysis:

Step 1: Case and goal definition

Step 2: Identification of key variables

Step 3: Scenario construction

Step 4: Scenario analysis and interpretation

Step 5: Scenario transfer

5. Game-based learning, simulation, serious games, narrative-based learning

Simulation and learning games belong to a group of methods that creates a realistic environment in which behaviour can be tested. Often these games/activities are also used to start a (teaching) series. They are suitable for generating concern/empathy or for putting a group in a certain situation that they can otherwise only experience cognitively rather than emotionally.
Four functions are distinguished in simulations and learning games:

- Diagnostic function: how does a person behave in a certain function?

[5] Wikipedia (German)
[6] Sustainicum Collection

- Feedback function: a player receives feedback on behaviour or its effect.
- Training function: new behaviour patterns are tested and optimised.
- Perspective function: players slip into other roles in order to be able to assess (social) situations from other perspectives (e.g. role reversal).

A serious game is a board, card or computer game that is not primarily or exclusively intended for entertainment, but may contain such elements. What serious games - as well as educational games - have in common is the desire to convey information and education; this should be done in a balanced a relationship with entertainment aspects. Real simulations and simulation games provide the user with the opportunity to gain experience. Actions generated from knowledge can be tested here according to the trial and error principle. Theoretical knowledge can either be acquired beforehand or imparted during the game, which can then be tested in a virtual practice.[7]

Narrative-based learning is a learning model grounded in the theory that humans define their experiences within the context of narratives - which serve as cognitive structures and a means of communication, as well as aiding people in framing and understanding their perceptions of the world. Narrative contextualises abstract concepts and provides a scaffold for the transfer of knowledge within specific contexts and environments. This model aligns with the constructivist ideals of situated learning - which theorises that active learning takes place within the context in which the knowledge must be applied. Anchored Instruction is a type of situated learning that presents students with a realistic narrative within a specific context. At the narrative's core is a problem that must be solved by constructing and applying the knowledge within the targeted learning domain.[8]

Teaching/learning approaches to promote reflection on values and emotions

1. Role-play-based learning with a change of perspective

In education, role-playing is an important method of social group work. As a rule, real life situations are simulated. One aim is for the participants to expand their social skills by playing out critical or themed situations in simulated reality. Furthermore, the players can try out their respective roles, try to behave according to the role and learn to accept others in other roles. The aim is also to acquire skills in dealing with serious situations (e.g. dealing with conflicts).
The roles assigned can be very different or very similar to the character of the persons. If the roles also correspond to the characters of the group participants, the role swap provides the opportunity to experience the feelings and thoughts of the others.
The aims of a role play can be:

- Getting to know the social possibilities in certain situations
- Getting to know your own limits: For example, how long can I put up with verbal abuse?
- Changing behavioural patterns: For example, by practicing de-escalation rhetoric
- Developing empathy: For example, by swapping roles or as an external observer of your own role, played by someone else
- Opening up to the outside world and overcoming fears: On the basis that role play can offer a protected space
- Empathizing with the experiences of others through your own play: Making the experiences of others your own
- Acquiring knowledge in connection with corresponding social situations
- Visualization of complex social situations that are difficult/hard to reproduce in the media

Ultimately, role play is a pedagogical opportunity to gain a sense of the differentiation of one's own identity. By interacting with others, even if only in the simulated situations of the game, I improve my perception and my social skills. Both help me to define and differentiate my role and position in groups.

A change of perspective enables empathy, i.e., the ability and willingness to recognize, understand and empathize with the feelings, emotions, thoughts, motives, and personality traits of another person. Empathy is also generally considered to be the ability to react appropriately to other people's feelings, for example compassion, sadness, pain and a willingness to help out of sympathy. The basis of empathy is self-awareness - the more open a person is to their own emotions, the better they can interpret the feelings of others - as well as self-transcendence in order to overcome egocentric attitudes.[9]

2. Critical Service Learning (CSL) with a threefold perspective

According to T.D. Mitchell

Service learning is a teaching method that combines social commitment with professional learning in the classroom. Service learning combines cognitive learning with the assumption of responsibility (service) (s. below). Service learning is an effective approach to promoting action skills. However, there is a risk that it cements existing inequalities and power imbalances, especially if students act from a position of superiority towards target groups and thus practice this habitus.
In order to promote action skills as well as critical thinking and reflection on values, approaches are needed that enable active action in practice.

[7] Wikipedia (German, English)
[8] Wikipedia (English)
[9] Wikipedia (German)

CSL complements the traditional understanding of SL with three additional objectives[10]:

- A social change orientation
- Working to redistributive power
- Developing authentic relationships

In order to develop a critical attitude (towards the system, the existing social order and one's own role), regular guided reflection phases (individual and group) are required.
Self-reflection refers to the activity of thinking about oneself. This means analysing and questioning one's thoughts, feelings and actions with the aim of finding out more about oneself. We can question ourselves not only as an individual person, but also as part of a system, for example as part of a family or a team.
Self-reflection can be encouraged through methods such as: self-dialogue, storytelling, narrative methods, working with metaphors, journals, The Six Minute Write[11], Think-pair-share, Six Thinking Hats, More than words[12]
A contemporary understanding of SL in the context of ESD also includes an integration of the three perspectives: Lecturers, students, practice partners. All three stakeholder groups should meet as equals, they must benefit from the SL project and all are learners in this setting.[13]

3. Transformative learning

According to Jack Mezirow

Transformative learning, as a theory, says that the process of "perspective transformation" has three dimensions: psychological (changes in understanding of the self), convictional (revision of belief systems), and behavioural (changes in lifestyle).
Transformative learning is the expansion of consciousness through the transformation of basic worldview and specific capacities of the self; transformative learning is facilitated through consciously directed processes such as appreciatively accessing and receiving the symbolic contents of the unconscious and critically analysing underlying premises.
The perspective transformation is explained by Mezirow as follows[14]:

1. Disorienting dilemma
2. Self-examination
3. Sense of alienation
4. Relating discontent to others
5. Explaining options of new behaviour
6. Building confidence in new ways
7. Planning a course of action
8. Knowledge to implement plans
9. Experimenting with new roles
10. Reintegration.

Mezirow distinguishes between four forms of learning:

- Learning on the basis of existing meaning schemes
- Learning new meaning schemes
- Learning through the transformation of meaning schemes
- Learning through the transformation of meaning perspectives

When learning through existing meaning schemes, knowledge is gained within an existing frame of reference, whereby the meaning schemes are differentiated and refined. However, the way in which the world is interpreted does not change, as the meaning perspectives remain unchanged. When learning new meaning schemes, the scope of application of existing meaning perspectives is expanded, whereby the meaning perspectives are not changed but strengthened. Here too, the framework for action remains the same, only additional schemata are added to support a perspective. No transformation takes place in these two forms of learning; only the latter two forms of learning are attributed to transformative learning in the classical sense. When learning through the transformation of meaning schemata, the existing schemata are changed by adding something or combining different schemata. Existing schemata are broken up and replaced or expanded by new ones. If meaning schemas change fundamentally, this can have an effect on the meaning perspective and change it too. According to Mezirow, learning through the transformation of meaning perspectives is the "most important type of emancipatory learning" and requires critical reflection on one's own way of thinking about how one arrives at one's meanings and interprets one's experiences. In such a reflexive way of thinking, the perspectives of meaning are questioned and changed. It is only through the reflexive transformation of meaning schemes and perspectives that learning becomes transformative.[15] Central elements for this form of learning are experience, critical reflection, and rational discourse.

4. Inner development goals approaches

[10] Mitchell, T. D. (2008). Traditional vs. critical service-learning: Engaging the literature to differentiate two models. Michigan Journal of Community Service Learning, 14, 50-65)
[11] Wikipedia (German)
[12] Sustainicum Collection
[13] Fischer Manuel et al. (2023): Critical Service Learning im Kontext von Bildung für Nachhaltige Entwicklung (BNE) unter Integration der drei Perspektiven Studierende, Hochschule und Praxispartnerinnen und -partner. In: Becker, I., Kastner, F, Schank, Ch. & Studer, J. (Hrsg). (2023). Service Learning an deutschsprachigen Hochschulen. Perspektivisch, nachhaltig, umgesetzt. Bern: hep
[14] Mezirow, J. (1995). "Transformation Theory of Adult Learning." In: *In Defense of the Lifeworld*, edited by M.R. Welton, pp. 39–70. New York: SUNY Press
[15] Mezirow, Jack: „Learning to Think Like an Adult: Core Concepts of Transformation Theory“ In: Taylor, Edward W.; Cranton, Patricia: „The Handbook of Transformative Learning. Theory, Research and Practice.“ Jossey-Bass, San Francisco 2012

The IDGs will provide a framework of transformative skills for sustainable development. The current IDGs framework represents 5 dimensions and 23 skills and qualities which are especially crucial for leaders who address SDGs, but fundamentally for all.[16]
The five dimensions:

1. Being – Relationship to oneself
2. Thinking – Cognitive Skills
3. Relating – Caring for Others and the World
4. Collaborating – Social Skills
5. Acting – Enabling Change

A toolkit describes different learning methods for each dimension such as compassion training, nonviolent communication and Theory U for groupwork.[17]

5. Mindfulness exercises (also in nature, with music or art)

Rooted in Buddhist meditation discourses, as a spiritual or salutogenic practice, mindfulness means maintaining a moment-by-moment awareness of our thoughts, feelings, bodily sensations, and surrounding environment in a gentle, nurturing lens. This accepting and non-judgemental way of taking care of our thoughts and feelings supports a compassionate view on the self, the other, and the world. Practicing mindfulness supports sensing in the present moment rather than rehashing the past or imagining the future. Rooted in ancient spiritual wisdoms, cosmologies and epistemologies of the so-called eastern and southern worlds, mindfulness already deeply contains a complex notion of sustainability. “Deep Ecology” perspectives relate to the connectedness of all things between the universe, any other being, and the self. Not to focus on borders and antinomies, but on the unity of space and time offers a different concept of the Self as nonseparated from the dynamic globe and universe. It decentres humanity into a position of conviviality with the global and universal ecosystem. Within sustainability discourses the deep transformative potential of learning sustainability, sustainability learning, and mindfulness in sustainability is addressed. As the discourse of mindfulness has become relevant in many spheres and academic fields, in a secular Western and individualized discourse, mindfulness does relate to individual or organizational wellbeing. These salutogenic discourses refer to the beneficial effects of mindfulness on physical and mental health and to the quality and potential of organizational mindfulness. They connect to sustainability in many implicit and explicit ways.[18]

There are several exercises designed to develop mindfulness meditation, which may be aided by guided meditations "to get the hang of it". As forms of self-observation and interoception, these methods increase awareness of the body, so they are usually beneficial to people with low self-awareness or low awareness of their bodies or emotional state, and can provoke anxiety, distress, flashbacks, pain, and even trigger substance abuse in people who are very focused on themselves, their bodies, and their emotions.

- One method is to sit in a straight-backed chair or sit cross-legged on the floor or a cushion, close one's eyes and bring attention to either the sensations of breathing in the proximity of one's nostrils or to the movements of the abdomen when breathing in and out. In this meditation practice, one does not try to control one's breathing, but attempts to simply be aware of one's natural breathing process/rhythm. When engaged in this practice, the mind will often run off to other thoughts and associations, and if this happens, one passively notices that the mind has wandered, and in an accepting, non-judgmental way, returns to focusing on breathing.
- In body-scan meditation the attention is directed at various areas of the body and noting body sensations that happen in the present moment.
- One could also focus on sounds, sensations, thoughts, feelings and actions that happen in the present. In this regard, a famous exercise, is the mindful tasting of a raisin, in which a raisin is being tasted and eaten mindfully. By enabling reconnection with internal hunger and satiety cues, mindful eating has been suggested to be a means of maintaining healthy and conscious eating patterns.
- Other approaches include practicing yoga asanas while attending to movements and body sensations, and walking meditation.[19]

[16] Inner Development Goals
[17] Inner Development Goals: Research Report
[18] Susanne Maria Weber and Marc-André Heidelmann: Mindfulness in Sustainability. In: Walter Leal Filho (Ed.) (2019): Encyclopedia of Sustainability in Higher Education. Cham: Springer Nature
[19] Wikipedia (English)

Teaching/learning approaches to promote action skills for sustainable development

1. Problem-Based Learning

According to John Dewey

Problem-Based Learning (PBL)[20], also known as Problem-Oriented Learning (POL), is a form of learning in which learners are expected to find a solution to a given problem largely independently.
Typically, the method is planned with seven phases ("seven-jump process"):

1. Clarification of unknown terms
2. Topic identification or problem definition
3. Brainstorming on hypothesis generation
4. Systematic ordering and evaluation of the hypotheses
5. Formulation of learning objectives
6. Research ("learning time")
7. Synthesis

2. Project-Based Learning

According to William Heard Kilpatrick

Project-Based Learning[21], also referred to as project teaching or project work, is a form of teaching and learning based around a central project idea. It is an innovative method that strives to achieve more proximity to life, problem awareness and interdisciplinary thinking as well as independence and willingness to cooperate. The project usually goes through the following phases[22]:

- Initiation – the meaning of project teaching is explained and ideas for projects are found.
- Start – the selected project is set in motion.
- Planning – negotiations take place to determine who does what, when, where, with whom.
- Implementation – the project is given a practical form.
- Presentation – the project results are presented.
- Evaluation – the project results are reflected on.
- Continuation – follow-up projects are initiated.

3. Action Learning

Action-oriented learning, based on a real project, according to Reginald W. Revans

Action Learning[23] is a method of experiential learning ("Learning by Doing") for individuals or groups in companies or other organisations.
In Action Learning, a team works on a specific project that is relevant to an organisation whilst at the same time reflecting on the learning process. The method typically includes the following elements:

- The decision to act originates from a client who is directly interested in the solution of a task. The team or its participants conclude a specific project agreement with the client. This contains all the important points concerning the result to be achieved, the way and means to do so, as well as details of the use of resources and responsibilities.
- A commitment to learn on the part of the participants is a prerequisite for the programme. Participants must have the will to learn new things: they are asked to improve the effectiveness of their own behaviour as leaders or part of the team, to gain a better understanding of their environment and to discover personal possibilities for exerting influence.
- The Set (which refers to a group of action learners) is central to learning success in order to encourage active participation in the solution of the task through group dynamics. In the Set, each member takes responsibility not only for their own learning success, but also for the learning success of the group as a whole. The Set usually consists of four to six participants, up to a maximum of eight. Ideally, they should have different professional and management backgrounds.
- The facilitator helps the Set to reflect on and evaluate the project experiences. He or she helps to resolve conflicts, promotes a climate of trust and provides a focus for discussions.
- A process of questioning and reflection promotes exchange and collective learning within the group. Frequently used methods for this are team reflection and problem-solving interviews.

[20] Wikipedia (English) and Cornell University. Center for Teaching Innovation
[21] Boston University. Center for Teaching and Learning
[22] Wikipedia (German)
[23] Wikipedia (English) and World Institute for Action Learning: What is Action Learning?

4. Service Learning

according to Robert Sigmon

Service learning is a teaching method that combines social commitment with professional learning in the classroom. Service learning combines cognitive learning with the assumption of responsibility (service)[24].

Service-learning combines academic teaching with civil society involvement. For example: law students who develop and run a legal advice centre for refugees.
In doing so, young people learn that it is worthwhile to work for the community. They practise social and democratic skills and are able to apply their practical knowledge and experience to their studies. In this way, teaching becomes practical and hands-on. Service learning is thus based on the principle that social commitment can be combined with professional learning. In this way, "service" and "learning" benefit from each other: on the one hand, social commitment is enriched by the theoretical and conceptual knowledge acquired by the students during their studies, and on the other hand, professional learning gains relevance, reference to specific actions and depth of understanding through real-life experiences.
Service Learning is based on eight evidence-based and widely-negotiated quality standards:

- Meaningful Service
- Link to Curriculum
- Reflection
- Diversity
- Youth Voice
- Partnerships
- Progress Monitoring
- Duration and Intensity

5. Learning in Living Labs and Design Thinking (also for start-up foundation, socio-political engagement and other real-world projects)

Living labs (or Real-world laboratories) are a new form of cooperation between science and civil society which focuses on mutual learning in an experimental environment. Stakeholders from science and practice come together to develop and test scientifically and socially robust solutions based on a common understanding of a problem. The laboratory concept is extended from beyond its classical scientific and engineering meaning to a social context.
It is expected that the scientific findings developed via living labs will be more easily taken up by politics, civil society and business, and that society will thus become more capable of taking action with regard to sustainable development.
In living labs, exciting learning projects can often be initiated and implemented by students. Such learning projects in real laboratories can be seen as a special form of project-based learning (see above) but goes beyond that. In particular, intensive interaction with various practical stakeholders and the inclusion of their perspectives and interests result in real projects that reach a higher and more demanding level of complexity. The projects can be located at very different levels, e.g.:

- political projects
- practical non-commercial projects (if a civil society group benefits from the project, it becomes "service learning", see above)
- Purpose-driven start-ups (social entrepreneurship)

Close interaction between study content and practical implementation is crucial to ensure an optimal learning effect and develop real skills.[25]

Design thinking is an iterative methodology for (re)framing problems and co-creating implementable solutions using visual thinking and prototyping and a collaborative problem-solving strategy. Design thinking:

a) connects the needs of people involved in the problem to researchers'/experts' observations of the problem;
b) focuses on creating innovative ways of looking at the problem;
c) embraces visualization, storytelling, and experimentation through building and testing prototypes.

The approach is based on the assumption that framing problems in new ways can lead to more implementable and innovative solutions.
In the context of education, design thinking can be used to build collaborative skills of students to tackle complex problems in interdisciplinary settings.
The five-step methodology of design thinking is embedded in a human-centred mindset. The steps are group processes accompanied by a facilitator.

1. Empathize – The group gathers information about the problem situation and collects insights on a particular theme. These insights are specific in time and place, usually pinpoint a contradiction, and explain why or how things work.
2. Define – The group identifies and agrees upon the insights that are most surprising or meaningful to its members.
3. Ideate – Using each problem statement as a focus, the group brainstorms potential solutions.
4. Prototype – Group members transform the chosen ideas into physically concrete objects or conceptual papers.
5. Test – Prototypes are presented to other stakeholders as soon as possible.[26]

[24] ben:edu – Schweizer Netzwerk Service Learning an Hochschulen: Service Learning
[25] ETH Zurich, USYS TdLab: Living Labs and Netzwerk Reallabore der Nachhaltigkeit
[26] scnat knowledge. Methods and tools for co-producing knowledge: Design thinking

Zielgruppe/Kontext

Themenbereich

Kompetenzen/IDGs/Transformative Entwicklungsziele

Passende Lernmethode(n)

Praxispartner/Zusammenarbeit mit