

## LIST OF TEACHING METHODS

**Lecture** is “a method of teaching by which the instructor gives an oral presentation of facts or principles to learners and the class usually being responsible for note taking, usually implies little or no class participation by such means as questioning or discussion during the class period” (Good & Merkel, 1959, as cited in Kaur, 2011, p. 10). A possible scenario would be the following: In a course with 50-100 participants, the students are given a series of lectures on the concept of sustainability and main sustainability issues across the three main domains (economical, environmental, and social). The purpose is to provide the students with a systematic overview of the field. During the lectures, students are provided with reading recommendations and may ask questions for understanding.

**Group discussion** “is a free verbal exchange of ideas between group members or teacher and students” (Sajjad, 2010, p. 10), “a give-and-take dialogue that encourages students to enrich and refine their understanding” (Alvermann & Hayes, 1989, p. 306). It can involve the whole class (whole-group discussion) or separate groups within the class (small-group discussion) and take place in written as well as oral form (Jahng et al., 2010). One possible scenario can be the following: In a seminar with 15 participants, students are required to read recent articles on a sustainability topic. In class, they are given 2-3 questions that help them analyse the topic using the literature as a starting point, and they discuss them in 4 or 5 smaller groups.

**Debate** is an activity which involves “two groups of students put[ting] forward opposing arguments on an issue” (Cotton & Winter, 2010, p. 47). A possible scenario would be the following: In a seminar with 20 participants, a debate on the topic of genetic engineering in agriculture should be conducted. Two groups are built with ten students each. One group is assigned with the position in favour of genetic engineering, the other one with the position against it. Then, participants in their groups need to develop arguments supporting the position they were assigned to. For this they can search for relevant information and/or work with material provided by the lecturer. After having developed arguments, the debate is held: arguments in favour and against are presented alternately by different representatives of the two groups. At the end all participants come together and reflect on and evaluate the arguments provided.

**In-class role play** (e.g. Board Meeting Game) is an active learning and teaching technique, considered to be a part of interactive simulation whereby participants act out the role of a character in a particular situation following a set of rules (Dingli et al., 2013; Rao & Stupans, 2012). A possible scenario could be the following: In the course of a seminar, a group of 20 students role-plays a climate change conference (the students take on the roles of business representatives, politicians, environmental activists, local citizens, and researchers, while the teacher serves as a moderator). Prior to the role play, the students are given three weeks to prepare for their parts (materials provided by the teacher serve as a starting point but the students also need to gather additional

information and develop their positions and arguments on their own), followed by a single three-hour long role-play event.

**Virtual Reality simulation** is an “artificial representation of a real world process by the means of Virtual Reality technology to achieve educational goals via experiential learning”. It “allows the visualization of data in three dimensions and provides interactive functionalities that reinforce the feeling of immersion into a computer-generated virtual world” (Davis, 2015, p. 65). One example scenario of a Virtual Reality simulation is as such: In a seminar with 20- 30 participants, over the course of several classes (depending on the number of students), a VR simulation of environmental impact of agriculture is conducted. The initial VR environment contains a simulation of a small part of an ecosystem in its natural state (e.g. a part of a forest or a lake bottom) that a participant can explore and do some basic interaction with using a VR glove. In addition to that, the simulation contains several modified versions of the same environment representing the outcomes of several agricultural practices (including the use of pesticides and fertilizers, among others) that students can explore.

**Case studies** are "written summaries or syntheses of real-life cases that require students to tease out the key issues involved and to identify appropriate strategies for the resolution of the 'case'. (...) A 'case' should be a complex problem written to stimulate classroom discussion and collaborative analysis, and be a student-centred exploration of realistic and specific situations." (Alt et al., 2020, p. 62). One possible scenario is as following: In a seminar with 20-30 participants, students are presented with a text summarizing a complex sustainability related problem of a real company. The students are asked to identify the problem and its implications (environmental, ethical etc.), relevant stakeholders and their points of view, as well as the social, cultural, technical, environmental etc. factors contributing to the problem. Besides, they are also asked to suggest possible strategies for addressing the problem. If necessary, the students are also asked to gather additional information to better evaluate the problem. The students work in smaller groups and then present their arguments to the entire class.

**Service-learning project** (for the community) is a method where “students engage in activities intended to directly benefit other people, where the activities are integrated with learning activities in an intentional and integrative way that benefits both the community organization and the educational institution” (Hayes & King, 2006, as cited in Lozano et al., 2017, p. 8). A possible scenario would be the following: a partnership is created between the university and one or several organisations that support people who are experiencing homelessness (emergency shelters, medical assistance points, soup kitchens) and that are in need of volunteers. Each student, participating in a specific course, is required to work there a fixed number of hours on one day of the week for the entire semester (e.g. cooking and serving food, sorting clothing donations, organising cultural events for the guests, providing them with information, organising a

fundraiser or applying any other available skill upon agreement with the organisation, individually and in small groups).

**Sustainability-related consulting project** is a “learning by doing” method where students work on solving real business and environmental [or rather sustainability-related] problems by developing practical recommendations for a real organisation (Segal & Drew, 2012, p. 1). In their role as consultants, students assist with diagnosing the client’s situation and finding and implementing solutions (Butler, 2018, p. 1-4). A possible scenario could be the following: In a course with 20 to 25 students, a social start-up with the mission to reduce the use of plastic in everyday life is bringing in the challenge to design a new system of reusable food packaging for off-trade sales. Students are divided in teams of 4 to 5 persons and are all working on the same challenge. After the challenge has been introduced by the client and teams have been defined, the groups gather information and prepare a more concrete task description as well as a work plan which they present to the client and discuss with him. In order to find a solution, students afterwards search for and analyse relevant information and engage with (different) stakeholders (e.g. in the form of interviews). At the end, results are presented in front of the client as well as the class.

**Sustainability-related research project** is a student’s own scientific endeavour to answer a sustainability-related research question (under the guidance of a faculty member) that can take the form of primary empirical research, secondary data analysis, or meta-analysis (based on Rutgers University, n.d.). A possible scenario can look like this: Each student, participating in a specific course, chooses a research topic related to a sustainability problem (e.g. “obstacles to waste reduction”) out of a list provided by the teaching staff. Under the supervision of the staff, each student then reviews literature on the chosen topic, develops a research proposal, and selects and applies methods necessary to answer the research question (the methods can be empirical – quantitative, qualitative or meta-analysis – or theoretical). The supervisor(s) provide(s) additional materials and feedback, and in the end, each student submits a course paper.

**Self-reflection task/exercise** is an activity that “provide[s] opportunities for students to reflect on [i.a.] personal roles, attitudes, and responsibilities in relation to a range of sustainability issues” (Cotton & Winter, 2010, p. 47). Reflection, in this case, can be defined as “the process of internally examining and exploring an issue of concern, triggered by an experience, which creates and clarifies meaning in terms of self, and which results in a changed conceptual perspective” (Boyd & Fales, 1983, p. 100). An example scenario of a self-reflection task can be the following: As a task accompanying an internship or an experiential learning course, students are required to keep a reflective journal. After each day of the practical experiences of the internship or the course, students should make a journal entry reflecting on that experience. For that purpose, the students are provided with broadly formulated questions designed to

prompt them to deeper understand their own behaviour, experience, and motivation in terms of sustainability. The students are given the options to either submit the journal entries directly to the course instructor, or to publish them online in the form of a blog.

**Interdisciplinary team teaching** is a method that allows having specialists in different fields to help students explore topics from two or more distinctive disciplinary perspectives (Lozano et al., 2017, p. 7). One potential scenario for this is the following: In a course on studies of poverty with 30 to 35 students, the syllabus is developed in a team effort between six professors in the fields of sociology, social work, psychology, economics, history and healthcare. During the semester, each of them delivers 2 to 3 lectures from the perspective of their own discipline, but the last 30 minutes of each lecture are dedicated to discussion (with active student participation) on how to connect the content and perspective of this lecture with the content and perspective of the previous one(s).

**Vision-building exercises** are foresight exercises (Filip et al., 2005) "such as future workshops, scenario analyses, utopian/dystopian story-telling, science-fiction thinking, and forecasting and back casting" (UNESCO, 2017, p. 55). They are "interdisciplinary studies that aim at envisioning possible, probable, or desirable futures" [and] "(...) are meant to address complex societal issues" (Filip et al., 2005, p. 203). One possible scenario would be the following: A group of 20 students is divided into four groups of equal size, and each of these groups independently works on their own version of back casting\* a sustainable future of the local public transport system over the course of several sessions: In the beginning, students are made acquainted with what back casting is. Then, each group works on generating a vision of a sustainable future of the local public transport system and possible ways to achieve it. In preparation to this, student groups research the current state and problems of the transport system. After that, student groups develop a strategy and plan further actions. Finally, student groups present their visions and strategies to the whole group and the course instructors and submit a report on their results.

\*Back casting comprises generating a vision of a desirable future, followed by taking a step back to understand how this future can be achieved, followed by generating strategies and planning further actions to bring these strategies to life.

**Field trip** is "an activity that serves educational purposes and occurs outside of the classroom at a location other than on the campus at which the course is regularly taught" (The University of Rhode Island, n.d.). A possible scenario would be the following: In a course on corporate social responsibility and sustainability with 15-20 participants, students make several trips to local businesses that represent best practices in terms of CSR and sustainability (the businesses are selected and trips are organised by the course instructor) where they are shown and told about how this level of sustainability is achieved and what issues and problems still exist; they are also encouraged to ask questions.

**Outdoor, nature-related experiences** represent "a method of teaching and learning that emphasizes direct, multisensory experiences; takes place in the outdoor environment; and uses an integrated approach to learning by involving the natural, community, and individual environments" (Gilbertson et al., 2006, p. 6). A possible scenario is as such: In a course with 20-30 participants on environmental sustainability, students are involved in an urban gardening project and work several days within the nature to grow plants.

**Peer-teaching** refers to "an acquisition of knowledge and skill through active helping and supporting among status equals or matched companions" (Topping, 2005, p. 631). A possible scenario may be as such: 6 senior students teach an elective seminar dealing with "The role of gender equality in creating sustainable communities" to a cohort of students who are one year younger. The overall plan of the course (including the list and the order of topics) is created by a faculty member in advance. As a first step, the senior students are given a brief introduction into teaching skills and instruments. Then, each senior student takes two topics (for two sessions) and, under supervision and with support of the faculty member, creates a session plan and prepares the session content and reading materials, and delivers the lesson.

**Flipped classroom** "attempts to 'flip' the typical structure of a course such that the presentation of concepts (traditionally achieved through in-class lectures) is presented outside class, whereas class time is reserved for working on problems or assignments (i.e., in-class 'homework')." (Peterson, 2016, p. 10). One possible scenario is as following: In a course with 20-25 participants, the students have the goal of designing a business plan for a sustainable, socially responsible enterprise in 3 to 4 smaller groups. This general task is broken down into smaller steps, and each of them can be realised within one session of in-class group work where students also have the opportunity to ask questions to the instructor. Before each session, students watch pre-recorded lectures and read supplementary materials that are meant to help them acquire knowledge necessary for conducting the steps. All materials are provided together with questions to guide the students' reading. Answers to them should be posted and discussed in an online-forum set up by the lecturer(s). In the beginning of each in-class session, a time is set aside for questions about the lectures and reading materials. Afterwards, students work in their groups on designing their business plan. At the end of the course, each group presents their plan.

**Gamification** is the practice of using game design elements (for example, points, badges, leader boards and storylines), game thinking and game mechanics in non-game contexts to motivate participants (Al-Azawi et al., 2016, p. 133). A possible scenario could look like this: In a course dealing with sustainability in energy consumption, a group consisting of 20 students (divided into four groups of equal size) plays a game during the entire semester as part of their homework. The game requires them all to install an app that allows them to register and monitor their energy consumption

behaviour in the household, gives points for each action reported by the user based on how energy-sparing it is, gives feedback with explanations, information on possible alternative actions, and keeps a general score. At the end of the course, the teams' collective scores are compared, and the winner is announced.

**Arts-based teaching and learning method** (e.g. theatre, drawing exercise, music-based exercise) is a method, which applies the “purposeful use of artistic skills, processes, and experiences as educational tools to foster learning in non-artistic disciplines and domains” (Boston University, The Center for Teaching and Learning, n.d.). A possible scenario could be the following: In a seminar on business ethics and sustainability with 10-15 participants, students are asked to create an own theatre play on a current ethical dilemma incorporating artistic elements derived from theatre science.

## LIST OF TEACHING APPROACHES

**Lecture-based learning** is a teacher-centred approach, characterized by lecturers delivering instructions and contents to students as passive listeners (Leary, 2012).

**Experiential learning** means that "instructors promote learning by having students directly engage in, and reflect on personal experiences (...)" (Slavich and Zimbardo, 2012, p. 573). Examples of experiences are projects, internships, community work, or field trips.

**Collaborative learning** means that "individuals in a social constellation (e.g., group, team, or community) within a physical and/or virtual environment interact on the same or different aspects of a shared task to accomplish implicit or explicit shared and individual learning goals (...)" (Strijbos, 2016, p. 302).

**Active learning** "require[s] the educator to privilege the learner's participation over his or her own declarative knowledge of the subject" (MacVaugh and Norton 2012, p. 74). "The core elements of active learning are student activity and engagement in the learning process" (Prince 2004, p. 223).

**Self-directed learning** is "a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes". (Knowles 1975, p. 18, as cited in O´Shea, 2003).

**Inter-/transdisciplinary learning.** Interdisciplinary learning describes a learning situation "...that involves the study of a particular topic by drawing on knowledge from several disciplines at the same time", being "(...) concerned with the links and the transfer of knowledge, methods, concepts, and models from one discipline to another" (Greig & Priddle, 2019, p. 3). Transdisciplinary learning additionally "(...) requires students to analyze, synthesize and harmonize their connections into a coherent whole that lies beyond the culture of any single discipline, and is therefore emergent" (Greig & Priddle, 2019, p. 3).

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