Education for Sustainable Development – approaches by the Ecology and Economy Laboratory at the European Campus Rottal-Inn

Robert Feicht[*]   Jennifer Huber[*]   Anna Marquart[*]

Introduction

The climate change and its causes, the exploitation and scarcity of resources, the exuberant lifestyle of people and their consumption are straining our earth. Some researchers and institutions are calling for rapid, far-reaching changes in our way of life [1, 2]. Twenty to 30 percent of the world population are using 80 percent of the resources to satisfy their chosen standard of living, the remaining 20 percent of the resources must be enough for the rest of the population. In other words: we overuse our Earth at least 1.5 times [3]. To react on this, the education of special competences and well-trained people are needed. The understanding for the issue of sustainability has to be sharpened.

With the report of the Club of Rome "The Limits to Growth" in 1972, the issue of finite resources was taken up for the first time [4]. The Brundtland Report of 1987 [5] continued to fuel the debates, and the UN Conference on Environment and Development in Rio de Janeiro in 1992 [6] raised the topic of sustainable development worldwide [7]. The United Nations proclaimed a World Decade "Education for Sustainable Development" (ESD) in 2002; this requires solid anchoring of contents for sustainable development in our education systems [8]. A further step in this direction was the enactment of the "Sustainable Development Goals" (SDGs) by the United Nations in the year 2015. 193 member nations adopted 17 goals and 169 sub-goals with the aim to reach them in the year 2030 [3, 9]. The topic of Education for Sustainable Development is also anchored in target 4 called "Quality Education".

According to the United Nations, Education for Sustainable Development "[…] does not only integrate contents such as climate change, poverty and sustainable consumption into the curriculum; it also creates interactive, learner-centred teaching and learning settings. What ESD requires is a shift from teaching to learning. It asks for an action-oriented, transformative pedagogy, which supports self-directed learning, participation and collaboration, problem-orientation, inter- and transdisciplinarity and the linking of formal and informal learning. Only such pedagogical approaches make the development of the key competencies needed for promoting sustainable development possible." [10] By Education for Sustainable Development different target groups acquire key competences, such as systemic thinking, forward-thinking and acting, competence for group collaboration, critical thinking, competence for fair and environmentally friendly action as well as competence in planning and implementing innovative projects [11, 12].

The Ecology and Economy Laboratory (EcoLab)

The Deggendorf Institute of Technology (DIT) has recognized the significance and scope of Education for Sustainable Development and installed the Ecology and Economy Laboratory (EcoLab) at the European Campus Rottal-Inn (ECRI) in Pfarrkirchen; in October 2019, the EcoLab has officially started operation. The European Campus Rottal-Inn is an English-speaking campus of DIT. Students from all over the world are studying there. The team of EcoLab (identical with the authors of this article) develops concepts and ideas for Education for Sustainable Development at ECRI in Pfarrkirchen – taking the international background of students and the different basic requirements into account. We are aware that our graduates are multipliers (in Germany and their home countries). In that sense, it is our duty to provide students with an excellent knowledge base with respect to sustainability – in addition to their actual study subject.

[*] European Campus Rottal-Inn, Technische Hochschule Deggendorf

EcoLab-Projects and didactic methods of Education for Sustainable Development

1. WorldCafé – Participation in the planning process for a new campus building

In the winter semester 2018/2019 the participation process for the planning of a new campus building took place at ECRI in Pfarrkirchen (see Figure 1). The planning is carried out by the State Buildings Authority Passau (Staatliches Bauamt Passau). The EcoLab team conducted interviews, visited best practice examples in the area of sustainability and organized a WorldCafé. A WorldCafé is a didactic method to discuss different topics in a larger group and in a relaxed atmosphere. To create this atmosphere, a room has to be designed like a café: round tables with chairs and the opportunity to stock up on drinks and snacks. The tables are covered with paper to capture the developed ideas. At each table a moderator leads the discussions. There are several rounds where the participants go from table to table to discuss different topics. At the beginning of each round, the moderator summarizes the results from the previous discussions. The WorldCafé for the new ECRI building had seven different tables with the following topics:

1. Research
2. Teaching
3. Campus Management
4. Governance
5. Transfer
6. Integration
7. Student Engagement

These topics were largely taken over from the the project "Nachhaltige Hochschule: Kriterien zur Bestandsaufnahme (KriNaHoBay)" (sustainability in higher education: criteria for surveying the status quo). This project was conducted under the guidance of the Catholic University of Eichstätt-Ingolstadt and the Ludwig Maximilian University of Munich and funded by the Bavarian State Ministry for the Environment and Consumer Protection. For our international campus, the EcoLab team added the topic "Integration". The results of this participation process were summarized in a concept paper for a sustainable campus and handed over to the university administration in April 2019 for further use.

Figure 1: World Café as part of the participation process for the new building

2. Seed Balls and EcoLab BikeStation

In May 2019, the ECRI summer party was celebrated. In line with the debate about biodiversity in Bavaria (and beyond) the visitors produced seed balls at the EcoLabs booth (see Figure 2). In particular, the young guests were very active here. The EcoLab team also provided information on native flora and fauna in this context; the aim was to inform about the current situation and to encourage people to actively engage in biodiversity.

A further well-attended attraction was the EcoLab BikeStation with a spring check-up for students' bikes – carried out by the owner of the bike (see Figure 3). The EcoLab provided tools free of charge and helped the students to help themselves in checking, cleaning and repairing their bikes. With the help of the EcoLab BikeStation the students should be animated to (sustain) sustainable mobility.

Figure 2: EcoLab Seed Balls at the summer party 2019 at the European Campus Rottal-Inn

Figure 3: EcoLab BikeStation at the summer party 2019 at the European Campus Rottal-Inn

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3. Opening week of the new Laboratory Building

In the second week of October 2019, the new ECRI laboratory and seminar building "Sustainability Innovation Lab Centre" (SILC) was opened officially with several events. The EcoLab provided an interactive seminar about the "Degradation of different types of plastics"; this seminar was specifically designed for the target group of pupils. At the beginning of the seminar the participants were invited to build up a "garbage timeline" including various types of plastic. This didactic method is often used in environmental education – the target group actively participates in the seminar and gets a sense of how long it takes for nature to break down certain materials. Afterwards, the correct solution was worked out together with the participants.

Furthermore, the above mentioned BikeStation took place again, offering students tools free of charge to repair and fix their own bikes.

4. Synergie-Festival

On the 12th of October 2019, the Synergie-Festival[1] took place at the European Campus. The festival came up with creative workshops about energy saving and ways towards a new lifestyle. It conveys a positive creative power, which is based on the interaction of many participants. The festival was funded by the Bavarian State Office for Environment (Bayerisches Landesamt für Umwelt, LfU) and organized together with the regional management of the district administration Landratsamt Rottal-Inn. All ECRI laboratories opened their doors and conducted vivid experiments around the topics energy and resources. The Ecology and Economy Laboratory offered the EcoLab RepairCafé for students and visitors. With the help of the RepairCafé method, visitors can be made aware that apparently defective devices and equipment do not have to be disposed of immediately. Frequently, the functionality can be restored with comparably low cost and effort. This saves resources – and your wallet. If the device actually cannot be refloated, at least some components can be reused as replacement parts.

Results

The EcoLab of ECRI sees itself as an institution in which various didactic methods and concepts are used to stimulate different target groups to sustainable action in projects and events. With these methods and concepts, EcoLab acts in the sense of "Education for Sustainable Development" and supports the students – especially the international students of ECRI – in acquiring key competences for a sustainable lifestyle. The international students of ECRI take this knowledge they learned during their studies into their future life. Our graduates are in this sense multipliers or even global multipliers of Education (and acting) for Sustainable Development.

Outlook

The EcoLab handles a wide range of sustainability topics. With interdisciplinary seminars, projects and events in the field of sustainability and Education for Sustainable Development, the topic is considered with regard to international students as well as companies and citizens within the region. The EcoLab BikeStation and EcoLab RepairCafé will be continued and expanded during the next semesters. The aim is to permanently and successfully anchor sustainability and Education for Sustainable Development at DIT and ECRI institutions. The EcoLab team and the DIT Working Group Sustainable Development design concepts for the integration of sustainability throughout the university.

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Prof. Dr. Robert Feicht

Robert Feicht completed a double degree in mathematics and business administration. He first studied at the RWTH Aachen, later at the Friedrich-Alexander University Erlangen-Nürnberg. Subsequently, he worked as a research assistant at the Fraunhofer Center for Applied Research on Supply Chain Services in Nürnberg. In addition to the consulting of medium-sized companies, he developed customer-specific mathematical solution procedures in the area of network and personnel planning. Later, he returned to the University of Erlangen-Nürnberg, where he wrote his interdisciplinary doctoral thesis in the field of economic theory related to resource management. He then worked for the government of Upper Palatinate for five years. Here he was responsible for the areas of the energy transition and digitization. In this function, he consulted companies and downstream authorities, and set up and coordinated state incentive programmes in the energy and digitization sector. In 2018, he was appointed Professor of "Business Administration – Energy and Resource Economics" and Head of the Ecology and Economy Laboratory at the European Campus Rottal-Inn (ECRI) in Pfarrkirchen. He is also a member of the DIT Working Group Sustainable Development.

Robert Feicht absolvierte ein Doppelstudium in Mathematik und Betriebswirtschaftslehre. Er studierte zunächst an der RWTH Aachen, später an der Friedrich-Alexander-Universität Erlangen-Nürnberg. Anschließend war er als wissenschaftlicher Mitarbeiter bei der Fraunhofer-Arbeitsgruppe für Supply Chain Services in Nürnberg tätig. Neben der Beratung von mittelständischen Unternehmen entwickelte er dort kundenspezifische mathematische Lösungsverfahren im Bereich der Netzwerk- und Personalplanung. Später kehrte er an die Universität Erlangen-Nürnberg zurück und verfasste dort im Bereich der Wirtschaftstheorie seine interdisziplinäre Promotion mit Bezug zur Ressourcenwirtschaft. Im Anschluss arbeitete er fünf Jahre für die Regierung der Oberpfalz und verantwortete hier die Bereiche Energiewende und Digitalisierung. Zu seinen Aufgaben gehörten die Beratung von Unternehmen und nachgelagerten Behörden sowie der Aufbau und die Koordinierung staatlicher Förderprogramme im Energie- und Digitalisierungsbereich. Seit 2018 ist er Professor für „Betriebswirtschaft – Energie- und Ressourcenwirtschaft" und Leiter des Labors für Ökologie und Ökonomie am European Campus Rottal-Inn (ECRI) in Pfarrkirchen. Zudem ist er Mitglied der THD-Arbeitsgruppe Nachhaltige Entwicklung.

Contact / *Kontakt*
✉ **robert.feicht@th-deg.de**

Dipl.-Betriebswirtin (FH) Jennifer Huber (M.Sc.)

Jennifer Huber studied business administration with a focus on wood economics and human resources, as well as wood technology in the Master's degree at the Rosenheim Technical University of Applied Sciences. Subsequently, she worked as a research assistant at the Fraunhofer-Zentrum Bautechnik in the field of sustainable buildings. In 2018, she started working as a research assistant in the field of sustainability at the European Campus Rottal-Inn. Her main focus is on integrating Education for Sustainable Development into teaching at ECRI, as well as the development of ECRI towards a sustainable campus. She is also a member of the DIT Working Group Sustainable Development.

Jennifer Huber studierte Betriebswirtschaft mit den Schwerpunkten Holzwirtschaft und Personalwesen sowie Holztechnologie im Masterstudiengang an der Technischen Hochschule Rosenheim. Anschließend war sie als wissenschaftliche Mitarbeiterin am Fraunhofer-Zentrum Bautechnik in Rosenheim im Bereich nachhaltiges Bauen tätig. Seit 2018 arbeitet sie als wissenschaftliche Mitarbeiterin im Bereich Nachhaltigkeit am European Campus Rottal-Inn. Ihr Hauptfokus liegt auf der Integration von Bildung für nachhaltige Entwicklung in die Lehre am ECRI sowie auf der Entwicklung des ECRI hin zu einem nachhaltigen Campus. Sie ist außerdem Mitglied der THD-Arbeitsgruppe Nachhaltige Entwicklung.

Contact / *Kontakt*

✉ **jennifer.huber@th-deg.de**

Anna Marquardt (M.A.)

Anna Marquardt completed her Master's degree (geography, economics, didactics of biology) at the University of Passau. After her first professional position in environmental education in the Berchtesgaden National Park, she has been working freelance since 2011, focusing on GIS, mapping, cartography, graphic communication and event planning (e.g. landscape architecture, forest reports, nature film festival). From 2012 to 2018 she worked as a research assistant in the areas of project administration, GIS analysis, spatial modeling & visualization, sustainable regional development, planning processes & participation at the Technology Campus Freyung. Since 2018, she works as a laboratory engineer in the field of sustainability at the European Campus Rottal-Inn in Pfarrkirchen. Since October 2019 she is responsible for the Ecology and Economy Laboratory. In the EcoLab, she focuses on the integration of Education for Sustainable Development into teaching at ECRI and the practical implementation in projects. She is also committed to the development of ECRI towards a sustainable campus. She is a member of the DIT working group Sustainable Development.

Anna Marquardt absolvierte ein Magisterstudium (Geographie, Wirtschaftswissenschaften, Didaktik der Biologie) an der Universität Passau. Nach einer ersten Station in der Umweltbildung im Nationalpark Berchtesgaden ist sie seit 2011 freiberuflich mit den Schwerpunkten GIS, Kartierung, Kartographie, Graphische Kommunikation und Veranstaltungsplanung tätig (z.B. Landschaftsarchitektur, Forstgutachten, Naturfilmfestival). Von 2012 bis 2018 arbeitete sie als wissenschaftliche Mitarbeiterin am Technologie Campus Freyung der THD im Bereich Projektadministration, GIS-Analyse, Räumliche Modellierung & Visualisierung, Nachhaltige Regionalentwicklung, Planungsprozesse und Partizipation. Seit 2018 arbeitet sie als Laboringenieurin im Bereich Nachhaltigkeit am European Campus Rottal-Inn in Pfarrkirchen und betreut seit Oktober 2019 das Labor für Ökologie und Ökonomie. Im EcoLab setzt sie den Fokus auf die Integration von Bildung für nachhaltige Entwicklung in die Lehre am ECRI und die praktische Umsetzung in Projekten. Zudem engagiert sie sich für die Entwicklung des ECRI hin zu einem nachhaltigen Campus. Sie ist Mitglied in der Arbeitsgruppe Nachhaltige Entwicklung der THD.

Contact / *Kontakt*
✉ **anna.marquardt@th-deg.de**

SPOTLIGHTS