Johanna Michenthaler & Katharina Salzmann-Schojer

Researching and shaping local sustainable food systems–development of a learning module

This article presents a learning module that was developed within the framework of an international Erasmus+ project and in cooperation with 20 prospective teachers. The learning module enables learners of school-based vocational education to intensively deal with the food system(s) of their region. The comprehensive learning materials and lesson plans are made freely available.

Keywords: locality, food system, food and consumer education, nutritional practices, green pedagogy

1 Introduction

The current global food system and its processes along the food supply chain are major contributors to climate change (EU, 2014). The environmental degradation, social hardship and economic changes should actually make people rethink their everyday behaviours (IPCC, 2012). The current state of the food system shows that in the areas of food security and productivity, the sustainability goals are being met, but in the areas of the environment, animal welfare and health, key sustainability goals are barely being met, if at all. Accordingly, the current food system is not yet considered sustainable in the overall view (Umweltbundesamt, 2019a). The reimplementation of local cycles is currently being intensively discussed as a solution (EC, 2017; StMUV, 2019).

The learning module "A look beyond the horizon: Our region – our food – our future" enables learners to engage in a differentiated and structured way with the region they live in and its food system(s). The aim is to get to know and analyse the food system of the region and then to participate in a transformation towards a sustainable, regional food system. To perceive oneself as part of the system and to learn to know as well as reflect on one's personal scope for action and design, are central didactic concerns in this context.

2 Methodology and genesis of the learning module

The basic idea for the learning module was developed within the framework of the Erasmus+ project "Teaching Local Sustainable Food Systems" together with an in-

ternational team from five EU countries. The project aims to professionally support teachers in teaching local, sustainable food systems and to provide them with a scientific basis on the topic as well as ideas for the didactic implementation and learning materials. At the beginning of the project, following questions were addressed: What are local sustainable food systems (LSFS) from the point of view of the project partner countries and what best-practice-examples are there? International field trips were made, and indicators for LSFS were defined. Based on a common understanding of local sustainable food systems, ideas for didactic implementation in schools were generated. In cooperation, three learning modules with different time frames were developed and the main topics, structure and format were defined. The learning module presented in this article *"A look beyond the horizon: Our Food – Our Region – Our Future"* is the most comprehensive of the three learning modules, which was concretised at the national level in terms of subject and content. Under the supervision of the authors of this article, 20 prospective teachers from the Master's programme of the University College of Agricultural and Environmental Pedagogy have developed detailed lesson plans and teaching materials in German and English. The learning materials were then nationally and internationally tested and evaluated at schools. The results were considered in the improvement of the lesson plans. The interdisciplinary character of this learning module is due to the large number of actors from different disciplines, organisations and universities involved.

Interdisciplinarity is defined by the cooperation of different disciplines, as well as their approaches, ways of thinking and methods, in order to work out solutions to problems for jointly determined objectives (Defila & Di Gulio, 1998, p. 117).

Not only the development of this learning module can be described as interdisciplinary, but also the application or implementation in the school context must be interdisciplinary. It will not be possible for one teacher alone to implement the learning module in his/her school. The learning module is suitable, for example, for implementation in the context of project weeks or in the context of modular or learning field-oriented teaching.

The developed teaching and learning materials will be made available to teachers as open-source materials and the implementation will be accompanied within the framework of further training seminars.

3 Theoretical background of the learning module

In addition to the subject-specific content, which is the focus of the learning module, the focus was primarily placed on the didactic foundation and subject-specific didactic implementation.

Figure 1 provides an overview of these subject contents and didactic perspectives, which are described in more detail below.

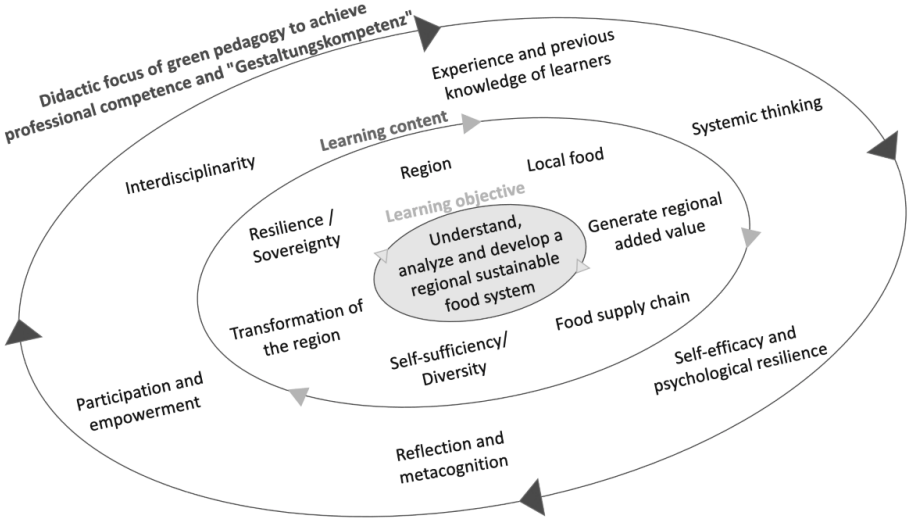

Fig. 1: Didactic perspectives, learning content and learning objective of the learning module (Source: own depiction)

3.1 Didactic principles and professional implementation of the learning module

In the following chapter, the didactic approaches and their implementation in the learning module are presented.

3.1.1 Green pedagogy and education for sustainable development

In order to enable learners to learn in a complex way and to prepare them for the diverse challenges of the future, the didactic concept of "Green Pedagogy" was developed at the University College of Agricultural and Environmental Pedagogy. Green Pedagogy bases on Education for Sustainable Development.

> Education for sustainable development means education that makes people's individual ability to act and shape their lives in the sense of an economically, ecologically and socially sustainable perspective their central concern. (Heinrich et al., 2007, p. 15)

Negotiation processes to develop solutions are at the focus of education for sustainable development. The starting points are people's everyday experiences. They should be empowered to act responsibly in their environment. It should be noted that too high and comprehensive expectations for sustainable development can overstrain people and thus trigger resignation (Heinrich et al., 2007).

Education for Sustainable Development is concretised in Green Pedagogy through selected thematic fields (Forstner-Ebhart et al., 2016): these include, for

example, resource protection, economy and production, consumption and lifestyle, as well as society and social issues (Wogowitsch, 2012). In the developed learning module, all of these topics are taken into account in a specific form.

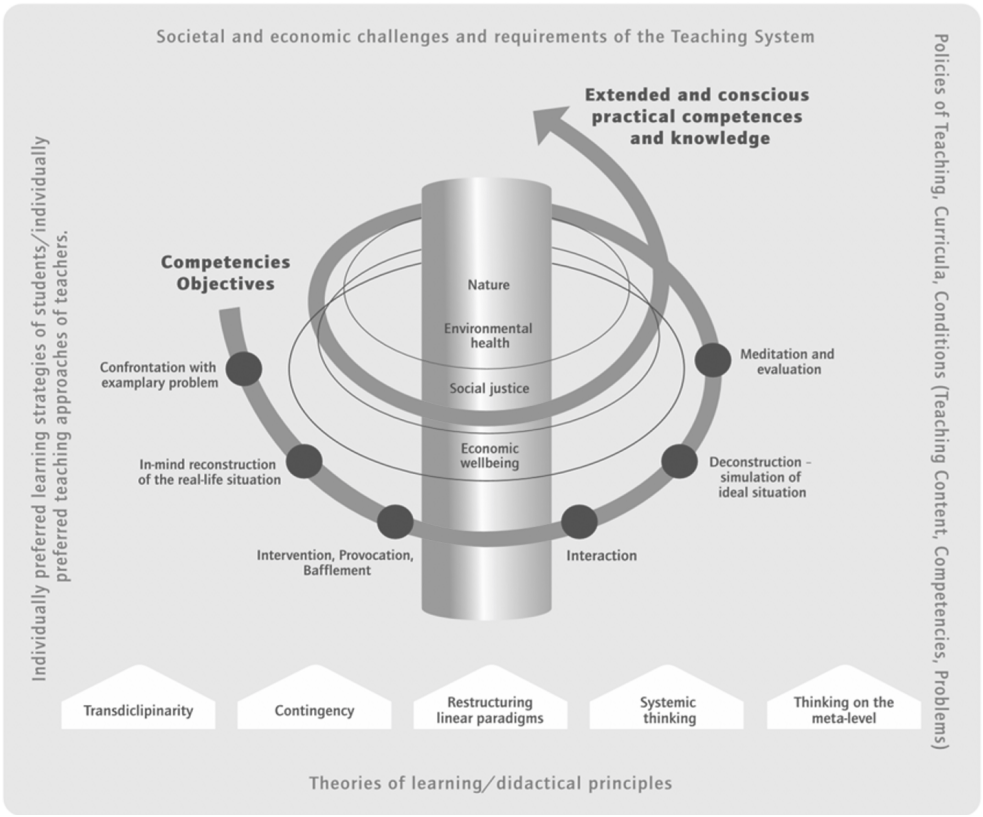

Fig. 2: Didactic concept of green pedagogy University College of Agricultural and Environmental Pedagogy (Source: own depiction)

Green pedagogy is also based on constructivist approaches to didactics (Forstner-Ebhart et al., 2016). This is taken into account in the concrete learning module by enabling active, self-directed, situational and social learning processes. As in Education for Sustainable Development, Green Pedagogy focuses on self-activity, autonomy, co-determination and solidarity as well as the self-reflection of learners. Dealing with contradictions is a central element in the learning process.

Furthermore, Green Pedagogy offers a framework (Fig. 2) for the concrete development and implementation of teaching and learning settings to initiate transformation towards sustainable development (Forstner-Ebhart & Linder, 2017).

Figure 2 shows the five didactic principles and the steps or stages in the learning and cognition process of Green Pedagogy. Particular importance is attached to sys-

temic thinking and metacognition in the developed learning module. The learning module itself and its individual learning sessions are designed along the phases of Green Pedagogy. The learning process is opened by a confrontation with an exemplary problem. Based on this, the actual situation is reconstructed, such as pupil perceptions, behavioural routines, process flows, etc. This is followed by an intervention phase in which new knowledge can be acquired. It is essential to break linear thinking patterns and increase the tolerance for ambiguity. According to the acquired knowledge, solutions are developed in the interaction phase. In the deconstruction phase, the results are placed in a concrete application context and solutions are developed according to the situation. Each learning session concludes with a reflection on the learning results and one's own learning process.

With the learning module, the authors also want to follow the principles of didactics described by Angele et al. (2021) for the design of exemplary learning opportunities along the food supply chain in the teaching of nutrition.

3.1.2 Learning objectives and competencies of the learning module

The call to change lifestyles is growing louder: away from lifestyles based on unsustainable consumption, waste of resources, degradation of ecosystems and exploitation of people, towards a model that seeks to increase the well-being of all people in accordance with the carrying capacity of the planet (UNECE, 2011, p. 6).

The learning module tries to respond to this call by fostering both *professional competences and "Gestaltungskompetenz"* in learners:

- *Professional competences and skills* include the development of verifiable vocational skills and abilities. These were taken from the curriculum for agricultural VET schools (Faistauer et al., 2017) as basic learning objectives in the learning module.
- *"Gestaltungskompetenz"* goes beyond this and is more far-reaching. In the context of Education for Sustainable Development, "Gestaltungskompetenz" means that learners are able to draw conclusions about the interrelationships of ecological, economic and social developments and to make decisions based on these conclusions, both in their private and professional lives (Bormann & De Haan, 2008). In addition, sustainability competences (modified according to UNECE, 2011) are promoted. These are to be understood as superordinate competences that are promoted in the learning processes but are not evaluated within the framework of the lessons. They thus serve as orientation for the learning process and the final self-reflections of learners but are not taken into account in the performance assessment.

The overall goal in the learning module is to get to know, to analyse and to develop a local sustainable food system. In concrete terms, this means that learners are made aware of responsible consumption and sustainable production and are able to plan,

decide, implement and reflect on their actions in a knowledge-based way. They should develop a mindset for sustainability that includes value orientations and mindfulness in addition to knowledge and skills. The attitude-behaviour-gap should be reduced through the joint negotiation of congruent decisions in learning situations that focus on non-material values or promote pro-social and pro-ecological behaviour patterns (Stanszus et al., 2017).

The learning module should therefore enable learners to have a more differentiated perception of their immediate environment and inform them about the origin and production of their food. Transformation processes in the region but also in personal nutritional behaviour can be initiated by questioning behavioural routines. The aim is not to create completely correct solutions for a local sustainable food system, but to initiate critical thinking processes and viable solutions.

3.1.3 Systemic learning in the learning module

Systemic learning can be realised through a multi-perspective view of the food system of a selected region. Vice versa, getting to know and developing the food system in an analytical way requires systemic learning processes.

Learning in a systemic way always takes place context-related. It enables a change of perspective and reframing, i.e. familiar aspects are seen with new eyes. Systemic learning builds on resources in the sense of strengths and is solution-oriented (Schwing & Fryszer 2013).

In the systemic learning process, which discusses different topics of regions depending on the focus, the teacher plays a role accompanying the learning process rather than a role imparting knowledge. In this process, learners acquire competences through an active approach to knowledge (Leisen, 2011). The teacher is required to deal intensively with the respective region during the preparation and to plan the learning process according to the knowledge and skills of the learners and the specifics of the region.

3.2 Professional contents and main topics of the learning module

The global food system is a major contributor to climate change. Along the entire food supply chain, processes are taking place that are criticised for accelerating climate change and increasing social inequality (EC, 2014). The reimplementation of local cycles in the food system is often described as a solution to these challenges (EC, 2017; StMUV, 2019). But what do local food strategies look like?

3.2.1 Local food strategies

Local foods are products with a clearly defined geographical identity of origin (e.g. Vorarlberger Bergkäse, Seewinkler Tomaten), which are produced or processed only

with raw materials from the respective region and which are sold locally in that region. The guideline is that the production of the raw materials, their processing and the distribution of the finished product must take place within a radius of no more than 100 kilometres (Global 2000, n.d.).

At the beginning of the development of a local food strategy, it is important to define or negotiate the geographical boundaries of the local food system. There are no uniform rules for this definition and national borders are not necessarily to be understood as such. As a spatial definition of a local food system, distances of about 50 km (Umweltbundesamt, 2019a) or regions with a diameter of 80 to 100 km can be considered.

Local food strategies offer diverse potentials and effects. In addition to protecting the environment and increasing resilience to weather extremes, improving the health of the population as well as food security and sovereignty are important aspects. Local supply chains help to generate regional identity and can increase the appreciation towards food. Consumers expect more transparency and insight into the local food system. Many qualities are associated with geographical proximity to producers. In addition to securing production knowledge, local food strategies can aim to (re)build trust in the food system (Umweltbundesamt, 2019a).

3.2.2 Food systems and their food supply chain(s)

According to the American Dietetic Association [ADA] (2007), a food system consists of all entities and activities related to food supply, including agricultural production, food processing, distribution, retailing and consumption. The food system is all-encompassing: from water, to gardening, to farming, to hunting, to preservation, to food safety, to fast food restaurants, to fad diets, to grocery store sales staff, to food banks, to dinner preparation, to rubbish collection, to obesity, and so on (ADA, 2007).

In this learning sessions, the food supply chain is thought of in five stations: production, processing, distribution, consumption, and resource and waste management (Umweltbundesamt, 2019b).

Examples of local sustainable food systems range from solidarity-based farming and food cooperatives at the farm level, to small villages or towns, to ecoregions or organic districts who organise themselves by structuring supply chains. Producers enter into agreements with consumers to achieve the shortest possible transport distances for food, to generate economic benefits and to form participatory, inclusive communities. The components of agriculture, environment, economy, culture and society are interconnected in a complex system (EducLocalFood, 2019).

3.2.3 Transformation of food systems

Ericksen (2008) outlines a framework for examining the multiple interactions of large-scale food systems with global environmental change and for assessing the key societal outcomes affected by these interactions: Food security, ecosystem services and social well-being. These are used to assess key processes and determinants of food security in a given place or time. They allow for an analysis of linkages between food system outcomes or drivers of environmental and social change, as well as conflicts of objectives between the outcomes of the food system itself (Ericksen, 2008).

These key processes and determinants are needed as a starting point to initiate the transformation of the system. Transformation itself is seen as a process of change in the structure of an entire system or its subsystems. These require a radical change or a fundamental paradigm shift. The food system is seen as an open system based on the natural environment: Natural resources are used to produce food. Environmental resources (soil, water, air) are natural reservoirs for waste and by-products of the production processes (Umweltbundesamt, 2019b).

The diverse elements of the food system, such as environmental goods, acting persons, but also immaterial and material aspects interact in reciprocal processes, which can be controlled or transformed (Umweltbundesamt, 2019b).

The aim of transformation is to generate agro-biological diversification and food sovereignty through sustainable long-term solutions and thus increase the resilience of a region (CIDSE, 2018).

3.2.4 Food sovereignty and resilience of a region

Food sovereignty describes a policy framework that addresses the main causes of hunger and poverty. In this context, local control over the production and consumption of food is to be integrated into democratic processes (CIDSE, 2018). However, there is no single prescription for the democratization of food production. It is a process that must be continually developed and adapted to regional conditions. The principles are the human right to food and its production, the strengthening of local markets, fair trade relations, living incomes and education, national indebtedness, guaranteed access to fertile land, water and seeds, agro-ecological care and the protection of natural resources (Zukunftsstiftung Landwirtschaft, 2021).

The prerequisite for food sovereignty is the recognition and empowerment of the citizens and communities so that they can live out their economic, social, cultural and political rights and needs with regard to their dietary preferences (CIDSE, 2018). The focus is on the human being and his or her right to healthy, culturally adapted and self-determined food, but also on protection against harmful nutrition. Thus, the people who produce, distribute and consume food are placed at the center of food

systems and not the interests of markets and transnational corporations (Nyéléni Forum, 2007).

Concrete measures of food sovereignty are closed local cycles, the closest possible relationships between production and consumption, the development of local and regional self-sufficiency, which overall increases the resilience of a region (Zukunftsstiftung Landwirtschaft, 2021).

As Voepel and Wolf (2018) describe, diversity is an essential factor for the resilience and thus resistance of a region to global ecological, social and economic developments. The degree of diversification is important here, i.e. that a wide variety of sectors are represented in a region (Voepel & Wolf, 2018).

If the complex regional food system with all its acting persons and enterprises along the food value chain is considered, everyone ideally recognizes the great potential of regional sovereignty and resilience. The learning module is addressing this task.

4 Overview of the learning module

The learners' favourite dish is the initial point of the learning module. For these, the food requirements are determined and purchased accordingly. The meals are prepared and the purchase is analysed. Thereby it is determined where the food comes from and its more or less sustainable production. Subsequently, field research is carried out in the region. Which of the foods are produced in the region, which could be purchased directly from producers in the region? Which foods are not available? Which gaps in the supply situation are identified? Of which foods can the origin not be traced? The learners are looking for contact and exchange with regional policy as well as with the actors along the food supply chain in the region. Recommendations for action for the development of the region and their own consumption behaviour are derived from the experiences and findings.

By creating a personal approach about the favourite dish, an emotional involvement of the learners should happen. Excursions, interviews, analyses, preparing the favourite dish, planning an event, researching and discussing as well as reflecting on the findings are just a few of the methods used in the learning process. A well-prepared environment and reflective guidance by the teacher are essential for the learning module.

The learning process is supported by keeping a learning diary, in which the learners record their results and findings from the learning process. The aim is to trigger both reflection and metacognition.

Different learning environments, diverse methods, support for creativity, reflection and metacognition characterize the learning module. These are also approaches that are immanent to Green Pedagogy (Forstner-Ebhart et al., 2016; Michenthaler & Laufenberg-Beermann, 2019).

The learning module contains twelve learning sessions with a total of 120 teaching units, in which learners deal with actors of the local food system along the supply chain. The module follows a building block system A, B, C, D, E. These elements comprise 30 teaching units and must be completed fully for a successful learning process. In the category C there are further learning sessions from C1–C7 with a total of 90 teaching units (Fig. 3). These can be completed optionally, depending on interest, focus and time.

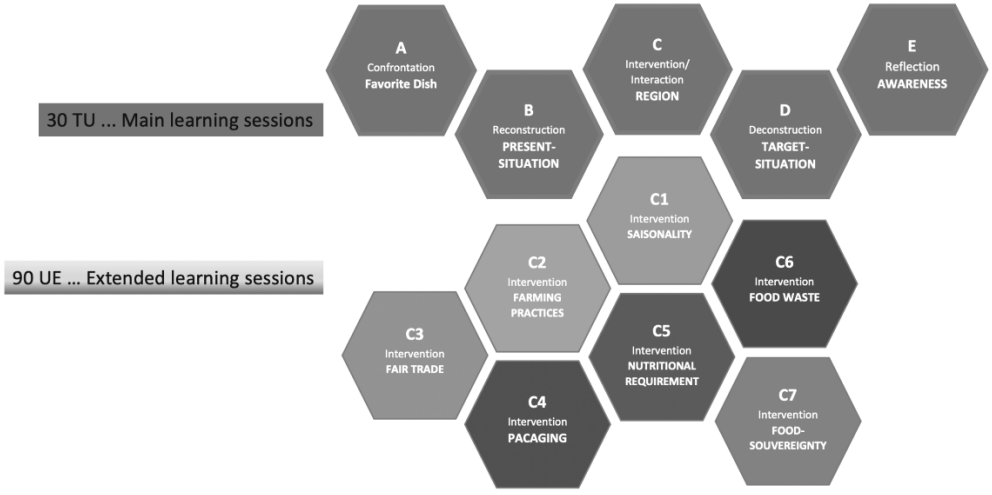

Fig. 3: Learning sessions in the learning module (Source: own depiction)

To support teachers, flashcards were created for each of the twelve learning sessions, to provide an overview. Detailed lesson plans have been formulated in a consistent format, which provide an in-depth insight into the detailed planning of the learning situations.

Teachers as well as persons in non-formal education are invited to test the learning materials. Under the following link all documents are available to download for free:
https://www.gruene-paedagogik.at/download/
a-look-beyond-the-horizon-our-region-our-food-our-future.

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Authors

Johanna Michenthaler & Katharina Salzmann-Schojer

Authors of the lesson plans: Kilian Berschl, Theresa Bruckner, Phillipp Dietrich, Anna Eder, Magdalena Gattringer, Katharina Gindl, Katja Harrer, Theresa Heidl, Michael Lehner-Dittenberger, Victoria Lettenmair, Harald Mattenberger, Johanna Michenthaler, Victoria Mraz, Alexandra Muhr, Christoph Pranz, Theresa Priller, Anna Quehenberger, Horst Reiter, Katharina Salzmann-Schojer, Theresa Strobl, Michael Unterberger, Melanie Wimmer und Stefan Zahler

University College of Agricultural and Environmental Pedagogy
Angermayergasse 1
A-1130 Wien

E-Mail: johanna.michenthaler@haup.ac.at | katharina.salzmann@haup.ac.at
Internet: www.haup.ac.at