Schluss mit der Billiglüge!

»Wir können uns Pseudo-Billig nicht mehr leisten!«

Volkert Engelsman

Alles so schön billig bei Aldi & Co! Dabei sind die Preise nur so niedrig, weil die Kosten abgewälzt werden – auf Umwelt, andere Länder, kommende Generationen. »Die Preise lügen« zeigt eindrucksvoll, warum uns billige Lebensmittel teuer zu stehen kommen.

Volkert Engelsman, Bernward Geier (Hrsg.)

Die Preise lügen
Warum uns billige Lebensmittel teuer zu stehen kommen

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We are witnessing unprecedented attention to the global challenge of meeting the food and nutrition security needs of a growing and changing population. Achieving this in a way that is sustainable in the short and long term, for both the environment and people, is a formidable task confronting citizens and decision-makers alike. Billions of people currently suffer from one or more forms of malnutrition, be that overweight and obesity, chronic hunger and undernutrition or micronutrient deficiencies (FAO et al. 2017). This global burden has the potential to become even more severe in the face of climate change, decreasing biodiversity, increasing inequality and changing consumption patterns.

We believe that solutions to these challenges demand new ways of thinking, collaborating and learning that reflect the complexity of food systems and consider the interrelated biophysical, social, economic, political and cultural systems.

**Sustainable Food Systems Education**

Over the past decade, we have seen a proliferation of new academic programs, research agendas and institutes initiated around the theme of food and nutrition security or food systems, as well as renewed interest and reinvestment in established programs and courses. Although these offerings broaden the dialogue on food systems, we have observed that the majority of these activities still maintain an emphasis on agriculture and biophysical systems.

ETH Zurich (the Swiss Federal Institute of Technology Zurich) identified the world food system as a strategic priority for the university in 2010, and out of this initiative, the World Food System Center (WFSC) was established in 2011 (WFSC 2015). The WFSC includes members from 40 research groups across eight ETH Zurich departments and the Eawag (Swiss Federal Institute of Aquatic Science and Technology), and is anchored in the Department of Environmental Systems Science (D-USYS). In addition to supporting interdisciplinary research on food systems, the Center runs unique educational courses, including an intensive, residential two-week short course called the World Food System Summer School.

As an educational model, stand-alone summer school courses are growing in popularity, though they are not necessarily a novel form of education (Torenbeen and van Rest 2014). When designed intentionally, summer schools provide an exceptional format for learning about food systems. As residential, immersion programs, they offer opportunities to use learning methods and pedagogical approaches that may be infeasible in traditional courses. As intensive courses, they provide students with additional knowledge and experience beyond (but complementary to) their disciplinary or core study programs, and the chance to connect to a global network of colleagues. In addition, students can intersect disciplines and contexts. Our two-week World Food System Summer School allows participants, specialists and stakeholders to learn from one another. We describe the conceptual framework for the course, elucidate the design criteria used and discuss challenges, aiming to support the development of education offerings in this space.

**Keywords:** design criteria, education for sustainable development, food systems, higher education, short courses, summer schools

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1 The World Food System Center conducted a benchmarking of food system and food and nutrition security initiatives in the academic sector over the period 2011 to 2017.

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The WFSC developed a course that serves this purpose by building a food systems syllabus that teaches participants about challenges and solutions from a variety of disciplinary and sectorial perspectives. The course explores the roles of students, researchers and young professionals and how they can engage with the issues in their work, studies and lives. It offers a platform to exchange first-hand with diverse stakeholders from the food system to discuss topics across disciplinary and generational boundaries (figure 1).

With the increasing number of food system courses, it is helpful to have a means for evaluating and comparing them to identify their strengths and foci. For instance, what determines the quality of a sustainable food systems course? What criteria should these courses meet, if they should contribute to preparing the next generation to address the complex challenges of the food system?

In this paper, we first introduce our conceptual framework used to analyze food systems and to design the summer school courses (figure 2). Second, we describe the course that we developed at ETH Zurich in more detail. Third, we present a set of criteria we have developed (table 1, p. 173), which can support others to design new sustainable food systems education courses or reflect on existing courses.

We mainly drew on our own experiences and on an analysis by Wiek et al. (2013), who proposed a set of criteria for international sustainability education programs. In addition, we used the work by Hilimire and co-researchers, who developed “concepts for effective food systems learning” and “curricula for educational programs on sustainable food systems” (Hilimire 2016, Hilimire et al. 2014) along with Galt and coauthors’ (2012) discussion about “engaging values in sustainable agriculture and food systems education.” Finally, reflecting on our insights from conducting several summer school courses, we discuss some of the most pressing challenges that we have faced in fulfilling these criteria and that others may encounter as well when designing their own programs and courses.

With this paper, we offer a departure point for further discussions around improving, designing and expanding high-quality educational opportunities that support positive change towards sustainable food systems, and sustainability more broadly.

Teaching Sustainable Food Systems: A Framework for Analysis

The WFSC has offered a two-week, intensive food systems summer school regularly since 2013. To date, we have run the course four times in Switzerland, once in India, once in South Africa, once in Côte d’Ivoire, training 166 participants from 52 countries. The course was designed to foster a cross-disciplinary exchange of knowledge about all aspects of the food system. It applies a systems thinking approach that invites participants to grapple with systems theory as it is applied to the world food system, while interacting directly with stakeholders.
ability (YES) (Grant 2009, 2013). Like the YES courses, the WFSC summer schools seek to equip young leaders to address global challenges. This requires a curriculum that combines attention to knowledge, core skills and values (see Grant 2013).

We developed a conceptual framework (figure 2) to illustrate our understanding of the food system and guide our curriculum. It includes all food system activities, the boundary conditions that shape and constrain them, and the desired outcomes, namely, food and nutrition security, human wellbeing and environmental sustainability. Though not illustrated in the diagram for simplicity, the framework enables discussion of the complex and interrelated network of actors and institutions that span this system (figure 4, p. 172). As a pedagogical tool, the diagram is useful because it illustrates the material flows and highlights desirable food system outcomes that can be applied to multiple scales. It offers a starting point to add on the complex social and political dynamics of the food system and facilitates discussions about interactions, feedbacks, emergent behavior and complex systems approaches. In our experience, beginning with this simple conceptual framework to create a common understanding helps students and instructors locate their expertise in a broader landscape and move away from narrow disciplinary foci.

The course introduces new knowledge, builds core skills and encourages participants to connect the outcomes of a food system with the values embedded in it, while orienting them towards exploring their own role in creating appropriate solutions and driving change. Further, participants collaborate in a multi-disciplinary and multi-cultural cohort (figure 5, p. 174) that continues as a professional support network after the course ends. We rely on a variety of participatory and student-centered learning methods driving change. Further, participants collaborate in a multi-disciplinary and multi-cultural cohort (figure 5, p. 174) that continues as a professional support network after the course ends. We rely on a variety of participatory and student-centered learning methods.

FIGURE 3: Participants meet with villagers, farmers, small-scale processors and a women’s seed cooperative in rural India. Such facilitated interactions allow the understanding of the local context from a variety of stakeholder perspectives and through a two-way exchange engage participants as both producers and users of knowledge. In the foreground lies a Puja, a ritual performed by the hosts to welcome and honor guests. Karnataka state, India.

FIGURE 2: Key elements and desired outcomes of the food system. A food system includes value chain activities that transform inputs and resources into food consumed by humans. The functioning of this value chain is shaped by a complex and interacting set of system boundaries that include environmental, social, political and economic conditions. The whole system operates through a complex network of actors who have varying influence and power. Ideally, all elements and actors of the food system would work together in a way that supports the delivery of the key food system outcomes, namely, food and nutrition security, human wellbeing and environmental sustainability, also in the face of shocks and drivers of change. In this framework, we consider food and nutrition security to include 1. the availability of adequate food in terms of quantity and quality, 2. access to that food for all individuals, 3. the use of the food in a way that supports health and nutrition outcomes, and 4. the resilience of all of these three elements in the face of increasing number and intensity of shocks to the system in the future.

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ods to achieve this, including case studies, workshops, panel and facilitated discussions, field trips, role plays, simulation games, creative work and interactive lectures. Participants work in diverse groups throughout the course on activities that encourage peer-to-peer and experiential learning. In particular, the four stages of Kolb’s (2015) Experiential Learning Cycle (concrete experience, reflective observation, abstract conceptualization and active experimentation) are iterated throughout the course.

The WFSC promotes the courses widely both within Switzerland and internationally through a variety of networks, including our alumni network. Since the course is not a specialist course, we accept applications from a broad range of backgrounds and educational programs. However, the work is designed for those recently graduated from or currently studying in Master’s or PhD programs. With approximately 25 students per course, the selection process is highly competitive, and our acceptance rate is typically less than 25 percent of applications received. In each course, we have students from approximately 20 countries and a wide range of academic backgrounds. There is a purposeful selection of qualified applicants to incorporate cultural and disciplinary diversity in each cohort.

Design Criteria for Sustainable Food Systems Education Courses
While an extensive medium-term evaluation of our course is ongoing, we assess short-term outcomes through evaluations and pre-/post-knowledge tests administered as part of each course. The findings of these short-term evaluations and tests, as well as increasing interest from donors and new course partners, give us grounds to consider the summer school approach a success, while signaling where there is room for improvement and adaptation. Thus, we are confident that the set of twelve criteria we have developed based on our experiences running and evaluating our summer schools (table 1) can support others establishing new offerings under this theme, or help reflect on existing ones.

Lessons Learned: Challenges, Constraints and Trade-offs
Although these design criteria have guided our summer school courses, we have

2 We are currently in the process of evaluating the medium-term outcomes of the courses through surveys and focus groups with the alumni cohort.
TABLE 1: Design criteria for sustainable food systems courses (including justification and the sources supporting it, with “WFSC” referring to our own experience). The criteria are not listed in any hierarchical order.

<table>
<thead>
<tr>
<th>CRITERION</th>
<th>EXPLANATION</th>
<th>SOURCE(S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>promotion of cross-cultural exchange and teamwork</td>
<td>Professionals today must be able to collaborate across cultural and geographic boundaries in a sensitive manner (figure 5).</td>
</tr>
<tr>
<td>2</td>
<td>raise awareness of context specificity of food system challenges and solutions</td>
<td>Food system challenges and solutions are highly context specific; when students are aware of this, they will be more able to adapt their approaches, design appropriate solutions and consider multiple perspectives (figure 1).</td>
</tr>
<tr>
<td>3</td>
<td>systems thinking approach, exploring the food system as a complex system</td>
<td>This approach emphasizes interactions, feedbacks, emergent behavior, outcomes, tradeoffs and non-linearity. It highlights unintended consequences and teaches the importance of broad collaboration to develop solutions in a participatory way (figure 6).</td>
</tr>
<tr>
<td>4</td>
<td>interdisciplinary and cross-sectoral approach</td>
<td>Working in complex systems requires a broad range of perspectives, knowledge, skills and experiences. This involves interacting and exchanging with a broad range of stakeholders in the system (figure 4).</td>
</tr>
<tr>
<td>5</td>
<td>incorporation of a blend of experience, theory and skill acquisition</td>
<td>Effective adult learning occurs when students go through four stages (Kolb’s Experiential Learning Cycle): concrete experience, reflective observation, abstract conceptualization and active experimentation.</td>
</tr>
<tr>
<td>6</td>
<td>experimental approach to program design</td>
<td>Working outside of traditional disciplines and curricula requires innovation in content, program setting and teaching approaches. The classroom can serve as a living lab where new approaches are developed, implemented, evaluated and redesigned in iterative cycles.</td>
</tr>
<tr>
<td>7</td>
<td>exploration of agency and power of diverse actors</td>
<td>Students must learn how power dynamics affect how food system actors participate in framing problems and solutions and to recognize the different roles they can have in creating change, including but not limited to their professional roles.</td>
</tr>
<tr>
<td>8</td>
<td>values-based approach to teaching and course/curricula design</td>
<td>A values-based pedagogical approach means “paying explicit attention to the values that 1. underpin different agricultural and food systems and their governance, 2. inform and shape educational strategies and experiences, and 3. are held by different individuals in various encounters in the learning environment” (Galt et al. 2012, p. 3). When participants explicitly develop their value framework, they can use this as a basis for discussions about polarized topics.</td>
</tr>
<tr>
<td>9</td>
<td>appreciation of all participants as both producers and users of knowledge</td>
<td>Students and contributors should act as both producers and users of knowledge and adopt a critical thinking approach to current systems and norms. Creating a setting that is socially inclusive and flat in terms of hierarchy, both contributors and students are encouraged to exchange and learn from and with each other (figure 6).</td>
</tr>
<tr>
<td>10</td>
<td>diverse participant cohort and promotion of an equitable and inclusive environment</td>
<td>Diversity creates a rich learning environment. Effective organizers must be mindful of creating an equitable and inclusive environment where all participants, regardless of background, feel empowered to learn and contribute (figure 5).</td>
</tr>
<tr>
<td>11</td>
<td>diverse faculty cohort and a core facilitation team on site for course duration</td>
<td>Diversity in faculty helps the instructors relate to the students, and vice versa. It supports exchange across disciplines, sectors, scales and cultures and helps to avoid discipline or sector bias in the program design. The core facilitation team’s continuous presence is important to ensure the reflection and integration of the learning experiences and to hold a space that is inclusive and supportive.</td>
</tr>
<tr>
<td>12</td>
<td>course location offering a degree of isolation with opportunities to engage first-hand with food system issues</td>
<td>Group interaction, bonding and peer-to-peer learning is optimized when the group is in a location with few distractions, yet there are still ample opportunities to engage in practical and hands-on activities with the food system (figure 7).</td>
</tr>
</tbody>
</table>

learned many lessons over time, recognized a number of challenges and identified areas for improvement. These largely relate to the many constraints and trade-offs an organization or institution faces when trying to develop a novel course that falls outside of traditional disciplines and curricula.

The first major constraint we deal with, particularly in meeting criteria 3, 4 and 5, is time. We find two weeks to be optimal for our course due to its intensive nature. But covering a large and complex system in such a timeframe is a major challenge. There is a constant trade-off between depth, breadth and integration, and it is simply not possible to cover all relevant issues. For this reason, we aim to instill a mindset of self-driven and lifelong learning by encouraging participants to identify, enlarge and access their own knowledge networks and resources during and after the course, and to explore further offerings outside of their own curricula.
The time constraints also lead to challenges in terms of allocating adequate interactive and reflective space into the course, linked to criterion 9. The short-course format privileges exchange within the cohort; however, effective learning also requires adequate time and methods for individual reflection as well as free time. Here we have had some success with blocking time for journaling and reflection as well as scheduling social activities and a free day into the course program.

Given the extensive use of participatory teaching methods, our classroom environment may be more familiar to participants used to student-centered instruction. In many contexts, the classroom is still a place where hierarchy and power relations play a strong role in determining who may speak or contribute and when. To overcome this, we devote ample time at the start of the summer school to set guidelines for how we will work and interact together, and to emphasize that participants are there to learn from one another and share their unique knowledge, skills and experience. This links directly to criterion 9, the appreciation of participants as both producers and users of knowledge. During the course, the core facilitation team observes participation and checks in with students to determine if they need any additional support.

In order to manage language asymmetry, we openly discuss potential issues and related measures at the start of the course, offer informal translation when needed, and encourage participants to help one another understand and digest the main topics from each day.

Implementing a course across sectors and scales while using diverse pedagogical approaches requires exceptional faculty and contributors; they must possess the relevant knowledge, be willing to teach in a participatory and experiential manner, and be available to travel to the course site. As this can be challenging, we have worked to build a diverse network of contributors who are aligned with the approach, and who in turn recommend colleagues when we move to other parts of the world to offer the course. Sometimes we will work with a content contributor who has a valuable depth of knowledge but limited experience with innovative teaching methods. In such cases, we offer support by designing or facilitating their session, so they can focus on sharing their knowledge and experience. All of these activities help us to collectively address criteria 2, 4, 9 and 11.

Extensive fundraising efforts allow the course to be offered at a highly subsidized rate. In addition, financial support is available to participants with limited resources.
to avoid making this a barrier to participation. While this supports participant diversity and the fulfillment of criterion 10, it means there is still a relatively high overall cost per participant. This creates limitations in terms of the feasibility for replication or scaling up. Thus we feel the thoughtful design of the course is all the more important, as we aim to have a high impact on each participant given the investment costs.

Since 2013, we have successfully replicated the original Swiss course in other locations (to date in India, South Africa, Côte d’Ivoire). This has required working with new donors and partners and adapting the course to different cultural and geographical contexts. In doing so, applying our basic design criteria has been invaluable. It ensures that the core of the course and the experiences for the participants remain the same, yet appropriately modified. We always work with local partners based in the host country who support us in developing the necessary network and align the course program and expectations with local cultural norms, including gender dynamics, management styles and approaches to learning.

Conclusion
The design criteria discussed in this paper aim to support the development of food systems education courses and programs in tertiary education. As educators with diverse experiences and backgrounds, we have designed the World Food System Summer School with the aim of serving a highly relevant and complex theme – understanding food system challenges and developing sustainable solutions.

As we continually improve these courses, we share our pedagogical design criteria and our lessons learned, which may provide guidance for other educators developing similar offerings. We fully appreciate that it may be impossible to apply all the twelve design criteria outlined above in all types of food systems education courses. However, we hope that outlining this holistic design for educators who are developing related courses can stimulate a priori reflection about how some of the elements could be integrated, regardless of the course format.

As the challenges facing our food system become increasingly pressing, the need for motivated and capable leadership is critical. Education has a pivotal role to play in the drive towards positive change, and as educators we are uniquely placed to innovate our teaching and learning formats towards this goal.

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References