Transformative Sustainability-oriented Open Education

Anne Algers and Arjen E. J. Wals

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Transformative Sustainability-oriented Open Education

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How can open education play a role in making academia more responsive and responsible in addressing ill-defined and ambiguous, but ever so urgent, sustainable development challenges? In this chapter, a case study from the field of sustainable development of food systems will provide a narrative that illustrates the possible impact of open education; and the value of a culture of openness to individuals, to a community, and to society. First, we provide a contextual background on the implications of openness in higher education. Second, we introduce the subject of sustainable development (SD) of our global food systems; and third, we discuss the concept of education for sustainable development (ESD). Fourth, by means of *thick* description (Geertz, 1973), we report a case study on open education which we discuss in light of learning theory, critical pedagogy, and sustainable development. In the end we argue for a radical interpretation of open education which we refer to as transformative sustainability-oriented open education, where ”open” refers to inviting and expressing critique and marginalized perspectives in controversial societal issues, while transformative refers to enabling learners to bring about change.

Openness in Higher Education

Open can be both an adjective and a noun. As an adjective it is defined in the dictionary as “allowing access, passage, or a view through an empty space; not closed or blocked” while as a verb it refers to “unfold or be unfolded; spread out.” “Open” in open education has emphasized the more instrumental adjectival meaning over the more emancipatory active verb meaning, although the latter meaning has gained support in recent times. The definition of open education has evolved over time, amid many differences in terminology, from the

concept of open access to a *product* - conceptualised as open educational resources (OER) - to an emancipatory *process* - Open Educational Practices (OEP) (Hylén, 2006). One of the definitions focusing on agency and empowerment is the definition by Kanwar, Balasubramanian and Umar (2010):

> The phenomenon of OER is an empowerment process, driven by technology in which various types of stakeholders are able to interact, collaborate, create, and use materials and pedagogical practices, that are freely available, for enhancing access, reducing costs, and improving the quality of education and learning at all levels. (p. 77)

A newer definition is that OEP is a catalyst for free and wide reflection on knowledge and pedagogies (Farrow, 2017).

A more technical definition is related to the use of creative commons licenses arguing that the power of OER lies in the five Rs, which are the rights to retain, reuse, revise, remix and redistribute the OER with an open license (Wiley, 2014). Wikipedia, which is the most pronounced example of Open Educational Practice (OEP), is globally used as a *scientific reference point* while, on the other hand, being held in suspicion by a range of scientists – whether their concerns are founded or not. However, in small subject areas, in particular, there is a need of a constantly critical user. This is related to the transparency of both the content and the process by which it is created. Clicking on the tabs that appear on every page allows us to read across time, which make critical reflection possible (Brown & Adler, 2008) as long as the reader is aware of each tab representing a choice made by someone else that steers in a particular direction.

Wiley and Gurrell (2009) claim that an OER has two dimensions, one that is context-free and

has to do with the accuracy of the content; and one that has to be assessed in the context between a specific user and a specific resource. One could argue that the first dimension is about the accuracy of the OER *per se* and the second dimension about its contextual values or legitimacy. Thus, we agree with Schulman (1999) that learning is most powerful when it is shared, contested, examined, and challenged in public and least useful when it is private and hidden However, there is a risk of hidden monitoring and analysing of learner behaviour not with the intent of enhancing learning but rather of influencing this behaviour that can even increase inequalities (e.g. when learning analytics is used *of* learning rather than *for* learning) or to enhance consumerism (e.g. big data mining for commercial purposes).

Open education can be regarded a potential solution to contemporary challenges as knowledge is socially challenged and therefore more robust (Camilleri et al., 2014) and invites both creativity and transgression of taken-for-granted normalized routines when open implies open to alternative perspectives, to marginalised groups and to critique and questioning. Viewed as such, OER can be a powerful force in tackling wicked problems such as climate change, toxification of water, soil, air and bodies and loss of biodiversity, that are characterized by complex interdependencies where solving one aspect of a wicked problem may reveal or create other problems (Ritchey, 2013). Such an transformative interpretation of OER can also provide a response to a commonly expressed critique that the flow of OER is most often in one direction, from the Northern to the Southern hemisphere (Hodgkinson-Williams & Arinto, 2017; Kanwar et al., 2010) which can be seen as one way to fuel neocolonialism and neoliberalism. Transformative sustainability-oriented OER, instead, has the potential to nourish, for instance, social justice when it helps to create the conditions and techniques for collaborative knowledge creation that extinguishes or at least diminishes the societal power order. Daniels et al. (2010) posit that the capacity to recognise and collaborate

on shared and open resources is a reaction to experts' groupthink and fragmentation; and conclude that by focusing on tensions and contradictions, transgressive learning situations will develop, since what chafes can lead to something new and enhanced. This way of thinking is of particular interest in the context of sustainable development as we will illustrate by zooming in on a discussion of our food system.

Sustainable Development of our Global Food systems

What can open education offer for the sustainable development (SD) of our food system? Food is essential to all beings but the way humans – over nine billion by 2050 – produce and use food affects all life on Earth as it involves the use of water, land, non-human animals, chemicals, fossil fuels, labour as well as socio-cultural practices. The development of food systems that are mindful of the well-being of all animals, both human and non-human, as well as of the planetary boundaries and carrying capacity of the Earth (FAO, 2016; UN 2018) is an enormous challenge.

The challenge of creating sustainable food systems is not defined by clear boundaries. The farming, economic, environmental and socio-ecological practices that relate to food are all inter-connected and creating sustainable food systems will need to consider all of them systemically. The United Nation's Agenda 2030 outlines 17 Sustainable Development Goals (SDG) of which 15 refer to the content of SD, roughly divided into ecological, social and economic aspects; and two SDG represent key mechanisms or processes that can help address them: SDG 4 calls for quality education and SDG 17 calls for collaboration and multi-stakeholder partnerships. Of the 15 SDGs addressing content aspects of SD all encompass so-called wicked problems (Gibson & Fox, 2013; Rittel & Webber, 1973) – characterized by

complexity, uncertainty, contestation, and multiple causation, interactions, and feedback loops – several, if not all, relate to food. As such the SD of food systems can be considered a wicked problem in that they may never be solvable, but our attempt to deal with them can advance our knowledge and understanding of complexity and as well as strengthen our ability to respond to uncertainty and ambiguity. Figure 1, below, represents an attempt to capture the global food system holistically. Still, there is no one single figure that can capture all the elements, interdependencies, and sensitivities of food production, distribution and consumption. Similarly, there is no one single figure that can capture this for any of the SD challenges.

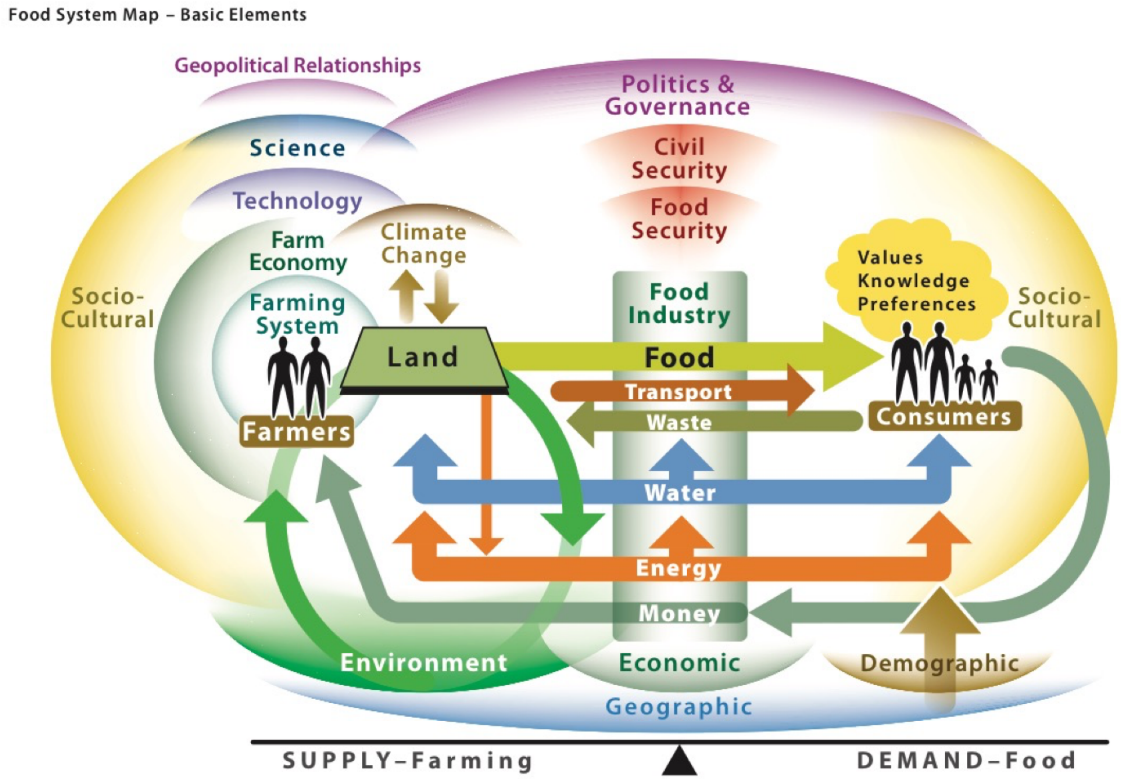

Figure 1. Basic elements of the global food systems and their relationships. The figure shows how food systems are 'nested' in other systems that connect with the world of science and technology, (geo) politics and governance, values and knowledge creation covering environmental, geographic, economic and demographic spheres and a range of chains, processes and feedback loops. (Source: GFSA at Global Food Security Alberta, ShiftN, https://gfsa.files.wordpress.com/2011/11/shiftn-global-food-system-page_1.jpeg; Open Access CC BY)

Although Figure 1 illustrates that food systems affect and involve many sectors and actors, illustrating that food challenges are nexus challenges requiring a systemic response, the figure also reveals a bias by centring the human and de-centring the non-human. Arguably, even the human centredness displays a bias as citizens are framed as ”consumers” which is a rather dehumanizing way of describing citizens as if their only role on Earth is to consume. A key point here is that what is often lacking in addressing global sustainability challenges is an understanding of how we can approach them more holistically and inclusively, for instance, considering the local-global element, the past-present-future, structure and agency, and the tension between the powerless and those seemingly in control.

Thus, there is a need to both disentangle complex elements and to learn to see and consider relations, perspectives and, sometimes conflicting interests and power relations (Kaiser & Algers, 2016). Furthermore, the dynamic nature of the knowledge regarding SD – what may seem sustainable today, may turn out to be unsustainable tomorrow as we continuously need to learn, (un)learn and recalibrate in light ongoing change and transformation - calls for reflexive forms of learning that facilitate a continuous search for the most sustainable and ethically tenable solution possible. Open education, as we interpret it here, advocates boundary-crossing at different levels: between informal, non-formal and formal learning; between science and society; and between disciplines but also between knowing and doing, as open education emphasises knowledge-in-action (Reiter, 2001).

The key characteristics of wicked sustainability challenges warrant that we consider the potential of open education as an emerging concept in education as a critical component of learning strategies that can contribute towards the realisation of a more sustainable world.

In this chapter, a case study from the field of sustainable development and democratic food systems will provide a narrative that illustrates the possible impact of open education; and the value of a culture of openness to individuals, to community, and to society.

Education for Sustainable Development

Education for sustainable development (ESD) has been around since Chapter 36 appeared in Agenda 21, the report of the UN's first Earth Summit held in Rio de Janeiro in 1992 (Meakin, 1992). Chapter 36 stressed the importance of education in raising awareness and facilitating action on global challenges around food, water, energy, biodiversity and their local manifestations. In some ways, ESD became an umbrella bringing together a number of *adjectival* educations that each had different traditions and objectives, including environmental education, health education, human rights education, and nature conservation education. Without getting into the success or lack thereof the effectiveness or impact of ESD so far (for this see Wals, 2009; 2012), we will highlight some key characteristics and a criticism of ESD (see also Wals and Benavot, 2017). First, ESD calls for the need for inter- and transdisciplinary approaches to help people understand complexity and interrelatedness. Systems thinking is often advocated as a key mechanism for realizing this, and Lane (2017) has recently suggested how systems thinking and open education in combination can support ESD. Second, ESD seeks to bridge the gap between awareness and action by encouraging exploration of real or existential issues and by creating space for attempts to make change. Concepts such as experiential learning, agency, empowerment and learning-by-doing often appear in policies, curricula and guidelines for ESD and similarly "... it is in the realms of individual and community participation and empowerment that future OER interventions hold their greatest promise and will yield their largest gains" (Arinto et al., 2017, p. 589). Third, ESD calls for deeper reflection on the values that drive what we do and what makes living

sustainably easy or difficult. Value-based teaching and learning that include ethics and moral reasoning are considered critical in moving towards sustainability, and open education has been suggested as a way to be in dialogue within contested and value-based issues of societal relevance (Algers, 2015).

Fourth, critical thinking and asking questions such as, ”What is keeping things from changing?” or ”Why am I not always acting in accordance to my values?” are essential in getting underneath the structural aspects of normalized unsustainability. More recently, dealing with socio-scientific disputes and false truths has been added to the critical thinking element of ESD, especially in light of climate change denial (e.g. Algers, 2017; Wals & Peters, 2017). Fifth, as is stated quite well in the 2016 Global Education Monitor Report (UNESCO, 2016) and building on the fourth point, the continuous emphasis on *development* itself needs to be critically assessed as is done in some Latin American countries where intentional communities speak of sustainability as an *alternative to development*. This critique has led to some scholars staying away from ESD altogether and using alternative concepts such as education for sustainability (rather than for SD) or ignoring the noun “sustainability” and adjective “sustainable” altogether.

One struggle within ESD is the tension between instrumental and emancipatory tendencies regarding the role of education in creating a more sustainable world. An instrumental perspective suggests that education is one among many tools that governments can use to make people lead more sustainable lifestyles. Here there is a somewhat agreed-upon idea of what such a lifestyle entails and what kinds of behaviours are needed to live such a lifestyle. Along with rules, regulations, policies, subsidies, and fines, education is one mechanism that can work in an agreed-upon and often science-informed direction. An emancipatory perspective, on the other hand, does leave open what the most sustainable way of living is and

suggests that this is highly contextual, time, and location dependent: it is something we need to search for but not something we can confidently prescribe. Rather than focusing on changing citizens' behaviours and lifestyles, emphasis is placed on developing the capacities and competences citizens need to become more thoughtful, considerate, critical, effective, engaged and empowered. The idea of sustainability citizenship (Wals & Lenglet, 2016) fits well with such an emancipatory approach. As educators concerned with democracy (participation, agency), equity (inter-human, inter-generational, inter-species) and sustainability (living well within planetary boundaries), we are particularly drawn to the emancipatory perspective. We believe open education has something to offer to such a perspective as it can increase space for self-determination, autonomy and co-creation. Before we present the case study that demonstrated this point, we need to declare our normative position which states that open education should contribute to a sustainable, equitable world, a world in which all people can prosper without compromising current and future planetary boundaries, including taking animal sentience and ethics into account (Fraser, 1999; 2008). In other words, we are not interested in open education as a new tool to help companies grow, expand market share, or increase shareholder value, which in our opinion accelerates unsustainability and represents a rather narrow view of education that does not serve people and planet but only the economy.

A Case Study of Open Education for Sustainable Development

The example we will focus on originates in the fact that farmers have kept animals in intensive systems and sometimes viewed the animals as artefacts; however, today many citizens do not accept this view on farm animals (Fraser, 2008; Special Eurobarometer, 2016). This has resulted in a dis-coordination in the food value-chain and contradictions between

farmers, consumers, and citizens. Differing consumer and industry expectations on farm animal welfare may lead to increasing conflicts between consumers and the food industry, which is not sustainable in the long run (Algers, 2011). Such conflict has already resulted in arson of laboratories (Friend, 1990) and arson of animal transport vehicles for slaughter in Sweden. The issue is therefore important for society representatives to tackle (Algers, 2015). We will use what can be conceptualised as a *thick* description (Geertz, 1973) to illustrate how we see the potential of open education.

In Sweden, an OER about animal welfare at slaughter and killing was created in 2012 by a team of researchers from the Swedish University of Agricultural Sciences (SLU) in collaboration with slaughterhouses, non-governmental organizations (NGOs) and representatives from religious groups; the latter were involved in writing the sections on kosher and halal slaughter. The aim of the OER was twofold: to support local efforts to increase understanding of relevant animal welfare regulations, for example, in slaughterhouses, and to provide free access for anybody interested in gaining knowledge about animal welfare at slaughter and killing.

The OER includes each species (cattle, pigs, sheep, horses, chickens, turkeys, geese, deer, reindeer, rabbits, ostriches and fur animals) structured with learning objectives, formative assessment with feedback, and take-home messages. It includes 650 webpages, 800 illustrations and 150 video clips. The OER is openly available at http://disa.slu.se/ and the Swedish Centre for Animal Welfare (SCAW) has since 2013 been responsible for updating and translating the OER under a CC BY-NC-SA license (Algers et al., 2012; Algers & Berg, 2017).

During the creation phase, the team had ongoing discussions with external agents who reviewed the OER and improved the practical handling details. The target group is diverse

and includes: i) slaughterhouse staff, animal transporters and farmers, ii) students in veterinary sciences and animal husbandry, iii) and the general public that wants to know how the food is produced. The characteristics of each sub-target group is described below:

i) New legal frameworks require education in animal welfare at slaughter and certificates of competence for slaughterhouse staff. The ideas guiding the framework is that people handling animals at slaughter need to understand the animal's behavioural needs and natural behaviour in order to recognise why animals must be treated in a specific way. Furthermore, staff should be knowledgeable about the causal link between animal stress and impaired meat quality as further motivation to handle animals with high animal welfare standards. The OER allows staff to learn from and comment on the content freely in time and space. A summative assessment is organised by a national organization and a certificate of competence is issued for slaughterhouse staff who have passed the examination (hitherto about 550 staff have taken the course and more than 500 have received a certificate; more than 1200 staff passed a simplified litigation due to long experience) with the result that, in principle, all the slaughterhouse staff handling animals in Sweden are educated in animal welfare (Nordensten, L., June 8, 2018, personal communication).

ii) Access to slaughterhouses is not self-evident and in some countries, students are not allowed into slaughterhouses. The slaughter processes are very complex and the behaviour of both abattoir staff and animals, and how these behaviours are interconnected, needs to be understood. This is very difficult to comprehend when students are visiting a slaughterhouse. It is also difficult for groups of students who visit slaughterhouses to observe animals and therefore, the use of photos and videos, and, potentially, VR-technology such as the *i*Animal Tool (The New York Times, 2017), in the OER is critical.

iii) Citizens have very little knowledge about slaughter. In a recent focus group study,

> participants argued, in a pluralistic way, in favour of information on slaughter being available to the public because: (a) slaughterhouses are entities that are traditionally closed and slaughter is probably one of the most sheltered activities and, like in all other activities, citizens want transparency, (b) there are a lot of beliefs and naïve views on slaughter and basic knowledge about slaughter of farm animals is a prerequisite to have moral opinions about food, and (c) people with knowledge have an obligation to tell, not least because animals are vulnerable. Thus, there is a case for unbiased and transparent public sharing of information that is available in a way that promotes learning. (Algers & Berg, 2017, p. 6).

Publishing photos and using video footage and even more powerful VR-technology showing slaughter is controversial because such images can be perceived as aversive. The slaughter industry's umbrella organizations were concerned that the OER would be used by animal rights groups to discredit abattoirs and the industry in general. This concern was, however, not voiced by the individual slaughterhouses. Slaughterhouses showed their satisfaction to tie practice to theory. They were proud of their work given the set of circumstances (Wickman, 2013), and wanted to share best practice. However, slaughter industry umbrella organizations required the material to be locked behind a password. After being put under pressure by the umbrella organizations, the Swedish Board of Agriculture (the main funder of the creation process) succumbed to the pressure and suggested a system based on restricted access to the learning resource, which in practice meant disregarding a signed contract with SLU about openness.

The different opinions among stakeholders created a conflict, as a result of pressure from the umbrella organizations and the Swedish Board of Agriculture on SLU to stop the openly accessible learning material and thus to break a contract. However, after discussion with the lawyer at the university about the conflict, the lawyer wrote to the involved stakeholders: “In the choice between meeting the requirements from upset stakeholders and safeguarding academic integrity, a university must always choose the latter” (Algers & Berg, 2017, p. 2). Consequently, the OER is still openly available. Further development with a shared medium that enhances the conversational framework to also enable learners to solve problems would be an improvement for democracy and sustainability; however the risks of introducing false information, fake data and offensive content and the resources needed for moderating have to be considered.

The Case Study in Light of Activity Theory, Critical Pedagogy and ESD

Geertz (1973) explains the purpose of a thick description as: ”The aim is to draw large conclusions from small, but very densely textured facts; to support broad assertions about the role of culture in the construction of collective life by engaging them exactly with complex specifics” (p. 28). However, before we draw any large conclusions we need to introduce another theoretical framework in order to properly analyse the case study.

In the analysis of human interactions within the case study, the cultural historical activity system (CHAT) is used as a lens. Engeström’s seminal work on CHAT (e.g. 2008; 2015) and peer-production discusses the necessary properties of a shared object for successful collaboration and argues that in order to give an object power it needs to have intrinsic properties. We argue that open education about democratic food systems has these kinds of intrinsic properties.

The object of activity addresses the relationship between the actors and their motives and concerns, and gives the activities a special direction; in this case study, the object of activity is a negotiation about the accepted level of animal welfare on the day of slaughter. CHAT is based on the ideas that 1) humans act collectively, learn by doing, and communicate in and via their actions; 2) humans make, employ, and adapt tools or instruments of all kinds to learn and communicate; and 3) a community is central to the process of making and interpreting meaning – and thus to all forms of learning, communicating, and acting (Kaptelinin & Nardi, 2006). In the creation of new learning approaches to food, many actors need to be involved since different competences are needed in order to identify the instruments to enable learning, adapt the content to societal rules (e.g. animal welfare legislation and rules in higher education), take into consideration power relations between actors (which is related to division of labour) and identify learning goals and gather the content. (See Figure 2 below.)

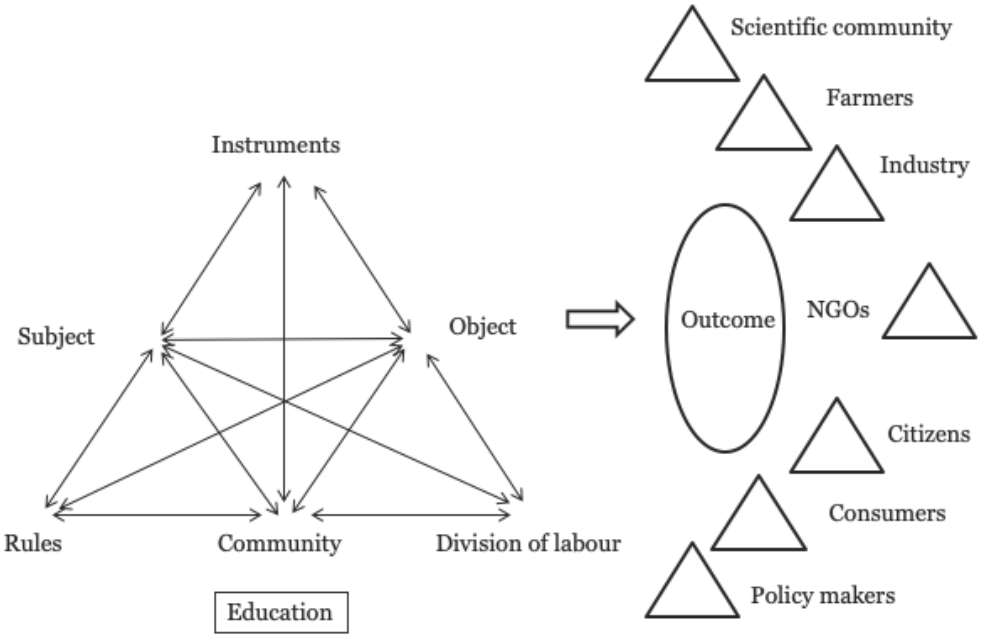

Figure 2. Activity systems involved in learning about food, with highlighted activity system for education (After Engeström, 2015).

Democratizing the educational process is a far more radical interpretation of openness than the democratization of access to formal education, which was the original goal of open

education. Furthermore, learning on the edge of one's comfort zones and challenging taken-for-granted and normalised ways of thinking can be an effect of boundary crossing (Wals & Peters, 2017). The case study is characterized by a multiplicity of stakeholders with conflicting interests: Commercially-driven cooperative industries with a profit motive of interest, animal activist communities with an empathy motive of interest, and consumer communities that may have other motives.

Thus, striving to share the same object – a mutual view on animal welfare – involves a critical view and a will to revise accepted practices and their tacit rules and procedures. This integrative approach is used to analyse the motivations of actors to their practices, in this case, how slaughterhouses look at their production systems for meat, consumer attitudes to animal products and teachers' willingness to integrate learning activities about food and animal welfare into their curriculum.

Collaborative knowledge creation based on boundary-crossing can be seen as horizontal movements of knowledge between multiple parallel activity contexts and was introduced as an expansive learning theory some decades ago (Engeström et al., 1995). This is where OER come in as boundary objects. Either they are introduced as complete objects to achieve boundary activities and connect actors from different worlds (Star & Griesemer, 1989) or they are objects that are generated through a process of boundary activities (Engeström et al., 1995). The first approach can also be described as the *cathedral* model that emphasizes top-down where understanding is shared between small groups of skilled developers, as opposed to the latter - the *bazaar* model. The *bazaar* model is an open educational practice and is based on bottom-up and open development of understanding in the public (Farrow, 2017; Raymond, 1999). This aligns again with Dewey's legacy who argued that an educational

system within a democracy stimulates learners' power, since it "gives individuals a personal interest in social relationships and control, and the habits of mind which secure social changes without introducing disorder" (Dewey, 1916, p. 99).

Formative interventions are in contrast to linear interventions, situations in which goals are not known ahead and the expansive transformation process is owned by the participants (Engeström, 2011). Hence, in formative interventions, the key outcome is agency among the participants who take charge of the process, and the intervention must be embedded and contextualised in the participants' life (Engeström, 2011). Thus, formative interventions lead to transformation and the process does not have one actor who has the sole, fixed authority; and the work never results in a "finished" product. Transformative agency is characterised as a quality of expansive learning (Sannino, 2015), in which the actors break away from the given frame of action and take the initiative to transform it and generate new concepts and practices that "carry future-oriented visions loaded with initiative and commitment by the learners" (Sannino et al., 2016, p. 4). Engeström and Sannino (2010) suggest that peer production, or OEP, is one of the biggest challenges for future studies of expansive learning alongside the serious theoretical and empirical efforts that are needed in order to understand and integrate the two directions "up and outward and down and inward" (p. 21). Peer production of learning about the food sector or animal welfare will include negotiations between the stakeholders in the food sector both because their *stakes* result in different expectations and because facts and values are intertwined in knowledge about food.

The creation and sharing of knowledge within and across organizational, disciplinary and cultural boundaries is an act of critical pedagogy, which has been described by Shor (1992), as

> Habits of thought, reading, writing, and speaking which go beneath surface meaning, first impressions, dominant myths, official pronouncements, traditional clichés, received wisdom, and mere opinions, to understand the deep meaning, root causes, social context, ideology, and personal consequences of any action, event, object, process, organization, experience, text, subject matter, policy, mass media, or discourse. (p. 129)

Critical pedagogy rejects the ideological neutrality of knowledge and argues that teaching is inherently a political act (Farrow, 2017; Habermas, 1971; Säljö, 2010) and emphasizes learners' emancipation and critical thinking. CHAT points at the transformative potential of contradictions and this is where the two might interface. When talking about sustainable development, also within the context of food and nutrition, critical questions like: What structures and routines are in place that normalize unsustainability? What alternatives might be available or can be created that can disrupt them and can lead to the normalization of more sustainable ones? Likely this will reveal contradictions. From a transformative emancipatory perspective, open education can only be open when it allows for a critical interrogation of *what is*, an open exploration of *what should be*, identification of the pathways that might get us there, and an analysis of what can help facilitate change and of what keeps change from happening.

An additional requirement or characteristic of critical pedagogy is that multiple voices are included – often those typically marginalised – and that people can contribute equally undisturbed by power relations. Dillon, Stevenson and Wals (2016) refer to civic science as a means of promoting ecological democracy (Wals & Peters, 2017) that can help disrupt, transgress, and transform unsustainable practices. Civic science here is seen as distinct from the more common citizen science to emphasize that the concerns of citizens drive forms of

collective inquiry rather the concerns of scientist. In their conclusion, Dillon et al. (2016) point at the importance of

> engaging all stakeholders as co-creators and co-learners in a deliberate and systematic process of knowledge building. An important part of this process is treating emerging goals and knowledge as tentative and subject to revision based on ongoing critical and collaborative dialogue, inquiry, and action. (p. 455)

The latter points at another element of open education: the emergent and iterative nature of collaborative learning.

Using CHAT to "read" the thick description of the case study, we can distil a number of general and critical characteristics where open education for sustainable development can be of particular relevance:

1. A transdisciplinary subject area that needs integrating both natural and social science in which perspective changes encourage disruptive thinking that goes beyond conventional ways of knowing and doing.
2. A subject area that implies affective capabilities and a sense of empathy and stewardship as well as ethical thinking.
3. A subject area that in order for societal stewardship needs intercultural communication and inclusiveness particularly for groups finding the subject highly sensitive.
4. A creation process based on a flexible and adaptable design and collaboration between academia, industry, NGOs and the public (SDG 17) for quality education (SDG 4).

5. When the object for the creation process and the outcome - the OER – never is finalized, rather a resource in flux that embraces diversities and responsiveness to societal challenges, values and norms.
6. In search for design features with abilities for enacting agency from the wider public and even from silent voices but acknowledging that the use of additional instruments has to be carefully weighed against the risk of false or fake data.
7. When navigating in complexities but, when guided properly, can result in a deeper discussion about the disadvantages for sustainable development of making hidden knowledge visible.
8. When undemocratic and sometimes fake news prescribe how people should live their lives it is academia's responsibility to take an active role on the internet. Dewey wrote that democracy is not just a means of protecting our interests and expressing our individuality, but also a forum for *determining our interests* (Dewey, 1897, referred in Wals & Peters, 2017).

The Way Forward

When stakes are high and the issues are complex and even wicked, as they are in matters of sustainable development, we argue that access to knowledge and learning across boundaries for *every* citizen requires the consideration of new qualities to open education (see the list at the end of the previous section) which can make OER more responsive, relevant, responsible and reflexive. The educational design principles in open education as described in this chapter involve many different stakeholders in informal learning activities leading to more robust knowledge (Camilleri et al., 2014) and is, in the best of worlds, a catalyst for free and wide reflection on both knowledge and pedagogies (Farrow, 2017).

"These collaborative forms of research and learning suggest a shift away from 'research as mining' grounded in empirical analytical, positivist and mechanistic traditions to 'research as activism' rooted in socially critical transformative and even transgressive traditions" (Wals & Peters, 2017, p. 36).

Finally, in light of global systemic dysfunction and the need to become bolder in responding to global sustainability challenges, we suggest that "open" also should refer to academia actively expressing and inviting critique and marginalized perspectives in controversial societal issues. Inviting dissonance, even discomfort, and surprise, will be needed to break with hegemonic forces, structures and systems that currently make exploitation, oppression and over-stepping ecological boundaries the norm. The transformative potential of sustainability-oriented open education does not so much lie in optimizing practices and values that are at their core problematic, but rather in transitioning towards alternative ones that make living sustainably by choice the default.

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Bibliography

Dr. Anne Algers is associate professor at the Department of Education, Communication and Learning, University of Gothenburg, Sweden. Her research interests include open education and technology-mediated teaching and learning within higher education. She has an interdisciplinary approach and use the framework of cultural historical activity theory.

Dr. Arjen Wals is a Professor of Transformative Learning for Socio-Ecological Sustainability at the Education and Learning Sciences Group of Wageningen University in The Netherlands. He also holds the UNESCO Chair of Social Learning and Sustainable Development. His teaching and research focus on designing learning processes and learning spaces that enable people to contribute meaningfully to sustainability.