# Beyond unreasonable doubt

## education and learning for socio-ecological sustainability in the anthropocene

Prof. Dr Ir. Arjen E.J. Wals

Inaugural address held upon accepting the personal Chair of Transformative Learning for Socio-Ecological Sustainability at Wageningen University on 17 December 2015

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ISBN 978-94-6257-369-7

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### Learning for tomorrow

*"There may be flowing water on Mars… But is there intelligent life on Earth?... While we marvel at NASA's discoveries, we destroy our irreplaceable natural resources – so we can buy pre-peeled bananas and smartphones for dogs" (George Monbiot, The Guardian, 30-09-2015)*

*"Our worries about the environment are not only academic. They affect us personally. They influence what we choose to eat or how we get to work. They keep us awake at night. They make us grieve for the world we are leaving to our grandchildren. They stop us from choosing to have kids. They trigger depression. "I don't want to live under the thumb of despair anymore," a man recently wrote to me. "Not only is it a terrible way to live, it's not productive and results in disengagement and total loss of agency. I may not be able to fix the world, but I want to go on trying through positive actions and not hiding under the bedcovers."* (Kelsey, 2014)

Young people today are disproportionately affected by global sustainability challenges in that they will have to live longer with the socio-ecological consequences of lifestyle and development choices made by the generation of their parents and grandparents, particularly in the wealthier parts of the planet. They will also have more time to work on these challenges assuming that there will be enough time still to address climate change, biodiversity loss, resource depletion, food and nutri-

1 This text is a reflection of my inaugural address: it is not a literal transcription of my spoken words. In fact there will be some differences as new ideas and priorities inevitably will have emerged in the two months between the handing in of this text and the actual inaugural address held on December 17th of the year 2015. The text is a composition of recent writing that has been published in 2015 or will be published shortly but also includes some new writing. Some of the work comes from work done with colleagues which I wish to recognize: the paper on Transformative, transgressive social learning in COSUS included Heila Lotz-Sisitka, David Kronlid and Dylan McGary, the foreword to the Springer Handbook *Educating Science Teachers for Sustainability* I wrote with Justin Dillon, and finally, the piece on sustainability in higher education where I draw on a chapter written with Valentina Tassone, Gary Hampson and Jonathon Reams. For copyright reasons this text is not to be distributed but only for personal use as a companion to the actual inaugural address.

tion insecurity and so on. These issues have in common that can be characterized as highly complex and systemic, ambiguous and contested, and urgent and existential. Being aware of the nature and seriousness of sustainability issues is in itself insufficient for resolving or even improving them (Kollmuss and Agyeman, 2002). In fact, raising awareness about sustainability issues without developing people's capacity to meaningfully and adequately address them may lead to powerlessness, apathy and withdrawal and as such could potentially do more harm than good.

Young people have a good reason to feel overwhelmed by sustainability issues as they have a full life ahead of them and may even doubt having children of their own some day in the face of the declining state of our planet. The qualifier 'may' is used in the previous sentence intentionally as we actually know very little about how young people perceive sustainability challenges, how they think they will affect their future prospects, and their perceived ability to affect change and do something about them in their present and future lives, both personally and professionally. Of particular interest here is the role of education, teaching and learning in developing young people's understandings, agency and competences to help them respond more effectively to sustainability challenges than, arguably, the generation of their parents and grandparents. Young people in many parts of the world, but certainly not all, – from early childhood education to primary and secondary education to oftentimes vocational and higher education – spend on average about 10000-hours/ per year in formal education settings. In addition there is an increased push for continuing education and lifelong learning. Yet, most of these hours are used to develop basic scientific and societal skills and literacies mainly with the aim to develop a qualified and dynamic work force that can compete in a globalizing economy. Only a fraction, at best, of these hours is spent on developing people's capacity to respond to the key challenges of our time and to help improve the well being of people and planet.

Just last year, in the fall of 2014, over 40 Dutch youth organisations petitioned the Dutch Ministry of Education and Science to take sustainability seriously in all education. They argued that the state of our Planet is a dire one as a result of what sometimes is called a major systemic global 'dysfunctionality' caused by human activity, also referred to as the anthropocene. The ministry did not respond in a satisfying way to the youth petition arguing that already a lot was being done. As a result the youth organisations found allies in the Dutch parliament who agreed to motion the government to seriously respond to their request. This motion received a majority vote basically forcing the government to take (un)sustainability seriously as a 21st Century theme that affects people and other species everywhere, now and in the future. In Sweden, where I also work part-time at Gothenburg University,

young people to seem to be drivers of sustainability as well, particularly in higher education. CEMUS, based at the university of Uppsala is a "student-led interdisciplinary education, a transdisciplinary research school, and a forum to stimulate deep discussion and innovative action on the most pressing environment, development and sustainability issues of our time" (source: www.csduppsala.uu.se/about/). CEMUS–like initiatives can be found around the word and many of them, not in the least because of social media, are becoming inter-connected and intertwined to form a movement that also gets the support from their teachers/professors.

The push by the younger generation for serious engagement of education of sustainability is urgently needed, as earlier attempts to realize such engagement have, on the whole, not been very successful. Over 40 years of promoting and developing environmental education (EE) and over 20 years of education for sustainable development (ESD) have not influenced education enough to reorient it to serving the well-being of people and planet. Arguably there has been some success at the policy-level, in part as a result of international UN-sponsored events, in the seventies, to get EE on the agenda in many countries (UNESCO, 1978) and in the last 10 years to get ESD on the agenda, especially during UN Decade of Education for Sustainable Development which took place between 2005 and 2014 (Wals, 2012). Perhaps the most recent recognition in the international policy arena of the role of education in realizing more sustainable development is the ratification of the 17 Sustainable Development Goals (SDGs) during the October 2015 General Assembly (www.sustainabledevelopment.un.org/topics). Although education is considered crucial in all 17 SDGs, SDG 4 singles out the role of education, capacity building and lifelong learning. Another indicator that signals that environmental and sustainability education might be gaining some traction in society comes from educational research where we are seeing a number of journals (e.g. *Environmental Education Research, Journal of Environmental Education, International Journal of Sustainability in Higher Education*) that are getting ISI-status through the Web-of-Science, thereby attracting researchers from other educational fields and other disciplines altogether to this area of interest. The American Education Research Association (AERA) has recognized environment and sustainability as key areas of education and research. The Nordic Educational Research Association (NERA) chose education for sustainability as its main conference theme in 2013. The Australian International Education Conference chose "international education: global, responsible, sustainable' as its theme for the 2015 conference. The European Educational Research Association recently approved a new network on Environmental and Sustainability Education (ESE) and declared "the role of education in societal transitions" as the main theme for the 2015 conference.

In addition, it is interesting to note that leading education scholars such as Martha

Nussbaum, Michael Apple, and Gert Biesta, who early in their careers paid little attention to global sustainability challenges, are now strong advocates for strengthening the role of education in co-creating more equitable, democratic, responsible, and meaningful ways of living (see Apple, 2010, 2013; Biesta et al., 2013, Biesta, 2014 and Nussbaum, 2010).

Despite these 'successes' on the international policy and declaration front, and the increased status of research and scholarship on environmental and sustainability education, environment and sustainability, on the whole, receive very little attention in education. Forces to make education serve the economy by helping young people become flexible workers who can switch jobs when the changing economic climate demands so have been far greater (Nussbaum, 2010). It was not until the very end of the UN Decade of Education for Sustainable Development, on the day before 2014's Earth Day (April 22nd) that a global newspaper, the *New York Times*, published a half page article on the role of and the need for education for sustainable development with a specific focus on teaching climate change in schools (Gardiner, 2014). Hundreds, if not thousands of articles have been published about climate change and sustainable development but rarely do they make a reference to the role of education, teaching and learning. As the world is confronted with major ecological crises leading to or amplifying major social crises (and vice versa) it is about time that the media begin to engage the question of 'How should education respond?' and 'What should people be learning and how?'

## The difficulty of education and sustainability

While there is a growing awareness that there is a need of involving people meaningfully in what seems to be the greatest challenges of our time, the earlier referred to article in the *New York Times* also notes resistance to doing so by referring to the state of Wyoming where lawmakers blocked the teaching of climate change saying that doing so could hurt the local economy. Arguably, there is very little reasonable doubt remaining at present about the seriousness of the global socio-ecological challenges threatening our planet. Yet, there is a lot of unreasonable doubt, for instance around climate change, manufactured purposely by interest groups seeking to maintain current unhealthy systems as they benefit from them the most, at least for the time being (see also: Wynne, 2010). Citizens and, indeed many educators and policy-makers, among them, find themselves confused and caught in the middle; often defaulting to the everyday routines and systems they are accustomed to in their personal and professional lives. Who to believe? What to do?

So despite the growing recognition in society that sustainability concerns need to become more in focus in education and learning, particularly among young people, it is not so clear how to do this. In part this is a result of what we might call the nature of sustainability and associated challenges. In "Message in a bottle," my first inaugural address (Wals, 2010), I argued that sustainability is both urgent and inevitably unknown. Sustainability remains a contested concept both normatively and scientifically although consensus about the rapidly declining state of planet Earth seems to be growing. Even within niches such as environmental and sustainability education there are different interpretations and meanings associated with sustainability. Sterling has described it as an inevitably ill-defined concept (Sterling 2004). Jickling once referred to the search for sustainability as a treasure hunt for an infinitely illusive object (Jickling 1992). Dreyfus *et al.* (1999) called it an attractively vague idea. More recently John Huckle, one of the first scholars to critically engage in sustainability education in the early nineties, and I wrote a paper for a special issue in *Environmental Education Research* on environmental education in the age of neo-liberalism, where we point to the danger of ESD becoming an extension of neo-liberal interests much like sustainability and 'green'.

The ill-definedness, contestation, and commodification of both SD and ESD, could easily become an excuse to not engage with sustainability in education: a risky response as the emerging sustainability challenges are too important to be ignored by educators. For those who do want to engage, there are a number of educational challenges to grapple with. For one, the growing urgency may require quick instrumental responses to change people's lifestyles and behaviours that could, in the extreme, lead to an eco-totalitarian society where education is one of several 'tools' to be used instrumentally. This might be considered problematic when education is seen as 'bildung' which is semi-autonomous movement or process that enables people to become human through their own exploration, discovery, interaction with and in the world with all its possibilities and constraints (physically, socially, morally, ecologically, economically, culturally). My colleague and good friend Bob Jickling and I have referred to this perspective as an emancipatory one where the nature of the sustainability crisis calls for a rethinking of values, reconnecting people with places and leading meaningful, ethically defensible and globally responsible lives. Here education is about enabling people to deal with, among other things, complexity, uncertainty, ambiguity and loss of identity and sense of place, in a meaningful, ethical and caring way (for the latter see for instance Noddings 2005a; 2005b). From an emancipatory point of view education is not an instrument to be used to prescribe certain behaviours or inculcate certain values but rather a means for meaningful engagement, making deliberate choices, and for relating and connecting with the human and the more than human world. Of particular interest here is Biesta's em-

phasis on the necessity of judgment: "with each question (purposes, forms, tensions) the answer does not come from research, evidence or policy but requires judgment, and not just any judgment but normative judgment that involves values based upon/ informed by a vision about education and about being human and about living together" (Biesta, 2015). Biesta maintains that ultimately education is about finding a balance between qualification – socialisation – subjectification in order to support the formation towards a grown-up way of being in the world in which we acknowledge and care for what is at stake in democracy, ecology and care (*Ibid.*).

This is not to say that there is no place for instrumentalism in saving our Planet! Should there be agreement about what is known to be sustainable and known to be unsustainable and about how we should or must live our lives accordingly, then there is a whole range of appropriate instruments or tools available: laws, regulations, advertisement, social marketing, taxation, subsidies, etc., but education is not one of them. Let me explore his a little further drawing on I chapter I co-authored with former SWEDESD Director Frans Lenglet in a book on sustainability citizenship (Wals and Lenglet, 2016).

## Known, unknown and unknowable sustainability[2]

As far as the 'known sustainability' is concerned, we might state, for instance, that sustainability consists of three hierarchically situated and dynamically interrelated dimensions: (a) the biological, geological and climatological substrate and its planetary boundaries, (b) the social relationships between humans but also between humans and the non- or more than human world including the 'natural' substrate mentioned under (a), and (c) the human-made structures, belief systems, institutions and instruments – economic, cultural, political and otherwise – that shape these relationships and are shaped by them. Many scholars recognize this description as do many practitioners and policy-makers. Still there is some language used here that may raise questions; for instance, the reference to relationships between humans and the non- or more than human world is not always well understood. Nonetheless there appears to be growing consensus that sustainability is ultimately about the interplay between people and ecologies. People constantly seek to maintain or enhance the quality of their lives - a rich mix of basic and more abstract needs. The fundamental task in the coming decades

2 In this section I draw on: Wals, A.E.J., Lenglet, F. (2016) Sustainability citizens: Collaborative and disruptive social learning. In: *Sustainability Citizenship in Cities: Theory and Practice*, edited by Ralph Horne, John Fien, Beau Beza and Anitra Nelson, London: Routledge.

is to redesign our socio-political-economic system in ways that reintegrate the dependencies between people and their underpinning ecological systems. Indeed, despite the inevitable confusion, contestation and complexity that surround sustainability, there is quite a body of robust knowledge on each of these dimensions and, increasingly, how they are nested and how they influence each other. There is a lot we *do* know – we could take the IPPC reports on climate change as an example of 'known sustainability'. However, we should immediately add that there are still uncertainties no matter how robust the knowledge appears.

When juxtaposing the known and the unknown and the sustainable and the unsustainable there is a range of possible actions, as Table 1 shows in a somewhat simplistic but hopefully provocative way. For each of the six emergent possibilities different capacities may be needed for moving towards sustainability. At the same time all six possibilities must be considered when exploring ways to become more sustainable in what we do.

*Table 1. A typology of sustainability and associated action possibilities*

| | **Unsustainability** | **Sustainability** |
|---|---|---|
| KNOWN | Actions which one knew or could have known were unsustainable at the time.<br><br>Example: dumping of toxic waste in rivers or littering plastics. | Actions which one knows for sure that are sustainable or are at least clearly more sustainable than other available options.<br><br>Example: biking to work instead of taking the car. |
| UNKNOWN | Actions which one thought were sustainable but turned out not to be so.<br><br>Example: the use of asbestos for fireproofing and insulating buildings or the use of artificial grass and rubber /Astroturf for outdoor sports. | Actions one is engaged in for quite some time without considering sustainability, but which turn out to be sustainable.<br><br>Example: The use of wind-power and biking. |
| UNKNOWABLE | Actions that are unsustainable but one, at least at present, has no way of knowing this or for which one does not have the resources or chooses not to allocate resources to find out.<br><br>Example: none, we don't know (yet)... | Actions one engages in and which one believes are the most sustainable given what one knows now but of which one will never know if they really are sustainable (at least not in our lifetime), at least in the short term.<br><br>Example: the use of solar panels and wind turbines. |

It should be noted that there is also some movement between the cells in the sense that what was once unknown can become known over time while the other way around may happen as well: what we thought was known may result in unanticipated effects, leading to a practice or rather its effects to become less known than first thought (e.g. the initial use of DDT to fight malaria or, possibly, the use of GMOs in food production). Given this dynamic it can be argued that sustainability above all requires reflexivity and the ability to continuously experiment, test, recalibrate and question one's actions, individually and collaboratively and that there will always uncertainty, confusion and controversy around what sustainability is. This recalibrating should be done against criteria for sustainability that are not frozen in time and place but established with the knowledge of today with the full understanding that this knowledge will change and that the context in which these actions are tested and recalibrated affects what knowledge is relevant.

Supposing that 'sustainability' is a once-and-for all defined 'fixed' end-goal, it would restrict the scope and range of behavioural options (pathways) and lead to compulsory if not repressive systems of enforcement. Such a system would demand diligent, disciplined and complacent citizens and *per force* the idea of 'sustainability citizenship' would constitute quite something else from what those who take on an emancipatory perspective on education and a dialogical interpretation of democracy are likely to advocate. In contrast, if sustainability is seen as an emergent and continuously to be redefined property, the range of action possibilities or pathways to sustainability becomes larger. At the same time, there are objective physical boundaries and inter-subjective – to be constantly re-negotiated – social boundaries within which the pathways need to be (re-)defined.

These considerations suggest that an emancipatory perspective on education and learning in the context of sustainability would engage learners in critical reflections on the known, the unknown, the knowable, the unknowable, the dynamics that occur when the world changes due to natural and anthropogenic causes, but also on the boundaries of the systems of which we are part (ecological, economical, social). We cannot always focus on personal growth and development as if this is an infinite possibility: we must also learn to live with constraints, within boundaries, and learn to be and to live meaningful, fulfilling and responsible lives within inevitable limitations. In a sense the 'limits to growth' (Meadows et al., 1972) warning from the Club of Rome from the early 70-ties, not only applies to economic development but also to human development, and perhaps, any form of development. This position does not match well with prevailing innovation, development and growth discourse.

## Sustain'abilities'

We *do* know a lot about these boundaries and about what is *un*sustainable, while we are increasingly learning about what is *more* sustainable. There is lots of experience to draw from. Certain human qualities, pre-dispositions, bodies of knowledge and ways of knowing are known to be generative for becoming more sustainable in what we choose to do or not to do. We can now even refer to a whole body of literature trying to describe *sustainability competence* and associated abilities (Barth *et al* 2007; Wiek *et al* 2011). Table 2 shows just one way of trying to describe such competences. Since this personal chair is located within the Education & Competence Studies Group of Wageningen University, a few words on the concept of 'competence' seem appropriate. I do not consider 'competence' as an analytical term that cuts up human behaviour into smaller pieces that can somehow be measured or captured in a rubric. Rather I view sustainability competence as a relational, contextual and emergent property. As such sustainability competence refers to a way of knowing, doing, being and transforming in action that leads to a temporary outcome that is considered the most sustainable given what we know, value and strive for at that moment in time while working on sustainability challenges in a concrete setting.

*Table 2. Dimensions of sustainability competence and associated sustain'abilities'*

| **Sustainability competence** | **Examples of sustain'abilities'** |
|---|---|
| **Dynamics and content of sustainability** | Sustainability literacy<br>Systems thinking<br>Adopting an integral view<br>*Learning to know* |
| **Critical dimension of sustainability** | Questioning hegemony and routines,<br>Analysing normativity<br>Disruptiveness, transgression<br>*Learning to critique* |
| **Change and innovation dimension of sustainability** | Leadership and entrepreneurship<br>Unlocking creativity, utilizing diversity<br>Appreciating chaos & complexity<br>Adaptation, resilience<br>Empowerment and collective change<br>*Learning to make change* |
| **Existential and normative dimension of sustainability** | Connecting with people, places and other species<br>Passion, values and meaning-making<br>Moral positioning, considering ethics, boundaries and limits<br>*Learning to be, learning to care* |

So, the use of the term, competence, seems particularly useful when it is considered as a relational and emergent property manifesting itself when people try to enact sustainability: trying things out and learning from the experience in a connected way (externally with others, internally with head-heart-hands). When competence is dissected and reduced to piecemeal behaviours and indicators of such behaviour then the use of the concept may do more harm than good. Such a reductionist view of competence perpetuates a mechanistic way of thinking that can easily lead to prescriptions of behaviours rather than to the active and meaningful engagement of citizens.

Table 2 is not meant to be exhaustive or to be read like a shopping list. Rather, the table seeks to highlight that there are at least four 'dimensions' of sustainability competence (conceptual and systemic knowledge, critical thinking, change and innovation, and an ethical or existential, normative dimension); and while each has its own qualities and associated 'sustain-abilities', they are mutually interdependent. For example, to not to include the 'existential and normative' dimension would leave us with a set of qualities that a company wishing to expand market share, increase shareholder value and maximize growth at all cost might want to have represented in its workforce. In other words, many of these qualities, especially when operationalized in isolation, could be used for purposes that have little to do with sustainability.

The same can be said about the critical dimension: without it, there is a risk that currently unsustainable systems could be strengthened and not transformed. To illustrate this, one might consider hegemonic neo-liberal forces causing a systemic 'dysfunctionality' that accelerates unsustainability at a global scale. Think of the planned obsolescence of products rather than the cradle-to-cradle production process; the inequity and exploitation that is built in market-driven privatised economies rather than an economy built on cooperation and solidarity; the reframing of human beings as consumers and lifelong workers rather than empowered citizens and life-long learners; 'straight jacketing' education to serve the economy rather than people and planet; the built-in bias towards short term thinking and the maximisation of profit and materialism over the striving for a dynamic equilibrium and meaningful living; the 'cut and run' mentality of 'place and people-less' corporations rather than place-based enterprises rooted in communities and their people; the use of deceptive language to normalize or legitimize ecological malpractice such as the use 'emissions' instead of air pollution (the term used formerly for this) or 'up to 30% plant-based material' to promote the use of plastic bottles. Even the widely hailed Sustainable Development Goals can be critiques from this perspective: while eradication of extreme poverty is accepted without question, there is no SDG calling for the eradication of extreme wealth, while the latter could probably greatly help realize the former and, indeed, many of the other SDGs.

All this calls for a critical sustainability literacy to help citizens see through this and help them recognize and question the powers at work and the directions in which they move.

Of course we need to be mindful and critical of trends and forces in education that minimize the possibilities and spaces for the cultivation of such literacy. In a blog called EducareNow, Bill Boyle, writes: *"And in thinking deeply about the role of accountability in education, we need to recognize the increasing, and mostly unconscious creep of economic utilitarianism beyond the bounds of economics into all aspects of life. The ideology of market fundamentalism, which says that all value is reduced to the single value of economics, that is, all is commodified, has a price, and can thus be measured in terms of its efficiency, threatens our collective responsibility for the democratic spaces that are essential for the formation towards a grown-up in the world with people and planet in mind"* (https://educarenow.wordpress.com/2015/07/20/accountability-and-the-erasure-of-democracy/)

Although the development of sustainability literacy and competences is essential, transitions towards a more sustainable world are unlikely to occur by relying on individuals becoming sustainability citizens without considering the other dimensions. Much literature focusing on sustainability competence places a lot of weight on the role of the individual and is based on the usually flawed assumption of the capable citizen (all equal before the law) and a level playing field between 'atomic' individuals. But individuals are not 'atomic', although they are often 'atomized' by the practices and procedures of institutions and the ideology of 'democratic' and 'consumer choice', while their behaviour is heavily circumscribed by structures, institutions and practices over which they have little influence or control.

There are many different examples of bringing deliberative democracy to wicked and complex situations, to create new spaces for collaborative and social learning that at times will need to be disruptive to break from hegemonic routines and vested powers and interests that are not serving the wellbeing of people and planet (e.g. Barry 2005; Hopkins 2013). Being disruptive or transgressive is an essential part of sustainability-oriented learning, in part also because it can create substantive rights for persons who as formal citizens have procedural rights but which they cannot exercise (Lotz-Sisitka *et al.*, 2015). This connects with Barry's view of sustainability citizenship as a form of resistance citizenship existing within and as a corrective to unsustainable development (Barry 2005). So, in addition education and learning in the context of sustainability is also about facilitation group dynamics, dialogical interaction, social movements, multi-stakeholder processes and co-creation: all weak spots within environmental and sustainability education.

## Focus of the new Chair in transformative learning for socio-ecological sustainability

From an emancipatory perspective, referred to earlier, there are at least three important questions that need to be asked: 1) what sustain'abilities' and responsibilities we need to develop in learners, 2) what learning spaces or ecologies of learning are most suitable in developing those abilities, and 3) how can the cultivation of these abilities, responsibilities and spaces be designed and supported? These questions are at the heart of the new personal Chair in transformative learning for socio-ecological sustainability. In other words, the main focus of the chair lies on understanding, designing and supporting learning processes that can help citizens understand complex socio-ecological issues through meaningful engagement and interactions with and within the social, physical and virtual realities of which people are part and the development of the capacities they need to contribute to their resolution. The addition of 'socio-ecological' to sustainability is intentional, as much work done on sustainability nowadays tends to focus on economic sustainability, often without people and planet in mind. In a way sustainability has lost its transformative edge 'sustainability' during the last decade as the much of the private sector embraced it as a marketing opportunity. Adrian Parr (2009) even suggests that sustainability has been hijacked and neutered. While economics inevitably is part of the sustainability puzzle, the need to (re)turn to the ecological boundaries in which we have to learn to live together, as well as to the well-being and meaning of life issues for all, has prompted me to make the social-ecological more prominent in the description of this Chair. Therefore, I am particularly interested in understanding and supporting forms of learning that can lead to the engagement of seemingly unrelated actors and organizations in making new knowledge and in taking the actions necessary to address socio-ecological challenges. The Chair also advocates *collaborative research efforts among scientists, educators, and the public, linking science and society with place and identity, through more effective processes of public engagement and learning that can result in meaningful socio-ecological outcomes* (Wals et al. 2014, 584).

It should be recognized that there are many forms of learning are emerging that all have promise in enabling such collaborations. They include; transdisciplinary learning, transformative learning, anticipatory learning, collaborative learning and social learning, but also the recently introduced concept of transgressive learning (Lotz-Sisitka et al., 2015). These forms of learning show a high family resemblance in that they (Peters & Wals, 2013; Lotz-Sisitka, et al. 2015):

- consider learning as more than merely knowledge-based,
- maintain that the quality of interaction with others and of the environment in which learning takes place as crucial,

- focus on existentially relevant or 'real' issues essential for engaging learners,
- view learning as inevitably transdisciplinary and even 'transperspectival' in that it cannot be captured by a single discipline or by any single perspective,
- regard indeterminacy a central feature of the learning process in that it is not and cannot be known exactly what will be learnt ahead of time and that learning goals are likely to shift as learning progresses,
- consider such learning as cross-boundary in nature in that it cannot be confined to the dominant structures and spaces that have shaped education for centuries.
- require the development of agency, action competence and disruptive capacity.

The above characteristics make clear that the search for sustainability cannot be limited to classrooms, the corporate boardroom, a local environmental education centre, a regional government authority, etc. Instead, learning in the context of sustainability requires 'hybridity' and synergy between multiple actors in society and the blurring of formal, non-formal and informal education. Opportunities for this type of boundary learning expand with an increased permeability between units, disciplines, generations, cultures, institutions, sectors and so on.

## Teaching, schooling, pedagogies, didactics for sustainability[3]

Earlier I already indicated that despite some apparent successes at the policy level and in research on environmental and sustainability education little has happened in educational practice in the last 40 years. This is hardly a surprise when considering the everyday reality of schooling. In times when teachers around the globe are held to account by the performance of their students in international comparisons such as the Programme for International Student Assessment (PISA) (OECD, 2012), which focus on literacy, numeracy, and science, it is a challenge for them to engage in something as ill-defined as "sustainability." In times when many of us, including our students, spend many waking hours gazing at an electronic screen looking for instant gratification and quick responses, even during school hours, it is a challenge to connect meaningfully with the complex issues of sustainability affecting our world. In times when schools are increasingly seen as the manufacturers of the "human capital" needed to serve the economy and as places where the seeds of consumerism can be planted at an early age, as seen in the growing influence of commercial interests in shaping education systems, it is a challenge to reorient teaching and learning to counter this status quo.

3 In this section I draw on: Wals, A.E.J., Dillon J. (2015) Preface. In: Susan Stratton, Rita Hagevik, Allan Feldman and Mark Bloom (Eds.) *Educating Science Teachers for Sustainability*, Frankfurt, Springer, p. ii – vi.

Surprisingly, there are parts of the world where there is space for teaching and learning in a sustainability-oriented education program. Several factors, often in combination, seem to be critical for such an education to occur, such as; available space for a localized curriculum; the presence of a school ethos conducive to connectivity and place-based learning; a culture of reflexivity as opposed to a culture of accountability; a local community concerned about sustainability; and the vision, leadership, and capacities educators. It may come as a surprise to find that there are countries where the entire school system has adapted to the challenges of teaching for sustainability while also doing well on international comparisons (Ählberg et al., 2015). Finland is often used as an example of a country where schools are permitted to develop their own localized curricula working on existentially relevant issues without losing sight of the so called basics (Sahlberg, 2011). It helps, of course, that Finland is a country where teachers have a high status in society, are well paid, and are encouraged to research their own practice (Rasku & Kinnunen, 2003). It appears that at the macro (societal/national) and meso (school/community) levels, there are differences in the conditions and challenges for initial teacher education and for subsequent professional development for education and learning with sustainability in mind (Stratton et al., 2015).

Sustainability pedagogy is hardly referred to in current discourses on education and learning in the context of socio-ecological sustainability and sustainable development. In linking with the earlier referred to German 'bildung' orientation as an appropriate orientation to emancipatory education, it is useful to reflect on what sustainability pedagogy might entail. Pedagogy in general refers to the creation of spaces (emotional, social and physical) that are conducive to developing, becoming and being in the world. Sustainability pedagogy adds to this a normative orientation that pre-supposes a certain way of developing, becoming and being in the world given certain expectations (e.g. about living together, what is fair, just and democratic) and inevitable constraints (e.g. the fragility of eco-systems and limits to the carry-capacity of the Earth). The Chair will seek to shed some light on what such pedagogy looks like. There are some clues available already based on, for instance, critical pedagogy and place-based pedagogy, but also on earlier work done in the field of environmental education. There's not enough time and space in this inaugural address to dive in much deeper but it seems that such a pedagogy would need to be: relational (allowing for caring for and connecting with people, places, other species, etc.), critical (allowing for critique and questioning), 'actionable' (allowing for agency and creating change), ethical (opening up spaces for ethical considerations and moral dilemma's) and political (confrontational, transgressive and disruptive of routines, systems and structures when deemed appropriate).

Sustainability, as an inevitably ill-defined and ill- structured concept, poses didactical challenges as well. Sustainability represents what some refer to as wicked problems (Gibson and Fox, 2013): problems that defy definition, have no single solution that works always and everywhere, drenched in ambiguity, and are submerged in conflicts of interest among multiple stakeholders (Figure 1). Sustainability, in a sense, cannot be taught. At best, teachers can create environments that are conducive to the exploration of sustainability issues around climate change, poverty, food security, biodiversity, and so on. As such, teaching sustainability becomes an educational design challenge.

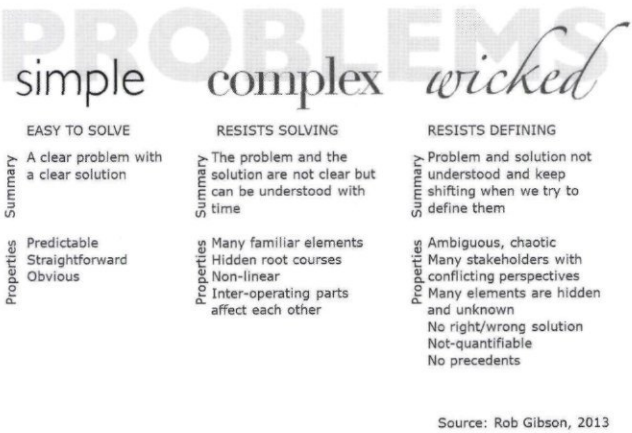


*Figure 1 A typology of problems (source: http://mofox.com/pdf/simple,complex,wicked.pdf)*

In addition to a rethinking of educational design, there will be a need to develop a new didactical orientation that enables learners to grapple with wicked problems. Sustainability didactics refers to teaching and learning, and the design of learning environments or spaces, that enable learners: to see the world more holistically, to see the local manifestations of global phenomena but also the global manifestations of their own choices and actions, to consider different time perspectives, past-present-future but also to consider short and long term effects, to help them understand systems and systems dynamics, to help them deal with complexity and uncertainty, to help them navigate socio-scientific disputes, anticipate probable futures and imagine and articulate more desirable ones, and, finally, to engage them in change and transformation to move beyond awareness and the threat of paralysis by becoming overwhelmed. That's a long sentence with high ambitions in terms of learning outcomes. As pointed out earlier, these learning outcomes are increasingly

referred to as sustainability competences or capabilities, and some speak of "sustainability literacy" (Cooke, 2010) as foundational for understanding the complex nature of sustainability challenges and their associated socio-scientific disputes. Finally, the treating of values and ethics in the classroom has been long neglected and will need to become an integral part of our education if sustainability is to be seriously addressed (Corrigan, Dillon, & Gunstone, 2007). Presently many educators appear wary of integrating values and ethics into their teaching, also because the educational policy-frameworks they work in do not encourage doing so.

## Boundary crossing, whole school approaches and ecologies of learning

One way to work on these outcomes in a meaningful and integral way is to take existential or 'real' sustainability issues as a starting point for teaching and learning, advancing more integrative ways of thinking, and engaging learners in change and transformation. This does not mean abandoning the classic school subjects, which tend to be of a disciplinary nature but rather making them relevant in our common quest to address these issues. When taught separately, natural sciences, arts and humanities and sustainability education give a disjointed answer to society's demand for a more sustainable world. This way of teaching and learning inevitably calls for a different way of designing spaces for learning or learning arena's that allow for boundary crossing between different disciplines, perspectives, interests and values. Environmental and sustainability education can be seen as a mechanism for capacity-building and the creation of so-called vital coalitions or partnerships to enable citizens, young and old, to determine together what it takes to move from the current way of living, which relies heavily on consumption, continuous growth and technology, to a more sustainable one that not only serves the economy but also and foremost people and planet. The concept of 'vital coalitions' refers to (temporary) configurations or arrangements between different groups in society that are in each other's vicinity but until they were challenged by a common sustainability issue saw no immediate reason to work together. In a sense they are brought together in their attempt to address sustainability in a meaningful way. A hybrid learning configuration then comprises a vital coalition of multiple stakeholders engaged in a common challenge using a blend of learning processes (for instance: discovery learning, joint fact finding, problem-based learning, social learning, inter-disciplinary learning) in order to bring about real, meaningful and responsible change.

We see plenty of examples from around the world where such new ways of learning are being supported and developed. Among them is the concept of 'edible school

gardens', whereby schoolchildren grow their own food in an educational garden with the support of local government, local businesses and societal organisations, while simultaneously learning about the things they grow in science lessons. In my own native country, The Netherlands, there is the example *Groene schoolpleinen* ('green school grounds') where children help design their own school yards and look for ways to make them more natural, engaging and fun, again with the support of community actors both private and public (Figure 2). Another good example is *YardMap*, which combines the use of social media, Information Technology (IT) and citizen science. Citizens, inter-generationally jointly map and analyse biodiversity in their own neighbourhood by means of digital photos, special apps and Google Maps with the aim to identify the areas with the greatest potential for boosting biodiversity. Action plans designed to ensure that the YardMaps are kept fully up-to-date are drawn up and implemented on the basis of studies and in consultation with scientists and local partners (including the municipal authority, garden centres and an NGO). The various YardMaps are linked via social media.

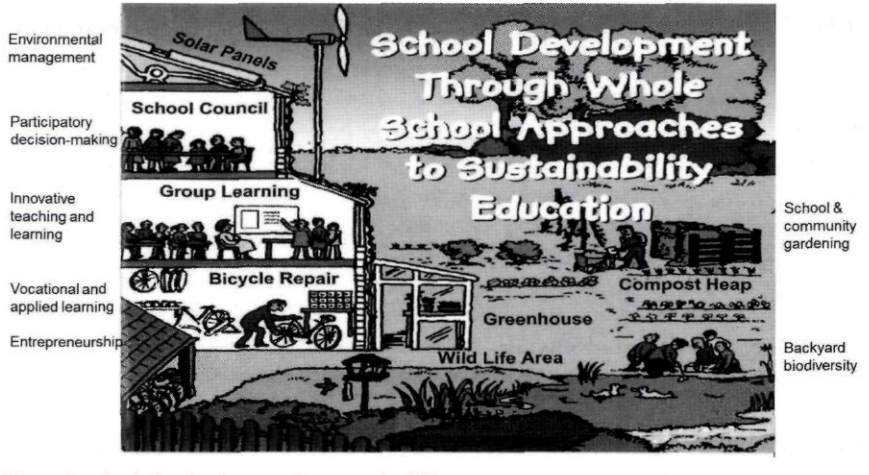


*Figure 2 A whole school approach to sustainability*

Creating closer ties between citizen science, science education and sustainability education will help citizens, young and old, and scientists take a meaningful and practical approach to the pursuit of a more liveable, enjoyable and healthy future that does not compromise the carrying capacity of the Earth and the future of our own and of other species (Wals et al., 2014). As suggested earlier, this is more than linking the content of the curriculum to sustainability issues like climate change; it also involves developing new competencies such as dealing with complexity, uncertainty and confusion, and devising and implementing meaningful local solutions often with the

support of local universities and the local government. This method of 'transformational learning' may also help to restore some of the lost public confidence in science. The government will have to put more effort into stimulating and supporting the 'hybrid learning environments' or 'learning ecologies' that blur the boundaries between science and society, school and neighbourhood, local and global, and shift the emphasis to the wellbeing of people and planet (Figure 3). Governments also need to make sure that schools and universities can participate in these arrangements.

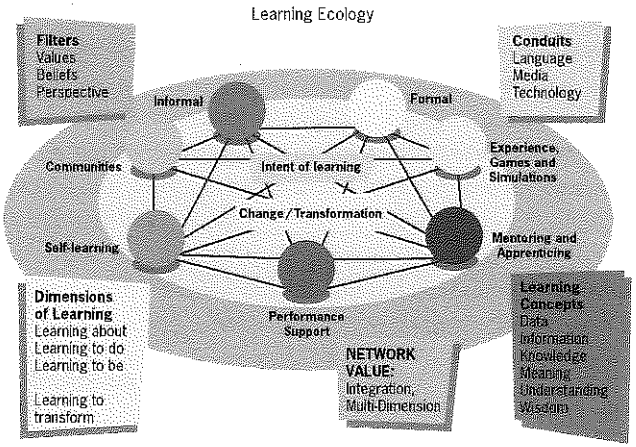


*Figure 3 Creating ecologies of learning (Source: George Siemens, 2005)*

A learning ecology here is understood as a networked, facilitated and mediated configuration of formal and informal forms of learning revolving around a change or transformation challenge. The learning is influenced by a number of factors including: the filters learners bring to the configurations (values, perspectives and beliefs), the conduits that facilitate learning (language, media and technology), the various dimensions of learning (from learning about something to learning to transform something) and the different layers of learning concepts (from data to wisdom).

## Chair's key research areas

The Chair's research agenda is to be co-designed by those connected to the Chair within Wageningen UR (e.g. the PhD-candidates) and internationally (especially with Gothenburg University and the research networks and societies connected to the Chair). However we do not start in a vacuum: the research challenges listed below appear fruitful for generating such an agenda. They are not listed in any particular order and are not intended to be exhaustive but they connect with the analysis and trends introduced so far.

1 *Initiate a comprehensive, systematic review of existing applications and case studies of "transformative (social) learning for socio-ecological sustainability"*

This component has three main purposes: (1) to continue to document the full range of interpretations of transformative (social) learning for socio-ecological sustainability as they emerge in a number of disciplines but this time with special attention to transformative processes; (2) to document the range of existing applications of transformative (social) learning; and (3) to understand how researchers and practitioners from different disciplines have attempted to funnel uncoordinated and inharmonious individual actions into collective actions that support explicit goals.

2 *Understand the role conflict, dissonance and diversity (pluralism) in transformative and transgressive social learning processes*

Although it is generally recognized that the dissonance that results from the interplay between diverging perspectives, values and knowledge systems can be a key trigger for learning, we know little about the idea of situated and personal 'optimal dissonance'. Given the importance of conflict and dissonance in transformative learning, it is important to be mindful of people's comfort zones or dissonance thresholds. Some people are quite comfortable with dissonance and are challenged and energized by different views, while others have a much lower tolerance with regards to ideas conflicting to their own. The trick is to learn on the edge of peoples' individual comfort zones with regards to dissonance: if the process takes place too far outside of this zone, dissonance will not be constructive and will block learning. However, if the process takes place well within peoples' comfort zones – as is the case when homogenous groups of like-minded people come together – learning is likely to be blocked as well.

3 *Identify key characteristics and indicators of transformative hybrid learning configurations*

An important question to be asked is what conditions and affordances that are conducive to social learning in the context of sustainability. George Siemens speaks of a 'learning ecology' to emphasize that connectivity between people is influenced and can be strengthened by a number of inter-related factors that together form a learning configuration. He uses the concept of 'connectivism' to refer to the need for the integration of principles explored by chaos, network, and complexity and self-organization theories (Siemens, 2005). During the coming years we hope to build upon these insights and unveil new ones as we will actively research a number of 'learning configurations in action' at the cross-roads of formal and informal learning.

4 *Describe competences relevant for socio-ecological sustainability*

Both the facilitators of and the participants in transformative learning for socio-ecological sustainability will need some basic competencies in order to trigger and support a learning process powerful enough to realize innovations and transitions that require a change of values, a change of (corporate) culture, a change of lifestyle, and, ultimately, a whole system redesign. But what do these competences look like and how can they be developed? The focus on competence continues to be relevant in the Chair group in which this personal Chair is hosted: Education & Competence Studies (ECS).

5 *Explore the role of ICTs and ICT-supported civic science in strengthening socio-ecological sustainability*

There is an urgent need to study ways in which ever-present technologies and cyberspaces can be used to help people (re)gain a deeper and more empathetic contact with each other and with the world (presently these technologies and spaces tend to lead to the exact opposite). One area of interest is the active involvement of citizens, young and old, in the monitoring of local socio-ecological issues by collecting real data (using for instance special apps and sensors installed on smart phones) and sharing those data with others doing the same elsewhere through social media and on-line platforms, as a catalyst for realizing the first three points. The Chair intends to connect with researchers and research programs that are also exploring this topic, in particular with the ESD Research Group at Gothenburg University and Cornell's Civic-ecology Education Group.

These five area's link with the current work done by the PhD-candidates associated with the Chair (Figure 4) but with some the connection is stronger than with others. The work of each of these PhD-candidates is fascinating and provides a source of inspiration for my own scholarship and teaching. I do not have time or space to single out there work but to make up for this I have included their published work so far in the appendix to this written version of the inaugural address. It should be noted that the application domain of the research can be in, for lack of a better descriptor, more formal learning contexts (e.g. K-12 schools, vocational schools and higher education) and more non-formal learning contexts (e.g. community-based and workplace-based) and, increasingly, at the interface of formal and non-formal contexts.

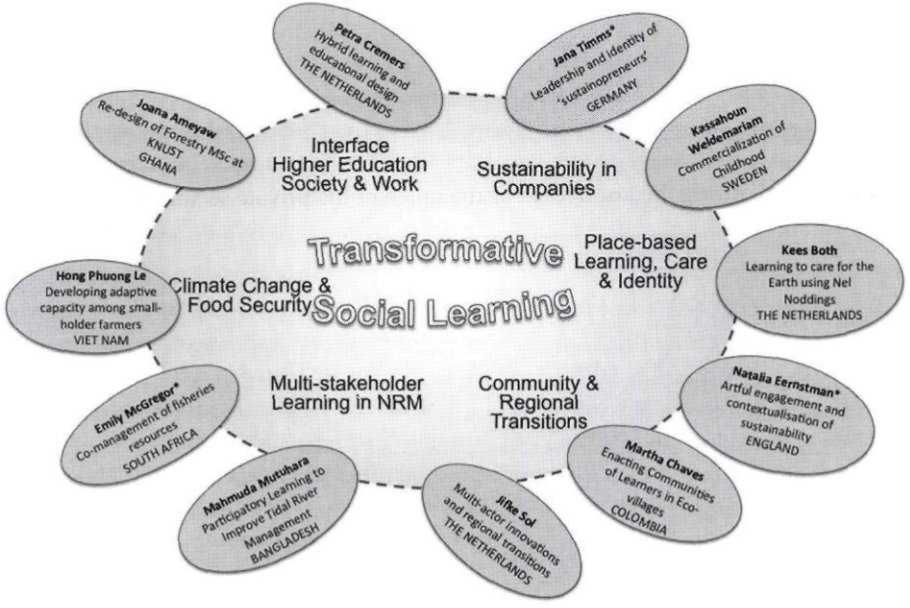


*Figure 4 PhD-candidates linked to the Chair (note * demarcates external PhD)*

A promising international research project the Chair will contribute to is 'Transgressive Social Learning for Social-Ecological Sustainability in Times of Climate Change' (T-Learning) funded by the ISSC for a three-year period. In this project participants will be working with civil society, youth, academic, government and community partners across nine countries in diverse areas that are vulnerable to arising impacts at the climate-energy-food-water security and social justice nexus to: initiate, frame and investigate expansive, transgressive approaches to learning. The project will

identify 'germ cell' activities for T-learning and examine how T-learning can initiate and expand sustainability transformations in selected community sites in Africa, Asia, Latin America and Europe. Of particular interest here is the notion of transgressing or contravening which refers to acts of disruption or consciously created disturbances that can break the unhealthy resilience of unsustainable practices, systems and routines. An example might help here. In the discourse around climate change there tends to be an emphasis on adaptation and adaptive capacity, using inevitable change as the main argument for doing so. By placing the emphasis on coping and responding, the systems that are responsible for climate change remain uncontested and the root causes untouched. This is where transgressive learning and disruptive capacity building comes in. Notice that 'resilience' does not necessarily represent a good quality. Research on this type of learning and associated capacities is urgently needed.

## Chair's involvement in educational development and innovation

As I hope has become clear by now, the question of the place of socio-ecological sustainability in the curriculum of higher education and of education in general is not one of integration but rather one of innovation and systemic change within our institutions as the latter will allow for more transformative and transgressive learning to take place. As suggested earlier such learning emphasizes 'learning for being', alongside learning for knowing and learning for doing. It requires permeability between disciplines, between the university and the wider community, and between cultures, along with the competence to integrate, connect, confront and reconcile multiple ways of looking at the world. With the increasing complexity of societies, the interdisciplinary nature of people-society-environment relationships, the problems faced at local and global scale, and the uncertainty about their solutions or resolutions, there is a need for new spaces for collaborative and transformative approaches in both education and educational development. The Chair seeks to contribute to creating such spaces by contributing to the transformation of education within Wageningen University itself and beyond. This work will be done in conjunction with Gothenburg University where Wageningen University will support the development of an International Masters in ESD, which is to start in Gothenburg in the Spring of 2017. The Initiative for Transformative Sustainability Education (ITSE) developed with staff and students in Wageningen in 2011 will guide educational development in the years to come (Schwarzin *et al.*, 2011a; 2011b)[4]. ITSE's main concern has been to

4 The initial team working on this model consisted of: Wiebe Aans; Irena Ateljevic; PJ Beers; Anouk Brack; Karen Fortuin; Lisa Schwarzin; Maja Slingerland; Valentina Tassone; Alejandra Vargas Foncesca; Arjen Wals and Renate Werkman.

develop a framework for transformative sustainability education that addresses not only theoretical knowledge and practical skills, but also guides students to question their values, attitudes and behaviours, enables them to empower themselves, and facilitates social and collaborative learning among a diversity of stakeholders. In a nutshell, ITSE wants to empower students to walk the talk of sustainable development within their own (expanding) sphere of influence (Wals *et al.*, 2016).
The framework differentiates between four dimensions of education, which must be in balance to promote learning for change (Figure 5):

- The 'objective' IT dimension refers to theoretical and applied approaches to sustainable development;
- The subjective 'I' dimension pertains to personal development needed to become actively engaged with sustainable development;
- The inter-subjective 'WE' dimension focuses on collaborative competencies for working in inter-disciplinary environments;
- The cross-boundary dimension integrates the 'I,' WE' and 'IT' through experiential, project-based learning.

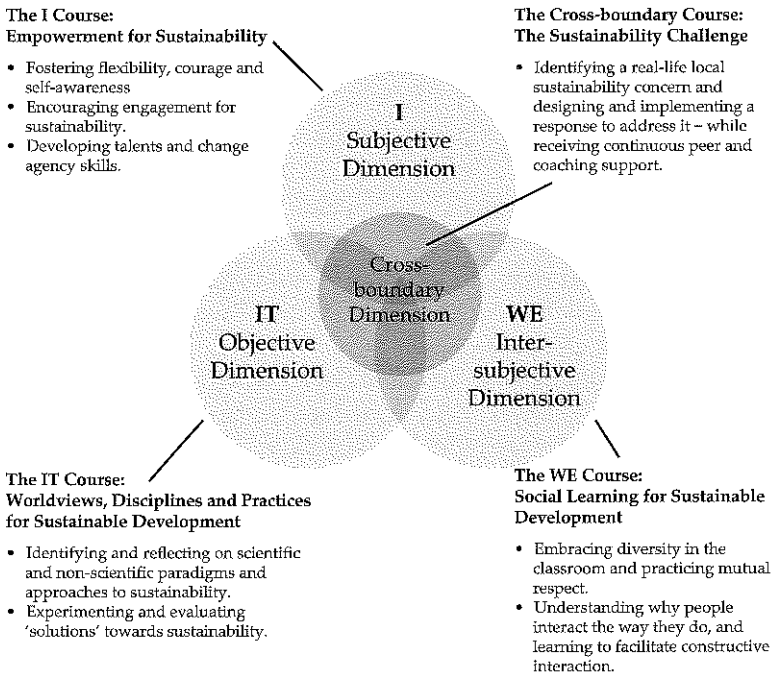


*Figure 5. The ITSE dimensions of strengthening eco-logical sustainability in education at Wageningen University*

ITSE recognizes that people learn from their total environment, which should be designed to create interaction and creativity. The IT course encourages students to develop reflexive awareness of the legitimacy of multiple scientific and non-scientific perspectives on sustainability issues and to develop awareness of the complementarities and contradictions between these perspectives. In this way, students develop a meta-awareness of transition agents and processes, and find ways to approach, analyse and contribute to sustainable development. During integrative course work, students analyse in depth a sustainability topic that fits with their personal interests and development goals. The International Masters in ESD at Gothenburg University will also have a distance-learning component which will be developed jointly with Cornell University and will build upon the Global On-line Environmental Education Course that will be co-taught with over 20 internationally known scholars of environmental education and related fields during the first half of 2016.

A new three credit course Supporting and Understanding Sustainability Transitions (SUST) has been designed to accommodate socio-ecological sustainability and the dimensions distinguished in ITSE. SUST, coordinated by colleague Valentina Tassone, will be a preparatory course for students working in interdisciplinary teams on a real sustainability challenge as a part of Wageningen's infamous Academic Consultancy Training (ACT). In order to be considered a sustainability challenge, four criteria will be loosely applied:

- The challenge focuses on addressing current sustainability related challenges, within the WU domain of food and living environment, for example challenges related to food, energy, circular economy, liveable cities, well-being, biodiversity and resource management.
- The challenge attempts to address those challenges by focusing on at least two (or more) of the following perspectives: Environment\Ecology, Economy\Business, Society\Lifestyles and Culture\Mindsets.
- The challenge attempts to address those challenges by engaging at least two (or more) of the following five key actors (including the one commissioning the project): societal organizations, research, education, governance, and private sector.
- The challenge aims to contribute to the transition of society (or a sub-system of society) towards sustainability by exploring new ways of thinking, being and doing (for example in terms of principles, practices, governance, business models, etc.)

A second new six credit course, coordinated by colleague Hansje Eppink, Teaching, Learning and Capacity-Building for Sustainable Development (TLC4SD) enables students to develop the capacity to transfer and co-create knowledge in – depending on where they see themselves going after graduation – formal, non-formal and informal

education and training settings. A third new course, 'Social and responsible innovation and institutions in food and the environment' will be a capstone course in the new Research Masters. The course investigates different institutional architectures of processes of social and responsible innovation using sustainability as a normative underpinning. The Chair will be one of the co-ordinators and instructors in the course. Finally the Chair will also be one of the co-leaders of a global on-line course on 'Environmental Education: A transdisciplinary approach to addressing wicked problems'. This course, developed by an international consortium, creates an environmental education "trading zone"—an online space where scholars and students gather to learn about multiple disciplines that shed light on how to improve environmental quality and change environmental behaviours (www.globalee.net).

The Chair, together with colleagues Hansje Eppink and Valentina Tassone, will also contribute to the Enhancing Responsible Research and Innovation through Curricula in Higher education (EnRRICH), This EU-funded project aims to support the embedding of Responsible Research and Innovation (RRI) in curricula. The EnRRICH project wants to develop the capacity, the knowledge, the skills and the attitudes of students and staff in higher education to respond to the research needs of society as expressed by civil society organizations (CSOs).

In primary education the Chair will work closely with the NatureWise Foundation (Stichting Natuurwijs) as a member of their governing board. The NatureWise Foundation develops and supports nature- and sense-of-place oriented experiential learning programs that takes children out of the class room into nature and/urban green spaces using a hart-head-hands approach in a way that allows teacher to make links with the school curriculum. The Foundation works closely with the National/State Forest Service (Staatsbosbeheer).

Finally, the Chair will continue to engage in the development of green vocational education in The Netherlands by developing the *Green Compas* to help schools integrate sustainability systemically using a learning-based whole institution approach. Colleague Anne Remmerswaal is leading this project.

## A few words on higher education[5]

*"The people with the biggest ecological footprints are note the ones who received no formal education living in poverty but are the ones with PhDs, Masters and Bachelors degrees... The conventional wisdom holds that all education is good, and the more of it one has, the better... The truth is that without significant precautions, [it] can equip people merely to be more effective vandals of the Earth"* (David Orr, Oberlin College)

David Orr's somewhat altered quotes – they have been used a lot by many others all over the world and as a result may have changed somewhat over time, much like Einstein's quotes - are a good entry point for some thoughts on sustainability in higher education. The evolution to date of sustainability and sustainable development – two related but not identical concepts (Hampson 2012) – in higher education has been described (Wals and Blewitt 2010) as a three-staged process consisting of: 1) the rise of environmentalism in the 1970s and 1980s which led to environmental engineering, environmental studies, environmental law, etc. as a part of university education and research; 2) the greening of the ivory tower with a focus on universities' own environmental impact and management in the 1990s and 2000s; and 3) the emergence of sustainability science representing holistic, systemic, integrative approaches and methodologies linking education, research and outreach. The latter perspective questions deeply ingrained methodological, organisational and educational routines which led to the, earlier referred to, commodification of education and research for serving economic interests rather than people and the planet. Sometimes the concept of a 'whole-institution approach to sustainability' is used to refer to such a perspective although this concept does not always include a rethinking of ontological (ways of being in the world) and epistemological (ways of knowing the world) assumptions.

A re-orientation of higher education towards sustainability requires unconventional ways of looking at management, leadership, knowledge creation and the interface between science and society. Some of these 'unconventional ways' are captured by sustainability science (Lang *et al.* 2012) and so-called 'post-normal science' perspectives (Funtowicz and Ravetz 1993). Sustainability science, in particular, is born out of the realisation, within a small but critical mass within the science community, that global challenges – such as climate change, food and nutrition security for all, rising ineq-

5 Here I draw on: Wals, A.E.J., Tassone, V.C., Hampson, G.P. and Reams, J. (2016) Learning for Walking the Change: Eco-Social Innovation through Sustainability-oriented Higher Education In: Matthias Barth, Gerd Michelsen, Marco Rieckmann, Ian Thomas (Eds.), *Routledge Handbook of Higher Education for Sustainable Development*, London: Routledge, p.25-39.

uity and the continued loss of (bio)diversity – are urgent and require that we explore new ontologies and epistemologies. These challenges are further compounded by the 'disconnect' between people and places by hyper-consumption- driven information and communication technologies. Ad-hoc, piecemeal solutions that are comfortably described and even the optimisation of the 'clever' systems that we have created during the last centuries, do not do the trick anymore, if they ever did. This realisation might lead to a wider recognition that addressing sustainability issues requires alternative modes of interaction, ones that allow for more systemic responses as well as the exploration of alternative values and ways of being in and relating to the world which acknowledge the inevitable uncertainty and continuous change (Peters and Wals 2013). Parallel to this there is the emergence of movements in the international policy arena that point to the need for 'responsive and responsible research' (Stilgoe et al. 2013). Although these developments appear to coincide and show a high family resemblance, they lack synergy, despite optimists' beliefs that a 'perfect storm is brewing' – one which will lead to a values and learning-based transition.

It is no surprise that in light of this there is a rise of: community engaged science (e.g. citizen science and civic science), new forms of learning (e.g. social learning and transformative learning), thinking (e.g. anticipatory thinking and systems thinking), competence (e.g. sustainability competence and normative competence), new methodologies such as practical theory building and phronesis (Peters and Wals 2013), new networks in higher education such as the living knowledge network (*www.livingknowledge.org*) and GUNI (*www.guninetwork.org*) and, finally, new forms of education and learning around 'real' locally grounded sustainability issues (GUNI 2011).

A key question is: How can higher education become the broker of this perfect storm and lead the way in values and learning-based transitions towards socio-ecological sustainability? Education and learning – in formal educational institutions and in situations where people meet and work – can be considered spaces in which people – as learners and as citizens – are invited and encouraged to explore an issue and to respond to each other's different, divergent and sometimes even mutually exclusive concerns. These are spaces where issues of public concern can be made public. Therefore, for example, in the words of Masschelein and Simons (2009: 237), the purpose of universities is not "just about making things known (as 'matters of fact') but about making them present (as 'matters of concern')." One of the tasks of this new Chair is to explore the promise of methods and approaches (ways of doing things) that allow citizens not just learn about 'matters of fact' but to make these facts, and the sustainability issue of which they are part, into a matter of public concern and deliberation, leading to collaborative learning and even collective action. In so doing, they help to (re-) establish and (re-)vitalize substantive citizen rights.

## Concluding remarks

In terms of human agency and capacity, sustainability ultimately has something to do with our ability to sustain. But *what* to sustain? *what for?* and *how?* are critical questions that are not easily answered as the world rapidly changes, knowledge becomes quickly obsolete and values and interests shift, as do the powers that drive them. I suggest that the indeterminacy of sustainability coupled with the normative position of having a moral responsibility of taking care of people and planet in a way that enables quality and dignified lives for all including non-human species, now and in the future, calls for new forms of learning and new competencies and qualities. As sustainability is an emerging property of an on-going learning process, rather than an agreed upon outcome that can be comfortably and authoritatively prescribed, transferred or taught, we need to focus our attention on the spaces (physical, social, cultural and psychological) and the conditions (levers, barriers, support mechanisms) that allow for such learning to take place in the first place. These learning spaces and conditions should allow for critiquing and even subverting existing frameworks, frames, institutions, rules of the game, procedures and patterns that have established themselves overtime and may have been useful in the times they were conceived but now turn out to be inherently unsustainable.

A sustainability citizen is one who is able to interrogate resilient unsustainability and who can participate in the co-creation of new systems and associated routines that appear, at least for the moment, more sustainable than the ones in need of replacement. Clearly this demands more than the ability to adapt to changing circumstances due to, for instance, climate change or, in light of such changes, to become more resilient as an individual and as a community. It rather requires the capacity to disrupt and to transgress prevailing, dominant and unquestioned frameworks and systems that predetermine and structure social and economic behaviour, and that, somewhat ironically, have proven to be highly resilient themselves. This capacity is little emphasized in the current discourse around sustainability governance and in circles connected to education and learning in the context of sustainable development. By stressing disruptive capacity building and transgressive learning (see also Lotz-Sisitka *et al.*, 2015) the focus shifts away from learning to cope with the negative and disempowering effects of the current hegemonic ways of 'producing,' 'consuming' and 'living' to addressing the root causes thereof and to the quest for morally defensible, ethical and meaningful lives.

How to 'design' spaces for this type of learning and capacity-building is an interesting question. We do know that breaking hegemonic systems and routines will require creative and energizing solutions that can generate a force strong enough to

create expansive niches or pockets of transformation that can with time become new "regimes" that may shift the entire "landscape" (Geels and Schot 2007). Diversity and so-called boundary crossing serve creativity. Diversity in and by itself is an insufficient quality of a community for it to become a source of creativity. Without social cohesion and basic communication skills such as listening and discussing, diversity can become a source of conflict. It can drive people apart by deepening cleavages and entrenching boundaries. Learning for (transition to) sustainability usually takes place within a continuum of like-minded, self-motivated people gathering around an issue in opposition to existing structures and powers etc. on the one hand and orchestrated 'participation' arranged by the powers that be to give a semblance of 'inclusiveness' and being open to alternative ideas on the other hand. Most activities occur somewhere in between these two extremes, where finding common ground, nurturing and giving voice, and allowing for alternative forms of decision making and exercising power need to be negotiated.

A transition to a healthy society in an ecologically viable Earth requires committed, critical and competent citizens, who aspire to values that are not purely based on the material side of their existence but also on care for fellow human beings and, indeed, other species, here and elsewhere, now and in the future. Such a transition is un-imaginable if we fail to reform and to re-orient our current education systems and ignore the power of education and learning. As such sustainability can become a driver of educational innovation in education, while simultaneously, education and learning can become drivers of sustainability.

The second opening quote of the written version of this inaugural lecture is not exactly one that radiates optimism and hope. If anything, it breathes despair. It is not my intention for the listener or the reader to come away from this address thinking 'we are on a collision course and there's not much we can do about it'. Around the world there are many examples of innovations, transitions and 'next practices' that do not have a narrow single normative underpinning of (rapid) economic growth, but a broader inclusive agenda of sustainability. As Paulo Freire articulated so well, hope must be rooted in practice, in the struggle. If not, if there is inaction, you get hopelessness and despair (Freire, 1992). Freire described hope as an ontological need that should be anchored in practice in order to become historical concreteness. Without hope, we are hopeless and cannot begin the struggle to change (Ibid.).

Fortunately there is a whole range of hopeful and generative practices emerging from student-led transformations in higher education, to citizen-led transformation of urban green spaces, to sustainability minded activist scientist engaging in transformation of energy, water and food systems, to school communities trying to green

their schools and curricula in meaningful ways, to economist beginning to challenge some of the fundamentals that underlie capitalism: there are niches that suggest a perfect storm is in the making. Another sign of hope comes from a very different corner. Ethological primatologist de Waal, who has studied apes and monkeys for over 30 years concludes in his important book 'The age of empathy' (de Waal, 2009) that greed and aggression are complemented and usually overmastered by cooperation, justice, and peacemaking in social species… let us see.

## Word of thanks

This Chair is rooted in the education and learning sciences that form the core domain of the Education & Competence Studies (ECS) group within Wageningen UR. The Chair builds upon a long tradition within Wageningen UR that started in the 1980s with the emergence of environmental extension, environmental education and environmental communication, continued in the 1990s with biodiversity education, multi-stakeholder social learning in natural resource management contexts and education for sustainable development. The latter areas have been the focus of the Wageningen University-based UNESCO Chair in Social Learning for Sustainable development, installed in 2009 and extended in 2015 until December of 2019. In less than 2 years I will have worked at Wageningen University for 25 years – that's quite some time – and I must acknowledge the university for remaining a pleasant and vibrant workplace for all those years. There is a reason for the university entering the top 50 of the Times Higher Education Index and being named this year as the world's top agricultural university by US News.

On a more personal note, there are many people who have somehow helped and/or inspired me to arrive at this point in this on-going journey, I acknowledged them in my first inaugural address 'Message-in-a-Bottle' and there will be some inevitable overlap. Let me start with the late Bill Stapp of the University of Michigan, a founding father of Environmental Education in many ways who I was privileged to have as my PhD- Chair and mentor. Then I wish to acknowledge ECS-Chair Martin Mulder who will retire next year and deserves a lot of credit for making ECS an internationally recognized group by creating a good mix of people, giving them the space and autonomy they need to excel. ECS has a powerful mix of talented people working on topical issues in education, competence development and learning.

I also wish to acknowledge my Swedish colleagues at the University of Gothenburg: they enrich my perspective and I feel our joint work is beneficial for both Wageningen and Gothenburg. In the Dutch policy-scene two people have been particularly

important to me and many others in the field of Environmental Education in The Netherlands: Dirk Huitzing and Roel van Raaij. Without them the development of EE and ESD in The Netherlands would in all likelihood have stagnated somewhere in the mid-nineties of the last century.

Much credit goes to my family as their influence on me goes much further back in time and inevitably is much deeper. Of course I must single out Anne, my partner in life who has been my loving beacon of support ever since we moved in together almost 30 years ago (talk about sustainability!) when I was a student doing an internship in a high school in Oak Park, Illinois. Another source of inspiration and energy comes from our children who, since 'Message in a Bottle' have become young adults and are now students themselves: Kendra in Leiden, Brian in Amsterdam. Clearly, without the three of you I would not be standing here today. I also wish to recognize my mother, Joke Wals, who has been the consistent force in my life nurturing and encouraging me to pursuit my ambitions but with whom I have shared a common interest in environmental and sustainability education for decades.

Finally, when weighing the pro's and con's of doing a second inaugural address or not, there was of course the argument of taking the opportunity to share how ideas have evolved and profiling new areas of education and research, but I also thought it would be another opportunity to bring those key family members who have left us unfortunately, back in the lime light, albeit just for a brief moment. Last time I dedicated the Chair in Social Learning for Sustainable Development to my father, Harry Wals, who died suddenly in 2006 at the age of 70. My father was in many ways a leading environmental educator in The Netherlands and, indeed, far beyond. His love for people and nature inspired not only me but also all those he touched around the world. With his charisma, energy, and youth, he was, without ever using the term himself, a catalyst of social learning. This time I will dedicate the chair also to Anne's mother, Maureen Gutenkunst, who passed away at a very respectable age - in good time so to speak - in her home on Beaverlake in Hartland, Wisconsin just over one year ago. She was a proud, giving and resilient woman who, unknowingly, perhaps had a closer connection to nature and a better sense of place than many of us. Those of us who have had the good fortune of looking through the window of her sun porch will know why. She was a beautiful woman who, like my father, is dearly missed.

*I have spoken.*

# References


- Ahlberg, M., Aineslahti, M., Alppi, A., Houtsonen, L., Nuutinen, A. M., & Salonen, A. (2015) Education for sustainable development in Finland. In R. Jucker & R. Mathar (Eds.), *Schooling for sustainable development in Europe: Concepts, policies and educational experiences at the end of the UN decade of education for sustainable development* (Schooling for sustainable development, Vol. 6). Frankfurt: Springer.
- Apple, M. (2010) *Global crises, social justice, and education*. New York: Routledge.
- Apple, M. (2013) *Can education change society?* New York: Routledge.
- Barry, J. (2005) Resistance is fertile: from environmental to sustainability citizenship. In: Bell, D. and Dobson, A. (eds.) *Environmental Citizenship: Getting from Here to There?* Cambridge, MA: MIT Press, p. 21-48.
- Barth M., Godemann J., Rieckmann M, Stoltenberg U. (2007) Developing key competencies for sustainable development in higher education, *International Journal of Sustainability in Higher Education*, 8(4): 416–430.
- Biesta, G. J. J., De Bie, M., & Wildemeersch, D. (Eds.). (2013) *Civic learning, democratic citizenship and the public sphere*. Dordrecht/Boston: Springer.
- Biesta, G.J.J. (2014) *The beautiful risk of education.* ***Boulder, Co: Paradigm Publishers.***
- Biesta, G.J.J. (2015) *What really matters in education*. Public lecture held VIA University College, March, 2015 (accessible via: www.slideshare.net/orlanielsen/gert-biesta-what-really-matters-in-education.
- Cooke, B. (2010) The handbook of sustainability literacy. *Innovations in Education and Teaching International*, 47 (3), 341–341.
- Corrigan, D., Dillon, J., & Gunstone, R. (Eds.). (2007) *The re-emergence of values in science education*. Rotterdam: Sense Publishers.
- Dreyfus A., Wals, A.E.J., Van Weelie D. (1999) The socio-scientific dispute character of environmental education, *Canadian Journal of Environmental Education*, 4: 155-176.
- Freire, P. (1992) A Pedagogy of Hope. Chippenham: Continuum Publishing Company.
- Funtowicz, S.O. and Ravetz, J.R. (1993) Science for the Post-normal Age, *Futures*, 25(7), 739–55.
- Gardiner, B. (2014) Setbacks Aside, Climate Change Is Finding Its Way Into the World's Classrooms. *New York Times*, April 21, 2014.
- Geels, F.W. and Schot J. (2007) Typology of sociotechnical transition pathways, *Research Policy*, 36 (3): 399-417 http://dx.doi.org/10.1016/j.respol.2007.01.003.
- Gibson, R., Fox, M. (2013) *Simple, Complex and Wicked Problems*. Retrieve at: http://mofox.com/pdf/simple,complex,wicked.pdf.
- Hampson, G.P. (2012) Eco-logical Education for the Long Emergency, *Futures*, 44(1), 71–80.
- Hopkins, R. (2013) *The Power of Just Doing Stuff*, Cambridge: Transition Books.
- Huckle, J. and Wals A.E.J. (2015) The UN Decade of Education for Sustainable Development: business as usual in the end, *Environmental Education Research*, 21(3): 491-505 http://dx.doi.org/10.1080/13504622.2015.1011084.
- Jickling B (1992) Why I don't want my children to be educated for sustainable development, *Journal of Environmental Education*, 23(4): 5-8.
- Kelsey, Elin (ed.) (2014) Beyond Doom and Gloom: An Exploration through Letters. *RCC Perspectives* 2014, no. 6.
- Kollmuss, A. and Agyeman,J. (2002) Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behaviour? *Environmental Education Research* 8(3): 239-260.
- Lang, D.J., Wiek, A., Bergmann, M., Stauffacher, M., Martens, P., Moll, P., Swilling, M. and Thomas, C., (2012) Transdisciplinary Research in Sustainability Science: Practice, Principles, and Challenges, *Sustainability Science*, 7(1), 25–43.
- Lotz-Sisitka H., Wals A.E.J., Kronlid D., McGarry D. (2015) Transformative, transgressive social learning: rethinking higher education pedagogy in times of systemic global dysfunction, *Current Opinion in Environ-*

*mental Sustainability*, 16, 73-80, doi:10.1016/j.cosust.2015.07.018

- Masschelein J and Simons M (2009) From active citizenship to world citizenship: a proposal for a world university, *European Educational Research Journal*, 8 (2): 236-248.
- Noddings, N. (2005a) *The challenge to care in schools* (2nd ed.). New York: Teachers College Press.
- Noddings, N. (Ed.). (2005b) *Educating citizens for global awareness*. New York: Teachers College Press.
- Nussbaum, M. (2010) *Not for profit: Why democracy needs the humanities*. Princeton, NJ: Princeton University Press.
- Parr, A. (2009) *Hijacking Sustainability*. Cambridge, MA: MIT Press.
- Peters, S. and Wals, A.E.J. (2013) Learning and Knowing in Pursuit of Sustainability: Concepts and Tools for Trans-Disciplinary Environmental Research. In: Krasny, M. and Dillon, J. (Eds.) *Trading Zones in Environmental Education: Creating Trans-disciplinary Dialogue*. New York: Peter Lang, p 79-104.
- Rasku, A., Kinnunen, U. (2003) Job conditions and wellness among fi nnish upper secondary school teachers. *Psychology & Health*, 18 (4), 441–456. doi: 10.1080/0887044031000147184
- Sahlberg, P. (2011) *Finnish lessons: What can the world learn from educational change in Finland?* New York: Teachers College Press.
- Schwarzin, L., Wals, A.E.J., Ateljevic, I. (2011b) Efforts to create an integrative transformative programme on sustainability at Wageningen University. In: GUNI (Eds) *Global University Network for Innovation; Higher education committed to sustainability: from understanding to action*. Series on the Social Commitment of Universities, Higher Education in the World Part 4, Basingstoke, UK: Palgrave/Macmillan.
- Schwarzin, L., Wals A.E.J. and Ateljevic, I. (2011a) Collaborative curriculum innovation as a key to sprouting transformative higher education for sustainability, In: GUNI (Eds.) *Higher Education's Commitment to Sustainability: from Understanding to Action* Global University Network for Innovation (GUNI), Series on the Social Commitment of Universities, Higher Education in the World Part 4, Basingstoke, UK: Palgrave/Macmillan.
- Siemens, G. (2005) Connectivism: Learning as Network-Creation. *ASTD Learning News*, 10 (1) 1-3.
- Stilgoe, J., Owen, R. and Macnaghten, P. (2013) Developing a Framework for Responsible Innovation, *Research Policy*, 42(9), 1568–80.
- UNESCO (1978) *Intergovernmental Conference on Environmental Education*. Tbilisi (USSR). 14-26 October 1977, Final Report. Paris: UNESCO.
- Waal, F. de (2009) *The Age of Empathy: Nature's Lessons for a Kinder Society*. New York, NY: Crown Publishing Group.
- Wals, A.E.J. (2010) *Message in a bottle: learning our way out of unsustainability*. Inaugural address held upon accepting a Professorship and UNESCO Chair in Social Learning and Sustainable Development held May 27th, 2010. Wageningen: Wageningen University, retrieval via: http://groundswellinternational.org/2010/12/14/message-in-a-bottle-learning-our-way-out-of-unsustainability/
- Wals, A.E.J. (2012) *Shaping the Education of Tomorrow: 2012 Full-length Report on the UN Decade of Education for Sustainable Development* - DESD Monitoring & Evaluation Report, UNESCO, Paris.
- Wals, A.E.J., Brody, M., Dillon, J. and Stevenson, R.B. (2014) Convergence Between Science and Environmental Education, *Science*, 344, p. 583-584.
- Wals, A.E.J., Dillon J. (2015) Preface. In: Susan Stratton, Rita Hagevik, Allan Feldman and Mark Bloom (Eds.) *Educating Science Teachers for Sustainability*, Frankfurt, Springer, p. ii – vi.
- Wals, A.E.J., Lenglet, F. (2016) Sustainability citizens: Collaborative and disruptive social learning. In: *Sustainability Citizenship in Cities: Theory and Practice*, edited by Ralph Horne, John Fien, Beau Beza and Anitra Nelson, London: Routledge.
- Wals, A.E.J., Tassone, V.C., Hampson, G.P. and Reams, J. (2016) Learning for Walking the Change: Eco-

Social Innovation through Sustainability-oriented Higher Education In: Matthias Barth, Gerd Michelsen, Marco Rieckmann, Ian Thomas (Eds.), *Routledge Handbook of Higher Education for Sustainable Development*, London: Routledge, p.25-39.

- Wiek A., Withycombe L., Redman C. L. (2011) Key competencies in sustainability: a reference framework for academic program development, *Sustainability Science*, 6 (2): 203-218.
- Wynne, B. (2010) When doubt becomes a weapon. *Nature*, 466, 441–442 (22 July 2010), doi:10.1038/466441a

## Appendix – Key publications from current PhD-candidates[6]

- Ameyaw, J., Arts, B., Wals, A.E.J (2015). Challenges to responsible forest governance in Ghana and its implications for professional education, Forest Policy and Economics (2015), http://dx.doi.org/10.1016/j.forpol.2015.07.011
- Chaves M., Wals, A.E.J., Macintyre T. (in press). A living community is always a learning community": Yes, but who said it as easy? 25 Year Anniversary Issue of the Southern African Journal of Environ Education.
- Cremers, P.H.M., A.E.J. Wals, R. Wesselink, N. Nieveen and M. Mulder (2013). Self-directed lifelong learning in hybrid learning configurations. International Journal of Lifelong Education, DOI:10.1080/02601370.2013.838704.
- Cremers, P.H.M., Wals, A.E.J., Wesselink, R., Mulder, M. (in press). Design principles for hybrid learning configurations at the interface of school and workplace. Learning Environments Research.
- Eernstman, N. and Wals, A.E.J. (2013) Locative Meaning-making: An Arts-based Approach to Learning for Sustainable Development, Sustainability, 5(4), 1645-1660.
- Sol, J. and Wals, A.E.J. (2014) Strengthening ecological mindfulness through hybrid learning in vital coalitions. Cultural Studies of Science Education, DOI 10.1007/s11422-014-9586-z
- Sol, J., Beers, P.J. and Wals, A.E.J. (2013) Social learning in regional innovation networks: Trust, commitment and reframing as emergent properties of interaction, Journal of Cleaner Production, 49 (8), 35-43. http://dx.doi.org/10.1016/j.jclepro.2012.07.041

6 Only published or accepted papers in peer reviewed journals have been included. There are other publications (e.g. book chapters) and a number of manuscripts are currently under review.

Prof. Dr Ir. Arjen E.J. Wals

*'For the first time in history one single species has succeeded in living in a way on planet Earth that disrupts major natural systems and forces in such a way that our survival is at stake. A transition is needed to break with resilient unsustainable systems and practices. Such a transition requires active civic engagement in sustainability. New forms of education and learning, including 'disruptive capacity building' and 'transgressive' pedagogies are urgently needed to foster such engagement.'*

ISBN 978-94-6257-369-7