Visions for Sustainability

IRIS

Vision without action is useless.
But action without vision
is directionless and feeble.
Vision is absolutely necessary
to guide and motivate.
(Donella Meadows)

Interactions between different logical levels
produce phenomena unseen at either level.
(Gregory Bateson)

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VISIONS FOR SUSTAINABILITY is an indexed scientific journal published in open access by the Interdisciplinary Research Institute on Sustainability (IRIS). The journal promotes a debate on how the concept of sustainability can be addressed and applied in existing and foreseeable societies worldwide. Particular emphasis is placed on facilitating communication between researchers of different disciplines, supporting educational projects and examining the role of contemporary science in dealing with issues related to sustainability. Papers are welcome from researchers and scholars of natural, political, social and other sciences as well as philosophical and humanistic disciplines, and in particular from anyone wishing to make a contribution which combines multiple viewpoints. The aim is to host as wide a range as possible of multidisciplinary, interdisciplinary and transdisciplinary perspectives on sustainability. Discussions or comments on articles which have previously appeared in the journal are also welcome. All submissions will be refereed before publication.

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Continuing Humanity's Dialogue with Nature and Itself

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"Truly, I live in dark times!". In the poetry of Bertolt Brecht, reviewed in the fifth article of this issue as a powerful voice decrying the unsustainability of the human actions that characterized his era, living in "dark times" is a recurring theme. We might consider the term equally appropriate to describe the negative forces at work in our current period. The widespread global poverty and injustice, the large-scale migration crises, the atrocious violence perpetrated both by so-called fundamentalist terrorists and those who vow to combat them, the demagogic populist movements, the aggressive protectionist nationalisms, all combine to produce a frightening international scenario. At the same time, the startling combination of ignorance and arrogance resulting, for example, in denial of climate science – for one of the US President's advisers (presumably utterly oblivious to the irony of his statement) climate change is a "manufactured crisis", while another can blithely assert "I would not agree that [carbon dioxide] is a primary contributor to the global warming that we see" – renders with absolute clarity the immense difficulties encountered in creating the necessary conditions for any one of a number of essential sustainability transitions.

In the light of all this, we have, however, no option but to continue our commitment to dialogue and reciprocal exchange, as stated in the original aims of this journal, to build connections between different visions and logical levels, creating interdisciplinary and transdisciplinary perspectives. In this respect, all of the articles published in this issue deal with the relationships between actions and impacts, awareness and accountability, understanding, resolving and reporting issues, current and new paradigms, combining aspects of visual arts, literature and science, psychology and sociology, ecology and economics, ethics and technology. Together they unite theoretical, research and educational visions we hope can make a significant contribution to humanity's dialogue with nature and itself.

Art Teachers' Education for Environmental Awareness. What is Hidden in Nature that we have never Seen or Heard?), by Ásthildur B. Jónsdóttir, offers a particular vision of the role of education in promoting awareness, attitudes and actions that put sustainability at the heart of every aspect of the human enterprise. The author's emphasis is on considering what kind of knowledge and experience should be provided by teacher education in order to enable future teachers to play such a role. The article describes a project developed in the Reykjavík Botanical Garden and involving student teachers of art and pupils who work together. The project is built on a participatory pedagogy which includes critical place-based learning in learner-directed settings and harnessing tacit knowledge to this end. It is argued that teachers with an increasing sense of self-efficacy and action competence will be better able to help pupils make choices and undertake courses of action based on sustainability. The author examines the complementary roles of art and science in the building of knowledge and how both must be based on leaners' direct engagement with their surroundings in order to stimulate their dialogue with their fellow learners and with nature and provide the vital ingredients of play, passion, participation and pertinence.

Nonviolent Conflict Transformation and Peace Journalism is a translation from the original Italian of a paper by Nanni (Giovanni) Salio, written as an introduction to a collection of essays, testimonies and experiences, in which the author summarises his lifelong exploration and practice of nonviolence within the context of the analysis and resolution of conflict and links this to the important role that can be played by peace journalism. Starting from Gandhi's belief that conflict should be seen as an occasion for dialogue and the discovery of common ground, the article examines ways of transforming aggression into a positive and non-destructive creative force for building

sustainable trajectories via nonviolent thoughts, words and actions, together with the crucial importance of education and training of professionals who work in this field. A significant role in this shift can be played by peace journalism, in terms of the responsibilities exercised both by editors and journalists concerning choices about what to report and how to report it. Such choices can enable us to go beyond the confines of much mainstream, or even war-oriented, journalism that tends to limit and determine understanding within simplistic schemes of reference such as *good* and *evil*, *right* and *wrong* or *them* and *us*, in order to promote equality at the level of building and sharing knowledge and place empathy and solidarity as a sustainable basis for dialogue between people and with their environments.

In *On the Use of Life Cycle Assessment to Improve Agronomists' Knowledge and Skills toward Sustainable Agricultural Systems*, Cerutti et. al. examine a specific aspect of the quantitative measurements and calculations of environmental impacts in agronomics in which "*in general terms, sustainability is perceived from two very different points of view: sustainability as practices, such as reducing food miles, buying organic, consuming less meat, etc., or sustainability as metrics, involving the quantification of the environmental performance of a system through the application and comparison of sustainability assessment indicators*". The approach proposed is based on Life Cycle Analysis (LCA) – which permits a quantitative description of a variety of features linked with production, (e.g. distribution, consumption, and waste treatment) that contribute to the determination of the environmental impact of a given product. The authors argue that by enabling university students to carry out LCA, they are not merely being introduced to technical facts, but also given the chance to achieve higher levels of awareness of the complexity of agricultural and food systems and of the importance of a critical appraisal of a variety of qualitative and quantitative analytical methods to evaluate their impact. Both the need to go beyond the perspectives of single disciplines and that of providing students with a variety of approaches to learning – from statistical analysis to open discussion of the data made available and from case studies to engaging students in discussion tackling open questions – are considered vital for promoting awareness of ways of accounting for environmental sustainability.

In *The Challenge of ICT Long-Term Sustainability,* Norberto Patrignani considers various aspects of the all-pervasive extension of information and communication technology within the perspective of the interdependent evolution of technologies and societies, the types, scales and, in particular, rates of technological innovation and its impact on people and environments. He argues for the urgent need to establish a new design paradigm based on criteria such as recyclability, repairability, minimization of material and power consumption and zero-waste. The paradox of acceleration of all our processes of communication, production and consumption, largely due to inexorable developments and applications of ICT, is that it creates unsustainable trajectories for human beings and their environments. Far from enabling us to have more time to engage in useful human activity as a result of the increased speed of each of our processes, acceleration unrelentingly leads to rhythms that are untenable in the context of respecting the limits of human beings and the planet they inhabit. What is necessary is an approach based on Slow Tech in order to achieve a gradual transition towards the wise production, use and disposal of ICT.

In *Humanity and Nature, Warfare and Exploitation in Bertolt Brecht's Poetry*, Enzo Ferrara and Martin Dodman look at how already in the first half of the nineteenth century Brecht's work was a precursor of many

of the themes today considered central in sustainability literature. Long before many branches of natural, economic and social sciences began to examine the unsustainable consequences of indiscriminate exploitation of natural resources and uncontrolled production and consumption processes, the German poet offered a devastating analysis of how all forms of possession, dominance and manipulation for satisfying the greed of individuals or groups, including that of warfare, are inextricably linked as human impulses that are both destructive and unbearable.

Brecht's poems bear witness to the limits and paradoxes of the endeavours of those who struggle against the forces of evil and destruction and constantly underline how our only hope for salvation is through dialogue designed to help us build and maintain common discourses and communities of values. Particularly striking is the repeated sense of responsibility toward future generations and the reiterated plea asking those generations to not judge too harshly our failures and shortcomings. "Think of us with clemency".

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Art Teachers' Education for Environmental Awareness. *What is Hidden in Nature that we have never Seen or Heard?*

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Abstract. It is argued here that teacher education needs to make a fundamental shift in the types of knowledge and experience that count as valuable for future teachers. The article reflects on some aspects of a weeklong project involving student teachers and 5th grade students that has taken place in the Reykjavik Botanical Garden for the past four years called *What is hidden in nature that we have never seen or heard?* The project has been a part of the Children's Cultural Festival. This is a collective project where more than seventy pupils from a neighbourhood school work under the direction of a group of student teachers from the Iceland Academy of the Arts (IAA). The project focuses on the transformative power of education for sustainability (EfS), and participatory pedagogy including critical place-based learning and tacit knowledge. The settings at the Botanical Garden were developed as a part of a pedagogical course taught by the author of this article, aiming to develop the student teachers' self-efficacy and action competence.

In the Botanical Garden the student teachers plan learning settings for the pupils and carry the responsibility for that week in collaboration with the local school. The work is based on their earlier learning in the pedagogical foundation course. The way of working of the student teachers in the Botanic Garden can lead to a mutual fostering of these two concepts in ways that may be expected to promote professional development and tacit knowledge. Acquiring and being able to use the concepts augments the voice of the student teachers and I discuss why such pedagogies are valuable in teacher education.

Keywords: education for sustainability, art education, action competence, self-efficacy, professionalism, tacit knowledge

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Introduction

We live in critical times for teacher education. University staff that take part in teacher education are facing the need for gaining new understandings of the ecology of our planet and our world because of climate change and the dominance of unsustainable lifestyles (Gore, 2009). Thus universities need to be able to reorient their approaches to address the knowledge and values needed for sustainability. The term sustainability is increasingly used in institutions of higher education, though interpretations can differ widely from the deeply ethical to the highly technical. In schools teachers are required to address sustainability and understand the nature of *wicked* problems, as the Icelandic national curriculum for all school levels in Iceland has placed EfS as one of the fundamental pillars for all education and all subjects since 2011 (Ministry of Education, Science and Culture, 2011).

It is important to establish intermediate spaces between 'scientific knowledge' and everyday life. One way of making this link is through artistic approaches that have the potential to work with scientific facts in a creative way with a clear connection to lived experience.

The teacher education department at the Iceland Academy of the Arts (IAA) has, like many other teacher education institutions around the world, begun implementing EfS in preservice and in-service teacher education programs (McKeown, Hopkins & Chrystalbridge, 2002). The focus at IAA has been on creating firm connections between theory and practice.

In the spring 2013 a collaborative venture between IAA, a local elementary school, the Reykjavík children cultural festival, and the Botanical Garden was established. The collaboration is based on a weeklong art workshop in the Botanical Garden (WIG) connected to the Children's Cultural festival, concluding with an exhibition. For the student teachers from the IAA their involvement is an assignment. In this article several aspects of the project are presented and discussed. The overall goal of the assignment in the WIG is to provide a variety of settings for pre-service art teachers to use as they learn to organize learning experiences for children in the community. The aim of this project and the related activities is to engage learners within the context of their communities and for them to address relevant local issues with a focus on EfS. The student teachers are 12-18 in number and they create 6-8 projects or workshops for 70-80 fifth grade children, every year. It should be noted that although we speak of the children as the learners in this article, the student teachers are also learners themselves.

WIG is now an annual project with new learners and new student teachers each year and developed by student teachers that have prior to the project covered how to approach EfS in an integrated manner. They have in the preparation course discussed different learning environments such as focusing on learning through sensory experience via material (Hetland, Winner, Veenema & Sheridan, 2013; Ingold, 2011); choice-based teaching for artistic behaviour, (Douglas & Jaquith, 2006); critical place-based education (Gruenewald, 2003; Jónsdóttir, 2013; Macdonald & Pálsdóttir, 2013; Stevenson, 2008, Wakeman, 2015); and learner-directed settings (Jaquith & Hathaway, 2011). This provides the opportunity for art educators to consider how the qualities of play, passion, participation and pertinence can be acknowledged and embraced in school settings.

My role at WIG was to facilitate settings that provided time and space for the student teachers to make connections to their prior knowledge, give them feedback and support along the journey. By using this methodology in teacher education, students are more likely to use the same methods once they become in-service teachers. The aim of WIG is for the student teachers to develop self-efficacy (Bandura, 1997) and action competence (Mogensen and Schnack 2010). Teachers with increasing self-efficacy and action competence in connection to EfS have the potential to influence the choices their pupils make and the courses of action they pursue (Kozak,S. & Elliot, S., 2014).

WIG has concrete objectives for the participating children. Working with the theme *What is hidden in the nature that we have never seen or heard?*, the aim of the workshop and the exhibition with which it ends is to raise

awareness of the impact we all can have on our natural environment, today and in the future. WIG is based on the participants' active interaction with their surroundings in the Botanical Garden and discussions on how to build a fair and sustainable society. The workshop ends with an open exhibition showing the process of the artistic workshop and the art created by pupils using their senses and their aesthetic experiences.

Motivation: Artists and student teachers

Ever since I started to teach at IAA I have taught the course on pedagogy for elementary schools, including student teaching in school. All of the pre-service students in the IAA reported in interviews that they felt they were getting too little field experience and few possibilities to try out alternative approaches in education, fearing that once they became in-service teachers they would do the same routine year after year and fall into pre-formed ideas of the role of the teachers.

My research data showed that this issue needed to be addressed and in 2013 I approached the principal of the local school and asked if the school was willing to collaborate with us. We got a grant from the city and since then this event has taken place four times and we are planning to continue. All the student teachers in visual art education participate in planning and running WIG as an assignment in the pedagogical course.

The student teachers at IAA bring a great deal of knowledge with them when they enter teacher education programs. They are all professionally trained artists, designers or architects with BA, BFA, MA or MFA degrees. Therefore, once in the program, a great deal that is taught is based on their prior knowledge. WIG gives them the potential to connect educational theories to their previous experience.

Throughout the four years of WIG I have kept a journal to analyse the development and the potential of the project, creating settings for the student teachers to discover how they can experiment with theories of developing knowledge through art creation with the pupils.

Art as a source of knowledge

Many scholars have researched art as a source of knowledge including John Beder (1993), Noël Carroll (2002), Cynthia Freeland (1997), Graham Gordon (1995), Eileen John (2001), David Novitz (1998), Louis Arnaud Reid (1985), James O. Young (2001). Their approaches are different but all come to a similar conclusion:

> *The scope and limits of the knowledge which can be derived from the arts are examined in 'What can be learned from art?'... Before artists or scientists can represent anything, they must observe aspects of the world. If their representation has cognitive value, they are grounded in careful observation. Just as scientists conduct experiments and gather observations prior to constructing theories, so artists make a careful study of the objects they intend to represent* (Young, 2001, p.65-66).

All the WIG assignments organised by the pre-service art teachers were designed to address how we impact on the world around us, and how it impacts on us. The projects carried out by the student teachers focus on contemporary issues, the problems of our time and on projects to build the future. Some of the assignments are a narrative about how we feel about our community and our planet, how we act in it, and how we care for it. This is done in order to develop deeper forms of connection through creativity and imagination, providing settings for the pupils to find other forms of knowledge and ways of being in the world. An interesting issue for sustainability education is that of tacit knowledge, the type of human knowledge that is bound up in the activity and the effort that produced it. This kind of knowledge is value adding and resides within organisations (Horvath, 1999). Tacit knowledge includes judgment, experience, insights, rules of thumb, and intuition, and its retrieval depends upon motivation, attitudes, values, and the social context. Professionals and other experts generally perform their practice primarily on the basis of tacit knowledge (Polanyi, 1967,

Horvath, 1999). To what extent can tacit knowledge be knowledge about sustainability?

The Icelandic curriculum places strong emphasis on knowledge that is gained from lived experience, but it still appears as if the common educational discourse presumes that knowledge refers to facts and objective information. The Icelandic emphasis on knowledge production is in line with Amrit Tiwana's research on different forms of knowledge:

> *Knowledge is a fluid mix of framed experience, values, contextual information, expert insight and grounded intuition that provides an environment and framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms* (2002, p. 269).

Within WIG, the pre-service art teachers experience first hand how EfS connects visual art education to the complexity of the world beyond the classroom. A significant amount of learning time has been spent outdoors, over the course of one week in the settings of the Botanical Garden. The project deals with local elements in connection to the community. The project also reflects on UNESCO's pedagogical foci that encourage cooperation and sharing of knowledge, skills, perspectives, and questions, to help pupils prepare for the world of work as well as community participation and decision-making (UNESCO, 2011). However, in spite of these similarities there are many ways in which the arts' and the sciences' contribution to knowledge is different.

Pedagogical approach

The pedagogical approach at WIG aims at developing transdisciplinary learning and teaching using art as medium, to express the participants' ideas and thoughts. The pedagogical focus criteria are reached with a balance between direct instruction and project-oriented teaching methods. WIG illustrates how a deeper understanding of subject matter can actually be enhanced through art creation. This is the foundation for the transformative power of artistic actions that form the pre-service art teachers' identity, professional values and habitus.

When organising the activities at WIG a framework called *Connecting the Dots* developed by Stan Kozak and Susan Elliot (2014) was introduced. It is built on key learning strategies for environmental education, citizenship and sustainability. In the framework Kozak and Elliot reflect on how students can become engaged and active citizens involved in achieving environmental, social and economic sustainability. The pre-service teachers use the framework and design learning strategies for the pupils with a focus on involving them as engaged learners, learning within the context of their communities, and addressing relevant, local issues.

Discovering issues about sustainability through a creative approach that sparked their imagination gave the pupils the potential for self-discovery through participating in art making and through engaging in activities outdoors. The exhibition gave the visiting guests a chance to go through a process of self-discovery, transcending their own horizons, something which was empowering for the pupils as they discovered how their artistic actions could affect the visitors.

> *Works of art are means by which we enter, through imagination and the emotions they evoke, into other forms of relationship and participation than our own. ...To some degree we become artists ourselves as we undertake this integration, and, by bringing it to pass, our own experience is reoriented. Barriers are dissolved, limiting prejudices melt away...This insensible melting is far more efficacious than the change effected by reasoning, because it enters directly into attitude* (Dewey, 1934, p. 334).

The transdisciplinary learning approach employed links concepts and skills through a real-world context, one of Paulo Freire's (1970) emphases in his critical pedagogy. The student teachers' move education beyond just blending

disciplines to an approach aimed at learning objectives that require pupils to both find answers to questions, and to form questions they themselves might have about the content. Transdisciplinary learning aims at stimulating students to solve real world problems and allows them to faithfully create and build their own ideas. Rather than supporting the idea that knowledge of the other is needed in order to engage with the other, they place more emphasis on the multiple and unique ways that individuals come into the world. Gert Biesta (2012) has come to a similar conclusion:

> *So just as competencies in themselves are not enough to capture what teaching is about, the idea of education as an evidence-based profession makes even less sense* (p.16).

The pedagogical approach at WIG stresses the importance of cultivating environmental values (Gralton et al., 2004), which is in line with the National Curriculum (2013) learning outcomes both in natural sciences and in visual art. When connecting the actions undertaken at the garden there is a strong link between education for the environment and EfS.

The actions are also in line with the framework for 21st Century Learning (P21, 2015) that highlights the vitality of transdisciplinary approaches that can promote depth of understanding as well as adaptability, which are important skills needed to succeed in our changing world. The framework was developed with input from teachers, education experts, and business leaders to define and illustrate the skills and knowledge students need to succeed in work, life and citizenship, as well as the support systems necessary for 21st century learning outcomes.

The pedagogical focus in WIG is of a participatory nature. It seeks to transform structures and practices that perpetuate undemocratic life in order to promote the development of a politically emancipatory and humanizing culture of participation, voice and social action. Scholars researching participatory pedagogy have identified three key elements for successful participatory pedagogy: 1) providing ample choice and flexibility in assignments and course activities; 2) navigating the balance between challenge and risk; and 3) creating contexts for critical reflection (Simmons, Barnard & Fennema, 2011).

Place-based learning

According to UNESCO students should understand how the earth's ecosystems set boundaries for mankind; they should understand their own ecological footprint and how the ecological footprint of societies and nations is linked to development; they should be able, in a critical way, to evaluate the value of information about environment and nature; they should be active and responsible citizens with regard to the environment and nature; they should be able to formulate a critical opinion on the environment, society, culture and economic system; they should have an understanding of the common responsibility of the human race on earth and her inhabitants (UNESCO, 2005).

In this respect, places can be very fruitful learning sites for students. In order to learn to understand themselves and their environment students need to get a sense of their own place (Greenwood, 2008). The WIG project has a place-based focus. Place-based learning is informed by cross-curricular links and contextualized by the diverse characteristics of the places that are studied. Place-based approaches and the tasks proposed are primarily intended to motivate the pupils through humanistic and scientific engagement with their surroundings (Gruenewald & Smith, 2008).

Sustainability: Learning steps

We do not really know how learners, be they children or adults, begin to understand the world in terms of sustainability concepts. Current discourse is, however, extremely fertile, offering a range of ideas and terms, increasingly involving everyday language. In WIG many new concepts were developed. What follows illustrates a few influential areas of discussion

which have been used by scholars and increasingly by learners and so are entering common educational discourse.

Frequently, when issues of sustainability are discussed, questions of social behaviours and cultures are discussed in connection with environmental problems. Discussion also involves whether sustainability could be considered as an intersection of the economic, social and environmental sectors or whether social and economic systems are inherently limited by the environment (Huckle, 2005). The course I developed at the IAA was also framed by issues emerging after the turn of the century and then used frequently during the Decade of Education for Sustainable Development (DESD) from 2005 to 2014 and coordinated by UNESCO (2005). A massive website has enabled the development of a basic vocabulary across many countries.

In the early seventies two economists put forward the notion of *wicked* problems, defined as those characterized by high levels of complexity, ambiguity, controversy and uncertainty both with respect to what is going on and with respect to what needs to be done (Rittel & Webber, 1973). Wicked problems is a term frequently used but still perhaps not well understood and thus requires extensive discussion (Singer & Macdonald, 2016). To use the term appropriately we need to understand many factors: that wicked problems are hard to define because of the actual nature of the problem; that there is no one solution to a given problem, because each one is unique (Macdonald & Jónsdóttir, 2014); that the solution to the problem differs depending on time and space; that it is neither right nor wrong; and sometimes the problem itself does not appear until the solution is found (Rittel & Webber, 1973; Thompson & Whyte, 2011).

In recent years education for sustainability scholars have applied the wicked concept to a range of issues. A parallel discussion is being addressed more vigorously now as some scholars have reached the conclusion that it is no longer possible to be satisfied with a transformation of knowledge, a concept that we have been using in justifying new approaches. What is now needed is 'transgression' where we move beyond our current set of values and practices, and 'look back' and try to cross boundaries and move into areas that would question current structures and not set about transforming them (Lotz-Sisitka, Wals, Kronlid & McGarry, 2015). A further discourse would say that knowledge is plural, contested and inherently contingent (Colucci-Gray et al., 2013). What is important to emphasize is that we are moving within a new and complex field and the language of sustainability is constructed as we research it and learn more about it. This was and is a challenge for teachers and learners.

A case study from Reykjavík

The data for this study are drawn from my personal observation. I designed the project and have organised and developed it from its outset. This case study uses action research and records my observation through journal writings.

The case examines some of the most important, distinct and successful aspects of the four years of WIG. The specific focus of this paper is on the participatory pedagogy which the pre-service art teachers have used in their process of becoming reflective professionals of EfS. I also reflect on the claims of knowledge making through art, the successes and the difficulties experienced, and the teacher educator's effort to develop rational dialogue when reflecting on the practice of promoting critical reflection in connecting theory and praxis.

Using action research to approach investigation has become increasingly important to me as an assistant professor and a programme director where I have responsibility for development. My findings have led to new understanding of operational significance for the practice at the teacher education department at IAA. This has advanced knowledge about EfS within teacher education. The investigation has the potential to help improve teaching and learning within

the programme and to contribute to a redefinition of the teacher educator's role within the development of the programme, specifically in terms of values, processes and methods (Brockbank & McGill, 1998).

The research process followed a similar format for each year, beginning with taking notes throughout the whole process and interviewing some pre-service art teachers who have taken part in the project. It also includes analyses of student teachers' written responses and assessment meetings. During the WIG process, permission was sought, and in each case granted, to tape-record the semi-structured interviews conducted. According to Yin (1984), the strength of a case study is that it is based on multiple sources of evidence which allow the investigation to retain the holistic and meaningful characteristics of real-life events.

Results and discussion

Over a number of years, the pre-service art teachers have created very different approaches or themes with their groups of pupils. When the learning outcomes of WIG have been analysed, there are indicators that show a sense of belonging, increased community vitality, cultural knowledge, and awareness of new artisan skills. The projects raised the participating 5th grader's awareness of their environment and its care through a focus on eco-friendly behaviours, connection to raw natural materials, ecological knowledge and waste management.

Most of the WIG groups have created projects that require intellectual quality including higher order thinking skills, deep knowledge, deep understanding, and substantive conversation. All of them have developed experience-based learning for the pupils with a focus on being in a natural environment, learning by doing, and working on projects in which they have choices and a chance to make decisions.

By creating an open exhibition as part of the week of cultural celebration for children, the project as a whole directed the learning to an audience beyond the classroom. As an organiser, I also created a photo essay showing the children at work, which was exhibited in the Botanical Gardens café.

The key learning strategies for the WIG can be explained in a mind-map based on the *connecting the dots* framework. The mind-map was created as part of the project assessment. The assessment meetings at IAA with the student teachers lasted for approximately three hours. After each meeting the researcher wrote detailed descriptions from her notes for later analysis. The purpose of this was to draw out the major issues connected to education, themes, issues of implementation, changing attitudes etc. The findings ultimately enabled analysis connected to current available literature. The following section uses data from the four projects to examine the different ways of working with tacit knowledge that encouraged the pupils to become aware of issues related to sustainability within UNESCO's sustainability learning framework (2005).

Content of the learning from WIG in relation to the UNESCO's Learning pillars

When the activities are considered with regard to the learning pillars identified by UNESCO (2005), one can see that the projects touch on various different examples of each of the following: Learning to know; Learning to be; Learning to live together; Learning to do; Learning to transform oneself and society.

Learning to know

The student teachers have appreciated being able to access the resources and expertise of the Botanical Garden staff. The members of staff have shown them how the Botanical Garden comes alive in the spring. Some of the groups have created sound magnifiers so they can listen to the root system of the trees waking up from the frosty winter.

The student teachers have reflected on the importance of trying, by using their own skin, to reflect on the local environment. Some of the groups have developed projects with a focus on sensory experience. The pupils then focus on learning from the materials available, for example one year when a moss and fungus specialist was working in the Garden moss became the theme of one of the groups, such as reflecting on why moss is sometimes unwanted and sometimes desirable. Another group has worked with soil and different kinds of sand to create the perfect mud to build things from. Some of the student teachers have used storytelling in their approach as the materials and accessories that are presented in the garden have become part of the pupils' experience. Stories are an engaging way to open and encourage dialogue, both with the materials used and also with each other (Gersie, 1992).

Learning to be

Most of the WIG projects have built on the principles and values that underline sustainable development. The overall objective of WIG is to contribute to the participants' personal development where mind and body, intelligence, sensitivity, aesthetic appreciation and spirituality are all challenged.

Some of the groups of 5th graders reflected on active citizenship, like the group that created their own *Small society*. The group had started to discuss different societies and some of them had seen a new report on artists that had lived in a Mongolian yurt in Iceland. Those artists had carried out creative projects and promoted of a different way of working and living. A student teacher stated:

> *We had a great conversation about the use of materials and the traditions that are inherent in this kind of adaptable architecture. The Mongolian Yurts are attracting interest from people in many parts of the world as an ecologically friendly and attractive living space that can be used for a variety of purposes* (Student teacher 2015).

The group of pupils had, by end of the week, created a set of community rules they found important, and an environment within the yurt where everyone in the group had something to say. They had brought old sheets and curtains to create the yurt itself, decorated it, and constructed decorations or ornaments that were inspired by indigenous cultures in order to drive away bad spirits. Many of the projects

related to community have also helped the pupils to learn to live together.

Learning to live together

Here the objective is to know oneself in the context of complicated social structures and to develop attitudes towards society and the environment. Other groups have reflected on differences and observations of how the lifestyle of people has changed. For example, in the neighbourhood of the Botanical Garden there are hot springs that people in Reykjavík used wash their clothes in. Some of the WIG groups have paid tribute to these washerwomen that had walked across the city, the group created sculptures that reflected the hard work the women had carried out. The children also did experiments with a range of fabrics that they got at the Red Cross, and then dyed them in different ways. One pupil had brought with him a cool-aid drink. After discussing colour pigments in the drink they decided to do experiments with colouring fabrics using both cool-aid and natural colours.

By creating a project like WIG, the student teachers can practice designing and teaching a good quality arts education and discover it as an essential component of holistic education, both formal and informal. Some of the projects have aimed at building capacity for community-based decision-making, resulting in community rules that include social tolerance, environmental stewardship, adaptable workforce and quality of life.

In WIG informal learning is a local ongoing phenomenon of learning via participation and is in contrast with the traditional view of teacher-centred learning that can be described as knowledge acquisition. The pre-service art teachers create an environment in which learning is able to flow and develop in whichever way and direction the pupils desire. Within that ideology the belief is that the pupils will end up learning more, not only about what they we need to know, but also about things that interest them. This kind of learning is transdisciplinary, aiming for the pupils to solve real world problems and allow them to faithfully create and build their own ideas.

Learning to do

Some of the groups focused on contributing to a concrete reality characterizing all our daily decisions and actions. Approaches to the theme *Fair community* have been very frequently aimed at building a sustainable and safe world for everyone. One of the groups chose to create a world they called *Togetherness* where the main focus was on playing together and experiencing new and unexpected things. They asked to be located outside the official Botanical Garden to have more freedom. One child wanted to experience how it would be to live underground. He and some of his friends spent a long time digging a hole in a hill they found. This provided a great learning curve for them as they learned to use different tools for digging and removing stones and different kind of soil.

Both artists said that the pupils that had spent the whole week outdoors (not going in to the greenhouse at all) and had been very happy.

> *Actually being in the environment experiencing its beauty, seeing the effects of their artistic activities had an impact on the pupils. Some of them were not sure if this was an artwork or not...but that really does not matter* (April 2016).

This pair places a strong focus on validating the process. They appeared excited by the prospect of choosing a project significant to themselves and allowing the pupils to have the liberty to design a course of action (Researcher notes 2016).

One of the groups called themselves the *Hawks* drawing the name from the bird that has great skill in noticing things around them. They worked like spies reflecting on the relationships they noticed with others participating in the project.

They created their own tools to report on their findings, and created metaphors mapping out different relationships to the garden that they had absorbed in the groups in working within WIG.

They noticed how some of the children liked to work small-scale while others liked to create bigger things. Some created something abstract while others were working with more concrete things. Some chose to work as a team while others worked in smaller groups within each large group.

Learning to transform oneself and society

Through this research I have learnt how to systematically use actions which influence the sustainability of society. All the fiver pillars of learning relate to all phases and areas of learning in the WIG project. The pillars support one another and are embedded as basic principles in the WIG project, resulting in collective learning for the student teachers as they learn to transform themselves and society. This includes that they have been able to integrate the values inherent in sustainable development into all aspects of their learning through the project. The cross-curricular themes applied in WIG that have been designed by the student teachers and the broad competences for integration in and across subject areas and learning domains have empowered both the pupils and the student teachers. This results in student teachers taking on responsibility for creating learning settings that aim for the pupils to envision a sustainable future.

The student teachers have reflected on the importance of the intermediate space that WIG provides for them and how it elicits their potential to develop their self-efficacy and action competence. Many of the participants have stated that their experience in WIG, together with their own tacit knowledge and experience, can be used to arrive at informed decisions for the good of themselves and others. They have also stated that the experience made it possible for them to focus

on increased participatory virtues (Macdonald & Jónsdóttir, 2014) where individuals have the potential to be more creative and include discussions on wellbeing in other spheres of life. That embraces encouraging freedom of expression and enriching the learner's creativity and imagination.

> *The student teachers' enthusiasm for their projects seems to arise from the pleasant discovery that they are able to connect educational theories to their own practice. One student teacher, for example, credited this project with making her more willing to experiment with different strategies. Indeed many of them felt empowered as professionals capable of connecting theory with practice, and able to use their judgement to adapt curriculum and educational strategies to the pupils' needs and to the context* (Researcher journal, 2016).

Learning by doing and challenges

Many of the student art teachers have described their experience in the WIG as learning by doing. Many referred to their experience as 'hands on' and considered this week as having had one of the greatest impacts on their learning in the pedagogical course.

A number of pre-service teachers have used the term 'real life' experience to describe aspects of WIG, and how that impacted on the pupils learning. This included being outside in a natural place, responding to natural elements and often reflecting on real life situations.

They have also connected their experience to the importance of integrated learning. Many of the pre-service teachers and the in-service teachers from the local school have described the learning that takes place at the Botanical Garden as connecting aspects of the school curricula with what happens in classroom activities, and how that must have an impact on pupils learning.

After starting this project, that included exploring, investigating, creating and learning new skills through WIG, there was more variety in student teachers' theses. Some said that this experience would encourage them to recreate this project once they became in-service teachers. Some were still afraid it would be difficult to do this alone with a whole class.

> *I think we all wanted to get the children to be confident and have lots of self- esteem, and be able to be independent. We just used different ways to do it.*
>
> *I think the projects with the best outcome had experienced teachers with great self-esteem, and were willing to allow the pupils to do lot of experiments.*
>
> *The most independent pupils were active learners, they did everything themselves and did not rely on us too much.*

One of the teachers from the participating school stated:

> *I have been a classroom teacher for many years and been part of this teaching team [in the WIG]. It is an ideal setting in terms of keeping quality high, being part of the team, the kids all working in many small groups, they learn to work together in a new way, outside of the classroom, with new people that don't know their background. ... It is a fresh start* (April 2014).

When pairing the student teachers it is important to keep in mind that they do not always have the same values or ideas. One stated:

> *I know I will have to work with all kind of people in the future but It's much easier to work with people who have similar values to you* (April 2016).

It can be very a important experience to learn to work with people that do not have the same ideas as you. After meeting with this pair and discussing the importance of giving everyone a position where they would feel valued, it was useful to explain that there are many stages of working together and the most important thing is to give them confidence to take responsibility on working out problems. This encourages them to act independently, but also ensures they would always be supported when necessary. This was an important learning event for both of them.

Another complained about her partner always wanting to take control:

> *It's hard to develop self-esteem when the people you are working with don't really have*

> *faith in you. It seems to me everything I suggest is wrong, not that I want her to be obedient, that's the last thing I want . . . I just want a dialogue* (April 2014).

Lack of time was often a problem in the collaboration:

> *It would have been important if we could have sat down together after each day and asked ourselves what is missing, what do we need to be developed, etc. I know some of the groups did that and that was helpful for them. We were always in a rush to go to another class or we had other duties we had to work on (Student teacher, 2015).*
>
> *Some of the student teachers have other duties at the IAA so their energy has been diverted away from the Botanical duties. I have had conversations with some of the student teachers and I have talked to my colleges and asked them to give them a break. Thankfully none of the student teachers are at risk in their practice in WIG. Next year we need to get off the mark sooner so this does not happen* (Researcher journal 2015).
>
> [It has been agreed that next year no other classes will be required of the first year student teachers during this week.]

The first two years of the project, an assessment meeting was not included in the planning. But after analysing the data from the first two years, assessment meetings were then included. The in-service teachers and the student teachers have all considered the importance of these assessment visits. That visit gives space for supporting and deconstructing what the pupils had seen and experienced. Their experiences are very diverse:

> *In WIG we do have so much more space to experiment.*
>
> *I think this was more like playing then schooling.*
>
> *I sometimes get very tired in the classroom because I have to sit the whole day and use the indoor voice. It was nice that I did not have to think about that in the Garden.*
>
> *I liked how I could decide what material I used and how I used it.*
>
> *I didn't like it when it was cold, I always forgot to bring warm cloths.*
>
> *Our group was the best group because we spent all the time outside. We did not go into the greenhouse.*
>
> *The different engagement through diverse learning sequences has often brought up how important it is to work with values and virtues in connection to EfS.*

One of the teachers from the participating school stated:

> *I have been a classroom teacher for many years and been part of this teaching team [in WIG]. It is an ideal setting in terms of keeping quality high, being part of the team, the kids all working in many small groups, they learn to work together in a new way, outside of the classroom, with new people that don't know their background. ... It is a fresh start* (April 2014).

When working in the park the student teachers worked in pairs. A few times I did not make a good match when pairing the student teachers. Some of them complained and I had to explain to them that once they become schoolteachers they will have to work with all kinds of people. One stated:

> *I know I will have to work with all kinds of people in the future but it's much easier to work with people who have similar values to you* (April 2016).

Self-efficacy and action competence

The student teachers have developed strong self-efficacy (Bandura, 1997) and achieved action competence (Mogensen and Schnack 2010) in relation to EfS through WIG. Therefore they should be more likely to select tasks and activities in their classrooms that relate to sustainability in the future. That is because feeling competent means they will not avoid those issues. They need to believe in artistic sustainability actions in order to engage in them. It is a indicator of student action competence when they have developed the ability, motivation and desire to play an active role in finding solutions to problems and issues they feel are worth fighting for (Mogensen and Schnack 2010). Even though most research on human agency has been centred mainly around the development on individual self-efficacy,

people do not live their lives autonomously. In many cases development is only achievable through collaborative efforts. In social cognitive theory the conception of human agency is extended to collective agency. Empowered pre-service art teachers with strong self-efficacy are willing to share the belief of their collective power to produce desired results, and this is a key ingredient of collective agency (Bandura, 1997).

The idea for WIG had been developing for several years. The IAA was able to connect with the community, children learnt new things, and the student teachers found it an interesting challenge. Before the project started the researcher was already aware of many issues and had ideas for several activities, based on the theoretical emphases connecting theory and praxis in relation to place-based education. Prior to WIG, the IAA teacher education department had developed a strong relationship with the local neighbourhood. This included creating settings for the pre-service art teachers to teach in short art courses in their first term for the afterschool programme (started fall 2010). This has been a wonderful opportunity for the IAA pre-service art teachers to gain sometimes their first experience teaching in an environment they identify themselves with and feel good in. It is also very beneficial for the local children, all of whom know the big IAA building but have never entered an art academy before. They are generally curious about what happens there, and many parents have expressed how positive they are about this initiative.

> *It is really great for the kids to be able to walk here after school and get an ambitious course.*
>
> *It's great for the kids here in the neighbourhood to be able to walk here. It takes great stress off not having to attend art courses at the other side of town.*
>
> *My daughter has been taking your course for the past four years. It is frustrating that she is too old. I have really liked how she has been able to work with different artists that are in your teachers' programme.*
>
> *I have completely different view on the Art Academy now that my son has been with you for the last two years. Now I like that old meat-processing factory [the building was originally designed for this purpose] and I no longer think it is ugly. He gets a lot out of what he does with you. It is so seldom that kids have the opportunity to experiment with different media.*

This positive feedback we have received through our collaboration with the local community has given the project members of WIG a very important positive attitude and will for participation.

Developing professionalism

Sergiovanni (1992) believes that in order to improve schools must adopt the metaphor of the school as community rather than as organization. The central framework for the characteristics of a professional learning community are the five dimensions identified by Hord (2004) (a) supportive and shared leadership, (b) shared values and vision, (c) collective learning, (d) supportive conditions, and (e) shared practice. Currently, education relies on direct leadership and little time is left for leaders to focus on issues of substance that can make real changes in the ways we are teaching and learning (Sergiovanni, 1992). In WIG the emphasis was on a participatory pedagogical approach that allowed the participants to focus on different phenomenon over a long time. Working with participatory virtues has been found useful in comprehending sustainability and its wickedness and those aspects of human values which complicate and sometimes confound the process of realizing sustainable values (Macdonald & Jónsdóttir, 2014).

When working on school improvement, it is therefore crucial to understand that schools are communities and that everyone must become involved in the leadership of such schools. All the workshop projects have highlighted the importance of working together as a community. Being involved means internalizing shared goals, being committed to

professionalism and professional virtue and behaving in a collegial manner (Sergiovanni, 1992). When spending time in the beautiful Botanical Garden, the participating 5th graders were walking, listening, meditating, making, marking, exploring, accepting, questioning, and writing as a group. They also got time for private creation in the group sessions that later became part of the whole enterprise.

Transdisciplinary teaching is democratic in nature. The most important fundamentals for transdisciplinary teaching are a high degree of openness and curiosity from all stakeholders with an open mind, willing to adapt, quickly and unconventionally, to new and unexpected circumstances. The aim is to generate learning environments in the WIG where power relationships are mutually constructed and negotiated between those involved in the learning process, through which relationships evolve during the relational pedagogical approach to co-creating knowledge. Therefore, the concept of participation becomes essential to the pedagogical process and its intention to transform the way we pursue social and ecological justice in line with the ActSHEN project principles and goals[1]. When going through my journal writings on the workshop, this is something the student teachers discussed as the biggest learning curve at the Botanical Garden.

The journey towards professionalism

The project in the Botanical Garden was designed around supportive and shared leadership. It was a venue for the student teachers to try to share responsibilities with the pupils.

> *It was a challenge in the first days to give the control partly up to the kids because the issues that we believed they would value was not always the same issues they valued as important* (Student teachers, April 2014).

Working as a large group when designing the overall objectives and learning outcomes provided shared values and visions for the project. In that process the student teachers built on theories studied in the IAA pedagogical programme. The project at the Botanical Garden also required connection to the curriculum at the local school. That required a transdisciplinary approach some of the student teachers found hard. In the research notes is stated:

> *I am mindful of the challenges of asking the student teachers to implement a complex transdisciplinary project on as tight a time schedule as the week in the WIG. As I am unsure of what we can reasonably expect from the student teachers, I cannot anticipate all their concerns or be sure I am guiding them in the right direction. I feel that I am not entirely in control of this project and am concerned that the uncertainty may increase the anxiety of the student teachers* (Researcher journal, 2013).

Those worries were unnecessary, since the student teachers showed more ability as they were given more confidence.

> *I have learned to trust the process. The more freedom I give to the student teachers the better they will deliver. It is still important that they make clear connections between theory and practice* (Researcher journal, 2014*).*

When working in pairs, or in groups of three, this gave them both needed support and also required shared leadership where they had to respect each other's perspectives and ideas.

> *Student teacher X has shown great flexibility in adjusting her ideas for the project to her partners approach. She is checking pupils' interest and trying to make sure they fit to the ideas of EfS. It is interesting to how they are bringing out the best in each other* (Researcher journal, 2016).

When sharing their experience from the fieldwork, the student teachers developed collective learning. One of the student teachers stated, when discussing what she learned from the project:

[1] ActSHEN is Action for Sustainability in Higher Education in the Nordic region. In 2013 a group of scholars several of whom knew each other from earlier Nordic cooperation developed a projects, frameworks and lessons which give students more influence i.e. more voice and more choice http://blogs.helsinki.fi/action-for-sustainability/.

> *My sense that I lack control is compounded by the fact that this is a collaborative project.*

Another student teacher stated:

> *I have enormous respect for each of you and the unique qualities you brought to WIG. In my heart the uniqueness of each of you will always be respected. You were all committed to fostering a safe environment for the pupils where they could create the meaning of their experiences.*

Working in collaboration with WIG, the flora and fauna specialist, and working with the in-service teachers from the local school, generated a supportive condition. Mounting an exhibition at the garden and then later at the local school allowed for shared practice where the local community gave valuable feedback and at the same time the connection to the community also provided validation and stronger connection. The exhibition later created added value, as the value of the project was evident when it was awarded the 'encouragement award' by the Education Office in Reykjavik in 2015. The acknowledgement gave real life connections as the project was no longer just a school assignment, but it had become an important initiative in the pupils' lives.

For the student teachers is has been empowering to get direct feedback from the pupils and analyse it later in an assessment meeting together as a group. It has allowed them to share what went well and what needed improvement, forming a collective efficacy that leads to action competence. This project gives them the chance to reflect on their own actions as professionals.

Can the participating pupils learn from art?

In many schools the focus is on children learning for testing but not for real comprehension (Nelson, 2013; Solorzano, 2008). This also involves the danger of dismissing tacit knowing. Progressive teaching methodologies based on the theories such as those advocated by Dewey (1934) and Paulo Freire (1994) are difficult to endorse because of the time and energy needed to prepare students for standardized tests. Many such important educational theorists have in some way or another referred to tacit knowledge in their concepts. It has been interesting to see how the educators in the local schools have been willing to participate in activities that are aimed to help the pupils expand knowledge they already know through the artistic activities.

This understanding of the importance of fostering tacit knowing through art is important because it has a very positive impact on the in-service teachers that take part in the project with their pupils. The concept of tacit knowing is important to our understanding of how students learn and how we can rethink teaching strategies.

When working in the garden through this collective project, the children have had to make good judgments about qualitative relationships, i.e. by making rules for invented communities. The pupils have also practiced respecting different perspectives because, unlike much of the curriculum in which correct answers and rules prevail, in the arts, it is judgment rather than rules that prevails (Eisner, 2002). In these projects the student teachers have discovered, when fostering a choice-based approach, that they can show the pupils how problems can have more than one solution, and that questions can have more than one answer. That is because the arts celebrate multiple perspectives. One of their biggest lessons in WIG is that there are many ways to see and interpret the world and small differences can make large effects (Eisner, 2002).

For some of the student teachers it was difficult to offer choice to the pupils:

> *When I first stressed that they should allow each child to choose a project with meaning to himself or herself, I sensed some level of silent incredulity: an "Oh, yeah. Sure." kind of attitude. At some point, one of the student teachers stated that she felt she was not teaching the kids anything. This was very important because it allowed me to discuss how we as teachers can be stuck in the setting that*

we were brought up in (Researcher's notes 2014).

Students can respond to works of art, and in the context of tacit knowledge one can learn from his or her reactions. Through the arts it becomes vivid that neither words in their literal form nor numbers exhaust what we can know. The limits of the language do not define the limits of potential cognition (Eisner, 2002). In the artistic activities the pupils have learnt that, in complex forms of problem solving, purposes are seldom fixed, but change with circumstance and opportunity. Learning in the arts requires the ability and a willingness to surrender to the unanticipated possibilities of the work as it unfolds (Eisner, 2002).

The projects that have focused on creating settings for the pupils to think through and within the natural raw material in the garden enabled them to have experiences they could not have from any other source. Through such experiences, they have the potential to discover the range and variety of what we are capable of feeling. All the projects allow the pupils to experience and to express what cannot be said. By inviting them to disclose what a work of art and art creation helps them feel, they must reach into their creative and imaginary capacities (Eisner, 2002). At the same time, since the main knowledge gained at WIG is a tacit knowledge, it can be often be hard to identify when the pupils have developed value judgment, or gained experience that gives them insights or intuition.

Conclusion

The experience at the WIG provides increased focus on connecting theory and practice for the student teachers at the IAA. The research findings indicate that they are able to identify the higher order thinking skills in activities such as more frequently asking critical questions, comparing different perspectives, creating meaning, drawing conclusions, and developing opinions and values.

The findings suggest the practices in WIG both enact conceptualization focusing on pupil learning and create empowering settings in teacher education, allowing student teachers to reach action competence. As they connect theories and practice they develop self-efficacy, and at the same time they create a powerful learning environment for the pupils, building their self-efficacy through vicarious experience.

The student teacher's work makes me optimistic about teaching and education. They have done so well with the projects they undertook in WIG! They have managed to reach out to students in unexpected ways in the first day of the project. All the children returned happy and excited about continuing tomorrow (Researcher's journal, April 2014).

This case study gives a good example of how teacher educators can create settings for student teachers to develop self-efficacy and action competence. WIG is an example of the potential of art in EfS where the learning settings discussed earlier are characterised by play, passion, participation and pertinence.

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ORIGINAL PAPER

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Nonviolent Conflict Transformation and Peace Journalism

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Editors' preface

Nanni Salio (1943-2016) was a passionate and indefatigable theorist and activist in the fields of environmentalism and sustainability, pacifism and nonviolent conflict resolution. In publishing posthumously a translation of this paper, *Visions for Sustainability* wishes to pay tribute to his commitment and the importance of his contribution to the development of these fields. The paper examines the importance of the work of John Galtung, together with his debt to Mahatma Gandhi, within the framework of peace research and studies in the field of conflict and its transformation by nonviolent means. Both a model for conflict analysis and an approach to its nonviolent transformation are proposed. These lead to a discussion of the characteristics and significant role of peace journalism as part of a necessary transformation of paradigms in order to promote a sustainable approach to conflict. The work of Mahatma Gandhi is inextricably linked to his role in the nonviolent struggle for Indian independence. A recent article published in *The Times1* reported that India is firmly on track to become the third-fastest growing economy in the world, overtaking those of long-established countries such as the UK. From the perspective of classical economic growth, the tables seem to have been turned on "first-world" economies, yet at the same time India is gaining very high scores in terms of statistics on violent clashes between different religious groups, political corruption and gender violence. In *The Argumentative Indian* (2005) Amartya Sen drew attention to his own country as the birthplace of many creeds, a breeding ground for the largest multiplicity of languages, religious beliefs and ethnic groups, yet almost no other country seems to be so dramatically divided. From a cultural heritage of exchange and dialogue to a fast-growing modern India at the helm of a capitalist economy, the tables have indeed been turned from quite a different perspective. Historically, such periods of transition bring massive economic, social, and environmental transformations, yet the implications these may have at a global scale are less than obvious and by no means clear to all viewers. For India, as with a number of other countries, 'social instability' or even open conflict as is the case in Syria, are presented as recent occurrences, by-products of 'newly' emerging social or economic patterns, a rhetoric of the present, featuring rich and poor, winners and losers, 'victims' and 'perpetrators'. Watching the news from afar, the public is cast in the role of spectators, hopeful and hopeless. Nanni Salio argues that peace journalism has a fundamental role to play in 'joining the dots', enabling people to see the connections and opening up dialogical spaces. His paper outlines the key features of peace journalism and discusses the implications for training and practice in media communication.

Introduction

Within the field of peace research, the seminal work of Johan Galtung develops directly from that of Mahatma Gandhi. One of his first works, elaborated together with his teacher Arne Naess, was concerned with the ethics of Gandhi's nonviolence policy (Galtung & Naess 1955), subsequently further developed by Naess (1974). Galtung defined Gandhi as a "conflictologist", or a founder of a "science of conflicts" (Galtung, 1987).

On 2 October 2007, on the occasion of Gandhi's birthday, at the opening conference of the first International Nonviolence Day promoted by the United Nations in New York, Galtung identified five basic points of Gandhian teaching. Two of these are of particular interest for this article: *never fear dialogue* (during all his battles Gandhi spoke with anyone, including the Viceroy of an Empire he hated, and his life shows how this bore fruit) and *never fear conflict: it is an opportunity rather than a threat*.

For Gandhi, a conflict was a challenge to get to know one another, to find something in common, for parties to not remain indifferent to each other. He preferred violence to cowardice and conflict and disharmony to a total lack of relations, but clearly valued above all the nonviolence of courageous and harmonious relationships (Galtung, 2007a).

Galtung's work on the figure of Gandhi, to which dozens of works continue to be added every year (including a particularly interesting reflection by the Iranian philosopher Ramin Jahanbegloo in 2008) has helped both the ethical and the political dimension of Gandhi's nonviolence to emerge with greater clarity. A crucial step was taken when in the search for peace and in nonviolence education we came to realize the fundamental conceptual and practical importance of the idea of conflict.

What is conflict?

A growing number of authors, researchers and schools of thought have been moving towards the analysis of conflicts at micro and macro levels, starting from a vision of conflict as holding both constructive and destructive potential, at one and the same time. In other words, conflict is neither regarded as a synonym of violence nor of war, but as the ineluctable existential condition that characterizes all human beings, capable both of giving rise to creative and constructive growth for all parties involved as well as leading to a negative and dramatically destructive situation.

This distinction has been made explicit in psychology, particularly within the work of Erich Fromm, and the difference between benign and malignant aggression has by now been conceptually established, in the same way as that between violence and assertiveness and that between passiveness and active and proactive nonviolence (which intervenes beforehand). However, in both political and educational common practices there is still widespread perplexity and resistance to such distinctions, as conflict tends to be regarded as something negative and to be avoided, while invoking a generic condition of harmony, which overlooks existing contradictions, leaving us unprepared when conflicts suddenly explode. In the language customarily used by the media, conflict is considered even more synonymous with war and this semantic ambiguity adds to confusion, frustration and a sense of helplessness.

Conversely it may be possible to elaborate a definition of nonviolence based on ongoing studies and reflections that are not only philosophical and ethical, but also operational. as in, for example, the following statement: For Galtung, nonviolence is the ability based on a set of actions which may be deployed in order to transform conflicts in a constructive and creative way from the micro to the macro level in order to minimize all forms of violence. In this way, it consists in the ability to transform natural human aggression into a positive and non-destructive creative force. An analysis of conflict as a dynamic set of processes and relations

is central to this purpose, and it encompasses the process of nonviolent communication.

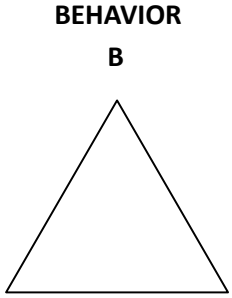
Conflict analysis

In recent decades a number of schools of thought concerning the concept of nonviolence have developed and are still present today[1]. The school of "conflict resolution" focuses on the key concept of the needs of the parties involved and the idea that a conflict can be permanently closed, apparently in a rather mechanical and rigid fashion when needs or demands are met. The school of "conflict management" places more emphasis on the concepts of power and values, focusing on the presence of dynamics which can orient the conflict towards pondered and controlled solutions which come from the outside with respect to the parties involved. A specific and original contribution to this framework, especially useful in basic education and training programs, is the one provided by Belgian anthropologist Pat Patfoort, who proposes an approach based on the "major/minor" model, by representing the imbalance of power between the parties that must be rebalanced[2].

A further school, of which Galtung and the Transcend International Network are among the best-known representatives, prefers to discuss nonviolent transformation of conflict, highlighting the purely dynamic and ever-changing, relational nature of conflict rather than the search for final and static solutions. Beyond the Galtung/Transcend school of thought, other researchers and educators have increasingly adopted the expression "nonviolent transformation of conflicts"[3].

Galtung proposes an interpretative model based on the "triangle of conflict". This proposal is presented in a systematic way in two manuals for peacekeepers, one in a reduced format, *The Nonviolent Transformation of Conflicts* (2000), and the other, more extensive and comprehensive manual, *The Transformation of Conflicts by Peaceful Means* (2008). The manuals were originally published by the *United Nations Disaster Management Training Program* and are valuable tools for use in basic training.

In Galtung's triangle, each one of the vertices A, B and C corresponds to a characteristic feature that contributes to defining the conflict. A stands for behaviors, attitudes and emotions, what is "inside" every single key player, even at an unconscious level. B is the behavior, or what is "outside" every single key player, which is visible and manifest. C indicates the contradiction of purposes and incompatibilities, corresponding to the relation "between" the key players in the conflict. A fully developed conflict includes all three of these aspects, of which only the behavior is manifest, while the other two are latent. There can be cases in which only one or two of the salient features of the conflict are present.



The nonviolent transformation of conflict is a constructive approach, in that it helps find solutions allowing conflicting parties to obtain benefits and thus turning the conflict into an opportunity for growth for all participants. When trying to understand what is meant by "nonviolent transformation of conflict", it is important to recognize that the term conflict is not synonymous with violence nor with war. Rather it indicates a situation of contrast, of contradiction between multiple social key players pursuing different purposes. The use of violence is a negative

[1] Axt et al. (2006)
[2] Patfoort, P. (2002, 2006)
[3] Mischnick, R. (2006). and Galtung, J. (2007b)

outcome of this situation, causing the conflict to escalate if it cannot be creatively and operationally transformed by all parties involved.

Symmetrical and asymmetrical conflicts

The Transcend model posits the existence of basic types of conflicts, symmetrical and asymmetrical, which differ depending on the power relations between the parties involved. In symmetrical conflicts, there is power balance between the parties, whereas in the second type of conflict the relationship is unbalanced. Most of the micro conflicts, which are relational, are predominantly symmetrical, while asymmetrical examples tend to prevail among macro conflicts. One of the techniques employed in dealing with symmetrical conflict is mediation, which cannot be immediately used in the asymmetrical case, because one must intervene initially in order to rebalance the relationships of power. The party holding more power is unlikely to agree to sit down at a table and mediate.

The mediator is an external, neutral party, equidistant (or equally near) with respect to the conflicting parties, able to facilitate communication and the search for solutions which may come from the conflicting parties themselves. The mediator's intervention must be accepted and requested by both parties on the basis of trust. The function of the mediation is to act like a "mirror", facilitating the transfer of perceptions, feelings and motivations held by the participants and which are fuelling the conflict. The mediator's role is to help separating and identifying the objective components from purely subjective ones. In order to do so, active listening skills and the ability to use dialogue to help people to empathize and identify with the situation are of crucial importance.

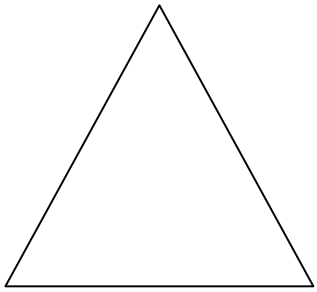
In asymmetrical conflicts the external parties play the fundamental role of intervention, which is not necessarily requested, in order to rebalance the power relations which put the oppressed party at a disadvantage. In addition to rebalancing the power relations by intervening on behalf of the oppressed, the external parties are tasked with restoring interrupted communication channels. They must re-humanize both the oppressed and the oppressors, taking upon themselves the violence of repression so as to show the suffering of the oppressed and the group that intervenes in their favor, evoking empathetic behaviors that change attitudes, prejudices and behaviors. In addition, they put themselves in the position to reduce the influence of direct and indirect consensus which indifferent external parties give to the oppressors' power system and so facilitate the emergence of a win-win type of higher-order solution, allowing everyone to be a winner and ensuring no one is a loser.

From the triangle of conflict to the triangle of nonviolence

Galtung matches the vertex of another triangle, the nonviolence triangle, to each of the vertices of the triangle of conflict. Vertex A, that of attitudes, corresponds to empathy, or the ability to put oneself in someone else's shoes, feeling and perceiving their feelings, to "see from the inside", thus using the mediation process to help the parties in conflict free themselves from the mental ghosts that often prevent them from understanding what is actually happening. Vertex B, behavior, corresponds to nonviolence in actions and dialogue in communication. Nonviolence is essential in order to avoid the progressive ascent towards conflict, which may turn into violent behaviors. Together with strictly nonviolent attitudes, dialogue is the best tool for investigating what is happening on the outside, beyond social key players, in the form of overt behaviors. Furthermore dialogue is necessary in order to pursue nonviolent communication, to build bridges between the parties and facilitate mediation and reconciliation processes. Dialogue is the tool that acts as a bridge between the subjective aspects, the attitudes that characterize the personal experience and emotional perceptions of the

conflicting persons, and the objective component consisting of the real contradictions that exist between the goals of the parties involved. Vertex C, contradiction, corresponds to creativity, which is necessary for the emergence of higher-level solutions that enable all the key players to fully achieve their legitimate objectives, overcoming the contradictions between the parties in conflict.

DIALOGUE and NONVIOLENCE



CREATIVITY **EMPATHY**

From the analysis conducted thus far we recognize the applicability of Galtung's analysis of conflict to the training of mediators but also and more generally, of communicators, those being people directly involved in the conflict as well as those that are peripheral to it. For example, media communicators, but also other professionals involved in reconciliation and restoration processes, teachers, social workers, politicians or businessmen (we will return to this point later). Nonviolence comes in many forms and may pertains to different dimensions of the triangle.

In order to develop skills related to each of the three vertices, it is necessary to train and acquire practical experience. The Transcend manual offers some guidance, exercises and specific suggestions.

Galtung comes from a Norwegian family of doctors and nurses who influenced him at a very young age. This medical culture centered on care led him to regard violence as a disease and war as an illness, both of which must be addressed through a "medical paradigm" based on diagnosis, prognosis and therapy (DPT). Both peace and health can be defined negatively (as the absence of war and disease) or in a positive way (quality of relations on an international and a micro scale). In this way, Galtung and other scholars have proposed an isomorphism between peace studies and those on health (2005).

In the Transcend approach, the knowledge-building process concerning the conflict is called "diagnosis". It is oriented both to the past and to the present and consists of two phases. In the first phase, the peacekeeper (*conflict worker*) uses the ABC triangle and dialogue with the parties to analyze and understand the conflict and build a map of the conflict with all the different direct and indirect parties. In the second phase, the peacekeeper uses dialogue to facilitate the passage of the perception of "the other" to each party in relation to the conflict. This can be useful in cases where the parties' legitimate purposes and positions are not understood. The subsequent "prognosis" also passes through two phases. The first is to explore the past, how the events occurred and how they could have been if the key players had behaved differently (therapy of the past). Therapy of the past can also be useful for the therapy of the future. The second phase is to use future predictions as a deterrent for the prevention of violence. History is an important reference for prognosis. In a further phase, that of therapy, creativity comes into play in order to go beyond the dominant paradigms and design a future that is not limited by the past.

Of crucial importance when dealing with conflict are empathy and in-depth listening. To develop an empathetic attitude, Galtung suggests placing ourselves "in deep relationship with people, with many people and with different kinds of people, treasuring the works of the artists that we have among us, writers, poets and those who have neither name nor fame, but that we may meet anywhere". The ability to establish an empathetic relationship with other people allows us to "soften our attitudes", gradually creating a predisposition

to more in-depth and authentic dialogue.

Dialogue, nonviolence and the search for truth

Galtung proposes developing nonviolent behavior according to three main aspects (*Transcend Manual,* p. 98):

1. **Nonviolence in thought**: meditation, inner dialogue, preparation for work on conflict, moments of silence, trying to identify and eradicate our own destructive impulses.
2. **Nonviolence in words**: external dialogue with the parties in conflict, preventing the attribution of guilt/shame, seeking common roots, a common future and shared responsibilities, thoroughly exposing one's own anxieties, fears, unsatisfied needs, trying to imagine futures that all parties could live in.
3. **Nonviolence in action**: demonstrations, use of mass media, meetings to facilitate negotiations, what can be termed ordinary, soft political battle. Beyond these actions exists the political battle of strong nonviolence, such as non-military defense (NMD) against more direct outer violence, and nonviolent revolution (NVR) against internal structural violence (direct violence in a frozen form).

Dialogue, which is very different from debate, is also the main tool for gradually discovering "the truth" contained within ourselves and reaching higher levels of understanding, allowing us to build bridges between seemingly irreconcilable positions. The emphasis on creativity is the specific point that distinguishes the Transcend approach from other mediation proposals that explore more the inner aspects of conflicting persons and work less on contradiction. The task of the mediator is therefore to help the conflicting parties overcome the phase relative to the past and be able to develop a therapy and a project oriented towards the future, which in Gandhian terms is called a constructive project. Although a "creativity formula" is not known and no one can ever be sure that it will automatically reveal itself, it is thanks only to our commitment that we are able to say that the basic direction to follow is the one to "introduce a new aspect-dimension-perspective, a new way of looking at the situation to change the conflict - a necessary condition so that the conflict will be released".

As with all approaches to conflict, this one is also mainly (but not only) centered on creativity, and does not aspire to be exhaustive. In fact, it is possible to identify a benign creativity, one directed at the nonviolent transformation of conflict, but also a malignant creativity implemented by those who do not even remotely intend to give up their power and privileges. Even techno-science presents this ambiguity in terms of creativity to develop even more lethal weapons in the arms race and creativity to expand our knowledge and lead to problem-solving tied to satisfying basic needs and sustainability. In the same way, advertisers may define themselves as "creative", but their work can deliver both a "regressive advertisement" and a "progressive advertisement".

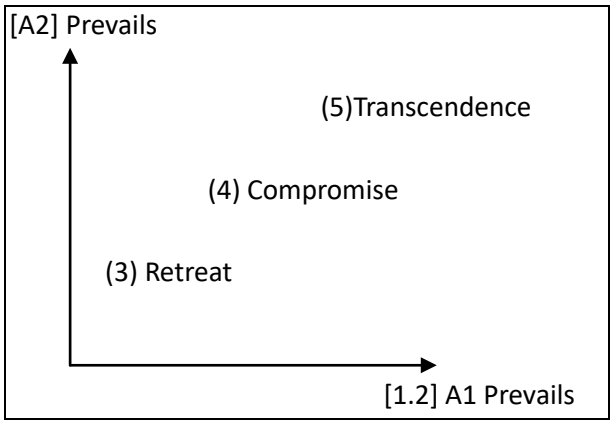
The outcomes of conflict

Analyzing a basic case of conflict with two key players and stakes, A1 and A2 (contradiction), as in the Israel/Palestine case, Galtung identifies and classifies five main possible outcomes of the conflict.

1. Violence is used to impose the winner’s objectives on the loser, as in the case [1.2], whereby the key player A1 prevails (i.e. Israel).
2. In the symmetrical situation, always determined by violence, the key player A2 (i.e. Palestine) prevails.
3. An external solution is imposed from above, and involves retreat (administration of the entire territory by the UN).
4. Compromise reached as a result of negotiations (for example, two states, two populations).
5. Transcendence, meaning the parties are able to

develop a creative (transcendent) solution that satisfies all legitimate goals (for example one State for two populations, or a Middle Eastern federation similar to the European Union).

Outcomes 3, 4 and 5 are situated along a diagonal axis and are the most positive, in a rising scale that goes from 3 to 5. Outcomes 1 and 2 create conditions of exclusion and great instability, and are a prelude to more violent developments.



The difference between the various schools of thought we have considered mainly concerns the greater emphasis that Galtung places on creativity in the search for higher-level solutions that achieve the legitimate objectives of all the parties in conflict. Transcendence lies in a paradigm shift, in leaving predetermined and crystallized patterns that prevent us from looking beyond, to be able to facilitate the transformation of the conflict in a constructive and positive manner.

The lifecycle of conflict

Conflict is generally presented as a dynamic process that develops following three main phases: before violence, during violence, after violence. In order to act in a nonviolent way, we have to learn specific techniques for each of the three phases that can be classified as techniques for prevention, intervention and reconciliation. Prevention means to educate and promote *conflict literacy* concerning the management and nonviolent transformation of conflict through dialogue, active listening, nonviolent communication, sharing, empathy and awareness. The purpose is to avoid the ascent of conflict towards increasing and destructive levels of violence, keeping aggression, anger and fear under control in order to avoid feeding a growing spiral of actions and reactions that may result in the explosion of extreme violence.

When prevention fails, or when we find ourselves as a third party dealing with situations where violence is already in place, the task becomes more difficult because intervention is necessary to stop the violence in order to protect victims, or weak parties, without adding more violence. It is the opportunity for the nonviolence of the strong, the brave, those who place themselves between the parties, putting their lives at risk without threatening that of others. It is obviously necessary to distinguish interposition and intervention on a small scale, even in casual everyday situations, from intervention in violent and/or armed conflicts of a macro type on a large scale, as an alternative to armies and military facilities. While in the first case individual intervention can sometimes be sufficient and, in any case, extreme situations, where we are forced to act alone, may occur, in macro conflicts we must intervene in a collective manner, planned organized beforehand in order to be efficient.

Unlike other types of intervention, nonviolence seeks to free both the oppressors and the oppressed, both the victims and the perpetrators, from the dehumanizing chains of violence. It is an ambitious and difficult task which many times throughout history has been taken on by the "righteous", whose behavior is like that of Bodhisattva, capable of manifesting compassion and sharing towards all living beings. The dynamics of nonviolent action require this willingness to self-sacrifice, even extreme, to personally bear the unjustly exercised violence by the oppressor and by the perpetrator, to trigger a boomerang effect that shatters the apparently monolithic power of the

enemy, gradually involving wider sectors of third parties which were initially indifferent or neutral. This has happened many times throughout history, and in very different situations: from the liberation struggle of India under the leadership of Mahatma Gandhi, to the struggle against apartheid in the United States with Martin Luther King, and in South Africa with Nelson Mandela and Desmond Tutu, as well as the changes in Central and Eastern Europe which culminated in 1989.

At the same time, the reconciliation work after the violence is equally important. Without this therapeutic action, the cycle of violence tends to easily reproduce itself. The wounds and trauma suffered individually and collectively have a deep effect within, and sooner or later are likely to re-emerge at a conscious level with destructive consequences. The Truth and Reconciliation Commission in South Africa promoted by Tutu and Mandela is an important positive example to be followed and perfected in all those cases, from Rwanda to the Balkans, from Palestine to Ireland to the Basque Country and so on, where violence has caused immense hatred, thirst for revenge and the inability to coexist.

In order to render nonviolent transformation of conflict something concrete and feasible, it is necessary to invest in resources, energy and time and develop expertise in each of the three phases. Prevention is better than intervention, and is less difficult and cheaper. It is right to intervene because each one of us is, to a certain extent, a party in all conflict, even if external. Reconciliation is essential if we want to break the vicious cycle of vengeance and the resurgence of violence. We possess adequate knowledge and skills regarding each of these phases today, but they are not thorough. Research is ongoing, particularly in order to address the so-called "intractable conflicts", those that never seem to end, where the spiral of violence inexorably continues over time. In this respect it is fundamental to keep in mind the need to deeply work together towards changes in three directions: transforming the violent key players, violent structures and violent cultures.

Before, during and after “the rain": prevention, damage reduction and reconciliation

The Macedonian director Milcho Manchewski used the title of his highly-acclaimed film "Before the Rain" (1994) as a metaphor to describe a situation of potential conflict crisis, where a timely intervention was necessary in order to prevent the outbreak of violence. This is what should have been done in the Balkans from the first signs of crisis, in Rwanda and in the Great Lakes area in Central Africa, and in many other situations. Prevention is far better than intervention, as it is more effective and less costly. In this regard, the director of the Transcend network, Dietrich Fischer, has compared the cost of international mediation operated by civilians, as in the case of the Peace Corps, with that of military intervention (Fischer, 2006).

> In the 1980s, the fear of a war in the Balkans was focused on Romania, where 1.6 million Hungarians and more than 30 million people belonging to other minorities coexisted with a population of 23 million Romanians. Romania and Hungary were enemies in both world wars and both committed atrocities and fought each other over a few territories. Fear and mistrust always had deeper roots. But Allen Kassoff and two of his colleagues from the Project on Ethnic Relations of Princeton managed to bring four senior representatives of the Romanian government and four representatives of minorities together. In two three-day meetings held in both Switzerland and Romania, they helped the parties reach an agreement that gave the Hungarian community the right to use their language in schools and in local newspapers in exchange for the promise to renounce the secession. With this effort, a civil war similar to the one that broke out in former Yugoslavia was avoided. In contrast, international peacekeeping operations to end an ongoing war require not days or weeks, but years. UN troops have been

> stationed in Cyprus for more than 30 years and are still needed; this is not merely a few individuals, but tens of thousands of soldiers. 20 thousand UN soldiers failed to stop the fighting and massacres in Bosnia Herzegovina. 60 thousand NATO troops were sent to enforce a cease-fire, yet a reconciliation was not reached. This means that it was necessary to engage about 10,000 times more people, for a period 100 times longer, compared to those involved in a reconciliation. The costs for a peacekeeping operation are thus one million times more than the costs of an attempt at mediation. Instead of spending a few thousand dollars for a meeting room and airfare, billions of dollars are instead spent. Even worse: in 1991 the Gulf War to expel Iraq from Kuwait cost $100 billion, without counting the destruction it caused. But the most important aspect to consider is that the prevention of a war before its outbreak saves many lives. The difference between peacekeeping once the war breaks out and mediation consists in spending at least an extra order of magnitude every step of the way.

If violence erupts, action is immediately needed in order to "reduce the damage", such as that of fire fighters who rush to put out a fire. The previously proposed methods of transforming/managing/resolving conflicts do not go into the merits of this delicate task. They are addressed to other phases of conflict and simply report and express hope for the establishment of rapid civilian deployment forces (like the Peace Corps mentioned earlier) to interpose and help the population.[4]

Galtung and others emphasize that after the violence we must act through the "3Rs: Reconstruction, Reconciliation, Resolution", to address the visible and invisible effects of war and violence" (Galtung, 1998). Much literature has been concerned with the consequences of violence. Two studies in particular are in line with Galtung's analysis: one by Richard Mollica, *Invisible Wounds* (2007) and the other by Adriana Cavarero, *Horrorism. Naming Contemporary Violence* (2007). Cavarero identifies twelve different approaches to reconciliation in the different traditions of human history, some of which are specific to certain ancient cultures and, in some cases, are still implemented. At the same time, despite the apparent wealth of multiple approaches, Galtung considers the world "ill-equipped for almost all of these tasks".

Galting lists twelve creative ways to promote reconciliation after violence: the exonerating nature/structure/culture approach; the repair/ restitution approach; the apology/forgiveness approach; the theological/penitential approach; the legal/punitive approach; the origins of interdependence/*karma* approach; the historical/the commission for truth approach; the theatrical/reliving events approach; the combined suffering/healing approach; the combined reconstruction approach; the combined resolution of conflict approach; the *ho'o pono pono* approach.

Of particular interest is the *ho'o pono pono* approach, a traditional Polynesian, and more specifically Hawaiian, way of acting, which means "do the right thing", or "assume the right attitude". This practice also takes on a therapeutic value that goes beyond the reconciliation process and is based on the idea that we are responsible not only for what we do personally, but also for all those people who are in our environment. The perpetrators, the victims, those who are both and those who are neither one nor the other, sit around a table presided over by a "wise man" and begin to speak freely, clearing their minds Galtung, 2005; Urbain, 2004).

The meeting follows four main phases:

1 Establish the facts, *what* happened in the community.

2 Investigate *why* this happened, highlighting the committed acts.

3 Share responsibilities, including acts of omission, apologize.

[4] L'Abate, A. and Porta, L. (eds.), (2008)

4 *Develop a constructive future-oriented program* based on the positive outcomes along the diagonal of the possible solutions diagram.

Nonviolent transformation of conflict experiences: education and training of professionals

The types of conflict situations we can be involved in vary considerably, both in terms of the specific focus of the conflict (gender, generation, environment, economy, interpersonal relations, racism and international relations) and in relation to its magnitude. The latter can range from micro dimensions (intra- and inter-personal) to medium-sized (condominium, ethnic groups, union disputes, neighborhood, school and work) up to the macro dimension of the world's global relations (economic, political and environmental), and arriving at conflicts between civilizations. We still do not know enough to be able to formulate a general theory that can be applied to every type of conflict, on any scale. However, we can establish some general criteria that can be applied as a first approach to different situations. Galtung addresses this problem by assuming the existence of an isomorphism between conflicts of different scales, ranging from micro to macro, and believes that his model can be applied, at least in a first phase, to any scale.

We have already noted most of the micro conflicts of a relational type are predominantly symmetrical, while most macro conflicts are asymmetrical. Considering that the mediation techniques usually employed in dealing with symmetrical conflicts cannot be immediately used, intervention is necessary in the asymmetrical cases in order to balance power relationships. The dynamics of nonviolent action that underlie the interventions promoted by external parties has been the subject of analysis by various authors, in particular by Gene Sharp in *The Politics of Nonviolent Action* (1986-1997) and by Galtung in Chapter 2 "Theory of conflict" of *Peace by Peaceful Means* (2000). These works, and other ongoing research and theoretical perspectives, are essential reference points for training mediators and peacemakers.

Over the last two decades, there have been widespread practical examples of nonviolent transformation of conflicts in many countries at various scales and in differing social environments. The basic groups that operate in the macro context, with interventions of nonviolent interposition in situations of armed conflict, reconciliation after violence and prevention, have led to, in the most successful cases, the design and partial establishment of professional and permanent operational structures (a significant example is the project for the establishment of a Nonviolent Peace Forces).

In terms of educational projects, both micro and medium-scale, multiple contexts have given rise to developments in the mediation of conflicts between peers, specifically addressed to interpersonal relationships. Numerous educational materials are available which offer theoretical and practical tools for starting self-training courses[5]. At the same time, it is important that all those approaching these educational processes for the first time follow specific courses that use active training methodologies, which are essential for activating the set of emotional, perceptual and intellectual factors that make it possible for a nonviolent transformation of conflict to avoid being reduced to a purely theoretical proposal.

Galtung's experience as a Peace Research scholar and mediator extends over half a century and has been documented not only in the great bulk of his writings, but also in a paper that presents a hundred case studies where he has applied the Transcend method: *50 Years: 100 Peace & Conflict Perspectives* (2008). In addition to specializing in international mediation, Galtung has also extended

[5] C.f. the *Departures* series by Daniele Novara for the La Meridiana editions, the works of Marianella Sclavi (2003, 2006) and the work she edited for the Consensus Building Institute in 2007.

his mediation method to other levels, as described in one of his latest works, *Facing Conflict* (0000). Another example is *Transcending and Transforming* (2008), where in every single chapter, corresponding to each day of the week, he introduces conflict situations ranging from micro to macro, to even larger, approached following his methodology. The result is an invaluable tool for everyone to use for study and practise, and for all those who want to familiarise themselves mediation. The SABONA project has been launched in Norway and applies the Transcend methodology in schools. SABONA is a local word meaning "I see you", in the sense that you are part of me, and "I feel you". It is also used as a greeting, which according to Galtung is better than our usual 'Good morning', which he ironically considers "a not very deep meteorological message", while SABONA expresses a deeper relationship. "Sabona" is also used as a response to this greeting, a practice is similar to other greetings such as shalom or salam ubuntu.

Nonviolent transformation of conflict and peace journalism[6]

We have become accustomed to *war journalism* and recognize its features. Ongoing wars are presented as individual events, separated from historical dynamics and precedents. The media rarely plays a critical role, giving precedence to propaganda in favor of one or another faction in the war. Such an approach is based on the model of sporting competition, rather than *peace journalism*. For example, in order to understand what has happened since the attacks of 11 September 2001[7], it is necessary to introduce the concept of "blowback", a term used by the CIA to describe the reactions of other countries on domain policies planned and implemented by the Pentagon strategists.

In his trilogy[8], Chalmers Johnson offers a lengthy and acute analysis of this phenomenon. These are three essential books that help understand the roots and dynamics of the current crisis. As Galtung states, *blowback* is the third law of dynamics applied to international politics: "to every action there is a reaction, a counterforce". The terrorism of nations exercised from above with bombers and drones generates terrorism from below as a response, by those who rebel and often indiscriminately strike civilians, similar to state terrorism, which simply calls these deplorable consequences "collateral events".

In order to attempt to dispel the "fog of war"[9], there are some steps that can be taken.

1 *Contextualize the events*. It is essential to reconstruct the history of the countries at war, drawing on many available sources, especially using the most reliable internet websites, knowing that everyone makes mistakes and that truth is a rare commodity often hidden by the "fog of war". International websites that can be consulted include www.antiwar.com; www.znetitaly.altervista.org; www.transcend.org,

[6] The latter was included in the revision phase of the complete works after the death of Nanni Salio, using part of his previous writing, the article *Wars, terrorism and media propaganda,* published in the Newsletter of Centro Studi Sereno Regis of 6 February, courtesy of the magazine Nuova Società, which was obtained from the author and published on 15 February 2016.

[7] In the author's article (referred to in the note) wars are also discussed, starting with the one in Iraq of 1991, whereby the attacks of 11 September 2001 represent the "repercussion". The date of the Twin Towers and Pentagon attacks has now become a 'periodising' event, and it is for this reason that specific reference is made in order to attempt to introduce the concept of *blowback*.

[8] *The Last Days of the American empire. The Repercussions of Foreign and Economic Policy of the last Great Power,* Garzanti, Milan 2003; *The Tears of the Empire. The Industrial Military apparatus, The Secret Service and the End of the American Dream*, Garzanti, Milan 2005; *Nemesis*. *The End of America,* Garzanti, Milan 2008.

[9] This term refers to the "The Fog of War" by Errol Morris, director of the documentary about Robert McNamara, winner of the 2004 Oscar for documentaries.

and Italian websites include www.serenoregis.org, which contains the translation of Galtung's weekly editorials.

2 *Do not give into fear.* Equally important is considering which threats deserve more attention. In Western countries, the probability of dying from a terrorist attack is 100 to 1000 times lower than that of a car accident, terminal illness or death induced by environmental imbalances and pollution. We should also be aware that terrorism of Islamic extremist groups causes a number of victims 10 to 100 times higher among Muslims than Westerners. Finally, care should be taken to address major global threats: climactic chaos, energy crisis, financial crisis, extreme poverty and misery, which are all topics that are ignored or considered as being less important.

3 *Peace journalism instead of war journalism*. Peace journalism distinguishes between conflict and war. War is not a synonym of conflict, but the outcome of an unresolved conflict. Peace journalism is based on three fundamental steps: mapping all the key players of the conflict, identifying their legitimate objectives (those that do not violate fundamental human needs and rights) and developing concrete, constructive and creative solutions to meet the legitimate objectives of all parties involved in the conflict. Examples of this type of journalism can be found in Galtung's editorials.

A type of journalism that approaches this and is very useful is investigative journalism, by reporters such as Robert Fisk, John Pilger, Pepe Escobar and Marinella Correggia. In their contributions, peace journalists are not necessarily identified for their reportages on areas directly affected by conflict. Rather, they play the important role of making conflict transparent, by identifying the parties involved and the nature of the relationship which connects them. Important contributions in this regard are those which highlight the violation of basic human rights, through political or cultural oppression but also through the indiscriminate consumption of resources for the benefits of the few. Peace journalism can be defined as the process which uncovers and unveils stories of environmental justice, reduction of personal demands, creative responses to oppression, and portrays the actions taken by many groups (such as nonviolent struggles, manifestations, marches) in many parts of the word and especially in the South. Peace journalism is a tool for re-establishing equality of knowledge systems, empathy and solidarity. Within this view, the principal objective of this paper was to offer a theoretical and research-based perspective for the development of peace journalism to enable transitioning for sustainability.

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On the Use of Life Cycle Assessment to Improve Agronomists' Knowledge and Skills toward Sustainable Agricultural Systems

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Abstract.
Purpose. In agricultural and forestry sciences higher education, environmental sustainability is most often taught through the discussion of examples of green agricultural practices, such as precision farming, and more rarely by taking a more general point of departure in environmental assessment methods, such as Life Cycle Assessment (LCA). Nevertheless, we think that teaching LCA in the agronomists' curriculum might significantly contribute to enhance students' systemic perspective on agricultural sustainability. The purpose of this paper is to highlight which additional knowledge and skills may be given to agronomists thorough the teaching of LCA. *Design/Methodology/Approach.* We designed two short courses focused on LCA to be followed by students at the Bachelor´s degree in Agronomy (University of Turin, Italy) and at the Master´s degree in Sustainability of Agro-food Networks (UNESCO Chair for Sustainable Development, Turin, Italy). After the courses, students filled in a questionnaire about their opinions on the usefulness and value taken from the short courses. *Findings.* From students' answers in the questionnaire and their comments during both teaching sessions, it was possible to point out four key aspects acquired by students during the courses: (I) Complexity of agricultural systems. Application of LCA requires to describe the energy flows and material cycles of the system under study and to decide the allocation of environmental impacts to specific phases of the production. (II) Systemic view of the farms. The need to identify boundaries between technical and natural systems for impact assessment highlights the strong interconnection between the two of them. (III) The problem of efficiency. The application of LCA may highlight that productions that are efficient from an agronomic point of view may not be as efficient from an environmental point of view. (IV) Conceptions about sustainable agriculture. During the group work, students were asked to highlight (if possible) the paradigm of sustainability of the authors of the scientific papers and to discuss it. This way, they were able to reflect on the complexity of the concept on environmental sustainability. *Practical Implications.* Teaching LCA in an interactive course, agronomists discussed pivotal concepts for environmental sustainability, such as system thinking, the problem of efficiency as well as conceptions about sustainable agriculture. All of these aspects reflect positively on the professional life of the agronomists, even if they will not apply any environmental impact methods in their future careers. *Originality/Value.* This paper describes a pioneer research in which LCA is used as a pure educational tool for understanding the environmental efficiency of agricultural systems, but also founding concepts of environmental sustainability in the agricultural sector.
Keywords. Life Cycle Assessment, Sustainable agriculture, System thinking, Crop management, Higher education, Teaching improvements.

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Introduction

Theoretical framework and aims of the research

Environmental sustainability has been included in the curricula of undergraduate and graduate programmes across Europe for more than 10 years (Holmberg et al., 2008; Lozano and Lozano, 2014). In fact, integrating sustainability into diverse academic curricula has been recognised as essential for providing students with the skills and insights which allow them to help societies become more sustainable (Lozano, 2010). This integration is occurring at different levels and rates in relation to the academic area of the Bachelor´s or Master's degree. In particular, there are a number of studies on approaches for embedding sustainability issues into engineering curricula at technical universities (Holmberg et al., 2008; Segalas et al., 2010), but studies about the integration of sustainability issues in other disciplines, such as agronomy (Parr &Trexler, 2011), dentistry (Kinakh, 2015) or information systems, (McGibbon& Van Belle 2015) are rare.
In general terms, sustainability is perceived from two very different points of view: sustainability as practices, such as reducing food miles, buying organic, consuming less meat, etc., or sustainability as metrics, involving the quantification of the environmental performance of a system through the application and comparison of sustainability assessment indicators (Sala et al., 2013). In the agricultural context, the teaching of environmental sustainability is often just exemplified by greener agricultural practices, such as precision farming, but usually, a systemic vision of sustainability in the food production is missing. The agricultural education in Italy (in both high schools and academies) reflects this approach. When sustainability is presented to students, it is usually discussed as practices for lowering the use of chemical products or plastics; rarely, environmental assessment methods are used as tools to give students a more concrete perception of the environmental performance of agricultural systems. In contrast to this traditional approach, some studies have proven that the practice of environmental impact assessment and the application of professional tools can also be efficiently used for educational purposes (Bergeå et al., 2006).
One of the tools commonly used for environmental impact assessment is Life Cycle Assessment (LCA), which includes the compilation and evaluation of the inputs, outputs and potential environmental impacts of a product system throughout its whole life cycle. In particular, LCA is a well-established and scientifically recognised methodology whose principles and methodological framework have been drawn in several certification schemes focused on environmental profile of products and services, such as ISO 14064:2013, well known as Carbon Footprint (CF), Environmental Product Declarations (EPD), Product Environmental Footprint (PEF), etc. The Life cycle assessment methodology has been standardised by the International Standardisation Organisation (ISO) in the ISO 14040 series (1997-2003) and revised in 2006 (i.e. ISO 14040:2006 and ISO 14044:2006).
The origin of LCA can be found in the early 1970s, when large multinational companies started to investigate the life cycles of their products in order to figure out where in the production process they could save resources, primarily for economic purposes (Bauman and Tillman, 2004). In such studies, results were reported as resource and emission profiles, but no quantitative assessment of the associated impacts on the environment was performed (Hauschild and Huijbregts, 2015). In the following years, the LCA approach was developed and formalised to be used in the industrial sector, but it was only in the mid1990s, that its validity was recognised also for the agricultural sector (Audsley et al., 1997). Nowadays, LCA is considered a useful tool to compare alternative food products, processes or services and as a background for environmental product declaration (Schau and Fet, 2008). Notarnicola et al. (2015) describe LCA as one of the most appropriate methods to study the environmental performance of

agricultural systems, as it allows the identification of environmental hotspots and the evaluation of different agricultural techniques; in addition, it supplies scientific data to the decision makers both at firm and political level. However, LCA application in the agri-food sector is a complex and challenging endeavour (van der Werf et al., 2014) and is usually performed by highly specialised experts and not considered for the higher education in the agricultural curriculum.

The application of LCA does not evaluate the absolute sustainability of an agricultural system; nevertheless, from an educational perspective, applying LCA to a case study can be considered as a concrete proxy for sustainability, as it enables students to engage with a range of sustainability issues (McGibbon& Van Belle 2015).

The purpose of this research is twofold: (I) to investigate if LCA can be used also as a didactical tool to support the learning of environmental sustainability for agronomists and (II) to evaluate the potential outcomes and benefits of teaching LCA in agricultural higher education. To make this assessment an action–research perspective (Whitehead &McNiff, 2006), we applied it to two case studies. In particular, the following two sections discuss the theoretical background in with the research takes place, including the way in with environmental sustainability is embedded in academic courses. Section 2 presents the method applied to point out key aspects that can be acquired by agronomy students teaching LCA. Section 3 describes the four main competences that can be improved in the agronomist curriculum via the teaching of LCA; finally, section 4 concludes the paper.

The inclusion of environmental sustainability in agronomic programmes

Papers focusing on the embedding of environmental sustainability in academic curricula of agricultural education are rare. Karsten and Connor (2002) developed an interdisciplinary undergraduate course in the science and policy of sustainable agriculture for students from several backgrounds, from political to agricultural sciences. The aim of their work was to highlight interdisciplinary thought and the inclusion of different perspectives. The authors developed specific teaching materials that featured aspects from both natural and social science domains. Wiedenhoeft et al. (2003) organised an experiential course in Agroecosystems Analysis for advanced undergraduate and beginning graduate students. They applied a mixed approach of lectures and farm visits, including interviews with the farmers and their families. The authors remark that, for the students, the multidimensional learning experience was more valuable than other traditional courses at their home campuses. Also, Parr and Trexler (2011) adopted a field approach for teaching sustainable agriculture. In particular, they assessed perceptions and achievements in focus groups composed of students who worked in college farms in several locations in the United States. The experimental learning approach was extremely productive, and the authors stated that specific activities at student farms on a university campus can be good occasions for in-depth embedding of sustainability in agricultural education.

Besides these three positive experiences, a discrepancy can be seen between the number of researches working on developing sustainability assessment methods and the number incorporating such methods into the curricula of university courses. Lozano and Lozano (2014) pointed out that the main reasons for this discrepancy could be: (1) ignorance or lack of awareness about the relevance of sustainability; (2) a lack of proper settings and support to change teaching curricula; (3) insecurity and fear of lacking academic credibility for teachers and professors who teach interdisciplinary courses that are needed for education in sustainable development; (4) over-crowded curricula; and (5) teachers who might prevent or support the diffusion.

Holmberg et al. (2008) defined two problems for embedding environmental sustainability in academic curricula: (1) internal factors, which are typical for the academic and engineering community, such as scepticism, disciplinarity and specialisation, autonomy, the desire to quantify problems and the reluctance to consider the 'soft' sides of problems; and (2) societal-contextual factors, which refer to the scientific system in a country, national values and mainstream political ideas.

In the agricultural teaching community, all of these aspects are relevant, plus one important additional issue: the traditional agricultural approach in the period from the 1980s–1990s was based on the aim of 'increasing production' and, more recently, this aim shifted to 'increasing the quality of food products'. Nevertheless, in order to understand the importance of education on environmental sustainability in this field, a paradigm shift is needed towards the idea of 'increasing the sustainability of food products'. This approach includes the study of the ecosystem services that are provided by agricultural systems and the application of environmental assessment methods to food production systems; however, at least in Italy, few agricultural courses include these topics, mainly because of the traditional academic separation of environmental and agricultural disciplines.

International experiences in including environmental sustainability in higher education

Despite the limited research published so far, there is an increasing interest in collecting experiences focused on the inclusion of sustainability as a subject in universities' curricula (Lozano & Lozano, 2014). In this direction, Holmberg et al. (2008) described the efforts of three European universities in the integration of sustainable development into their educational programmes through individual interaction with teachers and other faculty actors. Segalas et al. (2010) presented the results of a five-year research project that analysed how competences in sustainability were introduced into five European technological universities in order to evaluate which pedagogical approach best facilitates the learning of sustainability topics. The authors organised the pedagogical strategies applied in the studied universities in lecturing, project-based learning, case study, problem-based learning, back casting and role play. They found that in the case of sustainability, lecturing is a good method to introduce students to sustainability concepts, but the most efficient approaches are the ones that involve students actively. In particular, both case study and problem-solving approaches can be useful, as students directly face real or ad-hoc situations, are able to discuss how they would have acted and compare professional solutions (as either good or bad examples).

Lozano and Lozano (2014) presented the process of developing a Bachelor's degree curriculum in Engineering for Sustainable Development at the Tecnológico de Monterrey, Mexico. In their work, the authors defined five general approaches for embedding sustainability in academic curricula: (1) introducing the discussion of some environmental issues in an existing module or course; (2) developing a new, specific course on sustainable development; (3) intertwining sustainability as a pivotal perspective in already formalised disciplinary courses, tailored to the nature of each specific course; (4) developing a specialisation path (as a set of courses and laboratories) on sustainable development within the framework of each faculty; and (5) developing a specific, integrated curriculum based on sustainability that targets the demands of professionals with this expertise. This last approach has proven to be more efficient and useful for the professional life of students (Lozano et al., 2014), but at the same time, it is the one that encounters more difficulties and resistance. Indeed, the simple incorporation of teaching materials about sustainability in a regular course may be considered just a starting point for institutions, as such steps alone result in insufficient integration of sustainability principles into students' professional lives (Lozano & Lozano,

2014). This happens because of the interdisciplinary nature of sustainability (Sala et al., 2013), which implies that, in order to be effective, sustainability must become part of their paradigm and way of thinking (Holmberg et al., 2008).

Methods

A quali-quantitative investigation

Measuring the effectiveness and the outcomes of teaching interactive and non-standardised disciplines is not straightforward. Several researches on this issue use the approach of testing student knowledge before and after the pilot course or the didactical intervention (Harun et al., 2015). This approach is even more effective when the survey can reach a high number of students, which enables the application of statistics (Azapagic et al., 2005; Kagawa, 2007). In case the number of students is low, any statistical remark will be poorly supported; nevertheless, interesting information can be achieved adopting an action–research approach (Whitehead &McNiff, 2006). This practice allows for meaningful interconnections between personal ideas, the results of educational research and the first-person educational experience of the participants. The prime objective of data collection is therefore that of using data as feedback to enrich and support the constructive process of restructuring and integration of knowledge.

To assess the usefulness of teaching LCA in agricultural higher education, two courses were specifically designed and took place within the University of Turin, Italy (see next sections for the description of the courses). These two courses were considered as case studies in order to highlight conceptions, ideas and benefits of including the study of LCA as a tool in their curriculum. The two courses were designed with an action-learning perspective (Lund et al., 2014), providing students with an active role in discussing among themselves results of papers that are focused on the application of LCA to food products.

In both case studies, students were asked to fill out a questionnaire, answering specific technical questions and highlighting which aspect of the course they found more interesting and useful for further applications. At the end of every course, data were numerous, but heterogeneous and varied, because they were not collected following a fixed research protocol established *a priori*. However, through the application of qualitative research methodologies, concepts that emerged — directly or indirectly — in students' presentations and feedbacks were collected and classified, obtaining interesting results that are, to a certain extent, statistically significant (Creswell, 1998; Silverman, 2000). The accurate documentation of classroom activities, integrated by the participants' final assignments, provides significant information, which can be generalised to some extent, about preconceptions and prior knowledge and the learning and teaching processes that have been developed about the proposed scientific topics.

Case study 1: Bachelor´s degree in agronomy, University of Turin

At the Department of Agriculture, Forestry and Food Science, University of Turin (Italy), a short course (6 hours) about the application of various environmental impact assessment methods in agriculture took place in 2011 and 2012 in three Master degrees: Agricultural Sciences and Technologies, Food Sciences and Technologies as well as Science and Culture of the Alps. In the three cases, the course was designed as 3 hours of lecture and 3 hours of group work. The lecture was focused on the basics of the LCA approach, including a brief presentation of the LCA framework in order to dedicate more time to the outreaches of the approach, such as ecodesign in agricultural systems and environmental product declarations. The group work was then developed around the discussion of a scientific paper describing a full LCA or one footprint (carbon, water or ecological) for a food product following specific guidelines. In particular, each

group was asked to prepare a presentation addressing the following issues: *(I) What were the aims of the research? (II) Which environmental impact assessment method was used? And how was it set up? (III) Which system boundaries were applied and why? (IV) Which functional unit and why? (V) Critical comments of the obtained results. (VI) How can the results be used?* Papers for the group work were selected among the most didactical case studies from the *Journal of Cleaner Production*, *The International Journal of Life Cycle Assessment* and *Agriculture Ecosystems and Environment* in the years 2005–2010. In particular, 40 papers were given to the students in each course. Table 1 briefly describes the main characteristics of the 8 papers chosen by the students at least once per course. The paper of Mila i Canals et al. (2007) was chosen all three times because students were interested in the discussion of sustainability of domestic versus imported food products (the well-known issue of food miles). The other papers were mainly chosen because, as highlighted by the students themselves, the food products investigated in these articles were closer to their personal and professional interests. From their presentations, it was possible to verify what students learned to identify conceptual obstacles and educational outreaches.

Table 1. List of all papers chosen by students in the three courses of case study 1. Considered indicators are Life Cycle Assessment (LCA); Ecological Footprint Analysis (EFA) and Emergy Analysis (EM). Country category considers the area of the study and not necessarily the origin of the research group. In boundaries, different kinds of limitations of the system are considered; cradle-to-gate* refers to a cradle-to-gate scenario, but considers the final product at the gate (e.g. palm oil); cradle-to-market (int) considers a cradle-to-market scenario with an international market. Other information about the fields include: cg = capital goods, n = nursery, p = plantation of the orchard.

Times chosen	*Article*	*Product*	*Country*	*Aim of the research*	*Method*	*Reference flow*	*Boundaries*
3	Mila i Canals et al. (2007)	Apple	UK, New Zealand	Domestic versus imported	LCA	Mass-based (FU = 1 kg)	Cradle-to-market (int)
2	La Rosa et al. (2008)	Orange	Italy	Comparison agro-techniques	EM	Mass-based (seJ/g)	Cradle-to-gate
2	Niccolucci et al. (2008)	Grape	Italy	Comparison agro-techniques	EFA	Mass-based (gha/t); land-based (gha/ha)	Cradle-to-market (p, cg)
2	Yusoff& Hansen (2007)	Palm oil	Malaysia	Regional/national profile	LCA	Mass-based (FU = 1 t final product)	Cradle-to-gate* (n)
1	Coltro&Mourad (2009)	Orange	Brazil	Regional/national profile	LCA	Mass-based (FU = 1 t)	Cradle-to-gate
1	Liu et al. (2010)	Pear	China	Comparison agro-techniques	CF	Mass-based (FU = 1 t)	Cradle-to-market
1	Mila i Canals et al. (2006)	Apple	New Zealand	Regional/National profile	LCA	Mass-based (FU = 1 t)	Cradle-to-market (int)(cg)
1	Mouron et al. (2006)	Apple	Swiss	Methodological issues	LCA	Land-based (FU = 1 ha); receipt-based (FU = 1 $)	Cradle-to-gate (cg)

Case study 2: Master´s degree in Sustainability of Agro-food Networks, UNESCO Chair for Sustainable Development

Since 2013, the UNESCO Chair for Sustainable Development of Turin has been hosting the Master's degree in Sustainability of Agro-food Networks. Students are graduated in several disciplines, mainly agricultural sciences and biology, but also economy, marketing and social sciences. In the degree, several courses touch on the concept of sustainability, and in the years 2013/2014 and 2014/2015, a specific course on environmental impact assessment methods was offered. The course was structured in 20 hours of lecture and 4 hours of group work. In the lecture, environmental assessment methods applied to food networks were discussed, including an extensive presentation of the LCA method, ecological footprint analysis, the water footprint, emergy analysis, the urban metabolism approach to food distribution systems and the most updated framework for environmental product declaration for food products in Italy. The focus of the course was to provide students with the conceptual tools to understand environmental assessment methods in order to be able to approach them critically and to make the best of the results of environmental reports.

As for the experience described in Karsten and Connor (2002), teachers of the course faced challenges in connection with the interdisciplinary nature of the course material and the diverse backgrounds of the students. Therefore, as suggested by Karsten and Connor (2002), different teaching practices were applied, such as the focus on crucial concepts rather than specific disciplinary details and the adoption of frequent short questions and written activities in order to check the acquisition of pivotal concepts.

The group work followed the same structure as the course offered at the Department of Agriculture. Students were divided into groups and asked to choose a scientific paper and prepare a presentation addressing the following issues: *(I) What were the aims of the research? (II) Which environmental impact assessment method was used? And how was it set up? (III) Which system boundaries where applied and why? (IV) Which functional unit and why? (V) Critical comments of the obtained results. (VI) How can the results be used?* In contrast to the previous course, students were asked to choose a paper from the proceedings of the scientific congresses of the Italian LCA Network from 2009 to 2014. The following papers were selected: Arrigoni et al. (2014), Neri et al. (2012), Pirilli et al. (2012), Patrizi et al. (2012), Recanati et al. (2014), Ruini & Marino (2009), Secchi et al. (2013), Vitali et al. (2013) and Zamagni et al. (2013). Table 2 briefly describes the main characteristics of the chosen papers. Also in this case, from their presentations, it was possible to verify what students learned to identifyas conceptual obstacles and educational outreaches.

Table 2. List of all chosen papers in the three years of case study 1. Indicators considered are Life Cycle Assessment (LCA); Ecological Footprint Analysis (EFA), Emergy Analysis (EM) and Water Footprint (WF). In boundaries, different kinds of limitations of the system are considered; cradle-to-gate* refers to a cradle-to-gate scenario but considers the final product at the gate (e.g. olive oil or milk).

Article	***Product***	***Aim of the research***	***Method***	***Reference flow***	***Boundaries***
Arrigoni et al. (2014)	Hemp as insulation for buildings	Comparison of products	LCA	Mass (FU = 1 kg of product)	Cradle-to-gate*
Neri et al. (2012)	Wine, olive oil	Comparison of agro-techniques Comparison of methods	LCA, EM	Mass (FU = 1 l wine) Mass (FU = 1 kg oil)	Cradle-to-gate*
Pirilli et al. (2012)	Clementine	Comparison of agro-techniques	LCA	Mass-based (FU = 1 t); land-based (FU = 1 ha)	Cradle-to-gate

Patrizi et al. (2012)	Vertical garden	Background study for EPD	LCA	Product-based (FU = 10-product module)	Cradle-to-user
Recanati et al. (2014)	Average farm in Gaza	Regional/national profile	WF	Time-based (FU = 1 year) nutrient-based (FU = 1 kg of protein)	Cradle-to-gate
Ruini& Marino (2009)	Pasta	Background study for EPD	LCA	Mass (FU = 0.5 g)	Cradle-to-market
Secchi et al. (2013)	Cosmetic ingredient	Comparison of products	LCA	Mass (FU = 1 kg final product)	Cradle-to-gate*
Vitali et al. (2013)	Milk	Background study for EPD	LCA, WF	Mass (FU = 1 l milk)	Cradle-to-gate*
Zamagni et al. (2013)	Sugar	Background study for EPD	CF	Mass (FU = 1 kg sugar packed)	Cradle-to-market

Educational outreaches

In contrast to Segalas et al. (2010), who reported that students at technical universities perceive environmental sustainability as mainly related to technology, this aspect was just slightly present in the courses at the agricultural department (case 1, with just future agronomists) and absent in the course in the UNESCO Master's degree (case 2, with students from several backgrounds). In this second case study, environmental sustainability was perceived more as a social issue in terms of a motivation for behaviours and consumption practices.

From the feedback received in all activities, students demonstrated to have understood the basics of the LCA approach, as well as other annexed concepts related to environmental sustainability. Categorising the different feedback collected from the students, it is possible to summarise that the most interesting aspect in teaching LCA to agronomists is the development of the so-called integrative assets (Viegas et al., 2016), which are considered to be those that lay behind, between and beyond the other environmental sustainability attributes in sustainable higher education. In particular, in the two experiences, it emerged that students understood the importance of complexity and system thinking in agriculture. Furthermore, two important knowledge assets were successfully acquired from the practical activities: the problem of efficiency and the conception of sustainable agriculture. In this case, such assets were not directly taught as such, but they emerged from their own remarks and were deeply discussed.

To highlight the positive outreaches of these four assets for the agronomical curriculum, such concepts are discussed in detail.

Complexity

There are several definitions of complexity. In biology and ecology, complexity refers to systems whose components interact in multiple ways and follow local rules, with the effect of producing a high number of scenarios and effects (Carroll, 2005). Complexity can also be referred to behaviours in social sciences and in economy; nevertheless, besides the different definitions, the capability of incorporated complexity in an analytical approach is considered a funding concept for sustainability education (Dale & Newman, 2005).

The application of an environmental assessment method requires studying the 'personal history' of the product and not just the use phase. Therefore, investigating the life cycle of products, it is possible to understand the energy flows and material cycles of the production system. As a consequence, students are forced to visualise the different direct and indirect components of the agricultural systems and their internal and external links.

In the two case studies, it emerged that students were used to thinking of each part of

the agricultural system as a stand-alone component and not focusing on the relations. For example, the choice of a crop variety is usually considered for the yield that can be achieved in a given pedo-climatic site, but it influences the field design, management practices, farm structures and machineries that are needed to support the production, leading to more or less consumption of agricultural inputs such as fertilisers, pesticides and water (Cerutti et al., 2013). This lack of inclusion of complexity in the agronomists' view is in contrast to the idea that academic education should provide conceptual structures and tools for dealing with complexity (Sibbel, 2009).

It is interesting to note that standardisation is somehow the opposite of complexity and, although the LCA approach uses several levels of standardisation, the need for modelling the investigated system requires an understanding of the connections and complexity of the case. An example of visualisation of a part of the complexity of a production system is the modelling of an orchard for the application of the emergy analysis (Figure 1), in which the relations among the components of the systems are accounted in terms of energy flows (La Rosa et al., 2008).

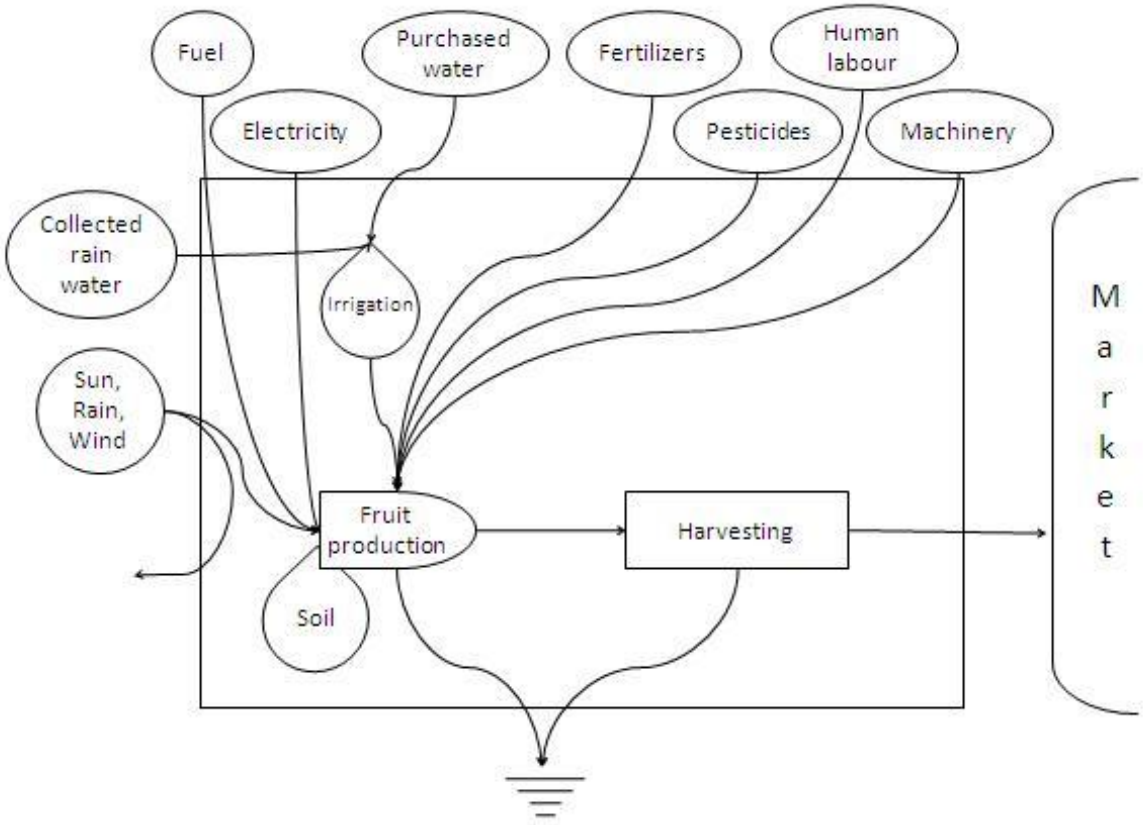

Figure 1. General energy system diagram of an orchard. This diagram is commonly used for emergy analysis and represents the fruit production system from a thermodynamic point of view.

In addition, applying LCA enables students to visualise the breakdown of environmental impacts for each phase of the production system. This process allows the student to visualise that different improvements in the production process might have different effects on the environmental performance. In fact, the most common visualisation of a production system according to LCA is using a diagram flow (Figure 2) in which each life stage of the system is visualised and can be accounted for potential environmental impacts.

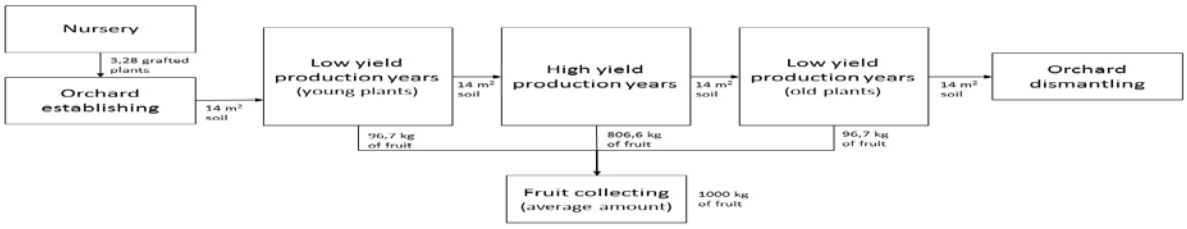

Figure 2. Flow Diagram according to LCA rules, based on a real case study in order to calculate the potential environmental impacts related to the production of 1 ton of apples (modified from Cerutti et al., 2014.)

Systemic view of agricultural fields

System thinking can be defined as the awareness of complexities involved in real-life practices (Viegas et al., 2016). It is considered an important asset in sustainability education because the ability to think systemically can facilitate industrial and societal transitions to sustainable production and consumption patterns (Padovan et al., 2015). Nevertheless, several researchers (Wells et al., 2009) highlight that it is very difficult to achieve system thinking in higher education because teachers are used to giving and taking back from students' disciplinary knowledge as they consider that this kind of knowledge better meets the professional requirements of students.

One of the ideas that stand at the base of the LCA approach is the emission (impacts) from the technical system to the natural system (Baumann & Tillman, 2004). The need to identify boundaries between technical and natural systems for impact assessment highlights the strong interconnection between the two of them. In particular, in order to model a farm, three main systems have to be considered: the natural, the technical and the orchard itself. The natural system can be simplified as the biotic and abiotic components of the environment in which the orchard is embedded. The interfaces between natural and orchard systems are mainly soil, air and water (as local parts of pedosphere, atmosphere and hydrosphere). Furthermore, the farm is dependent on several ecosystem processes provided by biotic components. As system theory suggests, all systems are in fact components of still larger systems, and all components of systems are in fact systems made up of still smaller components (Ikerd, 1993). For example, fruit trees are at the same time components of the orchard system and systems themselves (Figure 3).

More precisely, the fruit tree subsystem is the core of the orchard system, because effects of natural and technical systems can be seen mostly at the plant level (Page, 2009). As a consequence, applying a systemic view to a farm allows highlighting connections with related systems and becoming conscious of environmental boundaries that have to be considered for an environmental sustainability assessment.

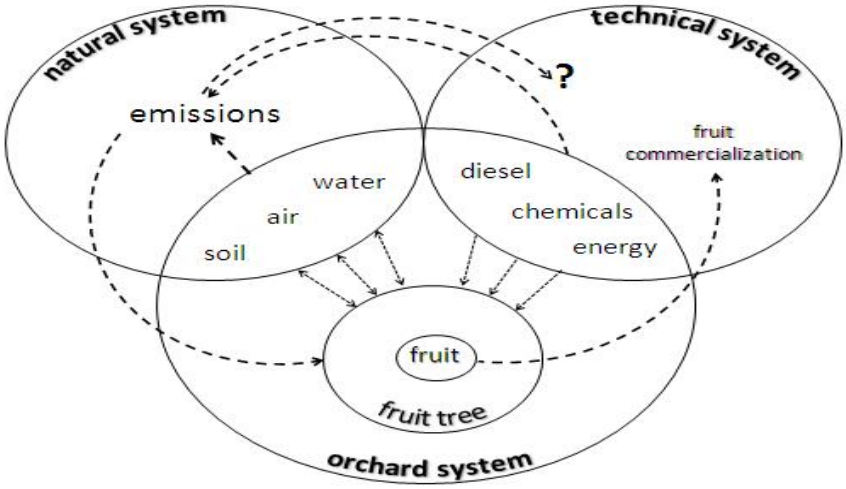

Figure 3. One of the possible representations of the orchard from a systemic point of view modified and generalised from Page (2009). Orchards are at the same time part of the natural system and part of the technical system, but they are also a system themselves with subsystems (e.g. fruit trees). Interface components of the three systems are represented with common areas of the three cycles; arrows represent interactions between components.

The problem of efficiency

In general terms, efficiency is considered to be synonymous with environmental sustainability. For example, in the energy context, the adoption of measures of efficiency allows to save energy; nevertheless, studies on the rebound effect demonstrate that money saved can be used for assessing even more impacting practices (Binswanger, 2001). In the agricultural sector, this effect is less evident and connected to the problem of land use change; however, the problem of the theoretical overlapping of efficiency and environmental sustainability is strongly present in the agronomist's mind. In fact, from the agronomical point of view, the food production systems that are more efficient in terms of input use per unit of product should be more sustainable. But the application of some assessment methods highlights that productions that are efficient from an agronomic point of view may not perform well from an environmental point of view. The LCA helps to understand this issue through the application of multiple functional units in the same case study. As highlighted in several studies (Cerutti et al., 2013; Masset et al., 2015; Van der Werf & Salou, 2015), the choice of the function unit might have a relevant effect on the quantification of the environmental performance. For food products, typical functional units are mass-based (e.g. 1 t of product at the farm gate or 1 kg of final product), yet a land-based functional unit (1 ha of field) often leads to complementary results. Indeed, when considering only impacts per mass unit, high input/high output systems are the favourite, but the total amount of impacts (such as emissions) of a given territory might increase. On the contrary, when considering only impacts per unit area, low input/output systems will have a better ranking in terms of decreased impacts at a regional level, but may create a need for more land use elsewhere, giving rise to additional impacts.

A didactical example used to understand this issue is the case reported in Cerutti et al. (2013). Until the 1950s, hundreds of different varieties of apple (*Malus domestica*Borkh.) were grown in Italy, as in many other fruit-producing countries. However, in the 1960s, with the proliferation of commercial varieties

and orchard specialisation, the local germplasm lost importance and began to be forgotten by growers and consumers. Many ancient varieties were gradually replaced by commercial ones, and the Italian fruit-growing scene underwent significant change. Nowadays, more than 70% of orchards grow only Golden Delicious, although the ancient apple germplasm of the Piedmont region (Northern Italy) currently consists of about 350 varieties. Cerutti et al. (2013) calculated the environmental performance of three representative ancient apple varieties from Torino and Cuneo provinces, namely Grigia di Torriana, Magnana and Runsé, using an LCA methodology. In particular, the environmental impacts of the varieties were compared to those of the commercial varieties of Golden Delicious, according to three functional units: a mass-based functional unit (1 t of fruit), a land-based functional unit (1 ha of orchard) and a currency-based functional unit (1,000 € earned). The impacts for the category global warming potential of the four varieties are summarised in Table 3, according to the functional unit used. Considering impacts for 1 t of product, the Golden Delicious varieties showed the best environmental performance; in particular, the ancient varieties showed on average 17% higher emission in relation to Golden Delicious. However, the results were the opposite considering the impacts for 1 ha and 1,000 € income. According to these functional units, the ancient varieties had the best environmental performance, and the impacts for Golden Delicious production per ha of orchard were on average 24% higher in global warming potential in relation to the ancient varieties. A lower difference can be found by applying the economic value-based functional unit; in this case, ancient varieties had on average 9% lower emissions in relation to Golden Delicious.

Table 3. Global warming potential of the four apple varieties according to the functional units considered in the study (elaboration from: Cerutti et al., 2013).

Functional unit	Dimension considered	Varieties			
		Golden Delicious	Grigia T.	Magnana	Runsè
Mass-based	kg CO_2-eq/t of fruit	163.9	203.9	192.9	196.5
Land-based	kg CO_2-eq/ha of orchard	6,555.3	5,554.8	4,775.9	4,540.8
Economic value-based	kg CO_2-eq/1000€ earned	327.8	305.2	293.9	291.1

Conceptions about sustainable agriculture

Sustainability is a broad concept that is sometimes considered ambiguous because it means different things to different people at different periods of time. As a consequence, many definitions of sustainable agriculture can be found, but most of them are connected to the three pillars of sustainability: society, economy and environment. For example, Reganold et al. (2001) summarised this concept as follows: 'To be sustainable, a farm must produce adequate yields of high quality, be profitable, protect the environment, conserve resources and be socially responsible in the long term' (pag. 927). Nevertheless, although it is generally accepted that sustainable agriculture is achieved when the economic, social and environmental conditions are fulfilled, the emphasis given to each of these components varies greatly across individuals, organisations and governments. One aspect that inevitably influences the choice of the way of seeing sustainable agriculture is the scholarly background of the researcher.

Furthermore, two distinct perspectives exist: weak and strong sustainability (Ayres et al., 2001). In general terms, weak sustainability allows for the near complete substitution of natural capital with other kinds of capital, whilst strong sustainability means no substitution ofnatural capital with other kinds of capital. A consequence of the adoption of a strong sustainability perspective is the acquisition of an eco-centric vision in which the three pillars are not at the same level and environmental sustainability is considered as a prerequisite for socioeconomic sustainability; therefore, it has priority over other aspects. In this vision, the use of metrics for environmental sustainability is seen as necessary in order to give scientific-based information to support polices and stakeholders. natural capital with other kinds of capital. A consequence of the adoption of a strong sustainability perspective is the acquisition of an eco-centric vision in which the three pillars are not at the same level and environmental sustainability is considered as a prerequisite for socioeconomic sustainability; therefore, it has priority over other aspects. In this vision, the use of metrics for environmental sustainability is seen as necessary in order to give scientific-based information to support polices and stakeholders.

Several papers, technical documents and policy guidelines that support sustainable food production and consumption take into account environmental criteria based not on threshold values of the environmental impact indicators, but on qualitative judgements of practices, such as the seasonality of products, harvesting practices, minimisation of waste and professionalisation of operators (Cerutti et al., 2016). However, if sustainability practices are not associated with a specific evaluation of an environmental indicator (such as emissions of climate-changing gasses, water depletion or soil consumption), they do not allow quantification of the actual environmental savings (Cerutti et al., 2016). During the discussions in both the lectures and group work, several reflections on the concept of sustainable agriculture emerged. One clear feedback was that through the study of LCA, students changed their personal understanding of sustainability from a vague set of practices to environmental metrics. Despite the complexity that stands behind the 'measurability' of sustainability, it became clear to students that in order to be defined as sustainable, a production or a production system has to quantify an environmental performance. Furthermore, a deep discussion occurred on the concept of strong sustainability (Goodland & Daly, 1996), in which maintaining ecosystem services is more important than production.

Concluding remarks

Life Cycle Assessment is one of the most applied tools for environmental impact assessment of food products (Notarnicola et al., 2015), but the feedback received from students highlighted that it can be much more. Focusing on the right questions, LCA can be transformed into a powerful didactical tool for education in sustainable development.

The knowledge and integrative assets achieved by learning and discussing the LCA approach positively reflect in the professional life of the agronomists, even if they will not apply any environmental impact method in their activities.

Further studies should focus on developing specific activities, possibly using educational versions of LCA software, to enable students to put into

practice abstract concepts of sustainable development and to understand the importance of metrics in accounting for environmental sustainability.

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The Challenge of ICT Long-Term Sustainability

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Abstract
The long-term sustainability of Information and Communication Technologies (ICT) requires a new design paradigm based on the recyclable-by-design, repairability-by-design approach, the minimization of material and power consumption, and a zero-waste goal. Nevertheless the growing speed of electronics devices replacement is not compatible with the limits of the planet Earth. A new design, development, manufacturing, and use of ICT, based on the Slow Tech concept, is required: technologies that are socially desirable, environmentally sustainable, and ethically acceptable.

Key words: Information and Communication Technologies (ICT), long-term sustainability, rare-earths, cloud computing, Slow Tech

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***Perspective**: Theoretical visions*

***Fields**: Technology, Economy and Social Sciences*

***Issues**: Sustainable ICT production and consumption*

Introduction

This paper proposes to look at Information Communication Technology (ICT) from the point of view of the relationship with the environment and sustainability in the long-term. Up to the year 2013, very few researchers were investigating the "*uncomfortable truth*" related to the production, use and disposal of modern ICT. Several works have investigated this area (Fairweather, 2011; Whitehouse et al., 2011; Hilty et al., 2011; Patrignani and Kavathatzopoulos, 2012) and, since 2013, with the first Conference ICT4S, *ICT for Sustainability*, in Zurich, an important community of scholars is investigating with a wider view on this fundamental issue at the core of critical infrastructures of society (ICT4S, 2013). The main questions are "*is it possible to close the production-use-disposal cycle for ICT? And for how long will this cycle be sustainable?*". In the following a closer and systemic view is proposed at these three phases - production, use, and disposal - applied at the ICT world in order to highlight the relationships with material consumption, climate change, and dangerous pollution.

Production

The famous expression "*matter matters too*" (Georgescu-Roegen, 1979) recalls the importance of taking into account the long-term consequences of the continuous materials extraction. These activities imply irreversible processes, decreasing quantities and increasing extraction costs (Bardi, 2014). For producing ICT a long list of materials is needed and, unfortunately, ICT use rare metals for manufacturing microprocessors and integrated circuits in general. As described in a recent study from Yale University: "*... the increasingly use and mining of rare metals can have devastating environmental consequences as well as serious geo-political concerns*" (Schmitz and Graedel, 2010). The famous case of Coltan (Columbium-Tantalum mineral) disclosed this grey area of ICT, where most of these materials (also called "*conflict minerals*") are extracted in conditions of illegality, including child labour and slavery (Nimbalker et al., 2014; Vazquez-Figueroa, 2010).

Electronic devices contain *conflict minerals* like Tantalum, Tungsten, Gold, Tin; *substances of concern* like Litium, Beryllium, Chromium, Fluorine, Chlorine, Arsenic, Bromine, Cadmium, Antimony, Mercury and Lead; *rare earths* like (Yttrium etc.); and many other scarce elements like Indium, Palladium, Cobalt, Platinum, etc. For example, the reserves of supply remaining of Indium, used for screens and displays, are estimated to be just 14 years. Inside all of ICT, just the smartphones account for 7.1 Billion devices produced and distributed since their introduction in 2007. The energy needed just for manufacturing them have been around 700 TWh (Greenpeace, 2017). Just for reference, in 2016 Italy consumed 310 TWh (Terna, 2017).

A serious reflection on this side of ICT long-term sustainability is now mandatory. Designers, computer professionals, vendors, the main drivers of ICT development, should seriously reconsider the entire life-cycle of electronic devices in order to minimize their impact on the planet.

Use

Of course, ICT can be used for de-materialising processes and reducing energy consumption by moving bits instead of atoms, accelerating the transition to a less material-intensive economy (Hilty, 2008). But moving and processing bits does not come for free and, since the 1980s, the debate about the side effects of ICT on the environment has emerged (Benson, 1985; SVTC, 2007). It is very complex to balance these two aspects but manufacturing, using, and disposal ICT is requiring a growing amount of energy and this risks compromising the benefits coming from dematerialization.

End users' mobile devices, computers and servers are the most visible areas of ICT and, considering their growth speed, their total power consumption is growing: a smartphone, for example, requires about 5 KWh per year for its use (EPRI, 2017). But nowadays they are

completely useless without connecting them to a network.

Looking at the power consumption of a typical telecommunication network one can divide it in four different components: data centers, network, mobile access and fixed access.

The gigantic data centers of the cloud computing represents about 10% of the total power consumption and it is increasing by 25% every year. In 2016 the world's data centers total power consumption has been around 416.2 TWh (Ericsson, 2015).

The network in itself (data transmission, routers, channels, IP networks, etc.) consumes about 20% of the total, while the fixed access (ADSL, fiber, etc.) consumes about 45% of the total. The mobile access network areas (2G, 3G, 4G, etc.) get 25% of the total.

Looking at the total CO_2 generated by data centers (0,36 $GtCO_2$), voice and data networks (0,30 $GtCO_2$), and end-users-devices (0.59 $GtCO_2$) (GESI, 2015) we have a total of 1.25 $GtCO_2$ that can be attributed to ICT. On the positive side, it is estimated that by 2030, if appropriately developed and applied in manufacturing, buildings, agriculture, transportation, and power, ICT could save 12.1 $GtCO_2$. Even if the ICT energy balance looks positive, a number of issues need further research: what is the amount of energy (and related CO_2) needed to build ICT and to manage e-waste?

Welcome to the wireless world

Another area of concern is the growing use of wireless channels for accessing ICT. Electromagnetic spectrum is a commons now put on sale by many countries. It is considered a "limited commons" since: a) the available frequencies are limited (radio waves, microwaves, infrared up to 428 THz, the upper frequency limit where humans start seeing red light), and b) beyond some limits, one cannot use two frequencies that are too close each other without risking interferences. The new exponential growth of wireless connectivity of mobile devices to the Internet have introduced immense market opportunities and a pervasive penetration of these waves carrying energy (Cachard, 2017). The World Health Organization (WHO), via its International Agency for Research on Cancer (IARC), has classified the waves used in ICT, like WiFi, Bluetooth, UMTS, LTE, etc., in the category B2 "*potentially carcinogenic for human beings*" (IARC, 2013). While waiting for more precise results coming from many ongoing research studies in this direction, a precautionary approach is recommended in particular for long-time expositions.

Disposal

Since in all ICT devices many hazardous substances are contained, the related environmental risk of disposal is very high. The United Nations University estimated that in 2014 roughly 42 million tons of e-waste was generated despite the value and the risk of related materials. Smartphones contributed for 3 million tons to this mountain of e-waste. And the mountain is growing: it will reach 50 million metric tons in 2017 (Baldé et al., 2014). It is now mandatory to investigate the destination of these devices at the end of their life, since the precise location of their disposal in mostly unknown, or they are sent to destinations where their management is very dangerous. According to Blacksmith Institute and Green Cross Switzerland the most polluted place in the world is Agbogbloshie, Accra in Ghana. This dumpsite is an immense area full of electronic devices coming from Western countries and it grows at a rate of 215,000 tons per year (Bernhardt and Gysi, 2013).

The entire ICT community should immediately start to face this challenge to long-term sustainability.

One first possible action is of course to introduce the recycling of ICT devices as mandatory. Several studies have demonstrated, for example, that the cost of recycling gold from old computers is in the same order of the cost of mining the mineral (Step, 2013).

A second action is to address the problem at design stage: all ICT devices should be required

a recyclable-by-design approach that will simplify the e-waste management.
A third possible action is to introduce a repairable-by-design approach: by easily repairing these devices their lives will be lengthened. By changing only the broken components that will be easily substituted, provided that the interfaces by all modules are interoperable and open, like in open software and open hardware (Arduino, 2017).
A fourth more radical action is to introduce comprehensive industrial design and developments (e.g. "*cradle-to-cradle*" or "*regenerative design*") that learn from natural cycles; the industrial products should start to be seen as organisms with circulating materials creating waste-free systems (Lovins, 2008).

Slow Tech

Slow Tech concept, a quest for a good, clean, and fair ICT has been recently introduced: "*... a new starting point for systems design: ... based on a long-term view of the desirability and social importance of technologies, their environmental impact and sustainability, and the fairness and equity of the conditions of workers*" (Patrignani and Whitehouse, 2014). Slow Tech approach starts from taking into account the limits of the planet and the limits of human beings. In particular the "*clean side of Slow Tech*" is introducing the reflection into the ICT community: how should designers, computer professionals, ICT companies, policy makers, and end-users collaborate for directing ICT towards a long-term sustainability? (Patrignani and Whitehouse, 2015). A very good case study of Slow Tech approach is provided by Fairphone, a smartphone that is seriously taking into account the problem of recyclability and repairability (Raoul, 2017).

Conclusions

The ICT community of designers, computer professionals and vendors have to seriously reconsider ICT consumption cycles and their speed with repairable and upgradable by-design projects. Also from the end users' point of view a serious reflection is urgent: in some countries 50% of people change their mobile device every twelve months. It is a speed that the Earth cannot afford and a slow replacement approach is one of the key actions.
Even in the economists' community the concept of limit to growth is now starting to be accepted: the new concept of a "*circular economy*" is very promising (Stahel and Reday-Mulvey, 1981; EMAF, 2013).
A more systemic view of nature including our industrial processes is needed. Even if ICT could and should be mainly used for saving energy and cleaning our activities, the increasing speed of human beings' processes is not sustainable in the long term. If human beings seriously appreciate the limits of the planet, closing the cycles is no more enough: a reflection on the *speed* of these cycles is becoming mandatory. According to German sociologist Rosa the curious paradox of contemporary society is that "*we don't have any time although we've gained far more than we've needed before*" (Rosa, 2013). Since this acceleration is mainly due to ICT, facing this paradox of modern times requires the wise production, use, and disposal of ICT.

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Humanity and Nature, Warfare and Exploitation in Bertolt Brecht's Poetry

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Abstract. This article proposes a reading of the poetry of Bertolt Brecht as a powerful indictment of much of human activity in terms of its damaging effects both on the lives of many human being themselves and the nature which they depend on in order to live. Long before awareness of the threats to the environment caused by indiscriminate exploitation of natural resources and uncontrolled production and consumption processes became widespread, Brecht pointed to many of the risks being run, to the inequalities that must be rebalanced and the injustices that must be righted, to how sustainable human trajectories can only be based on cooperation, autonomy and responsibility. Above all, Brecht showed how warfare and exploitation are not separate issues, but are rather inextricably linked as destructive human impulses.

Key words. Poetry, warfare, exploitation, humanity, environment

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***Perspective**: Theoretical visions*

***Fields**: Human sciences and poetry*

***Issues**: Warfare, injustice, accountability*

In an age of increasing and accelerating globalization, human and all other lives, together with their environments, are undergoing change in multiple ways. Evidence from biology and geology confirms that the fine dividing line often traced between humankind and nature has become increasingly blurred. For example, no longer can we maintain the belief that there is a distinction between warfare as a means of resolving disputes and the destruction of nature as a form of exploiting resources for satisfying our needs. This perspective renders ever more urgent the search for new ways of acting to change our trajectories and tackle the perils of our time that threaten all forms of life and every aspect of the environments that host it.

A further danger stems from the homologation of cultures, systems of belief and languages. The decline in cultural and linguistic diversity exacts a heavy price as it chips away at the range of human possibility that constitutes the wealth of both beauty and hope with which civilizations build their development. This is a matter of great concern and all those who care about the condition of the earth, its living creatures and in particular that of humankind can bear witness to the fact that answers go beyond single visions or specific disciplinary perspectives. Our efforts not to exceed the limits of what the earth can support and remain in equilibrium are useless if we cannot build and maintain common discourses and communities of values.

Poetry – in a way which goes beyond that of any of the sciences – can act as a powerful medium for celebrating diversity. Poems, even – and perhaps especially – those conceived during such harrowing periods as wartime, can address the question of fulfilment of our fundamental needs for sustenance and emotional support, promote awareness of the infinite complexities of our lives, and exhort us to value and practice the virtues of cooperation, autonomy, and responsibility[1].

In just this way, the poems of Bertolt Brecht (1898 – 1956) proclaim a special message and a unique vision of the challenges of our times, able to encompass within the same perspective the perils faced both by humanity and nature. Although he was yet unaware of such threats as climate change, planetary tipping points, or holes in the stratospheric ozone, Brecht's writings can be seen as sounding a timeless warning of the need to build awareness of the risks run by humanity both in terms of its destructive impulses and its inability to build reciprocal understanding through dialogue. His works are full of the contradictions posed by human trajectories and stand among the finest iconoclastic compositions of modern literature.

It has long been normal to describe war as a universal tragedy in the face of which human beings can no longer sing and poets have to hang their harps to the branches of willows, like the ancient prophets of the Jews deported to Babylon, as in Psalm 137 of the Bible:

By the rivers of Babylon we sat and wept
when we remembered Zion.
There on the poplars we hung our harps,
for there our captors asked us for songs,
our tormentors demanded songs of joy;
they said, "Sing us one of the songs of Zion!"

[1] Arrobbio, O., Camino, E., Colucci–Gray, L., Dodman, M. and Ferrara, E. *Global Issues and Events. Relationships, Understanding and Actions at Individual and Community Levels*, Visions for Sustainability, 6, pp.3-5, 2016.

How can we sing the songs of the Lord
while in a foreign land?

The Italian poet Salvatore Quasimodo (1901–1968) – awarded the Nobel Prize for Literature in 1959 "for his lyrical poetry, which with classical fire expresses the tragic experience of life in our own times", – claimed that war changes poets, "alters the moral life of a people and fosters a greater need for truth than is felt in normal times"[2]. Quasimodo gave poetic form to this sentiment in the famous poem *On the branches of Willows* (*Alle fronde dei salici*, 1947):

And how could we sing
with a foreign foot on our hearts,
among the dead abandoned in the squares
on the grass hard for the ice, to the lament
like lambs of children, to the black scream of
a mother going to meet her son crucified on
a telegraph pole?
From the branches of willows, as a vow,
also our harps were hung,
they were swaying light to the sad wind.

In certain moments in history, this kind of poetry could have appeared an invaluable testimony on the part of the survivor who leaves his town in flames with his father on his shoulders and his son by his side. In our present age, these lines have an almost unbearable ring, both emotionally and ethically. It is as if the poet had abdicated the exercise of his own will to retreat into self-exile, foregoing further efforts to struggle for his art and humankind's future.

Brecht might well have seen his poem on the undecided, *The Waverer*, as a reply to such resignation. What is fundamental for Brecht's art is to defy fatalism, rebutting the idea that terrible times – which will forever threaten humanity, in one way or another – must necessarily limit our focus to the problems besetting us, affirming the idea that joy expressed through artistic and poetic production must always be present to give value to life. While Simone Weil talked about the chance, even in the worst of times, to produce at the very least an inventory of the things oppressing us, in the *Svendborg Poems*, written in exile in Denmark in the 1930s, Brecht wrote[3]:

In the dark times
Will there also be singing?
Yes, there will also be singing
About the dark times.

For Brecht, it is more appropriate to imagine the poet as a man who no longer escapes. On the contrary, the poet stubbornly remains, constantly searching for something that has been able to survive the passage of destructive forces, and can therefore become the basis for reconstruction as an immediately available tool for those who – in a completely modified context – can appreciate its beauty and utility. Brecht was able to produce poetry even out of the very worst horrendous experience. One of his most striking books, *War Primer*, comprised a series of short sonnets set to images of World War II. In this unique text, Brecht offered a devastating visual and lyrical attack on war. He took photographs from newspapers and added short lapidary verses to each in an attempt to address the rotten truth of war by directly using – and ironically inverting – the tools of mass media and propaganda. Pictures of catastrophic bombings, portraits of leading Nazis, scenes of unbearable tragedy on the battlefield, all contribute to an anthology of horror, in which Brecht's words are razor-

[2] Rebay, L. *Introduction to Italian Poetry*, Dover, 1991.

[3] Translations of Brecht's poems are by the authors

sharp, angry and direct, and produce an outstanding literary memorial to World War II.

Another of Brecht's poems, *The Cherry Thief* (in *Later Svendborg Poems and Satires*, 1936-1938), describes the nonchalant attitudes of a young man who steals cherries from the poet's tree. A utopian detachment from the grip of a controlling and possessing will is evoked, together with the idea that, perhaps, in the future the possessive pronouns "mine" and "yours" will no longer mean anything. Above all – we might add – "mine" and "yours" mean nothing when referred to natural fruits (or resources). It would clearly seem that they already had no meaning in the eyes of the migrant, radical politician, and writer who observes the scene:

Early one morning, long before the cock crowed
I was awakened by whistling and went to the window,
In my cherry tree – a grey dawn filled the garden –
Sat a young man with patched trousers
Merrily picking my cherries. As he saw me
He nodded, and with both hands
Gathered the cherries from the branches into his pockets.
For quite a while as I lay once again in bed
I could hear him whistling his gay little song.

Such a poetic experience has its roots in the perception of the urgent need to escape from a perspective centred on dominance, possession and exploitation, in order to build a vision founded on sharing and participation. The embedded message is that we have to search for a way to create unity even when afflicted by strife and conflict. Everything depends on our ability to establish connections between things, on which we must base our discussion and ensure that our way of talking is serious, able to provoke heartbreak and let tears flow as the expression of our humanity.

Homeric poems had this same quality, conceived as rhapsodies alternating pain and suffering with joy and hope, witnessing a collective and shared memory. Their genesis required a profound sense of dwelling in a place that nurtures life and endurance in the face of all adversity, in order to let the connections between all things emerge and transform individual and separate verses into the elements of one unique work. This task would seem to be impossible for one person, even though we refer to one author.

Yet we may ask ourselves who or what is an author? The term "author" derives from the Latin "augere", meaning both "originate" or "promote" together with "augment", "enhance", "accomplish step by step". The language we can share with Brecht challenges all of us as authors. It does not matter if we are authors of a poem, a scientific theory, a song, a work of art, a new fruit or flower, or a political movement seeking freedom. What matters is gaining awareness through authoritative – and not authoritarian – modes of being, considering the consequences of our choices, maintaining a vision of nature and its multifaceted accomplishments which take place through changes and transformations that are continuous and sustainable both in the pace set by their rhythm and the resilience of their outcomes.

Brecht's life was always shaped by the terrible and catastrophic events of what he called "dark times" and his efforts to combat the causes and the perpetrators of that darkness. Born in Augsburg in 1898, he had a difficult childhood and untreated bacterial pharyngitis caused him to suffer from chronic fevers that developed into a

weakened heart condition and a rheumatic illness, thereby causing a facial grimace and uncontrolled movements. He grew up during the First World War and achieved success as a writer before Hitler's rise to power. He was then forced to spend 16 years in exile, returning to Berlin only to clash with the new East German regime as it came to power. In the following selection of poems each one focuses on different aspects of the human condition and our understanding of it, the ability or inability to take action and to assume responsibility, towards both present and future generations. In particular, *To the Future Generations* (1939) shows a marked awareness of being accountable for today's shortcomings.

An die Nachgeborenen

I

Wirklich, ich lebe in finsteren Zeiten!
Das arglose Wort ist töricht. Eine glatte Stirn
Deutet auf Unempfindlichkeit hin. Der Lachende
Hat die furchtbare Nachricht
Nur noch nicht empfangen.

Was sind das für Zeiten, wo
Ein Gespräch über Bäume fast ein Verbrechen ist
Weil es ein Schweigen über so viele Untaten einschließt!
Der dort ruhig über die Straße geht
Ist wohl nicht mehr erreichbar für seine Freund
Die in Not sind?

Es ist wahr: Ich verdiene nur noch meinen Unterhalt
Aber glaubt mir: das ist nur ein Zufall. Nichts
Von dem, was ich tue, berechtigt mich dazu, mich sattzuessen.

Zufällig bin ich verschont. (Wenn mein Glück aussetzt, bin ich verloren.
Man sagt mir: Iss und trink du! Sei froh, dass du hast!
Aber wie kann ich essen und trinken, wenn
Ich dem Hungernden entreiße, was ich esse, und
Mein Glas Wasser einem Verdursteten fehlt?
Und doch esse und trinke ich.

To the Future Generations

I

Truly, I live in dark times!
An ingenuous word is foolish. A smooth forehead shows indifference. He who laughs
Has not yet heard
The terrible news.

What times are these, in which
A conversation about trees is almost a crime
Because in doing so we keep silent about so much wrongdoing! And he who walks quietly across the street. Does he not put himself out the reach of his friends
Who are in danger?

It is true: I work for a living
But, believe me, that is a coincidence. Nothing
That I do gives me the right to eat until I am full.

By chance I have been spared. (If my luck runs out, I am lost.)
They tell me: eat and drink. Be glad to be among those that have!
But how can I eat and drink
When I take what I eat from the starving
And the thirsty do not have my glass of water?
And still I eat and drink.

Ich wäre gerne auch weise.
In den alten Büchern steht, was weise ist:
Sich aus dem Streit der Welt halten und die kurze Zeit
Ohne Furcht verbringen
Auch ohne Gewalt auskommen
Böses mit Gutem vergelten
Seine Wünsche nicht erfüllen, sondern vergessen
Gilt für weise.

Alles das kann ich nicht:
Wirklich, ich lebe in finsteren Zeiten!

II

In die Städte kam ich zur Zeit der Unordnung
Als da Hunger herrschte.
Unter die Menschen kam ich zu der Zeit des Aufruhrs
Und ich empörte mich mit ihnen.
So verging meine Zeit
Die auf Erden mir gegeben war.

Mein Essen aß ich zwischen den Schlachten
Schlafen legte ich mich unter die Mörder
Der Liebe pflegte ich achtlos
Und die Natur sah ich ohne Geduld.
So verging meine Zeit
Die auf Erden mir gegeben war.

Die Straßen führten in den Sumpf zu meiner Zeit.
Die Sprache verriet mich dem Schlächter.
Ich vermochte nur wenig. Aber die Herrschenden
Saßen ohne mich sicherer, das hoffte ich.
So verging meine Zeit
Die auf Erden mir gegeben war.

Die Kräfte waren gering. Das Ziel
Lag in großer Ferne
Es war deutlich sichtbar, wenn auch für mich
Kaum zu erreichen.
So verging meine Zeit
Die auf Erden mir gegeben war.

I would be glad to be wise.
The old books teach us what wisdom is:
To retreat from the strife of the world
To live out the brief time that is your lot
Without fear
To make your way without violence
To repay evil with good –
The wise do not seek to satisfy their desires
But to forget them.

But I cannot heed this:
Truly I live in dark times!

II

I came to the cities in a time of disorder
As hunger reigned.
I came among men in a time of turmoil
And I protested with them.
In this way I passed
The time given to me on earth.

I ate my food in the midst of slaughtering.
I lay down to sleep among murderers.
I was carefree with love.
And I looked upon nature with impatience.
In this way I passed
The time given to me on earth.

In my time streets led into a swamp.
My language betrayed me to the slaughterer.
There was little I could do. But without me
The rulers sat more securely, or so I hoped.
In this way I passed
The time given to me on earth.

The forces were limited. The goal
Lay far in the distance
It could clearly be seen even though
For me it was unreachable.
In this way I passed
The time given to me on earth.

III

Ihr, die ihr auftauchen werdet aus der Flut
In der wir untergegangen sind
Gedenkt
Wenn ihr von unseren Schwächen sprecht
Auch der finsteren Zeit
Der ihr entronnen seid.

Gingen wir doch, öfter als die Schuhe die Länder wechselnd
Durch die Kriege der Klassen, verzweifelt
Wenn da nur Unrecht war und keine Empörung.

Dabei wissen wir doch:
Auch der Hass gegen die Niedrigkeit
Verzerrt die Züge.
Auch der Zorn über das Unrecht
Macht die Stimme heiser. Ach, wir
Die wir den Boden bereiten wollten für Freundlichkeit
Konnten selber nicht freundlich sein.

Ihr aber, wenn es soweit sein wird
Dass der Mensch dem Menschen ein Helfer ist
Gedenkt unsrer
Mit Nachsicht.

III

You, when you resurface following the flood
In which we have perished, remember
When you speak of our weaknesses,
Also the dark time
That you have escaped.

For we went forth, changing country more often than our shoes
Through the class warfare, desperate
At how there was only injustice and no outrage.

And yet we knew:
Even the hatred of sordidness
Distorts our course.
Even anger against injustice
Makes our voice hoarse. Alas, we
Who wished to lay the foundation for kindness
Could not ourselves be kind.

But you, when at last comes the time
In which man can help his fellow man,
Think of us
With clemency.

Concerning Spring was written in 1928, when the idea of the Anthropocene and the question of environmental pollution were not yet issues of political concern. Yet this visionary text appears as an early warning, able to deal in poetry with issues about the relationship between human trajectories and climate change, together with the dangerous lack of attention and concern about it, along with a spreading sense of unease concerning economic growth and an overwhelming fear of its consequences.

Über das Frühjahr

Lange bevor
Wir uns stürzten auf Erdöl, Eisen und Ammoniak
Gab es in jedem Jahr
Die Zeit der unaufhaltsam und heftig grünenden Bäume
Wir alle erinnern uns
Verlängerter Tage
Helleren Himmels
Änderungen der Luft
Des gewiß kommenden Frühjahrs.
Noch lesen wir in Büchern
Von dieser gefeierten Jahreszeit
Und noch sind schon lange
Nicht mehr gesichtet worden über unseren Städten
Die berühmten Schwärme der Vögel.
Am ehesten noch sitzend in Eisenbahnen
Fällt dem Volk das Frühjahr auf.
Die Ebenen zeigen es
In aller Deutlichkeit.
In großer Höhe freilich
Scheinen Stürme zu gehen:
Sie berühren nur mehr
Unsere Antennen.

Concerning Spring

Long before
We swooped upon oil, iron and ammonia
There was each year
A time of intense and irresistible leafing of trees.
We all recall
Lengthening days
Brighter skies
The changing air
The sure arrival of Spring.
We still read in books
About this celebrated time of year
Yet for a long time now
We have not seen above our cities
The renowned swarms of birds.
Most of the time people notice Spring
While sitting in railway station.
The plains show this
In its old clarity.
High above, it is true
Shining storms hover:
Yet by now they only touch
Our aerials.

Morning Address to a Tree Named Green (*Hauspostille* 1927) expresses a sense of resilience and hope. Growing, surviving and maintaining dignity have never been easy, yet there is the chance for them to survive, even during the worst possible storm, both real and allegorical. Just as in the words of the Tao Te Ching: *Be bent, and you will remain straight*.

Morgendliche Rede an den Baum Griehn

Griehn, ich muß Sie um Entschuldigung bitten.
Ich konnte heute nacht nicht einschlafen, weil der Sturm so laut war.
Als ich hinaus sah, bemerkte ich, daß Sie schwankten
Wie ein besoffener Affe. Ich äußerte das.

Heute glänzt die gelbe Sonne in Ihren nackten Ästen.
Sie schütteln immer noch einige Zähren ab, Griehn.
Aber Sie wissen jetzt, was Sie wert sind.
Sie haben den bittersten Kampf Ihres Lebens gekämpft.
Es interessieren sich die Geier für Sie.
Und ich weiß jetzt: einzig durch Ihre unerbittliche Nachgiebigkeit stehen Sie heute morgen noch gerade.

Angesichts Ihres Erfolges meine ich heute:
Es war wohl keine Kleinigkeit, so hoch heraufzukommen
Zwischen den Mietskasernen, so hoch herauf, Griehn, daß
Der Sturm so zu Ihnen kann wie heute nacht.

Morning Address to a Tree Named Green

Green, I owe you an apology.
I could not sleep last night because of the din made by the storm,
When I looked out I noticed you swaying
Like a drunken monkey. That's how I put it.

Today the yellow sun is shining in your bare branches.
You are still shaking off a few tears, Green.
But now you know how much you are worth.
You have fought the most bitter fight of your life.
Vultures were taking an interest in you.
And now I know it's only by your unrelenting Pliability that you are still upright this morning.

In view of your achievements today I think
It was no mean feat to grow up so tall
In between the tenement houses, so tall, Green, that
The storm can get at you as it did last night.

On Unfruitfulness appeared in *Later Svendborg Poems and Satires* (1936-1938). It echoes the lines in the New Testament: "Every tree that does not bear good fruit is cut down and thrown into the fire" (Matthew 7:28).

Yet, in the haste to exploit resources and consume products, what criteria are employed to assess events, who considers what are the underlying causes and who carries the principle responsibilities for what happens?

Über die Unfruchtbarkeit

Der Obstbaum, der kein Obst bringt,
wird unfruchtbar gescholten. Wer
untersucht den Bode?

Der Ast, der abbricht,
wird faul gescholten, aber
Hat nicht Schnee auf ihm gelegen?

On Unfruitfulness

The fruit tree that bears no fruit
Is accused of being barren. Who
Examines the soil?

The branch that breaks
Is called rotten, but
Wasn't there snow lying on it?

The doubts expressed in *To a Waverer* (1935) are attributed to someone other than the speaker and interpreted as a polemic against those who were not resolute enough in their antifascist stance.

An den Schwankenden

Du sagst:
Es steht schlecht um unsere Sache.
Die Finsternis nimmt zu. Die Kräfte nehmen ab.
Jetzt, nachdem wir so viele Jahre gearbeitet haben
Sind wir in schwierigerer Lage als am Anfang.
Der Feind aber steht stärker da denn jemals.
Seine Kräfte scheinen gewachsen. Er hat ein unbesiegliches Aussehen angenommen.
Wir aber haben Fehler gemacht, es ist nicht zu leugnen.
Unsere Zahl schwindet hin.
Unsere Parolen sind in Unordnung. Einen Teil unserer Wörter
Hat der Feind verdreht bis zur Unkenntlichkeit.
Was ist jetzt falsch von dem, was wir gesagt haben
Einiges oder alles?
Auf wen rechnen wir noch? Sind wir Übriggebliebene, herausgeschleudert
Aus dem lebendigen Fluß? Werden wir zurückbleiben
Keinen mehr verstehend und von keinem verstanden?
Müssen wir Glück haben?
So fragst du. Erwarte
Keine andere Antwort als die deine!

Yet the speaker is unable to reply, since everyone must find their own answer, their own understanding, their own way of being, their own way of assessing what has been done and not done.

To a Waverer

You say:
Things are looking bad for our cause.
The darkness is deepening. The forces are declining.
Now, after working for so many years
We are in a more difficult position than at the outset.
But the enemy stands there, stronger than ever.
His forces seem to have grown. He has assumed an air of invincibility.
We however have made mistakes; there is no denying it.
Our numbers are dwindling.
Our slogans are in disarray. The enemy has twisted
A part of our words beyond recognition.
What is now false of what we have said:
Some or all?
Who can we still count on? Are we just leftovers, cast out
Of the river of life? Shall we remain behind
Understanding no one and understood by none?
Must we get lucky?
This is what you ask. Expect
No other answer than your own.