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Consumption in Environmental Education: Developing Curriculum that Addresses Cradle to Cradle Principles

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Introduction.

The body of literature on ‘responsible’, ‘ethical’, or ‘green’ consumption, as well as barriers to it, has been growing (for a recent reviews and case study of barriers to sustainable consumption, see Kollmuss and Agyeman, 2002 and Isenhour, 2010). Recent research suggested that the contemporary emphasis on green consumerism might also be driving more consumption as they aim to absolve consumers of their guilt by offering ‘responsible’ products (Zizek, 2011). Scholars have also warned of the “rebound effect” (Greening et al., 2000), when consumers rationalize buying ‘green’, ‘ecological’ etc. products advertised by companies expert in the art of green washing marketing. As environmental educators struggle to integrate ‘responsible’ consumption into the school curriculum, questions related to what is ‘responsible’ consumption and how it can be best achieved remain. Based on the distinction between private and public sphere environmentalism (Stern, 2000), many environmental education scholars have argued for the need to distinguish between private actions in regard to consumption, such as buying

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green products and recycling; and public actions such as public lobbying and boycotting actions targeted at governments and corporate elites. Drawing on the structuralism perspectives critics of private sphere environmentalism question that consumers can effectively drive significant change given their small sphere of influence relative to the immensely more powerful interests of political and corporate elites with a stake in sustained consumption levels and continued economic growth (Chawla and Cushing, 2007; Isenhour, 2010). The emphasis on responsible consumption and expressed hopes for behaviour change by individual citizens making more sustainable choices, fails to recognize many of the structural constraints on individual choice (Death, 2011) as well as unwillingness of many to adapt to sustainable lifestyles unless coerced to it by the government or corporate policies limiting consumption choices. Some authors have argued that the focus on consumer choice and market-based solutions makes perfect neoliberal and political sense as it does not restrict personal choice or the market and is not explicitly anti-consumption (Hobson, 2002).

In regard to environmental education, this implies that along with learning ‘the facts’ and personal responsibility in regard to environment, pupils should be encouraged to learn how to engage at collective, social and political citizenship levels (Davies et al, 2002; Chawla and Cushing, 2007; Amsel, 2009). Participation, social and engaged learning in relation to environment were also advocated (Rickinson, 2001; Wals, 2007; Reid, et al 2008; Rickinson, et al 2009), yet collective effects of consumption or public actions in regard to consumption, such as boycotting, were not discussed. Upper-elementary school students reasoning about environmental issues such as global warming and climate change (Shepardson, et al 2009) was examined without any reference to the negative effects of consumption. Children’s understanding of economic (Sevón and Weckström, 1989) and marketing forces is another growing line of inquiry (Leiser and Halachmi, 2006), normally not directly associated with consumption.

We may ponder how the potential conflicts, contradictions and dilemmas of responsible consumption are dealt with at the level of environmental education. At present, there is little known about the connection between environmental education and current theoretical debates as well as practical dilemmas associated with consumption. Consumption study, while sometimes implicit in environmental education curriculum at the upper elementary school level in The Netherlands, nor is it explicitly addressed.

In this article, one specific aspect of responsible consumption, related to the notion of eco-effectiveness and the Cradle to Cradle framework is discussed in relation to upper-elementary school curriculum. First, I shall address the Cradle to Cradle (or C2C) framework, then I shall discuss environmental education in The Netherlands in relation to consumption, and finally I will draw some recommendations for the curriculum on responsible consumption derived from C2C framework.

Cradle to Cradle Framework.

Up till now little has been said about how ‘responsible’, ‘sustainable’, ‘ethical’ or ‘green’ consumption can be conceptualized at the level of the curriculum. This article aims to

establish a framework for addressing social and environmental responsibility with the aim of incorporating the subject of eco-effective consumption into the upper-elementary school curriculum. The subject of eco-effective consumption derives from the book by the American architect William McDonough and the German chemist Michael Braungart 'Cradle to Cradle: Remaking the way we make things' (2002).

The Cradle to Cradle Framework (or Cradle 2 Cradle or C2C for short) does not reach for sustainability as it is usually defined in terms of the popular maxims of 'reducing, reusing and recycling', but provides an ideological framework that seeks to create industrial systems that are not just efficient at minimizing waste but essentially waste free. McDonough and Braungart ask us to contemplate not just about minimizing the damage, but rather about taking a revolutionarily approach to the problem and imagine how contemporary waste no longer needs to exist. The C2C approach that McDonough and Braungart propose, suggests that being less bad is not good enough. Going on with a system that generates massive amounts of waste in the endless spiral of production and consumption, the authors argue, will only prolong the bad system. The familiar reduce, reuse, recycle and regulate adage serves to maintain the cradle to grave production rather than stimulating fundamental change towards *eco-effectiveness*. McDonough and Braungart suggest that each and every product can be designed from the outset so that after its lifetime is over, the product will then continue to live while providing nourishment for something new, by becoming a nutrient within either a biological or technological cycle.

Cradle to Cradle identifies three key design principles which inform human design from a Cradle to Cradle perspective:

1. Waste equals food
2. Use current solar income
3. Celebrate diversity

Waste equals food refers to the idea that non-usable waste does not exist in nature because the processes of each organism contribute to the health of the whole ecosystem. Using the metaphor of the cherry tree's blossoms that fall to the ground and decompose into food for other living things, and using examples of bacteria that feed on the organic waste of both the trees and the animals that eat its fruit, depositing nutrients in the soil, McDonough and Braungart emphasize the idea that organism's waste is food for another and nutrients flow indefinitely in cycles of birth, decay and rebirth. This idea should be easily translatable into elementary biology curriculum of the upper-elementary school children.

The idea of using current solar income largely overlaps with mainstream sustainability's discourse supporting renewable energy. The authors argue that despite the current dependency on non-renewable energy sources, human energy systems can be nearly as effective as the sun and wind. Cradle-to-cradle systems -from buildings to manufacturing processes- tap into current solar income using direct solar energy collection or passive solar processes, which makes effective use of natural light. Again, this idea seems well-suited within the upper-elementary school level.

Celebrating diversity maxim does not necessarily refer to the popular idea of cultural or social diversity, but to respect of diversity in natural systems. The authors approach diversity from a holistic perspective, arguing that healthy ecosystems are complex communities of living things, each of which has developed a unique response to its surroundings that works in concert with other organisms to sustain the system as a whole. This idea is similar to the ideas expressed in bionics (defined in Webster dictionary in 1960 as "a science concerned with the application of data about the functioning of biological systems to the solution of engineering problems") and biomimicry, inspired by Janine M. Benyus' book *Biomimicry: Innovation Inspired by Nature* (1997). Biomimicry is defined as a "new science that studies nature's models and then imitates or takes inspiration from these designs and processes to solve human problems" (Benyus, 1997). Similarly to the bionics and biomimicry, C2C takes nature's diversity as a prototype for many models for human designs, tailoring designs to maximize their positive effects in order to "fit" within local natural systems and to enhance the local landscape where possible. McDonough and Braungart have designed a number of urban areas and buildings taking into account local climate, materials and both human and ecological needs.

Products designed for consumption – buildings, objects, or food – need to be made or designed to be eco-effective rather than eco-efficient. While efficiency of the 'bad' system that produces waste in the first place is suspect (why should a bad system be sustained), C2C proposes a fundamentally different way of conceiving consumption. To simplify the message at the level of upper-elementary school children, in C2C terms, consumption does not have to be 'bad' if it is done 'right'.

Environmental education in The Netherlands and the subject of consumption.

Environmental education in The Netherlands followed similar path to the developments of EE in other (particularly, West European) countries since the definition of the goal of EE formulated in The Belgrade Charter: 'To develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones' (UNESCO–UNEP 1976). As environmental education was shown to be affective in raising ecologically concerned citizens (Miller, 1975) the Tbilisi Declaration (1977) outlined the aim of environmental education in people's active involvement in working toward the resolution of environmental problems. Countering the optimism of ecological modernization theory (Mol and Sonnenfeld 2000), from the time of the publication of the Limits to Growth and the Belgrade Charter, EE seen as education '*aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solution*' (Stapp et al, 1969). Gough and Scott (2007) described the goals of higher education in general in fostering the development of creative, resourceful, independent, critical individuals and fulfill a range of broad policy goals. Reflecting European developments, the early nineteen sixties EE in The Netherlands is dominated by nature study and learning about the physical systems that support plants and animals. The science-

oriented styles of education were aimed at promoting awareness of environmental problems and the scientific or technical solutions for them, based on the assumption that when students are taught about these issues they will learn to care about the environment.

The outdoor, wilderness or adventure field study centers fostered the use of natural environment for first-hand experiences. Nongovernmental organizations (NGOs), and especially international conservation groups have been some of the most active promoters of environmental education since the 1970s and continue to stimulate EE programs in The Netherlands to the present day. In the nineteen seventies, conservation education targeted at teaching about conservation of species and dangers posed to the environment emerges, alongside with the urban studies of built environments, and city planning. The nineteen eighties are characterized by the emergence of multiple forms of environmental education, including Global Education and Earth Education which recognizes the wider vision of environmental issues. Action Research involved community and pupil-led problem-solving through fieldwork, typically addressing local level environmental issues such as waste, pollution and recycling. Other types of approaches included community of partners including pupils, students, teachers, NGO's, politicians: all working together to identify and resolve socio-ecological problems.

Following decade sees a rise in different educational trends or forms including empowerment education, which focuses on communication, capacity-building, problem-solving and action, aimed at the resolution of socio-environmental problems. New concepts and scope of work of environmental educators resulted in new labels such as “socially-critically environmental education” or “grassroots environmental education” (e.g. Barratt Hacking, et al 2007; Andrezejewski, et al 2009).

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By now, ESD with its focus on social issues such as poverty, inequality, human rights, etc. starts to take over from traditional EE with its focus on environmental protection. UNESCO's Decade for Education for Sustainable Development (DESD) served to instruct the Dutch branch of ESD (Heideveld and Cornelissen, 2009; Kopnina, 2011b). In the Netherlands efforts at development of environmental education have been primarily coordinated by the Dutch Association for Educations – the so-called Vereniging Educaties Nederland (VEN). VEN is an umbrella organization whose goal is to link adjectival

educations such as environmental education, health education, peace education, culture education, and education for sustainable development or ESD and to serve as an interest group for environmental educators (Wesselink and Wals, 2011:71). However, while the word 'consumption' is sometimes mentioned in the documents pertaining to the development of environmental curriculum in The Netherlands, little explicit mention of what is actually meant by 'responsible', 'sustainable', 'ethical', or 'green' consumption is made.

Another organization involved in Environmental Education programs and curriculum is called Natuur en Milieu Educatie (NME) platform, or Nature and Environment Education. At the elementary school level, Dutch school curriculum involves outdoor activities, such as 'bosweek' ('forest week') or 'schooltuinen' ('school gardens') as well as curriculum related to science education. NME, together with the Dutch testing and assessment company CITO, has developed guidelines for the development of EE in elementary schools, such as Nature Education for Elementary Schools (Thijssen, 2002) and Sustainable Development for the Elementary Schools (Wagenaar, 2007). The Dutch Ministry of Education also supports Sustainable Teacher's Colleges Foundation (DHO), 'working on sustainable development in education; either through separate modules or by means of an incorporated view' and seeking to integrate socially and environmentally relevant knowledge into existing curriculum for subjects such as geography, botany, biology and history. DHO developed an on-line forum called (Plado), in which professionals involved in EE can contact each other and share knowledge on issues of sustainable development in education. One of the themes developed by Plado is responsible consumption but it is not (yet) discussed in relation to school curriculum.

Other private initiatives at the level of elementary schools include project NatuurWijs (www.natuurwijs.nl), sponsored by Dutch bank Triodos. Yet another initiative is that of the INESPO (International Environment & Scientific Project Olympiad). This international Olympiad is intended for students between 13 and 18 years from secondary high schools and high schools (the so-called havo and vwo-schools) in the Netherlands. 'By organizing INESPO, the Cosmicus Foundation wants to bring attention to environmental problems in schools in the Netherlands. Cosmicus involves students in this important matter in order to bring communal consensus on social environmental values and eventually to eliminate the environmental problems through education (<http://www.inespo.org>). Recently, University of Utrecht research group took part in INESPO's program to develop problem-solving capacities in regard to environment in upper-elementary and secondary high schools (http://www.uu.nl/NL/Actueel/Pages/Internationalescholierenzoekenoplossingenvoormilieu_vraagstukken.aspx). According to the analysis of environmental education and ESD in The Netherlands (Kopnina, 2011b), neither of these programs involved the subject of consumption in any explicit way.

One of the recent on-line publications of Dutch 'Learning for sustainable development' (in Dutch, *Leren voor duurzame ontwikkeling*) platforms was the 'Inspired by Cradle to Cradle: C2C practice in education' brochure containing a number of business cases and company examples relevant to the development of 'environmental awareness' in school and college students (Boer et al, 2011). In his chapter on cradle to cradle in primary

education, Geisen (2011) describes the reaction of group of upper-elementary school children's (sample size is not specified) to the viewing of the documentary 'Afval=voedsel' ('Waste=Food') about consumption and C2C principles. The children were then asked to collect the ideas into the drawn 'thought bubbles' and asked to do a presentation of ideas for C2C designs, products, objects, or ideas, such as designing a new school building that will use local and natural materials or designing a special roof garden.

Children were also asked to reflect upon themselves, using the C2C framework, addressing the central question: 'what can I do to maintain the strength within myself and even to let it grow into something more beautiful?' The environment, the system in which children live, plays a key role in developing this potential. The children are made aware of this by asking 'who or what do I need to allow this strength to grow within me, both now and in the future?' But also the question: 'what can you offer?' is essential for this process (Geisen, 2011:30). In order to make the above questions more concrete, the children were also asked to perform a number of practical tasks related to the idea of C2C, such as growing a tree from a seed. Detailed information on this project is available via Cradle to Cradle introduction film and power point available via <http://www.youtube.com/watch?v=8jP8CC2rKj4>. The children learned not only grow the seeds but also to articulate answers to questions like 'what could this seed contribute to you, others, environment, world, both now and in the future?' The children were also asked to make behavioral pattern diagram (BOTG) of the growth and shared their experience with each other (Geisen, 2011:31-32). The children were then asked to provide feedback on the process, share tips for growth with others and take seeds home to plant.

Aside from a few ad hoc experiments with introducing lessons and lectures about C2C and consumption into curriculum, little practical recommendations are made in relation to development of upper-elementary school curriculum. Dutch curriculum development organizations did not make any explicit link made between learning about consumption and environmental education and/or education for sustainable development. As appeared in the recent studies, C2C framework could provide such a theoretical and practical link.

Recent case-study of attitudes towards consumption in upper-elementary school children in The Netherlands indicated a need for the development of school curriculum addressing 'responsible' consumption at schools (Kopnina, 2011, 2011a). The study conducted between January and May 2010 involved Dutch upper-elementary school children and their parents. The total number of 91 children participants (31 from the Montessori school, and 60 from the regular public school) and 59 adult family members (20 from the first school, 39 from the second school) participated. This study comparing consumption knowledge and attitudes in Dutch children and their parents have identified a number of themes relevant to the study of consumption within the school curriculum. For example, parents identified knowledge of 'health benefits and risks of consumed items' as most important followed by 'social responsibility' including interest in consumption of fair trade products. Children, however, have identified 'food should not damage nature' and packaging that is not good for nature' as the most important categories in responsible consumption (Kopnina 2011).

Evaluative focus group meetings held with pupils, parents and teachers after completion of this research between May and December 2010 have demonstrated the need for 1. Addressing consumption as part of school curriculum; 2. Discussing implications of 'responsible' consumption; 3. Developing concepts and practical ideas at the upper-elementary school level of how the children – the citizens of the future – can contribute to 'positive consumption'; 4. Develop channels of communication about what constitutes 'responsible consumption'. This research has indicated the need for a conceptual framework addressing consumption at the upper-elementary school level. In this article, such a framework is established using the notion of eco-effective consumption derived from the so-called 'Cradle to Cradle' philosophy.

Application of cradle to cradle framework to the consumption curriculum.

Aside from being an inspirational philosophy, C2C book and its authors have inspired many students of business, architecture, design and construction to by model their designs on nature's operating system -generating materials that are "food" for biological or industrial systems, tapping the renewable energy sources, celebrating diversity. In other words, C2C design created a not only a new paradigm for industry, one in which human activity generates a wide spectrum of ecological value but also the one that appeals to more pragmatic powerful elites by offering practical social and economic benefits as well. C2C is particularly useful in the case of conceptualizing consumption at the upper-elementary school level because of a number of features.

1. The framework is based on simple to understand ideas such as nutrient cycle – something elementary school children learn in science classes as part of their regular curriculum;
2. While critical of the current state of production (or industrial capitalism), the framework is essentially positive and does not put stress on negative effects, but rather solutions understandable to young children;
3. The framework uses practical easy-to-explain design and product ideas to complement its theoretical or ethical underpinnings. Upper-elementary school children can be asked to come up with ideas for their own design based on C2C framework;
4. Cradle to cradle framework can serve as a bridge to high school education, with its emphasis on citizenship, politics, and history education as it provides an overview of historical industrial developments and capitalism;
5. Practical labour courses are well suited for children learning to 'make things';
6. C2C framework can be easily combined with existing courses including outdoor education (in Dutch case, 'forest week' or 'school gardens').

Thus, the C2C framework could be integrated at a number of levels in the existing curriculum – as part of existing courses on history (e.g. industrial development), biology (e.g. nutrient cycles), and applied labour courses (e.g. practical hand-on learning). C2C could also be taught as a separate course, with the goal of enabling critical understanding of modern system of production and consumption. Particular emphasis on both negative – as it is at present – and potentially positive – as it can be in the future – aspects of

consumption would provide an excellent learning environment for children to complement their environmental knowledge about the distant places and issues where environmental problems may occur. C2C framework would allow children to both critically think about the existing system of production, and to encourage them to think of solutions. Both inspiration and practical lessons from C2C could be easily carried into high school curriculum – perhaps not only in the Dutch but in most (West European or international) schools.

Conclusion

This article aimed to establish a framework for addressing social and environmental responsibility with the aim of incorporating the subject of eco-effective consumption into the upper-elementary school curriculum. Eco-effective consumption' may be included as part of the existing course curriculum at the upper-elementary school level, notably within biology and history courses; as well as given as a separate subject (requiring teacher education). The results of this study could be used by teachers in the EE field by integrating consumption into the existing EE courses or for development of a specialized program on consumption. Essentially, C2C framework could be used at upper-elementary school level to address the questions related to what present mechanisms of production and consumption are, what can be improved, what can a child (according to the stage of life) realistically, do, and, perhaps more metaphorically – C2C framework could be used as a means of planting the seeds of consciousness about the modern world of consumption and early awareness of possibilities of addressing problems associated with consumption.

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