RESEARCH AND INNOVATION IN EDUCATION FOR SUSTAINABLE DEVELOPMENT

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Research and Innovation in Education for Sustainable Development. Exploring collaborative networks, critical characteristics and evaluation practices.

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ABSTRACT
Recent research works on Environmental Education in master and PhD theses contain more or less explicit or implicit concepts of sustainability. This chapter explores the notions of sustainability in a selection of recently accepted theses of a Korean graduate school for Environmental Education. Although those theses differ in topics and even in faculty disciplines, their common ground should be that they were written in the light of the ESD decade. But the students’ conceptualisations mirror more a fuzzy divergence than a well-reflected variety of sustainability concepts. Hence the chapter examines the need and potentials for future graduate students to identify and to offer rather explicit concepts of sustainability in their research papers on Environmental Education.

KEYWORDS
divergent concepts, environmental education, higher education, master and PhD theses, sustainability

INTRODUCTION
There is a growing number of graduate students whose graduate theses deal explicitly or implicitly with sustainability. Among those is Janet Moore (2005), who admitted that she had only little background in the area of sustainability. Originally she majored well trained in a traditional discipline but admitted in her self-reflection, that at the beginning she failed to deal with the complex requirements of sustainability. Higher Education for Sustainable Development (HESD) seems to require interdisciplinary approaches (Pearce & Russill, 2005). This interdisciplinary characteristic leads to a variety of research approaches and a diversity of facets on environmental education (Wals & Jickling, 2002).
In this small case study we want to show that this diversity bears also some danger. The object of our case study is a graduate school for environmental education in Korea, where students work under the supervision of faculties from various disciplines. On the one hand, this multiplicity of epistemological foundations and variety of concepts of sustainability can be seen also a free choice of understanding of the respective researchers (McKeown & Hopkins, 2003). On the other hand, sustainability is a confusing and contested notion already, which has been defined in many different ways reflecting theoretical foundations (Boogaard et al., 2008). These differences challenge higher education institutes in their rally to integrate sustainability under their banner (Cotton et al., 2009).

**HIGHER ENVIRONMENTAL EDUCATION AND SUSTAINABILITY**

Universities worldwide promoted steps for creating more sustainable campuses (Wals, 2014). Based on a number of international declarations – among those the Thessaloniki Declaration (IAU, 2006) – universities committed to address environmental issues and Sustainable Development (SD) in their disciplines’ curricula and research (Wright, 2002).

Lozano et al. (2013) analysed the 24 declarations, charters, and partnerships developed to foster SD from 1972 to 2009 and identified three levels: society, education, and higher education, showing the evolution of these initiatives. They point out that despite a number of initiatives and efforts to engage with SD, universities have adhered to traditional “Newtonian and Cartesian mental models (p.17)” so they suggest that multi-disciplinary education and research is needed to accelerate societal transformations to SD in universities.

Similarly, a great focus in literature on HESD emphasize to teach and to learn, but these endeavours are limited to scientific or economic activities like the composting system, finding alternatives to toxic chemicals, assessing ecological footprint, or sifting towards fair-trade coffee (Cortese, 2003). With this activities universities want to engage students in understanding sustainability (Everett, 2008). However, few examples only show how on-going research – in particular for master and PhD theses - articulate new and highly diverse concepts and theories by observing fundamental transformations which are taking place in society (Poeck & Vandenabeele, 2012). Based on a small Croatian case study, Anđić and Tatalović (2014) recommend that Bachelor’s and Master theses in their faculty are among others an important measure to reorient teacher education towards sustainability.
In particular, graduate students foster their competencies and values in higher education through conducting research for their master’s and PhD theses. Due to this core activity, graduate students of environmental education could integrate the notion of SD or Education for Sustainable Development (ESD) into their theses and relate it to their respective research topic (Gough & Scott, 2007). Nevertheless, while teaching and greening were mentioned to implement SD into universities, none of the deans or faculties talked about theses writing as an instrument of implementation (Wright, 2007). Looking into the international journals we found only a few attempts to review theses and dissertation research related to environmental education since the 1980’s (Marcinkowski et al., 2013).

FUZZY MULTIPLICITY OR CONSTRUCTIVE DIVERSITY

In the UNESCO report on Contexts and Structures for Education for Sustainable Development (Wals, 2009), the author argues that various correct interpretations and usages of SD exist, despite that most of them are consensual with the general goal. Wals wrote, “There is no ‘one size fits all’ when it comes to SD, and the road that will take us there, does not necessarily make SD and ESD weak concepts” (Ibid., p.7). Furthermore, he argues that this variety opens multiple ways towards a SD.

However, maybe this openness to a variety of conceptual meanings of SD derived from the need of international documents, which have to embrace different worldviews and perspectives, as well as varieties of “locally relevant and culturally appropriate terms used to describe sustainability and ESD” (McKeown & Hokins 2003, p.125). Of course, in diplomatic perspectives, we should acknowledge usage of politically and culturally astute names. There were terms like “Green Growth” in Korea from 2008 to 2010 (Cho et al., 2014) or “Smart Growth” in Tennessee, because the governor did not use the term SD. Although we can follow the practical argument for coining SD to get along with various synonyms (McKeown & Hopkins, 2003), we might question if the basic concept of SD will finally follow a joint intention as Wals argued at the beginning of this chapter.

There seems a kind of common understanding and vision of SD on the surface, which might cover possibly different conceptions of sustainability (Sylvestre et al., 2013). Therefore, the authors warn us to mute debate about the differences, because they might lead to incompatibility in graduate programs. The authors see a need to argue and debate SD, because to them, the tensions and differences seem necessary for an evolution of the concept. Hence the question arises if difference in the conceptual understanding of SD means just a form of fuzzy and ambiguous multiplicity or a
constructive diversity of concepts. The fuzzy multiplicity might cause an inherent ambiguity of the concept of SD which results in an ill-defined consensus but leads to conflicts instead of common visions and joint actions (Sherren et al., 2010).

**WR ITING T HESIS AND S USTAINABILITY CONCEPTS**

Notably, many universities require students to complete a dissertation in order to graduate and apply for a scholarship (Patton, 2001). It is a rite of passage into each student’s chosen field (Marcinkowski et al., 2013). However, since the early 1980’s, environmental education research has limited attention to dissertation research, nonetheless, a review of dissertations can help identify academic communities where students have been socialized and inducted. Probably, as Stevenson (2007) argued, the discourse-practice gap is attributed to absence of the discourse of practice for environmental education research within scholarly groups, particularly educational practitioners, and “fuzzy contours (González-Gaudiano, 2006)” often failed to identify “either the principal tasks or the key concepts and messages.” Particularly, the environmental education policy-makers and academic communities have not enough to consider pedagogy (Hart, 1993), because of this, principles that frame the sustainability discourse cannot be connected to pedagogical practices (Stevenson, 2007).

**ESD in the Korean case**

The decision to conduct this case study about Korean teacher education graduates seems worthwhile, because environmental education is a school subject in Korea with a comprehensive curriculum for all school types and ages. Under the government’s plan, ESD was chosen as one of the cross-curricular themes in the general guidelines of the national curriculum revised in 2007 and 2009 and was recently emphasized in the curriculum of local educational offices and schools from time to time (Lee et al., 2013).

Korean ESD definitions had been based on Presidential Commission on Sustainable Development (PCSD)’s Implementation Committee. PCSD developed the UN DESD implementation strategy in 2005; announced the related plans in 2006; enacted and promulgated the Basic Act for SD in 2007; and finally established the Environmental Education Promotion Act in 2008. These endeavours set up the basic framework for ESD as a high quality education about values, behaviours and lifestyles for sustainable future and social transformation (PCSD, 2006).

Korea’s ESD can be generally categorized into the following three phases in terms
of the aspect of changes during the DESD (Lee et al., 2014). In the first phase (2005-2008), ESD was emphasized as part of the plan to implement SD under the leadership of PCSD. In the second phase (the end of 2008-2010), as the government announced the “Low-carbon Green Growth” initiative as its national strategy, Green Growth Education (GGE) was implemented to facilitate the scheme. In the third phase (2011-2013), with the change of government, many activities were enforced under the name of ESD again. Additionally Korean National Commission for UNESCO contributed to ESD with their own definition of ESD (Jeong et al., 2010). Hence this decade had been ruptured by three fundamental different concepts in that three phases, which might have limited the chances to achieving fundamental parts of ESD (Cho et al., 2014).

Although the national curriculum has a substantial impact on school education in Korea (Kim et al., 2011), it seems difficult to identify how Korea defines the concept of ESD exactly. ESD is included in a number of themes of the cross-curricular sections such as Human Rights Education, Unification Education and Environmental Education, but is recognized marginally and unsystematically (Lee et al., 2005). Furthermore, ESD-related communication and education have expanded in quantity but substantial progress in quality has yet to be fully achieved (Lee et al., 2013).

**The case of the Environmental Education Graduate School in Seoul National University (SNU)**

The case explores the usage of ESD concepts in theses of the Interdisciplinary Program of Environmental Education in the College of Education in SNU. This program was designed to promote professionals in environmental education at the master’s and doctoral level, “who can play a bridge role in interlinking the academic research with environmental education practices in formal and informal settings (SNU http://enviroed.snu.ac.kr).” The specific characteristic of that graduate school is, that the affiliate professors of the school come from a variety of disciplines and departments. Each student chooses an academic advisor among those affiliate professors. Therefore the students of this graduate school write their theses in natural sciences, social sciences or humanity studies. Although it seems that they are cognate with ESD, it was difficult to find the immediate relevance to their theses.

In this small survey we sought for explicit explanations on ESD concepts in those theses, which were published over the DESD (2005-2014) in the graduate school of environmental education. We searched the electronic databases of the university’s digital library by using these descriptors: “Sustainability”, “Sustainable Develop-
ment”, “Education for Sustainable Development”, and found the total number of 62 theses submitted and approved in the respective period of DESD. But only 7 entries identified the notions corresponding the descriptors appearing in the titles or dissertation abstracts (See the Table).

<table>
<thead>
<tr>
<th>Degree</th>
<th>Author (Date)</th>
<th>Keywords</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master</td>
<td>Park, Deok-Soon (2007)</td>
<td>Love Earth II-Chon Program, middle-school students, pro-environmental behavior, teachers mini-homepage</td>
<td>(The)Effect on students’ pro-environmental behavior change through the environmental education by using a teacher’s mini-homepage</td>
</tr>
<tr>
<td>Ph.D</td>
<td>Cho, Eun-jeong (2008)</td>
<td>community building, residents-participatory community revitalization, social network, sense of place, place identity, adult environmental education, practical knowledge, learning community, environmental justice</td>
<td>A study on the Implication of Community Building in Environmental Education</td>
</tr>
<tr>
<td>Ph.D</td>
<td>Eom, Eun-Hui (2008)</td>
<td>neoliberalization of the environment, globalization from below, the Philippines, RapuRapu Project, mining industry, political ecology, environmental justice</td>
<td>Neoliberalization of the environment and the changes of the third world environment: political ecology of the RapuRapu mining project in the Philippines</td>
</tr>
<tr>
<td>Master</td>
<td>Kim, Tae-Yeon (2013)</td>
<td>identity, adult learning, sustainable human development, docent, narrative research</td>
<td>Exploring transformation of adults’ identity in view of learning as sustainable development: a narrative research on becoming a docent in a natural history museum</td>
</tr>
<tr>
<td>Ph.D</td>
<td>Seo, Eun-Jung (2014)</td>
<td>environmental curriculum in secondary school, environmental curriculum perspective, environmental education, key competencies, competence-based curriculum, delphi method, quantitative research</td>
<td>The Study of Key Competencies and the Epistemological Perspective in Secondary School Environmental Studies Curriculums</td>
</tr>
<tr>
<td>Master</td>
<td>Nam, Mi-Ri (2014)</td>
<td>proverbs, Traditional Ecological Knowledge(TEK), environmental lesson, analogical thinking, schema theory, experimental study</td>
<td>The effect of the proverb in traditional ecological knowledge lesson on elementary school students analogical thinking</td>
</tr>
<tr>
<td>Master</td>
<td>Cho, Yoo-Ri (2014)</td>
<td>biophilia, biophobia, connectedness to nature, environmental disgust sensitivity, private-public partnership for experiential environmental education, honey bee</td>
<td>An investigation into elementary school students’ environmental disgust sensitivity and connectedness to nature using the case of a honey bee experiential education program</td>
</tr>
</tbody>
</table>

Table. The 7 theses for analysis
MAJOR FINDINGS OF THE CASE

We found little discussion of the concepts of sustainability in the sense, that not all studies included comprehensive information on the theoretical approach to the concepts of ESD similarly to findings of research trends in journal of Korean association for environmental education (Hwang et al., 2012). In the following we just give a short insight into the perspective of ESD in the analysed theses.

Although the environmental education research discourse related to sustainability has gradually drawn the attention of environmental education researchers (Berryman & Sauvé, 2013), there were only 7 documents involving the concept of ESD explicitly. This result reflects on the facts that HESD in Korea have been amplified in connection with sustainable university management including greenhouse gas reduction and the installation of environmental facilities, whereas there is a little autonomous and independent research related to ESD (Lee et al., 2013). Once again, HESD has been gradually developed in the quantitative aspect, but the qualitative aspect has been relatively neglected.

In a similar vein, most theses sought for evidence how environmental education or ESD programs effects on students’ behavioural changes. The concentration on how the programs work seemed to be attributed to the conventional positivism – one of the research paradigm among the Fien (2002)’s research paradigm taxonomy. For example, Park (2007) introduced the environmental education program focused on using Social Network Services (SNS) for reinforcing the learner’s competencies. Nam (2014) pointed out that within the perspectives on Analogical Thinking and Traditional Ecological Knowledge (TEK), the TEK lessons through the proverb have an effect on environmental education to make an effort to get a sustainable living. And Cho (2014) developed the honeybee environmental education program to increase emotional affinity and connection with nature. The researchers commonly agreed with the idea that goal of environmental education is to achieve sustainability, analogous to Seo (2014)’s contention theorized the key competencies of environmental education as the integral abilities required to learners to solve environmental problems and act toward sustainability. However, as Berryman and Sauvé (2013) pointed out, there was a lack of definition or related theory to support their repeated claims about SD and ESD. These claims could be understood the notion of “slogan systems (Popkewitz, 1982, p. 20)” originally proposed to illustrated changeless reform (Robottom, 2013).

On the contrary, as Cho (2008) started her thesis with the definition of “environment” and “education”, some researchers shared her perspectives based on the
interpretative research paradigm. She mentioned “environment is not a separate
on with us but the medium that we acquire identity from and participate in” (p.
180). And for education, she insisted “we need the constructive approach” to involve
student-centered learning. Hence, she contemplated the meaning of the resident
participatory community building in environmental education. This intention was
similar to Kim (2013)’s research because she revealed the docents in a museum
with the view of learning as sustainable development as called “ESD 2” (Vare &
Scott, 2008). The alternative concept of learning as sustainable development was
proposed as a different view of what SD could be. As Foster (2002) argued SD can be
itself a social learning process to improve the life conditions of people.

Moreover, Eom (2008) claimed that current Korea’s high-dependent industrial de-
velopment strategies should be reconsidered to achieve sustainability considering
the limit of environment. Hence, she thought ESD is possible through “reflective
learning (p. 224)” characterized formative and transformative processes to empower
people to transform environmental and social conditions based on the critical para-
digm. Huckle (1997) mentioned that contested meanings of sustainability let people
act and reflect on these meanings, so it might be possible to make alternative
futures in more democratic way.

CONCLUSIONS
The case of an environmental education graduate school showed that only 7 out of
62 academic graduates embraced the notion sustainability in their thesis research,
although they show their expertise in specialized fields of environmental issues. A
particular reason for most higher education students in Korea might be that they
never received any ESD, even though they learned SD in middle school or high school
(Lee et al. 2006). DESD in Korea has been supported by a variety of sectors. These
endeavours to spread ESD-related performances to the schools or universities as
a whole have expanded in quantity but substantial progress in quality has yet not
been fully achieved (Lee et al. 2013).

It seems crucial in time of the international orientation on sustainable development,
that all the environmental education theses require an appropriate foundation in
the light of sustainability. But still misunderstandings of sustainability extend from
the society to higher education (Shriberg, 2002). Because environmental sciences
are still the major place for studies about sustainable development (Reid and Petocz,
2005) the focus of sustainability lays still on understanding the environment, rather
than the way humans interact with it.
Regarding sustainability as a political idea (Bengtsson, 2014), which is not necessarily consensual but might be antagonistic (Mouffe, 2005), we argue that an active debate among scholars and students seem to be a crucial activity in theses seminars and theses advisory. Faculties can encourage theses excellence in their respective fields but additionally should influence graduates to orient their theses in line with sustainability (Everett, 2008). Faculties affiliated to interdisciplinary graduate schools and programs in environmental education have a particular mission to offer floors for constructive exchange and debate about the divers concepts of sustainability.

As Robottom & Hart (1993) answered the critical question, – “What is a more appropriate form of environmental education research?” – the one possible consideration as to whether the research deliberate moral and social matters about educational teaching and learning, which the predominant view (of research paradigm) cannot. Furthermore, as a “subset (Fien, 2002)” of educational research, research on sustainability in higher education based on discussions about paradigmatic questions will lead to an advancement in the appropriateness and scientific proficiency of research.

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