

EDUCATION FOR SUSTAINABLE DEVELOPMENT AND SCHOOL GEOGRAPHY. THEORETICAL CONSIDERATIONS

PÉTER BAGOLY-SIMÓ

Humboldt-Universität zu Berlin, Berlin, Germany, Institute of Geography,

e-mail: peter.bagoly-simo@geo.hu-berlin.de

(Received: November 2012; in revised form: January 2013)

ABSTRACT

Over the last three decades, the concept of sustainable development has enjoyed growing attention. Transporting sustainable development into all forms of education is connected to Education for Sustainable Development (ESD). Due to its role in society, formal education plays a special part in the process of ESD implementation. This paper takes a closer look at the interconnectedness between sustainable development, ESD, and formal education by focusing on school geography, a subject with special affinity to both concepts and topics of ESD.

Keywords: *sustainable development, education for sustainable development, formal education, school geography, curricula, textbook*

INTRODUCTION

Never before in the history of humanity has the future been more intensively studied than today. Also, never before has modern technology “[...] given us the potential to irreversibly jeopardize the fate of mankind and nature for centuries to come” (Tremmel, 2008, p. 220). As a consequence, ever since the year 1992, the concept of sustainable development (SD) has reached global recognition and importance when we think about our future and try to find solutions to challenges that consider environment and development at the same time.

The first crucial international document to be cited within this context is the Agenda 21, which was ratified by ambassadors of 178 governments (BMUNR, 1992). While the four sections and 40 chapters of the document discuss contemporary and future challenges humankind sees itself confronted with, Chapter 36 dedicates special attention to the role of education. To strengthen further the contribution of all forms of education to a (more) sustainable future, the United Nations (UN) subsequently proclaimed the Decade of Education for Sustainable Development (DESD) for the period 2005-2014. According to its Action Plan, all “[...] DESD programmes and activities should reflect a balanced focus on education for the economic, social and environmental pillars of sustainable development, with culture as an underlying theme” (UNESCO, 2007, p. 15). Additionally, two of the nine long-term thematic programs explicitly aim at “[i]ntegrating ESD into Basic Education” and “[r]eorienting General Secondary Education for ESD” (UNESCO, 2007, p. 15).

Despite these ambitious expectations, the actual progress of structural implementation of ESD into formal education gives reasons for concern (*cf.* de Haan, 2012; Mulà, Tilbury, 2009; McKeown, 2007; Paden, Chhokar, 2007). Therefore, this paper takes a closer look at concepts of SD, ESD, and at subject education. In doing so, it sets a special emphasis on school geography given this subject’s strong affinity to concepts of both SD and ESD.

CONCEPTS OF SUSTAINABLE DEVELOPMENT

Since its definition in the Brundtland Report, SD has been (re)conceptualized in myriad ways and on various scales, ranging from the global through the national and regional to the local. Only four years after the Earth Summit, Dobson (1996) counted over 300 definitions of SD. Despite the great conceptual diversity of the very term, most definitions tend to either stress aspects of generational equity and justice or to emphasize the three dimensions of SD, namely ecological, economic, and socio-cultural aspects as commonly shared defining criteria.

Related to the idea of generational equity, the initial definition by the World Commission on Environment and Development (WCED) states that SD “[...] implies meeting the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987). The definition, thus, emphasizes aspects of both intragenerational (global) and intergenerational equity and justice and therefore implies the discussion of various theories and concepts of justice.

Over the last decades, generational equity and justice have enjoyed growing attention. According to Unnerstall (1999), the philosophical discourses of the 1980s display an increasing reluctance towards the discussion of the responsibilities we have for future generations. On the one hand, the *non-identity problem* coined in the late 1970s by Schwartz (1978)

and further discussed by Adams (1979), Kavka (1982) (most prominently as the *future individual paradox*), and Parfit (1987) aimed to clarify ethical dimensions of contemporary generations assuming responsibilities for future generations. On the other hand, Mulgan (2002) detached the generationality debate from Western Philosophies by arguing with alternative solutions rooted in non-Western Philosophies. Other scholars discuss aspects of intra- and intergenerational equity not only in general terms (Ekardt, 2010), but also related to climate change (Ekardt, 2011). In an analytical work, Tremmel (2008) thereby discussed key arguments objecting theories of generational justice, such as the *non-identity paradox*, the argument of *your neighbour's children*, or the *butterfly-effect* argument and contextualized them not only in terms of capital or wellbeing as axiological goals, but also regarding their quantitative limitations that resolve around the question of how much needs to be sustained. Overall, Tremmel (2008) stresses the ambiguity of the concept of generation as he juxtaposes the concepts of justice and right with respect to the emergence and historical development of the two concepts. Still, normative theories "[...] may be able to make a difference regarding our willingness to take on responsibility for the wellbeing of future generations" by pointing out the possibility of "intergenerational justice as enabling advancement" (Tremmel, 2008, pp. 222-223). Thus, sustainable management of all sorts of resources may indeed make it possible for future generations to satisfy their own needs within a given context of technological development to an even higher extent as present generations do.

The second commonly shared traditional conceptualization of SD distinguishes between three dimensions of SD, namely the ecological, economic, and socio-cultural sphere (*cf.* among others Grober, 2013). In contrast to the discussions on generationality, attempts to incorporate ecology with economy and socio-cultural aspects can look back on a longer tradition. Discussing the concept of SD from the perspective of cultural history, Grober (2012) traces the idea back to the early European Enlightenment and then sketches its evolvement until present days. Recently, however, the "trinity" of SD has been met repeatedly with criticism. In the following, special attention will be dedicated to three points of critique.

One point of critique targets the "[...] definitional haziness that continues to surround and shroud the notion of sustainable development" (Selby, Kagawa, 2010, p. 38). Drawing upon Lloyd (2009, p. 516, p. 518), Selby and Kagawa (2010) argue that economic growth and SD in terms of the Brundtland report cannot be reconciled within a paradigm that pictures a future which is "[...] axiomatically both sustainable and able to grow", but at the same time "[...] supported indefinitely by a finite Earth". Moreover, sustaining ecology and economy in terms of consumerism simultaneously "[...] reveals inconsistencies and incompatibilities of values, yet many people, conditioned to think that sustainable development is inherently good, will promote both at the same time" (Jickling, Wals, 2008, p. 14 in Selby, Kagawa, 2010, p. 39).

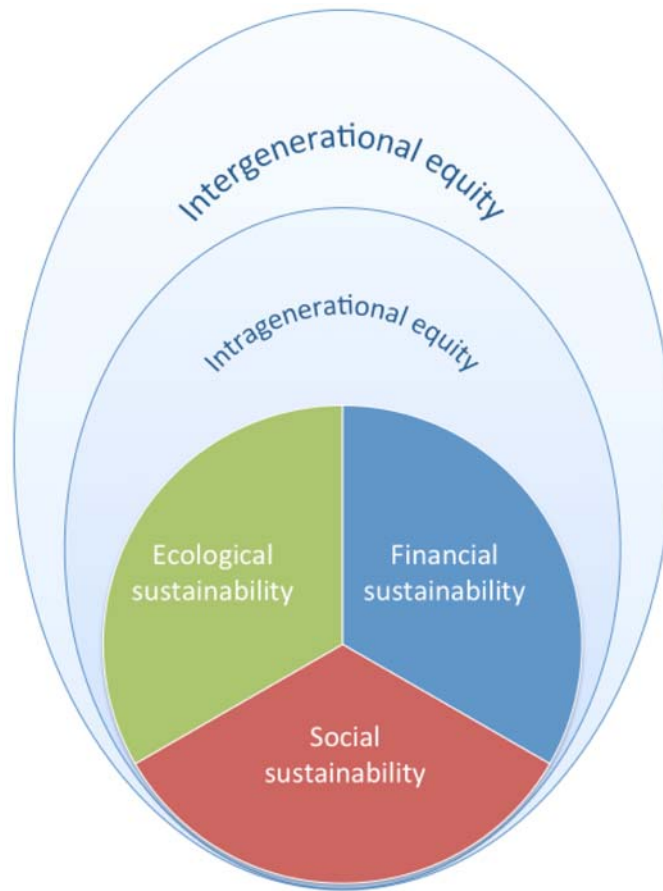


Fig. 1. Analytical model of SD

(Source: Tremmel, 2003, p. 130, modified)

A second point of critique refers to the traditional approach of distinguishing between three dimensions, or respectively areas, poles, or pillars of SD. Drawing upon early work by Bateson (1972), Meadows (1982), and Wilber (1997), Sterling (2010, p. 215) argues that the “[...] three dimensions [of SD], the ‘economic’, the ‘social’ and the ‘environmental’” actually are “[...] mental constructs. A glance out of the window at the real world will not indicate where any of these categories stops and another starts: the boundaries are in our heads”. Differentiation and dissociation, thus, result in a distorted view of systemic interconnectedness instead of focusing on the actual dynamics within the three categories.

A third critical perspective takes a closer look at cultural aspects. Building his case on Bowers (2002), Jickling argues that the three dimension of SD ignore “[...] how the person is nested in a culture that is, in turn, nested in (and dependent upon) natural systems” (Bowers, 2002, p. 76 in Jickling, 2010, p. 28), thus they make the concept of SD “context free” (Jickling, 2010, p. 28). Pigozzi (2007) further stresses the importance of culture by arguing that the three elements of SD assume an ongoing and

long-term process of change based on a traditional understanding of human society constantly in move. "Thus, culture is an essential underlying dimension. Sustainable development is about the direction and implications of change" (Pigozzi, 2007, pp. 28-29). Consequently, SD needs to balance concurring interests constantly, while trying for instance to end deprivation and powerlessness as ending deprivation and powerlessness by simultaneously protecting the environment.

The ongoing proliferation of conceptualizations of SD has led to a wide range of meta-analytical works examining its theoretical constructs. Along with Dobson's (1996) early work, one recent example is the *analytical model* by Tremmel (2003) that connects the three poles of SD with aspects of intra- and intergenerational equity and justice (Figure 1). Tremmel's analytical model thereby formed the basis of further analytical steps carried out in this work regarding concepts of SD. Choosing this specific model rests on two reasons: on the one hand, it is a meta-analytical work that analyzed a number of very heterogeneous conceptualizations, on the other hand it considered both SD models with a focus on the "trinity" of sustainability and on aspects of generational equity and justice.

CONCEPTS OF EDUCATION FOR SUSTAINABLE DEVELOPMENT

Over the last decades, ESD has been subject to myriad conceptualizations. Some definitions theorize ESD by identifying its extension and intension, while others juxtapose ESD and other forms of adjectival education. In the following, conceptualizations of both approaches will be briefly discussed.

According to the definition of UNDESD (2008) "[...] ESD enables all individuals to fully develop the knowledge, perspectives, values and skills necessary to take part in decisions to improve the quality of life both locally and globally on terms which are most relevant to their daily lives". Both its architecture and its normativity within and through the DESD qualify this definition as "expert knowledge-driven" (Vare, Scott, 2007, p. 193).

Drawing upon the typology of approaches regarding SD by Scott and Gough (2003), the SD concept of Foster (2002), and the learning models of Argyris and Schön (1978, 1996), Vare and Scott (2007) have broken down ESD into ESD 1 and ESD 2. The former corresponds to UNESCO's expert knowledge and implies that "[...] the role of the non-expert is to do as guided with as much grace as can be mustered" (Vare, Scott, 2007, p. 193). Thereby, ESD1 is nurtured by Scott and Gough's (2003) Type 1 and Type 2 approaches which assume that the problems humanity faces are either of environmental or of social and/or political nature. In either of the cases, science, respectively social science provides answers that need to be communicated broadly. Thus, ESD 1 builds upon two approaches that expect their learners to "[...] learn to value what others tell them is important" (Vare, Scott, 2007, p. 192). In contrast, Type 3 approaches

assume that no end-states can be specified, hence, learning has to remain open-ended. Consequently, essential for ESD 2 is to what extent “[...] people have been informed and motivated, and been enabled to think critically and feel empowered to take responsibility” (Vare, Scott, 2007, p. 194). Thus, ESD becomes (part of) lifelong learning.

In Pigozzi’s (2007, pp. 28-29) reading “[...] the three pillars of sustainable development [society (including political aspects), environment, and economy], give shape and content to learning for sustainable development. [...] Education, broadly understood, is therefore inextricably linked to well-balanced development, which takes into consideration the social, environmental and economic dimensions of an improved quality of life for present and future generations”. In addition, ESD “[...] must be a dynamic concept” that fosters “[...] knowledge, skills, perspectives and values” (Pigozzi, 2007, p. 29). According to Pigozzi (2007, p. 29), “ESD promotes the same learning outcomes as quality education, such as the skills to continue learning throughout life, to think critically, to work cooperatively, and to seek out and apply knowledge”. Thus, ESD is translated into observable, but not explicit actions of the individual.

Most conceptualizations fail to nail down explicitly what exactly ESD is. According to Wals and Blewitt (2010), the concept of *Gestaltungskompetenz* coined by de Haan (2008) is a solitary exception that makes ESD more tangible. In the reading of de Haan (2008), fostering ESD primarily aims at teaching *Gestaltungskompetenz*, which translates as the ability to apply SD-related knowledge to both recognize challenges of non-SD and to apply theoretical concepts of sustainability in order to solve problems by finding sustainable alternatives. *Gestaltungskompetenz* thereby encompasses twelve key skills: to construct knowledge in a cosmopolitan matter and based on new perspectives; to analyze and appraise processes in a foresightful manner; to gather insight and act in an interdisciplinary way; to recognize and weigh risks, dangers, and uncertainties; to plan and act together with fellow men; to participate in decision-making; to motivate oneself and others to get involved; to reflect on the general principle of oneself and of others; to base decision-making and action on conceptions of justice and equity; to plan and act autonomously; to show empathy (de Haan, 2008). Along these lines, knowing about the theoretical designs of sustainability actually represents a core pre-requisite for the implementation of any further competencies, responsibilities and methodologies (cf. Tremmel, 2003).

Wals (2011) reframes de Haan’s (2008) approach into his concept of *gestaltswitching*. Wals (2011) thus reminds us of the fact that education is not a proper instrument to influence human behaviour. In fact, ESD should foster capacity building and critical thinking rather than aim at (ideology-driven) behavioural change (Mayer, Tschapka, 2008; Jickling, Wals, 2008). “In other words, what may appear to be sustainable behaviour today may turn out to be unsustainable later in time” (Wals, 2011, p. 179). As a consequence, Wals (2011, p. 181) advocates ESD in terms of *gestaltswitching* which he defines as “[...] switching back and forth between different mindsets”. Crucial for the mindsets are four types of *Gestalt*: “[...]”

the temporal Gestalt (past, present, future and intergenerational), the disciplinary Gestalt (a range of social science and natural science), the spatial gestalt [original orthography!] (local, regional, global and beyond global) and the cultural Gestalt (multiple cultural mindsets whereby culture is broadly understood). Sustainability competence then refers to one's ability to respond to a sustainability challenge with all these Gestalts" (Wals, 2011, p. 181). Thus, *gestaltswitching* conceptualizes ESD in a less normative manner, but also in much more general terms.

With special emphasis on its history, Sterling (2010, p. 217) argues that "[s]ustainable education implies four descriptors: educational thinking and practice which is sustaining, tenable, healthy and durable". By doing so, Sterling (2010) not only substantiates ESD, but also proceeds to stress relational and systemic aspects necessary to comprehend our contemporary world. As a result, a "[...] sufficient and whole-learning response to sustainability is required at three levels — personal, organisational and social — and in the three interrelated areas of human knowing and experience", namely "[...] (1) perception (or the affective dimension), (2) conception (or the cognitive dimension) and (3) practice (or the intentional dimension)" (Sterling, 2010, p. 217). Similarly, Williams (2008, p. 42) stresses the importance of "[...] systems thinking and holistic learning" for ESD as postulated by Orr (1992, 2004) and Capra (1996, 2002).

Coming from a background in Philosophy, Gadotti (2009) argues for education for sustainable life. The concept of sustainable life has its origins mainly in the ecological movement of the last century and has been coined into a philosophical paradigm by Morin and Brigitte (1993), Santos (1995), Freire (1997), Boff (1999), and Salgado (2000). Gadotti (2009, p. 26) contextualizes sustainable life within the framework of Holloway's (2002) discourse of education to dissolve power and pleads for "[...] educating for another possible world". This form of education leads to something "[...] what does not yet exist, to utopia" (Gadotti, 2009, p. 26) that can be linked to Freire's statement that all is possible that has not been sighted yet. Would dominant cultures disappear, not only traditional (e.g. indigenous) knowledge became visible, but also feminist, ecological, Zapatist, landless and other movements too unfolded and contributed to an education for another world by being (former) pedagogies of absence.

Theorizing ESD also requires the juxtaposition of the concept with other concurring terms, which originated out of a series of adjectival educations. In the following, attention will be dedicated to Environmental Education (EE) and Development Education (DE), as the two most vividly discussed adjectival educations.

EE represents the first adjectival education towards which ESD has been constantly re-positioning itself during the last two decades. According to UNESCO EE "[...] is a well-established discipline, which focuses on humankind's relationship with the natural environment and on ways to conserve and preserve it and properly steward its resources" (UNESCO, 2007, p. 18). However, ESD "[...] should not be equated with environmental education" as it "[...] encompasses environmental education,

setting it in the broader context of socio-cultural factors and the socio-political issues of equity, poverty, democracy and quality of life" (UNESCO, 2007, p. 18). Despite UNESCO's pronounced position, there seems to be an ongoing debate regarding the actual conceptual delimitation of ESD as compared to EE (*cf.* Caride Gómez, 2005; McKeown, Hopkins, 2003). In fact, much of the critique at the address of ESD argues that over the last three decades EE "[...] has been progressively straitjacketed" (Selby, Kagawa, 2010, p. 38). As a consequence, "[...] ESD discourse has contributed quite successfully to diluting and blurring all the work of sensitisation, consciousness-raising and denunciation that has been constructed quietly by the pro-environment social movements in recent decades and more recently by environmental education" (Gutiérrez Pérez, Pozo Llorente, 2005, p. 297). McKeown and Hopkins (2007, p. 20) also stress that the transition from EE to ESD might lead to "[...] the worldview that humans are part of nature as EE becomes human-centred ESD". Moreover, ESD "[...] has given barely any space to the poetic and the numinous in its reliance on scientific rationality" (Selby, Kagawa, 2010, p. 44) while the same rationality has triggered environmental exploitation (*cf.* Bonnett, 1999). On the other hand, Porritt (2005, p. 51) qualifies the environmental movement as "[...] too narrow, too technical, too anti-business, too depressing, and often too dowdy". Given its strong focus on aspects of ecology and environment, EE fails to foster whole-systems thinking (Sterling, 2004).

The second adjectival education in need of consideration is DE, respectively Education for Global Citizenship, whereby the latter has progressively evolved from the former. On the one hand, though "[...] widely seen as sister movements", in developing countries "[...] the Western distinction between 'environmental education' and 'development education' was greeted with incomprehension because, there, environment and development issues were widely viewed as two sides of the same coin, and therefore environmental education was inevitably also development education" (Sterling, 2010, p. 216). This is equally true for ESD. Nonetheless, individual countries continued the tradition of separating ESD from DE. On the other hand, the development concept that has been propagated by ESD increasingly became subject of critique. Selby and Kagawa (2010, p. 39) argue that development in terms of ESD seems to be based "[...] upon a market-driven growth model" leading to "[...] a cosy association with the globalisation agenda in education".

Along these lines, Jucker (2011, p. 45) argues that "[i]t is not fertile to discuss whether ESD should be ESC (education for sustainable consumption) or ECC (education for climate change) or if we should stick with EE (environmental education) or EGC (education for global citizenship). All of these are sectoral, subject-specific and reductionist approaches which miss the whole point of ESD".

The concept of *Gestaltungskompetenz* coined by de Haan (2008) formed the basis of further analytical steps carried out in this work because it is a solitary exception that makes ESD more tangible. Implementing

theoretical constructs, such as SD, requires an explicit linkage between ESD topics and theory in order to actually foster skill development.

SUSTAINABLE DEVELOPMENT AND EDUCATION FOR SUSTAINABLE DEVELOPMENT IN FORMAL EDUCATION

The previous sections offered on the one hand an overview of several SD and ESD conceptualizations coming from quite different backgrounds ranging from Philosophy to environmental activism, while, on the other hand, major strategies of implementation were outlined. This section now explores the intimate relationship between ESD and formal education by setting a focus on secondary education in three selected spatial contexts, namely in Bavaria (Germany), Romania, and Mexico. The three spatial examples stand for the Western-developed, post-socialist, and post-colonial condition.

While global political consensus demands the holistic implementation of SD into all areas of our lives, the DESD puts a pronounced focus on the significance of all forms of education in the process of implementing SD. By reaching most individuals, formal education enjoys high priority in achieving ESD implementation. According to Mulà and Tilbury (2009, p. 90), the “[...] DESD recognises the importance of teaching ESD and seeks to influence governments [...] to revise the curricula in all learning spheres”. Therefore, one of the main research objectives of the DESD is to analyze curricula: “Given that so many nations, provinces, states and school districts have mandated curriculum, it is important to analyse existing curriculum to see how it includes or neglects knowledge, principles, issues, skills, values, etc. related to sustainable development. Such an analysis could form a basis for curriculum revisions” (McKeown, 2007, p. 94). Similarly, Paden and Chhokar (2007) also stress the emphasis UNESCO has put on curriculum research to facilitate a successful implementation of ESD. Furthermore, Wals (2009, pp. 198-199) reports in his Mid-DESD evaluation that “ESD is mainly integrated in national educational policies and curricula, especially in primary and secondary education” whereby “[...] ESD may be interpreted in many different ways, reflecting a country’s particular tradition in governance or by other challenges faced by a country or region. For example, a country might adopt a more pedagogical orientation towards ESD, emphasising (social) learning, participation and capacity building or a more instrumental one emphasising changing people’s behaviour”. Furthermore, Wals (2009, p. 200) stresses the fact that “[...] ESD-related research that does take place is mostly focused on formal education and on the policy and regulatory measures related to ESD implementation”.

As the DESD progressed, players involved in the process of implementation formulated different strategies and visions for ESD at schools. According to Jucker (2011, p. 43) “[...] successful learning only takes place in everyday practice (i.e., through living in the territory or real world)” whereby “[...] real people [are] engaging together and supporting

each other in change processes". Similarly, McKeown and Hopkins (2007, p. 22) recognize the limits of ESD "[...] envisioned solely as a discipline or a sum of several disciplines" and argue that a "[...] whole-school approach" is required to secure that "[...] sustainability is lived as well as taught. The buildings and the policies model sustainability, which is a powerful reinforcement of concepts taught in the classroom". However, more and more researchers have pointed out the necessity to carry out systematic and comprehensive studies regarding ESD implementation in all forms and types of education, especially formal education (Cruz López, 2011; Jucker, 2011; Wals, 2009; McKeown, 2007; Tilbury, 2007; Hak, Moldan, Dahl, 2007; Paden, Chhokar, 2007; Reid, Nickel, Scott, 2006; Sollart, 2005). Nonetheless, Selby and Kagawa (2010, pp. 39-40) argue — after taking a closer look at Stibbe (2009); Jickling and Wals (2008); Tilbury, Janousek (2007); Tilbury, Janousek, Elias, Bacha (2007); Rode (2006); and Roorda (2004) — that "[...] most proponents of ESD seem to have found a space where they feel they can more or less shrug off the need for deep critical reflection. In this untroubled state, there has been a preoccupation with the instrumental and pragmatic task of embedding ESD in institutions and systems through developing and establishing benchmarks, indicators and checklists; devising skills taxonomies; refining auditing and monitoring tools; drawing up performance league tables; and other potential mechanisms for targeting, standardisation, measurement and control".

Despite marginal critique, developing indicators has become one of the central issues to measure the overall implementation of ESD and thus represented the main outcome of the DESD. Over the last decade, various indicators were created to measure the effectiveness of implementation at both national and global scales (*cf.* UNESCO, 2009b; Hak *et al.*, 2007; Reid *et al.*, 2006; OECD, 2003). In 2005, the UNECE Expert Group reminded us of the ability of indicators not only to diagnose how well a system is working, but also to offer insight into hardly visible or even invisible structures and processes of a system (*cf.* UNECE, 2005a, 2005b). According to Podger, Piggot, Zahradnik, Janousková, Velasco, Hak, Dahl, Jimenez and Harder (2010, p. 299), the construction of indicators has aimed for the measurement of "[...] the goals of humanity's efforts for sustainability, which include wellbeing, quality of life and happiness" (*cf.* OECD, 2009; Stiglitz, Sen, Fitoussi, 2009; European Union, 2007; Meadows, 1998) than on focusing on isolated dimensions (e.g. ecological, economic, or social elements). In addition, Cruz López (2011, p. 168) reports on regional differences regarding the finality of indicators' construction. While "[...] European representatives considered the importance of defining indicators (qualitative and quantitative) to assess integration of ESD", the "[...] Latin American and Caribbean participants discussed introduction of sustainability issues in the transversal curricula, institutional diversity and a diagnostic to contextualise the change of paradigm about ESD in the region from reductionism to holism".

In more specific terms, indicator development has so far focused on selected subjects of national curricula (AdomBent, Bormann, Burandt, Fischbach, Michelsen, 2012; Michelsen, AdomBent, Bormann, Burandt,

Fischbach, 2011; UNECE, 2008) and rarely on comparing (Rieckmann, 2010) the entire set of school subjects of selected countries (Bagoly-Simó, 2012a). In contrast to earlier work (*cf.* Scott, Gough, 2003; Scott, 2002; Sterling, 2001), central topics of ESD (Jucker, 2011), such as health, human rights, pollution, poverty, consumption, biodiversity loss, water, energy (*cf.* Bagoly-Simó, 2012a) have increasingly moved into the centre of indicator development.

SUSTAINABLE DEVELOPMENT, EDUCATION FOR SUSTAINABLE DEVELOPMENT AND GEOGRAPHICAL EDUCATION

Following the brief discussion of SD and ESD in formal education above, this section sets its focus on the relationship between both concepts and school geography. As (school) geography investigates nature and society on different scales it thus displays — in comparison to other subjects — the highest degree of affinity to both topics and skills of ESD. Consequently it does not come as a surprise that the implementation of ESD into school geography has been on the agenda of the Commission on Geographical Education of the International Geographical Union since 1992 and resulted in the publication of charters (Haubrich, 1994) and declarations (Reinfried, Schleicher, Rempfler, 2007b) of international importance.

In 2007, geography educators from all around the world agreed on a commonly shared understanding of SD and ESD, which then amounted to a common framework of implementation for ESD with the ratification of the Lucerne Declaration on Geographical Education for Sustainable Development. Regarding its definition of SD, the document points out that “[t]he Commission’s vision of education for sustainable development is based on the concept of the ‘Human-Earth’ ecosystem” (Haubrich, Reinfried, Schleicher, 2007, p. 244). Thus, the interrelation between the system Earth (geosphere) and the human system (anthroposphere) inherent to school geography carries the very ideas of SD. While the Declaration lists a number of “geographical competencies to enhance SD” (Haubrich *et al.*, 2007, p. 245), such as geographical knowledge, methodological skills, values and attitudes, it does not contain a clear definition of ESD itself.

Geographical interpretations of SD, however, are not only limited to international charters and declarations, they look back on many years of scholarly work and exchange. The strong ties between geography and the concept of SD are expressed by statements like “[...] geography could claim ESD [as its own]” (McKeown, Hopkins, 2007, p. 18). School geography displays in fact not only a strong epistemological affinity; it also covers a range of key topics of ESD (*cf.* Bagoly-Simó, 2012a). Furthermore, geographers have an impressive list of discussions of the “[...] discipline’s contribution to educating for a more sustainable future” (McKeown, Hopkins, 2007, p. 21). A review of papers dedicated to SD, ESD, and school geography not only gives evidence to this, but also highlights the breadth of

research in Geographical Education (*cf.* Jonsson, Sarri, Alerby, 2012; Reinfried, 2009; Setha, Mund, 2008; Corney, 2006; van der Schee, 2003; Houtsonen, 2002; Haubrich, 2000). Along these lines, the concepts of SD and ESD have been discussed in relation to different players of the teaching-learning process (Yasar, Seremet, 2009; McKeown, Hopkins, 2007) from primary to university education (Jonsson *et al.*, 2012; Bowers, 2002), as well as in different forms of education (Ramos Trejo, Sánchez Crispín, 2009; Ruiz-Mallén, Barraza, Bodenhorn, Reyes-García, 2009). Along these lines, Corney (2006) has identified two main trends of conceptualizing SD when he observes, on the one hand, an increasing acceptance and consensus for the trinity model (Gough, 2002; Luke, 2001; Morgan, 2000; Huckle, Sterling, 1996) and, on the other hand, the urge to find opposing conceptual approaches to SD (Sauve, 2002; Scott, 1999).

Geography Education considers, however, aspects of SD and ESD not only on a theoretical-conceptual scale, but also strongly tied to core ESD topics such as climate change or demographic dynamics. Research on climate change, as a core topic in geography education, has encompassed both curricular frameworks, educational media (e.g. textbooks), and different players of the teaching-learning process. While the former has kept a focus on implementation into curricula (Dalelo, 2011; Westaway, 2009) and textbooks (Bagoly-Simó, 2012a; Böhn, Hamann, 2011; Böhn, 2006; Hopkin, 2001), the latter has dedicated attention to pupils' conceptual understanding of climate change and ways of conceptual change (*cf.* Reinfried, Aeschbacher, Rottermann, 2012), university students' opinion on actions helping to prevent climate change (Ambusaidi, Boyes, Stanisstreet, Taylor, 2012) and their knowledge of global climate change (Spellman, Field, Sinclair, 2003), and also to (non-)Western perspectives on environmental change (Jonsson *et al.*, 2012). Similarly, demographic dynamics figures prominently among the core topics of skill acquisition, where it is most frequently discussed as a means to foster numeral literacy. As a result, the study of demographic dynamics remains largely limited to quantitative methods of data acquisition, processing, visualization, and interpretation. While most authors have preserved their focus on geographical skill development, some authors — influenced by the ratification of the Lucerne Declaration — have embraced the idea of fostering ESD at the example of population dynamics (Reinfried, Ruf, Müller, 2007a).

When discussing research on ESD in Geographical Education, special attention needs to be dedicated to its heterogeneity in different national settings. What Bowers (2002, p. 76) discusses as cultural metaphors in the sense of “[...] how the person is nested in a culture that is, in turn, nested in (and dependent upon) natural systems”, becomes evident primarily on a national scale.

While geography educators in the United Kingdom have discussed the relationship between geography and (E)SD within the context of the ongoing curricular reform (Scoffham, 2011; Major, 2011), German school geography has experienced a shift in paradigm from EE to ESD (Hemmer, 1998), which requires students to familiarize themselves with ESD topics and to develop *Gestaltungskompetenz* (de Haan, 2008). In addition,

German school geography distinguishes sharply between ESD and DE. Despite intensive scholarly work (*cf.* Böhn, Otto, 2009) and a common framework (Appelt, Siege, 2007), geography educators tend to consider DE as part of a more general ESD (Schockemöhle, Schrüfer, 2012). Additionally, the implementation of ESD into school geography was also subject to research carried out by scholars outside of Geography Education (*cf.* Michelsen *et al.*, 2011). The results of this study, however, are superficial and of exemplary value.

Unlike in Germany, in former communist countries such as Romania, little attention was paid to ESD during the post-socialist transformation from a command economy to a free market economy. That explains why school geography has so far maintained a rather traditional view on the environment and its protection that is still rooted in the Marxist-materialistic philosophy of socialist education. Furthermore, EE emerges here from environmental geography and is ultimately tied to system theory (namely the interconnectedness of the individual natural sub-systems of the geosystem) and is taught during upper secondary education (Bagoly-Simó, 2012b).

Research on ESD in Mexican school geography is still in its early stages of development (Ramos Trejo, Sánchez Crispín, 2009). Nevertheless, work presented at national conventions on Geographical Education reflects a growing interest of Mexican teachers and academics in the fields of EE and ESD. Furthermore, the post-colonial perspective may help to incorporate indigenous knowledge (Ruiz-Mallén *et al.*, 2009) into geography education.

Summing up, (E)SD-related research in Geographical Education and about school geography is, with only few exceptions (Bagoly-Simó, 2012a; Böhn, Hamann, 2011; Böhn, Petersen, 2007), limited to the analysis of specific ESD topics and the way ESD is implemented in different national or regional curricula (Michelsen *et al.*, 2011), while there is little insight into the subject-specific understanding that school geography has of SD and ESD. Likewise, there are no results explaining the cultural contexts and their influence on the relationship of ESD and Geographical Education.

CONCLUSIONS

This paper aimed to take a closer look at the interconnectedness of concepts of SD, ESD, and subject education with a focus on school geography. The individual sections of this paper highlighted several challenges in need of consideration when working on ESD implementation into subject education. First, conceptualizations of SD are not only numerous, they also emerge from very different contexts both from inside and outside of academia. Second, understandings of ESD vary according to a number of variables such as political interests, structural feature of educational systems or the strength of adjectival educations. Third, formal education displays a unique mixture of SD and ESD conceptualizations in individual national settings. Fourth, geographical education works with its own set of concepts that emerges from the subject's conceptual and

thematic affinity to SD and ESD. Fifth, there is hardly any empirical work on the implementation of SD and ESD in school geography. Most authors remained within the limits of conceptual discussions. Further work needs to address these aspects.

References

- Adams, R.M. (1979). Existence, Self-interest, and the Problem of Evil. *Noûs* 13. 53-65.
- Adomßent, M., Bormann, I., Burandt, S., Fischbach, R., & Michelsen, G. (2012). Indikatoren für Bildung für nachhaltige Entwicklung (Indicator of Education for Sustainable Development). In Bundesministerium für Bildung und Forschung (Ed.), *Bildung für nachhaltige Entwicklung—Beiträge der Bildungsforschung*. Bildungsforschung 39.
- Ambusaidi, A., Boyes, E., Stanisstreet, M., & Taylor, N. (2012). Omani Students' Views About Global Warming: Beliefs About Actions and Willingness to Act. *International Research in Geographical and Environmental Education*, 21. 21-39.
- Appelt, D., & Siege, H. (2007). *Orientierungsrahmen für den Lernbereich Globales Lernen im Rahmen einer Bildung für nachhaltige Entwicklung (Frame of Reference for Development Education within the Framework of Education for Sustainable Development)*. Available at http://www.kmk.org/fileadmin/veroeffentlichungen_beschluesse/2007/2007_06_00_Orientierungsrahmen_Globale_Entwicklung.pdf (accessed on September 28th, 2012).
- Argyris, C., & Schön, D.A. (1978). *Organizational Learning: A Theory of Action Perspective*. Boston, MA: Addison-Wesley.
- Argyris, C., & Schön, D.A. (1996). *Organizational Learning II: Theory, Method and Practice*. Reading, MA: Addison Wesley.
- Bagoly-Simó, P. (2008). *Földrajzdidaktikai kutatások (Research in Geographical Education)*. Bucharest: Editura Didactică și Pedagogică.
- Bagoly-Simó, P. (2012a). Implementation of Education for Sustainable Development in Bavarian, Mexican and Romanian School Curricula. In: M.E. Dulamă (Ed.), *Tendințe actuale în predarea și învățarea geografiei—Contemporary Trends in Teaching and Learning Geography*. Cluj-Napoca: Presa Universitară Clujeană.
- Bagoly-Simó, P. (2012b). Környezetföldrajz és környezeti nevelés a román iskolákban (Environmental Geography and Environmental Education in Romanian Schools). In P. Bagoly-Simó (Ed.), *Környezet és fenntarthatóság a földrajzoktatásban*. Cluj-Napoca: Presa Universitară Clujeană.
- Bateson, G. (1972). *Steps to an Ecology of Mind*. San Francisco: Chandler.
- BMUNR (Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit) (1992): *Umweltpolitik. Agenda 21 (Environmental Policy. Agenda 21)*. Bonn: Köllen.

EDUCATION FOR SUSTAINABLE DEVELOPMENT AND SCHOOL GEOGRAPHY ...

- Boff, L. (1999). *Saber cuidar: ética do humano, compaixão pela terra (To Know How to Take Care: Human Ethics, Compassion for the Earth)*. Petrópolis: Vozes.
- Bonnett, M. (1999). Education for Sustainable Development: A Coherent Philosophy for Environmental Education? *Cambridge Journal of Education*, 29. 313-324.
- Bowers, C.A. (2002). Toward a Cultural and Ecological Understanding of Curriculum. In W.E. Doll & N. Gough (Eds.), *Curriculum Visions*. New York: Peter Lang.
- Böhn, D. (2006). International Dialogue on Educational Approach to Sustainable Development: Germany. In K. Purnell, J. Lidstone & S. Hodgson (Eds.), *Changes in Geographical Education: Past, Present and Future (Proceedings of the International Geographical Union, Commission on Geographical Education Symposium)*. Brisbane.
- Böhn, D., & Hamann, B. (2011). Approaches to Sustainability. Examples from Geography Textbook Analysis in Germany. *European Journal of Geography*, 2. 1-10.
- Böhn, D., & Otto, K.H. (2009). Orientierungsrahmen für den Lernbereich Globale Entwicklung (Frame of Reference for Development Education). *Praxis Geographie*, 39. 63-65.
- Böhn, D., & Petersen, J.F. (2007). Education for Sustainable Development: An International Perspective. *Internationale Schulbuchforschung/International Textbook Research*, 29. 139-145.
- Capra, F. (1996). *The Web of Life: A New Scientific Understanding of Living Systems*. New York: Anchor Books.
- Capra, F. (2002). *The Hidden Connection: Integrating the Biological, Cognitive, and Social Dimensions of Life into a Science of Sustainability*. New York: Doubleday.
- Caride Gómez, J.A (2005). In the Name of Environmental Education: Words and Things in the Complex Territory of Education–Environment–Development Relations. *Policy Futures in Education*, 3. 260–270.
- Corney, G. (2006). Education for Sustainable Development: An Empirical Study of the Tensions and Challenges Faced by Geography Student Teachers. *International Research in Geographical and Environmental Education*, 15. 224–240.
- Cruz López, Y. (2011). 5th International Barcelona Conference on Higher Education: Higher Education's Commitment to Sustainability from Understanding to Action. *Journal of Education for Sustainable Development*, 5. 167–69.
- Dalelo, A. (2011). Global Climate Change in Geography Curricula for Ethiopian Secondary and Preparatory Schools. *International Research in Geographical and Environmental Education*, 20. 227-246.
- Dobson, A. (1996). Environment Sustainabilities: An Analysis and a Typology. *Environmental Politics*, 5. 401-428.
- Ekardt, F. (2011). *Theorie der Nachhaltigkeit: Rechtliche, ethische und politische Zugänge—am Beispiel von Klimawandel, Ressourcenknappheit und Welthandel (Theory of Sustainability: Legal, Ethical, and Political Approaches—The Example of Climate Change, Resource Scarcity, and Global Trade)*. Baden-Baden: Nomos Verlag.

- Ekardt, F. (2010). *Das Prinzip Nachhaltigkeit: Generationengerechtigkeit und globale Gerechtigkeit (The Principle of Sustainability: Generational Equity and Global Equity)*. Munich: C.H. Beck Verlag.
- European Union (2007). *Beyond GDP*. Available at <http://www.beyond-gdp.eu> (accessed on September 28th, 2012).
- Fitz, J., Halpin, D., & Power, S. (1994). Implementation Research and Education Policy: Practice and Prospects. *British Journal of Educational Studies*, 42. 53-69.
- Foster, J. (2002). Sustainability, Higher Education and the Learning Society. *Environmental Education Research*, 8. 35-41.
- Freire, P. (1997). *Pedagogia da autonomia: saberes necessários à prática educativa (Pedagogy of Autonomy: Necessary Wisdoms to Educational Practices)*. São Paulo: Paz and Terra.
- Gadotti, M. (2009). What We Need to Learn to Save the Planet. *Journal of Education for Sustainable Development*, 2. 21-30.
- Gough, S. (2002). Increasing the Value of the Environment: A 'Real Options' Metaphor for Learning. *Environmental Education Research*, 8. 61-72.
- Grober, U. (2012). *Sustainability. A Cultural History*. Chelsea: Green Pub Co.
- Grober, U. (2013). Die Entdeckung der Nachhaltigkeit. Zur Genealogie eines Leitbegriffs (The Discovery of Sustainability. Contribution to the Genealogy of a Main Term). In J. C. Enders & M. Remig (Eds.), *Perspektiven nachhaltiger Entwicklung—Theorien am Scheideweg*. Beiträge zur sozialwissenschaftlichen Nachhaltigkeitsforschung 3. Marburg: Metropolis-Verlag.
- Guerra Ramos, M.T., & López Valentín, D.M. (2011). Las actividades incluidas en el libro de texto para la enseñanza de las ciencias naturales en sexto grado de primaria (The Task in Science Textbooks for the Sixth Grade of Primary Education). *Revista Mexicana de Investigación Educativa*, 16. 441-470.
- Gutiérrez Pérez, J., & Pozo Llorente, M.T. (2005). *Stutifera Navis: Institutional Tensions, Conceptual Chaos, and Professional Uncertainty at the Beginning of the Decade of Education for Sustainable Development*. *Policy Futures in Education*, 3. 296-308.
- Haan, G. de (2008). Gestaltungskompetenz als Kompetenzkonzept für Bildung für nachhaltige Entwicklung (Gestaltungskompetenz as a Skill Concept for Education for Sustainable Development). In I. Bormann & G. de Haan (Eds.), *Kompetenzen der Bildung für nachhaltige Entwicklung. Operationalisierung, Messung, Rahmenbedingungen, Befunde*. Wiesbaden: VS-Verlag.
- Haan, G. de (2009). *Transfer-21. Bildung für nachhaltige Entwicklung (Transfer-21. Education for Sustainable Development)*. Available at www.transfer-21.de (accessed on September 28th, 2012).
- Haan, G. de (2012). *Bildung für nachhaltige Entwicklung braucht mehr Verbindlichkeit (Education for Sustainable Development Requires More Commitment)*. Available at <http://www.nachhaltigkeitsrat.de/index.php?id=7104> (accessed on September 28th, 2012).
- Hak, T., Moldan, B., & Dahl, A.L. (Eds.) (2007). *Sustainability Indicators: A Scientific Assessment*. SCOPE (Scientific Committee on the Problems of Environment based in Paris) 67. Washington DC: Island Press.

EDUCATION FOR SUSTAINABLE DEVELOPMENT AND SCHOOL GEOGRAPHY ...

- Haubrich, H. (Ed.) (1994). *International Charter on Geographical Education*. Geographiedidaktische Forschungen 24. Nuremberg: HGD.
- Haubrich, H. (2000). Guest Editorial: Sustainable Learning in Geography for the 21st Century. *International Research in Geographical and Environmental Education*, 9. 279-284.
- Haubrich, H., Reinfried, S., & Schleicher, Y. (2007). Lucerne Declaration on Geographical Education for Sustainable Development. In S. Reinfried, Y. Schleicher & A. Rempfler (Eds.), *Geographical Views on Education for Sustainable Development: Proceedings*. Weingarten: HGD.
- Hemmer, I. (1998). Nachhaltige Entwicklung als neues Leitbild der Umwelterziehung und des Geographieunterrichts? (Sustainable Development as New General Principle for Environmental Instruction and Geography Education?). *Regensburger Beiträge zur Didaktik der Geographie*. 5. 197-200.
- Hemmer, I., & Hemmer, M. (Eds.) (2010). *Schülerinteressen an Themen, Regionen und Arbeitsweisen des Geographieunterrichts (Student Interest on Topics, Regions, and Methods of School Geography)*. Geographiedidaktische Forschungen 46.
- Holloway, J. (2002). *Changing the World Without Taking Power: The Meaning of Revolution Today*. London & Sterling, VA: Pluto Books.
- Hopkin, J. (2001). The World According to Geography Textbooks: Interpretations of the English National Curriculum. *International Research in Geographical and Environmental Education*, 10. 46-67.
- Houtsonen, L. (2002). Geographical Education for Environmental and Cultural Diversity. *International Research in Geographical and Environmental Education*, 11. 213-217.
- Huckle, J., & Sterling, S. (1996): *Education for Sustainability*. London: Earthscan.
- Jickling, B. (2010). Reflecting on the 5th World Environmental Education Congress, Montreal, 2009. *Journal of Education for Sustainable Development*, 4. 25-36.
- Jickling, B., & Wals, A.E.J. (2008). Globalization and Environmental Education: Looking Beyond Sustainable Development. *Journal of Curriculum Studies*, 40. 1-21.
- Jonsson, G., Sarri, C., & Alerby, E. (2012). 'Too hot for the reindeer'—voicing Sámi children's visions of the future. *International Research in Geographical and Environmental Education*, 21. 95-107.
- Jucker, R. (2011). ESD between Systemic Change and Bureaucratic Obfuscation Some Reflections on Environmental Education and Education for Sustainable Development in Switzerland. *Journal of Education for Sustainable Development*, 5. 39-60.
- Kavka, G.S. (1982): The Paradox of Future Individuals. *Philosophy & Public Affairs*, 11. 93-112.
- KMK (Ständige Konferenz der Kultusminister der Länder in der Bundesrepublik Deutschland) & DUK (Deutsche UNESCO-Kommission) (2007). *Bildung für nachhaltige Entwicklung in der Schule (Education for Sustainable Development in Schools)*. Available at http://www.kmk.org/fileadmin/veroeffentlichungen_beschluesse/2007/2007_06_15_Bildung_f_nachh_Entwicklung.pdf (accessed September 28th, 2012).

PÉTER BAGOLY-SIMÓ

- Lidstone, J., & Stoltman, J. (2007). Editorial: Sustainable Environments or Sustainable Cultures. Research Priorities. *International Research in Geographical and Environmental Education*, 16. 1-4.
- Lloyd, B. (2009). The Growth Delusion. *Sustainability*, 1. 516–536.
- Luke, T. (2001). Education, Environment and Sustainability: What Are the Issues, Where to Intervene, What Must Be Done? *Educational Philosophy & Theory*, 33. 187-202.
- Major, B. (2011). Justifying the Place of Geography in the School Curriculum. *Geography*, 96. 131-136.
- Mayer, M., & Tschapka, J. (Eds.) (2008). *Engaging Youth for Sustainable Development: Learning and Teaching Sustainable Development in Lower Secondary Schools*. Strassbourg: Council of Europe.
- McKeown, R. (2007). Setting the Stage for a Strategic Research Agenda for the UNDESD: A Joint UNU-UNESCO Workshop. *Journal of Education for Sustainable Development*, 1. 91-96.
- McKeown, R., & Hopkins, C. (2003). EE/ESD: Defusing the Worry. *Environmental Education Research*, 9. 117–128.
- McKeown, R., & Hopkins, C. (2007). Moving Beyond the EE and ESD Disciplinary Debate in Formal Education. *Journal of Education for Sustainable Development*, 1. 17-26.
- Meadows, D.H. (1982). Whole Earth Models and Systems. *The CoEvolution Quarterly*, Summer. 98-108.
- Meadows, D.H. (1998). *Indicators and Information Systems for Sustainable Development: Report to the Balaton Group*. Hartland Four Corners: The Sustainability Institute.
- Michelsen, G., Adomßent, M., Bormann, I., Burandt, S., & Fischbach, R. (2011). *Indikatoren der Bildung für nachhaltige Entwicklung–Ein Werkstattbericht (Indicators Of ESD–Report On Work In Progress)*. Bad Homburg: VAS-Verlag.
- Morgan, J. (2000). Geography Teaching for a Sustainable Society. In A. Kent (Ed.), *Reflective Practice in Geography Teaching*. London: Paul Chapman.
- Morin, E., & Brigitte, A. (1993): *Terre-Patrie (Homeland-Earth)*. Paris: Seuil.
- Mulà, I., & Tilbury, D. (2008). A United Nations Decade of Education for Sustainable Development (2005–14). What Difference will it Make? *Journal of Education for Sustainable Development*, 3. 87-97.
- Mulgan, T. (2002). Neutrality, Rebirth and Intergenerational Justice. *Journal of Applied Philosophy*, 19. 3-15.
- OECD (Organisation for Economic Co-operation and Development) (2003). *OECD Environmental Indicators: Development, Measurement and Use. Reference Paper*. Available at <http://unpan1.un.org/intradoc/groups/public/documents/apcity/unpan015281.pdf> (accessed September 28th, 2012).
- OECD (Organisation for Economic Co-operation and Development) (2009). *Statistics, Knowledge and Policy, 3rd OECD World Forum, Busan, Korea, 27–30 October, 2009*. Available at http://www.oecd.org/pages/0,3417,en_40033426_40033828_1_1_1_1_1,00.html (accessed September 28th, 2012).

EDUCATION FOR SUSTAINABLE DEVELOPMENT AND SCHOOL GEOGRAPHY ...

- Orr, D. (1992). *Ecological Literacy: Education and the Transition to a Postmodern World*. New York: SUNY Press.
- Orr, D. (2004). *Earth in Mind: On Education, Environment, and the Human Prospect*. Washington: Island Press.
- Paden, M., & Chhokar, K.B. (2007). Exploring Research Priorities for the DESD. *Journal of Education for Sustainable Development*, 1. 73-75.
- Parfit, D. (1987). *Reasons and Persons*. Oxford: Oxford University Press.
- Pigozzi, M. J. (2007). Quality in Education Defines ESD. *Journal of Education for Sustainable Development*, 1. 27-35.
- Pingel, F. (2010). *UNESCO Guidebook on Textbook Research and Textbook Revision*. Braunschweig & Paris: UNESCO & Georg-Eckert-Institute.
- Podger, D., Piggot, G., Zahradnik, M., Janousková, S., Velasco, I., Hak, T., Dahl, A., Jimenez, A., & Harder, M.K. (2010). The Earth Charter and the ESDinds Initiative: Developing Indicators and Assessment Tools for Civil Society Organisations to Examine the Values Dimensions of Sustainability Projects. *Journal of Education for Sustainable Development*, 4. 297-305.
- Porritt, J. (2005). *Capitalism as if the World Matters*. London: Earthscan.
- Ramos Trejo, A., & Sánchez Crispín, Á. (2009). La enseñanza e investigación en Geografía en el México contemporáneo (Geographical Education and Research in Contemporary Mexico). In Á. Sánchez Crispín & A.M. Liberali (Eds.), *La Geografía de América Latina: visión por países*. Buenos Aires, México, Caracas: Unión Geográfica de América Latina, SMGE, IGE UNAM, UGI.
- Reid, A., Nikel, J., & Scott, W.A.H. (2006). *Indicators for Education for Sustainable Development: A Report on Perspectives, Challenges and Progress*. London: Anglo-German Foundation for the Study of Industrial Society.
- Reinfried, S. (2009). Education for Sustainable Development and the Lucerne Declaration. *International Research in Geographical and Environmental Education*, 18. 229-232.
- Reinfried, S., Aeschbacher, U., & Rottermann, B. (2012). Improving Students' Conceptual Understanding of the Greenhouse Effect Using Theory-based Learning Materials That Promote Deep Learning. *International Research in Geographical and Environmental Education*, 21. 155-78.
- Reinfried, S., Ruf, W., & Müller, M. (2007a): Die erneuerbare Wassermenge wächst nicht mit! Eine Lernaufgabe zum Thema Wasserangebot und Bevölkerungswachstum (Renewable Water Quantity Does Not follow Growth! A Learning Offer to Water Resources and Demographic Growth). *Praxis Geographie*, 37. 28-33.
- Reinfried, S., Schleicher, Y., & Rempfler, A. (eds) (2007b). *Geographical Views on Education for Sustainable Development. Proceedings of the Lucerne-Symposium, Switzerland, July 29-31, 2007*. Geographiedidaktische Forschungen 42.
- Rieckmann, M. (2010). *Die globale Perspektive der Bildung für eine nachhaltige Entwicklung. Eine europäisch-lateinamerikanische Studie zu Schlüsselkompetenzen für Denken und Handeln in der Weltgesellschaft (The Global Perspective of ESD. A European-Latin-American Study on Key Skills in Thinking and Acting in the Global Society)*. Berlin: Berliner Wissenschafts-Verlag.

- Rode, H. (2006). *Different Indicators for Different Contexts? Developing Indicators for ESD in Germany*. Presentation at the Bath Royal Literary and Scientific Institute UK 'Indicators for Education for Sustainable Development: Engaging the debate' event, 17 March. Available at <http://www.bath.ac.uk/cree/resources/esrcesd/rodeppt.pdf> (accessed September 28th, 2012).
- Roorda, N. (2004). Developing Sustainability in Higher Education using AISHE. In P. Corcoran & A.E.J. Wals (Eds.), *Higher Education and the Challenge of Sustainability*. Dordrecht: Kluwer Academic.
- Ruiz-Mallén, I., Barraza, L., Bodenhorn, B., & Reyes-García, V. (2009). School and Local Environmental Knowledge, What Are the Links? A Case Study Among Indigenous Adolescents in Oaxaca, Mexico. *International Research in Geographical and Environmental Education*, 18. 82-96.
- Salgado, S. (2000). *Exodus*. São Paulo: Companhia das Letras.
- Santos, B.S. (1995). *Pela mão de Alice: o social e o político na pós-modernidade (By the Hand of Alice: The Social and Political in the Post-modernity)*. São Paulo: Cortez.
- Sauve, L. (2002). *Environmental education: Possibilities and constraints. Connect: UNESCO*. International Science, Technology and Environmental Education Newsletter 27.
- Schockemöhle, J., & Schrüfer, G. (2012). Nachhaltige Entwicklung und Geographieunterricht (Sustainable Development and Geography Education). In J.B. Haversath (Ed.), *Geographiedidaktik. Theorien. Themen und Forschung*. Braunschweig: Westermann.
- Schwartz, T. (1978). Obligations to Posterity. In R. Sikora & B. Barry (Eds.), *Obligations to Future Generations*. Philadelphia: Temple University Press.
- Scoffham, S. (2011). Core Knowledge in the Revised Curriculum. *Geography*, 96. 124-130.
- Scott, W. (1999). Environmental Education: Arguing the Case For Multiple Approaches. *Educational Studies*, 25. 89-97.
- Scott, W. (2002): Education and Sustainable Development: Challenges, Responsibilities, and Frames of Mind. In: *The Trumpeter*, 18 (1): 101-112.
- Scott, W., & Gough, S. (2003). *Sustainable Development and Learning: Framing the Issues*. London: Routledge.
- Selby, D., & Kagawa, F. (2010). Runaway Climate Change as Challenge to the 'Closing Circle' of Education for Sustainable Development. *Journal of Education for Sustainable Development*, 4. 37-50.
- Setha, V., & Mund, J.P. (2008). Professional Education Programme for Land Management and Land Administration in Cambodia. *International Research in Geographical and Environmental Education*, 17. 358-371.
- Snyder, J., Bolin, F., & Zumwalt, K. (1992). Curriculum Implementation. In P. W. Jackson (Ed.), *Handbook of Research on Curriculum*. New York: Macmillan.
- Sollart, K. (2005). *Framework on Indicators for Education for Sustainable Development: Some Conceptual Thoughts*. Netherlands: Netherlands Environmental Assessment Agency.

EDUCATION FOR SUSTAINABLE DEVELOPMENT AND SCHOOL GEOGRAPHY ...

- Spellman, G., Field, K., & Sinclair, J. (2003). An Investigation into UK Higher Education Students' Knowledge of Global Climatic Change. *International Research in Geographical and Environmental Education*, 12. 6-17.
- Sterling, S. (2001). *Sustainable Education: Re-visioning Learning and Change*. Dartington: Green Books.
- Sterling, S. (2004). *Linkingthinking. New Perspectives on Thinking and Learning for Sustainability*. WWF. Available at www.eauc.org.uk/file_uploads/linkingthinking-302.pdf (accessed September 28th, 2012).
- Sterling, S. (2010). Living in the Earth: Towards and Education for Our Tim. *Journal of Education for Sustainable Development*, 4. 213-218.
- Stibbe, A. (2009). *The Handbook of Sustainability Literacy: Skills for a Changing World*. Dartington: Green Books.
- Stiglitz, J., Sen, A., & Fitoussi, J. (2009). *Report by the Commission on the Measurement of Economic Performance and Social Progress*. Available at www.stiglitz-sen-fitoussi.fr/en/index.htm (accessed September 28th, 2012).
- Tilbury, D. (2007). Monitoring and Evaluation During the UN Decade of Education for Sustainable Development. *Journal of Education for Sustainable Development*, 1. 239-254.
- Tilbury, D., & Janousek, S. (2007). *Monitoring and Assessing Progress in Education for Sustainability Programs Nationally*. Brisbane: International Geographical Union Congress.
- Tilbury, D., Janousek, S, Elias, D., & Bacha, J. (2007). *Asia Pacific Guidelines for the Development of Education for Sustainable Development Indicators*. Bangkok: UNESCO Asia and Pacific Regional Bureau.
- Tremmel, J. (2003). *Nachhaltigkeit als politische und analytische Kategorie. Der deutsche Diskurs um nachhaltige Entwicklung im Spiegel der Interessen der Akteure (Sustainability as Political and Analytical Category. The German Discourse On Sustainable Development Morrored by the Interest of the Players)*. Munich: Oekom-Verlag.
- Tremmel, J. (2008). *A Theory of Intergenerational Justice*. Available at http://docserv.uni-duesseldorf.de/servlets/DerivateServlet/Derivate8442/Tremmel_Theory%20of%20IGJ.pdf (accessed September 28th, 2012).
- UNDESA (United Nations Department of Economic and Social Affairs) (2009). *Johannesburg Declaration on Sustainable Development*. Available at www.unescap.org/esd/environment/rio20/pages/Download/johannesburgdeclaration.pdf (accessed September 28th, 2012).
- UNDESD (United Nations Decade For Education For Sustainable Development) (2008). *About ESD*. Available at <http://www.desd.org/About%20ESD.htm> (accessed September 28th, 2012).
- UNECE (Expert Group on Indicators for Education for Sustainable Development) (2005a). *UNECE Expert Group on Indicators for Education for Sustainable Development Report. First Meeting 26-28 September 2005*. Ede, The Netherlands. UNECE. Available at: <http://www.unece.org/env/esd> (accessed September 28th, 2012).

- UNECE (Expert Group on Indicators for Education for Sustainable Development) (2005b). *Background Paper on Development of Indicators to Measure Implementation of the UNECE Strategy for ESD*. Ede, The Netherlands: UNECE.
- UNECE (United Nations Economic Commission for Europe) (2008). *Extract of Issues Relevant to Competences in ESD*. Available at www.unece.org/fileadmin/DAM/env/esd/inf.meeting.docs/EGonInd/8mtg/ExtractRFCompetencesEG_ESD_8_5.pdf (accessed September 28th, 2012).
- UNESCO (2007). *The UN Decade of Education for Sustainable Development (DESD 2005-2014). The First Two Years*. Available at <http://unesdoc.unesco.org/images/0015/001540/154093e.pdf> (accessed September 28th, 2012).
- UNESCO (United Nations Educational, Scientific and Cultural Organization) (2009a). *Bonn Declaration*. Available at www.esd-world-conference-2009.org/fileadmin/download/ESD2009_BonnDeclaration080409.pdf (accessed September 28th, 2012).
- UNESCO (2009b). *Review of Contexts and Structures for Education for Sustainable Development 2009*. Paris: UNESCO Section for DESD Coordination.
- Unnerstall, H. (1999). *Rechte zukünftiger Generationen (Rights of Future Generations)*. Würzburg: Königshausen & Neumann.
- van der Schee, J. (2003). Geographical Education and Citizenship Education. *International Research in Geographical and Environmental Education*, 12. 49-53.
- Vare, P., & Scott, W. (2007). Learning for a Change: Exploring the Relationship Between Education and Sustainable Development. *Journal of Education for Sustainable Development*, 1. 191-198.
- Wals, A.E.J. (2009). A Mid-DESD Review: Key Findings and Ways Forward. *Journal of Education for Sustainable Development*, 3. 195-204.
- Wals, A.E.J. (2011). Learning Our Way to Sustainability. *Journal of Education for Sustainable Development*, 5. 177-186.
- Wals, A.E.J., & Blewitt, J. (2010). Third Wave Sustainability in Higher Education: Some (inter)national Trends and Developments. In P. Jones, D. Selby & S. Sterling (Eds.), *Green Infusions: Embedding Sustainability Across the Higher Education Curriculum*. London: Earthscan.
- WCED (World Commission on Environment and Development) (1987). *Report of the World Commission on Environment and Development*. Available at www.un-documents.net/a42r187.htm (accessed September 28th, 2012).
- Westaway, J. (2009). A Sustainable Future for Geography? *Geography*, 94. 4-12.
- Wilber, K. (1997). *The Eye of Spirit—An Integral Vision for a World Gone Slightly Mad*. Boston: Shambhala Publications.
- Williams, D. (2008). Sustainability Education's Gift: Learning Patterns and Relationships. *Journal of Education for Sustainable Development*, 2. 41-49.
- Yasar, O. & Seremet, M. (2009). An Evaluation of Changes to the Secondary School Geography Curriculum in Turkey in 2005. *International Research in Geographical and Environmental Education*, 15. 171-184.