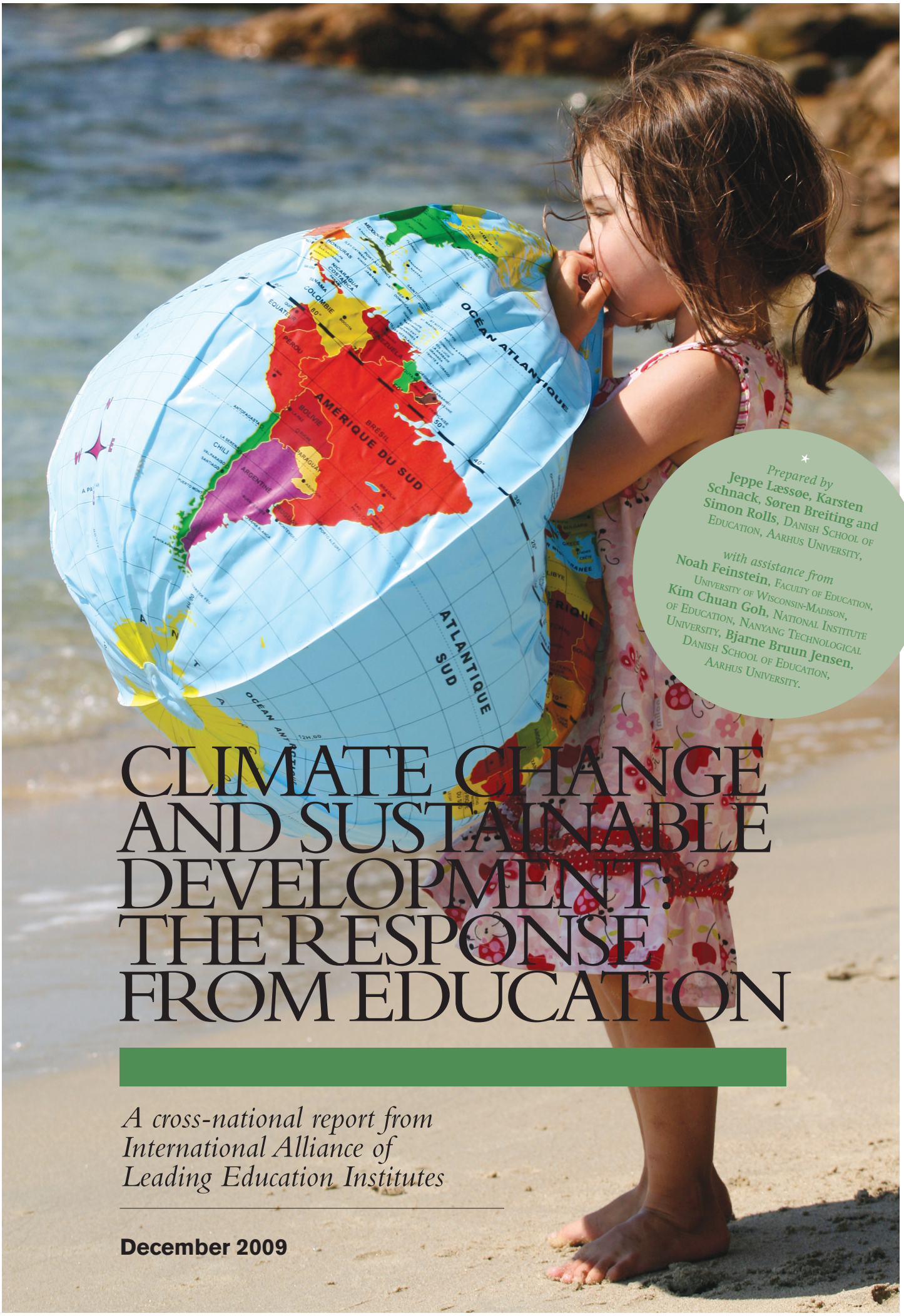

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CLIMATE CHANGE AND SUSTAINABLE DEVELOPMENT: THE RESPONSE FROM EDUCATION

A cross-national report from International Alliance of Leading Education Institutes

December 2009

Climate Change and Sustainable Development:
The Response from Education

CROSS-NATIONAL REPORT

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PREFACE

In this report, we present the results of a cross-national analysis providing a broad international overview of the initiatives taken and the problems involved in achieving the goals of the United Nations Decade of Education for Sustainable Development 2005-2014 here at the midway point. Based on the findings of research teams from ten different countries spanning six continents, the report also provides a timely survey of the ways in which education can contribute to tackling the challenges of climate change. This is one of a series of publications resulting from the project 'Climate Change and Sustainable Development: The Response from Education' conducted under the auspices of the International Alliance of Leading Education Institutes.

The International Alliance of Leading Education Institutes was founded at a meeting in Singapore on 21st August 2007. Made up of ten leading institutions in the field of teacher education and education research (São Paulo joined in 2008 and Cape Town in 2009), the Alliance acts as a think-tank which draws together existing expertise and research in education to generate ideas and identify trends, to serve as a collective voice on important educational issues and thus influence policy and practice in education. It aims to inform governments, international agencies, funding bodies and the public at large, to influence policy and practice in education and thus to enhance the profile and quality of education internationally.

The Alliance comprises representatives from the following member institutes:

> **Graduate School of Education,**
The University of Melbourne, Australia
> **Faculty of Education,**
University of São Paulo, Brazil
> **Ontario Institute for Studies in Education,**
University of Toronto, Canada
> **School of Education,**
Beijing Normal University,
People's Republic of China
> **Danish School of Education,**
University of Aarhus, Denmark
> **College of Education,**
Seoul National University, South Korea
> **National Institute of Education,**
Nanyang Technological University, Singapore
> **Institute of Education,**
University of London, United Kingdom
> **Faculty of Education,**
University of Wisconsin-Madison, USA
> **School of Education,**
University of Cape Town, South Africa

The core reason for the founding of the International Alliance of Leading Education Institutes was the recognition that education needed a "voice", a group that would seek to offer well-considered and balanced advice on important educational issues. The group would be mindful of the views of academic researchers, of what evidence and practice had to say, as well as the needs for action on the policy front.

Each year the Alliance partners agree on an issue for a common research project in order to provide the basis for the think tank to formulate recommendations for the policy and practice level on how to qualify their efforts on this issue.

In August 2008, *Climate Change and Education for Sustainable Development (ESD)* was chosen as the issue for the next year and, as the Danish School of Education holds the Alliance chair position, a research team from this university was chosen to lead the project.

The nine other universities have contributed by establishing research teams who have conducted national reports providing the basis for the cross-national analysis.

In August 2009, the Alliance partners met at Seoul National University in South Korea and discussed the results of the cross-national analysis. On this basis, eight recommendations have been formulated to inform and qualify policy initiatives regarding climate change and education. These recommendations will be presented to the public at a press conference in connection with the Copenhagen Climate Change Summit, December 2009.

For the national reports and other documents from the project and for further information, please visit *http://dpu.dk/RPEHE* or *http://edusud.dk/*

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We would also like to express our gratitude and special thanks to Dean Cho Young Dal and his staff at Seoul National University for their excellent hosting of the conference on 'Climate Change and Sustainable Development: The Response from Education', 19 August 2009.

The Danish research team[1],
Copenhagen, November 2009.

1 Professor Jeppe Læssøe, Professor Karsten Schnack, Associate Professor Søren Breiting, Senior Consultant Leif Glud Holm and Research Assistant Simon Rolls.

LINKS TO THE NATIONAL REPORTS

http://edusud.dk **and** *http://dpu.dk/RPEHE*

CONTENTS

ABBREVIATIONS

ESD: Education for Sustainable Development
CCE: Climate Change Education
EE: Environmental Education
UN: United Nations
UNESCO: United Nations Educational, Scientific and Cultural Organisation
NGO: Non Governmental Organisations

The national reports are available both compiled and as separate documents. When cited, they are referenced using the format (National reports: country abbreviation p.xx). The country abbreviations used are as follows:

AUS: Australia
BRA: Brazil
CAN: Canada
CHN: People's Republic of China
DEN: Denmark
KOR: South Korea
RSA: South Africa
SIN: Singapore
UK: United Kingdom
USA: United States of America

INTRODUCTION

In December 2002, the United Nations Decade of Education for Sustainable Development (2005-2014) was adopted by the UN General Assembly, and UNESCO was nominated to act as lead agency for the promotion of the Decade. The ambitious goal of the Decade is to integrate the principles, values, and practices of sustainable development into all aspects of education and learning. A sustainable future is defined as a development "that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development Report, 1987). Sustainable development is viewed as a complex issue, encompassing economic, environmental and social dimensions. In other words, sustainable development is essential to satisfy human needs and improve the quality of human life.
However, although we are now at the halfway-point of the Decade for ESD, the actual role and contribution of education has so far mainly been dealt with in vague terms.

Since the start of the Decade of ESD in 2005, the increasing awareness of accelerating climate change and the potential threats to human existence has led to growing concern for environmental issues. In December this year, the COP15 United Nations Climate Change Conference (the 15th annual Conference of the Parties) will take place in Copenhagen, Denmark. Here Ministers, officials, experts and NGOs from 189 countries will discuss and try to reach an agreement on how to tackle the challenge of climate change. The question is whether the role of education will be included in these negotiations, and, if so, which concept of and approach to education this will entail? There are certainly good reasons for providing the delegates and the global mass media with qualified suggestions of the role education might play.

The International Alliance of Leading Education Institutes has therefore decided to pool its unique resources within the field of ESD in a project exploring the response from education to the challenges of climate change and sustainable development from a truly international perspective.

AIM AND RESEARCH QUESTIONS

The aim of the joint research project has been to carry out and present a cross-national analysis and a set of recommendations for future ESD and future research in ESD. The key milestones have been to present the results of this analysis and the resulting recommendations at the August 2009 conference of the international alliance in Seoul, South Korea, and then later at a press conference in conjunction with the climate summit in Copenhagen in December 2009.

The project has been guided by the following four research questions:

> How is the concept of ESD, and the role and challenges of education in relation to sustainable development, interpreted in national strategies for the promotion of ESD?
> What is the state-of-the-art of empirical and conceptual research on ESD in the ten participating countries?
> Is it possible to draw any conclusions on the basis of existing research regarding what works (and what doesn't)?
> Does education play a part in the national efforts to cope with mitigation and adaptation to climate change? If so, how is it approached and how do these efforts influence ESD and vice versa?

RESEARCH APPROACH

This report presents the results of a comparative analysis of the ten national reports produced by the participating institutions. The national analyses which, as such, form the foundation for this report were not, however, conducted on the basis of a uniform data collection and processing procedure. Instead, it was decided that the design should remain open and sensitive to the fact that the countries involved vary greatly in terms of size, and of educational and research culture and traditions. They represent divergent political structures and have undergone different historical processes concerning the development of ESD. For these reasons, a compromise has been chosen between a common research design, enabling comparison, and a respect for diversity, ensuring that each partner would be able to present a fair representation of the situation in their country. Therefore, at the beginning of the project, a set of guidelines was compiled containing a long series of sub-questions concerning the study's main themes. At the same time, it was also emphasised these were merely guidelines and that

each individual national report should contain a historical analysis of the local development of ESD which considered the sub-questions in a meaningful way within the particular national, historical context. This has resulted in ten cohesive analyses of ESD and CCE in the countries the participating institutions represent, rather than a string of more specific, isolated responses to individual questions. On the basis of these national reports, the subsequent cross-national analysis has identified both general tendencies, significant variations, and particular phenomena considered to have a wider relevancy.

Education for sustainable development (ESD) constitutes the area for this study, but, at the same time, it is a relatively new and complex concept. Neither education nor sustainable development is unambiguous and straightforward concepts, so ESD is very much open to interpretation. Settling on one fixed definition of education and sustainable development would have meant excluding other interpretations, perspectives and data right from the start. In order to ensure a focussed study whilst simultaneously maintaining openness and sensitivity toward the use of the concept of ESD in different contexts, we used UNESCO's official documents on the UN Decade for ESD in compiling the guidelines for the national reports, but also made a point of allowing these analyses the opportunity to consider the various ways ESD is perceived and practised. It has proven to be the case that ESD, due to the UN's use of the term, can today be regarded as an all-embracing umbrella term, but, at the same time, that there exists criticism of the term and alternatives to it in the various national contexts. The open approach taken here enables us to observe and describe this ambiguity.

The strength of this study lies in its scope. With the participation of researchers from ten nations, the report provides a broad overview of the current situation and developments regarding ESD and CCE in countries of varying size and representing each and every continent. Breadth often stands in opposition to depth, and indeed, such a relatively wide-reaching short-term project as this cannot fully take into account the amount of detail and depth the field contains. For researchers and practitioners involved in ESD and related areas, this report may feel incomplete. A phrase from the US national report can, in this sense, be said to apply to the study as a whole: "Thoroughness was too great a goal for the scope of the work; usefulness, hopefully, was not".

Despite the breadth of the study, attention must be drawn to certain limitations regarding the global perspective. As such, the ten nations may represent the different continents, but they are not among the world's poorest nations. This is important to note, as the challenges of climate change and ESD are clearly different in less economically developed countries in a number of ways. There are therefore likely to be important differences in the approach taken to ESD in countries with high levels of consumption and in countries characterised by the struggle for poverty reduction through development. Despite the participation of the University of Cape Town, South Africa, the African continent is greatly underrepresented here, while a number of other areas and cultures of the world are notably missing, not least Western and Southern Asia and Southern and Eastern Europe. It is therefore important to be aware that there are other views on education's role in relation to sustainable development and climate change than those described in this study, in spite of its unusually broad scope.

Following the opening stages of the work on the national analyses, a three day workshop was held in Copenhagen at the beginning of March 2009 where a number of points were cleared up and a more precise design for the compilation of the reports was agreed upon. This included a decision to adopt a historical perspective on the construction of ESD in the individual nations and preserve the historical-cultural narrative throughout the document. It was also decided that the national analyses should, when appropriate, include political documents not stemming from national government in that ESD policy in some countries is more or less non-existent at the national level. In such cases, including documents from regional authorities and, in some instances, NGOs is necessary to provide a more accurate picture of activities. A third important decision was to focus the study on formal education and, more particularly, on compulsory schooling.

PROJECT DESIGN

The study has been conducted in three phases: developing a set of common guidelines, compiling ten national reports, and conducting a cross-national analysis.

The guidelines contained a number of questions divided into the following five themes:
Theme 1 ESD - overall conception: Concept, identity, profile
Theme 2 Education for Sustainable Development (ESD) and Sustainable Development (SD); Climate Change Education (CCE) and Climate Change (CC): The role of education in relation to the challenges of sustainable development and climate change respectively
Theme 3 Education for Sustainable Development and Climate Change Education (ESD and CCE): Relationships between Education for Sustainable Development and Climate Change Education.
Theme 4 ESD & the curriculum: Including evaluation, assessment, success-criteria, and the question of the relationships between ESD and the (academic) disciplines.

Theme 5: ESD and pedagogical traditions and development tendencies: ESD and school development; ESD and what happens in the classroom; ESD and teaching methodologies.

National analyses: Between March and May 2009, researchers from the participating institutes conducted the national analyses. These are documented in reports containing a wealth of material which forms the basis for this policy-oriented report and its recommendations as well as offering the opportunity for other collaborative publications in the future.

Cross-National Analysis: The national analyses provided comprehensive data regarding what is happening in the field of ESD around the world; to which degree ESD is based on, and followed by, educational research; and how global climate change concerns influence approaches to ESD and efforts within this field. After the preliminary stages of the work on the cross-national analysis, we decided upon an organisation and presentation of the analysis divided in five themes which are entirely not identical to those found in the guidelines. These five themes are presented below.

THE STRUCTURE OF THE REPORT:

The report is organised around a presentation of the five themes identified in the cross-national analysis:

> **Theme 1:**
Interpretations of ESD
> **Theme 2:**
Climate Change and Education
> **Theme 3:**
Structural conditions regarding ESD
> **Theme 4:**
Barriers related to development and implementation of ESD/CCE
> **Theme 5:**
Research

Each of these chapters commences with a description of the key issue or issues at stake. Findings are then presented across the national reports. The chapters conclude with reflections on these findings.

Please note: This report has been compiled as the knowledge basis for the IALEI conference in Seoul, August 2009, and the development of a set of joint recommendations for the policy level. For this reason it does not include a conclusion. At our homepages – *http://edusud.dk* and *http://dpu.dk/RPEHE* – you can find the following documents, based on the cross-national analysis in this report and IALEI presentations and discussions in Seoul:

> The eight policy recommendations
> Promising practices
> Why climate change and sustainable development challenge the way we understand and practice education
> Explanation: Climate Change Education (CCE) and Education for Sustainable Development (ESD): What are we talking about?
> The role of research and researchers: The need for knowledge-informed innovation
> Brief description of International Alliance of Leading Education Institutes
> Brief description of the joint research project: Climate change and sustainable development: the response from education
> Climate Change and Sustainable Development: The Response from Education. National Reports.

THEME 1: INTERPRETATIONS OF ESD

THE ISSUE

Education for Sustainable Development (ESD) is an open, vibrant, and contested concept and is likely to remain so. This is due partly to the existence of innumerable interpretations of education and of the role and function it should have within society, and partly to the intrinsic tension contained within the concept of sustainable development (SD), a phrase that has been controversial since it entered the public conscience with the publication in 1987 of the so-called Brundtland report *Our Common Future*. The considerable impact of 'SD' is linked to this intrinsic tension – the concept, with its juxtaposition of the words 'sustainable' and 'development', can help to bridge the gap between otherwise conflicting interests. Environmentalists tend to promote conservation, protection and restoration while advocates for development tend to value productivity, progress and change. Both positions are associated with a number of problems, however. By agreeing on a concept of sustainable development it would seem possible, at least on the surface, to establish some common ground from which to tackle the global challenges we face.

When the individually complex concepts of education and sustainable development are combined, the result is a hyper-complex concept which is very open to interpretation. This provides ample opportunity for implementation in accordance with national or regional cultures and traditions which can increase the viability and diversity of ESD projects, as encouraged by UNESCO and similar organizations. On the other hand, the openness of the concept can result in ESD being used as a blanket term for more or less anything, including the continuation of the status quo, or as a convenient label for new initiatives actually implemented for other reasons.

ESD is practically as well as conceptually complex, involving a high degree of interdisciplinarity. If sustainable development is fundamentally a matter of ensuring a good existence for everybody both in the present and in the future, then it involves not just an array of different dimensions and disciplines including ecology, economy, culture, politics and so forth, but also extensively the interaction between them. *The Vermont Guide to Education for Sustainability*, produced by one of the NGOs that are highly influential in the USA, describes the multidimensionality of ESD in this way: "The goals of sustainability are often referred to as environmental integrity, economic prosperity, and social equity. Education for Sustainability, or EFS, tries to bring these three goals of sustainability closer to reality. It promotes understanding the *inter*connectedness of environment, economy, and society" (National reports: USA p. 332). This is in itself an enormous challenge for education, a challenge that is magnified in the context of an institution (the school) that is typically organised according to strict principles of disciplinarity.

FINDINGS

A certain degree of variation in terminology can be observed across the participating IALEI countries, with examples including 'Education for sustainability' (e.g. USA and Australia), 'Environmental education for sustainability' (e.g. China), and 'Learning for a sustainable future' (e.g. Canada). These variations do not correspond to clear or consistent differences in meaning, however, and are generally not ascribed any great significance in the national reports (e.g. AUS). The designation 'Education for Sustainable Development', as used for the UN Decade, seems to be gaining in prevalence to the extent that it is able to function as an umbrella term encompassing regional variations (e.g. UK).

In most countries 'Environmental Education' (EE) is a more established field. Educational initiatives and, in particular, research of relevance to ESD can often be found under the name of EE. There are considerable differences in terms of how important it is considered to clearly distinguish between EE and ESD and of the extent to which ESD is perceived as an evolution and broadening of EE or as something new entirely. Across the IALEI countries, expansive understandings of ESD such as those found in UNESCO documents were more prevalent in general policy statements, while curricula, teaching materials and classroom practices are more likely to embody a narrower perspective consistent with a traditional EE approach.

The report from Singapore states: "while there has been some integration of environmental educa-

tion in the curriculum with the purpose of bringing some knowledge and awareness to the school children or undergraduates, they remain what it has always been – environmental education. Very little emphasis has been given to the message of sustainable development and climate change and its impact" (National reports: SIN p. 266).
Another example can be found in the report from USA: "As might be expected, publicly available EE curriculum resources vary widely in their relevance to ESD. A strong *programmatic* focus on social equity is notably absent from many of the most prominent EE curricula. Although there has always been a thread of concern for equity and social justice within the broader field of environmental education (cf. Cole, 2007), Kushmerick, Young and Stein (2007) found that this concern was only infrequently reflected in mainstream EE resources" (National reports: USA p. 342).

The Chinese report reveals (National reports: CHN pp. 119-125) that EE in China entered a third phase after 1992, a phase involving a reorientation to 'environmental education for sustainability' or ESD. Among Chinese educators, it is 'widely accepted that ESD was rooted in EE', but also that ESD represents a considerable broadening of the perspective in accordance with and inspired by international statements from UNESCO and others. The social, economic and cultural factors are incorporated and a developmental perspective in relation to future generations is given a central role. Concern for future generations is considered to be especially congruent with Chinese culture and a traditional Chinese way of thinking (with reference to Confucius). The transition from EE to ESD in China is not only a broadening in focus from a 'layer of 'nature" to a 'holistic 'environment' which involved ecology, society, economy and politics', but also an equally vital shift from a 'layer of skills and knowledge' to a 'holistic 'education' which involved awareness, values, and ethics'. Moreover 'all these changes were caused through critical thinking and the participatory spirit of ESD.' Despite this consensus about the meaning of ESD in China, it is possible to identify 'huge gaps between theory and practice, policy and implementation of ESD' (Tian, 2008).

In a number of IALEI countries, overall, comprehensive stipulations exist regarding ESD, although they are dealt with in different ways. In Korea there is a list of themes divided into three types of perspective: Socio-cultural perspectives, environmental perspectives, and economic perspectives (KOR). The themes highlighted under the first of these perspectives include some that are commonly found within peace education, such as re-unification and conflict resolution, and 'desires of public participation in social issues have been increased'. The list demonstrates that ESD is viewed not only as a continuation and broadening of EE, but that other related fields such as peace education are also 'regarded as kinds of subject or sub-areas constituting ESD'.

Other countries, rather than breaking ESD into themes, list a set of constitutive principles. In Australia, for example, the new 'National Action Plan for Education for Sustainability' (April 2009) outlines the following principles based on a holistic approach to ESD: "Transformation and change, Education for all and lifelong learning, Systems thinking, Envisioning a better future, Critical thinking and reflection, Participation, and Partnership for change" (National reports: AUS p. 13). It is clear from the Australian report that "a goal of ESD is to develop 'informed and involved citizens' who can actively participate in decision-making and actions for sustainable development" (National reports: AUS p. 14).

This last passage also indicates an understanding of education's role within society regarding SD which links ESD with citizenship education, emphasizing the role of pupils as active participants in the (democratic) decision-making process, rather than then portraying them as recipients of pre-determined 'correct' opinions. In Singapore, a more directive approach is adopted when it is stated that "They [the pupils] should be nurtured to act beneficially towards the environment", and ESD is regarded as a 'proactive movement' (National reports: SIN p. 256). In Korea, also, ESD is employed to ensure that society develops in a particular direction: "Education should be a core strategy of sustainable development because the 'people' is the most important factor for driving sustainable development (Lee et al. 2005)" (National reports: KOR p. 201). Ultimately, it is difficult to infer from such broad statements whether ESD in a particular is seen as instrumental or open-ended, whether it is a means to pre-determined ends or a way of enhancing broader reflection and decision-making about sustainability.

This theme is closely related to the question of whether ESD is viewed from an empowerment perspective or a behaviour modification perspective. From an empowerment perspective, the goal is to help the pupil's development as an independent thinker who considers and engages with society's important challenges, both alone and especially in dialogue with others. From a behaviour modification perspective, the goal is to alter a pupil's habits in line with more or less prescribed ideals, which are not themselves open for discussion. The criteria for success, and thereby the indicators and evaluation parameters, differ considerably depending on the perspective.

This difference can also be articulated as a question of whether ESD is concerned with 'narrow behaviour' or 'socio-political actors', a question, which has been a theme in England. Here, there has likewise been distinguished between a content-determined interpretation of ESD and an interpretation more focused on processes and on the development of general competencies such as critical thinking (UK). The latter interpretation can be illustrated by the Australian principles outlined above, whilst the Korean approach may illustrate a more content-determined interpretation.

The national reports for the most part indicate that the overriding approach in the investigated policy documents is an empowerment approach, but the findings are by no means clear-cut. In many cases, both the empowerment and behaviour-modification perspectives are embedded within a national approach to ESD even though the two are not logically compatible. This may be regarded as a pragmatic compromise in the negotiations of different input.

As it appears from the country reports from e.g. China and South Korea, the development of ESD is not a process restricted by national borders. It is to a large extent inspired by input from, and cooperation with, international agents (CHN, KOR). At the same time ESD-researchers in some of the countries have, more or less directly, influenced the descriptions of ESD at the policy level. The role of educational researchers has, as will be explained further in theme 5, partly been to interpret and discuss the concept of ESD and, as part of this, not least to reflect critically on the narrow behaviour modification approach (UK, USA, CAN, DEN, CHN). Thus, with close relations to the policy level, it seems reasonable that educational researchers to some extend have inspired the officers at the policy level to include empowerment-oriented formulations in the overall purpose of policy to promote ESD. The crucial question is, however, whether this comprehensive approach to ESD remains rhetoric proclamations or whether it is converted into regular policy initiatives and concrete practice? The last mentioned possibility is, for several reasons, doubtful:

Firstly, ESD combines, on the one hand, the educational field and its discourses and, on the other hand, sustainable development and the discourses that dominate this field. The competence oriented approach is related to the first mentioned, while the wishes to promote behavioural modification of the population are related to the technical-instrumental logic that dominates environmental management. The tensions between these positions are evident from several of the country reports. The report from USA contains an illustrative example. This example shows how a technology oriented draft for ESD with a narrow informative strategy, was transformed through negotiations with other types of agents, including the educational community, with the result that it ended up as a much broader competence oriented approach. In some of the participating countries the tensions between the different approaches are accentuated by the efforts to promote sustainable development by means of technological and economic innovation (CAN, SIN, KOR).

Secondly, the competence oriented approach is also contested by other aims and conceptions in the field of education. To this belongs partly the emphasis on qualifications requested by the business community and, thus, of great importance for the economic development (DEN, SIN), partly the recent trends to promote the application of standardised assessments within formal education (UK).

Thirdly, and not least, the competence oriented approach requires innovations in schools that can be difficult to implement. This will be further detailed in theme 3 and 4.

REFLECTIONS

As detailed in the Canadian report, there is an ongoing conceptual critique of ESD in the academic literature. Scholars including Bob Jickling, Lucie Sauvé and Connie Russell have argued that the 'official' UNESCO concept of ESD contains a number of weaknesses that, combined, make ESD a step backward from EE. Inspired by David Bell, it can be considered a decisive question whether 'ESD is a cure or placebo, that is, a means of helping mankind attain a more sustainable future or a distracter from the main challenges facing mankind (Bell, 2007)' (National reports: CAN p. 104ff).

For several of the critics, 'sustainable development' is 'nothing more than a vague slogan susceptible to manipulation and deception' (National reports: CAN p. 105). They posit that there is a particular ideology intrinsic to ESD that can all too easily lead to indoctrination with certain values and ideas. More specifically, it is claimed that ESD is buttressed by: a resource view of the environment, an economic view of development, and an instrumental view of education. On a deeper level, there is criticism of the anthropocentric orientation within ESD and the attempt to submit EE to this worldview, something which is inconsistent with their view that EE is, or at least should be, based upon an ecocentric worldview.

On the basis of this international study, it does indeed appear that anthropocentrism is a consistent characteristic of the various national approaches to ESD. This should come as no surprise, given that ESD emphasizes the needs of current and future human generations. Yet there is no doubt that 'need,' like 'sustainability', is an open and disputed concept with an inherent normativity. Our findings do not provide substantiation for claims that there will (always) be a reduction in the ethical and political reflections involved in determining what counts as genuine and worthy needs. Conversely, it is not always apparent from the material that a more indoctrinating pedagogy has been clearly rejected. Perhaps this is sometimes implied as a matter of course, but it likely deserves a more explicit thematization.

Another source of a potential reduction in both the breadth and depth of the concept of ESD has to do with the fact that often, it is various environmental

or humanitarian NGOs that are the primary source of pressure on the educational sector in relation to an intensification of ESD efforts. As such interest groups are by nature somewhat, partisan and primarily concerned with a cause other than general education, the pressure they bring to bear typically involves harnessing education in the service of specific objectives. Sometimes Ministries of Environment and other governmental bodies can play a similar role, as they are otherwise not involved in education and educational policy, but are interested in using education as an instrument to achieve particular targets, such as a reduction in carbon emissions.

Finally, in a number of countries, such as Denmark, a discrepancy can be observed between the interpretation within the research environment of ESD, including CCE, and the tendency within the policy environment to reduce such an understanding to one which is in part easier to govern and measure within a top-down model, in part more limited in terms of disciplines, perhaps in line with a pre-existing policy objective of raising the profile of particular subjects.

As described in the section on findings, these reductions are not dominant in the overall purpose descriptions of ESD. In general, they contain a broad collection of ideal formulations, as often seen in such policy documents. However, the challenge during the coming years will be to transform the ideals into practice; that is to create the opportunities for implementation of the more comprehensive competence oriented approach to ESD.

THEME 2: CLIMATE CHANGE AND EDUCATION

THE ISSUE

Over the course of the last few years, there is probably no other issue that has received greater global attention than climate change. This intense interest has led to questions about the role that schools play, or could play, in global efforts to mitigate or adapt to climate change.

From a pedagogical viewpoint, climate change is uniquely challenging. The starting point is a set of near-future scenarios that are all threatening and problem-filled. Climate change also requires risk assessment on the basis of uncertain knowledge and the acknowledgment that solutions will require political and ethical choices as well as technical innovations. In these realms, there is far less agreement than there is regarding the fact that there are problems which need solving. As highlighted in, for example, the Brazilian report, this complex and depressing picture can provoke two troubling responses: a passive and paralyzing fatalism or an oversimplification of the many important factors involved (BRA). The indeterminate and inherently political nature of climate change challenges the traditional "modern" understanding of the role of education, rooted in positivist epistemology, as a source of objective, reliable knowledge of the world, imparted through segregated academic disciplines. Perhaps more strongly than any other issue, climate change tests the capacity of education to organise learning around problems characterised by complex social dynamics, uncertain knowledge, and risks.

As was apparent in theme 1, such problems are not new and, to some extent, characterize all of ESD. It is therefore interesting to consider the influence of previous developments within ESD on new and forthcoming projects in climate change education (CCE), and conversely, to examine the role of CCE in the ongoing development of ESD. Will CCE be integrated within ESD or will it gain the status of an independent and perhaps even competing field?

FINDINGS

It would be untrue to say that climate change and the individual and societal actions needed to address climate change are new topics for education. Both can be found in environmental teaching materials from recent decades. Indeed, the general tendency found in the national reports is that CCE has not emerged as an independent field, but rather as an integral part of EE and ESD. In fact, it is a recurring theme across IALEI countries that CCE has only gradually begun to develop its own identity during the last three years, and is therefore still very much in its infancy. In some countries, this development is driven by government initiatives concerning climate change. The Chinese government, for example, has adopted climate change action plans which include specific education initiatives (CHN). Knowledge about CC will be included in basic education, higher education and adult education with focus on awareness and participation in relevant activities. Similarly, in the Canadian province of Newfoundland and Labrador, there has been a Climate Change Action Plan since 2005 which emphasises CCE. In this province, the route from plans may be attributed to the clearly visible local effects of climate change (CAN). The Danish government's 2009 ESD strategy has also launched a number of specific initiatives concerning CCE (DEN). New CCE initiatives under the rubric of EE and ESD can likewise be found in other countries. In Australia, where ESD is well-established, the new and ambitious National Solar School Initiative has been launched under the auspices of ESD but with specific reference to climate change. This initiative has set a goal "for all Australian schools to be 'solar schools' by 2016" (National reports: AUS p. 22). In addition to such 'top-down' initiatives, there are also examples of concrete 'bottom-up' initiatives organised by NGOs, as seen in the Brazilian report. Furthermore, the Brazilian example also shows that various other stakeholders are involved in debating the role and place of CCE (BRA). This is true of many other countries as well.

At present, CCE is still a peripheral topic in both educational research and practice. In the research literature, CCE has been addressed almost exclusively as a domain of science education. Within the

realm of practice, climate change is situated within EE and ESD, a minor theme of a peripheral area of the curriculum. Given the intense and growing interest in CCE, however, it is important to anticipate the possible scenarios under which this minor educational theme could develop into a central focus of education, and become established as an independent concept and focus area, whether it is labelled as 'climate education' or 'climate change education' (CCE)[2]. The national reports offer three different possibilities:

> One scenario is that CCE will develop independently of ESD, becoming a major theme within science education. This tendency is found in the USA, where CCE has so far been interpreted as "education about the scientific understanding of global climate change" (National reports: USA p. 327). A similar picture can be seen in China, where CCE is comprised of science popularization activities aimed at raising awareness and motivating students to follow behavioural advice (CHN). This seems to be a restricted approach compared to the general ESD policy in China, which is guided by four basic principles: value education, a holistic and interdisciplinary approach, increase of diversity and competence and creative inquiry.
> Another possibility is that CCE will develop as an integral element of ESD, emerging as a truly interdisciplinary pursuit. This tendency is mentioned in the reports from Australia, UK, South Korea and Singapore. This scenario is open for different variations due to the fact that ESD is not an exact category. For example it makes a difference if CC is integrated in ESD as part of a Green Growth strategy (cf. SIN, KOR and CAN) rather than as an issue which includes global ethics, transformation of lifestyles, social equity, limits to growth and other key topics of sustainable development.
> A third scenario is a hybrid of the first two, in which CCE is treated as an independent element under the umbrella of ESD, with ESD serving as collective term for a variety of independent focus areas thematically related to SD. This scenario is embodied in the Danish national ESD strategy, which contains a number of CCE initiatives that conspicuously do not place climate change within the context of ESD, seeking instead to promote a general science education (DEN).

These scenarios seem still open for negotiations. Different stakeholders will definitely try to influence the result. The Danish country report notes that 'education is conspicuous by its absence' in a recently published national climate policy document (National reports: DEN p. 176). This seems to be true of other countries as well (e.g. Singapore) and one reason could be that the national climate policy documents target the populace whereas education is within the purview of another ministry and it is left to the Ministry of Education to translate the national climate policy document into its own curriculum development for schools.

REFLECTIONS

Under theme 1, we described how ESD has developed against the backdrop of an ongoing tension between two opposing perspectives. On one side, there is the narrow and instrumental view of ESD as the communication of scientific knowledge with the goal of modifying student behaviour; on the other, a broader understanding of ESD as the development of general competencies that foster empowerment in action and decision-making. The current focus on climate change seems to be intensifying this conflict. The term ESD has been used around the globe as a tool for rethinking education and developing a broad spectrum of relevant competencies; CCE could either accelerate this process or bring it to a halt. The authors of the UK report emphasise the possibility that CCE represents a step backwards:

- - -
"Although it is also too soon to know how the idea of CCE might develop in future, it is worth noting that there is concern amongst many educators in the UK that it presents a worrying narrowing of ESD aims and agendas. Will anxiety about and increasing attention to particular climate change issues – especially dramatic environmental disasters (floods, cyclones) undercut broader educational attempts to promote sustainable development and sound environmental management? And will the frightening forecasts of impending environmental disaster lead to education programmes which are focused on behaviour change about single issues (carbon emissions, recycling, transport) to the detriment of holistic ESD goals (for example to encourage critical thinking and democratic participation)? Much of the discussion about ESD in the UK over the last decade has focused on how best to bring diverse and multiple perspectives into ESD programmes, so limiting the discussion to only climate change issues seems – to many – to be a step in the wrong direction." *(National reports: UK pp. 301ff)*
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As is especially apparent from the Danish report, CCE is an arena for a process with various stakeholders – NGOs, teacher networks, consultants etc - who interpret CCE and influence whether it will be integrated in a broader ESD framework or whether it will imply a re-interpretation of ESD. As the same stakeholders are present in the other countries as well, there is good reason to believe that the 'ongo-

2 As stated in the introduction, we use the term Climate Change Education (CCE) as the general term for the phenomenon in this study.

ing negotiation' between them will have a decisive influence on CCE and ESD over the next few years, thereby in determining the role that education will play with respect to both climate change and sustainable development more broadly.

Although researchers warn that the emergence of CCE may represent a step in the wrong direction, this does not mean that the issue of climate change necessarily entails a narrowing of focus to the detriment of other issues currently included within ESD. Indeed, discussions about climate change can give rise to consideration of far-ranging issues such as water shortage, agriculture, energy supplies, class tension, conflicts of interest regarding the distribution of goods, economic growth, political governance, lifestyles, and ethics. Climate change intensifies problems within all these areas, while climate mitigation and adaptation will certainly affect such intertwined issues. Seen in this light, the contemporary focus on climate change may be useful for ESD, even from the empowerment perspective. For this to happen, however, CCE must be conceptualized as more than simply climate change science, and CCE must be effectively integrated as a central theme *within* ESD, rather than an independent field.

During this transitional moment, research can play a significant role in shaping the relationship between ESD and CCE. First, researchers can help by more thoroughly clarifying and documenting that relationship. Second, research can fulfil an innovative function, challenging the pervasive assumptions about CCE and deliberately working to bring about dialogue and long-term planning[3]. The nascent field of CCE is currently in need of both clarification and dialogue, at least on the evidence of the national reports. The national report from South Africa illustrates the constructive role of research in bridging CCE and ESD. Lotz-Sisitka (2009) describes how climate change requires educators to transcend the local focus of social learning projects by connecting actions in one region to climate consequences in another[4]. Lotz-Sisitka and le Grange (2009) also point out that the empowerment view of CCE poses a far greater challenge to the field of education, as it is more difficult to foster a proactive response to the climate change than it is to encourage a passive, reactive response[5]. There is a stark contrast between the enormity of this task and the limited scale of ESD projects around the world. The urgency and global nature of climate change reveal a pressing need to develop and strengthen ESD, which means that researchers, as well as practitioners and other ESD stakeholders are faced with an important task in the coming years.

3 Biesta, G. (2009): Educational Research, Democracy and TLRP; Invited lecture presented at the Teaching and Learning Research Programme event 'Methodological Development, Future Challenges', London, 19 March 2009. *www.tirp.org*
4 Lotz-Sisitka, H. (forthcoming 2009): Climate Injustice: How should education respond?
5 Lotz-Sisitka, H. & L. le Grange (forthcoming 2009): Learning to live with it? Troubling education with evidence of global climate change.

THEME 3: STRUCTURAL CONDITIONS REGARDING ESD

THE ISSUE

When ESD is introduced into an existing educational system and school, a number of structural tensions arise. ESD does not have a pre-determined structure; instead it can be implemented in a variety of forms, thereby creating the possibility for adaptation to the established systems. Meanwhile, as these are usually influenced by other logics, the encounter generally tends to result in friction. While, in principle, it is merely a case of making some decisions, it is not always clear who should be making them. Furthermore, there are so many different interests and stakeholders involved that, as the national reports make clear, a direct route between the different levels, between theory, policy, external pressure and praxis, can seldom be detected.

The issue comes largely to revolve around the extent to which ESD is perceived and treated as something new to be added to the existing curriculum, thereby becoming an additional burden. Across national borders, schools are typically divided along fairly rigid subject or disciplinary lines and each discipline is often overcrowded with subject matter which pupils are required, or at least expected, to learn. Teachers are often trained to teach particular age groups and/or particular subjects. All in all, it can be difficult to ensure that ESD receives space in the school day, much less a cohesive treatment and logical progression across the age groups.

Of course, this is not only a structural issue, but also an ideological and pedagogical one. As is clear from the national reports, however, the structural issues are unavoidable. They include:

> the position and status of ESD within the school system;
> the disciplinary, multidisciplinary, and interdisciplinary organisation of ESD programs;
> the application of whole-school approaches to ESD.

FINDINGS

At the structural level, there are several ways to implement ESD within the school and the education system. Here, we will start with the Canadian report's presentation highlighting three of the possible different approaches to incorporating ESD within formal education: 'ESD as a part of science education; ESD as infused across the curriculum; and ESD as a fundamental educational principle' (National reports: CAN p. 107).

Both the Canadian federal government and provinces such as Ontario have treated ESD as 'a concept that can be fit into traditional school curricula as part of the discipline of science especially environmental education' (ibid.). Although this model has been criticised, it would still seem to be the case that 'science remains at the forefront of efforts integrating ESD into formal education' (ibid.). In other countries, one also finds the tendency to delegate the responsibility for ESD to a single subject or subject area. In these cases, it is always science which is assigned the task. In Denmark, ESD has even been introduced with the explicit goal of strengthening science education.

The problem with this approach is that the field of school science already tends to be overcrowded and that ESD therefore is all too easily reduced to science education or an ecologically oriented version of EE. The Brazilian report states that 'scientific research related to Climate Change has acquired a strategic position in science and technology policies with larger financial investments' (National reports: BRA p. 81). There is little doubt, however, 'that the transmission of scientific content is not enough to effectively verify the existence of a teaching and learning process in environmental education' (ibid.). On the basis of the different interpretations presented in theme 1, this can be considered even truer of ESD.

The second approach presented in the Canadian report was ESD as infused across the curriculum. In this case, the example is provided by the province of Manitoba. Here, a cross-curricular initiative concerning ESD was introduced in 2000 by dividing ESD into a number of principles that each fit the subjects in the traditional curriculum. In this way,

ESD could be infused into every discipline, thereby maintaining a great deal of breadth in the conception of ESD. The authors of the Canadian report note that 'infusion allows the essential structure of schooling and curricula to remain the same' (National reports: CAN p. 108).

Whether this comprises an advantage or a disadvantage is open to debate. It is undeniably a problem that this approach 'may reduce the status of ESD to an 'add-on'; extra work for teachers and students in an already crowded curriculum' (ibid.). In addition, the fragmentation of ESD can itself be a problem within such an approach. If ESD is perceived as being all about connections and interrelationships among surprisingly diverse fields, it is a considerable challenge to ensure the various elements, separated in the curriculum, combine to form a somewhat coherent whole.

The third approach identified in the Canadian report 'to bringing ESD into formal education is to re-orient school curricula to make ESD a fundamental educational goal. This is the approach taken by Nunavut where ESD, defined as a basic principle of the Inuit way of life, has been used as a foundation for re-orienting education. In this approach ESD is more than a cross-curricula add-on. As a foundational principle, it is built in to every aspect of the curriculum – content, teaching/ learning strategies and evaluation' (ibid.).

Except for small cases in the 'place-based education literature' mentioned in the USA report, there are no other examples in the national reports of such a pervasive and radical model and it is interesting to note that the territory's policy is not so much based on the various international documents, but rather traditional Inuit culture, values and traditions which 'happen to coincide with many of the ideas found in UNESCO's vision of sustainable development and ESD' (National reports: CAN p. 96). There is talk of an approach which 'presents an alternative view of governance and development' (National reports: CAN p. 94) and which is embedded within a culture which is not permeated by modernity in terms of worldview and outlook on life. It is unlikely that the model could be directly imported to industrial, urbanised societies; it is, however, thought-provoking and instructive that such alternatives exist.

Because these three approaches have different goals and anticipate different outcomes, it is difficult to directly compare their effectiveness in any meaningful way. One can, however, consider which opportunities they create for, for example, different forms of interdisciplinary teaching and learning, a theme which plays an important role in virtually all the national reports.

On one hand, some of the more transversal and holistically-oriented outcomes typically associated with ESD require a considerable investment in interdisciplinary learning. This result in experiments with cross-curricular themes, holistic teaching and whole-school approaches (see below). On the other hand, there is still a need to legitimise such approaches in terms of giving good results in the traditional subjects. For example, the US report states regarding a pedagogical movement referred to as Environment-Based Education (EBE): 'This integrative strategy is similar to that favoured by most American proponents of ESD. Although EBE is sometimes criticized within the EE community for its use of EE as a means to disciplinary ends, rather than an end unto itself, the constraining pressures of standards-based educational reform make it an attractive option for schools seeking to integrate ESD-related content without sacrificing achievement in the traditional disciplines' (National reports: USA p. 340). This issue raises its head frequently in a number of different contexts. It is related to the question of examinations, as discussed in the report from Singapore: 'In a very exam-oriented school education system, unless a subject is examinable not only will the emphasis wane, very often teachers' attitude towards the teaching of this component is sacrificed to the more important subjects that have examinations' (National reports: SIN p. 266).

Nevertheless, occasional attempts have been made to create a framework for more multidisciplinary and interdisciplinary teaching/learning in relation to ESD visions. Several of the national reports observe that there is a basis for, at the least, multidisciplinary work with SD issues as 'ESD objectives are explicitly addressed by curriculum standards of many subjects' (National reports: CHN p. 131, and e.g. DEN), but also that the implementation in different subjects is unbalanced (CHN, KOR). As revealed in the Canadian example from Manitoba, it may well be a good procedure to infuse ESD into the subjects, but it does not lead to large-scale change unless structures are introduced that encourage taking the step from, at best, parallel consideration of themes within the separated disciplines to genuinely problem-oriented, interdisciplinary learning activities. This point is corroborated in the Australian report with the interesting addendum that 'ESD is more often addressed in a more interdisciplinary way in primary (K-6) schools than in secondary schools' (National reports: AUS p. 27). Similarly, a new report from England shows 'that limited provision within individual subject areas … resulted in few opportunities for the cross-curricular learning which government policy has advocated, although there was more evidence of this kind of learning in primary schools where planning more easily crosses subject boundaries' (National reports: UK p. 304).

In some countries, there exist, or are planned, examples of more interdisciplinary or cross-curricular possibilities as a supplement to work in the individual, separate subjects (e.g. UK, KOR)

More common, though, are the *whole school approaches*, which are described in reports from several

countries (AUS, DEN, KOR, UK, USA). There is little agreement regarding terminology within this field, but terms including 'green schools', 'sustainable schools', 'green flag schools', 'eco-schools' etc. all refer to efforts at the school level that typically involve a greater or lesser proportion of the school's activity.

The Danish national strategy for ESD includes a project to give higher priority to the so-called Green Flag Green School movement, while simultaneously developing it more in the direction of ESD. This movement is embedded in the international Eco-Schools programme under the Foundation for Environmental Education (FEE), which currently involves 43 nations. The green flag is an award given to the individual school for implementing a more or less comprehensive teaching programme regarding environmental conditions at the school and in the surrounding area. Somewhat characteristically, increasing the number of green flag schools by 50 % by 2014 is an indicator included in the Danish strategy, but there is also a focus on sponsoring improved quality within the project (DEN). One of the major challenges here will undoubtedly be offsetting the physical, objective criteria for success (e.g. a reduction in energy and water consumption, a decrease in pollution etc.) with criteria more concerned with pupils' learning outcomes.

This issue can also be found in the US Green Schools programme, which originally 'was exclusively focused on the physical school building, its properties and their relationship to student health and performance' (National reports: USA p. 349). Today, the perspective is generally somewhat broader and oriented more towards pedagogical approaches that reflect various forms of sustainability. Green Schools in the United States are often private or charter schools with their own associations relatively disconnected from local public school networks. One such network, the Green School Alliance (GSA), focuses its efforts on the problem of global climate change. To become members of the GSA, schools must commit to: '…signing the Green Schools Climate Commitment at one of the following levels: 1) Climate Champion: Reduce my school's carbon footprint by at least 30% within 5 years, and achieve Carbon Neutrality by 2020; or 2) Climate Steward: Calculate my school's carbon footprint by establishing an energy and carbon emissions baseline, and achieve carbon reductions over time (Green Schools Alliance, 2009)' (National reports: USA p. 350). It is the GSA's intention that these laudable but narrow goals should function as the core of a more comprehensive effort to engage students, teachers and administrators in sustainability-related projects. 'The GSA's emphasis on "green" building and energy-use practices, and the idea that these practices can be a centerpiece of broader ESD efforts, is characteristic of whole-school ESD projects in the United States' (ibid.). Indeed, a four-school study suggests that it is possible to attain relevant results in terms of student learning in this manner (USA).

The whole-school approach can also constitute an integral part of official educational policy regarding ESD. This is the case in Australia where 'the Australian Sustainable Schools Initiative (AuSSI) is a whole school approach that is the flagship initiative for ESD in Australian schools' (AUS p. 11). After a pilot AuSSI scheme had shown that there were 'educational, environmental, social and professional benefits', guiding principles that could be applied nationally were identified, and by 2004 the national AuSSI initiative had been launched. The principles, the goals and the achievements of the initiative all include both environmental and pedagogical points without separating them or problematizing the relationship between them. This may be because 'this holistic and systemic approach encompasses school curriculum and pedagogy and school operations, governance, design, management and grounds. Connections with and influencing the community is another key aspect of AuSSI' (National reports: AUS p. 4). Such a pervasive programme can be difficult to analyse and difficult to emulate in other contexts. In any case, it requires widespread support to become mainstream - support that it has received and continues to receive in the new National Action Plan in Australia (AUS).

In many whole-school ESD projects, particular value is attached to the school's relationship with the local community: 'Connections with and influencing the community is another key aspect of AuSSI', as stated in the above quote from the Australian report. The Brazilian report discusses, among other things, a movement which began in 2003 with the establishment of School Agenda 21: 'The scope of the School Agenda 21 includes proposals of activities with the school community to map out the local reality in the past and in the present and, ultimately, devise action plans for the future' (National reports: BRA p. 65). Likewise, in Korea: 'the needs for school-community collaboration in implementing ESD programs are found in several policy documents' (National reports: KOR p. 220). The point is made that, through such cooperation, '[one] can provide ESD programs to foster decision making skills of their members in solving local issues' (ibid.). An example is provided from the city of Tongyong where an elementary school, in collaboration with the local RCE (Regional Centre of Expertise) has developed a significant combination of 'an entire-school approach' and close relationships with outside organisations (KOR).

No matter how such cooperation between school and local community is approached structurally, it would seem to provide an important environment for local participation. Summarising the extensive but somewhat fragmentary American research on EE and ESD, the US report states: 'The most likely route to empowerment – and to a range of other positive

outcomes including enhanced academic achievement and pro-environmental behaviour – appears to be sustained participation in complex environmental projects that cut across disciplinary lines. Furthermore, the intervention strategies that have achieved the most compelling and well-documented success have all focused on *local* participation' (National reports: USA p. 346).

REFLECTIONS

Just as it makes little sense to try to identify the ***one*** correct interpretation of ESD, or the ***one*** correct teaching method, it is pointless to try and identify a correct, universal structure for implementing ESD within the education system. Circumstances vary, traditions differ, and the context of implementation is never identical. In addition, the various structures seldom preclude one another, but, modified to fit the situation, can supplement each other. Nevertheless, it should be possible to learn something from the diversity.

As an isolated phenomenon, the introduction of ESD as a topic or a perspective within a single subject or subject area (typically science) provides extremely limited possibilities to promote an understanding of ESD which brings (conflicting) connections between environmental, social, economic, cultural and political aspects of the major issues into play. If one encases ESD, structurally speaking, within limited subject knowledge, one will have to make do with considerably lower ambitions.

Loftier ambitions can be found, for example, when the Presidential Commission on Sustainable Development (PCSD) in Korea writes: 'ESD should be approached as the re-orientation of the whole education process not as an individual curriculum or educational content. The whole school initiatives should be encouraged to change the school ethos' (National reports: KOR p. 213).

There are a number of examples in the national reports of attempts to implement such a change in 'ethos', structurally. A crucial precondition for any such effort is a school environment that supports interdisciplinary, problem-oriented and participatory work, and genuine support for ESD projects and programmes which otherwise run the risk of being squeezed out by the multitude of other agendas. As such, interdisciplinary work is generally reported to be more difficult to implement in secondary schools than in primary schools, in part due to heightened subject-specific agendas. In the UK and, not least, the US, it would appear that the 'consequences of standards-based reform have made American schools less hospitable for ESD' (National reports: USA p. 313).

ESD does not revolve around structures, but structures influence what takes place within them. If interdisciplinary, issue-oriented and participatory teaching/learning is to be promoted, whole-school approaches and school-community collaborations will continue to be of considerable interest.

It will in any case be critical to identify structures which both enable and make it attractive to work with ESD in a way which counteracts the reactive tendency in which, as Singapore report notes, 'the populace tends to be reticent and takes a back seat. "The government knows best" is an apt description of Singaporeans' perception of many issues facing the country' (National reports: SIN p. 268). These issues clearly extend far beyond the countries mentioned here.

THEME 4: BARRIERS RELATED TO DEVELOPMENT AND IMPLEMENTATION OF ESD/CCE

THE ISSUE

At first glance, one might get the impression that there exists a wealth of initiatives and goodwill in each of the participating nations which will ensure that ESD and CCE will develop in a manner satisfactorily reflecting the attention the field is afforded in international agreements. However, on closer inspection, the national reports reveal a number of more or less common barriers related to the development and implementation of ESD and CCE that are deserving of further consideration. For the sake of clarity, they are dealt with below under the following headings, although the issues are often interrelated:

> The balancing act between tackling long-term SD issues and more immediate economic imperatives
> Limitations in school organisation and practice
> Limited teacher qualifications for ESD and CCE
> Uncertainty and ambiguity regarding the concept of ESD
> Other constraints within the educational system.

FINDINGS

The balancing act between tackling long-term SD issues and more immediate economic imperatives

Generally speaking, globalisation has drawn attention to the competitiveness of the countries' workforce and students' performance within science in particular (CHN, DEN, KOR, SIN, UK). The effect on the educational system has been a greater focus on tests and performance indicators, and less willingness among teachers and schools to experiment with new approaches to teaching and learning. Both these factors impact negatively on the innovative, interdisciplinary and competence-centred aspects of ESD.

Certain pressing environmental issues might demand particular attention in individual countries such as drought and water shortage in Australia or rising sea levels in Singapore. Political factors can also play a role, such as the massive current focus in Denmark on reducing carbon emissions linked to the upcoming international climate summit in Copenhagen. Such priorities are, however, not necessarily tied to a broader effort to promote and develop ESD.

Limitations in school organisation and practice

The inspection of schools in the UK has given an indication of the reality compared to the political intentions for ESD:

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"The report also found that limited provision within individual subject areas – including citizenship, geography, science, and design and technology – resulted in few opportunities for the cross-curricular learning which government policy has advocated, although there was more evidence of this kind of learning in primary schools where planning more easily crosses subject boundaries" *(National reports: UK p. 304).*
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Even if

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"There is a good connection between what is said in Australian policy documents and the initiatives that have been put in place." *(National reports: AUS p. 14)*
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and

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"All of the major structural initiatives of the plan are now in place, providing a firm foundation for further action", according to the Australian government *(National reports: AUS p. 26)*
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the route to everyday school practice might not be that straightforward as indicated here with a reference to a national review:

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"… the major challenges to ESD in Australia are resistance to change by schools; the decentralisation of education to States and Territories; and, the costs involved in reorienting school education. They called for "a fundamental shift in current practice" (p1). Other educational challenges included an already crowded curriculum, and a resistance among some to use education as 'an instrument of policy'" *(National reports: AUS p. 15ff).*
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This statement related to an already crowded curriculum applies to a number of countries. In Canada teachers, headteachers and parents experience ESD as additional content appended to the existing curriculum (CAN). This is an important barrier to achieving an engagement with ESD at the practical level (SIN, UK). If ESD is not prioritised at the policy level, it is more likely to be considered an extra burden and as secondary or luxury content by practitioners (DEN, USA).

Limited teacher qualifications for ESD and CCE

Despite national differences regarding the strategy for ESD development, teacher training is widely accepted as key to further development of ESD. In some countries (USA, CAN, CHN), NGOs have played a central role by training teachers and providing teaching materials, hereby facilitating competence development among practitioners within the field of ESD. Nevertheless, in all ten countries, there is a lack of sufficient teacher training which has a negative impact on schools' engagement in and development of ESD. For example, in the USA:

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'Establishing teacher education requirements that focus on EE or ESD: Such requirements are now fairly common, but in most states they remain quite non-specific and give teacher education programs substantial leeway in choosing how to meet them. As a result, the practical impact on teacher training can be disappointing (Mastrilli, 2005)' *(National reports: USA p. 329).*
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And further

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'… the ideas of sustainability and ESD are even less well developed in American teacher education than they are in curricular and pedagogical reform' *(National reports: USA p. 346).*
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As is underlined in the Chinese report:

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"It will be a big challenge for the Chinese government, especially the Ministry of Education to prepare and train quality teachers of ESD and develop supportive resources for teaching and learning of ESD" (National reports: CHN p. 135). These are needed because: "The problems, mostly the theory-practice gaps in holistic outlook and critical thinking, could be partly explained by the teachers' partial or incomplete understanding of ESD, which is related to professional training of ESD" *(ibid.).*
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The need for teacher qualifications in ESD is a general prerequisite if schools and education systems are to be capable of providing qualified ESD teaching, as explained in this extract from the Singaporean report:

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'In the topic, Protecting the Environment, in the upper primary (pages 10-12) civics and moral education curriculum, students learn that to continue living in a healthy environment, they need to protect the environment, as the damage is irreversible. They are encouraged to examine the products that they use in their everyday lives and consider if these have adverse effects on the environment, find alternatives if they do, and be involved in recycling activities. However, while this reinforcement of environmental issues are made in the civic and moral education curriculum, the fact that it is a moral education programme located within the mother tongue subjects would not allow the environmental issues to be taught by teachers who are knowledgeable about the subject, unlike social studies where the many of the teachers have geography background or science where teachers have the necessary understandings of environmental issues through their subject mastery in biology or chemistry' *(National reports: SIN p. 257).*
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The above passage is also interesting in that it would seem to suggest that environmental issues are best dealt with from a science or geography perspective than, for example, a citizenship perspective.

The limitations in the individual teacher's ability to teach ESD not only restrict their own ESD teaching but also their involvement in ESD development as a joint challenge, making communication to teachers about related issues a more difficult task for the system.

Uncertainty and ambiguity regarding the concept of ESD

As demonstrated in theme 1, there exists a variety of interpretations of what ESD is and what ESD should be in each country. This variety can, in some respects, comprise a fertile field of development engaging researchers and practitioners in a common debate regarding what to focus on. However, when seeking to draw practitioners' attention to ESD

and encouraging them to incorporate ESD themes within their teaching, the conceptual ambiguity and lack of a shared understanding constitute a communication problem.

Other constraints within the educational system

As mentioned, an increasing focus on performance and the documentation of learning outcomes in many countries might function as a barrier for ESD development, as described here in the UK report:

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'Alongside active efforts to promote learning about and for sustainable development in the UK, however, over the last ten to fifteen years there has also been an increasing emphasis on standardised assessment within formal education. Many educators worry that this trend is undermining the overall quality of education in the UK, and that it poses particular challenges for the mainstreaming of topics such as sustainable development, which require a greater attention to learning processes than to outcomes' *(National reports: UK p. 293)*.

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Especially the high risks involved for some stakeholders are underlined in the report from Singapore:

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'… tensions within the school system in regard to environmental education where high stakes national examinations and accountability measures hold teachers to curricula that are academic and rationalist rather than socially critical and emancipatory in character (STU, 2008; Wong, 2003)' *(National reports: SIN p. 266)*.

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Incorporating EE/ESD aspects in exams would give students an impetus to focus on EE/ESD (SIN).

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'The Chinese government and educational researchers have been trying to change the 'education for exam' to quality education that values the needs, competence and happiness of individual students rather than merely mastering book knowledge and getting high scores in test' *(National reports: CHN p. 119)*.

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This is obviously not an easy ambition to fulfil in a hard pressed educational system with limited resources in many schools: especially not as long as the exams are linked to *"education for entering a higher school"* (National reports: CHN p. 136).

Adding to the general problem that ESD has to compete with the 'traditional' subjects for space in the curriculum and teachers' engagement, in some countries we find little or no focus on the progression of ESD during the period of compulsory schooling, described in the Chinese report as a lack of differentiation (CHN).

REFLECTIONS

The barriers described above are often interrelated. This means that any major improvement to the situation must involve addressing a number of issues more or less at the same time at the policy level. This will also generate certain synergy effects. If teachers have a basic background for teaching ESD, they will also be far better equipped to engage in ESD development, thereby facilitating communication from the policy level to the practitioner level. If policy is clearly communicated, adequate support structures are in place, and regulations exist underlining the importance of ESD, the system will function much better as a whole.

When ESD is first introduced within schools, it is a common situation that only a small handful of teachers find the role as local pioneers and innovators stimulating and engage personally in the development of ESD. These pioneers may play an important role as activists at the local level due to their passion and enthusiasm, but in the long run, ESD has to be adopted as more of a common challenge for the school if it is to become mainstream. One challenge in implementing innovative forms of ESD is finding ways in which to ensure that this passion and enthusiasm spreads to colleagues instead of overwhelming them, hereby encouraging inclusiveness and participation in the continuing development and innovation.

The national reports do not provide evidence of a clear pattern of differences in the main barriers for ESD development between the established industrialised countries and the countries characterised by more recent industrialisation. This probably has to do with the existence of greater variation *within* each individual country than found *between* countries at the overall level. It might also have to do with a lack of national baseline studies which might enable such a comparison. However, this would require a more explicit articulation of an 'ESD position' in each country than currently found to be truly meaningful. Nevertheless, varying national and local needs and challenges mean that important differences in national ESD priorities are to be expected, and thereby also differences in the main barriers to overcome.

It might have been possible to identify a pattern in the barriers to implementing and developing ESD in the form of different educational traditions clearly reflected in the approach to ESD and ESD development, and, for example, to demonstrate differences between centralised and decentralised school systems, but the national reports do not support any conclusions regarding such differences.

More specifically, the roots of ESD in the different countries have some similarities linked to the national development of EE. There are differences regarding which concept of EE has been dominant, and consequently in the ease with which EE has developed into an ESD approach focussing on students' empowerment and encompassing not only environmental, but also economic and social aspects.

It seems plausible that a focused effort to merge and develop established views on education such as health education, global education, conservation education and citizenship education, along with EE, into a more forward looking version of ESD would help to overcome some of the specified barriers.

In China and Singapore, considerable efforts have been made during recent years to make the learning situation more meaningful for students (CHN, SIN). In such cases, ESD can act as a catalyst for efforts to improve this. Interestingly, this tendency goes against another international trend mentioned as one of the barriers hindering the implementation and development of ESD in some countries, i.e. the increasing focus on standardised curricula linked to a quest for tests and performance indicators (e.g. DEN, UK, USA).

To overcome barriers to the future development of ESD, it might be helpful to develop cumulative models of ESD, which incorporate progression throughout the various stages of compulsory schooling, and to consider how best to gain the full potential of ESD at each level of the national educational system. Doing so can assist in the integration of ESD within the curriculum, but will require considerable national attention and research. On the other hand, too rigid and restrictive a focus on educational progression should be avoided as it can hamper the genuine participation of students allowed to focus on issues that they find important.

THEME 5: RESEARCH

THE ISSUE

In the midst of the UN Decade for ESD and the growing awareness of the risks of climate change, politicians worldwide have expressed a desire to intensify efforts within this field. The question is, what impact this will have on practice at school level? What are educators doing and what could they do? How can the quality of the teaching/learning in ESD be gauged, and how can it be improved? Research comprises a key component in answering each of these questions. UNESCO has therefore also recognised research as an essential component of success for the Decade for ESD.

In this chapter, we will take a closer look at the roles research has played so far in the development of ESD in the ten countries represented in this report. We will examine both the role of research in the development of policy and its role in the development of practice. What can we learn from these past experiences with research in ESD? Are there any general characteristics or defining features of this research? What differences are there among the different nations? How has the tension between analytical distance and policy/practice collaboration been negotiated? And, looking to the future: On the background of the various strengths and weaknesses identified in current and previous research efforts, what recommendations can be made regarding the development of ESD research in the coming years?

FINDINGS

A relatively new field of research

Just as ESD and CCE constitute relatively new themes within education, research in this area is also relatively new and, as yet, quite sparse. However, the national reports demonstrate that the existing research on ESD is closely linked to, and indeed often has its origins in, the field of environmental education--a field with a considerably longer history (CAN, UK, SIN, KOR, CHN, AUS, BRA, DEN, USA). In addition, development education (UK) and health education (DEN) are sometimes highlighted as areas of educational research that have dealt with ESD. As a result of these mixed origins, research has actively influenced ESD since the start of the UN Decade in 2005. In the following pages, we will illustrate the various roles of research in this process.

The cultural role – critical and innovative

The first point to be made is that research has assumed a role that we earlier referred to, using a term from de Vries, as 'the cultural role'. By this we mean that research has played a significant part in formulating and interpreting the concept of ESD. Partly critical, partly innovative, research has contributed to discussions on the theoretical foundations of ESD, the development of possible pedagogical approaches and principles, and strategies for shaping and evaluating ESD practice directly. The national reports illustrate this in various ways.

Research has not played its cultural role within a closed theoretical-academic vacuum, but in dialogue with other institutions and stakeholders. This dialogue has, as outlined under theme 1, been characterised by a critical polemic against a behavioural, prescriptive approach and a desire to develop alternative approaches, as far back as the early days of EE. This is particularly apparent in the Danish report and the report from the UK, which comments on this trend at length:

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"Overall, since the 1970s there has been, and continues to be, active debate in the UK about how educational programmes might lead to behavioural or attitudinal change in support of sustainability. These debates have also recently begun to be applied to discussions of education and climate change. Government-funded research and policy tends to take an instrumental approach to education and training in

these areas – i.e. that increasing access to knowledge and discussion of topics will result in change. There is a strong critique of this approach from some researchers, however, who are concerned that some educational programmes (variously labelled ESD/EE/DE or CCE) in practice are often too instrumental in their aims (e.g. gaining support for particular perspectives, initiatives or campaigns) because they rely on such an overly simplistic understanding of learning." *(National reports: UK p. 300ff)*
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In the USA and, in particular, in Canada, researchers have initiated a debate regarding the term ESD itself (cf. Theme 1), accusing its proponents of undermining the environmental dimension of EE and replacing it with an anthropocentric development perspective (USA, CAN). This reflects differences in the interpretation of sustainable development, but also demonstrates that ESD researchers have taken an active role in the conceptual evolution of SD and ESD, and in drawing attention to the consequences.

As time passes and people, societies and nature change, those changes give cause for new considerations regarding ESD. The role of researchers as both educators and innovators in the conceptual development of ESD is not strongly represented in all of the national reports, but there are examples from Denmark, Korea and Singapore which highlight the development of the 'green growth' discourse in these countries, which has strongly influenced the perception and practice of ESD.

Research's cultural role has predominately involved critical reflection, but the other side of the cultural role, making constructive suggestions for alternatives and new ways of understanding and doing things, is also discernible in the reports. As described in earlier chapters, the shift from EE to ESD can be considered problematic, but the widespread critical dialogue surrounding this shift can also be seen as a progressive trend, one that has advanced the discourse from nature to environment to a more holistic perspective tied to the concept of sustainable development (CHN). With ESD's status as a global issue and the possibilities for international comparison, there is great potential for an augmentation of the innovative aspect of research's cultural role, as suggested in the UK report.

Research as a source of expertise in ESD policy

In some countries, the cultural role of ESD research has been combined with direct involvement in policy development. The clearest example of this can be found in Australia. A review of Australian progress in ESD, compiled by Sustainability and Education Academy, York University in Canada, concluded:

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"Closely intertwined with policy development, research has played a vital role in promoting ESD in Australia. Advocates recognize the need for a strong research base in order to understand the effectiveness of ongoing education efforts and to determine how best to proceed in the future" *(cited in National reports: AUS p. 18).*
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This intertwining of research and policy is institutionally anchored within the Australian Research Institute in Education for Sustainability (ARIES), which is situated at Macquarie University, Sydney and primarily funded by the Australian Government Department of the Environment, Water and Heritage and the Arts. As well as providing a strong bedrock for the dialogue between research and policy in terms of resources and organisation, it should also be noted that this type of association between research and policy involves the risk that research becomes tied to contractual obligations. At ARIES, for example, the objective is politically defined as conducting research on "how to move beyond simply raising awareness to achieve the attitudinal and behavioural changes necessary to live sustainably" (National reports: AUS, p. 20). This framing of the research objective sets limits on what constitutes a relevant research question. Furthermore, fulfilling this objective is problematic:

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"However, it should be noted that much of the work of ARIES is descriptive rather than analytical. That is, while what is being done in a range of ways is documented by ARIES, the effectiveness of programs to lead to changed attitudes or behaviours is less well understood. This is somewhat unsurprising, as making causal links between an educational program and behavioural change is challenging" *(National reports: AUS p 20).*
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In some countries, the link between policy and research is not institutionalised in the same way, but there exists a close link nevertheless. In both Denmark and Korea, researchers have been actively involved in preparing their respective national strategies for ESD. In the case of Korea, the report stresses the positive, stimulating dialogue between researchers and other stakeholders. At first, this took the form of a joint research project which resulted in the compilation of a draft of the national strategy. Subsequently, a new cooperative process ensued:

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"The draft was shared during numerous meetings with various stakeholders, including government officials, local Agenda 21 representatives, teachers, NGO representatives and researchers. Such a process contributed to information sharing and triggered discussions and debates on ESD among stakeholders involved" *(National reports: KOR p. 200).*
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The development of the Danish ESD strategy is a similar example of dialogue among researchers, government officials and other stakeholders. In this case,

the researchers were asked to draft a foundation for a Danish strategy. As is clear from the Danish report, the interaction between input from researchers and the agendas of the political system proved to be somewhat difficult:

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"The presentation [of the researchers' draft for the national ESD strategy] was submitted to the Ministry in August 2007, that's more than 1½ years before the adoption of the finalised strategy, but here, only a handful of passages remain which in itself makes it fairly apparent that there is a considerable divergence in perspectives" *(National reports: DEN p. 158).*
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In several countries, there is no talk of dialogue among researchers, stakeholders and a government or state apparatus that is responsible for ESD policy, as was the case in Korea and Denmark. The report from USA analyses the development of ESD from a governance perspective, where the key stakeholders are the federal government, state governments and NGOs (USA). The governance perspective makes sense, also in relation to the dialogue in the other countries referred to here, though it demonstrates the variations among countries regarding which stakeholders are involved in policy development. As well as a source of concrete policy development, the dialogue among stakeholders can also be viewed as the development of an ESD discourse and a source of new knowledge. ESD and CCE are examples of issues that are defined and negotiated with researchers as only one of several parties involved.[6] This places new demands on researchers, and requires a great degree of reflexivity concerning their own position and the importance of maintaining standards of scientific quality and honesty.

With this development in the forms of knowledge production in mind, a number of the national reports contain interesting examples of alternatives to the classic expert role. It is not just a matter of improving the dissemination of the experts' knowledge, but of creating a dialectic, reciprocal learning relationship between the researchers' theories and teachers' practical knowledge. In Singapore, universities work in dialogue with local communities:

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"Correspondingly, the universities are actively involved in nature programs to translate their expertise and knowledge into community knowledge. They do so through their community outreach programs such as adopting a forest and involving school students in working with scientists" *(National reports: SIN p. 263).*
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Such collaboration can certainly take place in the form of a traditional expert-layman relationship, but it can potentially enable an interactive, mutual learning. In the United States, there is a similar example of a university (the University of Vermont) working alongside governmental agencies and NGOs to support teachers in their implementation of ESD in school settings (USA). American NGOs such as US Partnership for ESD also work as mediators with the purpose of supporting the development of ESD:

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"Participants decided that the Partnership would not design or implement programs of its own. Rather, it would serve as a clearing house - helping to connect, highlight, and foster collaboration among partners – and serving as a catalyst to convene groups and build community to support existing and emerging initiatives" *(USPESD in National reports: USA p. 333).*
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The opportunity for ESD researchers to play the role of mediators who network and catalyse knowledge and competence development among ESD stakeholders and practitioners is now supported on a global level by the United Nations University which has, so far, recognised 60 Regional Centres of Expertise around the world. All such centres share the goal of developing ESD within networks that include universities. At one of these centres, situated in Tongyong, South Korea, a number of university departments have collaborated with schools and the local community on the development of ESD (KOR).

The documentary role

It is perhaps predictable that ESD research has had an innovative and developmental role in conjunction with the introduction of ESD. It comes as more of a surprise that research is in a weak position when it comes to documenting practice. Keeping in mind UNESCO's recommendation that research be used to support the development of ESD during the UN Decade, one might expect that now, at the halfway point, there would be an extensive body of research on national initiatives, including both surveys of the ESD-related efforts and evaluations that could provide insight into existing projects and support their development. Despite sporadic examples to the contrary, the general impression gained from the national reports is that such studies are lacking. In the following pages, we will provide a clearer picture by distinguishing between documentation in the form

6 As argued by the sociologists of science Nowotny, Scott and Gibbons, research has less and less of a patent on the production of knowledge. Knowledge is produced within networks of actors where the researchers, of course, have a special role (Nowotny, H., P. Scott, et al. (2001): Re-thinking science. knowledge and the public in an age of uncertainty. Oxford, Polity Press).

of monitoring and the form of quality assessments, and, for the latter, between formative and summative assessments.

Monitoring offers a description of what is happening in practice, whether qualitatively or quantitatively. It does not provide explanations or contribute to quality assessment or research-based proposals for the refinement of practice. A handful of examples of ESD monitoring are given in the national reports. Australia, which began earlier than the other nations and which has funded an actual research institution for ESD, is an obvious outlier. In Australia, several studies have been conducted that describe the practice of ESD. These studies have concentrated in particular on how ESD is taught and on the implementation of the whole-school approach (AUS). The UK report also refers to monitoring studies, including both a survey of several key government departments concerning good practice in curriculum planning and whole-school approaches to sustainability, and a survey of young people's attitudes to global learning and how the practice of ESD learning on the ground (UK). In Singapore, a large-scale survey into students' general perceptions of sustainability was conducted in 2006 and has helped in gaining an understanding of the situation (SIN).

Unlike this purely descriptive documentation, researchers' role as formative evaluators involves data analyses that seek to provide input for the refinement of practice. Formative evaluation makes it possible to explain dynamics, barriers, and possibilities, and, on this basis, to develop qualified suggestions as to ways forward. In the national reports, there are a number of examples where research has been involved in developmental and action research projects, as well as in formative project assessments with the goal of supporting concrete development processes (KOR, CHN, DEN). Such projects are of greatest value to the projects evaluated, but researchers also argue for the broader relevance of such evaluations, which can be enhanced by knowledge sharing between researchers and practitioners. One example is the Scandinavian MUVIN project that generated a number of conclusions regarding, among other things, what students value in EE (DEN). Although there are many organizations that might foster this form of knowledge sharing, including the previously mentioned RCE for ESD, the national reports contain only a single notable example. In the United States, the NGO North American Association for Environmental Education (NAAEE) has developed and continues to refine guidelines for excellence within EE. These guidelines are:

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"…not a summary of research on 'what works'. They are the fruit of a consensus process, involving more than a thousand practitioners, that was intended to produce 'a common understanding of effective environmental education' (NAAEE 2004)" (National reports: USA p. 337).[7]
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Unlike formative assessment, summative assessment has to do with the *results* of a particular initiative, with less focus on shaping future practice. There is generally a lot of politically motivated interest in such research, research that both monitors what has happened and assesses the value of the results – usually in relation to predetermined success criteria and indicators. Despite this, there are few examples of this type of ESD research. In the UK, a government body assessed the work of several key government departments in 2003. The study "found evidence of good practice in curriculum planning and whole-school approaches to sustainability, but concluded that more could be done to fully integrate ESD across the curriculum" (National reports: UK p. 297). In South Korea, whole school projects have been successful in engendering environmentally friendly outcomes among students towards ESD. Furthermore, at study on a sample of Environmental Conservation Model School Initiatives revealed positive contributions of such endeavours towards sustainable development, but did also identify aspects where the schools achieve low accomplishment (KOR). In China, a study has documented that teachers who have participated in a major ESD project have developed attitudes, interests, awareness and teaching abilities within the ESD area (CHN). The US report confirms that this kind of study is still rare, but offers – as a significant exception to the rule – a summary of multiple tests of the teaching strategy Investigating Environmental Education Issues and Actions (IEEIA), and Environment-Based Education/Place-Based Education, conducted over a period of 20 years. Although these tests contain 'persistent methodological weaknesses,' they are 'remarkably consistent':

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"In each of the eleven cases, the students participating in IEEIA exhibited some type of environmentally relevant behavior change. In most of the cases, behavior change was accompanied by shifts in other skill, knowledge and attitudinal variables…" *(National reports: USA p. 345).*
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There can be grounds for taking a closer look at why summative assessment, despite being much in demand from policymakers, is so thin on the ground. Given that other novel educational programs have been the focus of considerable formative assessment, it can not be purely a result of the relative newness of ESD. The Australian report concludes the following regarding ESD research:

7 This corresponds with what Nowotny et al. term 'socially robust knowledge', knowledge which does not comprise universal rules for 'what works', but which is meaningful and applicable to practice in a given context and a given phase, and which is developed in an interaction between many participants, including researchers (Nowotny, H., P. Scott, et al. (2001): Re-thinking science. knowledge and the public in an age of uncertainty. Oxford, Polity Press).

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"There appears to be limited research on the impacts of ESD initiatives, impact being defined as 'the longer-term cumulative effects of an activity or programme and embody lasting changes'. Such studies would need to be longitudinal and complex, and separating out the influences of specific initiatives at school would be difficult" *(National reports: AUS p. 31).*
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As inferred here, the stumbling block for this form of research, and thus for meeting the demand from policymakers, may the methodological difficulty involved. The following passage from the Canadian report augments the impression of poorly functioning linkage between policy and research within the field:

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"Despite the profusion of policy, countrywide, it is difficult to ascertain their practical effectiveness. There is a paucity of research on how ESD, CCE or EE policy is being implemented, and its impact on schools and classrooms. Reports that do exist come from government bodies and other organizations active in the area. These self reports tend to be uncritical catalogues that focus on successes, and are silent about problems and failures. This research gap may reflect a deeper systemic weakness, that is, the lack of emphasis on research in influencing policy and practice. On the other hand, the current research gap may exist because plans surrounding ESD are relatively new and the scholarly community has yet to develop appropriate research initiatives" *(National reports: CAN p. 109).*
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Evaluating the effectiveness and, more broadly, the *value* of ESD activities requires a degree of consensus about the meaning of effectiveness in ESD. Thus, the ongoing dialogue between policymakers and ESD researchers regarding which quality criteria and methods of inquiry can be used to assess results within the field of ESD is key to improvements in this area. Is it a case of registering environmental results, e.g. reductions in carbon emissions, or is it about what students learn from the activities in the lessons? Should the criteria concern students' knowledge and/or their engagement and empowerment? In the UK, research on ESD indicators and the dialogue between researchers and government officials in this regard, is currently in focus. According to the researchers, progress here requires:

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"the need for clarity about the purposes of indicators and the interpretive frameworks on which they are based, and agreement that the quality of ESD should not be equated solely with indicator measurements" *(National reports: UK p. 298).*
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Until now documentary research has been described as a way to get hold of the state-of-the-art and to assess and elaborate programmes and practices. However, an important part of research, generally and thus in this field as well, is to approach the social reality in an open-minded and explorative way. ESD is a new phenomenon and ESD research should indeed be able to describe how this global idea is adapted and constructed in different socio-cultural settings. In this respect, an interesting feature of research in ESD is found in Korea where ESD issues are connected with the unique cultural, philosophical and historical backgrounds and traditions of the country. While adopting the internationally accepted methods and norms in ESD, Korean research shows that this could be balanced by locating ESD within the country's own cultural roots. One example is the incorporation of the spirit of 'Dure', an organization of the Chosun Dynasty that mobilized farmers to act cooperatively during periods of agricultural emergencies. Another area was the investigation of sustainable development through Korean traditional songs in ESD classes, and developing lesson plans based on traditional food, traditional agricultural knowledge, natural dyeing, etc. (KOR). Another example: By presenting four cases on how ESD is approached differently in four provinces, the Canadian report illustrates how this type of historical and contextual analyses can be helpful to our knowledge on the construction of ESD on more general levels as well (CAN). The national reports produced as part of this project have created a solid basis for taking further steps in the exploration of the socio-cultural shaping of ESD by means of international comparison.

REFLECTIONS

As has been apparent, research can play several roles in the development of ESD. The focus within the political sphere on research as documentation and clarification involves a risk of overlooking researchers' possible role as 'critical friends' and innovators. This role can be particularly important for such a young and uncertain field as ESD. Because SD concerns ongoing processes of global change, ESD must be kept up to date if it is to support SD through learning processes stretching from the global to the personal level.

Research also has an important role to play as a reflective participant in knowledge sharing networks alongside teachers and other ESD practitioners. Regional Centres of Expertise comprise a potential platform for developing this mediation, but there is a risk that research will become too closely linked to developmental projects in collaboration with the most committed practitioners (formative project assessments can also be included here). Research must also deal with and expound on normal ESD practice.

Regarding the latter, there is first and foremost a need for larger-scale studies that offer a detailed

overview of, and insight into, the issue of ESD-studies that illustrate the issue both quantitatively, qualitatively, and developmentally. However, as is evident, there are still methodological problems in this regard, intimately connected with ongoing discussions about the proper purposes and outcomes of ESD. The dialogue between the policy level and ESD researchers must continue with the objective of establishing a greater understanding of the particular challenges involved in documenting students' learning and utilisation of competences in relation to a complex issue such as sustainable development.

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LINKS TO THE NATIONAL REPORTS

http://edusud.dk **and** *http://dpu.dk/RPEHE*

CLIMATE CHANGE AND SUSTAINABLE DEVELOPMENT: THE RESPONSE FROM EDUCATION

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