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Guidelines and Recommendations for Reorienting Teacher Education to Address Sustainability

Education for Sustainable Development in Action
Technical Paper N° 2 - 2005
UNESCO Education Sector

*G*uidelines and *R*ecommendations for Reorienting Teacher Education to Address Sustainability

UNESCO

Education for Sustainable Development in Action
Technical Paper No. 2
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Prepared by UNITWIN/UNESCO Chair on Reorienting Teacher Education to Address Sustainability (Charles Hopkins, Chair & Rosalyn McKeown, Secretariat) and the International Network of Teacher-Education Institutions.

In response to the April 1998 Work Programme of the ESD: Education, Public Awareness and Training (Priority Area: B. Review national education policies and reorient formal education systems/Task B.3. Develop guidelines for the reorientation of teacher training.

But first and foremost our message is directed toward people, whose whole well being is the ultimate goal of all environment and development policies. In particular, the Commission is addressing the young. The World's teachers will have a crucial role to play in bringing this report to them.

If we do not succeed in putting our message of urgency through to today's parents and decision makers, we risk undermining our children's fundamental right to a healthy, life-enhancing environment. Unless we are able to translate our words into language that can reach the minds and hearts of people young and old, we shall not be able to undertake the extensive social changes needed to correct the course of development.

(World Commission on Environment and Development, 1987, p xiv)

The authors are responsible for the choice and presentation of the facts contained in this document and for the opinions expressed therein, which are not necessarily those of UNESCO and do not commit the Organization.

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Executive Summary

In 1998, the Commission on Sustainable Development called for UNESCO to develop guidelines for reorienting teacher training to address sustainability. In turn, UNESCO created a UNITWIN/UNESCO Chair on Reorienting Teacher Education to Address Sustainability at York University in Toronto, Canada. The Chair established an International Network of 30 teacher-education institutions in 28 countries to address this issue. The International Network met in October 2000 and began planning strategies and methods for moving forward. This document is the result of their efforts. It is born of practice informed by theory, not the musings of people who simply imagine how to proceed.

The international network undertook many types of initiatives in their efforts to reorient teacher education, decide which themes or sustainability goals to emphasize within their curricula, programs, practices, and policies to ensure that teacher-education programs fit the environmental, social, and economic conditions and goals of their communities, regions, and nations.

Members of the International Network made recommendations related to reorienting teacher education to address sustainability. The recommendations are pieces of wisdom garnered through the experimentation and hard work of teacher educators. The recommendations concern ministerial and national levels to the local level. The recommendations involve curriculum, pedagogy, policy, practice, programs, rewards, research, information and computer technology, partnerships, networking, communications, etc.

Members of the International Network repeatedly mentioned the urgency to act and the need for profound change. While many spoke of the enormity of the task at hand, all who participated were able to make significant and positive inroads. Interested individuals operating within their own spheres of control (e.g., weaving sustainability themes into their own classroom curricula) made great headway reorienting their programs. Also, many institutions were able to develop new courses at both the undergraduate and graduate levels. Problems arose, however, when the Network members advocated for change beyond the sphere of direct control. ESD within teacher-education institutions is currently endorsed by early-adopters. However, it will take concerted effort and resources to establish ESD in curricula, programs, practices, and policies across teacher-education institutions.

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Preface

Education for Sustainable Development (ESD) is an essential part of a larger conversation regarding quality of life for all the inhabitants of Earth. As university teachers and researchers our responsibility is to participate as critical colleagues and advocates in the intellectual lives of our faculties, institutions, and the broader community. We must examine the assumptions and propositions that circulate within our fields, including the concepts and assumptions informing ESD. Sustainable development offers a philosophic and analytical framework for educative enquiries in which economic, social, and environmental factors must be considered in relation to one another. Such enquiries provide opportunities for deliberating and addressing complex issues. Pedagogical processes that follow from these enquiries also require critical and open-ended engagement with complex issues. Part of our task therefore is to develop networks across faculties and disciplines thereby enabling joint discussions that will explore and theorize relationships and issues among social, economic, and environmental dimensions of sustainable development. These processes of inquiry, theory development, and critical dialog are our tasks, as opposed to imposing the concept of sustainable development on others. One way of developing such a critical discourse is to make sustainable development an open question for examination in the socio-political and socio-ecological contexts within which we work.

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Guidelines and Recommendations

I. Introduction

Agenda 21 states that efforts on multiple fronts are needed to create a more sustainable world. The 40 chapters of Agenda 21 describe a myriad of initiatives that must occur for nations to successfully pursue sustainable development. Education, as described in Chapter 36 "Promoting Education, Public Awareness and Training," is one of the fronts with high potential for advancing sustainable development efforts; however, education alone will not move citizens and governments to create a more sustainable future. Many people and organizations must share the responsibility for more sustainable societies through good government, enlightened policy, civic participation, and commitment. Nevertheless, education is essential for moving toward a more sustainable future. We cannot imagine how the people of all nations could move toward a more sustainable world without the contribution of educators from around the globe.

Educating for a more sustainable future in its broadest sense includes improving quality basic education, reorienting education to address sustainability, improving public awareness, and providing training to many sectors of society (see Appendix A). This document focuses on one aspect of education – teacher education – especially the role of institutions of teacher education in reorienting teacher education to address sustainability.

Institutions of teacher education fulfill vital roles in the global education community; they have the potential to bring changes within educational systems that will shape the knowledge and skills of future generations. Often, education is described as the great hope for creating a more sustainable future; teacher-education institutions serve as key change agents in transforming education and society, so such a future is possible. Not only do teacher-education institutions educate new teachers, they update the knowledge and skills of in-service teachers, create teacher-education curriculum, provide professional development for practicing teachers, contribute to textbooks, consult with local schools, and often provide expert opinion to regional and national ministries of education. Institutions of teacher education also perform similar services for school principals who have significant impact on what occurs in schools. Because of this broad influence in curriculum design and implementation, as well as policy setting within educational institutions, faculty members of teacher-education institutions are perfectly poised to promote education for sustainable development (ESD). By working with the administrations and faculties of teacher education institutions, governments can bring

about systematic, economically effective change. For these reasons, nations should include teacher education institutions in their national sustainability plans. To assist nations in this task, UNESCO requested the development and dissemination of these guidelines for reorienting teacher education to address sustainability.

History of this project and document

During the 1990s, UNESCO identified teacher-education institutions and teacher educators as key change agents in reorienting education to address sustainability. Subsequently, in 1998 the United Nations (UN) Commission on Sustainable Development (CSD) work program on Education for Sustainable Development called for UNESCO to develop guidelines for reorienting teacher training to address sustainability. In order to accomplish this task, UNESCO and York University, Toronto, Canada agreed to establish a UNITWIN/UNESCO Chair in 1999 to provide advice to UNESCO and institutions of teacher education. The task of developing guidelines for the reorientation of teacher education was passed to the UNITWIN/UNESCO Chair at York. As a result, one of the long-term goals of the UNITWIN/UNESCO Chair is to develop guidelines and recommendations for reorienting teacher education and associated realms of pedagogy, curriculum, and other related issues.

To accomplish this, the Chair established an international network of more than 30 teacher-education institutions in as many countries. Educators at these institutions work collaboratively to identify various ways of achieving this goal. The UNITWIN/UNESCO Chair has convened three international meetings of the International Network. The first took place in Canada in October 2000, the second in South Africa in September 2002, and the third in Sweden in 2004. At the first meeting, the Chair used the *Education for Sustainable Development Toolkit* (McKeown, Hopkins, and Rizzi, 2000) to create a common understanding of ESD. The Chair also adopted the Toolkit as the official document of the Chair and the International Network. At the first meeting, the participants explored ways to move forward with reorienting teacher education to address sustainability. In general, each institution decided upon its own avenues for experimentation, based on the contexts of its community and nation. At subsequent meetings and in reports, participants shared their efforts related to reorienting teacher education to address sustainability. The group also agreed on a format to document their efforts. We have distilled the experiences and wisdom from these efforts into this document. In addition, the Chair and International Network members are establishing a number of regional teacher-education networks which will not only provide a forum for teacher educators to share their expertise, but also support efforts to reorient teacher education to address sustainability. Regional networks have been established in Canada, Eastern Europe, the Caribbean, and Southern Africa. Others are in the planning phase. Together, these regional networks comprise more than 70 institutions of teacher education working to assist one another in developing and implementing ESD teacher education projects.

To create this document we collected and reviewed survey responses from teacher educators at 18 member institutions of the International Network. These teacher educators, who have gained significant experience over a range of reorientation undertakings, summarized their attempts to reorient their own teacher-education programs and made recommendations based on their own experiences for reorienting teacher education to address sustainability. The Chair and Secretariat identified common themes and recommendations amongst the survey responses and wrote a draft of the guidelines. Members of the International Network reviewed and revised the draft document at their meeting in Sweden in May 2004. The guidelines were then re-edited and submitted to the International Network for a second review.

The resulting document was submitted to UNESCO to be used in building the foundation of the United Nations Decade of Education for Sustainable Development (UNDESD).

This document poses guidelines for reorienting education to address sustainability. In addition, this document makes recommendations in a number of areas that are crucial to the success of reorienting teacher education to address sustainability. The recommendations include:

1. Ministerial and national level involvement
2. Community and regional/provincial involvement
3. Changes within institutions of higher education
   - 3A. Change across institutions of higher education
   - 3B. Change within faculties of education
   - 3C. Change related to engaging pre-service and in-service teachers
   - 3D. Change at the individual faculty member level
4. Funding and other resources
5. Partnerships
6. Research
7. Communications
8. Information Technology Opportunities

II. Guidelines for reorienting teacher education to address sustainability

In order to reorient teacher education to address sustainability, we needed to examine the major tenets of sustainable development and apply them to education and teacher education. As we examined the ideals that currently underlie sustainable development, we identified societal goals – environmental stewardship; social equity, justice and tolerance; and quality of life for all people in this generation and the next – that ESD would most likely address. And in democratic societies, ESD is created through a process of public participation and addresses community-based decision-making.

This excerpt from Earth Summit+5: Programme for the further Implementation of Agenda 21 describes the role of education in fostering more sustainable societies.

> *Education increases human welfare, and is a decisive factor in enabling people to become productive and responsible members of society. A fundamental prerequisite for sustainable development is an adequately financed and effective educational system at all levels, particularly the primary and secondary levels, that is accessible to all and that augments both human capacity and well being. The core themes of education for sustainability include lifelong learning, interdisciplinary education, partnerships, multicultural education and empowerment. Priority should be given to ensuring women's and girls' full and equal access to all levels of education and training. Special attention should also be paid to the training of teachers, youth leaders and other educators. Education should also be seen as a means of empowering youth and vulnerable and marginalized groups, including those in rural areas, through intergenerational partnerships and peer education. Even in countries with strong education systems, there is a need to reorient education, awareness and training so as to promote widespread public understanding, critical analysis and support for sustainable development. (p 74)*

To begin the process of reorienting teacher education to address sustainability, faculties of education around the world must draw their own thematic guidelines based on descriptions and ideals of sustainability. Although many idealistic and wholesome descriptions of the conceptual underpinning of sustainability and sustainability education exist, faculties of education must decide which themes to emphasize within their curriculums, programs, practices, and policies to ensure that teacher-education programs fit the environmental, social, and economic conditions and goals of their communities, regions, and nations.

Guidelines for creating educational materials in various disciplines exist. These guidelines can be used as starting points for developing guidelines for ESD projects. For example, the UNITWIN/UNESCO Chair on Reorienting Teacher Education has specified design criteria for its ESD projects. Each new project is created and evaluated based on the seven criteria:

- ESD is locally relevant and culturally appropriate.
- ESD is based on local needs, perceptions, and conditions, but recognizes fulfilling local needs often has global effects and consequences.
- ESD engages formal, non-formal, and informal education.
- ESD is a life-long endeavor.
- ESD accommodates the evolving nature of the concept of sustainability.
- ESD addresses content, context, pedagogy, global issues, and local priorities.
- ESD deals with the well being of all three realms of sustainability – environment, society, and economy.

The Chair also developed negative design criteria (i.e., pitfalls to avoid) when creating ESD projects):

- ESD is not imported from another cultural, economic, or geographic region.
- ESD is not "one size fits all," but must be created to account for regional differences.

Curriculum developers who are unfamiliar with local environmental, cultural, or economic conditions should not write ESD materials or programs. These negative design criteria do not imply that best practices should not be shared around the world. Best practices from one place must be adapted and modified to become locally relevant and culturally appropriate in another place.

In reorienting curriculum, we at the Chair use a framework of five components of a reoriented curriculum: knowledge, issues, skills, perspectives, and values and their interrelationship (McKeown *et al.*, 2002). The International Network strives to reorient teacher education to address sustainability within the realms of curriculum, programs, practices, and policies (see Appendix A).

In keeping with the theme that all education for sustainable development must reflect environmental, societal, and economic conditions and that it must be culturally appropriate, we leave it to faculties of education to create their own guidelines and design criteria that will steer their efforts to reorient teacher education to address sustainability.

III. Initiatives taken by members of the International Network

Members of the International Network undertook many types of initiatives in their efforts to reorient teacher education to address sustainability in their home institutions, provinces, nations, and internationally. Their efforts affected curriculums, programs, practices, and policies within their institutions in locally relevant and culturally appropriate ways. Their activities stimulated the growth of regional, national, and international networks. They used a wide variety of forums available to teacher educators (e.g., conferences and journals) to advocate for ESD. Members kept track of their efforts in journals, chronicling their efforts, successes, and failures.

Please note that members of the International Network received no funding from the Chair or any other international organizations to support their activities to reorient teacher education to address sustainability. We knew the successes of well-funded pilot programs would not be replicated; however, success stemming from personal initiative and allocation of resources internal to an institution would be believable and replicable.

Working within their own spheres of influence, members of the International Network created and implemented one or more the following types of activities related to ESD at their own institutions:

Curricular/Program Development

- Developed graduate level programs at Masters' and PhD levels in ESD.
- Developed a compulsory ESD course for Masters' programs in Geography and Environmental Education.
- Established Advanced Certificate programs in ESD.
- Established distance education courses in ESD.
- Established an Environmental Education concentration in the College of Education's Masters' Degree in Curriculum and Instruction.
- Reviewed and revised existing courses to address sustainability.
- Infused ESD into all Math, Science, Geography, and Technology courses.
- Infused ESD into other disciplines at undergraduate and graduate level programs such as agriculture, population education, and consumer education.
- Devised an ESD project using literature and language arts at the secondary school level to address male youth violence and to deliver skills in conflict resolution.

Literature
to address the problem of violence

In introducing education for sustainable development at one of the largest teachers' colleges in Jamaica, we began with the reorientation of the Literature program for student teachers who were preparing to teach English literature and language to high school students.

The Literature Project primarily addressed the problem of violence in Jamaican society, while incorporating other aspects of an ESD curriculum as well. We chose to address the issue of violence given its high level in our society and the world in general. To begin, we explored with our students the concept of sustainable development through lectures, discussions, and projects. In doing so, we reflected on a number of issues related to the environment, the economy, and society and encouraged students to pursue further research in this area.

In attempting to change attitudes toward violence and behaviors of violence through literature, we taught the set literary texts by focusing on their social/ historical, economic, and environmental aspects. That is, we examined (1) the roots of violence in Caribbean society – when, who, what, why; (2) the impact of violence, then and now; and (3) alternatives to violence, in other words, the path to peace. These questions are explored fully by Caribbean writers who understand that unless people openly recognize and acknowledge the latent violence in their society, it will erupt in unimaginable ways.

The class engaged, therefore, with the social and historical dynamics of violence, including that of violence perpetrated by one group upon another and its damaging effects on both groups. The texts emerged from a specific context in the Caribbean – the social and historical context is that of enslavement, colonialism – a context not only of rich cultural mixes, of creolization, but also a context of inequities, resistance, and violence. The texts also responded to that context providing challenging and alternative visions to violent relations.

Denis Scott's play Echo in the Bones, for example, provided students the opportunity to explore latent feelings of violence. Feelings of hostility and anger – emotions still "in the bone" as a consequence of racism, exploitation, and injustice – surfaced through the drama. In fact, the play became a vehicle for the release of such pent up emotions. Attaining the level of ritual and emphasising forgiveness and reconciliation, it also provided a sense of comfort and peace.

(Cont.)

The class also studied contemporary situations of violence in other texts. Students came to understand the systemic nature of violence – the way in which all aspects of society interconnect and impact each other. For example, the absent father, the single mother with few resources, the substitute father figure – the community don who prepares the son for a life of crime – and an indifferent society are brought together in Lorna Goodison's highly moving poem "The Woman Speaks to the Man Who Has Employed Her Son".

Parallel to the study of texts was our work in 'real time.' Immediate situations of violence in society around us became our other text. Lecturers encouraged students to apply the analytical skills employed in their study of the set texts to the immediate text on violence. Journal writing in which both students and lecturers reflected on their experiences with and responses to violence served as a powerful tool for analysis. Equally powerful was the sharing of journal entries as students revealed and examined both negative and positive responses to violence. It was clear that violence did not just exist in the society beyond the classroom wall but was also part of the psyche and thinking of those within the sanitised space of a teachers' college.

In addressing this, the lecturers engaged the services of a conflict resolution practitioner and took a workshop approach to conflict resolution. Although time was limited by the course schedule, the session was meaningful. Students were introduced to peaceful ways of managing conflict and left the session reflecting on the sometimes hidden agenda of conflict. Additionally, students participated in visioning alternatives to violence by planning peace projects. Even though these projects were not implemented, students envisioned the ability and power to effect change in their lives and in society.

Additional activities included an informal discussion with a police officer. The group openly discussed the ambivalence that many have toward the police. The police officer was equally as candid pointing out ways in which citizens counter efforts for peace. His explanation of community policing, in which citizens can work with the police to build peaceful communities, was helpful to the group.

(Dr Lorna Down
- University of the West Indies, Mico College, Jamaica)

- Initiated programs with Women's Studies, Women in Society, Women in Agriculture, and Women's Literacy.

Department of Women's Studies and Sustainable Development

It is now internationally recognized that women are not only equal with men but also many times even more powerful as partners of ecosystem management. Their empowerment and knowledge of natural resources and sustainable development are important to preserving this planet. In a country like Pakistan, women have been working without realistic valuation of their work and work places. They are deprived of many basic human rights, including the right to education. With a low level of literacy and awareness, such women are unable to fulfill their roles effectively and contribute positively to sustainable development.

The Department of Women's Studies (DWS) at the University of the Punjab established its master's degree to act as a catalyst for sustainable development by preparing properly educated men and women who: know the complementarity of the genders, believe in the economic and social empowerment of women, and can actively engage in sustainable development. The program, which focuses on women's roles inside and outside the home, draws faculty and professionals from various multidisciplinary fields, as health sciences, business administration, law, environmental programs, and small industries. DWS students work as interns in nearly 30 different organizations. Graduates of the program are employed by governmental, nongovernmental, and civil society organizations engaged in multifaceted tasks that lead to a more sustainable society. The DWS program impacts not only the students, but also the professionals who come in contact with them.

(Dr Munawar Mirza – University of the Punjab, Pakistan)

- Assisted in infusing the concepts of sustainability into dissertations and graduate research as an option.

INFUSING ESD INTO POSTGRADUATE TEACHER-EDUCATION PROGRAMS

The University of Zambia (UNZA) had no Masters' programs in environmental education or geography education until 2002 when both programs were initiated and received the first cohorts of students. The task was not easy. Devising the program required harmonizing various long-held interpretations of interdisciplinary work in an institution in which course work in single discipline, for both majors and minors, was the popular academic tradition.

It took about six years to devise the two Masters' degree programs and get them approved. A course on ESD became compulsory in both the environmental education and geography education programs. Although interdisciplinary work was part of the curriculum, one senior faculty member urged the university to make the ESD course compulsory for all postgraduate programs at UNZA. The acceptance of interdisciplinary work and sustainable development is growing on campus.

(Dr Charles Namafee – University of Zambia)

- Established short in-service courses for teachers.
- Launched an Aboriginal Studies programme with a focus on ESD and traditional ecological knowledge.
- Pursued research projects in ESD.

Institutional Change

- Formed Institutes and Centres for Sustainability Education.
- Formed institution-wide ESD committees and discussion groups.
- Launched a Cyber-Environment Education Institute.

A Cyber Multimedia Environmental Institute

Ewha Multimedia Environment Institute (EMEI) was established in 2001 with the financial aid of the Ministry of Environment and Ewha Women's University. This institute, a first for Korea, has five parts: Cyber Environmental Education Teacher Institute, Cyber Environmental Study Material Center, Cyber Environmental Policy Education Institute, Cyber Environmental Experience Study Center, and the Cyber Natural History Museum. Each part has a special program, and each part operates on an e-learning system.

Since the institute's opening, about a thousand customers per year visit the institute. Because financial aid from the government and the university has decreased every year, it is difficult to upgrade the program every year, requiring many financial resources. Nevertheless, this program has brought sustainability to thousands of online students.

(Professor Woun Sik Choi – Ewha Women's University, Korea)

- Developed ESD internships for students from other countries.
- Established an interfaculty Research Institute on Innovation and Sustainability.

Faculty Professional Development

- Launched an international peer reviewed journal on ESD.

Journal of Teacher Education and Training

Participating in the International Network on Reorienting Teacher Education to Address Sustainability provided Latvia's Daugavpils University with opportunities for more extensive and global dialogue, especially concerning action-research and demonstration projects related to ESD. University administrators felt a periodical could aid faculty development while advancing ideas and serving as a forum for introducing young researchers. By combining the activities of the International Network with the University's desire for an international journal, the Journal of Teacher Education and Training (JTET) was established in 2002. In 2003, the journal was recognized by Latvia's Academy of Science and included in its list of peer reviewed scientific publications. JTET has published four volumes. Currently, the JTET editorial board comprises 27 members from 12 countries.

Since its inception, JTET has become a tool for local and global networking. In 2003, JTET held its first international conference, *Sustainable Development. Culture. Education.* The European Regional Network for Reorienting Teacher Education to Address Sustainability was established at this same conference. This conference has become an annual event; each year another member institution of the European Regional Network organizes the conference (Daugavpils 2003, Tallinn 2004, Fehta 2005).

By 2004, the Faculty of Education and Management established the Institute of Sustainable Education, and JTET became a periodical of this institute.

(Professor Ilga Salite – Daugavpils University)

- Pursued European Union funding for faculty training in ESD.
- Initiated practical and theoretical research projects leading to publication of articles and books.
- Established a national ESD professional development consortium.
- Held institution-wide, national, and international conferences and workshops on ESD.
- Developed interfaculty exchanges related to ESD among universities.

Networking

- Formed four international regional networks of faculties of education related to ESD and reorienting teacher education, which involved approximately 70 faculties.

Establishing the Caribbean Regional Network

The International Network comprises about 30 teacher-education institutions from 28 countries. Many more institutions of teacher education expressed an interest to join, however, the International Network could not expand beyond the core group, which began working together in 2000. Also members of the International Network, including the Caribbean representatives, wanted to work more closely with other teacher-education institutions within their geographic regions to address regional issues.

Of the countries of the Caribbean, only Barbados and Jamaica are members of the International Network. From early on, we felt we needed a much greater representation. At the International Network meeting in South Africa in 2002, the Chair and Network members agreed that regional groups would be established to continue the work of the International Network. It became the task of Barbados, Jamaica, and Florida (USA) to try to establish the Caribbean Regional Network.

Five countries from the Caribbean along with representatives of universities in Florida attended meeting in mid-February 2004, which focused on Caribbean sustainable development issues. Speakers described Caribbean sustainability issues, the United Nations Decade of Education for Sustainable Development, and the Global Higher Education for Sustainability Partnership. Participants met in discussion groups and attended a workshop on the *Education for Sustainable Development Toolkit* created at the University of Tennessee.

The next Caribbean regional is scheduled for September 2005. Organizers continue to secure much wider participation from the other countries of the Caribbean region. Problems to be overcome in this endeavor include the lack of finances, limited communication among the colleges, and the perception that sustainable development may not be a priority.

(Henderson Nurse – Erdiston Teachers' Training College, Barbados)

- Established an ESD link with schools in another country.
- Developed a regional strategy for ESD.
- Established a language-based ESD network in Europe and the Americas in English, Portuguese, and Spanish.

ACES International Network

To achieve sustainability objectives, it is important to work in a diversity of contexts and build real progress in knowledge, while creating and elaborating answers and strategies with a high level of transferability and validity among these contexts. The University of Girona in Spain coordinated the ACES (Curriculum Greening of Higher Education, acronym in Spanish) network of five European and six Latin-American countries.

This network carried out the project, *Orienting Curriculum of Higher Education Studies towards Sustainability: Designing Interventions and Analysing the Process* (ALFA Programme, European Union, 2001-03). This multidisciplinary, inter-disciplinary, and integrative project involves a diversity of studies – teacher education, geography, pedagogy, economics, biology, agricultural engineering, tourism, planning, and management of protected areas – and deals with European and Latin American realities and contexts.

The work focused on:

- Defining the concept of curriculum greening of higher education.
- Characterising a university curriculum oriented toward sustainability.
- Applying these characteristics to the experimental studies of the project to gain insight on the effectiveness of the changes.
- Designing and applying practical actions oriented toward incorporating sustainability into higher education.

The methodology used is based on action research as well as participative and collaborative processes. This is the best option for: (i) democratising the project and giving the same value to all of the institutions; (ii) carrying out interdisciplinary projects; (iii) incorporating diversity into the construction of knowledge applicable to the varied contexts of each country. (see also *http://insma.udg.es/ambientalitzacio/web_alfastinas/angles/a_index.htm)*

(Dr Mercè Junyent & Dr Anna M. Geli de Ciurana – University of Girona, Spain)

Partnerships/Community Service

- Formed partnerships with local/regional government and nongovernmental organizations (NGOs).
- Undertook research on infusing ESD into teacher education on a national level.
- Developed recognition programs for schools and institutions that promote ESD (e.g., green school movement).
- Formed Sustainable Business Partnerships to promote ESD.
- Developed community-based off-campus teacher education projects within the inner city to improve the delivery of schooling to undereducated youth.
- Formed regional ESD curriculum-writing teams.
- Developed link between the faculty of education and the school of business to co-develop professional development programs on ESD for senior level education administrators.
- Produced manuals, texts, Web sites, and other sustainability teaching resources for elementary and secondary schools.
- Engaged geographic information systems and other information technology approaches to monitor community sustainability issues.
- Translated key ESD materials, including the Education for Sustainable Development Toolkit Web site, into local languages.

LINKING ESD TO AN EXISTING EDUCATION PROGRAM

This member of the International Network works with the GLOBE program, so he made presentations about reorienting education to address sustainability to GLOBE trainers, directors, and teachers in Russia, Kazakhstan, and Uzbekistan. He also addressed the European and world GLOBE Country Coordinators meetings.

GLOBE is a worldwide hands-on, primary and secondary school-based education and science program. Students take scientifically valid measurements in the fields of atmosphere, hydrology, soils, and land cover/phenology – depending upon their local curricula. The students report their data through the Internet, and create graphs and maps on the free interactive Web site to analyze data sets. Students have the opportunity to collaborate with scientists and other GLOBE students around the world.

Perhaps, in our Digital Era, we need to use images instead of words to pass along our ideas. A good web site for obtaining satellite images for free is the U.S. National Aeronautic and Space Administration (modis.gsfc.nasa.gov/gallery/index.php). In an age when students receive much of their information from TV, personal computers, or from mobile phone screens, teachers must use the same level of technology to introduce students to concepts of sustainable development. To show Earth from space – and how small and fragile it is – is a good starting point.

(Professor Feodor Surkov – Rostov State University, Russian Federation)

Promotion of ESD

- Delivered copies of Agenda 21 to all faculty members in the six largest regional universities.

Disseminating Agenda 21

In order to foster sustainable development and promote reorienting education to address sustainability, six thousand copies of Agenda 21 were printed and disseminated to teaching faculty of six universities in the State of Paraná, Brazil.

In 2001, a series of six seminars successfully launched the project, "Agenda 21 Goes to School," which introduced Agenda 21 to university instructors at six institutions of higher education (IHE) in Paraná: (1) Federal University of Paraná, Curitiba; (2) State University of Maringá; (3) State University of Ponta Grossa; (4) State University of Londrina; (5) UNICENTRO State University of Guarapuava; and (6) UNIOESTE State University of Cascavel. The main objectives of the seminar series were: (a) to promote the dissemination and use of Agenda 21 in the teaching, research, and extension activities in Paraná's IHEs, (b) to motivate university instructors to modify curriculums to prepare students for careers that encompass a wider vision of environmental issues and sustainability, and (c) to raise awareness and equip future professionals (of all areas) to collaborate preserving the environment and implementing sustainable development.

A complementary project directed inservice and pre-service teacher-education programs to promote a new, socio-environmental ethic, and to develop environmental preservation and sustainability projects for elementary schools. To facilitate this effort, teacher educators received the booklet, *Double Action: Awareness and Environmental Education for Sustainability* edited by Z.Z. Malhadas along with a copy of Agenda 21.

(Professor Ziole Zanotto Malhadas
– Federal University of Paraná, Curitiba, Brazil)

- Produced sustainability demonstration sites that address energy conservation, organic agriculture, wastewater treatment, etc.
- Participated in a national committee to rewrite teacher education certification requirements.
- Designed programs to model ESD practices within an institution.
- Use the Earth Charter as a framework for the development of presentations and workshops.
- Raised the level of awareness of ESD through many activities by writing journal articles and popular press materials; giving media interviews, lectures, and presentations at conferences; contacting academics and educators in many disciplines; and speaking with higher-education administrators around the world.

Developing new models of in-service for senior education leaders

The UNESCO Chair at York had the opportunity to take part in the Sustainable Enterprise Academy, a seminar for very senior level corporate executives aimed to help them plan for addressing sustainability issues within their corporations. It became apparent that this same in-service concept applied to senior education leaders. As a result, the Faculty of Education has teamed up with the School of Business (the originators of the business academy), Environment Canada, and Learning for a Sustainable Future (a national NGO) to develop a Sustainable Education Academy. The Academy is designed to address sustainability issues in elementary and secondary education systems across Canada. The program will take a holistic approach, preparing directors and superintendents to support grassroots initiatives in their districts. Some 40 senior educational leaders attended a one-day consultation to ascertain the kinds of issues the leaders wanted to address in the academy. The topics ranged from an introduction to sustainability to sustainability aspects of human resources management, purchasing, curriculum implications, building design, transportation for students, energy use, water use, and waste management among others. The education version of the academy will be launched in 2006 and will travel across Canada.

(York University, Canada)

The remainder of this document is founded on the experiences of the International Network members and the activities listed above. This document reflects practice informed by theory.

IV. Challenges to ESD and enablers

While many nations around the world have embraced the need for education to build capacity to achieve sustainability, only limited progress has been made on any level. This lack of progress stems from many sources. In some cases, a lack of vision or awareness of the role education could play in achieving sustainability has impeded progress. In others, it is a lack of policy or resources such as funding. The UNITWIN/UNESCO Chair and members of the International Network have identified a number of issues that limit progress in ESD. For example, one Network member wrote, "The main problems I faced when I tried to implement any work on education and learning of sustainability in our institutions were lack of awareness and understanding of the concept of sustainable development among our faculty members." Others claimed there are too many disparate initiatives, too little time for thinking about new ideas, and too little encouragement to think "outside the box" or make links between initiatives, particularly where cultural norms or existing mission statements don't mention sustainability.

None of this surprises anyone who works in an institution of higher education (IHE) and who has been involved in the change process. Everyone, who has somehow shaped change at an IHE knows, change is possible, and it does happen. Evidence of change appears in section III. Initiatives Taken by Members of the International Network in the description of innovative practices the International Network has developed.

Because IHEs advance knowledge, they enable change. The academic freedom of IHEs allows critical discourse of current knowledge and practices. Members of the International Network wrote, "As college and university teachers and researchers our responsibility as academics, educators, and advocates is to participate as critical colleagues in the intellectual life of our faculties, institutions, and broader community. This requires critical engagement with the field that we work in, and critical examination of the assumptions and propositions that circulate in the field." This freedom of discourse enables the changes necessary to reorient education to address sustainability. It allows faculty members to scrutinize curriculums, programs, practices, and policies of their institutions and the surrounding society and make small or sweeping changes.

Two other enablers of change in IHEs are time and funding. Released time from traditional responsibilities – teaching, advising, supervising student teachers, and committee work – frees faculty to focus their attention on planning and implementing change. Funding also

enables change. Funding for faculty-released time, allows them to concentrate their efforts on planning and implementing change. Funding also provides resources (e.g., publications, Web access, and materials) that make program development easier. We emphasize though that the changes in teacher education described in this publication were for the most part undertaken without outside funding.

All institutions of higher education, in whichever cultural context they are located, must be responsive to processes of change – processes that bring both opportunities and challenges. Through their responses institutions seek more effective ways of living out their missions while competing for resources in a rapidly changing and technologically globalized world. As the extensive research literature shows, little of this is straightforward even where senior managers mandate change. Existing institutional practice, cultural norms, and academic freedoms can all obstruct development. However, while these factors may inhibit change, they may also provide opportunities and useful points of engagement with those involved. Where change involves new ideas on emerging concepts (which like ESD arise outside the university and perhaps outside mainstream thinking), problems inevitably arise. However, strong change forces that pre-exist within the institution can guide a sensible course of action to minimize problems and optimize opportunities.

Communicating about ESD within teacher-education institutions is important to the progress or lack thereof related to change. Faculty members often have some existing conceptions of sustainability, which may or may not have kept pace with the evolving nature of sustainability. Linking ESD to ongoing academic programs requires a more comprehensive understanding of sustainability and local sustainability goals. Furthermore such linkage needs clear, concise ways of communicating about ESD. Communication needs to be comprehensible, address relevant issues, and reach the right audiences.

The communication administrators receive should enable them to understand the concept of ESD, to see the potential of ESD for their institution, and to enable the administration to inspire others. The communication also needs to help administrators build support for ESD within their institution. Not all administrators feel it is necessary to have access to the latest discussions in the wide spectrum of disciplined oriented journals or conference proceedings in order to promote ESD. The administrators, however, need communication that helps them in their task of reorienting their institution to address sustainability. Developing ESD communication strategies for senior administration is a major component of facilitating institutional change. The teacher-education community needs to develop specific communication strategies and materials for target audiences such as administrators.

Where existing accreditation or validation guidelines stand in the way (as will often be the case with ESD), getting institutional support for change will be helpful, as will identifying curriculum contexts where related developments are taking place – even those that are isolated and limited, and perhaps not linked with community participation or external stakeholders.

Leading by example and working through pilot, experimental, and optional programming may well be necessary to gain institutional support, and make progress. In addition, we can move forward by showing that ESD is good education and that ESD-related research is methodologically sound and important research.

Challenges to teacher education reorientation

Some of the more prevalent challenges reported by members of the International Network for reorienting teacher education to address sustainability fell into the following categories.

Institutional Awareness, Support, and Resources

- Official national and provincial curriculum rarely mandate sustainability.
- Teacher certification guidelines do not mention sustainability.
- Lack of or inadequately trained professionals who are knowledgeable about ESD.
- Lack of or inadequate funding and material resources.
- Lack of or inadequate national, provincial, and local policy to support ESD.
- Lack of or inadequate institutional climate that supports the creativity, innovation, and risk-taking necessary to support transformative efforts to reorient education to address sustainability.
- Lack of or inadequate reward for institutions or faculty members who undertake ESD programs.

Without the global (policy) it is hard to act local: limits to local action for sustainability education

The University of Edinburgh has a number of teaching staff committed to developing sustainability in curriculum. We have made substantial improvements since the start of the UNESCO program but the journey tells as much as the destination.

We recently broadened our Masters of Science in Outdoor Education to include a pathway in Environmental Education; both paths contain a significant ESD element. This was possible primarily because neither is a national curricular subject constrained by policy, and staff successfully argued the educational case. While staff was enthusiastic, increased resources did not support curricular changes; senior administrators saw this as consolidation of an international reputation.

Several years of internal lobbying and creative work by the university's Sustainability and Environmental Advisory Committee culminated in a new university-wide, optional first-year course in Sustainability and Society. That this took so long can be attributed to both the lack of national policy and expectation that universities should train graduates in sustainability. Authorization for us to write the course was in equal measure a response to a moral imperative and the realization that other universities included sustainability in degree programs.

In contrast, our modest ESD provision in teacher education has not been extended. Program structures, which are regulated by national policy, are considered 'full' already and inclusion of ESD is not required. Nonetheless, the collaborative development of a European Union funded and Web site (*www.education.ed.ac.uk/esf*) with Manchester Metropolitan University has allowed staff and teachers in service to access a wide range of materials within a structured ESD program.

What we had control over, we changed. What we couldn't change was due primary to institutional structures and the national policy context. These restrictions and lack of dialogue hindered change. Although governments have made international agreements on ESD, these are not yet being implemented at national or education-department level. UNESCO can play a vital role not only reminding governments of these commitments, but also in supporting institutions and particularly individuals who, despite the difficulties, do so at the local level.

Prioritizing Sustainability in the Educational Community

- Lack of or inadequate awareness of importance of ESD.
- Lack of knowledge of ESD complicated by the lack of access to in-service training related to ESD.
- Lack of support from the ministries of education.

Reforming Education Systems and Structures

- ESD is not part of ongoing educational reform.
- Prevalence of traditional disciplinary curriculum frameworks makes incorporating sustainability, which is transdisciplinary, arduous.

Establishing and Sustaining

- ESD programs are often developed without local community participation or involvement of other stakeholders leaving the program without local context or relevance.
- Lack of coordination of efforts between ministries of environment, education, health, agriculture, etc.

V. Recommendations relating to institutions of teacher education: practical activities to reorient teacher education to address sustainability

Reorienting teacher education to address sustainability will require efforts in many arenas and from the local to national scales. This section of the document lists recommendations, which stemmed from real-life experience on reorienting teacher education to address sustainability. These recommendations are the collective advice given by practitioners, who work in faculties of education, on how to move forward to reorient education to address sustainability. The recommendations address a number of themes and scales – personal to national – and concern curriculum, programs, policy, and practices all associated with teacher education. The following are not the musings of people who simply imagine how to move forward, but they are pieces of wisdom garnered through the experimentation and hard work of teacher educators, who bridge theory and practice.

1. Recommendations on ministerial and national involvement

Because many curricula – primary, elementary, secondary, and teacher-education – are mandated at the provincial/state or national level, those who promote reorienting teacher education to address sustainability often find themselves talking to and working with officials of ministries of education. The major issues are often around incorporating sustainability into curriculum and teacher-certification guidelines. If sustainability is mandated, it is far easier to reorient curriculum to address it than if incorporating ESD into the curriculum is optional. However, few ministries recognize the importance of ESD. International Network members write:

- "The main hindrance [to reorienting education to address sustainability] is the large number of educational priorities impinging upon teacher education pre-service programs."
- "The perception that education for the future was important, but that did not necessarily mean education for a sustainable future. The focus is more on innovation that supports the economy."
- "The perception… nationally is that ESD is not critical because it is not one of the main learning areas. Having assessment standards of ESD is essential to gain a measure of credibility."

- "The emphasis on literacy and numeracy in our education system continues without any acknowledgement of the contribution of [sustainability] or integration between numeracy and education or sustainability. ESD provides an ideal context for teaching the 'mechanical' skills of literacy and numeracy."

As a result of frustration with the above issues, International Network members learned to link ESD to ongoing education reform. They described ESD as a partial solution to current problems or issues. In addition, they established relationships in ministries of education, environment, health, agriculture, forestry, commerce, and human welfare, as they tried to help bridge the gap between the ministries. Knowing also that each ministry has a public information budget and the need or mandate to engage formal education, Network members solicited their support.

Recommendations:

1.1 Work with ministries of education to make ESD a mandatory part of elementary and secondary education at national and provincial levels.

1.2 Work with ministries of education to revise teacher education and certification requirements to include ESD and to align these revisions to correspond to the ESD components of elementary and secondary education.

1.3 Work with the ministries of education to create policy to support ESD.

1.4 Work with the ministries of education to create professional development programs related to ESD for teacher educators.

1.5 Engage teacher unions and national certification boards in the conceptual development and implementation of ESD.

1.6 Develop a strong national coordination team for ESD that includes professional organizations and issue-related educational organizations (e.g., consumer education, environmental education, and equity education) to integrate their work with institutional ESD initiatives through cooperation, collaboration, and sharing of ideas.

1.7 Work with national publishers and textbook committees to infuse sustainability into textbooks at all levels.

Liaison with the National Government

As the UN Decade of Education for Sustainable Development emerged in 2004, Canada prepared to implement a national Decade strategy as well. Under the initial leadership of the Department of Foreign Affairs and International Trade (DFAIT), various governmental departments, NGO's, universities, and interested individuals met in the Capital to explore a possible Canadian response. Later, Canada's Department of the Environment financed a national consultation on the Decade and created a network complete with sub-committees. The UNESCO Chair on Reorienting Teacher Education to address Sustainability at York University assumed the role of co-chair and will continue to do so until the full network has developed its terms of reference, completed its governance structure framework, and recruited members from sectors that the network felt were under represented, such as the private sector and civil society. The Canadian Commission for UNESCO has served as a valuable ally in both planning and recruiting sectors that normally would not see their role in sustainable development.

Adapting local ESD to fit new legislation and policy

N. Zahles College of Education is the only college in Denmark to make the special study topic of sustainable development mandatory for all students.

The Ministry for Education is working on a new Teacher Education Act, which is to be debated and drafted during 2005/2006. As a result of Denmark's signing of the Kiev Declaration in 2004 and my position on a Ministry for Environment subcommittee that focuses on Education for Sustainable Development (ESD), I have been working with the Ministry to integrate ESD into this new legislation. As work continues on the Teacher Education Act, I will be raising awareness and debates among the committee and getting other people, organizations, and media involved. While nearly everyone--even in the ministries--agrees on the necessity of focusing on ESD, it is very difficult for the Ministry for Education to take concrete actions.

(Professor Klaus Bruun – N. Zahles College of Education, Denmark)

National Professional Development Program

In New Zealand education for sustainable development (ESD) has been addressed through the concept of environmental education and learning and education for sustainability. Also, ESD is identified as a policy strategy in many national and local government, business, and private sector documents.

The Christchurch College of Education was the successful tender for the national EE professional development contract from the Ministry of Education. The professional development program involved three key initiatives. Firstly, it provided funding for the training of 75 national facilitators in seventeen different regions throughout NZ. A special Maori EE training program added another 18 Maori facilitators. The second initiative involved the national facilitators delivering regional training programs to teachers. The regional training programs provided a detailed exploration of the EE Guidelines for NZ Schools. The professional development approach encouraged teachers to use innovative ways to address ESD/EE within their current school programs and it also challenged participants to consider alternative ways of designing new school programs that focus on ESD/EE. The third initiative identified teachers and schools that were committed to ESD/EE and provided additional support and assistance for the school to become a pilot school. The focus of the pilot schools was to establish a number of regional 'enviro schools' or 'model schools' that could demonstrate a balanced curriculum approach to achieving education for a sustainable future. Many of the national pilot schools are now part of a national Enviro-Schools program.

(Professor Barry Law – Christchurch College of Education, New Zealand)

2. Recommendations on community and regional/ provincial involvement

Working at the regional, provincial, and community levels are as important to advancing ESD as working on the national level. National level efforts often aggregate and address national averages. However, many countries have great geographic, cultural, and economic diversity that a singular national curriculum or textbook cannot address. As a result, specific conditions and contexts must be addressed at regional and local levels.

Communities surrounding teacher-education institutions contain a wealth of activities and projects related to environmental, social, and economic spheres of sustainability. Addressing local sustainability issues can bring relevancy to the curriculum and contribute to deeper understanding of the complexity of the issue and its impact on the community and region. Furthermore, students often complain that what they learn in classrooms and from textbooks seems detached from their lives. Studying local communities and their sustainability

issues ameliorate the problem of relevancy. Community sustainability issues are perhaps more comprehensive than global issues due to their proximity and immediacy. Local, concrete examples, such as environmental protection or abuse and social justice or inequality, provide points of study for student teachers to incorporate into their curriculums to in turn engage their pupils. In addition, faculty members and student teachers can fulfill community outreach and service obligations by volunteering in the local community thus promoting their own understanding of and experience with sustainability. Student teachers will eventually weave these experiences into their classroom curricula.

Promoting ESD beyond the campus into the community or provincial level takes a different set of skills and knowledge base than working at the national level or on campus. For example, one member advises, "make certain that ESD is championed by senior civil servants in addition to politicians". Politicians, while influential, change posts more frequently causing more work – in briefing the newest politician on ESD – to sustain projects and progress. Also politicians often want to launch a "new cause" rather than be associated with a previous initiative."

Recommendations:

- ***2.1*** Make use of community resources (e.g., NGOs, institutions, clubs, religious organizations, government agencies, businesses, etc.) in the teacher education program, both within and outside the classroom, to teach about local sustainability issues, efforts to address these issues, sustainable practices, and sustainable businesses.
- ***2.2*** Establish new models of professional development in ESD that draw together essential skills, cross-curricular approaches, and action-based learning models so that student teachers and in-service teachers can work on projects that are relevant and important to their communities' future well-being.
- ***2.3*** Establish regional teacher-education groups to develop sustainability-related modules and relevant literature, which should be made available on a regional scale.
- ***2.4*** Develop strong regional consortium teams that allow educators from a range of sustainability-sector groups outside your organization to come together to *support teacher-education initiatives.*
- ***2.5*** Establish partnerships among universities to ensure ESD becomes the norm rather than an experiment or an isolated case and hence easily eradicated.

PREPARING TEACHERS TO WORK IN INNER-CITY SCHOOLS

To address the uniqueness of teaching in inner-city settings, York University established a specialized teacher-preparation program. Working closely with parents and existing schoolteachers, this program is based in a community center in a large, ethnically diverse government-assisted housing community called Regent Park.

After years of requests, the city of Toronto, recently agreed to rebuild the Regent Park community for the 12,000 working-class residents and their families. The new design is based on an extensive community consultation process. Student teachers at the site realized the consultation process was relevant to the lives of the pupils and that they could improve classroom work through incorporating it into the curriculum. As part of their practice teaching assignments in Regent Park schools, the student teachers discussed this project with their pupils, and asked them to draw pictures of their dream apartments, playgrounds, and community facilities. These students constructed models and wrote reports on their surveys and interviews and then presented their work to an audience of several hundred at the community center. York's educational endeavor has prepared teachers for traditionally hard-to-serve students while contributing to the long-term sustainability of a community.

(Professor Harry Smaller – York University, Canada)

Addressing regional needs

Through the efforts of the many local multiethnic and Indigenous communities, the University of the Autonomous Regions of the Nicaraguan Caribbean Coast (URACCAN) was founded in 1995. It was designed as a regionally based institution of higher education, capable of promoting economic, social, cultural, linguistic and environmental sustainability. As part of its mandate, in 2000 the University organized a broad consultation aimed at revising the centralized educational system, through the development of a new model that could better meet the demands and socio-cultural characteristics of the diverse population of the Caribbean Coast.

As a result of this process, the Regional Autonomous System of Education (RASE) was developed and approved by the regional councils. Its objective is the "integral training of men and women of indigenous peoples and ethnic communities, based on principles of autonomy, intercultural education, solidarity, and gender equality, within a regional and national culture that promotes human and sustainable development."

For its part, URACCAN responded to this new initiative by designing and implementing a Bachelor degree program (Licenciatura) in intercultural bilingual education, which would be accessible to elementary and secondary school teachers working in the many rural and remote schools of the region. The program is now well under way, and already these teachers are applying their new methodologies in introducing the knowledge, skills, and values of sustainability in their own respective classrooms.

(University of the Autonomous Regions of the Nicaraguan Caribbean Coast, Nicaragua)

3. Recommendations on change within institutions of higher education

This section on change within an institution of higher education (IHE) has four subsections of recommendations. All four deal with change within an IHE at a particular level: entire institution, faculty (i.e., departmental), engaging students, and individual faculty member.

3A. Recommendations on change across institutions of higher education

Reorienting teacher education to address sustainability will affect faculties and administrative units beyond the faculty of education. As we know from studies in ecology and sociology, a change in one part of a system will result in changes in other parts of the system. This general principle is also apparent on higher education campuses. Support from the highest institutional levels enhances the success of reorienting teacher education to address sustainability. For example, upper administration can facilitate success by structuring faculty reward systems for promotion and tenure to include teaching, research, and service related to ESD. Upper administration can also strive to manage the campus using sustainable practices, thereby reflecting the value the institution places on sustainable development. Modeling and promoting sustainability in practices and policies related to social equity and environmental stewardship will reinforce sustainability themes taught in academic and professional education programs.

One thing the International Network did not anticipate at the outset was frequent change of administrators. Senior administrators often rotate out of their jobs in 3 to 5 years. As a result, promoters of ESD found they had to, once again, meet with new administrators and convince them of the importance of ESD. Advocates of ESD should be prepared to create awareness and understanding in their own and other campus units to ensure the survival and success of ESD in their own faculties.

The following recommendations come from the experience of people who promoted ESD on their own campuses.

Recommendations:

- ***3A.1*** Promote reorienting education as a viable avenue for research and teaching in higher education institutions.
- ***3A.2*** Gain support of upper administration in the forms of mandates and resources to assist those who are working in ESD at lower levels.
- ***3A.3*** Involve faculty, support staff, researchers, and managers from across the institution to support interdisciplinary changes that reflect sustainability and reward participation in such efforts.
- ***3A.4*** Allow interdisciplinary courses in sustainability to fulfill degree requirements across disciplinary faculties.
- ***3A.5*** Create a sustainable-campus policy and conduct highly visible events that reinforce campus efforts to implement that policy (e.g., signing of the Talloires Declaration, reaching energy savings targets, and achieving diversity goals).
- ***3A.6*** Engage student groups and organizations.

THREE EFFORTS – ONE GOAL, SUSTAINABILITY

Florida Gulf Coast University (FGCU) has made three major contributions to the further ESD in higher education generally and teacher education specifically.

1. Swiss International Teacher Program
Summer 2005 marks the sixth consecutive year that the FGCU's College of Education has hosted teachers from Switzerland, Brazil, South Africa, Canada, and the United States. Teachers live together in the on-campus residence halls for four weeks while they acquire new skills, exchange information, and form an appreciation and understanding of interdependencies among people, communities, and nations for a sustainable future. Participants study and experience ecological, economic, and sociological dimensions of sustainability through ECOSYS a computer simulation model. The program also sends participants throughout southwestern Florida to conduct interviews with government, business, and nonprofit organization leaders and families who are dealing with issues of environmental stewardship and economic growth in one of the fastest-growing areas in the United States.

2. The Colloquium
FGCU requires a course on sustainability for all baccalaureate degree-seeking students. The course focuses on ecological, economic, and societal dimensions of sustainability and views the FGCU campus as an ecosystem. It includes field trips throughout southwestern Florida to various nature preserves and ecological points of interest. It uses the current State of the World publication and other books focused on ecological footprints. The pedagogical aspects of sustainability include reading Experience and Education by John Dewey.

3. Center for Environmental and Sustainability Education
FGCU recently established a center, which focuses on the interdisciplinary study of critical issues in environmental and sustainability education. The center also organizes a speaker series and other activities throughout the academic year.

(Professor Larry Byrnes – Florida Gulf Coast University, United Sates of America)

3B. Recommendations on change within faculties of education

In the International Network, many participants found that the first place (and perhaps most effective place) they could work was within their own classrooms and the curriculum area for which they were directly responsible. Most began by reorienting their own classes, including both what were taught and how the class was conducted. However, to go beyond this initial level was the real focus of this undertaking. The participants were to reach out within the faculty to attempt a larger-scale reorientation process.

Network participants discovered that ESD was not a common concept in many faculties, so they developed discussions around ESD for engaging faculty members and staff. Because in many universities top-down initiatives and mandates are not effective in bringing about change the reorienting effort sometimes hinges on the acceptance of staff and faculty. After gaining acceptance, ESD advocates worked to co-opt participation. They discovered one good way to find participants was to build on local and national sustainability issues and priorities as perceived by the general public (e.g., social equity or environmental degradation). Another was to enlist new participants by discussing and demonstrating how infusing ESD into the curriculum would address the concerns and priorities of local teachers and schools (e.g., improving access to quality education, student retention, motivation, and relevance of the curriculum to daily life).

One effective technique used by the Chair for gaining volunteer participation is to describe a vision for ESD programs with sufficient detail that faculty members can see a role for themselves in the ESD effort. This vision should include a broad range of activities (e.g., reorienting course curriculum, sitting on provincial or national committees to revise curriculum, writing materials or textbooks, supervising student teachers, developing examinations and assessment tools, developing policy at campus to national levels) in which faculty are already involved. In this way, faculty members can picture how their particular skills or knowledge could benefit the new ESD program. ESD should be proffered as a priority for future curriculum reform; however, faculty members should implement the ESD priority in their own ways, calling on their own knowledge and professional strengths.

Promoters of ESD in faculties of education needed large group acceptance for action plans for reorienting teacher education to address sustainability, but the implementation of such plans may be executed by a small group of dedicated faculty members. During the implementation phase, transparency of efforts and reporting back to all faculty maintained broader faculty support and tolerance of ESD activities. The following are specific recommendations from International Network members on working within faculties of education to reorient teacher education to address sustainability.

Recommendations:

- ***3B.1*** Make the administration and faculty leaders aware of the need for reorienting the teacher-education program.
- ***3B.2*** Provide educational opportunities to ensure that every member of the faculty of education understands the need for ESD, how it is relevant to teacher education in both improving quality basic education and reorienting existing education, and how each faculty member can contribute to the overall effort.
- ***3B.3*** Set up a participatory and democratic process involving every part of the faculty of education (i.e., faculty, staff, administration, research faculty, school liaisons, students, etc.) to reorient teacher education to address sustainability.
- ***3B.4*** Move quickly to institutionalize new ESD projects, so the progress will continue in spite of frequent changes in faculty, administration, or funding that endanger new projects and innovative undertakings.
- ***3B.5*** Lobby within the faculty for ESD at times of program review and renewal.
- ***3B.6*** Recognize and reward academic effort and administrative leadership, especially when it is voluntary and above and beyond the regular requirements.
- ***3B.7*** Describe for the teaching faculty the contribution that the reorienting process can make to their graduates.

Addressing Diversity

In the mid-1980's, the Faculty of Education at York University resembled most other education faculties in Canada. Most of the teaching faculty had previously taught elementary or secondary school, and most were of European descent. The faculty served students who had mostly done very well in school and who also were of European descent. The Faculty of Education offered a pre-service program focused mainly on the provincial curriculum and emphasized professionalism in approaches to teaching and learning.

Today, York's Faculty of Education complement is diverse, and the student body reflects Toronto's multicultural population. Although York's pre-service program still includes a focus on the provincial curriculum, it distinguishes itself from other programs by emphasizing equity issues in all aspects of the curriculum and all approaches to teaching and learning. This transformation came about as a result of a core group of faculty members who worked on committees to build consensus on initiating curricular and programmatic changes.

Sustainability now offers the Faculty of Education an opportunity to expand on its commitment to equity and to begin to address social justice issues related to poverty, violence, militarism, globalization, eco-racism, and environmental degradation. The challenge ahead is not unlike the challenge faced by equity advocates in York's education faculty twenty years ago. The task now is to find ways to engender understanding and build commitment and enthusiasm for the conceptual framework and pedagogical imperatives that sustainability education implies.

(Professor Don Dippo – York University, Canada)

Curriculum study and workshops to reorient teacher education

As part of the initiative of the National University of Lesotho (NUL) and the Lesotho College of Education (LCE) to address environmental degradation, teacher education courses were audited. The analysis was based on 27 course outlines from LCE, and interview data with lecturers for 23 courses offered in NLU's Faculty of Education. Almost half of the courses reflected environmental concepts and issues though only a few reflected environmental concepts in their examinations.

Subsequent to the survey, two workshops brought lecturers from both institutions together to reflect on local environmental issues and problems and revise their course outlines with respect to significant environmental concepts and issues, appropriate teaching strategies, expected learner competencies, and appropriate assessment. Revised preliminary courses show that while criteria used for revising courses could be a useful beginning to respond to environmental degradation, this procedure tends to limit individuals to modifying only certain aspects or topics of courses. However, a whole course reorientation could be achieved through an extended and collective conceptualization of environment and sustainability and a more rigorous examination of teacher education courses. Further activities have been planned and a teacher education network has been initiated towards this end.

(Dr Tsepo Mokuku – National University of Lesotho
& Mrs 'Mantoetse Jobo – Lesotho College of Education)

3C. Recommendations on change related to engaging pre-service and in-service teachers

The students in teacher-education programs go by many different names – student teachers, teacher candidates, interns, etc. For clarity and simplicity the authors of this document refer to students in teacher-education programs as student teachers.

Student teachers will notice our hypocrisies – such as programs, practices, and policies that do not reflect principles of sustainability that are taught in the curriculum. The members of the Network reported that students at all levels of education are very aware of the difference between what is said in class and what is practiced by individuals, the institution, and the community.

One of the great challenges of ESD is to have student teachers understand the interrelatedness of the environment, society, and economy and have this interrelatedness be evident in their teaching and their lives as community members. Since ESD is an instrument for imparting healthy personal and social attitudes towards environment and development, it must be concerned with human communities and how they interact with their local environment. Exploring how to do this on the campus is a good first step.

Addressing ESD will require student teachers to think about their profession from a different perspective and learn skills that perhaps, teachers in previous eras did not learn or use. As a result, the new generation of student teachers will require practice and support as they learn new approaches to education. The following are recommendations from teacher-educators in the International Network related to student teachers.

Recommendations:

3C.1 Require interdisciplinary coursework on sustainability for student teachers and make materials available for student teachers on local and global sustainability issues.

3C.2 Demonstrate pedagogical techniques that foster higher-order thinking skills, support decision-making, involve participatory learning, and stimulate formulation of questions.

3C.3 Emphasize to student teachers that citizenry in a sustainable community requires active participation and decision-making; challenge them to create ways to incorporate participation and decision making into their classroom procedure and curriculum.

3C.4 Discuss social equity (e.g., gender, racial, ethnic, and generational) with student teachers and identify ways in which the local community exhibits social tolerance, societal intolerance, equity, and discrimination.

3C.5 Request that student teachers analyze the mandated curriculum they will be teaching to identify topics and themes related to sustainability and those that are linked to local sustainability issues.

3C.6 Provide student teachers with opportunities to explore their own values and attitudes towards local sustainability problems and those of the surrounding region.

3C.7 Promote understanding of global sustainability in order to encourage critical thinking and decision making that influence personal lifestyle and economic choices.

3C.8 Develop specialized ESD programs for student teachers (e.g., mini-courses) with certificates of completion, so that student teachers can include them in their resumes for seeking employment.

3C.9 Promote graduates with ESD specializations, who are knowledgeable in ESD and its contribution to society.

3C.10 Place graduates who have completed courses in ESD in key schools and ministerial positions to help influence and bring about change.

Establishing a sustainable campus

Since 2004, faculty members and students have launched a series of efforts to convert an old administration building and the adjacent school garden into a Sustainable Campus (SC) at National Taiwan Normal University (NTNU). The facilities create a platform for first-hand teaching and learning experience for addressing sustainability. The SC, which was sponsored by the Ministry of Education, Department of Interior, and National Taiwan Normal University, has gradually become the demonstration base for many types of university courses. Moreover, NTNU's Graduate Institute of Environmental Education has developed ESD teaching materials and interpretive media for neighboring grade-school students, teachers and community residents. The major efforts on the SC include:

1. Rainwater Harvesting and Black Water Treatment and Recycling System
   - A rainwater harvesting system collects rainwater from the roof of the administration building and is used for flushing toilets in the building. The rainwater systems drastically reduces the amount of water used from the city water-supply system
   - Black water (sewage) is treated first by a septic tank and next by a specially designed and constructed wetland. The treated water is used to irrigate the SC garden
2. Increasing Biodiversity
   - By establishing a constructed wetland and aquatic pond, habitat was diversified both aquatically and terrestrially, which attracted more flora and fauna to the SC.
   - By creating a rooftop garden, also called a green roof the SC now has a vegetable garden. The garden is a demonstration site for organic farming methods. It also links farming with urban life. The green roof can reduces the building's consumption of electricity for air-conditioning during summer.
3. Energy Conservation Systems
   - By installing a solar photovoltaic panel and a solar hot-water system on the rooftop to generate electricity and hot water for the building, the SC campus reduced their energy consumption from the grid.
   - By design and installed sun-shelf, which blocks the direct sunlight and reflects natural light into the rooms of the building, the SC has decreased energy demand for indoor lighting.
4. Environmental Education and Interpretation System
   - The SC is now open to all the facilities across all disciplines at NTNU as a platform for their courses and for demonstrating possible means of sustainable living.
   - By developing and installing interpretive media (including eight pieces of interpretive panels, one self-guided trail brochure, and a poster), visitors, and both the public and school students gain insight and interest in the site and learn about sustainability.
   - In addition the SC has an educational packet available for primary school teachers and students. The packet includes four well-designed ESD teaching modules, which use the SC as the basis for teaching.

(Dr Tzuchau Chang & Dr Ju Chou
- National Taiwan Normal University,
Taiwan, China)

Initiatives to enable in-service teacher professional development

The Rhodes University Environmental Education & Sustainability Unit has developed an accredited module for in-service teacher professional development called the 'Schools and Sustainability' program. This program draws on earlier work in the context of a series of participatory certificate course program. With the introduction of the new curriculum, and the foregrounding of environment and sustainability concerns within the curriculum, a need for in-service professional development of teachers was identified. At a local level, Rhodes University worked with teachers from previously disadvantaged schools in the Makana District to develop lesson plans and classroom activities with an environmental and sustainability focus. A model for professional development was developed which is based on 'work together' and 'work away' tasks, allowing for application of learning in practice. Teachers attended regular cluster meetings over a two year period, during which they undertook audits of their schools and communities, developed environmental policies and management plans for their schools, and developed, taught and reflexively reviewed a series of lesson plans and classroom materials. Teachers' work was organized into portfolios and this work was assessed. Teachers participating in this program gained 24 credits towards a fourth year in-service teacher education qualification. The participating schools also achieved EcoSchools status. Since then, the initiative has grown to include more teachers in the Makana district, and is now expanding to a national program supported by the Department of Water Affairs and Forestry, and other environmental groups.

(Professor Heila Lotz-Sisitka – Rhodes University, South Africa)

Book series: Education for Sustainable Development

In order to lay a foundation to promote the development and adoption of ESD in China, scholars and teachers from several institutions wrote and published a series of books that introduces – for the first time in China – ESD concepts, main principles, international developments, practices, projects, and evaluation. The series on ESD is published by China Geological Press and includes seven books:

- *Panorama of Education for Sustainable Development*
- *Green University and Education for Sustainable Development*
- *Practice of Education for Sustainable Development*
- *Research Projects and International Comparison of Education for Sustainable*
- *Development Evaluation of Education for Sustainable Development*
- *Handbook of Teacher Training on Education for Sustainable Development*
- *Education for Sustainable Development Toolkit (translated works)*

With one exception, the authors are from Beijing Normal University, Beijing Academy of Education Sciences, Beijing Education Committee, and Tianjing Education Committee. The *Education for Sustainable Development Toolkit* was written by Dr Rosalyn McKeown of University of Tennessee and was translated by Wang Min, Wei Dongying, and others from Beijing Normal University. Professor Wang Min also served as editor-in-chief of the series.

(Professor Wang Min – Beijing Normal University, China)

ALTERNATIVE EXAMINATION IN TEACHER EDUCATION

One new course for student teachers at Uppsala University employs an alternative form of examination. After lectures, seminars, excursions, and study visits, students must show their understanding of sustainable development by constructing a case. Such case-based learning helps students acquire problem-solving and decision-making skills in complex situations. By reading narratives about individuals facing decisions or dilemmas, learners engage with the characters and circumstances; investigate so as to understand the facts, values, contexts, and decisions in the story; and connect the meaning of the story to their own lives. The teaching faculty informs the students about the case methodology and demonstrates a few examples. In one lecture, they are informed about a pilot project by using cases to create understanding. They are asked to construct a case that includes an environmental problem in an appropriate context. The students reacted positively towards this means of examination. The variety of issues ranged from the problem of a fattening population in Western countries to the extinction of the Aral Sea in Asia.

(Dr Valdy Lindhe – Upsala University, Sweden)

3D. Recommendations at the individual faculty member level

The role of pioneers in a new educational effort or reform is difficult and fatiguing. International Network members experienced many setbacks; some even repeated setbacks, in their attempts to involve others in reorienting teacher education to address sustainability. In order to help others keep their focus, energy, and good will during the difficult task ahead, they offer these recommendations.

Recommendations

3D.1 Begin by working within your own sphere of influence; change the things within the areas that are under your individual authority.

3D.2 Build partnerships; work closely with at least one colleague to ensure continuity and mutual support.

3D.3 Document work for ongoing reflection and evaluation.

3D.4 Attend ESD conferences with colleagues, student teachers, and graduate students to update knowledge and maintain enthusiasm for ESD projects.

3D.5 Learn basic grant writing skills.

REORIENTING SOCIAL SCIENCE AND GEOGRAPHY TEACHER PREPARATION COURSES

Many participants in the International Network advise others in faculties of education to begin working "within your own sphere of influence" and to initially change the things "within the areas that are under your individual authority" This vignette from Griffith University in Australia illustrates the successful reorienting of teacher education courses that prepare future secondary school social science and geography teachers. Reorienting these courses attempts to achieve two specific outcomes.

The first outcome is enhanced awareness of ecological sustainability, including personal behaviors and actions, both on the part of student teachers and the students whom they will teach. This effort has focused on such specific strategies as calculating personal ecological footprints, auditing personal energy consumption patterns, setting goals for reducing these, and monitoring progress toward attaining these goals. In addition, the students learn strategies to (1) create ecologically sustainable schools through suitable practices and (2) help creating sustainable communities through participating in community-based groups.

The second outcome is enhanced awareness and use of support structures for social science and geography teachers, including a variety of environmental education centers as well as Web-based information. This has involved extensive visits to the environmental education centers followed by on-campus workshops. The workshops concentrate on how student teachers can use these centers as part of the school curriculum and the appropriate use of Web sites to complete assessment tasks on issues related to the sustainability of Australian river, coastal, bushland, and urban systems.

Course evaluations of these outcomes and strategies indicate that the student teachers have enhanced levels of environmental sensitivity as well as increased confidence that they will apply these strategies in their teaching careers.

(Professor Wayne Muller – Griffith University, Australia)

4. Recommendations on funding and other resources

Unfortunately, in the majority of countries, few resources have been devoted to ESD. As a result, progress has come out of volunteer efforts of dedicated individuals and the in-kind resources of institutions. On this pilot project level, it was important to show that reorienting teacher education to address sustainability was not expensive and could be accomplished by cost-effective means. Now that the pilot project is completed, however, it is time for governments and institutions to dedicate funds to reorient education to address sustainability. Dedicated funds, personnel, and resources ensure that these pilot programs will be institutionalized and replicated and other projects begun on much broader scales. It is folly to think that funding and staffing allocation are not essential to creating and maintaining any education program.

Recommendations:

4.1 Work with ministries of education to redirect existing funding to address ESD.
4.2 Seek new sources of funding through grants, contracts, and sponsored research.
4.3 Collaborate with NGOs and environmental and social foundations.
4.4 Seek assistance from institutional units that support grant and contract acquisition.

A synthesis of knowledge and skills

At the University of Debrecen, the subject of sustainability has been introduced as part of the retraining of biology teachers, that is, in relation to environmental education. Two years ago, the Hungarian government prescribed for schools an elaboration of environmental and health education programs, in which we thought it best to integrate ESD. Educational purposes of ESD include the acquisition of knowledge in natural as well as in social sciences, of the skills, comprehension, and the general attitude to our visions of the future and to our values.

Although ESD is still a broad and new concept in that it is far from being fully elaborated or introduced, the University of Debrecen already emphasizes multi- and transdisciplinary study of issues of environment, economy, and society. The activities of our colleges from the Departments of Pedagogy and Sociology were a great help; together we managed to bridge the gap between natural and social sciences.

The ESD course induces certain ecological apprehensions and a way of thinking centered around the living environment, which helps create harmony between the social and the natural environment by restructuring environmental awareness. As an independent subject, ESD provided a synthesis of the knowledge and skills acquired in other courses and promoted critical thinking on environmental issues. The courses seem to have given teachers useful knowledge, which they can readily incorporate into their teaching practices.

(Professor Gyula Lakatos – University of Debrecen, Hungary)

5. Recommendations on partnerships

The work of reorienting teacher education to address ESD is so immense that fostering broad cooperation and engaging outside assistance is essential to long-term and widespread success. One Network member wrote, "This [era of cooperation] is different from years of competition between institutions and the constant replication of resources, courses, and programs all trying to prove [which institution is] the best. Now we are working as a national team to make sure we are all the best we can be." Partnering, however, can prove difficult in faculties; therefore, guidelines for acceptable partnerships, if not already in place, must be developed.

Recommendations:

- ***5.1*** Strengthen partnerships between teacher-education institutions and elementary and secondary schools, and such educational organizations as museums, outdoor education sites, and nature centers.
- ***5.2*** Strengthen local, regional, and international networks by sharing ideas, experiences, and materials and maintaining the vision of a sustainable world.
- ***5.3*** Work within national and international networks to help overcome difficulties and barriers at institutional and governmental levels.
- ***5.4*** Set up north-south and south-south cooperation and solidarity mechanisms around ESD to share experiences.

STEERING ESD INTO THE MAINSTREA

It is easy and comfortable for practitioners of minority interests like ESD to talk to and write for each other; we do it all the time and argue about minutiae. It is much more challenging to engage with the mainstream, but vital as well as it is here that influence lies.

So, when asked if you have anything to contribute to a seminar on *Redefining Prosperity: Delivering Well-Being*, organized in the government Treasury in association with the Cabinet Office and the Policy Studies Institute, you say 'yes' because this provides an opportunity to report on the *Listening to Children* project – a 12-month study of the local environmental perspectives of 11 to 13 year olds: how they think about where they live, their experience of living there, and how teachers and the school curriculum can take account of this.

The UK's Economic and Social Research Council funded this project as part of its Environment and Human Behavior program, 2003 – 2004.

The project was based on two key ideas:

- adults do not typically know children's experience and knowledge of their locality.
- such experiences are often neglected by teachers and schools in how the curriculum is thought about and organized.

The ways that children make sense of the relationship between home, school, and community, and how they interact with other children and adults who live there, rarely seem to be of interest to teachers and schools which tend to have their own fixed views of what should be studied. The project explored children's local community and environmental experiences, and how children's participation in community research can help them to become more environmentally conscious and active citizens, and so contribute towards their own, and community, well being.

(Professor William Scott – Bath University, United Kingdom)

6. Recommendations on research

For ESD to be a long-term success, advocates of ESD must develop a research agenda to support the effort. This agenda would include an accountability and assessment system to measure the impact on student learning. Proponents of ESD must have data to prove their claims of effectiveness of ESD. Asserting that ESD is important or effective will not be sufficient to sway audiences in ministries and academic institutions. Interdisciplinary research and collaboration is necessary both to build those arguments and to inform new ESD policy and programs.

As with any emerging field of research it is important that academic institutions accept ESD research as a legitimate avenue of inquiry and reward members of faculty who work in this field. Researchers need to be assured that their innovative and interdisciplinary work in ESD is valued in the faculty reward system (e.g., for purposes of tenure review and promotion).

Recommendations:

- ***6.1*** Create a research agenda to address important questions, such as the effectiveness of faculty efforts to reorient education to address sustainability.
- ***6.2*** Review and revise the theoretical framework underpinning of ESD as society and the concept of sustainable development evolve.
- ***6.3*** Increase research on quality teaching and learning approaches for ESD to help learning become more transformative in nature.
- ***6.4*** Conduct research on assessment standards and measures of performance for ESD to increase importance and credibility within the institutional assessment system.
- ***6.5*** Develop strong research-based arguments – to present to academic boards to show that ESD is a crucial re-orienting framework for education for the future.
- ***6.6*** Conduct research on economic costs and benefits of reorienting pre-service teacher education to address sustainability as well as providing professional development for in-service educators.

6.7 Conduct research on economic costs and benefits of introducing ESD in elementary and secondary curriculum compared to the costs and benefits of other educational reforms.

6.8 Develop research designs, methods, and techniques that focus on student learning results and yield applicable and meaningful findings.

6.9 Conduct school-based longitudinal studies using student work samples to determine the impact of ESD curriculum on student learning results.

6.10 Conduct research to establish and strengthen an open-ended research agenda to inform and strengthen key areas of ESD practice in Teacher Education for example curriculum change; participatory action research; auditing of institutional resource management and sustainability practices, etc.

6.11 Conduct research to establish and strengthen a vibrant 'community of practice' in teacher education, which strengthens the teaching and research capabilities of teacher educators involved in ESD.

Research as a Foundation for Change

The mission of the Environment Center at Charles University to update educational practice with recent knowledge derived from research on sustainable development, while catalyzing changes in educational paradigms to enable knowledge of sustainability to be naturally incorporated into the system and curriculum.

Although disciplinary-based education systems formally accept environmentally oriented courses, they make such courses isolated elements of a fragmented mosaic of knowledge. In practice, interdisciplinarity is still the individual decision of each lecturer. To compete with traditional curricular content and methods in teacher-education institutions, ESD will require a "paradigm shift." Such a shift would require university-based research in the fields of pedagogical theory and practice and contemporary philosophy of education.

The Environmental Center at Charles University defines research problems based on experience with existing sustainability-oriented teaching modules; applies for grants to various agencies to guarantee such research activities; publishes results in national publications, presents research findings at conferences, such as the *Forum of University Teachers*; and applies research results in its own teaching activities. Research themes include: definition of ESD in the context of national process of curriculum transformation; discourse analysis, general systems theory, and applications in education; and terminology in the interdisciplinary field.

(Dr Jana Dlouha – Charles University, Czech Republic)

7. Recommendations on communications

People who work to promote ESD have many challenges and barriers to overcome. This section pulls together experience and wisdom gained by the International Network as they meet those challenges. The concept of sustainable development meets with different levels of acceptance around the world. In some countries and communities, sustainability is central to envisioning a better future and working toward it today. However, in other places, sustainability is not accepted and is not considered useful as a paradigm for thinking about the future. While some institutions found the best approach was to address sustainability and ESD directly with the members of the faculty, others found that it was better to engage faculty members through other routes, such as talking about the interrelation of the three spheres of sustainability – environment, society, and economy. One International Network faculty member reported:

> *One of the difficulties that we have experienced is that ESD has not been taken up as a conceptually or theoretically interesting concept. It has not been as compelling as conversations around globalization, identity formation or the politics of identity, the new urban agenda, etc. It is often presented as a large unifying approach that over generalizes and diminishes the importance of specific concerns. As well, in popular usage, the language of sustainability either trivializes or undermines the concept of ESD, as we understand it. A more productive approach in this context might be to highlight an analysis that focuses on the interrelatedness of the society, environment, and economy. Deemphasizing the language of sustainability and focusing on this analysis may do much to further the goals of ESD.*

Communication about sustainability and education for sustainability is vital to garnering support and resources to move forward in reorienting education to address sustainability. The following are some general communications recommendations based on lessons learned from the International Network and the work of the Chair.

Use the vocabulary of your audience to promote ESD

Because ESD is new to many people, those who promote ESD need to develop the vocabulary to communicate the concept of sustainability to many audiences – from Ministry officials to poverty stricken parents unfamiliar with educational systems. Those who promote ESD need to express the importance of introducing ESD into our schools to ensure the well being of our communities, regions, nations, and planet. They must also learn to communicate how important it is to create a generation of students who can shape our future into a sustainable one.

Link the strengths and passions of others to sustainability

Find out what your audience is interested in or passionate about and then show them how it is also related to sustainability. Promote ESD by talking about concepts important to your audience and then linking them to sustainability and ESD. By doing this you will get more buy-in, acceptance, and tolerance. With new audiences, new initiatives and approaches will come. Be sure to welcome and acknowledge these new efforts.

Describe ESD as a solution to an existing educational issue

Learn to become conversant with national policies and issues by reading government documents. Then, use governmental vocabulary and language in correspondence with various ministries. By doing so, government appointees and employees will hear vocabulary and issues with which they are familiar. They can see the link between ESD and the issues their ministries have prioritized. Ideally, ESD can be tied to the agendas of various ministries by using this technique. Most importantly, by using this promotion technique you will be offering assistance in solving an existing problem rather than presenting a new problem that will require agency time, funding, and effort to solve.

Use all three strands of sustainability to promote ESD

When promoting ESD, make sure the concept of ESD that you promote embraces a broad scope, addressing the three realms of sustainability – society, economy, and environment – and the interrelationship of the three. Using a balanced approach will attract more professionals to join the ESD effort. For example, one institution in an Islamic country established a Department of Women's Studies through which it dealt with many sustainability related environmental and economic issues. The formation of the department greatly influences the scope and direction of ESD. As a cautionary note – environmental education, economics education, and social science education are important contributors to ESD, but each in isolation does not substitute for ESD.

Promoting ESD: a priority for years to come

Be prepared for a lengthy reorienting process that will undergo administrative changes, newly emerging priorities, funding cuts, and evaluation processes. Educators who have successfully led other similar undertakings say they have lobbied continuously over the years to maintain budgets, staff, and a place in the curriculum. ESD will also require that level of effort.

Models of successfully reoriented teacher education institutions need to be circulated among network members or global institutions in one form or the other. In this way, the education community can build on the experience and successes of others and avoid wasteful duplication or costly pitfalls. In order to do this, the ESD community needs to create or build upon existing networks to communicate with one another and the larger education community.

Recommendations:

- ***7.1*** Document successful ESD programs that have reoriented teacher education to address sustainability. Publish and disseminate this work.
- ***7.2*** Develop a recognition system for institutions of teacher education and elementary and secondary schools involved with ESD.
- ***7.3*** Submit articles on education for sustainability to journals, which usually do not address sustainability.
- ***7.4*** Present research and project reports to disciplinary professional organizations and educational organizations at local, regional and national conferences.
- ***7.5*** Work with mass media to disseminate ESD successes and sustainable development concepts.

Regional Centers of Expertise

One of the United Nations University's contributions to the UN Decade of Education for Sustainable Development is its program to develop Regional Centers of Expertise on ESD (RCEs). The concept calls for institutions of higher education to take a leadership role in building ESD teams at the regional level to support community sustainability plans and strategies. In the first step, institutions such as zoos, museums, NGOs, corporate trainers, faith-based groups, schools, and universities form a strategic alliance amongst the region's formal, non-formal, and informal educators. The second step seeks locally relevant information regarding sustainability issues, including plans to address these threats to their communities from various sources. These sources would include local, regional, and federal governments; the private sector; universities and other sources of research, information, and planning.

By bringing these two groups together, the educators and the sources of relevant local information, the quality of education will be enhanced and the regional government will receive a more informed and supportive citizenry. Several of our network faculties are already assisting UNU in the trial phase and others will be joining in the near future.

(Regional Center of Expertise, Toronto, Canada)

National workshop on ESD and teacher education leads to local changes

The first initiative of India's Institute of Advanced Studies in Education (IASE) at Jamia Millia Islamia was to organize a national workshop on ESD, to create awareness about sustainable development among faculty members. Through other IASE workshops and meetings, faculty members identified a broad course content for reorienting teacher education to address sustainable development. The broad areas identified included: concept of sustainable development, education for sustainable development, consumer education, population education, sustainable agriculture, environmental conservation, resource management, impact of technology on the environment, and women's education and sustainability. These topics have been incorporated in some optional papers as well as in some teaching subjects of the Bachelor of Education (B.Ed.) degree.

IASE also organized an in-service program for teacher educators from other institutions around Delhi. Subject experts from other departments of the university as well as other local universities served as resource persons.

The following changes were incorporated at the B.Ed. level beginning with the 2002-2003 session.

- IASE increased links with other universities and NGOs in Delhi and provided opportunities for deeper interaction with people involved in similar disciplines.
- Objectives for institutionalizing of the revised curriculum were achieved on time.
- IASE organized in-service programs for Delhi teachers on sustainable development.
- Craft instructors started using handmade papers and reusing or recycling waste products.
- Student teachers are undertaking projects based on environmental problems in their communities.

(Professor Zeenat Kidwai – Jamia Millia Islamia, India)

The Green Flag

The Keep Sweden Tidy Foundation helps shape public opinion on environmental issues, promotes recycling, and combats litter through public awareness campaigns and environmental education. By influencing people's attitudes and behaviors the Foundation encourages sustainable environmental development.

The Keep Sweden Tidy Foundation also provides education and literature on environmental methodology for teachers, and coordinates Sweden's eco-schools program, which aims to raise student awareness of sustainable environmental development issues. The program, established in Europe in the early 1990s and introduced in Sweden in 1996, is also a system for environmental management in schools, based on an ISO14001/EMAS approach. The eco schools program is now in 31 European countries.

To join the Eco-Schools program in Sweden, schools apply to the Keep Sweden Tidy Foundation. The schools then set up five goals within one of the priority areas: water, recycling, energy, forestry, or health and lifestyle. Schools that successfully fulfill their goals and get their reports approved by the coordinator are awarded the Eco-School Green Flag. To keep the Green Flag, schools must continue setting new goals and report their work. The Green Flag is a well-recognized and respected international eco-label for environmental education and performance. Read more about environmental education in Sweden on the Swedish Environmental Protection Agency's website at *www.internat.environ.se*

8. Recommendations on information technology opportunities

Although ESD is not yet widely accepted at the grassroots level, it is increasingly recognized as an emerging issue. ESD itself is evolving rapidly, both in content and modes of delivery. Some interesting developments on the horizon will affect teacher education. One area that promises rapid growth is the use of computers and the World Wide Web. Computer technologies align with the principles of sustainability by reducing use of resources for printed materials, reducing waste, and making information and programs available to audiences in areas distant from teacher-education facilities. ICT can help students to take responsibility for finding information and evaluating it and ultimately taking responsibility for aspects of their own learning. The Education for Sustainable Development Toolkit Web site (*www.esdtoolkit.org*) and the UNESCO teacher-education Web site, Teaching and Learning for a Sustainable Future (*www.unesco.org/education/tlsf*) are two examples of widely used existing resources. The Global Higher Education for Sustainability Partnership (GHESP) is planning a Web site that will assist institutions of higher education in designing and implementing ESD projects, which will lead to more sustainable campuses.

Recommendations:

- ***8.1*** Develop guidelines for using information technology related to ESD.
- ***8.2*** Develop guidelines for incorporating ESD into online and distance learning courses.
- ***8.3*** Provide professional development opportunities for teacher educators to use information and communication technologies (ICT) to provide professional development about ESD to in-service teachers who work in locations distant from campus.
- ***8.4*** Study the use of ICT to match student preferred learning styles and modalities (e.g., especially students from oral-based cultures whose preferred learning modality is listening, not reading).

Spreading ESD through seminars and online courses

The most important activity of the National University of Rosario (UNR) has been to provide seminars and courses on sustainable development issues to its teaching staff thus enabling them to work with students and administrative and auxiliary staff.

In addition, officials from regional institutions and governments have signed agreements to discuss and to spread awareness of sustainable development within communities. The latest agreement signed was with Casilda Municipality.

One notable ESD achievement was UNR's course for teachers on the Internet. In March 2003, the course "Education for Sustainable Development" was uploaded to UNR's Virtual Campus (*www.puntoedu.edu.ar* or *www.puntoedu.net*). More than a hundred students, mainly primary and high school teachers from different regions of the country have enrolled in the online course.

(Eduardo Spiaggi – National University of Rosario, Argentina)

VI. Conclusions

Many survey respondents repeatedly mentioned the urgency to act and the need for profound change. Bringing quality education to the schools of the developing world competed for importance with the larger question of "what kind of education would best serve humanity in the future?" This led to the general agreement that reorienting our current education systems – especially in the North – was an essential task. At the heart of this task is reorienting teacher education. An International Network member stated, "For the fulfillment of the objectives of ESD and effective teaching of the subject, a complete transformation in our teacher training programmes is needed." Another claimed:

There is an urgent need to re-examine the nature and structure of schooling in a more critical way to address [ESD] in its broadest context (i.e., school organizational principles, operational practices, school grounds management, and curriculum content). We are faced with a paradox: Is education the problem or the solution in working toward a sustainable future? At current levels of unsustainable practice and over consumption it could be concluded that education is part of the problem. If education is the solution then it requires a deeper critique and a broader vision for the future. Thus, whole systems redesign needs to be considered to challenge existing frameworks and shift our thinking beyond current practice and toward a sustainable future.

While many spoke of the enormity of the task at hand, all who participated were able to make significant and positive inroads. Interested individuals operating within their own spheres of control (e.g., weaving sustainability themes into their own classroom curricula) made great headway reorienting their programs. Also, many institutions were able to develop new courses at both the undergraduate and graduate levels.

Problems arose when the Network members advocated for change beyond the sphere of direct control. The lack of mandate from institutional and ministry policies relegated the initiative to an optional realm where already busy faculty members were hard to recruit. Furthermore, the lack of resources, such as an existing research agenda for ESD, also hindered the development of ESD within the institutional setting.

As expected, ESD within teacher-education institutions is currently endorsed by early-adopters. However, it will take concerted effort and resources to institutionalize ESD into programs, practices, and policies as well as the entire teacher-education curriculum.

As teacher educators, the challenge is ours to accept or ignore. Success or failure, however, will also depend on attention from provincial and national governments that set and fund educational priorities.

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Appendix A: Basics of Education for Sustainable Development

I. History of Education for Sustainable Development

From the time sustainable development was first endorsed at the UN General Assembly in 1987, the parallel concept of education to support sustainable development has been explored. From 1987 to 1992, the concept of sustainable development matured as committees discussed, negotiated, and wrote the 40 chapters of Agenda 21. Initial thoughts concerning education for sustainable development (ESD) were captured in Chapter 36 of Agenda 21, "Promoting Education, Public Awareness, and Training".

Unlike most education movements, people outside of the education community initiated ESD. In fact, one major push for ESD came from international political and economic forums (e.g., United Nations, Organization for Economic Co-operation and Development, Organization of American States). As the concept of sustainable development was discussed and formulated, it became apparent that education is key to sustainability. For about a decade, many people were realizing that education is important to any effort that would create a more sustainable future; however, little was progress was being made under the name of ESD. In fact, many considered education the forgotten priority of Rio. The importance of ESD was confirmed to the world when in December 2002 the United Nations declared 2005-2014 to be the Decade of Education for Sustainable Development. Now many educational organizations around the world are exploring how to reorient their curricula and programs to address sustainability.

II. Overarching concepts of ESD

What is ESD?

Chapter 36 of Agenda 21 was the first document to describe ESD. This chapter identified four major thrusts to begin the work of ESD: (1) improve basic education, (2) reorient existing education to address sustainable development, (3) develop public understanding and awareness, and (4) provide training for all sectors of society including business, industry, and government.

ESD is locally relevant and culturally appropriate

ESD carries with it the inherent idea of implementing programs that are locally relevant and culturally appropriate. All sustainable development programs, including ESD, must take into consideration the local environmental, economic, and societal conditions. As a result, ESD will take many forms around the world. Because each place has unique local environmental, social, and economic conditions and issues, ESD must be created locally rather than imported.

Strengths model

The cost of reorienting education to address sustainability is so great that nations cannot afford to rely on a remediation model to retrain the world's 59,000,000 teachers. Rather than primarily retraining in-service teachers to teach sustainability, we need to design new approaches to pre-service and in-service teacher education to address sustainability. One such innovative approach is the "strengths model". In this approach, every discipline and every teacher can contribute to sustainability education.

Many topics inherent in ESD are already part of the formal education curriculum, but these topics are not identified or seen to contribute to the larger concept of sustainability. Identifying and recognizing components of ESD is key to moving forward. Fortunately this step is easy and affordable.

To implement the strengths model, begin by ensuring that educators and administrators understand the concept of sustainability and are familiar with its principles. Once they understand the concept of sustainability, educators from each discipline can examine the curriculum and school activities for existing contributions to ESD. Next, educators can identify potential areas of the existing curriculum in which to insert examples that illustrate sustainability or additional knowledge, issues, perspective, skills, or values related to sustainability.

After identifying existing and potential contributions, leaders can create awareness among the educational community of these contributions to the larger ESD picture. Then, these contributions can be woven together to create ESD programs that are taught overtly to pupils and students. In this approach, the synergistic strengths of combined educational disciplines can convey the knowledge, issues, skills, perceptions, and values associated with ESD.

No one discipline can or should claim ownership of ESD. In fact, ESD poses such broad and encompassing challenges that it requires contributions from many disciplines. For example, consider these disciplinary contributions to ESD:

- Mathematics helps students understand extremely small numbers (e.g., parts per hundred, thousand, or million), which allows them to interpret pollution data.
- Language Arts, especially media literacy, creates knowledgeable consumers who can analyze the messages of corporate advertisers and see beyond "green wash".
- History teaches the concept of global change, while helping students to recognize that change has occurred for centuries.
- Reading develops the ability to distinguish between fact and opinion and helps students become critical readers of political campaign literature.
- Social Studies help students understand ethnocentrism, racism, and gender inequity as well as to recognize how these are expressed in the surrounding community and nations worldwide.

Each discipline also has associated pedagogical techniques. The combined pedagogical techniques and strategies of each discipline also contribute to an expanded vision of how to teach for creativity, critical thinking, and a desire for life-long learning – all mental habits that support sustainable societies.

The contributions of the environmental education and science education communities to the environmental strand of ESD have been well documented in the literature; however, equal attention has not been focused on the social and economic strands. Yet, the efforts of schools to create more just, peaceable, and equitable societies suggest that the social strand appears to be well developed in many countries. In fact, schools that have programs in multicultural education, anti-racist education, gender equity, anti-bullying, and peace education contribute substantially to the social strand of ESD.

Use of this strengths model requires that a cadre of educators and administrators, who are sufficiently well versed in the transdisciplinary concepts inherent in ESD, pull together the disciplinary and pedagogical pieces to form a comprehensive ESD program. The integration process will prevent omissions and duplication. In order to create a generation of educators and administrators who understand the strengths model, it must be employed by institutions of teacher education and overtly taught to pre-service professionals. (McKeown, *et al.*, 2002, p 18-22)

Education about sustainable development vs. education for sustainable development

The difference between education about sustainable development and education for sustainable development is an important distinction. The former is an awareness lesson or theoretical discussion. The latter is the use of education as a tool to achieve more sustainable futures. The UN Commission on Sustainable Development has called for education to be more than a theoretical discussion of sustainability at this critical juncture in time.

Reorienting teacher education involves transforming institutional programs, practices, and policies. Institutions involved in reorienting teacher education to address sustainability must "practice what they teach" and go through the processes necessary to make progress towards becoming an institution that models what it teaches.

III. Ensuring quality in ESD

Various fundamental premises raise concern for issues of quality in the delivery of ESD. Although the concept of quality and its assurance is generally taken to be relative and sometimes contested in its implementation, Network members raised many issues surrounding quality assurance in ESD during discussions of their experiences. Quality issues in ESD activities are integral to the overall enthusiasm depicted in various ESD plans of action at various levels from institutional to local, national, and international situations. In this regard, issues of quality delivery in ESD will expectedly differ from context to context and from one ESD practice to another. For example, many educational contexts where unemployment is high amidst many, people often tended to choose teaching as a last after all other career prospects failed to materialize. In other places and situations, teaching as a profession is paid relatively lower salaries and emoluments than other professions such as engineering. Moreover, teachers often feel overburdened with numerous societal expectations and curricular workloads. These issues, and more, could be precipitating sources of demoralization and demotivation to teachers who end up berating ESD by considering it an optional overload or something inherently unwanted arising from a "forced" career of teaching. The overall result of these issues could be the delivery of ESD that flounders.

Other concerns of quality lie in issues of how best to assess ESD activities so that, in turn, they measure up to the quality of human life to which they pertain.

IV. Components of a reoriented curriculum

The following excerpts from the Education for Sustainable Development Toolkit describe one approach to reorienting curriculum to address sustainable development (McKeown, *et al.*, 2002).

ESD is more than a knowledge base related to environment, economy, and society. It also addresses learning skills, perspectives, and values that guide and motivate people to seek sustainable livelihoods, participate in a democratic society, and live in a sustainable manner. ESD also involves studying local and, when appropriate, global issues. Therefore, these five (i.e., knowledge, skills, perspectives, values, and issues) [and the interrelationship between them] must all be addressed in a formal curriculum that has been reoriented to address sustainability. Simply adding more to the curriculum will not be feasible in most schools; they already have a full curriculum. Deciding what to leave out – what does not contribute to sustainability or is obsolete – is an integral part of the reorienting process. Let's look more closely at these five components of an education reoriented to address sustainability. (p 10-11)

Knowledge

Sustainable development encompasses environment, economics, and society. Therefore, people need basic knowledge from the natural sciences, social sciences, and humanities to understand the principles of sustainable development, how they can be implemented, the values involved, and ramifications of their implementation. Knowledge based on traditional disciplines supports ESD. (p 11)

Issues

ESD focuses largely on the major social, economic, and environmental issues that threaten the sustainability of the planet. Many of these key issues were identified at the Earth Summit in Rio de Janeiro and are found in Agenda 21. Understanding and addressing these issues are the heart of ESD, and locally relevant issues should be included in any program related to educating for sustainability. (p 12)

Skills

To be successful, ESD must go beyond teaching about local and global issues. ESD must give people practical skills that will enable them to continue learning after they leave school, to have a sustainable livelihood, and to live sustainable lives. These skills will differ with community conditions. Note that skills fall into one or more of the three realms of sustainable development – environmental, economic, and social… In addition, pupils will need to learn skills that will help them manage and interact with the local environment. (p 14)

Perspectives

ESD carries with it perspectives that are important for understanding global issues as well as local issues in a global context. Every issue has a history and a future. Looking at the roots of an issue and forecasting possible futures based on different scenarios are part of ESD, as is

understanding that many global issues are linked… The ability to consider an issue from the view of different stakeholders is essential to ESD. Considering an issue from another viewpoint besides your own leads to intra-national and international understanding. This understanding is essential for creating the mood of cooperation that will underpin sustainable development. (p 15)

Values

Values are also an integral part of ESD. In some cultures, values are taught overtly in the schools. In other cultures, however, even if values are not overtly taught, they are modeled, explained, analyzed, or discussed. In both situations, understanding values is an essential part of understanding your own worldview and other people's viewpoints. Understanding your own values, the values of the society you live in, and the values of others around the world is a central part of educating for a sustainable future. (p 15)

A curriculum that is reoriented to address sustainability will include principles of sustainable development. The Rio Declaration on Environment and Development lists such principles of sustainability (see *www.un.org/documents/ga/conf151/aconf15126-1annex1.htm*).

Following these principles, curriculums that are reoriented to address sustainability frequently have overarching goals for civil society to enhance environmental stewardship, social tolerance and equity, community-based decision making, and quality of life. Reoriented curriculum also helps to create a workforce that can increase nations' options for national economic sustainability plans. (McKeown, *et al.*, 2002. p 3)

V. Programs, practices, and policies

Reorienting teacher education to address sustainability can and should mean more than curricular change. It means that the programs, practices, and policies of institutions of teacher education should be reoriented to address sustainability. Changes in course work are more effective if other changes happen within institutions to support and reinforce those curricular changes.

Programs

Curricular change in institutions of education often occurs at the individual course level. Instructors and professors reorient their courses to include sustainability themes. As these efforts are successful, wider programmatic changes can occur. Examples of programmatic changes that address sustainability include: requiring students to volunteer at a local social or environmental nonprofit organization as a field experience early teacher-education programs, offering an intensive ESD workshop to pre-service teachers prior to graduation, requiring all student teachers to have an environmental education experience regardless of their discipline or specialty, and placing students in a socio-economic or cultural setting that differs from their own for part of their field experience.

The following excerpts from the *Education for Sustainable Development Toolkit* describe practice and policy related to ESD. (McKeown, *et al.*, 2002)

Practice

For policy changes to become firmly entrenched, the changes must be supported in the standard practices of the system. (p 39)

Practices related to ESD on campuses should be pointed out to teacher candidates. Ideally, teacher candidates would have the opportunity to observe a building in which environmentally sustainable practices are the norm. Observing recycling efforts, purchasing and using environmentally sustainable cleaning products, reusing paper, conserving energy, and conserving water will help teacher candidates think about practices that contribute to more sustainable classrooms and school buildings. (p 39-40)

Policy

Policy is an overall plan embracing the general goals and acceptable procedures of a government body or authoritative group. Policy is the next step after innovative practices have proven worthy of the time, effort, and resources expended. As more and more individuals recognize that an innovative program fulfills educational or political goals, management begins to look at expansion. Key to expanding innovative programs is the creation of policy. Policy is the "blessing" of the upper administration and the creation of institutional infrastructure that accompanies the "blessing." Once the innovation becomes policy, those who have pioneered the change feel validated and those who have not been involved must either become involved or be prepared to explain why they are not following the policy. Because all teachers and administrators will encounter education policy in their careers, it is important that they graduate with a basic understanding of how and why policy is generated. By understanding how policy is generated educators may be able to contribute to ESD-compatible change in their school systems.

Policy by itself will not effect change. From years of observing change in policy brought about by elections and subsequent change in government administration, the public knows that policy often does not alter programs or practices, especially without funding or acceptance from those who would implement the policy. (p 38-39)