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EDUCATION FOR SUSTAINABLE DEVELOPMENT (ESD) WITH SPECIAL REFERENCE TO TEACHER EDUCATION

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ABSTRACT

Education plays an important role in achieving the target of Economic Development. But only the concept of development is not enough even now is the need of sustainable development. The development that meet the needs of the present generation without compromising the ability of future generations to meet their own needs. The present research paper deals with role of education for sustainable development with special emphasis on the need of special teacher education program for teachers to cultivate the concept of sustainable development among students. None can deny the importance of teachers as they are dealing with the future generation of any country and when it is the concern for future generation then only teachers are the key agents who can develop the concept of sustainable development among students. But there are many challenges for teachers to implement any work on education and learning of sustainability in the institutions due to lack of awareness and understanding of the concept of sustainable development among other faculty members. Therefore there is an urge to take some initiative steps to change the systems at every level that’s why in last section of the paper recommendations are given.

KEYWORDS: Sustainable Development, Education for Sustainable Development and Special Teacher Education Program.

INTRODUCTION

ESD is a vision of education that seeks to balance human and economic well-being with cultural traditions and respect for the earth’s natural resources. ESD applies transdisciplinary educational methods and approaches to develop an ethic for lifelong learning; fosters respect for human needs that are compatible with sustainable use of natural resources and the needs of the planet; and nurtures a sense of global solidarity.

UNESCO Decade of ESD (DESD) 2005-2014

The idea of Education for Sustainable Development (ESD) is becoming increasingly important at all levels of the educational system including higher education. The UN International Environmental Education Programme (1975–1995) first introduced the notion
of sustainability in higher education, and the UN is now encouraging all countries to address ESD by making 2005 to 2014 the Decade for ESD, with an accompanying declaration that ‘there has been a common consensus that education is a driving force for the change needed’ and named the UNESCO as the lead agency to promote the Decade. Member States are invited to implement the Decade in their national educational plan. Agenda 21 states that efforts on multiple fronts are needed to create a more sustainable world. 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. The key role of teacher training for this initiative is recognised in the implementation strategy, and a notable event in the period leading up to the Decade has been the publication of a teacher education programme to support education for sustainable development (ESD). Agenda 21 describes the role of education in fostering more sustainable societies.

“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)

A strong advocate for ESD in the curriculum, Moore (2005b, p. 326) asserts that: ‘given what academics know about the current ecological condition of the planet, there is an obligation for universities to become leaders in the movement to prevent global ecological collapse’.

**FUTURE NEEDS IN EDUCATION FOR SUSTAINABLE DEVELOPMENT**

“Education plays a critical role in development” “Learning for change – Learning to change” “Learning to live together sustainably” (Koichiro Matsuura, UNESCO Director-General)

Sustainable development emerged in the 1980s as a response to the growing realization of the need to balance economic and social progress with concern for the environment. It was defined as a development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It is acknowledged that a wide range of skills and knowledge are required to educate students who are able to work critically and
effectively with issues of sustainability. Relevant skills and knowledge are for example the followings:

- to create knowledge in a spirit of openness to the world, integrating intercultural perspectives,
- to think critically and act in a forwarded manner,
- to acquire knowledge and act in cooperation with others,
- to participate in decision making processes,
- to learn how to learn,
- to reflect upon one’s own principles,
- to plan and act autonomously,
- to show empathy for and solidarity with the disadvantaged,
- to motivate oneself to become active.

Each of these competencies has its own theoretical foundation and is embedded in a greater context of education for sustainable development. The first competence for example aims at intercultural and horizon-expanding perceptions. Because a single regional and national perspective is too narrow for orientation in a complex global society, we must transcend the horizons of our perceptions and judgments and strive for a global view. This requires that we promote a basic attitude that involves curiosity and interest in the experiences and affairs of people from other regions of the world and the desire to learn from others.

The last competence for example reflects the fact that it requires a great deal of motivation to change oneself and to encourage others to change as well, in order to create a satisfying lifestyle for everyday. These competencies demand new patterns of teaching and a particular kind of educational practice in higher education:

- the prevailing orientations in the teaching of sustainable development are active learning, interdisciplinary thinking and problem solving;
- the role of a teacher changes from knowledge-giver to learning-enabler: educators act as models and learners;
- Learning takes place by reconnecting to real-life situations. This orientation focuses on real and practical life issues and actual experiences as learning situations.

OBJECTIVES OF EDUCATION FOR SUSTAINABLE DEVELOPMENT

The Delors report learning the Treasure Within proposed that the aims of education be built on four pillars of learning:

- **Learning to know** – knowledge, values and skills for respecting and searching for knowledge and wisdom
• **Learning to do** – knowledge, values and skills for active engagement in productive employment and recreation

• **Learning to live together** – knowledge, values and skills for international, intercultural and community cooperation and peace

• **Learning to be** – knowledge, values and skills for personal and family well-being

Considering the all encompassing scope of Education for Sustainable Development, and its aim to equip individuals with skills and capacities to transform attitudes and lifestyles, we could consider adding a fifth pillar of learning:

• **Learning to transform oneself and society** – knowledge, values and skills for self-reflection and active citizenship

These five pillars offer a foundation for education to provide both essential learning tools (such as literacy, oral expression, numeracy, and problem solving) and the basic learning content (such as knowledge, skills, values, and attitudes) required by human beings to be able to survive, to develop their full capacities, to live and work in dignity, to participate fully in development, to improve the quality of their lives, to make informed decisions, and to continue learning. These outcomes of education were identified in World Declaration on Education for All, *Jomtien, 1990.*

The long term goals of Education for Sustainable Development include:

• To promote understanding of the interdependence of natural, socio-economic and political systems at local, national and global levels.

• To encourage critical reflection and decision making that is reflected in personal lifestyles.

• To engage the active participation of the citizenry in building sustainable development.

In order to achieve these objectives, Education for Sustainable Development:

A number of other fields such as environmental education, global education, economics education, development education, multicultural education, conservation education, outdoor education, global change education and others are complemented. Education for sustainability is considerably broader and encompasses many aspects of these respected and established fields of study. It may embrace components from traditional disciplines such as civics, science, geography and others.

Teachers and schools make a special contribution to Education for Sustainable Development through the educational objectives they emphasise when selecting the content and learning experiences for students to study. The content chosen influences the areas of
knowledge to be learnt while the learning experiences chosen determine the skills and attitudes that students will develop.

**Aims**

Education should achieve changes in the community which:

- Lead to changes in work, lifestyle and consumption patterns.
- Encourage people to consider alternatives.
- Enable people to take part in decision making.
- Enable people to find information.
- Give people opportunities to participate.
- Encourage principles leading to a fairer society.
- Help people to understand the links between issues.

**Objectives**

Achieving these aims mean that education should help students towards the following objectives:

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Values</th>
<th>Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>How natural processes work</td>
<td>A commitment to all living things</td>
<td>Co-operative working</td>
</tr>
<tr>
<td>How our lives connect with others</td>
<td>A desire for social justice</td>
<td>Critical thinking</td>
</tr>
<tr>
<td>The planet earth as a finite resource</td>
<td>Empathy and awareness</td>
<td>Negotiation</td>
</tr>
<tr>
<td>Understanding of quality of life</td>
<td>Rights and responsibilities</td>
<td>Reasoned debate</td>
</tr>
<tr>
<td>How to make decisions</td>
<td>A global perspective and loyalty to the world community</td>
<td>Problem solving</td>
</tr>
<tr>
<td>How we provide for human needs</td>
<td></td>
<td>Creative ability</td>
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</tbody>
</table>

The English Panel on Education for Sustainable Development organised its proposed objectives around seven key themes:

- Interdependence of society, economy and the natural environment, from local to global
- Citizenship and stewardship – rights and responsibilities, participation, and co-operation
- Needs and rights of future generations
- Diversity – cultural, social, economic and biological
- Quality of life, equity and justice
- Sustainable change – development and carrying capacity
- Uncertainty and precaution in action.
These seven themes could be seen as central to Education for Sustainable Development. Theme 1 concerns the interdependent nature of the world. This gives rise to Theme 2 – the need for participation and action through the exercise of citizenship and stewardship. Themes 3-6 focus on key dimensions of sustainable development: (i) the needs and rights of future generations, (ii) respect for diversity, (iii) quality of life issues, and (iv)sustainable change. The final theme is a logical consequence of all the preceding themes and is concerned with the limits of knowledge and exercise of the precautionary principle.

**INDIA AND EDUCATION FOR SUSTAINABLE DEVELOPMENT (ESD)**

India, like any other developing country is spread across in vast subcontinent and enveloped in diverse colours of community, culture and religion. We live in a rapidly changing developing world and nowhere are it more evident than in India. It is a country experiencing both an accelerating growth rates alongside unequal socio-economic development with new concerns of environmental conservation and protection emerging as vital issue. It is amidst such a situation that India adopted a new paradigm of thinking and experience of development post-Stockholm Conference of 1972 called Sustainable Development (SD). Following which, India became a part of 187 countries agreeing on carrying out an important commitment towards SD by signing the Rio Declaration during 1992 UN Conference on Environment and Development. In order to achieve the goals of sustainable development, one of the first steps taken was in the direction of environment conservation and protection by promoting Environment education. This strategy was adopted post Stockholm conference by setting up Centres of Excellence for Environment Education under Ministry of Environment in the early 1980s. However, gradually with the realization of the role that Education can play for ensuing sustainable development, Government of India recommended Ministry of Human Resource Development to integrate environmental concerns into all aspects and levels of education. ESD aims to go beyond and achieve status of well being in line with sustainable development by empowering people through various forms of educational processes and practices to assume responsibility for creating sustainable future. This goal became finer when India became part of UN General Assembly resolution for establishing UN DESD (2005-2014) in the year 2005, in recognition of the need to enhance efforts in education and learning to address issues of sustainable development. Various alternative approaches have been adopted by countries to reduce their footprints with respect to ESD. However, scholars and development practioners have raised concerns that
India currently needs to move forward directly on its own endogenous sustainable model of development rather than imitating the models of the western countries. Veterans like K. Sarabhai puts it as challenge of ‘leapfrogging’ and blending both traditional – modern elements for ESD in all realms of society. Alongside, having the confidence to make critical choices and walk on its own well defined path is crucial for India so as to define the goals of ESD. As we move forward to redefine the notion of ‘development’ to be more sustainable from all quarters it also becomes important to develop the paradigm of ‘education’ i.e. the way it is practiced and conceptualized. In India, ESD has brought about a shift in emphasis from teaching to learning in myriad forms. The new National Curriculum Framework 2005 has as one of its key guiding principles: Connecting knowledge to life outside the school.

In this regard, India is the only country to have passed one of the landmark judgments passed by the Supreme Court of India directing all education boards to include environmental education (EE) as part of the formal education system at all levels. EE in India has always been seen in the development context. Therefore, much of the aspects of EE can be seen as ESD. It is in this respect that India is progressively marked different from other countries.

The Indian vision for the DESD /ESD is hence, based on a commitment towards sustainability rooted in a centuries old tradition of living in equilibrium with nature and all its elements. The 4th International conference on EE at CEE recognized and gave a shape to this vision by bringing together the expertise across the world to build the partnership. India recognizes ESD as a major drive of change and its commitment to sustainable development is reflected in it's polices, programmes and other Government and NGO led activities. However, challenges are still to be met in terms of creating awareness and ensuing ESD based development perspective. This is because concerns for environment conservation/protection cannot be put into place without addressing/taking into account the other/larger socio-economic and cultural reality of society in which concerns of environment are inbuilt.

The idea of sustainable development has been at the forefront of policy formation in India since, WSSD - 2002 (World Summit on Sustainable Development). Earlier the effectiveness of policy directives and actions of various sectors was weighed against its environmental friendly outcomes as the only indicator of Sustainable Development.

But now sustainable development as development/policy practice has acquired different hues of connotations – right from environment sustainability to parity of socio-economic development of society in the sector specific policy formation/action. Hence, none of the national development programmes are actually sector specific in its pure practice. Rather, it encompasses components from every sector in its programmatic framework for
sustainable development outcomes of achieving MDG’s for the country. This includes emphasis on aspects like – social upliftment (Marginalised communities), economic prosperity, education, environment protection, gender concern, health, peace etc. Consequently, the component of ESD in sectors can be conceptualized in terms of orienting various national programmes towards sustainable development principles of compromise and optimization; and to achieve stated MDG goals within sectors through various forms of educative practices and processes that ensue development (technical and non technical) through changing mindsets of people for a more sustainable living. This can be depicted in the following form:

**ROLE OF TEACHER EDUCATION IN ESD**

The European Strategy for Sustainable Development, adopted in 2006, recognised the important role of education and training systems should play in order to achieve the objectives of sustainable development. According to the strategy:
Education is a prerequisite for promoting the behavioural changes and providing all citizens with the key competences needed to achieve sustainable development. Success in revising unsustainable trends will, to a large extent, depend on high-quality education for sustainable development.

Education and training should contribute to all three axes of sustainable development, namely:

- **The Social perspective** – education and training strengthen social cohesion by investment in human capital;
- **The Economic perspective** – education and training contribute to building a knowledge society based on sustainable economic growth; and,
- **The Environmental perspective** – education and training are crucial for changes in citizens’ behaviour on issues such as: consumption, transport, use of sustainable energies, etc.

Even though all education and training activities have the potential to reinforce sustainable development, it is acknowledged that in order to fully realise this potential, education activities, especially focused on sustainable development, are required. Therefore, the UN Economic Commission for Europe drew up a separate Education for Sustainable Development strategy in 2005, recognising that:

“Education for Sustainable Development is a lifelong process from early childhood to higher and adult education and goes beyond formal education. As values, lifestyles and attitudes are established from an early age, the role of education is of particular importance for children. Since learning takes place as we take on different roles in our lives, Education for Sustainable Development has to be considered as a "life-wide" process. It should permeate learning programmes at all levels, including vocational education, training for educators, and continuing education for professionals and decision makers.”

Simultaneously, the United Nations launched the decade of Education for Sustainable Development (2005-2014), which triggers an important number of activities in this field.

Teachers are an important component of education whose services are important in the realization of educational goals the world over. Due to their central role in the enterprise of education, teachers at all levels require effective and sufficient education to be able to adequately carry out their roles and responsibilities. Otieno et al (1992) acknowledge that trained teachers are vital for quality education. Teaching according to Hough and Duncan (1997) is an activity, a unique professional, rational and human activity in which one
creatively and imaginatively uses himself/herself and his/her knowledge to promote the learning and welfare of others.

A teacher, according to Shindu and Omulando (1992), is the most important person in teaching who sees that educational programmes are successfully implemented by organizing and managing the learning experiences and environments. To educate others therefore, one needs to be educated and have a broad background of general cultural training that provides a broad liberal education. Working as an expert requires the acquisition of knowledge and practical abilities to work in complex situations. Teachers need the self-confidence to carry out their duties in demanding unique situations and need to implement their expertise in such a way that their customers, stakeholders and colleagues trust them (Isopahkala Brunet, 2004). They need research-based, research informed knowledge and be open to acquiring and assessing local evidence (Scardamalia and Bereiter, 2003).

Teacher education is an important component of education. Through it, school teachers who are considered mentors of society are prepared and produced (Lucas, 1972). Kafu (2003) says that teacher education is ostensibly designed, developed and administered to produce school teachers for the established system of education. Loughran (2006) looks at teacher education as the pre-service and in-service teacher preparation where students of teaching seek to develop knowledge and skills of teaching and to learn how to competently apply these in practice. These views summarize the importance and the role of teacher education in the life of a given society. Education in this respect is regarded as the driving force for social development. The improved ability to educate is an important ingredient for sustainable development.

There are variations of teacher education programmes for the different levels of education from early childhood to tertiary education. These forms of teacher education programmes involve the study of professional disciplines, teaching subjects and general knowledge subjects. The provision of both subject area education and professional knowledge is vital as it makes a teacher competent in the subject content as well as professional areas. Dove (1986) notes that teacher education emphasizes the cognitive development and specialist understanding of the subject. It comprises wider perspectives including an understanding of socio-economic and professional aspects of education, psychological practice and social theories underpinning pedagogical practice and knowledge of teachers’ roles and responsibilities. Teacher education is institutionalized educational procedures carried out in colleges and universities which have vocational and educative objectives.
Now paradigm has shifted from teaching to learning: active learning and the theory of constructivism. Education for sustainable development calls for a particular kind of educational practice. The stimulus-response approach which corresponds to the mechanical telephone exchange must be replaced by a theory which views the learner as an active processor of information. Learn theoretical research studies have shown that knowledge will not be transferred from teachers to students, but will be constructed and built up in concrete situations based on the foundations of their own experiences. This is a constructivist notion of learning: Learners construct meaning, which is the knowledge that they will use in their life. R. L. Garcia gave this definition: “Constructivism is a view of cognitive development as a process in which children actively build systems of meaning and understanding of reality through their experience and interactions…..children actively construct knowledge by continually assimilating and accommodating new information”

This new concept can be described as follows:

Constructivist Assumptions:
- meaning exists in every student’s mind
- meaning is formed by individual experience
- learning occurs through social interaction
- students are responsible for their own learning

Constructivist Environment:
- the classroom is a community of scholars
- learning is collaborative and cooperative
- teachers and students set high expectations for themselves

Constructivist Teacher Role:
- the teacher sets the general curriculum
- the teacher sets high achievement standards
- the teacher facilitates and motivates learning from experience.

In constructivist teaching the teacher moves from the traditional role of knowledge-giver to a learning-enabler, or - to use a metaphor – from being “the sage on the stage” to being a “guide on the side.” Teaching means to make learning possible: This is the shift from teaching to learning. Constructivist teaching is not laissez-faire. The guide is on the side, but not out of the room or even on an equal level with the naive student.

Constructivist theory is based on facilitative teaching, in which the teacher acts as coach or facilitator of learning for the students. Facilitative learning includes both didactic, direct instruction and “guide on the side”, indirect instruction. Facilitative teaching allows
and encourages the student to become self-directed. The student-as-player is active rather than passive. Thus the student gains the capacity to make one’s own decisions and to have thoughts and feelings that are not dictated by the teacher.

In this context a university has to be an institution that has to make active learning possible. Students can and must take responsibility for their own learning. The purpose of a university is no longer to transfer knowledge but to create environments and experiences that cause students to discover and construct knowledge for them, to make students members of communities of learners that make discoveries and solve problems.

The focus of active learning means that the learner takes opportunities to decide on aspects of the learning process. Learners make their own time-plan, they choose learning goals and activities they like, they test their progress, they take care of learning and understanding on their own and they reflect on errors and successes. Active learning in this sense has to do with the preparation, execution, regulation, control and feedback of learning activities by the learners themselves.

Research studies have shown that particular behaviour fosters the motivation of students as learners, their achievement and their willingness to active learning. Knowledge and special key qualifications cannot be produced in narrow structured sequences of events, but only developed individually by the student connecting to his own experiences. Problem solving competence cannot be created through routine processes; decision-making competence cannot be created where there are no decision-making possibilities, social competence cannot be created where there is no social learning situation. Instead of having a didactic of producing knowledge and competence in the individual, we have to have a didactic of facilitation. The members of faculties are no longer regarded as experts of their subject who impart knowledge by lectures; now university teachers are conceived primarily as the designers of learning environments; they study and apply best methods for producing learning and student success. Student-centered teaching involves much more than mastering content, designing courses or learning experiences, mastering techniques of instruction and polishing presentation skills.

Student-centered teaching requires a pervasive and profound social dimension of teaching: the quality of the student-teacher relationship determines the teaching process and the learning outcomes. Teaching can no longer be compared to "filling a barrel, but rather to enlighten a candle". The required classroom - qualifications of good teaching can be described as follows:
Teaching competence can be shown as a triangle; it consists of

Teaching competencies

subject matter competence  personal competence delivery competence
- knowledge of material/subject      - friendly approach, accessibility - presentation skills
- research ability                - willingness to help - variety of methods
- scholarship                      - communication skills - use of media
- selection and organisation of course content - positive attitude towards students - developing motivation
- organisation of course content  - fairness in examination and grading - active learning

During the 1990s, UNESCO identifies 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 education to address sustainability.

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. As we shall see below, the challenges for schools and teacher education in responding to calls for prioritizing and implementing ESD are considerable. For this reason, it is important to undertake research that considers the extent college teachers feel teacher education for sustainable development is a worthwhile and appropriate addition to the higher education curriculum. Some previous studies have identified teachers’ beliefs and attitudes as
barriers to the implementation of sustainability initiatives in higher education (Lozano, 2006). Specific examples of barriers include: the discipline-focused nature of many academics’ work (Moore, 2005a), the perceived irrelevance of ESD to some disciplines, and lack of time in the curriculum (Dawe et al., 2005). However, although these barriers have direct relevance for ESD, the majority is fairly generic to change initiatives within higher education and few studies have investigated in detail college teachers’ specific beliefs about and attitudes towards teacher education in sustainability in higher education. A notable exception is Reid and Petocz (2006), who examined academics’ understandings of sustainability across a variety of disciplines. They concluded that efforts to engage academics in ESD were hampered by the lack of a shared understanding and language for discussing sustainability issues, and a lack of enthusiasm for incorporating them into the curriculum in some cases: ‘sustainability is often seen as a bit of a nuisance, and possibly as a sop towards political correctness that interrupts the real work’ (p. 120).

CHALLENGES AND BARRIERS TO TEACHER EDUCATION FOR ESD

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.

1. **Institutional Awareness, Support, and Resources**
   - Official national and provincial curriculum rarely mandates 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 reorient education to address sustainability.
   - Lack of or inadequate reward for institutions or faculty members who undertake ESD programs.

2. **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.
3. 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.

4. 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.

RECOMMENDATIONS TO MEET CHALLENGES AND BARRIERS OF TEACHER EDUCATION FOR ESD

The main problems faced when teachers are to implement any work on education and learning of sustainability in the institutions due to lack of awareness and understanding of the concept of sustainable development among other faculty members. 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.

1. Recommendations on Ministerial and National Involvement

Ministries of education have to make ESD a mandatory part of elementary and secondary education at national and provincial levels. 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. The ministries of education should create policy to support ESD and professional development programs related to ESD for teacher educators. Engage teacher unions and national certification boards in the conceptual development and implementation of ESD; 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.
2. 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.

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. Modelling 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.

3. 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.

4. Recommendations on partnerships and information technology opportunities

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. Partnerships between teacher-education institutions and elementary and secondary
schools, and such educational organizations as museums, outdoor education sites, and nature
centers should be strengthened, as well as local, regional, and international networks by
sharing ideas, experiences, and materials and maintaining the vision of a sustainable world.
Both the government and institutions should develop guidelines for using information
technology related to ESD and for incorporating ESD into online and distance learning
courses. Professional development opportunities should be provided 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.

5. 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).

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