

**Mainstreaming environmental education and technology supported learning in Africa:
Challenges and Opportunities**

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1. Introduction

Established in 1985, the **African Ministerial Conference on the Environment** (AMCEN) is the main forum to strengthen co-operation on environmental issues among African governments. The mandate of AMCEN is to provide advocacy for environmental protection in Africa and among other things to ensure that basic human needs are met adequately and in a sustainable manner.

The objective of this paper is to encourage AMCEN to consider the issue of mainstreaming technology supported learning (which includes eLearning) into the work of national environmental authorities and mainstreaming environmental education and education for sustainable development programmes across other relevant ministries and educational institutions. The paper highlights a number of important international mandates of relevance to Africa; highlights a number of case studies that demonstrate best practice; and discusses the challenges and opportunities facing environmental and educational institutions.

As AMCEN-12 may wish to express itself on this important matter, a draft decision is appended (see Annex 1) to the paper for consideration by the working group on best practice and case studies.

A glossary of terms used in the field of technology support in learning is contained in Annex 2.

2. Technology Supported Learning and eLearning

Technology has become an important instrument in education. Attempts to use computer technologies to enhance learning date back to 1968 and to pioneering work in the USA. The use of technology as a resource to support student learning has generated both opportunities and challenges for educators. Computers, with their accompanying expansion possibilities of educational and productivity software, Internet resources, and networks, have provided a larger palette around which educators and trainers can create effective teaching and learning environments.

Computer-based technologies hold great promise both for increasing access to knowledge and as a means of promoting learning. Worldwide public imagination has been captured by the capacity of information technologies to centralize and organize large bodies of knowledge. Individuals are captivated by the prospect of information networks, such as the Internet, linking students around the globe into communities of learners.

What has not yet been fully understood is that computer-based technologies can be powerful pedagogical tools and not just rich sources of information. They are extensions of human capabilities and contexts for social interactions supporting learning. The process of using technology to improve learning is never solely a technical matter, concerned only with properties of educational hardware and software. Like a textbook or any other cultural object, technology resources for education, whether a software science simulation or an interactive reading exercise, function in a social environment, mediated by learning conversations with peers and tutors.

For instance eLearning¹ can contribute to environmental information becoming more readily available and also enhance networking and participatory exchange on environmental issues worldwide. ELearning can reduce costs for students by enabling them to learn from where they live or work and can also facilitate cross-cultural communication and networking. It presents a good opportunity for reaching more people not only to gain access to relevant training and information, but also to get to know the different technology tools that are available. It is also a major tool for environmental ministries and protection agencies in Africa to use in building the capacities of their extensive network of officials at the national level for effective monitoring and management of the environment.

As the World Wide Web continues to develop, a new family of tools known as Web 2.0 technologies has evolved that opens new opportunities to advance technology supported learning. Web 2.0 describes the new generation of web-based services that support the further development of the Web into a mass media as it enables swapping, sharing and linking of content and knowledge. Using mostly free “social software” such as Skype, wikis and weblogs, virtual communities and social networks are created online. Social software refers to software systems facilitating communication, interaction and cooperation.

One essential characteristic of Web 2.0 is that with its tools for contribution, commentary and appraisal it enables the users to develop their own social exchange and communicate easily between each other without an editor. Information provided is personal and subjective. The empowerment of users is one of the major goals of the “Web 2.0 trend”. These software systems enhance the growth of social networks and virtual communities, including learning communities.

3. Environmental education and technology supported learning in the international environmental context

Over the years, the consensus of the international community is that education is crucial to the achievement of sustainable development. The issue of environmental education and technology supported learning has been addressed in a number of international environmental fora dating back to the 1972 Stockholm Conference on the Human Environment which laid the foundation for the United Nations Environment Programme which was formally established by resolution 2997 adopted at the 27th session of the UN General Assembly later that year.

3.1 Stockholm Conference on the Human Environment (1972)

Education was given a prominent role by the Stockholm Conference in contributing towards addressing the several environmental challenges that the world faces. For instance, **Principle 19 of the Stockholm Declaration** states, *inter alia*, that

“Education in environmental matters, for the younger generation as well as adults, giving due consideration to the underprivileged, is essential in order to broaden the basis for an enlightened opinion and responsible conduct by individuals, enterprises and communities in protecting and improving the environment in its full human dimension.”

¹ The Commission on Technology and Adult Learning (2001) defines eLearning as instructional content or learning experiences delivered or enabled by electronic technology. In practice, it incorporates a wide variety of learning strategies and technologies (LaRocque and Latham, 2003).

Consequently there were several provisions for education in the Stockholm Plan of Action for the Human Environment.

3.2 United Nations Conference on Environment and Development (UNCED) (1992)

However, it was at the subsequent Rio Conference that the centrality of the role of education for achievement of sustainable development was particularly highlighted. Chapter 36 of Agenda 21 states amongst others that

“Education, raising of public awareness and training are linked to virtually all areas in Agenda 21, and even more closely to the ones on meeting basic needs, capacity-building, data and information, science, and the role of major groups.”

The UNCED (Earth Summit) in 1992 gave high priority in its Agenda 21 to the role of education in pursuing the kind of development that would respect and nurture the natural environment. It focused on the process of orienting and re-orienting education in order to foster values and attitudes of respect for the environment and envisaged ways and means of doing so. By the time of the Johannesburg Summit in 2002 the vision broadened to encompass social justice and the fight against poverty as key principles of development that is sustainable. The human and social aspects of sustainable development meant that solidarity, equity, partnership and cooperation were as crucial as scientific approaches to environmental protection. Besides re-affirming the educational objectives of the Millennium Development Goals and the Education for All Dakar Framework for Action, the Summit proposed the Decade of Education for Sustainable Development as a way of signalling that education and learning lie at the heart of sound approaches to sustainable development.

Chapter 36 of Agenda 21 emphasized that education is critical for promoting sustainable development and improving capacity of the people to address environment and development issues. Ever since sustainable development has been a common concern in all UN conferences and there has been a common consensus that education is a driving force for the change needed. It has also been pointed out that peace; health and democracy are mutually reinforcing prerequisites for sustainable development.

3.3 Millennium Development Goals (MDG) (2000)

Information and Communication Technologies (ICTs) are part of the MDGs where goal 8, target 18, indicators 47-48 make reference to them. Indeed the application of ICTs has an impact on the achievement of the other MDGs. Target 18 calls upon governments, in cooperation with the private sector, to make available the benefits of new technologies, specifically information and communications’ with the following indicators:

- Total number of telephone subscribers per 100 inhabitants
- Personal computers per 100 inhabitants
- Internet users per 100 inhabitants.’

Infrastructure is not the only factor that impacts the availability of ICTs but includes knowledge (i.e. literacy), quality (i.e. international internet bandwidth) and affordability (i.e. internet access tariffs). ICTs can help achieve MDGs by delivering educational and literacy programmes to disadvantaged communities using appropriate technologies. The International Telecommunications Union (ITU) is the lead agency for the ICT components of the MDGs. The achievement of MDG goal 7 (ensuring environmental sustainability) can be supported by greater

application of remote sensing technologies and communications networks that permit more effective monitoring, resource management and mitigation of environmental risks.

For Africa, pertinent issues are readiness, access, use and impact as described below:

Readiness: Appropriate and effective elements (infrastructure and policies) are in place to ensure the rapid adoption and widespread use of ICT.

Access: Wide diffusion and accessibility of ICT across all regions and sectors of society

Use: Use of ICT by business, government and civil society demonstrating what innovative e-applications are being developed and used.

Impact: A description of how ICT is enhancing development opportunities at local, national and international levels.

3.4 World Summit on Sustainable Development (WSSD) (2002)

The World Summit on Sustainable Development (WSSD) held in Johannesburg in 2002 broadened the vision of sustainable development and re-affirmed the educational objectives of the Millennium Development Goals and the Education for All Dakar Framework for Action. The Summit proposed the Decade of Education for Sustainable Development and the United Nations General Assembly in its 57th Session in December 2002, proclaimed the Decade of Education for Sustainable Development for the period 2005 – 2014.

3.5 World Summit on the Information Society (WSIS) (2003, 2005)

WSIS was organised in two phases in accordance with UN General Assembly Resolution 56/183 of 21 December 2001. The first phase (Geneva, 10-12 December 2003) adopted the Geneva Declaration of Principles and the Geneva Plan of Action. The second phase (Tunis, 16-18 November 2005) adopted the Tunis Agenda for the Information Society.

The Geneva Plan of Action stated (para 3) that Governments have a leading role in developing and implementing comprehensive, forward looking and sustainable national e-strategies. The private sector and civil society, in dialogue with governments, have an important consultative role to play in devising national e-strategies. International and regional institutions, including international financial institutions, have a key role in integrating the use of ICTs in the development process and making available necessary resources for building the Information Society and for the evaluation of the progress made. On the subject of e-environment, the Geneva Plan of Action further stated that Governments, in cooperation with other stakeholders are encouraged to use and promote ICTs as an instrument for environmental protection and the sustainable use of natural resources.

The Tunis Agenda outline eleven separate action lines (C1 – C11) with leads and co-leads from the UN family. Action line C7 (ICT applications) addresses both **eLearning** (Lead UNESCO and co-leads ITU/UNIDO) and **E-environment** (Lead WMO and co-leads WHO/UNEP/UN-Habitat/ITU/ICAO). UNEP is currently implementing programme activities that complement both of these action lines.

3.6 United Nations Decade of Education for Sustainable Development (UNDESD) (2005)

In 2005 the United Nations launched the Decade of Education for Sustainable Development (UNDESD). The UN Decade of Education for Sustainable Development (UNDESD: 2005–2014) is seen as a crystallization of the consensus amongst the international community that education is

fundamental to the achievement of sustainable development. Chapter 36 of Agenda 21 on Education and Public Awareness adopted by the Rio Earth Summit in 1992 prioritized environmental education and training, and included concrete activities for implementation. It was thus only natural that the historic World Summit on Sustainable Development (WSSD) in 2002 expanded on these earlier efforts by proposing that the next 10 years 2005-2014 be declared as the Decade of Education for Sustainable Development (DESD).

This re-echoed the theme of the Report of the Secretary-General of the United Nations at the turn of the century and the Millennium Summit leading to the adoption of the Millennium Development Goals (MDGs). The United Nations rose to this challenge and on the 20th of December 2002 declared the years 2005 to 2014 the DESD. This was in response to the need to produce a new generation of leaders that would be imbued with a deep environmental consciousness and with integrated perspectives in linking the three pillars of sustainable development – economic, social, and environment.

4. Environmental education and technology supported learning in the Africa context

Environmental education and technology supported learning has been addressed to some extent in a number of regional fora and other initiatives that relate to Africa.

4.1 New Partnership for Africa's Development (NEPAD)

The **New Partnership for Africa's Development (NEPAD)** is a vision and strategic framework for Africa's renewal. The NEPAD priority areas are to establish the conditions for sustainable development; policy reforms and increased investment in selected priority sectors (e.g. building and improving infrastructure, including information and communication technology) and mobilisation of resources. The NEPAD Environmental Action Plan (2003) indicates that the state of the environment is a major determinant of the growth and development objectives of any nation and has a pervasive effect on the safety and standard of living of the populace. One of the strategic actions in the NEPAD Environmental Action Plan is the development of capacity in all aspects of environmental issues in Africa.

The Education sector features prominently therein together with Health, Science and Technology and Development of skills, among the priorities in terms of "human development". This all-encompassing approach to the priority areas of NEPAD reflects the holistic approach to sustainable development and clearly corresponds to the principles underlying education for sustainable development. In Africa, the Decade should therefore be an important vehicle for implementing the operative paragraph set forth in the Education component of NEPAD. The **Mainstreaming Environment and Sustainability into African Universities (MESA)** partnership is constituted as a major contributor to NEPAD's Environmental Action Plan. More information on MESA is provided in section 5.2 of this document.

4.2 African Ministerial Conference on the Environment (AMCEN)

Decision 7 adopted at AMCEN-11 (Congo-Brazzaville, 2006) on the issue of Integration of environmental dimensions into disaster risk reduction programmes in the context of the Africa Regional Strategy for Disaster Risk Reduction, called upon Governments to *support and develop capacity-building programmes, including activities to increase institutional capacities, training and environmental emergency management education programmes.*

UNEP has, among other contributions to the AMCEN programme of work, (i) facilitated innovative programmes in African universities to mainstream environment and sustainability into teaching and learning; (ii) provided institutional capacity-building and facilitation in the development of regional training courses in environmental education; and (iii) developed learning support materials on cross-cutting environmental issues.

4.3 Second Decade for Education in Africa

The UNDESD and the Second Decade of Education in Africa launched by the African Union (AU) in 2006 are in perfect synergy and mutually reinforcing, the objective of the latter being to extricate the continent from its 'deficit' in education. Special attention will be given to insufficient capacities and resources as well as the negative impact that they have on education, the uncertain economic growth, high population growth, armed conflicts, and structural adjustment programmes.. Furthermore, the issues relating to good governance should be a basic concern as the implementation of the strategy implies favourable working conditions.

In response to the UN Decade of Education for Sustainable Development (UNDESD), the African Ministers of Education made a commitment in March 2006 to implement the UN Decade of Education for Sustainable Development in the context of the Second Decade of Education in Africa. In their statement of commitment, the Ministers of Education of Sub-Saharan African States agreed to support the UNDESD and to *support the development of strategies* for implementing the UNDESD in their respective countries within the framework of the African Union's Second Decade on Education, and to *ensure that principles of sustainable development are included in educational development frameworks, programmes and activities at all levels.*

4.4 Education for All Dakar Framework for Action (EFA)

At the World Education Forum in Dakar in 2000, 164 governments adopted the Dakar Framework for Action and committed themselves to achieving quality basic education for all by 2015, with particular emphasis on girls' schooling. There was a pledge from donor countries and institutions that "no country seriously committed to basic education will be thwarted in the achievement of this goal by lack of resources." The Forum identified six goals to be achieved in the framework and pledged support, for among other things, to harness new information and communication technologies to help achieve EFA goals. In support of the EFA, Sub-Saharan countries have been encouraged to adopt new, appropriate and cost-effective information and communication technologies to complement the integration of indigenous educational methodologies (UNESCO, 2006).

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