STRATEGIES FOR INTEGRATING SUSTAINABLE DEVELOPMENT INTO HIGHER EDUCATION

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ABSTRACT

The concept of sustainable development is the process of integrating and balancing the economy, environment, and the overall health and well-being of society.
 Education for sustainable development is an emerging imperative. It represents a major shift in the way students are taught and learn within the higher education sector in order to make higher education the major contributor to society's efforts to achieve sustainability development, through the skills and knowledge that its graduates learn and put into practice and through research and exchange with community.
United Nations General Assembly has proclaimed the ten-year period beginning on first January 2005 the Decade of Education for Sustainable Development (DESD) to emphasize that education is an indispensable element for achieving sustainable development. This initiative and many other initiatives of the United Nations agencies have been a great recognition for many universities around the world to pursue and mainstream Education for Sustainable Development (ESD), throughout their organizations. In fact many universities have become engaged in the process of integrating sustainable development in their activities, by integrating sustainable operations, policy and practices for the long term, in order to make higher education relevant to the societal needs, in general, and sustainable development in particular, and to make themselves a microcosm of the outside world. To achieve their goals universities have to find out what kind of learning objectives do the challenges associated with sustainable development impose on education in general and on higher education in particular and how can the universities respond to these challenges and how these learning objectives are expected to evolve in the future.
The purpose of this paper is to explore the strategies used by some universities to take into consideration integrating sustainable development to fulfill their assigned missions. Some examples are given to highlight the impact of sustainable integration development into higher education on education, research, economy and environment.
Keyword: sustainable development/ integration/ university/ research/ education

1- INTRODUCTION

Sustainable Development is widely acknowledged as a key concept for human society that is faced with both, aspects of human development and global change (e.g. economical globalization, global climate change etc...). Higher education as institutions

and individual academics have interests in relation to sustainable development through research, consultancy, teaching, and management. While sustainable development cannot be achieved through changes in one sector alone, higher education in particular is seen as a focal point to help create sustainable solutions for the future. Since the Decade of Education for Sustainable Development (DESD) proclamation of the United Nations Organization, and many other initiatives of the United Nations agencies many universities around the world pursue and mainstream Education for Sustainable Development (ESD), throughout their organizations, and have become engaged in the process of integrating sustainable development in their activities, by integrating sustainable operations, policy and practices for the long term, in order to make higher education relevant to the societal needs, in general, and sustainable development in particular. With the processes of globalization and localization, the economic, environmental and social performance higher education should play an active role locally, nationally, and internationally in enhancing knowledge and action competence regarding sustainable development through research and education in cooperation with surrounding society. The emergence of new forms of higher education, such as corporative universities, community and third sector alternatives, poses the challenge to universities to rethink and to reposition themselves on new bases to society. There are many other reasons why higher educational institutions should take sustainable development into account. Among these reasons, higher education institutions have a specific role in producing the professionals who will be the shapers of the future [1].

Now the challenge is to find ways to renovate education in a way that promotes competences for sustainable development and strategies to integrate sustainable development in the university curriculum in general and in higher education in particular [1].

The integration of Sustainable development in education in general and in higher education in particular is valuable not only because it allows the university to address social and environmental issues, but also because it can enhance and advance many teaching and research efforts.

This communication concentrates on how the university can use its full potential to make a contribution towards resolving the most pressing problems of the society through integration of sustainable development and the strategies to be sought to achieve its goals. In the following sections, are reviewed some strategies and models developed by some universities which can be sought for successful integration.

2- WHY SUSTAINABLE DEVELOPMENT?

The past 20 years have seen a growing realization that the current model of development is unsustainable.

Our way of life is placing an increasing environmental burden on the planet through:

- the consequences of already unavoidable climate change
- increasing stress on resources and environmental systems from the way we produce, consume and waste resources
- increasing loss of biodiversity, from the rainforest to fish stocks

We are also living in a world where over a billion people live on less than a dollar a day, more than 800 million are malnourished, and over two and a half billion lack access to adequate sanitation. A world disfigured by poverty and inequality is unsustainable.

Unless we reconcile these contradictions, we face a less certain and less secure future. We need to make a decisive move towards more sustainable development both because it is the right thing to do, and because it is in our long-term best interests **[2].**

The United Nations Decade of Education for Sustainable Development (2005-2014), for which UNESCO is the lead agency, seeks to integrate the principles, values, and practices of sustainable development into all aspects of education and learning, in order to address the social, economic, cultural and environmental problems we face in the 21st century. Sustainable development aims to help people to develop the attitudes, skills and knowledge to make informed decisions for the benefit of themselves and others, now and in the future, and to act upon these decisions. UNESCO's role and, in fact, the task of Member States is defined by the four major thrusts of ESD: improving quality basic education; reorienting educational programs; developing public understanding and awareness; and providing training. From the time sustainable development was first endorsed in 1987, the UN General Assembly explored the parallel concept of education to support sustainable development. The key roles of Education for Sustainable Development (ESD) are defined as follows:

- ESD concerns all levels of education and all social contexts (family, school, workplace, community),- ESD concerns all levels of education and all social contexts (family, school, workplace, community);
- ESD allows learners to acquire the skills, capacities, values and knowledge required to ensure sustainable development
- ESD fosters responsible citizens and promotes democracy by allowing individuals and communities to enjoy their rights and fulfill their responsibilities
- ESD provides essential learning tools and content to allow individuals to survive, to develop to 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 **[3].**

Universities and other institutions of higher educations have tremendous human and materials resources, such as well educated personnel, laboratory equipment, computers, library and other facilities required for carrying out research projects. Beyond teaching and research universities have a third social mission referred to as "extension", generally defined as the interaction and responsiveness of the university to the demands of society. This engagement role is thought to be a key to sustainable economic development as universities combine technology transfer and classroom learning with active involvement in sustainability projects on and off campus [**4].**

Therefore the universities can play a leading role in sustainable development to serve the community by determining community needs in research, education, and outreach , the discovery, dissemination and application of new knowledge and to anticipate and respond to issues and challenges in different fields (like agriculture, food systems, environment

and natural resources), in order to empower people to improve their lives, the lives of others, and the environments on which they depend **[5].**

In the following sections, strategies for integrating sustainable development and the generated benefits are reviewed.

3- STRATEGIES FOR INTEGRATING SUSTAINABLE DEVELOPMENT INTO HIGHER EDUCATION:

One of the principal strategies in support of university's goals is to foster integration of sustainable development into education in general and in higher education in particular through curriculum, programs, research addressing societal issues projects and activities it supports at academic and research institutions **[5].** Because there are varying purposes and goals for integrating sustainable development into higher education, various innovations and practices are being initiated in different universities.

As far as the teaching curriculum is concerned, many universities adopt new methods to integrate different aspects of sustainability into teaching and learning in higher education **[6].**

Tilbury and Cooke (2005) have defined the components (critical factors) of the learning for sustainability approach, in particular, to environmental education, which are: (1) Envisioning a better future, (2) Systemic thinking, (3) Critical (reflective) thinking, (4) Participation in decision-making, and (5) Networks and partnerships for change. According to Tilbury and Cooke (2005: 27–52) the above mentioned critical factors include the following elements **[6]:**

1) Envisioning a better future:
- Leads to an exploration of how to achieve change for a more sustainable future.
- Encouraging learning about the process of change and how it occurs.

2) Systemic thinking:
- Helps to look at multiple influences and relationships
- Identifies strategies that generate better sustainable solutions

3) Critical (reflective) thinking:
- Explores power relationships in our communities, such as universities
- Helps us to explore the influence of culture in shaping our views of the world
- Creates an ability to participate in change and provides new inspirations and perspectives, and thus, helps to construct an alternative ways of thinking.

4) Participation in Decision-Making:
- Involves learners throughout the process creating a greater sense of ownership and commitment to actions for the agreed goals
- Actively builds knowledge among learners through a dialogue

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- Confirms responsibility of outcomes.

5) Networks and partnerships for change:
- Create synergies between organizations to work for change
- Foster building shared visions among partners
- Allow partners to combine resources and talents
- Help motivate partners to work toward long-term change.

The above mentioned critical factor were re-developed and categorized into context, mental and activity related aspects as shown in Figure2. Contextual factors form a framework, while mental aspects refer to intrinsic changes in the learning process for sustainability. Activities are the ways to realize educational practices for sustainability (Figure 1) **[7].**

Society and working life: Future needs for Sustainable Development (SD)

Critical factors for ESD:
CONTEXT
Integration
Spatiality
Time perspective
MENTAL ASPECTS
Value clarification
Systemic thinking
Critical reflection
Motivation building
ACTIVITIES
Partnerships
Cooperation&
communication
Participation

Result of learning process:
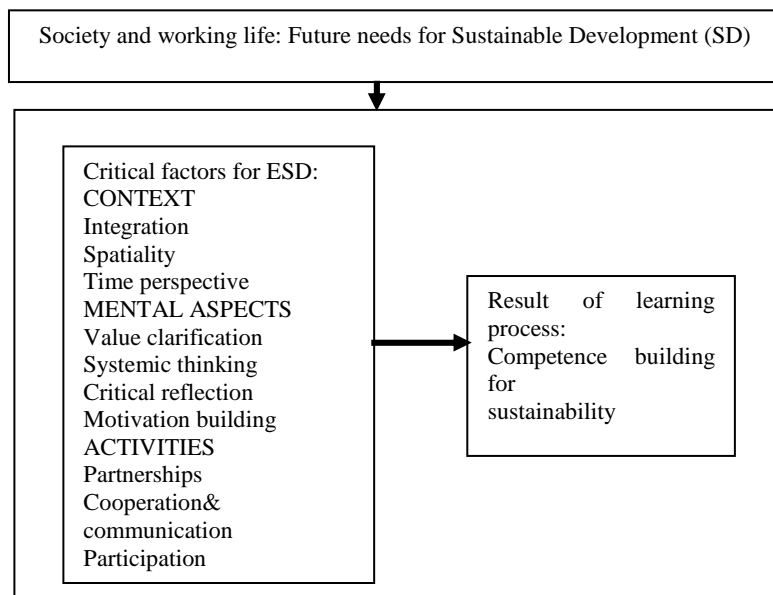Competence building for sustainability

Figure1- The model of learning for SD

The critical factors for ESD are context, mental and activity related aspects. The outcome of the learning process is competence building to promote activities for sustainability. The central feature in the model of learning for sustainable development is interaction between universities and society.

a- Context:

Context-related critical factors for ESD are the integrative approach, spatiality and time perspective. Mental aspects are related to value clarification, systemic thinking, critical reflection and motivation building. The third category, activities, has to do with partnership, cooperation and communication as well as factors related to participation. Here a more detailed explanation of each of these factors **[7]**:

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- Integrated and interconnected approach :

Integrated and interconnected approach for sustainable development is the basis for understanding and treating the world as a harmonious entity. An integrative approach means, first of all, understanding the causal links of the dimensions of sustainable development, and handling these as interconnected and integrated with each other. For instance ecological questions are not separate from economic, social and cultural ones, and vice versa.

- Spatiality:

Spatiality is important in the discussion of sustainable development. Learning for sustainability looks at sustainability issues from local to regional and global perspectives. In teaching situations, spatiality and time perspectives form a context as well as a perspective for learning.

- The time perspective:

The time perspective is a focal aspect in learning for sustainability.

b- Mental Aspects

- Value clarification:

Value clarification is a useful method in teaching when exploring and reflecting on People's attitudes, opinions and values.

- Systemic thinking:

Systemic thinking is a way to outline the complexity of a system and the connectivity of its parts.

- Critical reflection:

Critical reflection on its highest level demands students, teachers and other stakeholders to question their preconceptions of issues and create new or modified interpretations to understand and realize activities for sustainability.

- Motivation building

A teacher's role is to build the motivation towards sustainable practices, to transfer knowledge of sustainability, and to teach how to act and behave in terms of sustainable development.

c- Activities

- Partnerships

The sustainability also requires new kinds of partnerships. Ideally, partnerships for sustainability are based on a collaborative culture. Such partnerships can be established between the educational communities, public organizations, non-governmental organizations, local communities, entrepreneurs, etc.

- Cooperation and communication

Cooperation and communication between institutions of higher education is important, but to fulfill their service functions for the workplace and society, cooperation with external stakeholders is required.

- Participation

Participation requires involvement on different levels starting from the consultation and consensus building to decision making, risk sharing and collective partnerships

- Competence building:

Competence building for sustainability is a result of the learning process and development at individual, organization/community and institutional/societal levels.

Because there are varying purposes and goals for integrating teaching research and community service, various innovations and practices are being initiated in different universities.

4- EXAMPLES OF INTEGRATING SUSTAINABLE DEVELOPMENT INTO HIGHER EDUCATION:

Here are some examples each illustrating a different approach of integrating sustainable development into higher education.

4-1 Laurea University [1] :
All Laurea's new degree programs have a curriculum that consists of field specific themes. Themes are depicted as know-how in relation to the corresponding workplace. However, all the degree programs are based on the structure of the core curriculum. The core curriculum consists of study units and projects carried out for employers, which all involve a number of generic competences. The generic competences are ethical competence, globalization competence, innovative competence, reflective competence and network competence. In addition to these, there are field-specific competences of every degree program. These field-specific competences are basic and essential skills and knowledge needed in the field of study. One aim of the new curriculum is to take sustainable development into account as integrated with regard to field-specific themes.
The above mentioned five generic competences have a specific role for education for sustainable development:

- Network competence is built on communication skills, co-operation and multidisciplinary thinking
- Reflective competence means critical evaluation.
- Ethics refers to moral choices to which the individual is consciously committed
- The globalization competence consists of three parts, which are knowledge, motivation and values, and implementation skills.

4-2 Savonia University of Applied Sciences, Finland [8]
From the point of view of the authors, oil combating education is a proactive way to prepare for a potential oil spill because oil transportations are dramatically increasing on the Gulf of Finland, and therefore, there is an increasing risk for oil spills in the future. A study course implemented in the year 2006 is based on the idea to enhance a holistic understanding of an oil spill and oil combating from the sustainable development point of view as well as from the management point of view. The education was based on the pedagogical approach which emphasizes critical, reflective and collective learning. The participants of the education were both professionals and degree students from University of Applied Sciences in eastern Finland.

4-3 Delft University of Technology [9]:

The Delft University of Technology (DUT) adopted a SD education plan. It consists of three interconnected activities for all engineering curricula: the implementation of an elementary course "Technology in sustainable development"; the development of a graduation program in sustainable development for students who want to specialize; and the integration of sustainable development in all regular courses, wherever applicable**.**

4-4 University of Bradford [10]:

The University of Bradford adopts a Program called Ecoversity. It aims to embed the principles and practice of sustainable development across the entire institution and all activities. The Ecoversity Vision can be summed up as follows

- Working towards sustainable education by engaging students, staff, the local community and employers on the skills and knowledge needed in the pursuit of sustainable development.
- Working towards a healthy environment

Protecting the environment by minimizing our resource use and emissions whilst also enhancing the surrounding environment.

- Working towards social well-being by creating a greener, safer environment in which students, staff and the local community can live, interact, study, and be active.
- Working towards a thriving economy
- Developing research, innovation and knowledge transfer to bring greater prosperity to students, the University, City and Region

4-5 University of Gloucestershire [11]:

The University of Gloucestershire has developed a program called 'Promising Futures: A Sustainability Strategy 2008-2015'. The Strategy commits the University to a process of continuous improvement which extends activities across the campuses and facilities. It provides a sustainability vision for the University which is focused on 'shifting mindsets' as well as 'changing unsustainable practice'. Its ultimate goal is to contribute through its educational, research, outreach and operational activities to a more promising future for all. The actions taken by the university are:

- Curriculum: Embed sustainability across core course offerings: initially in professional courses and help staff promote and publish these developments.
- Research: Seek funding to establish new research streams and support research networking opportunities
- Student Experience: Develop a work placement and professional exchange program for students.
- Public Engagement: Launch RCE and establish its program of public engagement activities.
- Partnerships: Develop a sustainability partnership program for FE Colleges in the area of sustainability.

- Academic Profile: Participate in international and high profile sustainability research programs.

4-6 The Baltic 21 Education Sector [12]

The Baltic 21 Education sector is a platform for multi-stakeholder cooperation on education for sustainable development. The emphasis of the Baltic 21 Education sector program is on strengthening the capacity of knowledge building. The Action Program for the Education Sector is divided into a framework of action areas, which are common to the whole sector:

- Policies and strategies – include the development of education of sustainable development guidelines and promotion of international co-operation for curricula, program and course development at all levels of education;
- Competence development within the education sector including actions to increase the awareness of sustainable development issues among officials, principals and staff, to support co-operation between educators, researchers and practitioners to promote knowledge and skills in education for sustainable development;
- Continuing education which includes sustainability related knowledge and skills;
- Research on and development of education for sustainable development

4-7 Center for Systems Solutions, Poland & International Institute for Applied Systems Analysis, Austria [13]

Karolina Krolikowska, Piotr Magnuszewski and Jadwiga Magnuszewska from Center for Systems Solutions, Poland, and Jan Sendzimir from International Institute for Applied Systems Analysis, Austria, introduce a study course which integrates disciplines from ecology and economy through social studies and psychology to concepts that integrate across disciplines, i.e. systems science.

4-8 National research councils in Canada (SSHRC, CIHR, NSERC) [14]:

SSHRC, CIHR, NSERC have arrangements for funding community university research partnerships. These efforts have been supplemented by partnerships with governmental agencies, foundations and civil society that channel private and public investment in cost effective ways to produce results that contribute to social, health, and economic and environmental conditions in Canada and its communities. There are four broad categories of community university partnerships in research.

- Type one as individual faculty to community relationships that have been created without systematic institutional support.
- Type two are specific centers or institutes that support partnerships in their fields of interest with communities relevant to that interest.
- Type three is a systematic organizational structure operating on a cross-university basis to engage community partners in research of value to them and to the institution.

- Type four is a multi-higher education institution and community partnership to engage in research at a regional, national or international level on an ongoing basis.

5- BENEFITS OF INTEGRATING SUSTAINABLE DEVELOPMENT INTO HIGHER EDUCATION:

The integrating sustainable development into higher education and Universities Partnership offers in education for sustainable development can benefit and serve a variety of research, policy, educational, communities and action goals:
- the university as a place to equip leaders and civil society to play a greater role in shaping responsive measures both globally and locally, prepare leaders to be accountable to civil society to have their voices heard in decision-making bodies both globally and locally, and equip government, civil society and business to mitigate and adapt to climate change, environmental issues and sustainable development challenges [15].
- create new knowledge through research that both transcends traditional disciplinary, institutional and geographical boundaries, and crosses the academic/industrial division.
- Improvement of scientific understanding of global environmental challenges
- Development of technology and policy tools to help societies reconcile ecological and economic concerns
- educate a new generation of leaders for all sectors of society with the knowledge and skills required to address sustainability issues
- Education of a new generation of leaders committed to meet the challenges of sustainable development
- Allow students to learn and practice how to be environmentally socially, and economically responsible while being active citizens of the global community
- Research can encompass community-based scholarship and the development of new knowledge through collaborations with community participants.
- Teaching and learning can be done in a way that links educational goals with the challenges of life. Common forms of engaged learning are service-learning and problem-based learning, both utilizing community issues as a starting point for accomplishing educational goals.

Universities Partnership offers in education for sustainable development will enable universities to:
- enhance quality and policy relevance of university education in the context of sustainable development and the achievement of the Millennium Development Goals;
- increase knowledge on Education for Sustainable Development (ESD), so that future business managers, scientists and political leaders of the continent will incorporate values and principles of sustainable development in their decision-making;

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- raise awareness and spread a new way of thinking about environment, development and society, beyond the university boundaries inside the many other societal circles in which students, teachers and managers live;
- create opportunities for collaborative projects between universities, civil society, communities and the private sector; and
- contribute to the strengthening of scholarships and partnerships for sustainable development**.**

Higher education institutions contribute to sustainable environmental development in their regions in many ways, for example by **[17]:**
- Generating human capital in the region through their learning and further education programs in areas of sustainable development.
- Acting as a source of expertise through research, consultancy and demonstration.
- Playing a brokerage role in bringing together diverse regional actors and elements of capacity to the sustainability process.
- Offering recognition and reward incentives for staff to be involved in sustainable development leadership groups in the regional community.

6- CONCLUSION

This paper discussed the need of integrating sustainable development (SD) into higher education and explored some strategies for integrating SD into higher education and cited some examples to illustrate how SD can be integrated through research and curriculums. It also highlighted ways and possibilities for teachers in institutions of higher education to enhance the quality of their teaching. Certainly, there are many more examples of how to deal with SD issues and to bridge the teaching and research missions of the university. Integrating SD into university curriculum not only enhances the ability of the university to positively impact society, but also enriches professional experience of teachers and researchers. Therefore instead of framing faculty work as three distinct functions essentially subsumed by the teaching and research, universities should think of new policies that envision the work of faculty as occupying different points in the space where research, teaching and SD intersect.

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