Core Sustainable Development Competencies for the Workforce

Paper Presented at the

International Workshop on Workforce Development
For Knowledge Economy

7-13 September 2005, Seoul, Korea

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ABSTRACT

There is a general consensus that the workforce must be prepared so that it can contribute to the goals of sustainable development. However, the implementation of workforce education and training for sustainable development pre-supposes that the sustainable development-related knowledge, skills and attitudes are known. However, an extensive review of literature indicated that this information is non-existent. The purpose of this study was to identify the sustainable development-related knowledge, skills, and attitudes required by the workforce.

This paper describes research undertaken to develop the Sustainable Development Competency Profile (SDCP) for the workforce using integrative literature reviews and expert consultations. The SDCP generated by this study consists of six unifying themes: (1) ethics and values; (2) integrated decision-making; (3) responsible use of resources; (4) valuing diversity; (5) safety and well-being; and (6) continual improvement. These six themes address the essential knowledge, skills, and attitudes necessary for the workforce to apply the principles of sustainable development in their day-to-day activities, regardless of job function, sector of activity, and level of education and training. It is also broadly applicable to general education, adult education, and the technical and vocational education and training.

This research project was conducted by the National Centre for Workforce Developments (The Canadian Centre for UNESCO's International Project on Technical and Vocational Education and Training) with funding assistance form the Government of Canada, Human Resources and Skills Development.
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INTRODUCTION

The human economy already consumes around fifty per cent of the planet's natural production every year. If this trend is maintained we will soon need many more planets to support our needs. This unsustainable approach to development is causing major ecological disasters, contaminating the air that we breathe, contaminating the water that we drink, and several other irreversible damages to the environment. We are not only compromising our livelihood and quality of life, but we are also jeopardizing the livelihood of future generations. Although reversing environmental degradation has become a global priority, world leaders recognize that environmental protection cannot be achieved without due consideration to economic and social development. The concept of sustainable development emerged form this critical reflection regarding the interdependency and interconnectedness between environmental protection and economic and social development.

Kofi Annan (2002), UN General secretary challenges us to think of two competing visions of the world:

> Imagine a future of relentless storms and floods; islands and heavily inhabited coastal regions inundated by rising sea levels; fertile soils rendered barren by drought and the desert's advance; mass migrations of environmental refugees; and armed conflicts over water and other precious natural resources.
>
> Then, think again—for ….a more hopeful picture: of green technologies; livable cities; energy-efficient homes, transport and industry; and rising standards of living for all the world's people, not just a fortunate minority.

In 1987, the World Commission on Environment and Development (WCED) published *Our Common Future*, a groundbreaking report that brought the terms "sustainable development" and "sustainability" into widespread use. That report defined sustainable development as "meeting the needs of the present generation without compromising the ability of future generations to meet their own needs" (WCED, 1987) and called on the global community to take steps towards that goal.

At the United Nations' Earth Summit in Rio de Janeiro in 1992, "over 170 governments agreed that human development aspirations and the capacity of the environment to support them were on a collision course. Sustainable development became the overarching policy framework within which governments would seek to address the challenges of unsustainable development patterns" (Forum for the Future, 2004, p. 5).

One of the most prominent activities in this regard was the development of Agenda 21 as a part of the Rio Earth Summit (United Nations, 1992). Agenda 21 is a global action plan for achieving sustainable development and has provided a useful starting point for many government and industry-based projects. For instance, sustainability projects have been initiated at the national, regional, and local government levels all over the world. However, as repeatedly noted at the United Nations World Summit on Sustainable Development, Johannesburg (2002), there is still much work to do. If the concept of sustainable development is ever to be put into widespread practice, its principles must be integrated into all disciplines at every level of society. This necessity was explicitly recognized by Agenda 21, which positioned education as a key

element in the advancement and implementation of sustainable development. Even in countries with strong education systems, there is a need to reorient education and training to increase understanding and support for sustainable development. In particular, members of the workforce require new ways of thinking, new attitudes and skills to be able to implement the principles of sustainable development. Chapter 36 of Agenda 21 suggested that training is one of the most important tools to develop human resources and facilitate the transition to a more sustainable world. Agenda 21 also calls for:

- Vocational training programs "that meet the needs of environment and development with ensured access to training opportunities, regardless of social status, age, gender, race or religion"; and
- The promotion of a "flexible and adaptable workforce of various ages equipped to meet growing environment and development problems and changes arising from the transition to a sustainable society";

Given that "every human activity affects the environment, the entire population needs to be mobilized and trained to protect the environment" (Gagliardi & Alfthan, 1993). Sustainable literacy is therefore a basic skill that everyone should have and a sustainability literate person is expected to:

- Understand the need to change to a sustainable way of doing things, individually and collectively;
- Have sufficient knowledge and skills to decide and act in a way that favours sustainable development; and
- Be able to recognize and reward other people's decisions and actions that favour sustainable development (Forum for the Future, 2004, p. 9).

The implementation of workforce education and training for sustainable development pre-supposes that the sustainable development-related knowledge, skills and attitudes are known. However, an extensive review of literature failed to identify the sustainable development competencies required by the workforce. This of course represents a major barrier for integrating the concept of sustainable development in the preparation of the workforce. Educators are overwhelmed by the challenge of weaving an abstract concept like sustainable development in education and training. The purpose of this study was to identify the sustainable development-related knowledge, skills, and attitudes required by the Canadian workforce (Chinien, Boutin, McDonald & Searcy, 2004). This paper describes research undertaken to achieve this objective.

Conceptual Framework

A scan of literature and research was conducted to provide the guiding theoretical orientation and the underpinning foundation to the study. This review was used to elaborate a conceptual framework for the identification of the sustainable development competency profile required by the workforce. This framework consisted of two main elements, namely (1) sustainable development; and (2) human performance enablers.

The concept of sustainable development has been widened from focusing on limits to economic activity to the realization that a balance must be found between economic prosperity, environmental protection, and social equity. Therefore the three main clusters encapsulated in the concept of sustainable development, namely, environment, society and economy, were used as

the under girding foundation providing the conceptual framework for this study. A brief description of each follows:

- **Environmental**: An environmentally sustainable system must maintain a stable resource base, avoiding over-exploitation of renewable resource systems, and depleting non-renewable resources only to the extent to which adequate substitutes can be developed. The concept includes maintenance of ecosystem functions such as biodiversity and atmospheric stability, thus addressing resources that are traditionally not considered as economic resources.

- **Social**: A socially sustainable system must achieve distributional equity, adequate provision of social services including health and education, gender equity, as well as political accountability and participation to promote active citizenship. The overriding objective is: Quality of Life (UNESCO-UNEVOC, 2004, p. 1).

- **Economic**: An economically sustainable system must be able to produce goods and services on a continuing basis, and to avoid sectoral imbalances between such areas as agricultural and industrial production.

The human performance enablers incorporated three dimensions which are assumed to be critical for sustainable human performance, namely knowledge, skills, and attitudes. An illustration of the conceptual framework is presented in Figure 1.

Figure 1. Conceptual Framework for Sustainable Development Skills

Sustainable Development	**Sustainable Human Performance Enablers**		
	Knowledge	Skills	Attitudes
Environmental			
Social			
Economic			

Adapted from Buckland, 2002.

METHODOLOGY

The study was conducted in two main phases. Phase 1 consisted of a general scan of literature and research on environment, society and economy in order to identify key issues related to skill needs for sustainable development. This was followed by an extensive review of literature and research to identify specific sustainable development-related knowledge, skills, and attitudes (KSAs) that were of relevance to the workforce. These KSAs were then validated using a Focus Group methodology in Phase 2.

Phase 1.

The review of literature conducted in Phase 1 was focused on materials pertaining to sustainable development, education, and workforce development. Particular effort was directed at how this information applies to government organizations involved in workforce development policies. Information was gathered from local, provincial/state, national, and international sources through a review of a wide variety of sources including books, government documents and reports, journals, and the worldwide web. The literature review was supplemented by limited consultation with relevant experts. These experts were contacted primarily through email and postings on listservs and electronic bulletin boards.

The Conceptual Framework developed for this study guided the information gathering process. It also assisted the researchers in placing the knowledge, skills and attitudes or values identified in the appropriate cells related to the environment, society and economy. Although this Conceptual framework provided a very useful tool for identifying the KSAs, the limitation of classifying KSAs according to the clusters of environment, society and the economy separately was recognized. In many cases some KSAs had implications for more than one category. The decision to place a KSA element in a particular cell was based on an analysis of whether that particular element had more implications for the environment, society or economy.

As shown in Table 1, a total of 588 KSAs were identified in the literature review and classified as they pertained mostly to environment (161), society (258) or economy (169). It is noteworthy that there were more KSAs related to category of "society".

Table 1
Breakdown Of KSAs Identified For Environment, Society and Economy before the validation process

Sustainable Development	**Human Performance Enablers**			
	Knowledge	Skills	Attitudes	**Totals**
Environment	66	58	37	**161**
Society	78	101	79	**258**
Economy	67	63	39	**169**
Totals	**211**	**222**	**155**	**588**

Phase 2.

Given the methodology used for identifying the KSAs, it was determined that these KSAs had to be validated by a group of experts (n = 24) during phase 2. The focus group meeting was held to validate the knowledge, skills, and attitudes inventory developed in phase 1. The expert participants were selected on the basis of their experience in sustainable development and/or workforce development. This Focus Group meeting had four objectives:

- Validate the relevance and importance of each KSAs;
- Identify any gaps in the KSAs; and
- Assess the presentation format of the KSAs included in the Competency Profile;
- Identify priority sectors for improvement efforts.

The experts were divided into three groups, balanced with regards to expertise in sustainable development, and workforce development. Each group was assigned the task of validating a profile related to the environment, society and the economy respectively. A

professional facilitator, specialized in sustainable development, coordinated the validation process. The small group validation was facilitated by project staff.

The experts were also asked to classify the KSAs according to four skill levels used by the Canadian Government in the National Occupational Classification handbook. Occupations usually require:

A University education
B College education or Apprenticeship training
C Secondary school and/or occupation-specific training
D On-the-job training only

The breakdown of the inventory of KSAs after the validation process by the group of experts is shown in Table 2. The numbers in bracket represent the KSAs before validation. The total number of KSAs was reduced from 588 to 523. While a few KSAs were added in the area of society (5), 16 were eliminated from economy, and 44 form environment. Repetitive listing was the most frequent reason for the elimination of these KSAs.

Table 2
Breakdown of KSAs Identified For Environment, Society and Economy after the validation process

Sustainable Development	**Human Performance Enablers**			
	Knowledge	Skills	Attitudes	**Totals**
Environment	43 (66)	46 (58)	28 (37)	**117 (161)**
Society	66 (78)	109 (101)	78 (79)	**253 (258)**
Economy	57 (67)	59 (63)	37 (39)	**153 (169)**
Totals	**166 (211)**	**214 (222)**	**143 (155)**	**523 (588)**

The experts unanimously indicated that all 523 KSAs apply to all four skill levels (A, B, C and D) used by the Canadian Government in the National Occupational Classification handbook as described earlier. This result confirmed that these KSAs were broadly transferable across the workforce.

Focus Group Debriefing

A plenary debriefing session was held immediately following the validation sessions. The purpose was to get a general sense of the experts' reaction to the KSAs. The experts were asked to focus their discussions around five thematic questions rather than providing a detailed report of the validation. Key comments generated by these questions are summarized below.

- develop themes to better organize the information
- group skills into generic categories
- redefine "attitudes" as "values"
- eliminate environment, economy, society divisions within each cluster
- consolidate similar ideas and concepts
- it is necessary to focus on the interdependencies between and within the groupings

- be careful not to create "silos" or "islands" where each cluster is looked at as being on its own
- the clusters seem passive, more concrete action statements are required
- it would be helpful to link the breakdowns within the clusters

Revised KSAs inventory

The first draft of the KSAs inventory was revised on the basis of the feedback received from the experts. The most important revision made was to move away from the three clusters organizers, namely, environment, society and economy to avoid unnecessary repetition and to establish the interconnectedness and interdependency among these three elements. This was achieved by combining together all the KSAs related to each of the clusters (environment, society and economy) into three separately categories. The KSAs related to each of these new categories were then analyzed for commonalities and differences. The following six major categories emerged from that analysis:

- Attitudes
- Cognitive literacy
- Responsible Use of Resources
- Valuing Diversity
- Healthy Lifestyle
- Continuous Improvement

These six categories were e-mailed to the Focus group participants for comments. All those who responded confirmed that these categories were appropriate and some offered suggestions for improvement. Following is a list of the final skill clusters after taking into consideration the comments and suggestions of all respondents:

Ethics and Values

- Ethics and Values are defined as the attitudes needed to behave and act ethically.

Integrated Decision-Making

- The Integrated-Decision-Making theme is defined as the knowledge and skills needed to process information effectively and efficiently.

Responsible Use of Resources

- Responsible use of resources is defined as the knowledge and skills needed to use resources responsibly.

Valuing Diversity

- Valuing Diversity is defined as the knowledge and skills needed to contribute to, and support, diversity.

Healthy Lifestyle

- The Healthy Lifestyle theme is defined as the knowledge and skills needed to maintain workplace health and safety.

Continual Improvement

- Continual improvement is defined as the knowledge and skills needed to improve quality of life.

Sustainable Development Competency Profile (SDCP)

These six skill clusters were used to reclassify all the KSAs. This restructuring of the KSAs was performed to address two of the most important recommendations made by the experts, namely the need to provide for interdependencies among the key clusters of sustainable development (environment, society and economy) and the need for consolidating the KSAs. This exercise resulted into the Sustainable Development Competency Profile (SDCP, Table 3).

The SDCP provides a list of the broadly transferable, sustainable development-related knowledge, skills, and attitudes required by the Canadian workforce in order to apply the principles of sustainable development in their day-to-day activities, regardless of job function, sector of activity, and level of education and training. The SDCP is also broadly applicable to general education, adult education, and the technical and vocational education and training.

CONCLUSIONS

The principle of sustainable development calls for an integrated approach to environmental, social, economic and global considerations. The prospect of full integration cannot be guaranteed in the longer terms by the instruments of science, technology, economics and law alone. If the principle of sustainable development is to be implemented successfully, there is also a need for the workforce, to be equipped with sustainable development-related knowledge, skills and attitudes (KSAs).

This study is the first systematic attempt made to identify the essential broadly transferable sustainable development KSAs needed by the workforce. These KSAs must be woven into workforce development so that through a transformative learning model, the workers may become reflective practitioners who can effectively and efficiently contribute to the goal of sustainable development. The KSAs provide the underlying foundation to support reflective practice in the workplace and in personal life. The principles of transformative learning should be used to integrate education for sustainable development in workforce development initiatives.

The Sustainable Development Competency Profile (SDCP) generated by this study has multiple applications. It can be used for developing performance indicators, score cards, curriculums, training programs, self-assessment tool, needs assessment instruments, performance evaluation, feedback mechanisms, just to name a few.

It is noteworthy that there are two distinct sets of sustainable development-related KSAs: (1) generic or broadly transferable skills; and (2) occupationally specific skills. The focus of this study was on the generic skills. It is equally important to identify the occupationally specific sustainable development related KSAs for each trade and profession.

Table 3

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BROADLY TRANSFERABLE SUSTAINABLE DEVELOPMENT COMPETENCY PROFILE FOR THE WORKFORCE (SDCP)

ETHICS AND VALUES: ATTUTUDES NEEDED TO BEHAVE AND ACT ETHICALLY

• Appreciate the diversity of environmental, social and economic systems • Demonstrate a commitment to stewardship • Demonstrate leadership for sustainability • Respect human dignity • Show concern for quality of life • Embrace a learning culture • Support equity, inclusion, human rights, social justice and peace • Acknowledge constraints, but adopt a "can do" attitude • Demonstrate integrity and trustworthiness • Demonstrate self-reliance in dealing with complex issues • Embrace change with an open-mind and with confidence • Solve problems with persistence and perseverance • Accommodate different values and competing interests	• Accept trade-offs among conflicting goals • Use ethical principles in decision-making processes • Consider multiple perspectives in the decision-making process • Respect privacy of information • Respect intellectual property rights • Adhere to legislation, which protects the environment, promotes fair business practices and safeguards human rights • Understand the need for political systems in a democratic society • Learn from and work with others • Deal with others fairly and with transparency • Appreciate the dignity of work and fair pay • Adopt a "prevention is better than cure" attitude

INTEGRATED DECISION MAKING: KNOWLEDGE AND SKILLS NEEDED TO PROCESS INFORMATION EFFECTIVELY AND EFFICIENTLY

• Develop and maintain essential cognitive literacy skills • Develop and maintain integrative skills • Develop and maintain essential skills • Develop and maintain ICT literacy skills • Develop and maintain technological and scientific literacy skills • Reflect critically about issues • Work in collaborative workgroups • Learn to learn • Apply interpersonal skills to resolve conflicts • Recognize the importance of involving stakehdders in decision-making	• Think globally and act locally • Evaluate impacts and consequences of actions taken • Use a system approach for thinking and analysis • Make efficient, timely, accountable, and cross-sectoral decisions • Realize that today's decisions must be balanced with tomorrow's effects • Think imaginatively and creatively • Practice cross-functional and multi-criterial thinking • Consider multiple perspectives in the decision-making process • Recognize the interdependence between environmental, economic and social systems

REPONSIBLE USE OF RESOURCES: KNOWLEDGE AND SKILLS NEEDED TO USE RESOURCES RESPONSIBLY

• Acknowledge the limits of an area's carrying capacity • Understand shared responsibility for using resources efficiently • Recognize the need to use renewable resources • Demonstrate basic economic literacy and accountability • Minimize waste and view waste as a potential resource • Understand factors that contribute to degradation of resources and the need for restoration • Act as caretaker to environmental, social and economics systems for present and future generations, from a local, national and global perspective • Apply precautionary principles	• Anticipate and prevent problems • Use a proactive and strategic approach toward the use of resources • Understand the need for equitable distribution of resources and making provisions for social services • Understand that economic growth and development are compatible with responsible use of resources • Recognize the values associated with natural, human, social and produced capitals and understand the relationship among them • Recognize the key contributions of SME and entrepreneurs in economic development

VALUING DIVERSITY: KNOWLEDGE AND SKILLS NEEDED TO CONTRIBUTE AND SUPPORT DIVERSITY

• Understand the importance of biodiversity to humankind and the environment • Understand that economic diversity is a competitive advantage in a global economy • Understand and respect the need to maintain cultural and linguistic diversity for strengthening the social fabric	• Recognize the contribution of the cultural heritage and traditional knowledge of Aboriginal people for sustainable development • Understand that the social fabric is strengthened when the workforce reflects the diversity of a population • Encourage and facilitate diversity in the workforce • Adapt to cultural diversity

SAFETY AND WELL-BEING: KNOWLEDGE AND SKILLS NEEDED TO MAINTAIN WORKPLACE HEALTH AND SAFETY

• Understand that a healthy ecosystem benefits human health now and in the future • Recognize the effects of environmental degradation to health and safety • Select environmentally-friendly materials, products and processes • Handle hazardous materials safely (WHMIS).	• Practice a healthy lifestyle: healthy diet and regular exercise • Recognize the consequences of alcohol and substance abuse • Recognize the economic impact of accidents and unhealthy lifestyles • Practice accident prevention • Think and act safely

CONTINUAL IMPROVEMENT: KNOWLEDGE AND SKILLS NEEDED TO IMPROVE QUALITY OF LIFE

• Contribute to research and innovation to further economic growth, environmental welfare, human health and social well-being • Recognize the importance of sustainable development indicators for assessing growth and development • Understand that maintaining status quo is not an option • Understand the principles of continual improvement	• Understand the need for using more efficient means for distributing environmental resources and economic growth • Adapt to changing requirements • Recognize the need for checking and correction action • Upgrades skills to cope with socio-economic and socio-technical changes and environmental sustainability

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