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Technical and Vocational Education and Training and the 'Triple Bottom Line' of Sustainable Development

This short article seeks to convey the essential flavour of the longer Discussion Paper prepared by the UNESCO-UNEVOC International Centre for the UNESCO International Experts Meeting 'Learning for Work, Citizenship and Sustainability' which will be held in Bonn, Germany, from 25 to 28 October 2004. For a copy of the full discussion paper please see www.unevoc.unesco.org/bulletin

Introduction

» Business and industry today often speak of the 'triple-bottom-line' of their operations. Triple bottom line reporting is an approach to corporate accounting that reports not only financial matters but also the outcome of a firm's environmental and social activities. In other words, it represents an integration of social, economic and environmental goals and a move away from a single priority only on economic growth and profit. Relatedly, sustainable

development is a concept that embraces environmentally sound production and consumption, social equity and economically viable work organisations.

Education and training for sustainable development is a process. It is a process of incorporating considerations that impact on the long-term future of the economy, ecology and society into TVET. Building the competencies and commitments needed

for such futures-oriented thinking is crucial. We call it TVET for sustainable development. This paper is structured around the three key areas of sustainable development:

- TVET and economic sustainability
- TVET and environmental sustainability
- TVET and social sustainability.

>> 'Progress towards sustainable development makes good business sense because it can create competitive advantage and new opportunities'¹ argues Stephen Schmidheiny, the founder of the World Business Council for Sustainable Development. Perhaps the most important business asset today is **knowledge**, rather than capital. Unfortunately, however, TVET in many countries remains locked into the role of being a supplier of skilled traditional labour to industry and is, thereby, unable to respond effectively to the needs of organisations in the 'Information Age'. Damon Anderson, a researcher on social impacts of TVET, attributes this to the culture of 'productivism' in TVET 'which presupposes that economic growth is a permanent and necessary feature of human existence, regardless of its environmental impact and consequences.'² Giving precedence to economic interests, productivism subordinates the needs of individual learners to those of industry and strongly prioritises work and 'employability' over the non-economic outcomes of TVET. This has resulted in TVET being seen only as 'training-for-growth' and 'skills-for-work'. The broader general education needed for personal autonomy, citizenship and sustainability is often overlooked.

The economic aspects of sustainability are certainly very important but TVET systems, institutions and instructors need also to ensure that students and workers develop a different, wider set of economically-related knowledge, skills and attitudes. Four important new areas for which skills need to be developed are: economic literacy; sustainable production; sustainable consumption; and small business management.

Economic literacy involves gaining an understanding of economics and then using that knowledge to make informed economic choices as consumers, producers, savers and investors and as effective participants in the local, national and global economy. It involves understanding how changes in government policies, in taxation, interest and exchange rates, and in

demographic and market trends may impact upon decisions to be made by individuals, families, communities and enterprises. In relation to the world of work, greater economic literacy can lead to an understanding of sustainable production and ways in which resources can be conserved, waste managed through recycling and reuse and toxic waste and pollution minimised and controlled.³

Sustainable production is an approach to the manufacturing and delivery of 'goods and services in ways that respond to basic human needs and bring a better quality of life, while minimising the use of natural resources, toxic materials and emissions of waste and pollutants over the life cycle.'⁴ This involves adherence to a series of principles including:

1. Integrating economic and environmental goals in policies and activities by measuring and valuing **all** inputs, outputs and by-products from the production process;
2. Ensuring that environmental assets are properly valued by identifying and costing all environmental inputs to ensure that the sale price reflects the full costs of production and delivery;
3. Providing for equity within and between generations by reducing the consumption of inputs through the redesign of products and processes;
4. Dealing cautiously with risk and uncertainty by ensuring that the long-term impacts of production are reconsidered in decision-making.⁵

Sustainable consumption is the necessary corollary of sustainable production. The people of the developed countries are among the world's largest consumers of natural resources and their production and consumption patterns have major environmental, social and economic impacts

around the world. As indicated in the Worldwatch report **State of the World 2004**, 20 per cent of the world's population earn 85 per cent of the world's annual income, consume 75 per cent of global energy and over 80 per cent of other resources annually, and generate 75 per cent of annual global pollution.⁶ On the other hand, 2.8 billion people around the world do not have adequate access to food, water and shelter. Consumption provides one of the most potent examples of the inequalities that exist today. Thus, a key aspect of education and training for sustainable consumption is the integration of concepts of sustainable consumption into the planning of workplace production processes and in the daily lives and expectations of what it means to live a 'good life' in the minds of workers and their families.⁷ The 'seeds' for change must be 'planted' in TVET facility planning, procurement and use of materials, as well as in curricula, instructor training, and institutional practices.

Small enterprise management is also important for sustainable development. Many skilled tradespersons, former employees of larger businesses and even unskilled workers operate as sole traders or as part of very small (micro) businesses. The skills of creating and managing one's own job are vital in the popular (informal) economy which has become the main vector for productive activity for the majority of the world's poor, especially those living in the world's rapidly expanding cities. The popular economy represents the last resort against extreme poverty, youth unemployment and social exclusion, and is made up of a multitude of often very small businesses, run by families or by individuals. Jobs vary greatly, for example: recycling discarded household equipment, repairing machines, and sewing, selling and transporting water. To contribute effectively to sustainable development, TVET needs to address training needs for these jobs, too. To ensure that this takes place, TVET curricula should include entrepreneurship and small business management for those who will start their own enterprises.

>> Using resources wisely and minimising waste and pollution are central to ensuring that the natural environment will be able to continually supply business and industry with the natural resources and energy supply needed for economic development. There can be no long-term economic growth on a planet depleted of natural resources, too infertile to support the production of the plant and animal products upon which people and industry depend, and too polluted for humans to enjoy a healthy and productive life.

Environmental sustainability requires a change from the 'business-as-usual' approach to the sustainable production ethos described above. This involves the responsible use of raw materials such as energy and water, awareness of the impacts of production processes, and careful management to minimise any unintended results of production.

Environmental imperatives call for the integration of environmental sustainability into all aspects of TVET. This will involve designing programmes and courses that:

- Develop an understanding of a range of environmental concepts;
- Encourage reflection on the effects of personal values and lifestyle choice; and
- Promote skills for critical thinking and practical action.

Concepts: A number of important concepts, previously seen as technical concepts pertaining to environmental studies, are moving into more common usage. Concepts such as 'carrying capacity', 'ecological footprint' and 'natural resource accounting' need to be better understood if TVET for sustainable development is to mature with rigour and accuracy. A glossary of terms, all of which are likely to become much more familiar over the next years, can be found at the end of this article.

Attitudes and values: Environmental sustainability also requires a conscious commitment by all to **reflect upon the values and principles that guide our actions**. All cultures, communities, individuals and workplaces have their own views on what such values and principles should be. Given the need for sustainable development to be locally relevant and culturally appropriate, it is not possible to outline specific values to be encouraged by TVET. However, programmes should encourage students to reflect upon their own values, how they affect lifestyle choices and the social, economic and environmental impacts that would result if everyone in the world believed and acted as they did. Such programmes might also provide opportunities to reflect upon the relevance and likely impacts of the values held by other communities and cultures and the applicability to consumption and production choices of the values in an ethic such as the 'Earth Charter', for example:

- Respecting Earth and life in all its diversity;
- Caring for the community of life with understanding, compassion and love;
- Building democratic societies that are just, sustainable, participatory and peaceful; and
- Securing Earth's bounty and beauty for present and future generations.⁸

Skills: The **critical thinking and practical skills** to be enhanced to promote environmental sustainability include those of:

- Applying concepts related to environmental sustainability to the workplace;
- Evaluating the sustainability of the work environment;
- Identifying the environmental strengths of the work environment as well as areas in which change may be desirable and possible;

- Envisioning alternative ways of working and evaluating alternative possibilities for action; and
- Negotiating and justifying desirable changes with work colleagues and supervisors.

The importance of developing the knowledge, skills and attitudes that support environmental sustainability may be seen in a case study of the ethical issues associated with technological modernisation. One aspect of technological modernisation has been the development of modular technology; that means rather than **repair** components it is easier to **replace** an entire module. The contribution of this ethos to environmental degradation and the frivolous waste of resources present a moral dilemma. We must ask whether the price of 'progress' is too high. This question is even more poignant in developing nations, where replacement components are either unavailable or too expensive. Moreover, the cost for a TVET system to procure and stock modular replacement parts may be well beyond budgetary limits. Further, the question of how to dispose of replaced modular components raises issues of potential environmental damage, on the one hand and recycling potential, on the other hand.

Thus, TVET institutions and curricula need revision to include attention to the repair and recycling of modular components. If recycling is added to TVET curricula, it is possible for recycling industries to be developed. Examples are the recharging of expensive computer printer ink cartridges, the recycling of plastic containers, etc. into fence posts in countries with denuded forests. TVET has the potential to foster such 'culture change' by presenting alternative entrepreneurial models to students.

» On both the global and local scale, social sustainability involves ensuring that the basic needs of all people are satisfied and that, regardless of gender, ethnicity or geography, all people have an opportunity to develop and utilise their talents in ways that enable them to live happy, healthy and fulfilling lives.

Sustainable livelihoods are central to social sustainability. Meaningful work plays an important role in this. The concept of sustainable livelihoods embraces existing concepts of work and employment but widens them to include the multiple forms of economic and non-economic activities through which people create opportunities to sustain themselves, their families and communities. The United Nations Development Programme defines livelihoods as 'the assets, activities and entitlements which people utilize in order to make a living' – with assets including local natural resources (land, water, flora, fauna), but also social (community, family, social networks), political (participation, empowerment), human (education, labour, health), physical (roads, clinics, markets, schools), and economic resources (jobs, savings, credit).⁹

The wide view of resources and abilities in the concept of sustainable livelihoods raises questions about the traditional 'person-job' relationship that forms the foundation of many approaches in TVET. It is important to ensure that young people receive the best education possible to prepare them for a life of productive employment and to have the entrepreneurial skills not only to develop work opportunities for themselves and others but also to have the commitment and initiative to contribute to the social, economic and environmental well-being of their communities.

Thus, basic education is central to effective TVET. Literacy and numeracy are vital here. The health and safety of workers often depends upon their ability to read instructions (for example on fertiliser bags) and to make accurate calculations (e.g. of mixing and application levels). The wider skills of scientific and social literacy are also important for, for example, equipment maintenance and repair and understanding technological change (scientific literacy) and for group work, dialogue and negotiation with colleagues and supervisors, gender

and ethnic tolerance and other skills needed for harmonious relations in the workplace (social literacy). The application of such literacies to the world of work and active citizenship need to become core dimensions of TVET if it is to respond to the imperatives of social sustainability.¹⁰

Lourdes Quisumbing argues for an 'holistic and integrated human resource development programme for TVET' that 'aims to prepare the individual to become a responsible, free and mature person, equipped not only with the appropriate skills and know-how of the latest technologies, but also with deep human and spiritual values and attitudes – a sense of self-worth, self-esteem and dignity'.¹¹ Central to the development of knowledge, skills and attitudes for social sustainability, she argues, are the abilities:

- To work by oneself and with others in teams, with integrity and honour, with honesty, punctuality and responsibility;
- To adapt to varying situations; to know and understand problems and issues; to work out solutions creatively;
- To resolve conflicts peacefully;
- To have a good grasp of the reality of the world, of oneself and of others;
- To possess some general knowledge with specialisation in some field or area of work; and
- To continue learning and pursue lifelong education in a learning society.

A focus on the knowledge, skills and attitudes for social sustainability can develop all the powers and faculties of the individual – cognitive, affective and behavioural. From them can flow, according to Quisumbing, such 'work values and attitudes as creativity and adaptability, productivity, quality and efficiency, patience and perseverance, loyalty and commitment, freedom and responsibility, accountability, the spirit of service, a futures orientation, and a genuine love for work itself be developed'.

This view places ethics at the heart of developing social sustainability through TVET. The ethical and moral implications associated with social sustainability include:

Respect for cultural diversity is a core value in social sustainability. All people have the right to employment regardless of their ethnic or racial heritage and their religious beliefs. The rights to employment of indigenous peoples are especially important. This applies also to opportunities for further training and promotion. The internationalisation of the workforce through globalisation and labour migration also emphasises the importance of developing respect for cultural diversity in all TVET programmes.¹²

Gender equality is also a core value in social sustainability. The rights of women to equality of outcomes from education and training (as well as access) and to equality of employment opportunities, working conditions, access to further training and promotion are important human rights that need to be enshrined in TVET programmes. The vital importance of freedom from discrimination and sexual harassment, associated monitoring, reporting and disciplinary processes also need to be taught. These are matters for both male and female students and workers: women need training in ways of protecting their rights and freedoms in the workplace while men need training in their obligations to respect and honour all their work colleagues.¹³

Workplace relations: One positive result of the reduction in levels of management and the increase in workers' levels of educational attainment has been the **empowerment** of workers to advise management of better ways to operate or produce finished goods. This reduction from as many as eight to as few as three levels of management has improved communications between labour and management. Historically, communications between employers and employees has been mainly top-down. Increasingly it has become the practice of enlightened employers to utilise ideas from their employees that improve production and lessen waste. The same holds true for the creation of sustainability, both in TVET and in the workplace. Relations **between** co-workers also benefit from improved communication and tolerance of others'

differences. It goes without saying that a contentious workplace is not likely to be a sustainable one.

Teamwork at the workplace: A harmonious workplace is one at which teamwork is both valued and practiced. Teamwork appears to have taken on new importance in the Information Age. Many writers exhort TVET institutions at all levels to concentrate upon the training of **knowledge workers**, defined as those 'who use **logical-abstract thinking** to diagnose problems, research and apply knowledge to propose solutions, and design and implement those solutions, often as a member of a team'.¹⁴

The assembly line principles and practices in the Information Age – in particular the assembly of electronic equipment of all types – necessitate the enhancement of teamwork principles to ensure sustainability. Productivity measures, for example the failure rate of assembled equipment, highlight the importance of teamwork. Therefore, it is incumbent upon TVET institutions to foster the necessary climate and/or 'culture' of teamwork right from the initial entry of students and trainees into TVET institutions. It is also imperative that TVET teachers and instructors set a correct example by functioning as a team.

Relations between employers and employees: Conflict between labour and management has been a long-standing impediment to harmonious relationships between employers and employees. However, in some countries enlightened employers recognise that harmony is directly related to improved productivity, reduced spoilage, and even innovations suggested by employees.

Many collective agreements now include mechanisms for continuing TVET, delivered

either at the workplace or by means of released time for employees to attend off-site seminars, workshops and courses. In some instances employers pay or reimburse tuition fees. The contribution of such initiatives to employee retention constitutes yet another sustainable innovation. The effective introduction of technological innovations is usually accompanied by various forms of continuing TVET. Regrettably, most employer-sponsored training in industrialised countries is provided to sales and managerial personnel, rather than to production and service personnel. In order for on-the-job learning to become sustainable, it will be necessary for larger numbers of employers to recognise the benefits of continuing TVET.

Safety: Considerations of safety are of prime importance in TVET and at the workplace. Employers are responsible for the working conditions and well-being of their employees. Employees are responsible for actions that might place their peers in peril, produce dangerous or sub-standard goods or damage property. This suggests that another aspect of safety is the protection of TVET students/trainees and employees at the workplace.

Making TVET more sustainable in the safety domain involves continuous attention to safe working conditions in all types of education and training, as well as at the workplace. Safety considerations should be prominent in the design of TVET facilities and the procurement of equipment. Safety is often given the highest priority in TVET curriculum development. During training there are limits to openness and participation because the teacher or instructor is responsible for the safety of the learners, and at times must exercise firm control. Yet, despite the need for firmness, teachers and instructors must be transformed 'from those who impart knowledge to those who

facilitate learning.¹⁵ This transformation necessitates a 'culture change' from the didactic rote-learning heritage of TVET to an experiential and facilitative approach by teachers and instructors.

Citizenship: Social sustainability depends upon the willingness of people to co-operate in building and safeguarding a fair and democratic society. Reciprocal rights and responsibilities are important in a democracy, where the collective voice of citizens is the source of all legitimate authority. These rights include: quality before the law and the freedom to vote, to speak freely on public issues, and to participate in public interest groups. The duties of responsible citizenship include: paying taxes, obeying laws, demonstrating commitment and loyalty to democratic ideals, etc.¹⁶

The rights and responsibilities of citizens extend to the workplace also. This is why respect for gender and cultural differences and skills for developing harmonious workplace relations, teamwork and negotiating improvements in work practices are so important to social sustainability. TVET has key responsibilities to ensure that these civic disposition and participation skills are developed with experience. This can perhaps best be done through the following kinds of learning experiences:

- Student participation in democratically conducted student organisations;
- College-facilitated community service that is connected directly to the curriculum and classroom instruction; and
- Co-operative learning activities in which groups of students co-operate to pursue a common goal, such as inquiring about a public issue or responding to a community problem.¹⁷

Conclusion

➤➤ This discrete discussion of economic, environmental, social and political sustainability should not be taken as meaning that these different aspects of sustainability exist in isolation. Sustainable development depends upon the balanced integration of all systems. The discussion has separated

them here as a way of illustrating the various dimensions of each one. Thus, it needs to be emphasised that access to sustainable livelihoods and the resultant personal fulfilment and social development underpins economic prosperity. While we need to have an economy that is innovative, with

sensible competitiveness and good productivity, these will not last long unless we are also sensitive to environmental imperatives and develop an economy that is sustainable and resilient.¹⁸ TVET is vital to achieving this integrated view of sustainable development.

Sustainable development: A process by which the needs of present generations can be satisfied without compromising the ability of future generations to satisfy their needs.

Carrying capacity: The capacity of ecosystems to support continued growth in population numbers, resource consumption, and waste production.

Ecospace: The total amount of energy, land, water and other resources that can be used regionally or globally without environmental damage, disadvantaging the capacities of others to meet their basic needs or impinging on the rights of future generations.

Ecological footprint: The area of land and water needed to support the total flow of energy and materials consumed by a person, household, community or workplace.

Natural capitalism: An approach to managing workplace processes in ways that restore, conserve and expand natural resources (stocks of natural capital), use, recycle and reuse resource inputs as efficiently as possible, and assume responsibility for making products last longer and easier to dismantle for reuse or recycling.

Natural resource accounting: A strategy that helps a household, corporation or government calculate its real wealth, that is the value of total economic production minus the value of the natural and social capital consumed to achieve it.

Eco-efficiency: A strategy for maximising the productivity of material and energy inputs to a production process whilst also reducing resource consumption and waste production and generating cost savings and competitive advantage.

Life cycle analysis: A management tool for identifying the net flows of resource and energy used in the production, consumption and disposal of a product or service in order to

leverage eco-efficiency gains.

'Triple Bottom Line' reporting: An approach to corporate accounting that reports not only on financial matters but also the outcomes of a firm's environmental and social activities.

Environmental management system: A coordinated approach to ensuring that all environmental issues are taken into account in the workplace and regularly monitored and improved to ensure compliance.

The 5 Rs: Reduce, reuse, renew, recycle and rethink!

Local-global links: The recognition that the production and consumption of a product or service in one part of the world is dependent on flows of energy and materials in other parts of the world and that this creates potential opportunities and losses economically, socially and environmentally at all points in the local-global chain.

Interdependence: The relationships of mutual dependence between all elements and life forms, including humans, within natural systems.

Biodiversity: The diverse and interdependent composition of life forms in an ecosystem that is necessary for sustaining flows of energy and materials indefinitely.

Interspecies equity: A consideration of the need for humans to treat creatures decently, and protect them from cruelty and avoidable suffering.

Intragenerational equity: A consideration of the need to ensure that all individuals and societies have access to the resources required to satisfy basic human needs and rights.

Intergenerational equity: A consideration of the need to live of net resource production rather than natural capital in order to enable future generations to access a world that is at least as diverse and productive as the one each generation inherits.¹⁹



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