UNEVOC
INTERNATIONAL CENTRE
for Technical and Vocational
Education and Training

Discussion Paper Series 1

Orienting Technical and Vocational Education and Training for Sustainable Development

ORIENTING TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING FOR SUSTAINABLE DEVELOPMENT

A DISCUSSION PAPER

UNESCO-UNEVOC International Centre
for Technical and Vocational Education and Training
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Printed by: www.carthaus.de
Cover design: www.pinger-eden.de

This document can be downloaded in PDF format from:
http: //www.unevoc.unesco.org/publications/

ISSN 1817-0374

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FOREWORD

One of the main functions of the UNESCO-UNEVOC International Centre is knowledge management and information sharing. Particular attention is given to promoting best practices and innovations in technical and vocational education and training (TVET) and education for the world of work, with special reference to meeting the needs of developing countries, countries in transition and countries in a post-conflict situation. The Centre also seeks to help bridge the gap that often exists between research, policy and practice in the area of education for the world of work.

To address these functions, the UNESCO-UNEVOC International Centre is in the process of developing an extensive publications programme in the form of an **International Library of Technical and Vocational Education and Training** (TVET), to be published by Springer (the Netherlands). The following volumes are currently under preparation:

- International Handbook on TVET
- Book Series "Current Developments in TVET: Issues, Concerns and Prospects"
- Handbook on TVET Research
- National Profiles of TVET Systems
- A New International Journal of TVET: Studies in Vocational Learning
- Annotated Bibliographies of TVET
- Discussion Paper Series.

The current Discussion Paper on "Orienting Technical and Vocational Education and Training (TVET) for Sustainable Development" presents an overview of key concepts, trends and issues in the field of TVET for sustainable development. It has been prepared by the UNESCO-UNEVOC International Centre, in consultation with a number of UNEVOC Centres and partner agencies and several leading researchers, policy-makers and practitioners working in this field. This paper reflects the outcomes of discussions that took place at the UNESCO International Experts Meeting on "Learning for Work, Citizenship and Sustainability", which was held in Bonn, Germany, in October 2004. The current document is based on the discussion paper prepared for the UNESCO International Experts Meeting, and was modified in the light of the outcomes of this important meeting.

Special thanks are due to Professor John Fien and Professor David Wilson for being joint Rapporteurs-General at the UNESCO International Experts Meeting and for their contributions to this Discussion Paper.

This Discussion Paper is the outcome of a collective "brainstorming" and should be seen as the beginning of a process of debate (not a conclusion), as an attempt to stimulate discussion (not to direct it), and as an action-oriented paper (not a blueprint for action). The UNESCO-UNEVOC International Centre hopes that this Discussion Paper will make a useful contribution to the United Nations Decade of Education for Sustainable Development, which was launched in New York on 1 March 2005, and for which UNESCO is the lead agency. Comments, responses and recommendations are invited and should be sent to **publications@unevoc.unesco.org**

Rupert Maclean
Director

1. BACKGROUND, SCOPE AND PURPOSE

The challenge of sustainable development

1. The major challenge in the world today is to find ways of living and working sustainably, so that the reasonable needs and wants of people from all walks of life and in all countries can be satisfied without so over-exploiting the natural resources upon which all life depends that the ability of future generations to meet their needs and wants is threatened.

2. Moving towards the goal of sustainable development requires fundamental changes in human attitudes and behaviour – in our personal lives, in our community activities, and in our places of work. Successfully making these changes is critically dependent on education and training. The concept of sustainable development is not a simple one, and there is no road map to prescribe how we should proceed. Yet time is short, and it is necessary to act without delay. We must move ahead now, in a spirit of exploration and experimentation and with the broadest possible range of partners, so as to contribute through education and training to a sustainable future. Taking incremental steps now is preferable to waiting for larger measures to be realised. Such steps are of equal importance in both developed and developing nations, and some steps are common to all nations.

The legacy of Seoul 1999

3. In October 2004, UNESCO hosted an International Experts Meeting on "Learning for Work, Citizenship and Sustainability"[1] as a 5-year review of progress since the Second International Congress on Technical and Vocational Education (TVET) which was held in Seoul, Korea, in April 1999. Discussions on the central theme of the Seoul Congress – *lifelong learning and training for all, a bridge to the future* – led to the conclusion that a new paradigm of both development and TVET was needed. As the Preamble to the Recommendations in the Final Report stated:

> We have considered the emerging challenges of the twenty-first century, a century that will be an era of knowledge, information and communication. Globalization and the revolution in information and communication technology have signalled the need for a new human-centred development paradigm. We have concluded that Technical and Vocational Education (TVE), as an integral component of lifelong learning, has a crucial role to play in this new era as an effective tool to realise the objectives of a culture of peace, environmentally sound sustainable development, social cohesion, and international citizenship.[2]

The Millennium Development Goals and TVET

4. The "new human-centred development paradigm" was elaborated at the Millennium Summit of the United Nations General Assembly in September 2000, which agreed to a set of Millennium Development Goals (MDGs).[3] The MDGs include: halving extreme poverty and hunger, achieving universal primary education and gender equity, reducing under-five mortality and maternal mortality by two-thirds and three-quarters respectively, reversing the spread of HIV/AIDS, halving the proportion of people without access to safe drinking water, and ensuring environmental sustainability. They also include the goal of developing a global partnership for development, with targets for aid, trade, and debt relief. As a strategic vision, the MDGs are steps towards a longer-term vision

1 The International Experts Meeting was organised by UNESCO in collaboration with the German Federal Ministry of Education and Research (BMBF). The meeting was held in Bonn, Germany, from 26-28 October 2004.

2 UNESCO (1999) Final Report, Second International Congress on Technical and Vocational Education, UNESCO, Paris, p. 61.

3 See <http://www.un.org/millenniumgoals/>.

of building of internal capacity in all, especially developing, countries such that all institutions for education and training can act as an engine for sustainable development.

5. Achieving the MDGs necessitates action on issues such as poverty, hunger, education, gender equality, child and maternal mortality, HIV/AIDS, safe water, upgrading slums, and global partnerships for development that include technology transfer. Effective TVET is integral to finding and implementing solutions to all of these issues. In this way, TVET underpins every one of the MDGs and the achievement of sustainable development. It is impossible to think of making gains in poverty reduction, job creation, health or environmental concerns without a focussed TVET policy, and it is equally true that a well-articulated and focussed TVET policy can lead to huge improvements in education, gender equality and living conditions. Much of the improvement in human welfare over the last century in both rich and poor countries is due to technological innovation in the fields of public health, nutrition and agriculture. These improvements have led to reductions in poverty, mortality rates and improved life expectancy, for example. Similarly, improvements in areas such as environmental management increasingly rely on the generation and application of new knowledge. In essence, achieving the MDGs requires the development of appropriate forms of Technical and Vocational Education.

The crucial role of TVET

6. Reflecting such imperatives, the Seoul Congress looked to an innovative paradigm of technical and vocational education based upon "a learning culture" that encourages and educates people "to be productive and competitive, and to care for the well-being of its people". It was agreed that "a vibrant training culture is a key factor in attaining that goal ... and empower[ing] youth and adults to play a part in the new development paradigm."[4] As a result, the Final Report of the Congress is replete with statements about the contribution of technical and vocational education to a sustainable future. For example:

- Technical and vocational education, as an integral component of life-long learning, has a crucial role to play in this new era as an effective tool to realise the objectives of a culture of peace, environmentally sound sustainable development, social cohesion and international citizenship.[5]

- ... the TVET of the future must not only prepare individuals for employment in the information society, but also make them responsible citizens who give due consideration to preserving the integrity of their environment and the welfare of others.[6]

- TVET can play an instrumental role in developing a new generation of individuals who will face the challenge of achieving sustainable socio-economic development. A number of new subjects (issues) therefore need to be incorporated into TVET teaching and learning or be further emphasised for the sake of the future of all of us as we struggle to learn throughout life. A well trained technical workforce is essential for any country's efforts to achieve sustainable development.[7]

4 UNESCO (1999) op.cit. p. 54.
5 Ibid, p. 1 and p. 61.
6 Ibid, p. 27.
7 Ibid, p. 29.

> • ... there is an urgent need to renew TVET. This should be the top priority for every country... This is a task that can only be accomplished if a country can succeed in articulating TVET with its system of education within a framework of an overall sustainable development strategy.[8]

7. These statements represent a broadening of TVET from the narrow task of providing training for industry- and occupation-specific skills to the broader task of workforce development and lifelong learning for sustainable development and citizenship. A related initiative that impacts upon TVET is the International Labour Organisation (ILO) Decent Work Agenda:

> Decent work means productive work in which rights are protected, which generates an adequate income with adequate social protection. It also means sufficient work, in the sense that all should have full access to income-earning opportunities... Decent work also means a way out of poverty, allowing economic growth to benefit from competition, and workers' from economic growth... The evolving global economy offers opportunities from which all can gain, but these have to be grounded in participatory social institutions if they are to confer legitimacy and sustainability on economic and social policies.[9]

Progress in international thinking

8. International fora have reiterated the important role of TVET in achieving sustainable human development. For example, the international Education for All programme emphasises vocational preparation within a context of social and environmental responsibility. Thus, Goal 3 in the Dakar Framework for Action includes a call to "ensure that the learning needs of all young people are met through equitable access to appropriate learning and life skills programmes". This Goal emphasises the importance of skills development for employment and for effective citizenship, and the important relationships between them. In like vein, the 2002 Youth Employment Summit in Cairo called for educational approaches that empower youth, especially young women and the disadvantaged, to face the future with hope and optimism, secure in the knowledge that they have the human capabilities to care for themselves and their families and contribute to sustainable human development.[10]

- **Education for All**
- **Youth Employment Summit**

- **World Summit on Sustainable Development**

9. Similarly, the Final Report of the 2002 World Summit on Sustainable Development emphasised the need for all countries and international agencies to meet "capacity needs for training, technical know-how and strengthening national institutions in ... economically viable, socially acceptable and environmentally sound" development[11] in order to eradicate poverty, improve human health and access to safe water and hygienic sanitation, conserve the natural resource base upon which social and economic development depends, and foster the use of technologies for cleaner production and renewable energy.

Three central goals of TVET

10. UNESCO's Recommendations on Technical and Vocational Education (which were adopted in 2001) took into account the notion of sustainable development, even before the Johannesburg Summit, with UNESCO recommending that TVET should:

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8 Ibid, p. 89.
9 International Labour Conference, 89th Session, Geneva, June 2001.
10 Fien, J. (2002) Addressing Youth Employment Issues through TVET, Discussion Paper to Special Interest Group on Technical, Vocational Education and Training, 8th UNESCO-APEID International Conference on Education, Bangkok, November 26-29.
11 World Summit on Sustainable Development (2002) Plan of Implementation, Johannesburg, para. 19.

1. Contribute to the achievement of the societal goals of greater democratization and social, cultural and economic development, while at the same time developing the potential of all individuals, both men and women, for active participation in the establishment and implementation of these goals, regardless of religion, race and age;

2. Lead to an understanding of the scientific and technological aspects of contemporary civilization in such a way that people comprehend their environment and are capable of acting upon it while taking a critical view of the social, political and environmental implications of scientific and technological change;

3. Empower people to contribute to environmentally sound sustainable development through their occupations and other areas of their lives.[12]

Key questions

11. These three goals are central to orienting TVET for sustainable development. But what is an appropriate definition of sustainable development within vocational education and training? And how is the world of work related to, and affected by, the environmental, social and economic aspects of sustainable development? That is, what is the contribution of TVET to sustainable development and how can TVET be re-oriented to advance the transition to a more sustainable future? What are the different roles of pre-employment courses and work-site-based training in this? How does sustainability thinking impact on the objectives and content of TVET programmes and courses, resource use, maintenance and pedagogy within TVET? What successful approaches have been developed? What industry – and training – sectors have led the way? Which ones have lagged? What factors are essential to success in this? What actions need to be taken – by individual instructors and trainers, TVET colleges, and managers of TVET systems? Can developing nations avoid repetition of the mistakes made by developed nations? What support roles can be played by UNESCO-UNEVOC Centres? In particular, what actions can UNESCO undertake to support instructors, colleges and systems, especially as the United Nations has declared 2005 – 2014 to be a special Decade of Education for Sustainable Development and has recommended that all countries take progressive steps to integrate sustainable development into their education plans at all levels and in all education sectors?

12. These questions framed discussions at the October 2004 International Experts Meeting on "Learning for Work, Citizenship and Sustainability".[13] This Discussion Paper reflects these discussions and resulted in a Bonn Declaration and a range of suggested activities for UNESCO to consider when developing the TVET components of its Action Plan for the United Nations Decade of Education for Sustainable Development.

The development of this Discussion Paper

13. In preparing this document, UNESCO has drawn on a wide variety of sources: the results of the many international conferences mentioned above, reports of national initiatives, publications from the United Nations system and key institutional partners such as the World Bank and OECD and the views of experts in and specialists from the fields of TVET, sustainable development and education for sustainable development. Experts from the international UNESCO-UNEVOC Network were invited to review the draft. The ideas in the paper were also analysed by a Working Group at the October 2004 International Experts Meeting

12 UNESCO and ILO (2002) Technical and Vocational Education for the Twenty-First Century: ILO and UNESCO Recommendations, UNESCO, Paris and ILO, Geneva, p. 9.

13 UNESCO (2005) Learning for Work, Citizenship and Sustainability: Final Report. UNESCO International Experts Meeting, Bonn.

on "Learning for Work, Citizenship and Sustainability" and considered by many of the presenters at this meeting.

14. Thus, this document is the result of a collective "brainstorming" and is to be seen as a beginning of a process of debate not a conclusion, as an attempt to stimulate discussion not to direct it, as an action-oriented paper not a blueprint for action. Comments, responses and recommendations are invited as we move into the United Nations Decade of Education for Sustainable Development. Comments should be sent to:

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2. UNDERSTANDING SUSTAINABLE DEVELOPMENT

What is sustainable development?

15. Finding approaches to development that balance economic and social progress, address cultural differences, conform to global, national and local needs, and respect ecological values and limits is the key to sustainable development. However, efforts to define exactly what sustainable development is must reflect the varying conditions in different parts of the world and their impact upon national and cultural priorities and values. For example, "to an individual living in rural poverty in the developing world, "sustainable development", if it is to make any sense, must mean increased consumption and a higher living standard. By contrast, to an individual in a wealthy country, with a closet full of clothes, a pantry full of food and a garage full of cars, "sustainable development" could mean more modest and carefully considered consumption."[14]

16. Thus, sustainable development is not a fixed concept; rather it is a culturally-directed search for a dynamic balance in the relationships between social, economic and natural systems, a balance that seeks to promote equity between the present and the future, and equity between countries, races, social classes and genders. The interdependence of people and the environment requires that no single development or environmental objective be pursued to the detriment of others. The environment cannot be protected in a way that leaves half of humanity in poverty. Likewise there can be no long-term development on a depleted planet. Appropriate sustainable strategies must be developed for both rich and poor nations.

17. This makes sustainable development more a *moral precept* than a *scientific concept*, and links it as much with notions of peace, human rights and fairness as it does with theories of ecology or global warning. Indeed, while sustainable development involves the natural sciences, policy and economics, it is primarily a matter of culture: it is concerned with the values people cherish and with the ways in which we perceive our relationship with others and with the natural world.[15]

14 UNESCO (1997) Environment and Society: Education and Public Awareness for Sustainability, Background Paper prepared for UNESCO International Conference, Thessaloniki, para. 25.

15 UNESCO (2002) Education for Sustainability: Lessons Learnt from a Decade of Commitment from Rio to Johannesburg. Report to World Summit on Sustainable Development, UNESCO, Paris.

Common themes

18. While locally relevant and culturally appropriate approaches to sustainable development are necessary, it is possible to identify several common themes or goals appropriate to all settings, and all are highly relevant to the scope and goals of TVET. The International Implementation Scheme for the United Nations Decade of Education for Sustainable Development identifies a range of common themes of sustainable development across socio-cultural, environmental and economic perspectives, including:[16]

Socio-cultural perspectives

- **Human rights:** A respect for human rights is a sine qua non of sustainable development. This approach should inform policy formulation at all levels, leading to the adoption of a rights-based approach to development. ESD must equip people to assert their right to live in a sustainable environment. This may involve lobbying and advocacy, for example to limit or forestall destruction of forest habitats by road-builders or the extractive industries.

- **Peace and human security:** Enabling people to live in an environment of peace and security is fundamental to human dignity and development. Too often fragile processes of sustainable development are undermined by insecurities and conflicts. These result in significant human tragedies, overwhelming health systems, destroying homes, schools and often whole communities, and leading to increasing numbers of displaced people and refugees. Education for sustainable development therefore seeks to build skills and values for peace in the minds of humankind, as enshrined in the UNESCO Charter.

- **Gender equality:** Pursuit of gender equality is central to sustainable development where each member of society respects others and plays a role in which they can fulfil their potential. Gender parity in education is part of this and is the first of the Dakar EFA goals – with a target date of 2005 (cf UNESCO 2003). The broader goal of gender equality is a societal goal to which education, along with all other social institutions, must contribute…. Gender issues must therefore be mainstreamed throughout educational planning – from infrastructure planning to material development to pedagogical processes. In terms of ESD specifically, the full and equal engagement of women is crucial, first, to ensuring balanced and relevant ESD messages and, second, to give the best chance for changed behaviours for sustainable development in the next generation.

- **Cultural diversity and intercultural understanding:** Many opportunities for education and sustainable human development are undermined by the lack of tolerance and intercultural understanding, upon which peace is founded. This perspective must inform not only the content of educational programmes, but also characterise teacher/learner and learner/learner relationships. Learning situations of all kinds are ideal opportunities for practising and deepening respect for and understanding of diversity. Local knowledge is a repository of diversity and a key resource in understanding the environment and in using it to the best advantage for current and future generations.

16 The themes discussed below are extracted from UNESCO (2004) Draft International Implementation Scheme for the United Nations Decade of Education for Sustainable Development. Report to the General Assembly, UNESCO, Paris.

- **Health:** Issues of development, environment and health are closely entwined – ill health hampers economic and social development, triggering a vicious cycle that contributes to unsustainable resource use and environmental degradation. A healthy population and safe environments are important pre-conditions for sustainable development. Hunger, malnutrition, malaria, water-borne diseases, drug and alcohol abuse, violence and injury, unplanned pregnancy, HIV/AIDS and other sexually transmitted infections are just some of the problems that have enormous implications for health. The school environment itself must be safe and healthy. Schools should act not only as centres for academic learning, but also as supportive venues for the provision of essential health education and services, in collaboration with parents and the community.

- **HIV/AIDS:** The ravages of the HIV/AIDS pandemic in Africa and rising incidence in Asia undermine sustainable development and educational processes. It is urgent to look at alternative approaches to education in situations where orphans, missing teachers, the burden of care and overwhelmed social services make traditional educational approaches dysfunctional or irrelevant. Sustainable development itself takes on a different complexion in such circumstances and will require specially tailored measures and support. Nevertheless, education remains one of the best hopes to stimulate the behaviour changes and the co-operation needed to stem the pandemic.

- **Governance:** At local, national and international levels, sustainable development will best be promoted where governance structures enable transparency, full expression of opinion, free debate and broad input into policy formulation. Such a framework will give the best opportunity for ESD to bear fruit in terms of the full participation of citizens in setting parameters for sustainable development and good governance. ESD will thus consciously model and explain this framework.

Environmental perspectives

- **Natural resources (water, energy, agriculture, biodiversity):** ESD continues to highlight the importance of addressing environmental issues as part of the broader agenda of sustainable development. In particular, the links with societal and economic considerations will enable learners to adopt new behaviours in the protection of the world's natural resources, which are essential for human development and indeed survival. Humanity is dependent on the goods and services provided by ecosystems. Thus, the protection and restoration of the Earth's ecosystems is an important challenge.

- **Climate change:** ESD brings to the awareness of learners the crucial need for international agreements and enforceable quantified targets to limit damage to the atmosphere and check harmful climate change. The Kyoto accord, adopted by the UN in 1992, committed 160 countries to quantitative emission reduction targets, but remains to be ratified by countries responsible for 25 per cent of global carbon emissions. ESD is a key means to build a global lobby for effective action.

- **Rural transformation:** In spite of rapid urbanisation, three billion or 60 per cent of the people in developing countries and countries in transition, and half of the people of the world, still live in rural areas. Three quarters of

the world's poor, those earning less than a dollar a day, the majority of these female, live in rural areas… . Educational activities have to be linked to the specific needs of the rural community for skills and capacities to seize economic opportunities, improve livelihood and enhance the quality of life. In developing nations, providing an improved rural quality of life can address problems associated with migration to urban areas.

- **Sustainable urbanisation:** Half of the world's population now living in urban areas and the other half increasingly dependent upon cities for their economic, social and political progress. Factors such as globalisation and democratisation have increased the importance of cities for sustainable development. Accordingly, it is generally accepted that cities not only pose potential threats to sustainable development but also hold promising opportunities for social and economic advancement and for environmental improvements at local, national, and global levels.

- **Disaster prevention and mitigation:** Sustainable development is undermined where communities suffer disasters or are threatened by them. Past experience and projects have revealed the enormously positive effects of education for disaster risk reduction…. Education and knowledge have provided society with vulnerability reduction and life improving self-help strategies.

Economic perspectives

- **Poverty reduction:** This is the overarching concept which guides international commitments to development in the framework of the Millennium Development Goals. The principal instruments of planning and implementation in this regard are the Poverty Reduction Strategy Papers (PRSPs) produced by a growing number of developing countries and countries in transition. From the point of view of sustainable development, poverty reduction is the central concern of the economic element, but must be understood in relation to the other three elements: social, environmental and cultural.

- **Corporate responsibility and accountability:** The growth in the economic power and political influence of large corporations underlines their potential contribution to and effect on sustainable development. Issues of multilateral trade have immense implications for sustainable development, and ESD must build a balanced awareness of these economic and financial forces and enable learners to take action to increase public accountability and responsible commercial practices.

- **Market economy:** The global market economy as it currently exists does not protect the environment and does not benefit roughly half of the world's people. One basic challenge is to create global governance systems that harmonise the market more effectively with environmental protection and the goal of equity. Furthermore, there is a need for advancing a revolution in technology that dramatically increases energy efficiency, the use of renewable energy sources, recycling and waste reduction.

The crucial role of TVET

19. In integrating social, economic, environmental and political matters, sustainable development involves new ways of thinking about how we use resources to provide the goods and services we need. Thus, Elim Salim from

Indonesia who was the Chair of the World Summit on Sustainable Development argues that:

> … there are serious shortcomings in the way development has taken place in the 20th century … development has followed only the economic track and has left behind social and environmental stability, resulting in rising poverty, inequality in income and development and natural disasters through rising flood levels affected by sea rise due to global warming. Development as implemented in the 20th century was not sustainable.[17]

20. Yet, these problems were not caused intentionally. Rather they were the results of well-meaning development initiatives that, unfortunately, were implemented without a full understanding of the interlocking nature of social, economic, environmental and political issues. Education and training for sustainable development is a process of learning how to make decisions that consider the long-term future of the economy, ecology and equity in the workplace and wider community. Building the competencies and commitments needed for such futures-oriented thinking is a key task of TVET for sustainable development. Future TVET graduates will play a crucial role in inventing and implementing practical solutions to problems, such as poverty, environmental degradation, waste reduction, access to safe water and hygienic sanitation. Working at the interface between nature, technology, economy and society gives TVET graduates a key role in helping society respond to environmental and development issues.

3. TVET AND SUSTAINABLE DEVELOPMENT

What is distinctive about TVET?

21. TVET takes on a complex and distinctive character with regard to sustainable development. This is because – both directly and indirectly – TVET produces and consumes resources, as well as affects attitudes towards sustainability held by future workers in all nations. TVET has always included elements of sustainability, especially in the way scarce training materials were conserved and waste materials were disposed. This historical commitment gives TVET a foundation upon which to build future commitments to sustainable practices. The manner in which production and consumption is managed can either contribute to sustainability or to practices and conditions that are not sustainable. During education and training, the greater the exposure of trainees to sustainable concepts, practices and examples, the more likely the desired workplace *culture change* will take place in the future. Moreover, the delivery of sustainable practices must be universal; that is, encompassing not only pre-service TVET, but also on-the-job learning and worker upgrading and retraining. Continuing TVET will continue to predominate in the future, in order to accommodate both technological and job change.

Why should TVET have concerns about sustainability?

22. As both a consumer and a producer of resources, or more accurately a sector involved in the transformation of resources, TVET has multiple concerns about sustainability. The over-exploitation of natural resources, ill-health and grinding poverty can threaten the ability of future generations to satisfy their needs and wants. The challenge for TVET is to re-orient and re-direct its curricula to imbue students and trainees with respect for the conservation and sustainable use of resources, social equity and appropriate development, plus with competencies to

17 Salim, E. 2002. The Journey of Hope: From Rio to Johannesburg. Words into Action. For the UN World Summit on Sustainable Development, Johannesburg, 26 August – 4 September 2002. International Institute for Environment and Development (IIED), London, p. 16.

practise sustainable tasks at the workplaces of today and tomorrow. This can operationalise the Seoul Congress goal of producing "responsible citizens who give due consideration to preserving the integrity of their environment and the welfare of others".[18]

23. Similarly, in a labour market undergoing the transition from the Industrial Age to the Information Age – involving considerable job shift, re-training, and dislocation of workers – the maintenance of currency in the labour market also assumes importance with regard to the sustainability of employment. In some advanced economies the proportion of workers with less than secondary school completion and those with diplomas has reversed during the past decade. The adult and continuing TVET provided to workers in jeopardy of job loss can result in sustainable employment that will also impact upon their children's futures.

24. In addition, the growing significance of sustainability is having major impacts upon business and industry. Many companies are now not only reporting the results of their economic achievements to their shareholders and community stakeholders, but also the impacts of their social and environmental record through a system known as "triple-bottom-line" reporting. Many new industries and employment opportunities are also being developed, e.g. in ecotourism, environmental monitoring, sustainable community development, eco-design, recycling, alternative energy sources, land rehabilitation, pollution control, waste water treatment and reuse, etc. All require skilled workers who have knowledge of – and commitment to – sustainability, as well as the requisite technical knowledge. This is creating new roles and courses in TVET.

How can sustainability be applied to TVET?

25. These economic and social trends suggest that the education and training of workers must promote an understanding of sustainability for the stewardship of resources, the environment, and health to become more effective. Trends in the productive and service sectors suggest that both basic and portable skills and competencies will be sustainable in the long-term for job shifts and technological changes. Sustainable TVET involves the renewal of individual skills, labour market skill requirements, and the transformation of the world of work.

26. Major considerations in TVET such as gender and ethnic equality in the workplace, occupational health and safety, the wise use of resources and diminution of waste, etc. are also central to sustainability. The application of sustainable development principles to TVET is best accomplished in a comprehensive and planned manner through their inclusion in TVET curricula, incorporation in TVET facility plans, modification of procurement, usage and disposal of training consumable materials, selection of apprenticeship venues, improvement of routine and preventive maintenance practices, TVET instructor training and re-training, etc.

Areas of relevance

27. These many ways in which sustainable development is of key importance in TVET suggest that sustainable development needs to be integrated into pre-employment education and training, learning in the workplace and into further training. Addressing issues of poverty and modernising traditional cultures is also important because the pace of social change affects different populations in different ways. For example, developing nations are now "leapfrogging" communications technologies by developing cellular telephone systems, rather than a land-line infrastructure. The implications for TVET and sustainability are significant. The

18 UNESCO (1999) op.cit. p. 27.

addition of an *entrepreneurship* component to TVET will also contribute to sustainable self-employment opportunities, especially in the poorer countries.

Preparation for the world of work

28. Pre-service TVET functions to prepare new entrants to the labour force and is ideally suited for the promotion of sustainable practices in the workplace. The days when a high school dropout is able to secure long-term employment in agriculture, fishing, forestry, industry, mining and even the service sectors in most developed nations are rapidly coming to an end. The transformation of these sectors into *knowledge-based* sectors suggests that future farmers, fishers, foresters and miners will require at least fourteen years of education, to be able to operate computer-controlled agricultural, fish-finding, mining, manufacturing and timber-cutting equipment. The impact of computer technology upon many (if not most) service sector occupations has been equally dramatic. In developing nations, where large numbers of students drop out at different stages, integrated TVET models in which basic subjects are taught in conjunction with TVET may be more appropriate. This need for technological literacy in nearly every occupational area also implies that workers will need increased educational attainment and continuous learning. However, the world will always need trained specialists in the building trades (including carpenters, plumbers, electricians); skilled workers in the automotive, or electrical-electronic, or other product assembly, maintenance and repair industries; farmers, fishers, miners, and so on.

29. Another salient prediction is that today's youth will likely change jobs and careers several times during their working lifetimes and may work for as many as 12 to 15 different companies. In order to become truly sustainable, TVET must meet the challenges posed by this increase in worker mobility. This can be accomplished by providing a sound basic TVET foundation that can be supplemented – either by conventional or modular instruction – when required for job upgrading or change.

Learning at the workplace

30. Many enterprises "are beginning to pay attention to extending the value of their existing 'human resources,' recognizing that it is far more expensive to recruit and train workers" than it is to *re-train* existing employees. Thus, the new buzzword is "headlighting," which identifies required new skills and encourages employees to seek retraining. This trend offers considerable promise for TVET institutions in the future. Wonacott supports this perspective by noting that:

> Short product cycles, a fast-expanding knowledge base, and the rapid obsolescence of existing knowledge put tremendous pressure on employers to upgrade worker skills in a timely, effective economical manner (by means of) "just-in-time" training.[19]

31. The promotion of sustainable TVET should function to re-orient existing employees by acquainting them with new concepts and practices to improve their work processes. This requires the commitment and co-operation of employers at all levels – from senior management to supervisory personnel – and employee associations. Workplace learning should deliver sustainable TVET in concert with the modification of work processes, as the two are inseparable. TVET in developing nations can be made more sustainable by addressing the skill requirements of the future, rather than repeating training for the skills required in the past.

Further training aspects of TVET

32. In addition to workplace learning, there are many mechanisms for the delivery of further training. These range from occasional seminars and workshops to

19 Wonacott M. (2001) Adult Students: Recruitment and Retention, Practice Application Brief no. 18, ERIC Clearinghouse on Adult, Career, and Vocational Education, Columbus.

introduce new products, technologies, etc., to participation in formal education and training programmes. Sustainability concepts and practices can be infused in these TVET programmes, as well. Informal further training can also be delivered to small enterprises by NGOs in order to improve skills and enhance competitiveness. With regard to participation in formal education, a salient trend in many developed countries for the past decade has been the enrolment of degree-holders in diploma and post-diploma programmes at community and technical colleges, in order to upgrade their knowledge and skills. The common term for this trend is "reverse transfer," although at an American Vocational Association conference the suggested term was "reverse graduate school." Such programmes present a unique opportunity to address sustainability concepts and practices to existing employees, supervisors and management personnel.

33. The innovative use of the worldwide web and internet (ICTs) has increasingly become yet another mechanism to disseminate TVET education and training by distance delivery, albeit without either standardisation of available media or quality control. Here as well, developing nations are "leapfrogging" the technological gulf and adopting distance delivery of TVET. The range of commercially-available software packages, simulation software, web-delivered training, and distance-teaching community and technical colleges and universities grows broader and longer daily. The development of worldwide communication networks in TVET, and in particular the UNEVOC Network, has already contributed to exchanges and learning among TVET personnel in every corner of the world. This network and others in related fields also contribute to the development of sustainable TVET.

Applications of TVET to sustainability

34. These many aspects of TVET – from pre-workforce learning to learning in the workplace and further training – all require deep immersion in the understanding and practice of sustainable development. The changing nature of the world of work, especially due to globalisation and technological change, demands that TVET develop a skilled, committed and motivated workforce that understands how global changes impact upon local opportunities for business and industry – and hence employment – and how these changes also impact upon the quality of local social, economic and environmental conditions. To ensure a sustainable future, it is necessary that TVET also ensures that all workers are able to play appropriate roles, both in the workplace and the wider community, in contributing to social, economic and environmental sustainability. Employers have a responsibility to develop a skilled, committed and motivated workforce. Examples of how this can be done are addressed in the next sections. Another dimension of sustainability concerns the preservation of *traditional skills* in minority populations. This is implicit in the "tangible and intangible heritage" of UNESCO cultural policies.

TVET and economic sustainability

35. Unfortunately, TVET in many countries remains locked into the role of being a supplier of skilled labour to industry and is, thereby, unable to respond effectively to the needs of the emerging Information Age. Anderson 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".[20] Giving precedence to economic interests, productivism can subordinate the needs of individual learners to those of industry and prioritises work and "employability" over the non-economic outcomes of TVET. This has

20 Anderson, D. (2000) VET and Ecologism: Charting the Terrain, in Enriching Learning Cultures. Proceedings of the 11th Annual International Conference on Post-compulsory Education and Training, Centre for Learning Research, Griffith University, Volume 1, pp. 17-23. See also: Anderson, D. (2003). From productivism to ecologism: dilemmas, issues and strategies for VET, Australian Vocational Education Review, 10 (1) 1-14.

resulted in TVET being seen as "training-for-growth" and "skills-for-work", two goals for TVET that are antithetical to the needs of the Information Age and the that TVET also needs to serve.

36. Nevertheless, the economic aspects of sustainability are very important but, instead of productivism, they look to TVET systems, institutions and instructors to ensure that students and workers have developed a different, wider, set of economically-related knowledge, skills and attitudes. These include:

- **Economic literacy** involves using appropriate economic ways of thinking and problem-solving that lead to sound and 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 will impact upon decisions to be made by individuals, families, communities and enterprises. In relation to the world of work, economic literacy involves 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.[21]

- **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, so as not to jeopardise the needs of future generations." [22] 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 considered in decision making.[23]

- **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

21 National Council for Economic Education (2002) Campaign for Economic Literacy: Challenge and Response. See <www.ncee.net.cel>.

22 Norwegian Ministry of the Environment (1994) Report of the Symposium on Sustainable Consumption, Oslo.

23 Adapted with permission from Smith, J. (2003) Redesign of Government Sustainability Education Programs for Business Personnel – From Awareness Raising to Changing Behaviour, unpublished PhD thesis, University of New England, Armidale, p. 31.

consumption patterns have major environmental, social and economic impacts around the world. As indicated in the 2004 *State of the World Report*, the 20 per cent of the world's population living in OECD countries: 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.[24] Too much consumption also affects health with over fifty per cent of people in countries such as the U.S. and the U.K. reported as being overweight.[25] While these problems are disturbing, they pale beside those of the 2.8 billion around the world who 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.[26]

- **Managing a small enterprise** is an especially important skill to be developed through TVET. Many skilled tradespersons and even relatively unskilled workers operate as sole traders and require the project management, time management, business planning, reporting, saving and reinvesting skills needed to ensure that their businesses remain viable, due income received and accounted for, debts are paid, machinery and tools kept in good working order, taxes paid and plans made for the future. Skills in managing a small business are also becoming increasingly common as companies downsize and then outsource work to former employees. Indeed, the skills of creating and managing one's own job might be seen as a vital outcome of preparation for the world of work. It must not be forgotten, however, that the popular economy 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 small businesses, often family-run, but also of individual activities run by women and youth. Jobs vary greatly, and include: recycling discarded household equipment, repairing machines, sewing, selling and transporting water, making craft goods, and market stalls. To contribute effectively to sustainable development, TVET needs to address training needs for these jobs, also.[27] To ensure that this takes place, TVET curricula should include entrepreneurship and small business management for those who will start their own enterprises.

TVET and environmental sustainability

37. 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. Indeed, there can be no long-term economic growth on a planet

24 Worldwatch Institute (2004) State of the World 2004: The Consumer Society. See <www.worldwatch.org/pubs/sow/2004>.

25 Barber, J. (2001) The Sustainable Production and Consumption of Food: An NGO Perspective, Integrative Strategies Forum, Washington DC.

26 For objectives, guidelines, resources and strategies for promoting education and training for sustainable consumption, see Fien, J., (1998) Education and Learning for Sustainable Consumption, Issues paper for OECD Environment Directorate-CERI Joint International Conference on Education and Learning for Sustainable Consumption, Paris.

27 For a case study of TVET for the popular economy see UNESCO (2002) op. cit., Box 10.

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.

38. Environmental sustainability requires a change from the "business-as-usual" approach to development to the sustainable production ethos described above. This involves the responsible use of raw materials, energy, water, etc., awareness of the impacts of production processes, and careful management to minimise any unintended results of production. A number of approaches have been developed to support sustainable production, including: "cleaner production", environmental auditing through ISO14000 quality assurance, life-cycle analysis, ecodesign, industrial ecology, the "Natural Step", "natural capitalism", "Factor 4" and so on.[28] However, all share several common principles as illustrated in **Figure 1**.

Principle	Application
Nature is not subject to systematically increasing concentrations of substances extracted from the Earth's crust, e.g. fossil fuels, heavy metals and minerals.	Substituting minerals scarce in nature with others that are more abundant, using all mined materials efficiently and systematically reducing dependence on fossil fuels.
Nature is not subject to systematically increasing concentrations of substances produced by society, e.g. PCBs, CFCs, HCFCs, and PVC.	Substituting persistent and unnatural compounds with ones that are normally more abundant or break down more easily in nature, and using all substances produced by society efficiently.
Nature is not subject to systematically increasing degradation by physical means, e.g. dams to change river flows, clearing rainforests, intensive monoculture agriculture, and overfishing.	Drawing resources only from well managed ecosystems, systematically pursuing the most productive and efficient use both of those resources and land and exercising general caution in all kinds of modification of nature.
Human needs are met worldwide, e.g. access to food, water, health care, shelter, and education.	Using all our resources efficiently, fairly and responsibly so that the needs of all people on whom we have an impact, and the future needs of people who are not yet born, stand the best chance of being met.

Figure 1: Principles and Applications for Environmental Sustainability[29]

39. However, it must be constantly borne in mind that, despite the growing adoption of such principles and associated tools by business and industry, the resource efficiencies that result may not be enough to ensure long-term environmental sustainability. Drawing upon a UNEP report on the future of the global environment, Yencken argues that:

> Given the assumed growth of the world economy between 1990 and 2050, a 4 to 5 fold increase in overall "efficiency" is needed just to keep environmental pressure at its current level. In many cases this will not be sufficient to prevent environmental degradation of environmental resources. Depending on assumptions made with respect to population growth, economic growth and levels of sustainable use of various natural resources,

28 For details of these and many other tools and approaches for sustainable business and industry practices, see International Institute for Sustainable Development, (2001) Instruments for Change: Definitions and Concepts, <http://www.iisd.org/susprod/principles.htm>; UNEP (2002) Industry as a Partner for Sustainable Development, 10 years after Rio: The UNEP Assessment, Extended Executive Summary, UNEP, Paris.

29 Adapted with permission from Smith, J. (2003) op. cit., p. 43.

> the actual efficiency improvements required within the next half century are estimated to be in the range of five to twenty fold. This can only be achieved by increase in technological efficiency and the "dematerialisation" of production and consumption.[30]

40. Environmental imperatives such as these call for the integration of environmental sustainability into all aspects of TVET. This will involve designing programmes and courses that address the following objectives:

- 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.

41. **Concepts:** Relevant concepts which could underpin the integration of environmental sustainability into TVET include:

- **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.
- **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.
- **Lifecycle 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

30 Yencken, D. (2000) Sustainable Australia: Refocusing Government, TELA Paper Issue 3, Australian Conservation Foundation, Melbourne, p. 10.

potential opportunities and losses economically, socially and environmentally at all points in the local-global chain. The Brain Drain from developing to developed nations also affects sustainability in TVET and education.

42. **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 and, given the need for sustainable development to be locally relevant and culturally appropriate, it is not possible to outline specific values to be encouraged in TVET. However, programmes should provide encouragement and opportunities for students to learn how 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 and actions of the values in an ethic like the "Earth Charter", such as:

- 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.[31]

43. **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;
- Information Literacy – being able to find, synthesise and use information.

TVET and social sustainability

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

45. The agreed Plan of Implementation from the 2002 World Summit on Sustainable Development was based upon the premise that:

> Eradicating poverty is the greatest global challenge facing the world today and an indispensable requirement for sustainable development, particularly for developing countries.[32]

31 See <www.earthcharter.org>

32 United Nations (2002) World Summit on Sustainable Development: Plan of Implementation, Johannesburg, para 6.

46. Sustainable livelihoods are central to social sustainability and 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 their communities. The United Nations Development Programme defines livelihoods as "the assets, activities and entitlements which people utilise in order to make a living" – with assets including local natural resources (i.e. land, water, common-property resources, flora, fauna), but also social (i.e. community, family, social networks), political (i.e., participation, empowerment), human (i.e. education, labour, health, nutrition), physical (i.e. roads, clinics, markets, schools, bridges), and economic resources (i.e. jobs, savings, credit).[33]

47. 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 to TVET. While education, particularly TVET, has important roles in developing the social, human and physical capital needed for a sustainable livelihood, it is perhaps a very different form of TVET that is required.[34] Nevertheless, 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.

48. Thus, basic education is central to effective TVET. Literacy and numeracy are vital here. The health and safety of workers often depend upon their ability to read instructions (e.g. 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.[35]

49. Thus, Quisumbing argues for an "holistic and integrated human resource development program 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".[36] 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;

33 See <www.undp.org/sl/Documents/Strategy_papers/Concept_paper/abstract_concept10.htm>.

34 See Lawrence, J. (1997) Adult Education and Jobs, or Sustainable Livelihoods? Presentation at UNESCO panel on Changes in the World of Work, CONFINTEA V, Hamburg.

35 The role of basic education in promoting sustainable livelihoods is discussed in Lawrence, J. and Tate, S. (1997) Basic Education for Sustainable livelihoods: The Right Questions, Discussion Paper presented to the United Nations Development Programme International Working Group on Sustainable Livelihoods, Pearl River, New York.

36 Quisumbing, L.R. (2001) The Importance of Values Education for TVET and its Economic and Human Resource Development Program, Paper presented at the UNESCO Asia Pacific Conference, Adelaide.

- 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.[37]

50. 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 – and from them can flow 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".[38] The UNESCO DeSeCo Initiative sets a global standard for generic, psychosocial and key transferable skills, which will further social sustainability.

51. This view places ethics at the heart of developing social sustainability through TVET. Wonacott notes that the literature on ethical issues in TVET is most often concerned with dilemmas in teaching and the use of technology related to questions of power, access, control, intellectual property rights, privacy, equity, speech, etc. Ethical and legal issues for specific occupations are also often addressed.[39] There are also definite ethical and moral implications associated with social sustainability. Some of these 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.[40]

- **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.[41] Sustainability will be difficult to attain without equal access, participation and remuneration of women.

37 Ibid.
38 Ibid.
39 Wonacott, M. (2001b) Ethics: The Role of Adult and Vocational Education, Trends and Issues Alert No. 24, ERIC Clearinghouse on Adult, Career and Vocational Education, Columbus.
40 See Pegg, L. C. (1997) Diversity Training and Education in the Work Place, Journal for Vocational Special Needs Education 19 (2), 62-66; and Brown, B. L. (2002) Global Mobility of Workers, Trends and Issues Alert No. 35, Clearinghouse on Adult, Career, and Vocational Education, Columbus.
41 Scott, M. L. (Ed.) (2003) Equity Issues in Career and Technical Education, Information Series No. 390, Clearinghouse on Adult, Career, and Vocational Education, Columbus.

- **Inclusion** of other excluded groups, e.g. disabled, ethnic minorities, etc. is essential for the attainment of sustainability in TVET and workplaces. Without the inclusion of all groups in a society sustainability will not be achieved.

- **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 elicit – and 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, plus 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. While teamwork was important during the Agricultural and Industrial Ages, it appears to have taken on new importance in the emerging 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".[42]

  The restructuring of assembly lines during the Industrial Age, and the maintenance of many assembly line principles and practices in the emerging Information Age – in particular the assembly of electronic equipment of all types – necessitate the enhancement of teamwork principles to ensure sustainability. Productivity measures, e.g. 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. In Japan, Career Development Grants are made by the Government to employers to promote

42 Wilson, D. N. (2001b) 'Reform of TVET for the Changing World of Work', Prospects. XXXI: 1 p. 21.

TVET and/or sponsor HRD leave.[43] 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, studies have shown that most employer-sponsored training in industrialised countries is provided to sales and managerial personnel, rather than to those responsible for production and service delivery. In order for on-the-job learning to become sustainable it will be necessary for larger numbers of employers to recognise the benefits to be obtained from continuing TVET.

- **Safety**: Considerations of safety are of prime importance in TVET and at the workplace. Employers bear responsibility 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. However, one caveat during training is that 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.

- **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: equality 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, constructively criticising the conditions of political and civic life, and participating to improve the quality of national and community life.[44]

  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 suggesting that 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

43 Cummings, S. I. and Nicole Jecks, (2004) Skills Development and Productivity Through Social Dialogue. Bangkok: International Labour Office, Subregional Office for East Asia.

44 Klusmeyer, D. B. (1996) Between Consent and Descent: Conceptions of Democratic Citizenship, Carnegie Endowment for International Peace, Washington, DC.

- 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.[45]

4. KEY ISSUES/THEMES IN THE RE-ORIENTATION OF TVET TO SUSTAINABLE DEVELOPMENT

Introduction

52. Education and training are the primary agents of transformation towards sustainable development, increasing people's capacities to transform their visions for society into reality. When re-oriented towards sustainable development, TVET not only provides appropriate scientific and technical skills, it can also provide the understanding, motivation and support needed for applying them in the interest of helping create a sustainable future. However, the process of re-orienting TVET towards sustainable development is a broader and more pervasive task than that of revising syllabuses and devising new teaching and learning materials that incorporate principles and examples of sustainability. As Orr remarks, "The crisis [of unsustainability] cannot be solved by the same kind of education that helped create the problems... Schools, colleges and universities are part of the problem."[46]

53. Thus, re-orienting the curriculum towards sustainability requires significant educational reform or what Cuban calls "second-order change".[47] Where first-order change seeks to improve the effectiveness or efficiency of educational processes through new courses or materials without disturbing the basic organisational or instructional milieu of education, second-order change reforms the fundamental ways in which educational systems and institutions function and includes new goals, structures, and roles for schools, teachers, and students."[48] Thus, the process of re-orientation requires a coordinated approach to matters of legislation and policy, curriculum development, pedagogy, the management and maintenance of facilities and consumables and the training and ongoing professional development of TVET instructors, administrators, policy-makers and managers. Since quality TVET has included relationships with enterprises and industry, the impact upon curricula, apprenticeships, teacher and instructor development, facilities and equipment benefit from these relationships. Concepts of sustainability can become a two-way interchange in such relationships.

Legislation, Policy and Administration

54. TVET has always been grounded in legislation, normally in educational statutes. These statutes include the licensing of TVET institutions and the examination and certification of TVET output to permit entry to the labour force. The re-orientation of TVET policy to further integrate sustainable development must be undertaken by revised legislation and reform of curricula and administrative practice. One barrier to sustainability has always been the non-enforcement of existing legislation.

Curriculum Development

55. TVET curricula have evolved with changes in technologies and with the historical development of the field. Development of TVET curricula is more complex than in most "academic" areas. One important difference is that TVET

45 Patrick, J. J. (1999) The Concept of Citizenship in Education for Democracy. See <http://library.educationworld.net/a10/a10-145.html>; and Battersby, M. (1998) "Education for Citizenship: Service-Learning and the Reflective Citizen." Learning Quarterly, 2, pp. 3-6.

46 Orr, D. (1992), Ecological Literacy, SUNY Press, Albany, p. 83.

47 Cuban, L. (1988) A fundamental puzzle of school reform, Phi Delta Kappan, 70 (5), pp. 341-344.

48 Fullan, M. with Stiegelbauer, S. (1991) The New Meaning of Educational Change, Cassell Educational Limited, London, p. 21. In relation to education for sustainability, Sterling calls this a "constructive" approach to curriculum reform. See Sterling, S. (1996) Developing a strategy, in J. Huckle and S. Sterling (Eds), op. cit.

curricula have traditionally placed more emphasis upon the manipulative, psychomotor aspects of curricula than upon the theoretical. In the Information Age these distinctions are becoming less distinct. We now need to question what additional curriculum changes are needed to integrate Sustainable Development? Three potential strategies are:

- To include sustainable development concepts in all courses for everyone ("TVET for All");
- To enhance focus upon sustainable development in occupationally relevant areas, e.g. water, auto repair, fabrication, carpentry, forestry, mining, ICTs, service sectors, etc;
- To indicate that new jobs will become available in sustainability industries.

56. The inclusion of sustainable development in all courses can be built upon the *traditional* TVET practices in which skilled tradespeople taught apprentices to *repair, re-use, and re-cycle* materials and components at all levels in both developed and developing nations. Rural TVET has always operated upon these principles, especially in developing nations. Some TVET institutional practices and procedures require re-orientation to foster sustainability.

57. The inattention to sustainable development in some occupations is evident in the adoption of modular technology. Rather than *repair* components, it is easier to *replace* an entire module. This contributes to environmental degradation and the waste of resources and raises questions whether the price of "progress" is too high? In developing nations, where replacement components are either unavailable or too expensive, procurement and stocking of 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 suggests potential for developing recycling enterprises, on the other hand.

58. The generation of jobs in new sustainability industries, such as re-cycling, needs to be stressed – and both legislative and curricular provision added to TVET to develop future employees in such industries. Many new industries and employment opportunities are also being developed, e.g. in ecotourism, environmental monitoring, sustainable community development, eco-design, recycling, land rehabilitation, pollution control, waste water treatment and reuse, recharging computer printer ink cartridges, solar energy, etc.

59. The popular economy, particularly in developing nations, represents the last resort against extreme poverty, youth unemployment and social exclusion, and is made up of a multitude of small businesses, often family-run, but also of individual activities run by women and youth. Jobs vary greatly, and include: recycling discarded household equipment, repairing machines, sewing, selling and transporting water, making craft goods, and market stalls. To contribute effectively to sustainable development, TVET needs to address training needs for these jobs, also.[49]

60. The unique conditions faced by developing and newly-industrialising nations must also be taken into consideration. Where the "welfare model" of the state has traditionally assumed that TVET would "automatically" prepare people for jobs that

49 For a case study of TVET for the popular economy see UNESCO (2002) op. cit., Box 10.

the market would create, few provisions were made for those unable to secure employment. In these cases, some nations are now advocating training in *entrepreneurship* in both formal and informal TVET institutions. The assumptions underlying this approach are that entrepreneurship will lead to self-employment. It is further assumed that successful micro-enterprises will generate training opportunities for their workers. In addition, an enhanced, micro-level, in-service upgrading and training function may develop to serve these informal and transitional sectors. All require skilled workers who have knowledge of – and commitment to – sustainability, as well as the requisite technical knowledge.

Pedagogy

61. The goal of education has historically been "to create independent problem solvers [with] sufficient depth of understanding." In contrast, the goal of training has traditionally been "to teach people to follow prescribed procedures and to perform in a standardised manner."[50] In the changing world of work it appears that these two, formerly distinct, perspectives are converging.[51]

62. TVET is currently faced with the challenges posed by the displacement of the traditionally-strong focus upon manual work in favour of mental work, or at least the changing mixture of competencies required in the workplace. The boundaries between manual and mental work are fading away, as many traditional forms of work and the respective preparation processes for learning to work undergo change. The education and training of *knowledge workers*, suggests that this integration trend will predominate in the 21st century. This is because learning sophisticated technological concepts requires a sound foundation in mathematics, science, communications skills, and also an understanding of technology. However, notions of sustainability in TVET concern and affect both aspects of manual and mental competencies.[52]

TVET Facilities, Equipment, Consumable Training Materials, Safety and Maintenance

63. Facilities, equipment, and consumable training materials also need eco-design, use of recycling, etc. One long-standing problem with TVET facilities and equipment has been the inability to keep equipment current with that in those enterprises where their graduates will be employed. TVET graduates are, often, trained on obsolete or obsolescent equipment rarely found in those enterprises where they are being trained to work. Considerations of safety should be given primary consideration in both TVET facility design and curriculum development.

64. This problem has become even more acute as technological change transforms these enterprises. Mechanisms to redress obsolescence of TVET facilities and equipment range from donations of facilities and equipment by enterprises, provision of centralised workshops for neighbouring TVET institutions, traditional and modern *apprenticeship* arrangements, and fabrication of needed equipment by TVET teachers and instructors. Public community and technical colleges in some developed nations have benefited from donations by private enterprises. These arrangements also contribute to the development of sustainability in TVET by re-cycling equipment.

65. Similar problems have traditionally plagued the availability of training consumable materials necessary for TVET students and trainees to use in practical

50 Gray, K. C. and Herr, E. L. (1997) Workforce Education, Allyn & Bacon, Boston, p.159.

51 Wilson, D. N., (2001a) Technical-Vocational Education and Training, in D. and A. Poonwassie, (Eds.) Fundamentals of Adult Education. Thompson, Toronto, p.232.

52 Wilson, D. N. (forthcoming 2004) History of TVET, in R. Maclean and D. N. Wilson (Eds). International Handbook of Technical and Vocational Education and Training, Springer, Dordrecht.

exercises. Budget constraints often reduce available practice materials and affect the quality of training. While simulation may be the latest trend in TVET delivery in developed nations, there is no substitute for "hands-on" experience. In many nations, TVET instructors have become admirably resourceful in locating materials for their students to use in practical exercises. Such innovative practices appear to benefit both TVET students and contribute to sustainability by recycling scrapped equipment and supplies. Students trained in this manner are better equipped for an economy in transition, where repair, recycling and reuse predominate.

66. The problem of the lack of routine and preventive maintenance has plagued TVET, likely from its outset. The difference between a well-maintained TVET facility and one where maintenance has been neglected – or deferred – is palpable. Here, as well, budget constraints exacerbate maintenance provision. One possible explanation for the failure of many TVET projects in developing nations is their inattention to routine and preventive maintenance. There are few formal education and training programmes concerned with teaching routine and preventive maintenance.

67. On those projects where these concepts have been successfully transferred, experience shows that the best learning mechanism has been the involvement of both technical assistance personnel and their national counterparts in the assembly, installation, maintenance and repair of equipment. Evaluations have demonstrated that, even after project handover, when budgets for maintenance are often reduced, these TVET institutions continue to keep their equipment serviceable. This transfer of a "culture of maintenance" may differentiate successful TVET transfers from those which have failed. This adds yet another dimension to the concept of sustainability.

TVET Teacher, Instructor and Trainer Education

68. The implications of these trends for TVET at all levels are that teachers and instructors must be transformed from those who impart knowledge to those who *facilitate learning*. This transformation necessitates a change from the didactic rote-learning heritage of TVET to an experiential and facilitative approach by teachers and instructors. Teaching and learning in TVET are being transformed from an emphasis upon procedure learning and manipulative practices to knowledge, understanding and application.

69. Can sustainable development be developed in TVET instructor training? Pre-service TVET teacher, instructor and trainer education are either delivered in dedicated institutions, under the aegis of Ministries of Education or Labour, or together with the education of "academic" teachers in Teacher Training Colleges, usually at the post-secondary level. Both teachers and trainers are certificated in accordance with legislation, normally upon passing written and practical examinations. The most stringent training and certification are provided in Germany for instructors in the "Dual System", who must qualify for the designation as *meister,* or master. Many other jurisdictions have licensing mechanisms for newly-educated TVET teachers, often similar to mechanisms for "academic" teachers. A number of developing nations have Technical Teacher Training Colleges, initially implemented by bilateral or multilateral assistance projects. The "culture" of sustainability can be added to legislation, TVET teacher training, education/training, and certification mechanisms.

70. In-service TVET teacher, instructor and trainer education is delivered by a variety of mechanisms, ranging from in-class, to distance education, to on-the-job. In addition, *mentoring* by experienced TVET teachers and instructors is provided to novices. National UNEVOC Centres and the UNEVOC Network have

also begun to play a self-directed in-service learning role for TVET personnel. The usage of ICT to exchange TVET information and foster co-operation appears to be changing the field globally.

71. Principles and practices of sustainability must be added to both pre-service and in-service TVET Teacher/Instructor training, preferably *prior* to their introduction in TVET curricula and training institutions. Unless the culture of the TVET Teachers/Instructors is changed, sustainability may not be sustainable.

Training of Administrators, Managers, and Policy-Makers

72. The training of administrative and managerial personnel in TVET has been limited to university post-graduate programmes for technical and vocational educators and the ILO Turin Centre for training administrators and managers. Considerable on-the-job learning appears to have provided existing TVET personnel with many of their administrative and managerial skills. In addition, technical assistance projects have trained TVET managers and administrators in many developing nations.

73. Further, training of policy-makers has had an even "spottier" record. One major difficulty is that the rapid expansion of TVET since World War II implies that many experienced administrators and policy-makers have retired, often without passing the wisdom they developed – too often by "trial-and-error" methods – to their successors.

74. Training related to their roles in sustainable development must be added to both formal, institutional preparation of policy-makers, administrators and managers of TVET. This is similar to the call for the addition of sustainability content to the training of TVET Teachers/Instructors. One TVET management-training programme of interest is offered by *Internationale Weiterbildung und Entwicklung Gmbh* for the German Federal Ministry for Economic Cooperation and Development at the post-graduate level.

Monitoring of Outcomes

75. The attainment of sustainable TVET requires development of a systematic monitoring of outcomes – both social and environmental. This will involve monitoring TVET programmes and measuring outputs, outcomes, and impacts. Development of this monitoring system will require the improvement of existing indicators and statistical collection procedures and the establishment of analysing and reporting mechanisms.

5. TOWARDS AN ACTION PLAN

Introduction

76. As reported for the Second International Congress on Technical and Vocational Education (TVET) Seoul 1999, "technical and vocational education, as an integral component of life-long learning, has a crucial role to play in this new era as an effective tool to realise the objectives of a culture of peace, environmentally sound sustainable development, social cohesion and international citizenship."

77. Yet, the concept of sustainable development is not a simple one, and there is no road map to prescribe how we should proceed. The major challenge in the world today is to find ways of living and working sustainably, so that the reasonable needs and wants of people from all walks of life and in all countries can be satisfied without so over-exploiting the natural resources upon which all life depends that the ability of future generations to meet their needs and wants is threatened.

78. TVET graduates will play a crucial part in inventing and implementing practical solutions to sustainability problems such as poverty, environmental degradation and access to safe water and hygienic sanitation. Working as they do at the interface between nature, technology, economy and society, they have a key role to play in helping society respond to environmental and development issues.

79. TVET graduates will be called upon to face challenges such as re-orienting technology, managing risks, satisfying essential needs – food, water and sanitation – whilst conserving natural resources and reducing energy consumption. They, therefore, need to be aware of the concept and challenge of sustainable development and skilled in strategies for applying these in the workplace.

80. Many countries have begun to undertake the important reforms in legislation and policy, curriculum and pedagogy, and the professional development of instructors, policy-makers and administrators necessitated by the imperatives of sustainable development. As lead agency for the United Nations Decade of Education for Sustainable Development, UNESCO has the significant responsibility for supporting these countries and for catalysing all others to undertake the reforms needed to orient TVET policies, programmes and practices towards sustainable development.

Bonn Declaration

81. A major outcome of the October 2004 International Experts Meeting was a formally adopted statement, the *Bonn Declaration*, which argued that:

> ...since education is considered the key to effective development strategies, technical and vocational education and training (TVET) must be the master key that can alleviate poverty, promote peace, conserve the environment, improve the quality of life for all and help achieve sustainable development.

82. The full text of the Bonn Declaration is included in **Annex 1.**

Seven Strategic Areas for Action

83. Another important outcome of the October 2004 International Experts Meeting was the development of a draft action plan to guide UNESCO in its work in catalysing and supporting the orientation of TVET towards sustainable development during the United Nations Decade of Education for Sustainable Development. The action plan included short (1-3 years), medium (4-6 years) and long (7-10 years) term activities. Seven interlinked strategies, similar to those in the draft International Implementation Scheme for the Decade, were proposed for TVET for Sustainable Development:

1. Advocacy and Vision Building
2. Support for the Review and Development of National TVET Policies
3. Guidelines for Planning and Implementation
4. Capacity Building and Training Programmes
5. Learning Support Materials, Resources and Equipment
6. Networking and Partnerships in TVET
7. Ongoing Monitoring, Evaluation and Research.

84. The full text of the suggestions for the action plan is included in **Annex 2.**

Conclusion

85. Re-orienting TVET towards sustainability will require collaboration and partnerships across TVET administrators, teachers, researchers and policy-makers, of international and non-governmental organisations, business, government, trade unions and youth.

86. Success in these joint initiatives will require regular monitoring and evaluation based upon clearly defined goals and indicators. Some of these will relate to the outcomes of courses from TVET institutions, such as:

- Percentage of courses in which economic, social and environmental sustainability are integrated in ways appropriate to appropriate vocational competencies;
- Percentage of graduates who have taken such courses;
- Number of new courses addressing competencies for emerging sustainability industries.

87. Other indicators will relate to the orientation to sustainability in the management of campus operations, such as:

- Emission of CO2 per student
- Percentage of materials recycled
- Percentage of recycled materials purchased
- Percentage decrease in the use of toxic materials
- Percentage of renewable energy generated and consumed
- Percentage of organic wastes composted
- Water use per student
- Percentage of food served that was locally and organically grown.

88. Orienting TVET to sustainable development is a task worthy of significant investment of time, energy and resources. As the International Implementation Scheme for the Decade of Education for Sustainable Development states:

> There can be few more pressing and critical goals for the future of humankind than to ensure steady improvement in the quality of life for this and future generations, in a way that respects our common heritage – the planet we live on.
>
> As people we seek positive change for ourselves, our children and grandchildren; we must do it in ways that respect the right of all to do so. To do this we must learn constantly – about ourselves, our potential, our limitations, our relationships, our society, our environment, our world. Education for sustainable development is a life-wide and lifelong endeavour which challenges individuals, institutions and societies to view tomorrow as a day that belongs to all of us, or it will not belong to anyone.[53]

53 UNESCO (2004) Draft International Implementation Scheme for the United Nations Decade of Education for Sustainable Development. Report to the General Assembly, UNESCO, Paris.

ANNEX 1

THE BONN DECLARATION

We, the participants in "Learning for Work, Citizenship and Sustainability", a UNESCO meeting of international experts on technical and vocational education and training, are agreed that, since education is considered the key to effective development strategies, technical and vocational education and training (TVET) must be the master key that can alleviate poverty, promote peace, conserve the environment, improve the quality of life for all and help achieve sustainable development. Our conclusion was reached following deliberations among 122 technical experts from Member States, intergovernmental and non-governmental organisations and industry who met in Bonn, Germany, from 25 to 28 October 2004, on the threshold of the United Nations Decade of Education for Sustainable Development, to assess progress since the Second International Congress on Technical and Vocational Education, held in Seoul, Republic of Korea, in April 1999.

1. Following the deliberations at this meeting, and recalling:
   - the recommendations of the Second International Congress on Technical and Vocational Education (1999),
   - the goals set out at the World Forum on Education (2000)
   - the Millennium Development Goals adopted by the United Nations General Assembly (2000), and
   - the Revised Recommendation concerning Technical and Vocational Education (2001) adopted by the UNESCO General Conference at its 31st session,

   the participants in this meeting of experts affirm that the appropriate development of TVET is central to the attainment of those agreed goals.

2. Recognizing that the vast majority of the worldwide labour force, including knowledge workers, require technical and vocational knowledge and skills throughout life, we affirm that skills development leading to age-appropriate TVET should be integral to education at all levels, and can no longer be regarded as optional or marginal. It is especially important to integrate skills development in Education for All (EFA) programmes and to satisfy TVET demand created by learners completing basic education.

3. Preparation for work should equip people with the knowledge, competencies, skills, values and attitudes to become productive and responsible citizens who appreciate the dignity of work and contribute to sustainable societies. We call on all stakeholders to adopt this broader perspective for TVET.

4. The development of TVET since the Seoul Congress clearly shows that there is enhanced recognition of this branch of education as a means to productive livelihoods and social cohesion. However, the UNESCO TVET Survey of 2004 has revealed that progress has been uneven. Renewed effort to modernise TVET and ensure its enhanced status and sustainability is necessary. Increased scope for TVET is recognised in "sustainability industries" such as environmental conservation, cultural heritage site preservation and renewable energy production.

5. Accordingly, we invite the Director-General of UNESCO to urge Member States, the concerned agencies of the United Nations system and other relevant stakeholders, both public and private, to build partnerships and to revitalise efforts to implement the recommendations that have not yet received sufficient attention or resources.

6. Given the scale of the task and the complexity of the conditions in which action must be taken, we ask that particular priority be given to TVET initiatives that alleviate poverty, promote equity, especially in relation to gender, arrest the spread of the HIV/ AIDS epidemic, support youth in crisis, support rural

communities and people in excluded groups, encourage north-south and south-south cooperation and assist the development of countries in transition and those in and emerging from crisis and conflict. These TVET initiatives are pivotal to human-centred sustainable development.

7. As TVET experts, we call for approaches to development that harmonise economic prosperity, environmental conservation and social well-being. We therefore call for responses to globalization that humanise rather than marginalise, and for applications of information and communication technology that narrow the digital divide.

8. We commit ourselves, in each of our own countries and organisations, to taking the action necessary for quality skills development that leads to economically viable, environmentally sound and sustainable communities.

Bonn, Germany
28 October 2004

ANNEX 2

SUGGESTIONS TO UNESCO FOR ACTION PLANNING IN TVET FOR SUSTAINABLE DEVELOPMENT DURING THE UNITED NATIONS DECADE OF EDUCATION FOR SUSTAINABLE DEVELOPMENT

Preamble

We, participants at an International Experts Meeting on Learning for Work, Citizenship and Sustainability, in Bonn, Germany, 25-28 October 2004, elaborated the following range of activities which we would like UNESCO to take into account when developing an Action Plan for TVET and Sustainable Development to guide its actions in the TVET sector during the United Nations Decade of Education for Sustainable Development (2005-2014).

It is recognised that all Member States have been invited by the General Assembly of the United Nations to develop their own Action Plans for the Decade. However, the varying levels of capacity, resources and physical infrastructure for undertaking this task around the world, especially related to TVET where the relevance and significance of sustainability is a newly emerging priority, means that UNESCO, in partnership with other international agencies, has an important role to play in advocacy and vision building to catalyse understanding and action through knowledge sharing, capacity building, research and innovation and monitoring and evaluation.

Seven interlinked strategies that are similar to those in the draft International implementation Scheme for the Decade (October 2004) are proposed for TVET for Sustainable Development:

1. Advocacy and Vision Building
2. Support for the Review and Development of National TVET Policies
3. Guidelines for Planning and Implementation
4. Capacity Building and Training Programmes
5. Learning Support Materials, Resources and Equipment
6. Networking and Partnerships in TVET
7. Ongoing Monitoring, Evaluation and Research.

We recognise that we have suggested a very diverse range of activities and invite UNESCO to select from these, as relevant to EFA, MDG and TVET priorities in order to develop a manageable, focussed and effective Action Plan for TVET and Sustainable Development.

We urge UNESCO to reinforce existing partnerships, and build new ones, with other UN agencies, Member States and concerned stakeholders for the implementation of an action plan for TVET in the UN Decade of Education for Sustainable Development.

UNITED NATIONS DECADE OF EDUCATION FOR SUSTAINABLE DEVELOPMENT Suggestions to UNESCO for Action Planning in TVET for Sustainable Development			
Strategy	**Short-term activities (1-3 years)**	**Medium-term activities (4-6 years)**	**Long-term activities (7-10 years)**
1. Advocacy and Vision-Building for TVET for Sustainable Development	• Conduct high-level consultations with all relevant ministries of governments to encourage access and commitment to TVET and awareness of the importance of integrating sustainable development as a core theme in TVET • Translate and disseminate relevant TVET for Sustainable Development documents in local languages • Recognise premier institutions as "centres of excellence" in TVET and sustainable development to play a lead role in promoting the field • Develop a communication plan for the dissemination on TVET for Sustainable Development, including: o Disseminating regular briefing materials to UNESCO magazines, the educational press and mass media o Engaging National Commissions, UNESCO Clubs, ASP-Net schools and other relevant bodies affiliated with UNESCO in Member States o Engaging the Education, Youth and other relevant Caucuses at the CSD in advocacy of TVET for Sustainable Development o Maintaining a UNESCO website on TVET for Sustainable Development	• Review, revise and maintain the communication plan • Publish case studies that illustrate ways in which TVET is integrating sustainability principles at national, institutional and programme levels • Produce campaign materials (e.g. TV programmes, multi-media and documentaries) from activities implemented in the first 3 years for mass distribution • Hold interim consultations with member countries to gauge the extent of the awareness and recognition given to TVET and to take appropriate measures for its implementation	• Conduct an End-of-Decade review of the impact of the Advocacy and Vision-Building programme

UNITED NATIONS DECADE OF EDUCATION FOR SUSTAINABLE DEVELOPMENT Suggestions to UNESCO for Action Planning in TVET for Sustainable Development			
Strategy	**Short-term activities (1-3 years)**	**Medium-term activities (4-6 years)**	**Long-term activities (7-10 years)**
2. Support for the Review and Development of National/Regional Policies Supporting TVET for Sustainable Development	• Conduct regional consultation processes (2005-2008) on TVET for Sustainable Development) in preparation for a Seoul+10 international meeting in 2009 • Prepare and trial flexible guidelines to inform the review of national/regional policies supporting TVET for Sustainable Development. The guidelines should include, among other elements, advice on policies for: o Strategies for multi-stakeholder dialogue as part of the policy review and development process o Ways of relating TVET to national MDG and EFA goals o Exit and entry to/from TVET and other educational systems o A system of credit for prior working experience, especially in the non-formal sector o Enhancing values, as well as cognitive and skills education through TVET, emphasising "education of the heart" by putting "action" at the centre of TVET education, e.g. skills PLUS values, attitudes, self-esteem	• Make TVET for Sustainable Development a central theme of a Seoul+10 international meeting in 2009 • Conduct capacity-building programmes to facilitate the review of education policies to promote TVET for Sustainable Development • Establish a dynamic knowledge base that demonstrates detailed successful implementation of SD-based TVET systems • Review the status of TVET for Sustainable Development in national/regional education policies	• Review the status of TVET for Sustainable Development in national/regional education policies

UNITED NATIONS DECADE OF EDUCATION FOR SUSTAINABLE DEVELOPMENT Suggestions to UNESCO for Action Planning in TVET for Sustainable Development			
Strategy	**Short-term activities (1-3 years)**	**Medium-term activities (4-6 years)**	**Long-term activities (7-10 years)**
3. Guidelines for Planning and Implementation of TVET for Sustainable Development	• Develop and pilot sample guidelines for integrating sustainability principles into the operating procedures and programmes of TVET institutions, especially emphasising the importance of comparable profiles and standards • Conduct regional workshops to adapt the guidelines • Conduct regional training workshops for key personnel from Member States, including UNEVOC Centres, on using the guidelines for planning and implementation strategies • Develop and trial sample guidelines on assessment processes that facilitate the achievement of quality TVET standards	• Conduct regional workshops to report on the use of the guidelines in different national contexts and industry sectors • Conduct inter-country benchmarking of TVET for Sustainable Development • Develop and trial guidelines for evaluating the success of planning and implementation strategies for TVET for Sustainable Development	• Repeat benchmarking • Evaluate the impact of the planning implementation guidelines

UNITED NATIONS DECADE OF EDUCATION FOR SUSTAINABLE DEVELOPMENT Suggestions to UNESCO for Action Planning in TVET for Sustainable Development			
Strategy	**Short-term activities (1-3 years)**	**Medium-term activities (4-6 years)**	**Long-term activities (7-10 years)**
4. Capacity Building and Training Programmes for TVET for Sustainable Development	• Adapt relevant modules in the UNESCO multimedia programme *Teaching and Learning for a Sustainable Future* to suit the pre-service and continuous in-service professional development needs of TVET educators, policy-makers, curriculum developers, etc. • In partnership with UNESCO field offices and UNEVOC Centres conduct regional training workshops on how to integrate *Teaching and Learning for a Sustainable Future in TVET* into relevant pre-service and continuous in-service courses • Prioritise development of sample guidelines and training materials to support capacity building and training for TVET in rural transformation, the non-formal sector and for women, unemployed youth, indigenous people and persons with disabilities • Prioritise professional development materials on values education in TVET	• Evaluate, revise and maintain a programme to support the pre-service and continuous in-service professional development needs of TVET educators, policy-makers, curriculum developers, etc. in relation to TVET for Sustainable Development • Develop and trial demonstration projects on e-learning for professional development	• Evaluate, revise and maintain a programme to support the pre-service and continuous in-service professional training of personnel • Evaluate the outcomes and impacts of these professional development support activities

UNITED NATIONS DECADE OF EDUCATION FOR SUSTAINABLE DEVELOPMENT Suggestions to UNESCO for Action Planning in TVET for Sustainable Development			
Strategy	**Short-term activities (1-3 years)**	**Medium-term activities (4-6 years)**	**Long-term activities (7-10 years)**
5. Learning Support Materials, Resources and Equipment for TVET for Sustainable Development	• Develop exemplar learning support materials on environmental and values education for use in different TVET programmes, e.g. in relation to industry skills, work values, lifelong learning, developing personal and lifelong goals, and entrepreneurship • Develop guidelines and training packages in partnership with WHO for health competence and HIV/AIDS and values-driven TVET • Develop guidelines for instilling a culture of routine and preventative maintenance in the world of work • Provide staff training for using guidelines and training packages for TVET • Develop a virtual library with support materials for use in different TVET programmes • Collaborate with IITE to establish and maintain open courseware to support TVET for Sustainable Development	• Review curriculum and learning materials on learning for work, citizenship and sustainability, and evaluate achievements in consultations with employers and community leaders • Monitor and evaluate the use of guidelines and training packages • Develop regional and international networking for the use of support materials, including ICTs • Review, revise and maintain the virtual library	• Revise the guidelines and training packages to keep up-to-date • Review, revise and maintain the virtual library

UNITED NATIONS DECADE OF EDUCATION FOR SUSTAINABLE DEVELOPMENT Suggestions to UNESCO for Action Planning in TVET for Sustainable Development			
Strategy	**Short-term activities (1-3 years)**	**Medium-term activities (4-6 years)**	**Long-term activities (7-10 years)**
6. Networking and Partnerships in TVET for Sustainable Development	• Request UNEVOC Centres and other relevant networks to prepare action plans for TVET in the UN Decade of Education for Sustainable Development • Share research results, case studies, best practices via publications and websites • Support regional and national training programme networks and TVET professional associations	• Support networks in the conduct of their Decade activities • Organise meetings, conferences, events, etc. particularly in places where UNEVOC Centres are strong • Joint research and publications	• Support networks in the conduct of their Decade activities • Joint research and publications
7. Ongoing Monitoring, Evaluation and Research on TVET for Sustainable Development	• Develop agreed indicators and processes for monitoring the quality of outcomes and impacts of integrating sustainability into TVET programmes, institutions and systems • Develop agreed instruments for monitoring the knowledge, beliefs and behaviour of TVET students regarding sustainable development in all regions • Research and trial skill profiles appropriate to TVET for sustainable development	• Monitor and evaluate outcomes for Sustainable Development • Conduct benchmarking studies of the knowledge, beliefs and behaviour of TVET students regarding sustainable development in all regions • Validate and adapt skill profiles appropriate to TVET for sustainable development	• Monitor and evaluate outcomes for Sustainable Development • Repeat benchmarking studies of youth knowledge, beliefs and behaviour regarding sustainable development in all regions to assess the success of TVET for sustainable development during the UN Decade of Education for Sustainable Development

The discussion paper **Orienting Technical and Vocational Education and Training (TVET) for Sustainable Development** presents an overview of key concepts, trends and issues in the field of TVET for sustainable development. It examines interlinkages between the world of work and environmental, social and economic aspects of sustainable development, as well as ways in which TVET can be re-oriented to advance the transition to a more sustainable future. This paper is the result of collective brainstorming and was prepared in consultation with a number of UNEVOC Centres, partner agencies and several leading researchers, policy-makers and practitioners working in the field of TVET. It reflects the outcomes of discussions that took place at the UNESCO International Experts Meeting "Learning for Work, Citizenship and Sustainability" (Bonn, Germany, 2004) on the threshold of the United Nations Decade of Education for Sustainable Development, for which UNESCO is the lead agency.

This paper appears as the first volume in the Discussion Paper Series, which is part of the UNEVOC International Library of TVET - an extensive publications programme prepared by the UNESCO-UNEVOC International Centre.

The **UNESCO-UNEVOC International Centre** is UNESCO's specialised centre for technical and vocational education and training (TVET).

From its location in Bonn, Germany, it serves UNESCO Member States worldwide to develop and strengthen TVET.

The Centre focuses on:
- TVET systems development,
- Improving access to TVET, and
- Assuring quality of TVET

It uses tools such as:
- Networking
- Knowledge sharing and publications
- Inter-agency collaboration and partnerships, and
- Human resource development

The UNEVOC Network is the most prominent of the Centre's networks. It consists of more than 230 specialised TVET institutions in over 150 countries worldwide.

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