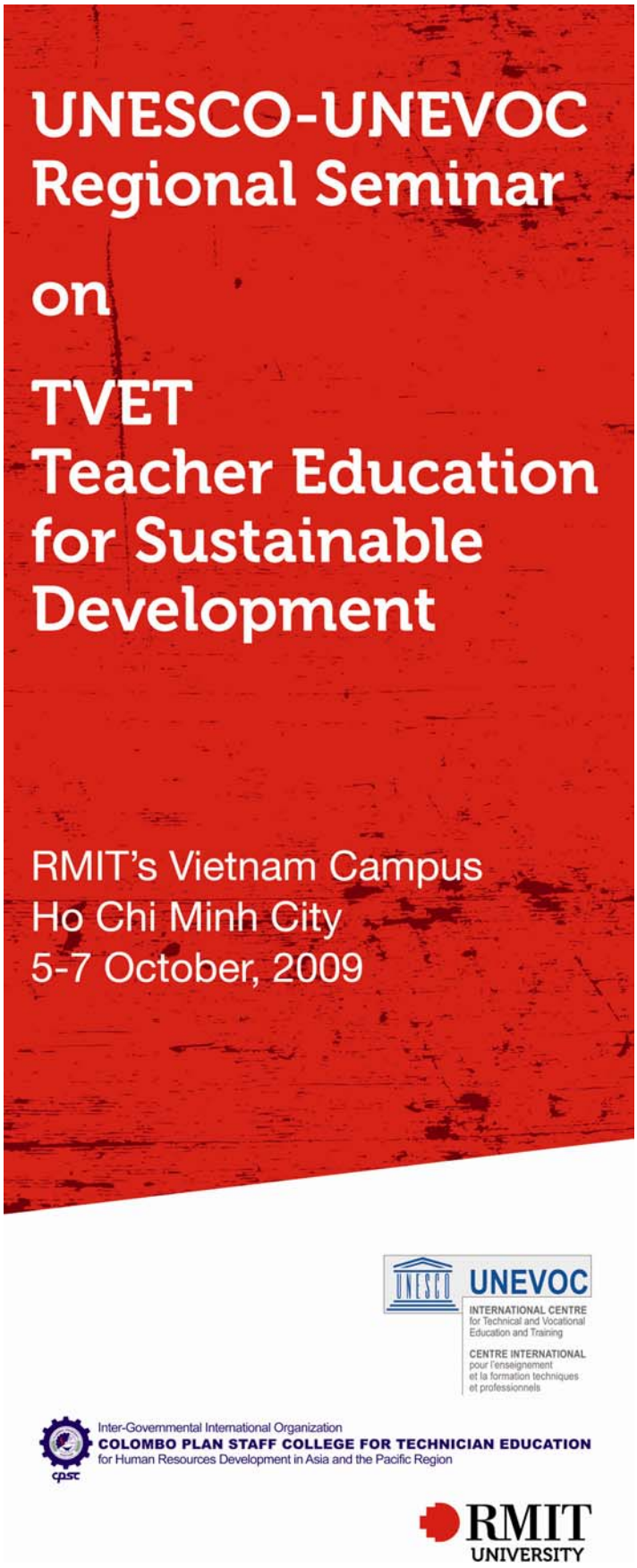


FINAL REPORT

An Asia-Pacific Experts Meeting organised by RMIT University on behalf of the UNESCO-UNEVOC International Centre for Technical and Vocational Education and Training in partnership with the Colombo Plan Staff College for Technician Education

FINAL REPORT

TEACHER EDUCATION FOR TVET AND SUSTAINABLE DEVELOPMENT

An Asia-Pacific Experts Meeting organised by RMIT University on behalf of the UNESCO-UNEVOC International Centre for Technical and Vocational Education and Training in partnership with the Colombo Plan Staff College for Technician Education

Venue: RMIT International University Vietnam

Ho Chi Minh City, Vietnam

5-7 October 2009

TEACHER EDUCATION FOR TVET AND SUSTAINABLE DEVELOPMENT

1. Introduction

A UNESCO-UNEVOC Asia-Pacific Experts Meeting on Teacher Education for TVET and Sustainable Development was conducted on the Saigon South Campus of RMIT International University Vietnam from 5 – 7 October, 2009. The meeting was organised by RMIT University UNEVOC Centre on behalf of the UNESCO-UNEVOC International Centre for Technical and Vocational Education and Training, in partnership with the Colombo Plan Staff College for Technician Education.

The objectives of the meeting were:

- To map contemporary issues of sustainable development for inclusion in TVET teacher education programs
- To identify current and new approaches to TVET teacher education that address such issues, especially in relation to globalization (e.g. international workforce mobility, the global financial crisis, etc) and climate change (e.g. energy efficiency, the ILO Green Jobs Initiative, etc.).
- To elaborate strategies for strengthening the contribution of TVET teacher education programs around such issues.
- To advise the UNESCO-UNEVOC International Office on future regional activities to support TVET teacher education for sustainable development.

The expected outcomes of the meeting were:

1. The mid-career professional development of participants and new ideas for integrating into home-country systems and programmes.
2. Suggestions for reorienting TVET teacher education curricula and practice to address sustainable development issues.
3. Recommendations to UNECO-UNEVOC and partners for supporting countries and institutions in enhancing the contribution of TVET teacher education to contemporary issues.

2. Background

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 need and wants is threatened.

Finding approaches to development that balance economic and social progress, address cultural differences, and respect ecological values and limits is the key to sustainable development.

Moving towards this goal 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.

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. 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.

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 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 practice sustainable tasks at the workplaces of today and tomorrow.

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, 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.

These trends lead to questions about the curriculum changes needed to integrate sustainable development into TVET. 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, tourism, service sectors, etc
- To indicate that new jobs will become available in sustainability industries**.**

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. The purpose of this seminar is to address the import of these three strategies within the context of teacher education for TVET.

As such, the meeting built on the outcomes of earlier UNEVOC meetings on Innovation and Excellence in TVET Teacher/Trainer Education (Hangzhou, China, November 2004), TVET for Sustainable Development (Ho Chi Minh City, Vietnam, July 2006), and TVET Teacher Education for Sustainability (Chiang Mai, Thailand, August 2007). Key issues and recommendations from the reports from these meetings informed the seminar, together with the report of the World

Conference on Education for Sustainable Development – Moving into the Second Half of the UN Decade" which was held in Bonn, Germany, from 31 March to 2 April 2009.

3. The Work of the Meeting

The programme involved keynote lectures, panel presentations, country reports, and both large group and plenary discussions. A copy is provided in Annex 1.

The participants in the meeting were invited as independent experts in TVET and/or sustainable development. The participant list and contact details is provided in Annex 2. All hold positions of responsibilities in national TVET systems, TVET institutes or teacher education institutes.

Opening Ceremony

The Opening Ceremony was chaired by Professor Annette Gough, Director of the RMIT University UNEVOC Centre, who outlined the background, objectives, expected outcomes and programme for the meeting. Mr Steve Paris, Acting President of RMIT International University Vietnam, presented an Opening Address in which he welcomed participants to the campus and outlined two aspects of the RMIT student experience relevant to the theme of the meeting. These were (i) the integration of work-integrated learning into the core curriculum of all students, and (ii) a strong emphasis on sustainable campus operations. Dr Hoang Ngoc Vinh, Deputy Director-General, Department of Professional Education, MOET and Director of the Vietnam UNEVOC Centre also presented an Opening Address in which he welcomed participants, especially from other UNEVOC Centres to Vietnam. Dr Vinh outlined the range of sustainability challenges faced by Vietnam and the ways in which all of these require a response form TVET.

Country Reports

Country reports were presented in two concurrent sessions. The reports focused on the following questions:

- What are the major sustainable development issues facing your country?
- How do these impact on labour force an skill needs?
- What are some examples of ways in which these skill needs are being met by TVET?
- What are teacher education institutions doing to help prepare TVET instructors to meet these skill needs?
- What challenges face teacher education institutions in meets these TVET needs?

Keynote Addresses

Three Keynote Addresses were presented.

- *Professor Shyamal Majumdar*, Director, CPSC, provided an analysis of the context in which teacher education in VET is operating in an address titled, *A New Paradigm for Teacher Education in TVET.* He outlined changes in the global economy and the implications for the nature of work, including the shift from the industrial era to the information society and the ways in which this impacted on the relations between enterprises, workers, resources, technology and society. The need for sustainable modes of production to be supported by new workplace competencies was emphasised as was the consequent need for a new paradigm of teacher education.

- *Professor John Fien, Professor of Sustainability, RMIT University,* spoke on topic of *Climate Change, Sustainable Development and TVET*. A short video was used to provide an overview of the science and impacts of climate change. This was followed by an explanation of the changes taking place in major economies towards "green jobs" with significant investments in environmental industries. This included the development of new enterprises, products and services that would both mitigate carbon and other GHG emissions, increased energy efficiency in the work place, and the development of new health, community service, environmental planning and agricultural practices to adapt to unavoidable climate change more effectively.
- *Professor Rupert Maclean, Director of the Centre for Lifelong Learning Research and Development, Hong Kong Institute of Education,* extended the focus on environmental and economic sustainability in previous addresses with a presentation on *Changing Meaning of Sustainable Development, International Labour Mobility and Developing Skills for the New Economy.* The Millennium Development Goals (MDGs) were outlined as a key responsibility of TVET because of its role in ending poverty, improving health, promoting gender equity and conserving natural resources. The impact of the MDGs in redefining 'development' and the emergence of alternatives to Gross National Product were discussed through an analysis of Gross National Happiness as a measure of development. The implications of an emphasis on social sustainability were explored in terms of changes in work-life balance,

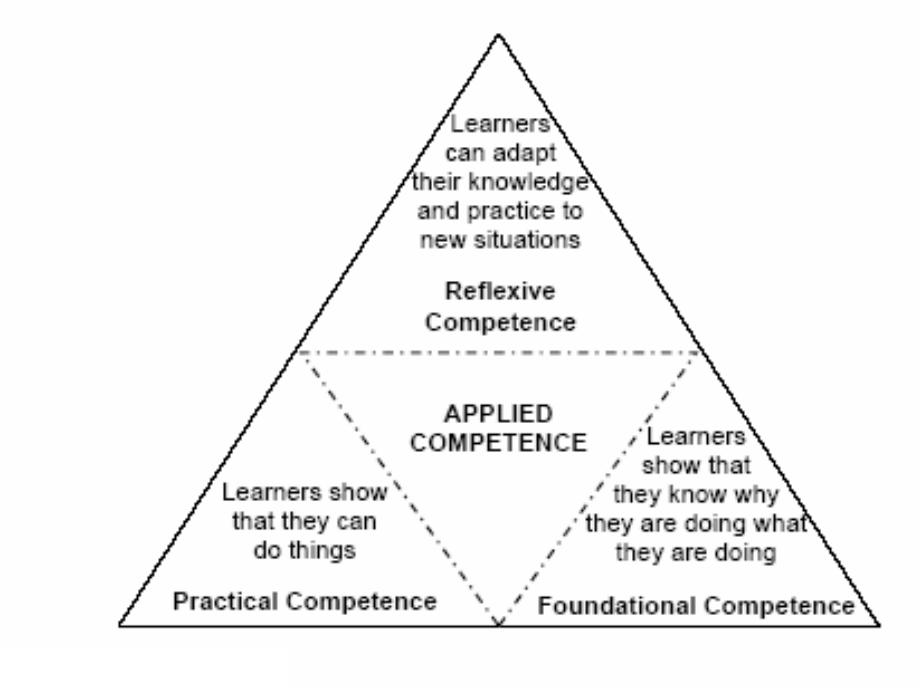
Panel Presentations

A panel of three speakers provided case studies of TVET Teacher Education for Sustainable Development as a basis for plenary discussion.

- *Professor Vinai Veeravatnanond, President, Thailand Association for Environmental Education*, provided an analysis of the moral/values basis of sustainable development through a case study of Buddhism and its focus on sustainability both as a pubic policy imperative for education and as a guide to personal lifestyle decisions. Teacher education therefore needed to be more than a technical preparation for instructors; it also needed to develop the capacity of instructors to integrate sustainability thinking into both course content and pedagogy.
- *Professor Annette Gough, Head, School of Education, RMIT University,* used a case study from Australia to identify the opportunities and challenges of integrating ESD into pre-service TVET teacher education programmes. The opportunities included a substantial body of literature on, and resources for, integrating sustainability into teacher education. However, she identified that these were primarily for primary and secondary teacher education, not TVET, and focused more on the environmental dimensions of sustainability than the social, economic and cultural. Another key challenge that was identified was the over-crowded teacher education curriculum for TVET and its focus on practical or utilitarian modes of instruction rather than the purposes or ultimate goals of instruction.
- *Professor 'Chandler' Huang Chunlin, Office of Institutional Research and International Affairs (OIRIA),* extended the themes developed by the two previous panel speakers through a case study of ESD in TVET in China. His special focus was on the in-service or continuing professional development of TVET teachers. He described an exciting collaboration between two UNEVOC Centres (OIRAI China and Griffith University Australia), which is using an action research approach to develop a collaborative community of practice among TVET instructors through which participants analyse the potential for

integrating ESD into their existing courses and then develop appropriate curricula responses.

The discussion on these panel presentations explored the place of value systems and religions other than Buddhism as a basis for ESD and the consequent need to rethink the nature of competencies as an outcome of TVET. An example of how this is being done in South Africa was provided, to explore three aspects of competencies:



Small Group Workshops

Four small group workshops were convened. The themes of the workshops were:

- Workshop 1: Analysis of country reports
- Workshop 2: Identification of implications of climate change for work practices, TVET courses and TVET teacher education
- Workshop 3: Identification of implications of alternative thinking about development, such as Gross National Happiness, for work practices, TVET courses and TVET teacher education
- Workshop 4: Development of an agenda for moving forward.

The guidelines for these workshops are provided in Annex 3. The conclusions of the workshop discussions are provided in the Section 4.

Final Plenary Session

The following recommendations for UNESCO-UNEVOC and CPSC were agreed at the conclusion of the meeting:

For UNESCO-UNEVOC

- For develop a global SD policy for TVET and guidelines on its implementation
- To coordinate with governments in member states to upgrade the importance of ESD in TVET in their national educational agenda
- To help organize capacity building training programmes and workshops in different regions to help member states in orienting their TVET for SD

- To share the successful TVET for SD experiences from different parts of the world through specific Portals and electronic networks, other resource materials and regional conferences and symposiums
- To introduce and distribute more useful and practical resource materials for teaching and assessment. For example, developing guidelines and standards tools on measurement of SD outcomes.

For CPSC

- The recommendations for UNESCO-UNEVOC are equally applicable for CPSC at an Asia-Pacific level.
- To conduct follow up and monitoring of the TVET-SD implementation in the region and assist the member governments in doing so effectively.
- Preparation of the Teaching learning and other resource materials based on the regional sustainability issues and disseminate.
- Conduct research and other innovations in the country based on SD

4. Workshop Reports

Workshop 1: Analysis of country reports

Participants worked in current sessions to present country reports and then engaged in an analysis of common themes. These were presented to a Plenary Session where they were synthesised according to six questions:

1. What are the major sustainable development issues facing the countries in your group?

- High level of poverty and unemployment rate and low literacy rate.
- Population problem in some countries, where most of the families have only one or two children and their parents don't want to engage their children in vocational training areas. Their only ambition is promoting their children to higher education.
- Regional differences, such as differences between east and western China, and regional-city differences in Korea
- Cultural differences – solutions must be culturally appropriate
- Mobility of population – creates inequity in access to services
- Attitudes – need to develop attitude of altruism and respect for cultural differences
- Less developed industrial sector, where trainees cannot get further training opportunities or practical training, in some countries.
- Mismatch between industrial sector and training providing sector or mismatch between demanded industrial opportunities and vocational training programs.
- Less awareness of TVET sector and current global trend. As the VOC fee sector, especially at rural level.

2. How are these impacting on the nature of work and employment opportunities?

- It is badly impacting on job opportunities, especially unskilled workers, or in demand skill areas might be provided to the job market.
- To avoid this situation, skill standards of demand occupations should be developed continuously every year due to worst development of technology in all occupational areas. (It may provide more employment opportunity every year).

3. What work force skill needs do these issues and impacts bring?

- "Soft skills" – interpersonal skills, team skills, collaborative research skills, creative thinking, learning to learn, attitude of inclusiveness (Thailand)
- Skills must be relevant to local context and community needs
- The ability to integrate values of sustainable development into all decision-making
- To understand and apply "footprint" concept
- Greater need for entrepreneurship, innovation and skills for self-employment.
- Evolution of new jobs such as ecotourism, environmental monitoring, land rehabilitation, renewable energy development (Malaysia)
- First of all prepare TVET policy plan for this country.
- Organise continued dialogue with local industries of the country.
- Prepare proper skill standards with the help of the industries.
- Understand the global TVET situation and economical development trends.
- Identify not only skill standards to local demands, but also to the regional and global demands. A qualified skilled labour force can be provided to fit to the local and international demands.
- Knowledge based skilled workforce should be introduced.

4. What are some examples of the ways in which these skill needs are being met by TVET in the countries of your group?

- Organised methodology of dual training system, knowledge and skill balance training systems are implemented.
- Public-private partnership programs implementing.
- Tailor-made special training programs are conducted for industrial needs.
- Sustainable development programs are introduced for TVET sector as well as industries such as rain water collection techniques, solar power, bio energy, wind energy improvement programs, CFC free eco-friendly ref. and air programs implemented (eg. repair, reuse and recycle program).
- Environmental Education In Korea – K-12 curriculum in Environmental Education firmly embedded, which includes an independent Environment subject in middle and high school. However, ESD is not referred to in curriculum documents.
- Forestry TVET in Indonesia is being developed with the goal of training technical personnel in sustainable forest management. The approach uses a local leadership model and integrates informal and formal education. Curriculum covers the three pillars of ESD: economic, environmental and social. Students will also be trained in values, such as honesty and cooperation.
- Partnerships with industry whereby TVET has access to facilities and equipment (Thailand)

- Mobile training units in remote areas -(Thailand)

5. ***What are teacher education institutions doing to help prepare TVET instructors to meet these skill needs?***

- Implementing progressive teaching learning methodology for TVET sector in application approach.
- Introduce pre-service training for newly recruited teachers and in-service training compulsory for existing teachers, and it should be provided continuously through ESD.
- Incorporating ESD through infusion and diffusion methodology into the TVET curriculum of teacher training.
- Special ESD projects works for teacher training or further training courses/programmes.
- Practical, work based learning (Malaysia)
- Training packages for teachers (China)
- New qualification standards
- Developing teaching methodology to reflect values of sustainable development – interactive, collaborative
- Action Research projects in China: Approximately 600 Teachers and 6000 students were surveyed on their knowledge of SD, and teachers' views were sought on their training needs. Teachers revised their curriculum in the light of issues identified at the UNESCO expert meeting (Thailand, 2006) and incorporated SD issues in their teaching, as well as innovative teaching methods (e.g. collaborative problem solving, case studies). Teachers and students kept logbooks for reflection and evaluation.

6. ***What challenges face teacher education institutions in meeting these TVET needs:***

- Ensuring that concept of Sustainable Development is widely understood in government, industry and the community, and its principles adopted and practiced in all domains of society
- Ensuring that TVET has a strong profile and a clear position within government structures.
- Ensuring that the role of TVET for sustainable development is widely understood
- The challenge of training - and retraining - large numbers of TVET instructors
- Reluctance of trained technicians to work in vocational schools (China)
- Need for quality frameworks for TVET
- Developing critical thinking in students and the community
- Using research to inform instructional policies and practices
- Rapid rate of technological - skills and knowledge are outdated very quickly so it is important to instil capacity for independent learning and research, learning to learn
- Need to use teaching methods that reflect values of sustainable development– collaborative, work-based, interactive, enquiry based, culturally appropriate.
- Enhancing the ability of students to think for themselves and study more independently
- Few facilities for ESD development program.
- No concrete policy in ESD at TVET sector.

- No research activities in TVET sector which directly affects the teacher training development too.
- Less motivation within the TVET sector and the society to engage with ESD.
- No financial assistance from industrial sector yet to develop ESD concept.
- International standards of TVET teacher training systems not yet confirmed.

Workshop 2: Identification of implications of climate change for work practices and TVET courses

Participants worked in small groups to analyse the implications for work practices and TVET of a range of common and emerging adaptation and mitigation strategies. The conclusions of the groups were presented to a Plenary Session where they were synthesised according in two tables.

A. Climate Change Adaptation

Sector	Adaptation Option or Strategy	Implications
Energy	Energy efficiency; use of renewable sources; reduced dependence on single sources of energy; strengthening of overhead transmission and distribution pylons and wires; underground cabling	for work practices
		for TVET
Water	Expanded rainwater harvesting; water storage and conservation techniques; water reuse; desalination; irrigation efficiency	for work practices
		for TVET
Agriculture	Adjustment of planting dates and crop variety; crop relocation; improved land management, e.g. erosion control and soil protection through tree planting	for work practices
		for TVET

Infrastructure/ building	Relocation; seawalls and storm surge barriers; dune reinforcement; land acquisition and creation of marshlands/wetlands as buffer against sea level rise and flooding; protection of existing natural barriers	for work practices
		for TVET

Transport	Realignment/relocation; design standards and planning for roads, rail, and other infrastructure to cope with warming and drainage	for work practices
		for TVET
Health	Heat-health action plans; emergency medical services; improved climate-sensitive disease surveillance and control; safe water and improved sanitation	for work practices
		for TVET
Tourism	Diversification of tourism attractions & revenues; shifting ski slopes to higher altitudes and glaciers; artificial snow-making	for work practices
		for TVET

B. Climate Change Mitigation

Sector	Key mitigation technologies currently commercially available.	Implications
Energy	Improved supply and distribution efficiency; fuel switching from coal to gas; nuclear power; renewable heat and power (hydropower, solar, wind, geothermal and bioenergy); combined heat and power; early applications of Carbon Dioxide Capture and Storage (CCS) (e.g. storage of removed CO2 from natural gas);	Work practices: In building services, power used extensively in providing civil, electrical and mechanical facilities. In factories, consumption is 24 hours. Home use, consumption for cooking, heating etc.
		TVET: Enhance use of solar systems, create new innovations, provdie more training programs in renewable or alternative energy source.
Wastes	Landfill CH4 recovery; waste incineration with energy recovery; composting of organic waste; controlled waste water treatment; recycling and waste minimisation	Work practices: Waste created without proper control.
		TVET: In waste disposal systems, improvements can be made. Waste products can be recycled for other use eg. Create energy from "cowding". Palmoil waste can be transformed into quality building materials when compressed. Sugar cane pulp waste can be converted to energy and also when compressed can become building material.
Agriculture	Improved crop and grazing land management to increase soil carbon storage; restoration of cultivated peaty soils and degraded lands; improved rice cultivation techniques and livestock and manure management to reduce CH4 emissions; improved nitrogen fertiliser application techniques to reduce N2O emissions; dedicated energy crops to replace fossil fuel use; improved energy efficiency	work practices: land management and use of agriculture products.
		TVET: Look for alternative crop use eg. Other than for food, can be used to create energy (certain plant species) while some herbs are widely used in medicine, modern or traditionally used – Biotechnology, organic farming produce healthy vegetables and less use of chemically produced manure. Use of herbs also practised in Thailand to control pest and insects for plant disease control.
Building	Efficient lighting and daylighting; more efficient electrical appliances and heating and cooling devices; improved cook stoves, improved insulation; passive and active solar design for heating and cooling; alternative refrigeration fluids, recovery and recycling of fluorinated gases;	Work practices: Infrastructure development projects, building construction design and material use, facilities provided and installed, use of energy during and after project completion. All these are more profit oriented and for comfort.
		TVET: More knowledge and training to produce EIA/EIS reports. Impact studies need more experts. Improve design construction and procurement of alternative materials which are SD friendly. Install (automatic control) systems to avoid waste of power. Enhance R&D in many related areas especially on locally available materials for construction and consider quality, economic use and SD.
Transport	More fuel efficient vehicles; hybrid vehicles; cleaner diesel vehicles; biofuels; modal shiftsfrom road	Work practice: Reduced use of power and reduced noise pollution.

	transport to rail and public transport systems; non-motorised transport (cycling,walking); land-use and transport planning;	TVET: Use alternative fuel such as from plant, create more efficient engine systems to save fuel and reduce noise. More training both technical and soft skills include instilling good attitudes. Technology on reduction of CO_2 or create CO_2 by-product use or proper way of eliminating CO_2. Reduce spare parts use. Recycle or repair. Promote good maintenance and installation.
Industry	More efficient end-use electrical equipment; heat and power recovery; material recycling and substitution; control of non-CO2 gas emissions; and a wide array of process-specific technologies;	Work practice: Frequent change of parts in manufacturing machines. Use of heavy fuel and produce waste.
		TVET: Promote good installation and maintenance of machines. Reduce repair. Reduce use of spare parts, recycle. Innovations in process control to reduce energy usage. Introduce better manufacturing ways to reduce waste and Co2 emission. Proper waste disposal systems. More studies on EIA, eco systems etc.
Forests	Reforestation; forest management; reduced deforestation; harvested wood product management; use of forestry products for bioenergy to replace fossil fuel use;	Work practice: re-afforestation, replanting all types of plant/tree/timber
		TVET: In carpentry work (Indonesia). Training on plant/tree/timber life cycle and profile before cutting. Develop attitude to value nature. Find alternative materials such as plastic instead use of wood. Forest management and replanting experts.

Workshop 3: Identification of implications of alternative thinking about development, such as Gross National Happiness, for work practices, TVET courses and TVET teacher education

On trying to answer the first two questions in the last schedule, the group got into a very meaningful and enriching discussion on several points as:

a) What has been the contribution of TVET in the past in raising GDP/GNP of developing and underdeveloped countries, economic productivity/prosperity of the countries, etc.

b) Whether individual countries have missed out anything in specific because of TVET's single orientation towards individual's economic betterment through skill development.

c) Whether economic productivity alone be an indicator of development. A development should also include quality life/dignity of living (better environment, peace, etc.).

d) How do developed countries compare with developing countries/underdeveloped countries with respect to Happiness Index – so also rural and urban sectors and its impact on the vocation – from purely Industrial Societies to Sustainable Societies.

e) Whether, as a result, there has been any changes in the very definition and understanding of "happiness" and "comforts".

f) Whether TVET has helped in increasing the Purchasing Capacity of the people, etc.

There were divergent thoughts and discussions on the aspect of Happiness as an indicator of development, and what it includes besides the material comfort – environmental safety – for this generation and the future – social security, physical and mental health, workplace peace, etc.

The group seemed to converge on two or three conclusions:

1. While TVET has, to some extent, contributed to economic development and in making available skilled man-power, it has missed out on the environmental and social contributions. There is thus a strong need to endorse environmental and social betterment (quality and dignity of living) in addition to economic betterment.

2. Happiness and wellbeing of human life depends on environmental wellbeing. This realisation will bring in the need to concentrate on training people in Informal and unorganised sectors – skilled workers at the grass root level in un-benchmarked sectors like construction, agriculture, horticulture, gardening etc. and in rural reconstruction, micro entrepreneurship ie. When economic development is seen in partnership. with environmental and social betterment, the scope and focus of TVET will broaden including physical and mental wellbeing and workplace satisfaction and peace leading to sustainability.

Workshop 4: Development of an agenda for moving forward.

Task 1A: Agriculture

Goal	Implications for TVET courses & teaching methods	Implications for TVET Teacher Ed.
Define meaning and scope of ESD in TVET	Critical analysis of practice, process and product	Foundation Competency for all instructors
Identify key relevant ESD concept	Reduce Recycle Re-use Repair/retrofit Review Rethink	Understanding of use of energy + climate change Food crisis
Identify mode of integration of ESD into TVET	Hybrid model	Promote skills for integrating ESD integrated across all subject areas
Subject specific SD competencies/outcomes	Able to: - Produce new idea/method - Reflect on Process - Manage water efficiently-method of doing this - Understand triple bottom line - Planning impact of SD eg. feasibility study	Teacher. Educators to have current experience & knowledge of agriculture.
Expand range of teaching and learning styles	-Scenario-case study, observational study in the field, eg. farmer has problem with rain fall students have to res. Solution eg. Use of water tank -Problem solving eg.1- How to reduce production cost eg.2- how to improve appearance and quality of product	- Model good practice in SD -Professional development VIP - Use of collaborative enquiry based learning and res. skills
Innovative assessment	-Research Skills -Production skills, eg. using tools, maintenance of tools, testing products - Student projects measuring water used, product quality & quantity - Reflect and evaluate different approaches, eg. alternative pest control	- PD is experiential, - Assessment designing including SD criteria

Task 1B: Tourism Industry

Goal	Implications for TVET courses and teaching methods	Implications for TVET teacher education
Define meaning and scope of ESD in TVET	- improved tourism research skills by undertaking group based workplace inspections and tours for students of tourism sites and areas. - Improved overall understanding of Tourism industry by improving teaching materials in ALL tourism industry jobs from cooking to cleaning to support to finance to entertainment. - Introduce common core subjects in sustainable development for all students that have a general overview of the issues facing tourism to promote ESD. - Develop teaching methods that introduce a holistic understanding of sustainable development.	- more staff development in group based material development, activity implementation and assessment. - Staff training for continued promotion and socialization of ESD for teaching staff to change attitudes
Identify key relevant ESD concepts	- -eco tourism – tourism activities that don't destroy the environment. - activities that include real experiences such as farm stays, field trips, and interactive holidays that include study and learning on the environment they are staying in.	- teachers require relevant research to develop programs that are community sensitive. - Field trips for teaching staff with minimum stays within areas where tourism is being developed.
Identify mode of integration of ESD into TVET, eg stand-alone courses, infusion, hybrid model	- hybrid model good but requires contextualization with local needs. - Political and social factors inhibit and resist hybrid models so infusion a more viable approach.	- training activities that help teachers analyze their subjects to infuse ESD into them. - Staff development that helps trainers develop new specific competency standards and curriculum in ESD.
Identify specific SD competencies/outcomes	- Competencies in analysis of SD impacts on workplace process such as reuse of dishwater and pool water, improvement of air conditioning systems and promoting sustainable practices to customers. - Competencies in group based problem solving that reflect the issues facing tourism such as environmental degradation by development. - Competency in empathy for all students. - Entrepreneurship competencies that recognize the pillars of sustainable development.	- Training activities that help teachers can teach and analyze that competencies - Training on how to pack and unpack training plans and programs that allow for better competency and learning outcomes on SD

Expand range of teaching and learning styles	- move from instruction to collaborative learning for teams of tourism students (no one works in a vacuum). - develop active learners by following/enacting active learning practices such as trainers delivering to students in the workplace and while on study tours. - move from expository to didactic modes of teaching (learner centered) that allow improvements in tourist operations while becoming more sustainable.	- promoting/socializing in student centered teaching and learning styles while recognizing the variation of learning styles that all students have. - Learning from local tourist operators on how to engage with the environment in a community sensitive way. -
Innovative assessment	- Simulated creation of new eco-friendly holiday resorts using role play and real world outputs. - Holistic assessment that includes criteria relating to more than just skills but also, attitude, social inclusion, team play and overall approach.	- training that helps teachers develop assessment tools that represent more holistic assessment. - Model holistic and innovative assessment approaches in the teacher training program itself. - Create programs that have teachers involved in ES activities within the tourism industry.

Task 1 C Construction Industry

Goal	Implications for TVET courses and teaching methods	Implications for TVET teacher education
Identify key relevant ESD concepts	- Natural resource and need for its conservation, - Judicious use of natural resources in construction activities, - Concepts of High quality construction planning and management practices which are environment friendly, management of human resource in terms of their working and living conditions (life styles), - Socio-cultural characteristics of construction and its relationship with the ecology of the place. - Alternate and appropriate technology for conserving natural resources	- Create awareness of the natural resources and its conservation in teacher educators - Understand the tertiary education culture with minimizing the degradation of the natural resources - Promote the skill of saving/ conservation of natural resources - Awareness of the new technology and innovations for conserving and optimal utilization of the available natural resources. - Knowledge of the architectural history that influence the culture of the place and its characteristics on the construction design and materials.

Identify mode of integration of ESD into TVET, eg stand-alone courses, infusion, hybrid model	- Sustainability concepts for construction such as availability, accessibility and cost of the natural resources - should be infused in all the courses at different levels. - In addition to the above the sustainability concepts should also be infused into programmes and activities on the campus and off the campus	- Identify ESD concepts in the courses for infusing sustainability perspective through action inquiry and research - Planning and organizing learning experiences around the integrated concepts for students
Identify specific SD competencies/outcomes	- Apply the knowledge and understanding of the economic, - societal and environmental cost (values) of the natural resources in construction, - Choosing appropriate methods for construction activities, ability to think of alternatives for substituting natural resources and minimizing wastage. - Ability to think holistically and develop environment friendly designs	- Coordination with the local industries to apply the knowledge and understanding and to improve construction process. - To conduct action research in construction activities and programmes, get feedback and use this feedback for improving his/her teaching practice - To revise or re-orient the curriculum standard by infusing SD concepts and practices based on research findings.
Expand range of teaching and learning styles	- Experience based teaching learning with practical exposure to conservation of natural resource practices - Exposure to multiple sources of information and virtual experimentation through ICT - Cooperative learning and interaction with the local communities for understanding and applying the traditional and indigenous knowledge in construction activities.	- Establishing partnerships and networking with other related industries for planning and organizing experiential learning. - Capacity building in ICT and experiential teaching-learning methodologies. - Availability of resource learning materials for effective teaching - Exposure to traditional and indigenous knowledge in construction
Innovative assessment	- Assessment through reflective journals, actual observation and maintenance of anecdotal/work reports - Real or authentic assessment techniques such as performance assessment, portfolios, reports, etc	- Practical exposure in designing and organizing such assessment tools and techniques with necessary inputs from the industry. - Training in organizing New Competency Based Assessment for TVET based on the concepts and practices of ESD

Task 2 Recommendations

Recommendations for TVET System Directors	Recommendations for Directors of TVET Teacher Education Institute	Recommendations for Lecturers in TVET Teacher Education Institute
- Wide plan –policies - TVET profile to be promoted, funding for TVET, Performance review of inst. SD - Facilitate resources and funding that support continuous refreshment of understanding of SD - SD to be set as one of standard/indicators for Quality Assurance system - Develop country specific policy on introducing SD in TVET based on UNESCO guidelines on SD - Develop a Master Plan and action plan for TVET-SD - Organize training programmes/workshop to re-orient TVET for SD - To develop and disseminate teaching learning guidelines and other resource materials for infusing SD in TVET - Creating and operating Data bases of relevant information (concepts, materials, assessment tools, practices, etc) on SD and making it available to TVET institutions - Provide funding support for action research and innovation for the effective implementation of TVET-SD	- Institutional policies - Performance review in SD - SD in programs - Institute to be good practice model of SD - Internal PD plan for SD - Compliance assessment - SD leaders/champions of change - Cross collaboration between Institutes and different industry areas - Involving and encouraging teacher education institutions in implementing the TVET-SD curriculum - Help develop a faculty/cadre of trainers of teachers in the aspect of TVET-SD - Build collaborations between colleges of TVET and industries and among colleges. - To set up a training centre for providing experience based training in TVET-SD. - To encourage faculties/institutions to carry out action research through providing funding and training support - Audit and monitoring system for SD Development.	- Recognition of good practice - Re-conceptualized idea of education –all areas to model on SD practice - New “currency” requirement for SD understanding - Position description for “new” SD aware educators - Equip with information, knowledge and skills in the effective implementation of SD in TVET - In the use of Information and communication Technology in TVET-SD implementation

Annex 1: Program

Monday 5 October 2009

09.00 Registration

09.30 Opening ceremony

Chair: Prof Annette Gough

Welcome Remarks

- *Mr. Steve Paris*, Acting President, RIUV
- *Dr Hoang Ngoc Vinh*, Director-General, Department of Professional Education, MOET; Vietnam UNEVOC Centre

10.00 Thematic address – *Shyamal Majumdar* - A New Paradigm for Teacher Education in TVET

10.45 Morning Tea

11. 15 Workshop 1: Country Reports

13.00 Lunch

14.00 Group Reports

14.30 Keynote address - *John Fien* - Sustainable development, climate change and TVET

15.15 Afternoon tea

15.45 Workshop 2: Implications for TVET and teacher education

16.30 Group Reports

19.00 Conference dinner

Tuesday 6 October 2009

09.15 Group photo

09.30 Keynote panel addresses

- *Vinai Veeravatnanond* - Teacher Education for Sustainable Development
- *Annette Gough* - Teacher Education for Sustainable Development within TVET
- *Huang Chunlin* - Curriculum Reform in TVET for SD in China

11.00 Morning Tea

11.30 Roundtable Discussions

12.30 Plenary Discussion

13.00 Lunch

14.00 Keynote address - *Rupert Maclean* - Changing Meaning of Sustainable Development, International Labour Mobility and Developing Skills for the New Economy

14.45 Workshop 3: Implications for TVET and teacher education

15.30 Afternoon tea

16.00 Group Reports

Wednesday 7 October 2009

09.30 Agenda setting - *Shyamal Majumdar*, Melbourne Theatre

10.00 Workshop 4A: Identifiation of needs, issues and priorities on TVET teacher education for sustainable development

11.15 Morning tea

11.30 Workshop 4B: Review of action priorities on TVET teacher education for sustainable development

12.15 Group Reports

12.45 Closing ceremony

13.15 Lunch

Annex 2: List of Participants

Title	Name	Organisation	Mailing Address	Telephone	Email Address
AUSTRALIA					
Mr	Rodney Noble	RMIT University, Melbourne	GPO 2476, Melbourne, Australia 3001	61 3 9925 8033	rodney.noble@rmit.edu.au
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JAPAN					
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ORGANISING COMMITTEE / HOSTS

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CPSC					
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Annex 3: Workshop Guidelines

Workshop 1 Country Reports

- What are the major sustainable development issues facing the countries in your group?
- How are these impacting on the nature of work and employment opportunities?
- What work force skill needs do these issues and impacts bring?
- What are some examples of ways in which these skill needs are being met by TVET in the countries in your group?
- What are teacher education institutions doing to help prepare TVET instructors to meet these skill needs?
- What challenges face teacher education institutions in meets these TVET needs?

Workshop 2: Implications of Climate Change Adaptation and Mitigation for TVET

Sector	Adaptation Option or Strategy	Implications
Energy	Energy efficiency; use of renewable sources; reduced dependence on single sources of energy; strengthening of overhead transmission and distribution pylons and wires; underground cabling	for work practices
		for TVET
Water	Expanded rainwater harvesting; water storage and conservation techniques; water reuse; desalination; irrigation efficiency	for work practices
		for TVET
Agriculture	Adjustment of planting dates and crop variety; crop relocation; improved land management, e.g. erosion control and soil protection through tree planting	for work practices
		for TVET
Infrastructure/ building	Relocation; seawalls and storm surge barriers; dune reinforcement; land acquisition and creation of marshlands/wetlands as buffer against sea level rise and flooding; protection of existing natural barriers	for work practices
		for TVET
Transport	Realignment/relocation; design standards and planning for roads, rail, and other infrastructure to cope with warming and drainage	for work practices
		for TVET
Health	Heat-health action plans; emergency medical services; improved climate-sensitive disease surveillance and	for work practices

	control; safe water and improved sanitation	
		for TVET
Tourism	Diversification of tourism attractions & revenues; shifting ski slopes to higher altitudes and glaciers; artificial snow-making	for work practices
		for TVET

Sector	Key mitigation technologies currently commercially available.	Implications
Energy	Improved supply and distribution efficiency; fuel switching from coal to gas; nuclear power; renewable heat and power (hydropower, solar, wind, geothermal and bioenergy); combined heat and power; early applications of Carbon Dioxide Capture and Storage (CCS) (e.g. storage of removed CO2 from natural gas);	for work practices
		for TVET
Wastes	Landfill CH4 recovery; waste incineration with energy recovery; composting of organic waste; controlled waste water treatment; recycling and waste minimisation	for work practices
		for TVET
Agriculture	Improved crop and grazing land management to increase soil carbon storage; restoration of cultivated peaty soils and degraded lands; improved rice cultivation techniques and livestock and manure management to reduce CH4 emissions; improved nitrogen fertiliser application techniques to reduce N2O emissions; dedicated energy crops to replace fossil fuel use; improved energy efficiency	for work practices
		for TVET
Building	Efficient lighting and daylighting; more efficient electrical appliances and heating and cooling devices; improved cook stoves, improved insulation; passive and active solar design for heating and cooling; alternative refrigeration fluids, recovery and recycling of fluorinated gases;	for work practices
		for TVET
Transport	More fuel efficient vehicles; hybrid vehicles; cleaner diesel vehicles; biofuels; modal shiftsfrom road transport to rail and public transport systems; non-motorised transport (cycling,walking); land-use and transport planning;	for work practices
		for TVET
Industry	More efficient end-use electrical equipment; heat and power recovery; material recycling and substitution;	for work practices

	control of non-CO2 gas emissions; and a wide array of process-specific technologies;	
		for TVET
Forests	Reforestation; forest management; reduced deforestation; harvested wood product management; use of forestry products for bioenergy to replace fossil fuel use;	for work practices
		for TVET

Workshop 3: Implications of Alternative Views of Development for TVET

1. **TVET has traditionally been organised to support increases in Gross National Product (GNP) to underwrite economic development by providing workers with the skills to make industries and enterprises economically profitable.**
   - What are some of the ways in which TVET has done this?
   - What have been the advantages of this approach?
2. **Imagine that your government has decided to make Gross National Happiness (GNP) its national goal?**
   - Why might a government decide to do this?
   - How would work practices change? For example in terms of:
     a. Green Jobs
     b. Hours of work and work-life balance
     c. The health of employees and their families
   - Would this be a good thing or a bad thing for the environment? Why?
   - Would this be a good thing or a bad thing for the economy? Why?
   - Do you believe it is possible to have both environmental protection as well as economic development as national priorities? Why? How?
   - Do you believe it is possible to have both social happiness as well as economic development as national priorities? Why? How?
3. **Making Gross National Happiness and Gross National Product equal national priorities would mean that TVET should develop an understanding of the following examples of social, economic and environmental sustainability:**

Social sustainability	Economic sustainability	Environmental sustainability
• The changing nature of society and work	• Enterprise and entrepreneurship skills, such as innovation, creativity, and making one's own job	• Climate change
• Cultural diversity and tolerance in the workplace	• Globalisation and TVET - competitiveness, quality, labour migration	• Water quality and conservation
• The worker as an active citizenship	• Managing a small enterprise	• Waste management
• Other	• Other	• Other

   - Add another example for each.
   - Take the example of **jobs in the construction industry and the goal of energy efficiency in buildings (EEB**), and identify some examples of exactly what you could do to achieve the goals of social, economic and environmental sustainability

Social sustainability	Economic sustainability	Environmental sustainability
• The changing nature of society and work	• Enterprise and entrepreneurship skills, such as innovation, creativity, and making one's own job	• Climate change
Example	Example	Example
• Cultural diversity and tolerance in the workplace	• Globalisation and TVET - competitiveness, quality, labour migration	• Water quality and conservation
Example	Example	Example
• The worker as an active citizenship	• Managing a small enterprise	• Waste management
Example	Example	Example
• Other	• Other	• Other
Example	Example	Example

Workshop 4 A: Implications and Recommendations for TVET Teacher Education for Sustainable Development

Education for sustainable development in the 21st century

- Education for sustainable development is setting a new direction for education and learning for all. It promotes quality education, and is inclusive of all people. It is based on values, principles and practices necessary to respond effectively to current and future challenges.
- ESD helps societies to address different priorities and issues *inter alia* water, energy, climate change, disaster and risk reduction, loss of biodiversity, food crises, health risks, social vulnerability and insecurity. It is critical for the development of new economic thinking. ESD contributes to creating resilient, healthy and sustainable societies through a systemic and integrated approach. It brings new relevance, quality, meaning and purpose to education and training systems. "

What does this mean for TVET and for teacher education in TVET in ONE INDUSTRY SECTOR, eg construction, tourism, health services, agriculture, engineering, auto mechanic, office work, etc

Name of industry sector: ……..

Goal	Implications for TVET courses and teaching methods	Implications for TVET teacher education
Define meaning and scope of ESD in TVET		
Identify key relevant ESD concepts		
Identify mode of integration of ESD into TVET, eg stand-alone courses, infusion, hybrid model		

Identify specific SD competencies/outcomes		
Identify specific SD competencies/outcomes		
Expand range of teaching and learning styles		
Innovative assessment		

Workshop 4B: Key Recommendations for Reorienting Teacher Education in TVET for ESD

Recommendations for TVET System Directors	Recommendations for Directors of TVET Teacher Education Institutes	Recommendations for Lecturers in TVET Teacher Education Institutes