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## **Editorial TVET<sup>®</sup>Asia Issue 6:**

### **The Greening of Technical and Vocational Education and Training**

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The importance of building ecologically sound economies (greening) in order to address climate change and other pressing environmental issues is widely acknowledged by governments around the world. A notable example is the recently held 2015 United Nations Climate Change Conference in Paris/France where 195 countries adopted the first universal climate change agreement. Although the outcome of the conference, the Paris Agreement, requires ratification by national governments, it demonstrates the strong will of the attending nations to address the pressing issue of climate change, to adopt the outcomes to their own legal systems and to sign the agreement.

*East and Southeast Asia* is the workbench of the world and is presently hosting many environmentally stressing industries. The results are increasing hazardous environmental conditions and health problems in the Asian regions. It is widely agreed that the environmental conditions have to improve, so multiple stakeholders, including TVET systems, must contribute to this change. Work processes need to be adjusted, human behaviour should become environmentally friendly, and new professions based on new green technologies, like solar energy, wind power, e-mobility will appear on a larger scale. Ultimately, the industrial and educational sectors have to have a positive impact on this individual, economical and societal change process.

The 6<sup>th</sup> issue of TVET is addressing this most pressing challenge by discussing issues associated with the greening of TVET. The following articles provide, in an exemplary manner, an insight into what must be addressed normatively and what can be practically achieved on macro-, meso- and micro-levels.

MARGARITA PAVLOVA provides an overview of government's role in greening TVET, especially focussing on the East- and Southeast Asian region and the present development status of greening TVET. She demonstrates that greening of jobs and development of necessary skills are essential requirements for successful transitions to TVET greening. Based on the results of several studies, the author analyses various drivers, that impact upon the greening of skills in the region, and describes five enabling factors that should be systematically addressed for the greening of technical and vocational education and training (TVET). The article concludes with clear reform- and action-oriented suggestions.

DAYUE (DAVID) FAN reports a survey on greening in Higher TVET in China. As one of the UNEVOC Centres, Shenzhen Polytechnic participated in research that was initiated by UNESCO UNEVOC. Shenzhen Polytechnic carried out a questionnaire survey and document analysis to assess attitudes to greening in three polytechnics in Guangdong Province. The article provides the readers with the survey background, research processes and methodology and the preliminary research results on greening in construction and agriculture in China.

PHONG CHI DIEP and MARTIN HARTMANN focus on the topic of green skills, with respect to Vocational Teacher Education, as a key driver in technical and vocational education and training. They argue the provision of quality vocational teacher education plays an important role in achieving the supply of adequately skilled workers. In order to ensure that vocational teachers have the necessary competencies to address greening, the professional profile of vocational teachers needs to be continuously developed. On the basis of a literature review and considering features of “the greening of technical and vocational education and training”, the authors propose a model of pedagogical competence of vocational teachers in the context of sustainable development.

The authors HAMID ZOLKIFLI, YUSRI KAMIN, AZLAN BIN ABDUL LATIB, YAHYA BUNTAT and ZUBAIDAH AWANG from Universiti Teknologi Malaysia focus on the situation in Malaysia and the concept of generic green skills. The authors present the design and the results of a qualitative study, which explored the perspectives of employers and academics about the meaning of generic green skills. They conclude that the concept of generic green skills and the awareness thereof is not very clear for the interviewees, nor is the understanding of environmental friendly practices and learning in TVET. The authors claim that additional studies should be conducted to better understand and stimulate the inclusion of generic green skills in all industries, including green technology-oriented industry, to further improve awareness and implementation practices among the stakeholders.

KATHARINA BAUMGARTEN and STEPHAN KUNZ highlight the topic of greening TVET from a different, but extremely relevant perspective, strongly referring to and reflecting on experiences in Vietnam and the Philippines. The authors especially focus on the agriculture and manufacturing sectors, which are traditional industries in Asia and account for the majority of the labor force in Asia. At the same time these sectors are the largest environmental polluters. The authors highlight the need for non-formal, on-the-job training and workprocess-integrated learning. They make a case for a practical, non-academic approach to training, matching the demands of the industries, with informal and non-formal learning processes through smart technologies, and consistent with the need of workers and farmers.

JOACHIM DITTRICH, SANDRA PETERS-ERJAWETZ, UTA KÜHNE, and TELSCHE NIELSEN introduce new approaches to engineering education in the wind power sector in northern Germany. The wind power sector is in demand for an appropriately educated and trained workforce at both the skilled worker and the engineer levels. The authors describe an approach to enhancing the permeability between vocational and higher education in order to tackle the shortage in skilled labour. This approach has led to the development of a Bachelor program in wind power technology at the University of Applied Sciences in Bremerhaven in

cooperation with the Fraunhofer Institute for Wind Energy and Energy System Technology. The study program especially addresses students, who have a TVET-background and who are presently employed. The article provides information on the German wind power sector and its competence requirements and discusses experiences which derive from granting access to higher education for "non-traditional" students.

The authors HELEN KNIBB and CHRIS PACI present an analysis of the greening of Canada's college curriculum. Canada's colleges are adept at developing new skills training and educational programs to meet the challenge of responding to a greening economy, environmental sustainability and climate change. This paper explores how colleges are leading and responding with examples of: new programs and program modifications, curriculum innovation, new strategies for teaching and learning, new types of partnership and a vigorous applied research agenda. The authors identify three phases of development that characterize curriculum greening in Canada's colleges and institutes. Furthermore, the paper provides an overview of pan-Canadian college efforts to meet the skills needs of a greening economy. The underlying study focusses on the 137 publicly funded providers of technical/technology training; the colleges, cégeps, (Quebec's Collège d'enseignement général et professionnel), institutes, and polytechnics, which serve over 3,000 communities Canada wide.

MICHEL ZELIN describes a very distinctive perspective using the topic of greening technical and vocational education and training as the learning objective. His article on empowering green education in TVET through international project-based online competitions describes a highly innovative approach of financing and implementing an online-based learning organisation. The author is arguing that competitive online projects are the best way to spark students' interest in ecologically friendly production and in incorporating greening in TVET curricula. The article reviews the foundation, implementation, and a pilot trial at a community college level, of a free educational platform combining crowdsourcing, crowdfunding, and crowdgaming designed to conduct online learners' competitions. The competitions can be operated on a level of one class, school, or multiple school partners on an international level. Competitions involving international partners have great potential to engage students in learning the best environmentally safe and prudent processes.

NIC ROBINSON and DENISE BADEN in their article focus on embedding sustainability in the practice of trainee entrants to the hairdressing industry. They argue that there is currently little consideration of the environmental impact of practices within the hair and beauty sector. Hairdressers have the ability to build sustainable practices into the commercial operation of salons and to introduce sustainable practice to their clients. The article is based on a project where awareness of sustainable practice had been built into the Continuing Professional Development (CPD) opportunities for hairdressing tutors provided by UK awarding organisations. The project was conducted by Southampton University and funded by the Economic and Social Research Council (ERSC) and Vocational Training Charitable Trust (VTCT).

We wish you enlightening insights and enjoyable reading.

*The editors of Issue 6*

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