# 3<sup>rd</sup> International Symposium on Expertise in Sustainable Society

## 1    Introduction

The following paper provides a brief discussion of the 3<sup>rd</sup> International Symposium on Expertise in Sustainable Society (ISESS).

In the wake of the Japanese earthquake disaster, a number of Pacific Rim countries have shifted their focus to the sustainability sector to provide solutions to the on-going problems of the most densely populated places in the world. To highlight problems and showcase possible solutions the International Symposium on Expertise in Sustainable Society (ISESS) Conference was set up.

The ISESS was developed to provide a forum where professionals can discuss and analyse key issues affecting society and its sustainability.

The Symposium was organised by the South Eastern Regional College (SERC) and co-hosted with Toyama National College of Technology, Japan.

Please see Appendix 1 for a full list of the seminars held during the conference.

The following seminars may be of note to the work of the Committee:

## 2    Interactive Digital Media (IDM) – Mr Ming Fai Tang, Assistant Director with the Office of Learning Technologies, Temasek Polytechnic, Singapore

Temasek Polytechnic (TP) has modified its teaching methods to take into consideration changes in student learning.  Rather than focusing on information dissemination, the Polytechnic has adopted a "learn by doing" approach.

This change in methodology was adopted as a result of changes in technology, with most students able to access information via digital devices.  Tang argued that learning through discussion, practice and collaboration were more effective in light of the availability of information via the internet than more traditional learning via acquisition and inquiry.

In order to facilitate this method, Temasek Polytechnic has developed Personal Learning Environments (PLE):

- Based on the idea that learning will take place in different contexts and situations and will not be provided by a single learning provider;
- The PLE concept recognises that learning is a continual process and seeks to provide tools to support learning;
- Learners can use whatever tools and devices they want (such as laptops, tablets, smart phones, etc.);
- The PLE recognises the role of an individual in organising their own learning.

Temasek Polytechnic has developed an IDM based learning model in order to enable the PLE:

> *We focus on the use of IDM technologies by a community of self-directed learners engaged in the discovery and co-creation of content (knowledge), personalised to the learners abilities (or needs) that could be carried out anywhere, anytime and on any device.*

The IDM-in-education programme is powered by various learning systems that have been put in place:

- A learning management system acts as the integrating platform for learning technologies;
- A data centre and a redeveloped physical environment (with classrooms provided LAN access and multiple sockets for the charging of devices) enable IDM learning;
- Desktop virtualisation infrastructure supports student learning anywhere, anytime on any device; and
- An IT Service Management Centre was established to manage IT services that support lecturers and students in the use of technology for teaching learning.

Learning resources are accessible via a private, college operated Cloud.  This facilitates students being able to access learning materials wherever they are.

The IDM programme began in 2008, with further development planned up until 2015.

## 3 Development of teaching material for an eco-friendly approach in education – Professor Y. Naruse, Vice-President, Toyama National College of Technology, Japan.

Professor Naruse discussed the use of experimental and 'hands-on' activities as teaching methods in order to encourage students to develop their skills and acquire knowledge.  Students are:

> Required to develop their skills to set up a task and find its solution by themselves so it is necessary to develop a long-term continuous educational methodology, which encourages these skills to develop through all stages of education – from primary school to college.

The seminar focused on the use of robotic cars as a teaching resource. They were used at primary schools, junior high schools and Kosen colleges (National Technology Colleges).

Students needed to learn a number of tasks prior to running the car along a specially designed track.  Tasks included producing calculations for running time and energy use and consideration of issues such as how can a robotic car run with the least energy under given conditions.

As found by Professor Naruse:

> This research has revealed the process to be a useful learning material for both college students and university students because they are allowed to use control theory and optimal theory to investigate the results obtained by junior high and senior high school students who have used the same robotic car in their practical activities.

## 4 Blended learning pedagogy in a sustainable society – Dr Michael Malone, Mr Andrew Emmett and Ms Paula Philpott, SERC

This presentation from SERC discussed 'blended learning', a teaching method which has been adopted by the College.  Blended learning…:

> …combines the best features of good teaching and modern computer based learning materials to provide a learning environment that students now demand.

Blended learning has a number of benefits, including:

- Reduced costs, such as in printing documents for students;

- Reduced travel times;

- Room and equipment optimisation; and

- Offers flexible learning opportunities for a greater number of students.

However, the use of blended learning identified a number of concerns, including resources that lack interactivity and the need to invest in staff development in order to keep pace with changes in teaching practice.

In order to meet these challenges, SERC has developed a range of strategies. Two of the main approaches are the Virtual Learning Environment and Information and Learning Technology pedagogy mentoring.

- **Virtual Learning Environment (VLE):** The VLE, or MOODLE as it is known within the College, is managed by a dedicated team. It has two separate sections, one for students and the other for staff. MOODLE contains online learning support for students, including Wikis, forums, quizzes and computer marked assessment. Staff are encouraged to develop interactive learning material to maintain student interest. In addition, MOODLE encourages student engagement with the College via students responding to questions via mobile phone or PC, with the results displayed using a data projector. New content is developed by e-authors; and

- **Information and Learning Technology pedagogy mentoring:** This is a programme which focuses on the effective use of technology to support teaching and learning. Mentors focus on technologies that promote student engagement and independent learning. In addition a MOODLE toolkit of blended learning resources has also been developed.

The introduction of this system has resulted in a number of impacts at the College including:

- A significant improvement in the quality of lessons;

- Enhancement of the student learning experience – the programme was deemed 'Best Practice' by the Quality Assurance Agency (QAA);

- Improved student retention and achievement; and

- Improved access for students.

**Appendix 1:** Lectures and Seminars

- **Probabilistic distribution of fatigue lifetimes of the die cast magnesium alloy** – Professor Sotomi Ishihara, President of Toyama National College of Technology;

- **Energy Strategy for Japan** – Professor Nobuhiro Harada, Nagaoka University of Technology;

- **The challenges of a UK-Ireland integrated energy policy and infrastructure** – Professor Neil J Hewitt, University of Ulster;

- **Electric power generation using flow induced vibration** – professor Tsutomu Takahashi, Nagaoka University of Technology;

- **The status of the nuclear power industry in Japan and the need for a new radiation measurement system** – Professor Eiji Takada, Toyama National College of Technology;

- **Development of a model for a sustainable district energy system for industrial parks** – Daniel Cassidy, Limerick Institute of Technology;

- **Retrofit solutions to reduce energy usage in homes** – Paul Henry and John Ross, South Eastern Regional College

- **Social capital's role in the development of sustainable communities: A case study of a food cooperative** – John Reed and Adam Richards, Liverpool John Moore's University;

- **Greening the economy, greening economics: sustainability beyond orthodox economic growth** – Dr. John Barry, Queen's University Belfast;

- **Interactive Digital Media** – Ming Fai Tang, Temasek Polytechnic, Singapore;

- **Development of teaching material for an eco-friendly approach in education** – Professor Y. Naruse, Toyama National College of Technology;

- **Blended learning pedagogy in a sustainable society** – Dr. Michael Malone, Andrew Emmett and Paula Philpott, SERC;

- **Production and environmental application of calcium phosphate hybrid** – Associate Professor Masamoto Tafu, Toyama National College of Technology;

- **Development of the biogas industry in Northern Ireland** – Aaron Black, South West College;

- **HPC performance modelling and prediction tools: Costal engineering in Toyama Bay to cope with rising sea levels** – Associate Professor Shoichi Furuyama, Toyama National College of Technology;

- **Power-performance optimisation through dynamic core and frequency scaling on manycores** – Satoshi Imamura, Queen's University Belfast;

- **Passive house: an introduction** – Paul Henry and John Ross, SERC;

- **Integration of renewable generation onto the transmission and distribution network in Northern Ireland** – Raymond Smyth, NIE; and

- **A community energy monitoring system for Dundalk** – Dr John Loane. Dundalk Institute of Technology.