Promotion of Sustainability in Postgraduate Education and Research

ProSPER.Net

ProSPER.Net:

Transforming Higher Education and Creating Sustainable Societies

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Institute for the Advanced Study of Sustainability

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Foreword

This book provides an important contribution to the recognition of the role of education and research to a more sustainable future. By mid-century, the world will be very different from today and changes will happen at an ever faster speed. Therefore, innovation and creativity are considered key to learning in the 21st century, and we must reflect on a vision of education and learning that needs to be promoted beyond 2015 across the educational spectrum. The view that education fulfils a much broader function in empowering children, and adults alike, to become active participants in the transformation of their societies must gain momentum. Every human being needs to acquire the knowledge, skills, attitudes, and values necessary to shape a sustainable future. Education is key to achieve this.

As the lead agency for the implementation of the United Nations Decade of Education for Sustainable Development (UNDESD), the United Nations Educational, Scientific and Cultural Organization (UNESCO) and its Regional Science Bureau, recognize the relevance of this publication in documenting achievements in the advancement of education for sustainable development (ESD) in higher education in the Asia-Pacific region. The mission of ProSPER.Net, to strengthen the concept and understanding of sustainable development in higher education, aligns with the UNDESD goals of reorienting curricula and strengthening the capacity of educators.

Higher education institutions play a vital role in strengthening the ESD knowledge base and developing innovative approaches. The activities documented in this publication illustrate the importance of developing collaborative networks towards multiplying successful initiatives in ESD, and help to raise public awareness around sustainability. In presenting the achievements of ProSPER.Net, this publication identifies ways forward for enhancing sustainability in higher education in terms of policy influence, development and implementation.

As the UNDESD draws to a close, the 2014 UNESCO World Conference on ESD will reflect on key findings from research, policy development and programme implementation throughout the Decade. We should take stock of the achievements and outcomes of this Decade for Asia and the Pacific region, and reflect on a successor programme, regionally and globally. During the Rio+20 Summit, Member States agreed "to promote ESD and to integrate sustainable development more actively into education beyond the Decade of ESD". Future initiatives, such as the Global Action Programme (GAP) on ESD led by UNESCO, to be adopted and implemented beyond 2014, could be well served by the experiences and outcomes from the ProsPER Network through shared priority areas related to policy support, a whole-institution approach, educators, youth, and local communities.

Hubert Gijzen, PhD
Director
UNESCO Regional Science Bureau for Asia and the Pacific
UNESCO Representative to Brunei Darussalam, Indonesia, Malaysia, the Philippines, and Timor Leste

11 July, 2014

The Government of Japan has long been a strong supporter of ESD having proposed the Decade of Education for Sustainable Development (2005-2014) in the Johannesburg Plan of Implementation, adopted by the UN General Assembly in 2002.

The Ministry of the Environment of Japan has championed ESD domestically through implementing laws, policies and projects, and internationally through UN agencies like United Nations University (UNU). Major initiatives supported by Japan on ESD through UNU include the networking of ESD stakeholders through the global initiative Regional Centres of Expertise (RCEs) on ESD, and the Promotion of Sustainability in Postgraduate Education and Research Network (ProSPER.Net), a regional network of leading higher education institutions in Asia and the Pacific.

Over the years, since its launching in 2008, ProSPER.Net has been active and robust in the pursuit of its vision on sustainability and mission to transform higher education institutions. The Ministry has closely partnered with the UNU Institute for the Advanced Study of Sustainability (UNU-IAS) in enabling ProSPER.Net and contributing to sustainability change processes occurring in member institutions. The Ministry also initiated a review of ProSPER.Net after three years of existence, and commissioned UNU-IAS to conduct the study, which at its conclusion revealed the network's achievements, challenges and put forth recommendations for ways forward. It is important to recognize that the development of the ProSPER.Net Strategy and Roadmap was inspired and ushered in by the three-year review, and formulated by network members themselves. This spirit of cooperation among partners and members of ProSPER.Net emboldened the network to continue focused work towards transforming higher education and creating sustainable societies.

This commemorative publication, which the Ministry is proud to be part of, demonstrates the core of ESD, where multiple stakeholders collaborate for actions and, by the same token, government and academia work together in innovative ways for creating sustainable societies. It also documents the development, achievements and future directions of ProSPER.Net, and is immensely significant and timely as the ESD global community celebrates UNDESD's conclusion.

UN Member States reached consensus at the Rio+20 Conference that even after the end of UNDESD in 2014, ESD must be facilitated. In this regard, the Ministry of the Environment of Japan stands with other partners to continue supporting this critical human endeavour, which includes the organization of the 2014 UNESCO World Conference on ESD in Aichi-Nagoya, Japan.
As part of a community working on ESD, I truly hope that ProSPER.Net will further expand its network activities through supporting the transformation of higher education institutions around the world, and driving the ambitions of UNDESD into the future.

Tomokatsu Kitagawa
Senior Vice-Minister
Ministry of the Environment of Japan

14 June, 2014

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Preface

This commemorative publication, entitled "Transforming Higher Education and Creating Sustainable Societies", reflects the birth, history and contributions of ProSPER.Net, the Promotion of Sustainability in Postgraduate Education and Research Network. The ProSPER.Net alliance embodies the collective determination of like-minded, leading higher education institutions in Asia and the Pacific in pursuit of sustainable development.

The Future We Want outcome of the Rio+20 Conference recognized, inter alia, that younger generations are the custodians of the future, and that there is a need to improve the capacity of education systems to prepare people for the pursuit of sustainable development. This major educational goal must be realized through enhanced teacher trainings, the development of sustainability curricula and training programmes that prepare students for careers in fields related to sustainability. However, empowering higher education institutions requires change. As the signatories of the Higher Education Sustainability Initiative (HESI) Declaration stated, educational institutions have as a mission the promotion of sustainable development through research on and teaching of relevant sustainability-related concepts to create awareness, develop skills and nurture values that stimulate integrated knowledge and innovation. Higher education institutions should also commit to enhancing green campus initiatives, supporting sustainability efforts in communities, and engaging with and sharing results through international frameworks. UNU was one of the UN agencies that initiated the HESI movement. ProSPER.Net and several of its member institutions also endorsed and signed the declaration.

It is thus opportune that this special publication, attuned to global sustainability goals, is released in the year when the UNU Institute for the Advanced Study of Sustainability (UNU-IAS) is formed through the consolidation of two former UNU research and training units: the UNU Institute of Advanced Studies and the UNU Institute for Sustainability and Peace. The mission of UNU-IAS is to advance efforts towards a more sustainable future for all, through policy-relevant research and capacity development focused on sustainability and its social, economic, and environmental dimensions. The institute serves the international community, making significant and innovative contributions to high-level policymaking and key UN debates.

Readers will find this publication of immense relevance to creating sustainable societies by way of fostering change toward sustainability in higher education and research. It is a collective effort by members of the ProSPER.Net community, with contributions reflecting lessons learnt from network activities and projects. It is hoped that the readers will also find this book a valuable resource for learning processes regarding sustainability in higher education and research, and for institutions wanting to change. As implementation of the Global Action Programme on Education for Sustainable Development is set to launch following the formal end of the UN Decade of Education for Sustainable Development in 2014, ProSPER.Net continues to thrive and dedicate its aspirations to further transforming higher education institutions.

Kazuhiko Takemoto
Director
United Nations University
Institute for the Advanced Study of Sustainability

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ProSPER.Net Members

ProSPER.Net is developing a new generation of leaders who can best tackle global sustainability challenges in the face of rapid environmental degradation. By changing the way higher education institutions teach students about sustainability, ProSPER.Net improves the ways in which future professionals manage sustainability issues across a wide variety of disciplines.

There are currently 32 ProSPER.Net members, spread throughout Asia-Pacific, each having strong education and research programmes dedicated to sustainable development and related fields. Together, they work towards a common cause: creating multidisciplinary solutions to respond to a wide range of sustainable development challenges.

AUSTRALIA
RMIT University

CHINA
Institute of Applied Ecology – Chinese Academy of Sciences
Tongji University

INDIA
TERI University

INDONESIA
Universitas Indonesia
Universitas Andalas Indonesia
Universitas Gadjah Mada

JAPAN
Chubu University
Hokkaido University
Hosei University
Iwate University
Keio University
Miyagi University of Education
Nagoya University
Okayama University
Rikkyo University
Shinshu University
Tohoku University
University of Tokyo
Yokohama National University

KOREA
Yonsei University

MALAYSIA
Universiti Sains Malaysia

PHILLIPINES
University of the Phillipines

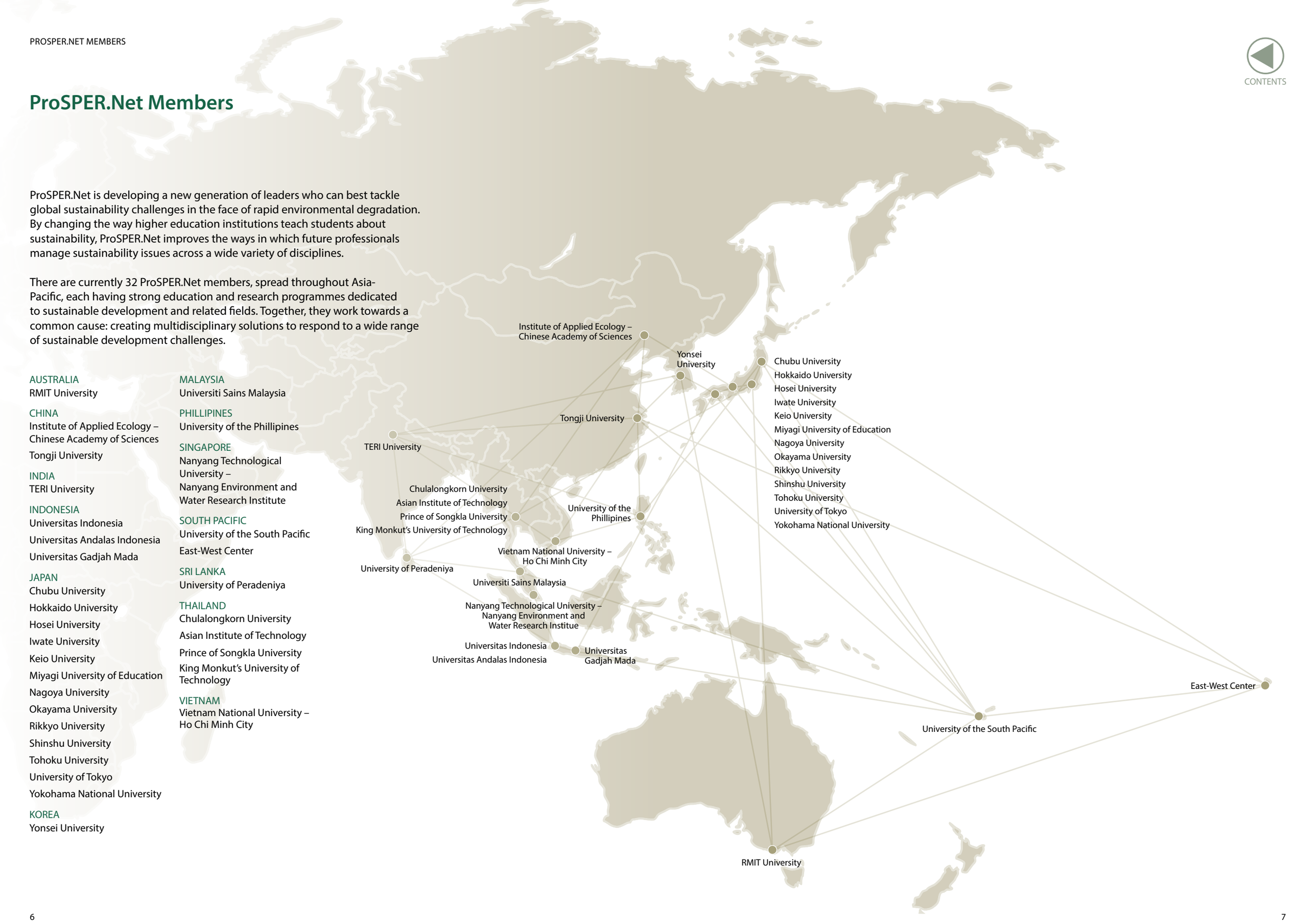
SINGAPORE
Nanyang Technological University – Nanyang Environment and Water Research Institute

SOUTH PACIFIC
University of the South Pacific
East-West Center

SRI LANKA
University of Peradeniya

THAILAND
Chulalongkorn University
Asian Institute of Technology
Prince of Songkla University
King Monkut's University of Technology

VIETNAM
Vietnam National University – Ho Chi Minh City



Editorial

It is undeniable that the world has changed. The introduction of communication technologies and advancements in transportation systems, particularly air travel, have compressed time and space. These changes are characterized as "the ongoing multi-faceted transformation of the parameters of the human condition"[1]. As many scholars who have discussed globalization and its consequences attest, it is a phenomenon that aggregates as much as it separates, that homogenizes and accentuates singularities while economies internationalize, and the everyday movement of people and goods also increase.

This global process also permeates the realm of knowledge production and demands for international cooperation. "Denationalization", meaning "the reframing of scopes of vision, and institutional structures and strategies to cultivate linkages beyond the national scale"[2], have affected education systems, and in particular, higher education. Evidences of these can be seen in the expansion of influence and of connections with knowledge centres in other countries, exchanges of research analysis and outputs, and sharing of complementary resources.

This is not a novelty per se, considering that international exchanges, or bilateral agreements in the form of memoranda of understanding between universities exist and were very much encouraged in the past to enrich educational and research outcomes, while elevating the profile of the institutions, attracting faculty and students. In this context, the emergence of networks, academic alliances, associations or similar types of arrangements was a natural development, congregating higher education institutions around different objectives that normally ranged around open academic exchange, sometimes in specific fields[3]. Networking in education can also be seen as a strategy for and source of innovation, generation of knowledge and institutional change[4].

However, the enabling technologies that made instant communication and presence a reality, coupled with the demands concerning social, economic and environmental dimensions of our current world, produce new dynamics and scales in which society has to operate. At the same time, the expansion of human knowledge, growing aspirations for improvement in quality of life and sustainable development are paramount forces in society that drive a growing quest for change. In a way, it is imperative to redefine learning systems, processes and contents across formal and non-formal education sectors that support the creation of sustainable societies.

Universities thus play a crucial role in nurturing professionals who possess the skills and knowledge to cope with increasingly complex, transdisciplinary and cross-border problems, whose combination makes it even more important for these higher education institutions to transform the way knowledge is generated and shared. They need to develop abilities that allow the current generation to understand, empathize and practice collective values and principles that can guide one to lead quality lives, respecting the natural limitations of the planet.

Against this background, sustainability-oriented initiatives in education were created, and ProSPER.Net, the Promotion of Sustainability in Postgraduate Education and Research Network, emerged from an international agenda that started at the World Conference on Sustainable Development (Rio 92) with the elaboration of Agenda 21, more specifically, Chapter 36, that emphasized the importance of public awareness, education and training to achieve sustainable development.

After that, the World Summit on Sustainable Development (WSSD) held in 2002 in Johannesburg included the proposal of the UNDESD to be implemented from 2005 to 2014, later adopted by the UN General Assembly in December 2002. It was also at WSSD that the UNU, together with other leading educational and scientific organizations, spearheaded an international initiative for ESD establishing the Ubuntu Alliance. This was based on the Ubuntu Declaration on Education and Science and Technology for Sustainable Development aimed at strengthening collaborative efforts among members in science and technology education for sustainable development[5].

In addition to this initiative and as a response to this international movement that placed education at the heart of the necessary transformations that enabled all of us to create awareness and change towards more sustainable practices in a lifelong learning process, in 2003 UNU created the ESD Programme at the UNU Institute for the Advanced Study of Sustainability (UNU-IAS)[6], with financial support provided by the Ministry of the Environment of Japan (MOE-J).

In a way, it is imperative to redefine learning systems, processes and contents across formal and non-formal education sectors that support the creation of sustainable societies.

At the time, a conjunction of factors came into place for ProSPER.Net to be established. One of the ESD Programme's goals is to contribute to the transformation of higher education, and the creation of an alliance of higher education institutions was under discussion at UNU-IAS. MOE-J was also developing a strategic plan to foster sustainability leaders in Asia, consolidated in the Environmental Leadership Initiatives for Asian Sustainability (ELIAS), a vision set forth by Japan in the 2006 Action Plan for the UNDESD. It is worth noting that the Action Plan stresses "the importance of implementing sustainable development programmes at higher education institutions as a first step"[7]. The combination of efforts towards the same direction provided the grounds for the creation of ProSPER.Net in 2008, as one of the ESD Programme's initiatives to foster ESD in higher education.

It is a fact that other academic networks are also setting sustainability as the main focus of their activities, primarily characterized by sharing experiences, promoting sustainable practices regarding campus operations, developing tools to measure sustainability performance – which is the case of the North American Association for the Advancement of Sustainability in Higher Education (AASHE) – and others like the United Kingdom Environmental Association for Universities and Colleges (EAUC), and the Copernicus Alliance[8]. Among this plethora of network initiatives in the area of sustainability in higher education, ProSPER.Net is somewhat unique in the sense that while promoting a multilateral platform for academic exchange, what other networks have been doing, it goes beyond the sharing of practices and aims to integrate sustainability into postgraduate curricula. Through actual implementation of projects, ProSPER.Net generates knowledge, develops capacity-building activities and influences policies in ESD, which are the main contributions of the ESD Programme at UNU-IAS for the implementation of the UNDESD. These are also reflected in ProSPER.Net activities, as the network members collaboratively design and undertake research projects, produce training materials and jointly offer capacity-building programmes such as the ProSPER.Net Young Researchers' School and the ProSPER.Net Leadership Programme.

Over the years, ProSPER.Net has been shaping its identity as a network that is translating global priorities into tangible activities within the sphere of its influence, the Asia-Pacific region, and also locally, throughout its various members. With a variety of subject matters and the interconnectedness of problems sprawling through different sectors and involving various stakeholders, ProSPER.Net projects that look into integration of sustainability in the curricula and production of

[1] Bauman, Z., 1998, *Globalization – The Human Consequences*, p. 2.

[2] Olds, K., "Associations, Networks, Alliances, etc: Making Sense of the Emerging Global Higher Education Landscape", p. 3. Available at http://www.iau-aiu.net/conferences/Mexico2009/pdf/Paper_Olds.pdf

[3] For additional insights and analysis regarding international cooperation in higher education, see Beerkens, E., "International Inter-Organisational Arrangements in Higher Education: Towards a Typology", *Tertiary Education and Management*; and Beerkens, E. & Derwende, M., "The Paradox in International Cooperation: Institutionally Embedded Universities in a Global Environment".

[4] OECD 2003, *Networks of Innovation: Towards New Models for Managing Schools and Systems*.

[5] The original Ubuntu Alliance members are UNU, UNESCO, International Association of Universities (IAU), Third World Academy of Sciences (TWAS), African Academy of Science (AAS), Science Council of Asia (SCA), International Council for Science (ICSU), World Federation of Engineering Organizations (WFEO), Copernicus Alliance (formerly Copernicus-Campus), Global Higher Education for Sustainability Partnership (GHESP), University Leaders for a Sustainable Future (ULSF). Three other members joined the Alliance after 2006: UNEP, International Union for Conservation of Nature (IUCN) and Association of African Universities (AAU). The Ubuntu Declaration is available at http://www.scj.go.jp/en/sca/activities/conferences/ubuntu.html

[6] UNU-IAS originally stood for UNU Institute of Advanced Studies (UNU-IAS). As of 1 January 2014, UNU-IAS was merged with the UNU Institute for Sustainability and Peace (UNU-ISP), forming a new UNU Institute for the Advanced Study of Sustainability (UNU-IAS).

[7] See summarized version of ELIAS document at http://www.env.go.jp/earth/coop/coop/english/cai/pdf/elias_asia_jinzai_e.pdf

[8] There are several other sustainability-focused academic networks, such as the Australasian Campuses Towards Sustainability (ACTS) in Australia and New Zealand, the Korean Association for Green Campus Initiative (KAGCI), the Mainstreaming Environment and Sustainability in African Universities (MESA), under the auspices of the United Nations Environmental Programme (UNEP), and others.

learning materials range from business to biodiversity, built environment, social entrepreneurship, sustainable consumption and production, health and Asian food traditions.

Some projects are also capturing the intersections between distinct fields, for instance, businesses and climate change that can be related through diverse impacts caused by unsustainable practices. Capacity development activities focus on young researchers experiencing sustainability challenges and local solutions in a multidisciplinary and multicultural environment, instigating human values through practicums that highlight university-community engagement activities. Given that early training is much required, especially for future generations of professionals, a leadership programme was designed, bringing together not only early career researchers and faculty, but young professionals from the public and private sectors, as well as from civil society. This is part of ProSPER.Net's efforts to bridge institutional gaps that hinder the integration of sustainability in higher education activities and contributes to the introduction of pedagogical innovations that are tied with sustainable development demands for complex problem-solving through interdisciplinary and multi-stakeholder approaches.

In 2009 the ProSPER.Net-Scopus Young Scientist Award was also created, addressing the need for more applied research in sustainable development. This is a partnership that involves Elsevier and the Alexander von Humboldt Foundation, and contributes to the recognition of top researchers in Asia who are going beyond their laboratories to potentially impact local communities with innovative scientific approaches that can improve communities' livelihoods. These are snapshots of the various activities that ProSPER.Net is developing with members and in partnership with other networks and institutions that will be further detailed in the respective chapters of this book.

The implementation of all these network activities brings a series of challenges, especially that of coordinating and fomenting an array of diverse projects. Any successful undertaking, especially one that is carried out within different countries, cannot be expected to self-develop without any degree of intervention or facilitation. UNU-IAS played a crucial role in keeping the vigour of several initiatives, but the current stage of ProSPER.Net's development most certainly denotes the level of commitment from ProSPER.Net members as well as the support from the MOE-J, which is the main donor of the ESD Programme. Leading members for projects as well as host institutions for all ProSPER.Net programmes were also fundamental for the successful implementation of several ProSPER.Net initiatives.

The impact of ProSPER.Net, as with any educational venture, is to be considered with a long-term perspective, although broadening the understanding of what sustainable development means and the implications for research and local communities, as well as communication skills, inclusive dialogue with multicultural and multidisciplinary perspective, are some visible changes that could be readily noticed in the short term from general feedback, especially from participants of capacity-building programmes.

As the end of the UNDESD approaches and the future of ProSPER.Net is seen in light of the Global Action Programme (GAP) on ESD approved by UNESCO as a follow-up to the UNDESD after 2014[9], it is possible to affirm that the foundations created by ProSPER.Net in the past years are solid and will enable the network to continue its activities, especially when considering the GAP five priority action areas, which are: policy support that includes the integration of ESD in the curricula; a whole-institution approach that promotes transformations in curricula and encompasses campus operations and peer-to-peer learning through inter-institutional networks; capacity-building of educators; empowering youth as change agents for sustainable development; and multi-stakeholder learning that privileges local community engagement and development.

In this regard, ProSPER.Net promotes the integration of sustainability in the curricula and thus the reorientation of teaching methodologies through curriculum development. It also implements differentiated capacity-building activities that function as a learning process for all involved. ProSPER.Net has also improved its governance capabilities, strengthened the monitoring and evaluation

[9] See UNESCO, General Conference, 37th Session, Proposal for a Global Action Programme on Education for Sustainable Development as Follow-up to the United Nations Decade of Education for Sustainable Development (DESD) after 2014. Available at *http://unesdoc.unesco.org/images/0022/002243/224368e.pdf*

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of research projects, and designed programmes aimed at building capacity of young researchers as future leaders, enhancing communication skills, increasing the understanding of sustainability, and creating platforms for multi-stakeholder dialogue conducive to participatory decision-making processes. Without a doubt, with this range and depth of activities, ProSPER.Net contributed to the implementation of the UNDESD in Asia-Pacific and is in the position of renewing its mandate after 2014 to continue its role in addressing the challenges of further integrating sustainability in all higher education activities, as well as attending to a post-2015 global development agenda that underlies education as one of the priorities to achieve sustainable development.

This book is a documentation of ProSPER.Net activities and research projects since the network was established in June 2008. It offers an overview of the work being carried out jointly by the ProSPER.Net Secretariat and ProSPER.Net members, showcasing the various achievements with insights regarding project development, challenges, outputs, lessons learned, policy implications and eventual ways to lead the initiative further. The editors hope that this compilation may serve as an inspiration for others to follow or join the network and engage with ProSPER.Net in spreading the message of sustainability within other higher education institutions across Asia-Pacific and beyond.

Aurea Christine Tanaka (UNU-IAS) and
Mario Tabucanon (UNU-IAS)

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Networking for ESD: ProSPER.Net's History and Future

Mario Tabucanon *(UNU-IAS)* and Aurea Christine Tanaka *(UNU-IAS)*

The ProSPER.Net alliance was founded in 2008 in response to the UNDESD and the uneven social, environmental and economic realities in Asia and the Pacific. By staying true to its core mission and vision, ProSPER.Net has flourished, producing concrete outputs through network governance, joint activities, and promotion and resource generation efforts. It has, in one way or another, influenced sustainability change processes throughout the region, especially in its member institutions. Despite this success, challenges still lie ahead. Now is a key time for reflection and for the examination of lessons learned from network experiences. Already, one thing has clearly emerged: ProSPER.Net has made significant impacts and is now poised to further contribute to transforming higher education by harnessing its potential as a network. ProSPER.Net looks forward to contributing to the implementation of the Global Action Programme (GAP) on Education for Sustainable Development, which will come into effect post-2014.

Origins

The ESD Programme of UNU-IAS carries out research, mobilization and capacity-building for the integration of ESD principles and components into formal and non-formal education curricula. The programme's four strategic goals are to advance ESD through multi-stakeholder initiatives; to contribute to the transformation of higher education; to contribute to international ESD-related actions; and to advance ESD knowledge.

In order to tackle the second component on transformation of higher education, UNU-IAS and 18 leading higher education institutions (HEIs) in the Asia-Pacific region[1], with the support of partner organizations[2], conceived the creation of a network dedicated to the Promotion of Sustainability in Postgraduate Education and Research (ProSPER.Net). The founding institutions affirmed their commitments to be part of an alliance to work together on promoting and mainstreaming the sustainability paradigm for institutional transformations in view of the need to create sustainable societies.

ProSPER.Net is a response to a fast-changing world in the 21st century, characterized by challenges of unprecedented proportions. The growing global population is expected to continue using and consuming more natural resources than before to achieve economic growth, with a persistent trend to imperil moral social values and degrade the environment. This unfortunate situation is what "green economy" aims to address and untangle – the decoupling of economic prosperity with environmental degradation and social inequities. These problems demand a long-term solution, spanning generations, and must be tackled by all sectors of society in concert. The consensus is that ESD is one of the most relevant answers to this dilemma, especially in the context of envisioning and designing a pathway towards creating sustainable societies. Though there is general agreement that ESD is one of the most effective ways forward, instilling the concepts of sustainable development into peoples' minds and hearts, and nurturing it into cultural values, is a daunting task. Higher education institutions have important roles to play in this defining human cause, particularly their contribution to building capacity, knowledge production and dissemination, as well as devising ways to apply scientific findings in a complex and dynamic reality. Higher education institutions can thus bring the world closer to the ultimate goal of creating sustainable societies and improved quality of life.

Within this chapter, ProSPER.Net contributions to delivering international ESD-related actions and advancing ESD knowledge through capacity-building and research will be described. Current ProSPER.Net engagements include capacity-building for educators, researchers, and government policymakers. Education and research activities of the network include those in the thematic areas of business, engineering and the built environment, biodiversity, health and food traditions, sustainable production and consumption, and sustainability assessment. Efforts towards improving network governance and involving members in building a strategic plan for the future will also be highlighted. The goal is to increase ownership and commitment and to stimulate implementation of ESD-related research projects and learning programmes throughout the region in partnership with a variety of stakeholders, from HEIs to international organizations, local communities and the private sector.

Network Historical Development – Context and Process

ProSPER.Net was inspired by regional policymakers' calls for producing a new cadre of leaders for Asian sustainability while cognizant of the need to strengthen higher education for sustainable development and the importance of networking to help HEIs face the challenges of rapid and uneven growth in the Asia-Pacific region. In 2007, UNU-IAS initiated discussions around an alliance of leading HEIs in the region to promote the sustainability paradigm in postgraduate education and research with the overarching mission to transform HEIs.

On 19-20 November 2007, an inception meeting was hosted by UNU-IAS in Yokohama, Japan, with 11 HEIs that had a history of collaboration with UNU[3], as well as partner organizations including the Ministry of the Environment of Japan (MOE-J). Participants at the meeting mapped out a strategy and designed a pathway towards establishing what would become ProSPER.Net. Under the leadership of UNU-IAS, the group developed the concept upon which the network charter was framed and the by-laws formulated. The timing was opportune since MOE-J was also shaping its own Environmental Leadership Initiatives for Asian Sustainability (ELIAS) and both the UNU-IAS and MOE-J initiatives shared a similar vision. Participants agreed by consensus to name the network the Promotion of Sustainability in Postgraduate Education and Research Network with the acronym ProSPER.Net; UNU-IAS would function as the network's Secretariat. Then they were invited to develop joint projects, aligned with the purpose of the network, which addressed the goal of integrating the sustainability paradigm into postgraduate courses, curricula and research.

On 5-6 March 2008, an organizational meeting was held in Yokohama where further discussions on proposed joint projects were held and the by-laws finalized. It was at this meeting where planning for the launch of the network commenced. By this time, the number of participating HEIs had risen from 11 to 18[4]. Three joint projects were initially identified, namely Integrating Sustainable Development in Business School Curricula, Developing a Postgraduate Curriculum on Public Policy and Sustainable Development, and Training, Education and Awareness Programme for Researchers and Educators of Sustainability.
The implementation of these inaugural joint projects generated seminal ideas for future projects. The final organizational meeting was held on 19 June 2008 followed by the first meeting of the network's General Assembly on 20 June. At that meeting, ProSPER.Net members elected their Board and the inaugural meeting of the Board was held subsequently[5].

It was on 21 June 2008 in Sapporo, Japan where representatives of all founding member institutions and partner organizations gathered for the official launching of ProSPER.Net. The auspicious event was held in conjunction with Hokkaido University's Sustainability Week 2008, as part of the celebratory activities leading to the G-8 Summit held in Hokkaido in early July of that same year. The heads of the founding member institutions or their representatives expressed their strong commitments to the newly-born alliance and formally approved the network's concept note, charter and by-laws.

Great collective efforts were invested in the shaping and functioning of the alliance, but the vital question was then and is now how to make the network not only sustain but also thrive through the cooperation and dedication of its members and partners. The network has withstood the test of time. Six years have now passed and as the formal end of the UN Decade on Education for Sustainable Development (UNDESD) approaches, the alliance has continued to grow and is getting stronger.

[1] The 18 founding universities are RMIT University, Tongji University, TERI University, Universitas Gadjah Mada, The University of Tokyo, Hokkaido University, Iwate University, Nagoya University, Okayama University, Miyagi University of Education, Rikkyo University, Shinshu University, Universiti Sains Malaysia, University of the Philippines, Yonsei University, Chulalungkorn University, Asian Institute of Technology and University of the South Pacific.

[2] The partners who were present at the launching were: Ministry of the Environment of Japan; Department of the Environment of Australia; United Nations Environment Programme; Institute for Global Environmental Strategies; and Elsevier Japan.

[3] RMIT University, Tongji University, TERI University, Universitas Gadjah Mada, The University of Tokyo, Hokkaido University, Nagoya University, Universiti Sains Malaysia, University of the Philippines, Yonsei University, and Asian Institute of Technology.

[4] The seven institutions that joined are Iwate University, Okayama University, Miyagi University of Education, Rikkyo University, Shinshu University, Chulalongkorn University, and University of the South Pacific.

[5] The first institutional Board members were RMIT University, Tongji University, TERI University, Hokkaido University, The University of Tokyo, Universiti Sains Malaysia, Yonsei University, Asian Institute of Technology, University of the South Pacific, and UNU-IAS (ex-officio). The governance and management functions of the network are vested in the Board by the General Assembly.

Challenges and Opportunities

The Asia-Pacific region, home to more than half of the world's population, is vast, with great diversity in terms of geography, culture, economies and societies. While the region has the largest and most populous countries, it also has some of the smallest and least populated ones, most of them vulnerable to disasters caused by increasing environmental degradation and climate change[6]. The region comprises developed, developing, and least developed countries, with more than 70 per cent of the population living on less than one US dollar a day. The region already hosts half of the urban population in the world and by 2025, it is expected that the number of mega-cities in Asia-Pacific will increase[7]. If left unchecked, the growing population is expected to consume increasing amounts of natural resources to achieve economic growth, with negative consequences for the environment.

The challenges facing Asia-Pacific can be seen as a great opportunity for nations to change their development pattern, fully integrating sustainable development (SD) and ESD concepts in policies, development strategies and project implementation. The transformative push incumbent upon HEIs is reflected in their important role of imparting the sustainability paradigm upon society and in integrating the notion into educational programmes and systems. HEIs are knowledge providers and their potential to effectuate societal changes should be recognized and stimulated. School systems may potentially reach out to HEIs for inspiration, guidance and learning spaces for the advancement of knowledge that can create a more sustainable future[8].

Higher education institutions are thus in a position to lead by example, practicing what they preach through reform of their own curricula to inspire and for others to emulate. Course designs and the systemic structuring of curricula should be attuned to sustainability principles. This demonstration of leadership can trickle down to other school systems through teachers and other professionals who received formal education under the reformed curricula. Higher education institutions ought to also invest in embedding ESD in non-degree and degree courses to impress upon working professionals the importance of sustainability; professionals can then further apply the notion throughout their careers. These courses, increasingly offered as online programmes, should be tailored to cater to agents of change in non-formal and informal education sectors, embracing the training-the-trainers strategy to enhance multiplying effects.

The quest for knowledge is a perpetual process, and so are societies' aspirations for attaining a better quality of life. New knowledge creation and the applications to societal problems are integral to the functionality of higher education institutions. New analytical tools and techniques that accommodate consideration of sustainability issues must be continuously developed. Important and vital research issues must be vigorously addressed, including research questions such as how to improve efficiency in the utilization of resources, how to search for innovative methods of environmental protection, how to develop comprehensive assessment indicators based on the distinct pillars of sustainability, and how to find new approaches towards the rational use of the planet's resources for the benefit of all. There is no question that research and education are intertwined and need to be viewed holistically.

Building academic alliances for promoting the sustainability paradigm in postgraduate education and research can and should enhance the global ESD effort. The strategy optimizes the use of resources as well as reduces or eliminates duplications. The "sharing of resources and knowledge" and "learning from each other" approaches are important ingredients of success. Collaborative alliances that initially were focusing exclusively on economic development can no longer ignore sustainability considerations. Higher education institutions are beginning to respond to this trend. There is a need to facilitate collaboration among universities to assist the process of university modernization, mutual learning between regions and peoples, and understanding between cultures.

[6] According to UN-Water, from 2000 to 2006, more than 83 per cent of disasters occurred in Asia. A total of 2,163 water-related disasters were reported globally, killing more than 290,000 people, affecting more than 1.5 billion people and inflicting more than USD 422 billion of damage. Source: UN-Water, *www.unwater.org*

[7] United Nations, Department of Economic and Social Affairs, Population Division, World Urbanization Prospects, The 2011 Revision.

[8] In this regard, it is worth mentioning another flagship initiative by the ESD Programme at UNU-IAS: the multi-stakeholder initiative on Regional Centres of Expertise (RCE) on ESD. A number of ProSPER.Net member institutions are either assuming leading roles or participating in RCE activities. An RCE is a network of existing formal and non-formal education organizations mobilized to deliver ESD in the region or locality where it is situated. It creates a platform for dialogue among regional/local ESD stakeholders to exchange information, experience and good practices on ESD. It develops a regional/local knowledge base and assists in promoting vertical alignment of curricula from primary through university education and in linking formal and non-formal sectors of the education community. RCEs work together in a network fashion forming the so-called Global Learning Space for ESD, which is a visible output of the UNDESD. In this regard, ProSPER.Net functions in collaboration with relevant RCEs in the Asia-Pacific region. For more information on recent RCE activities, consult the 7th Global RCE Conference – Regional Centres of Expertise on Education for Sustainable Development, UNU-IAS, 2013; and the 8th Global RCE Conference – Regional Centres of Expertise on Education for Sustainable Development, UNU-IAS, 2014.

ProSPER.Net at a Glance

Mission and Vision

ProSPER.Net helps transform higher education institutions, creating a community that can play a leading role in societal transformation for sustainable development. This unique academic alliance, through its members and partners in Asia-Pacific and beyond, helps transform knowledge institutions, introducing innovation in governance, education, research, and outreach, to produce a new generation of leaders equipped with the knowledge and skills required to build sustainable societies. Through its various network activities, ProSPER.Net integrates sustainability in curricula, capacity development, and policy influence. With these set goals at its core, ProSPER.Net has steadily increased its membership base and has significantly contributed to change processes in member organizations.

TERI University (Box 1), a founding member, has witnessed the cooperative growth of the network. The involvement of its faculty members and students in ProSPER.Net activities has raised the level of enthusiasm of the whole institution on sustainability issues.

ProSPER.Net served as a useful tool for Hokkaido University (Box 2) to raise interest in sustainability in higher education, specifically through a leadership role in the joint sustainability learning tool project entitled Alternative University Appraisal (AUA), later renamed SUSTAIN (Sustainability Appraisal for Academic Institutions). Many faculty and students learned of the university's annual sustainability week celebration through the lens of ProSPER.Net.

Active participation in ProSPER.Net activities, such as hosting the 2011 ProSPER.Net Young Researchers' School (YRS) deepened Hosei University's understanding of the network's mission to transform higher education institutions (Box 3). In fact, the YRS served as a driver for more meaningful connections within the university to deliver the programme with transdisciplinary and integrated perspectives.

Yonsei University (Box 4) has praised ProSPER.Net's approach toward providing network members flexibility and opportunity to propose and promote creative ideas for collaborative initiatives. It has learned from its ProSPER.Net experiences in projects and research activities and has contributed significantly to the network.

Prince of Songkla University (Box 5) attributed its boost in sustainability initiatives to its membership in ProSPER.Net. The network has enabled the university to widen interdisciplinary collaboration and allowed it to expand its own network in Southeast Asia, which is focused on assuring sustainability in research and education and inspired by ProSPER.Net.

ProSPER.Net has provided opportunities for Tohoku University and Shinshu University (Box 6) to participate in collaborative projects with other member institutions. Shinshu University was a participant in the first Business Curriculum project while Tohoku University offered to pilot the dialogue phase of the ESD learning tool created by the AUA/SUSTAIN project.

Box 1. **TERI University**

TERI University is privileged to be a member of the network for education for sustainable development, ProSPER.Net. I, personally, have been associated with this unique initiative ever since the first conceptualization workshop held in Yokohama in 2007. It has been a tremendous learning experience to see this network grow from just a few members to more than 30 today, and more importantly, grow in terms of the richness of discussions among its members, and the more tangible outputs – the successful collaborative projects. There is an excitement among the students at TERI University when they talk about the initiatives of this network – the Young Researchers' School and the Leadership Programme – which they look forward to every year. ProSPER.Net has inspired a large number of universities and schools of higher education in the Asia-Pacific region to look at their curriculum again through a sustainability lens. This, I am sure, will go a

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long way in building capacity to find innovative and holistic solutions to the myriad of problems the world faces today.

Gp Capt Rajiv Seth (Ret'd)
Dean (Admin) and Registrar
Professor of Finance
TERI University

Box 2. **Hokkaido University**

Hokkaido University is honoured to be one of the founding members of ProSPER.Net and to have hosted the launching ceremony at our Sapporo Campus in June, 2008. The strong support from ProSPER.Net members enabled us to twice hold a position on the ProSPER.Net Board. This confidence extended to Hokkaido University to lead the AUA project, work on a faculty development project, as well as a Summer School project. All of these opportunities served as a driving force to enhance awareness of ESD at Hokkaido University and resulted in increased participation in our annual Sustainability Weeks programme.

During Sustainability Weeks, our faculty and students host approximately 40 events including symposia, exhibitions, and discussion opportunities centred on a particular theme. In 2013, the theme was "Learning for a Sustainable Future" and we received more than 59,000 participants from Japan and abroad. We believe many of these participants came to know of our Sustainability Weeks programme through ProSPER.Net. The network and its members are a great source of wealth for us as we continue to work toward realizing a sustainable society.

Hokkaido University
Office of International Affairs

Box 3. **Hosei University**

After being introduced to ProSPER.Net activities by UNESCO, Hosei University applied to join the network and became a member in 2010. We saw it as a network of committed higher education institutions working on collaborative research projects, and thus prepared to set up an international cooperation committee at our graduate school, with the tacit understanding that it would become another academic arm for scholarship exchange among concerned researchers. We found out, however, that the network is more than just another academic network. It pursues curriculum reform to integrate the sustainability agenda into postgraduate courses as well as research in the area of sustainable development. This finding led us to reflect on our education and research activities that had been vertically divided so that such transboundary issues like sustainability would be pursued in perhaps more appropriate ways. This was particularly challenging at Hosei University since the only transboundary research institution in this field – the Hosei Research Institute of Sustainability – was destined to disappear in a few years. Hosting the ProSPER.Net Young Researchers' School at that time provided a great opportunity for the university to expand internal collaboration across vertical divisions, enhance cooperation among young researchers and senior scholars, and to begin the search for a similar kind of consortium within the campus. The latter was especially important so that vertically organized disciplinary teaching and research activities could be more meaningfully integrated thereby creating a transboundary teaching curriculum and encouraging holistic research activities.

As of 2014, this internal initiative has yet to bear fruit. Our only research institute for sustainability experienced severe budget and personnel cuts, but the fact it survived at all is probably due to ProSPER.Net membership. Moreover, a significant change that occurred is the acceptance of students from diversified departments and different universities in our graduate courses. Slowly but steadily, loosely organized transboundary teaching and research activities are winning recognition within the university and moving toward the direction we desire: a research and teaching consortium for sustainability within and beyond our campus. While facing the challenges at Hosei University to transform teaching and research activities that have been traditionally organized in a vertical system, ProSPER.Net participation has proven to be a significant networking opportunity that has helped us stimulate disciplinary strength with transboundary cooperation. Indeed, our experience proves that taking part in the network is a small step with big implications for the university's future.

Yuji Suzuki
Professor, Department of Global Politics
Hosei University

Box 4. **Yonsei University**
ProSPER.Net is a great international community by which nominal SD issues can finally spread wings and become realized. ProSPER.Net keeps a balanced approach between research and practice, and also in terms of participating institutions. The organization is well represented by Asia-Pacific countries and goes through a very democratic process in selecting new members. Over the years, the membership process is more competitive and in this regard, Yonsei University is proud of being a founding member.

Yonsei University has a high level of commitment to SD issues and its dissemination through research. As the only Korean higher education institution in ProSPER.Net so far, Yonsei University has tried to function as a linchpin between domestic organizations and the international SD community. Yonsei University is now well known as a champion of sustainability values and has learned a lot by participating in ProSPER.Net's activities and research projects, as much as it has contributed to its development. The best part of the ProSPER.Net alliance is that member institutions have flexibility and creativity to suggest and choose project themes. Once the topics are chosen, member institutions volunteer to be a part of the project. This is a very creative way of working on cutting-edge and innovative research. ProSPER.Net is a truly wonderful future-oriented international academic community and is sustaining the sustainability agenda in Asia-Pacific.

T. J. Lah
Associate Professor
Department of Public Administration
Yonsei University

Box 5. **Prince of Songkla University**
The guiding principle of the Prince of Songkla University (PSU), established in 1967 as the first university in southern Thailand, is "Our Soul is for the Benefit of Mankind". When PSU became a ProSPER.Net member on 9 July 2012, many new SD projects were implemented, and previous ones were strengthened or expanded.

The Green Research Certificate (GRC) project instills in graduates a sense of responsibility for society and environment, ensuring students take into consideration environmental sustainability, societal responsibility, and eco-efficiency in their research. The certification process evaluates each research proposal's environmental aspects and anticipated impact, while taking into account international concerns, national and university policies, and faculty mandates.

Three new programmes integrating SD in the curricula are offered in Community Ecotourism, Sustainable Energy Management and Earth System Environment and Adaptation for Sustainability (ESEAS). Also, newly established research units provide services to communities for economic improvement and increased sustainability. In 2014, PSU also initiated a "one faculty one strong community" policy that resulted in several faculties becoming involved in various sustainable community development in the region.

These projects have increased the environmental consciousness of PSU students and improved connections between PSU academics and the local community. ProSPER.Net membership allowed PSU to widen its collaboration and helped it initiate, in May 2013, a new collaborative network named ASSUREnet: Assuring Sustainability via University with Research, which deals with sustainable development in the areas of earth systems, energy and environmental problem-solving. PSU will continue making great strides in its SD-oriented programmes, research and community services, together with other ProSPER.Net members.

Assoc. Prof. Dr. Chusak Limsakul
President
Prince of Songkla University

Box 6. **Shinshu University and Tohoku University**
I have the rather unusual experience of having been involved with ProSPER.Net at two universities. It was at Shinshu University that I first became a network member. We were introducing a new Masters course providing a Management of Technology (MOT) degree founded on environmental sustainability, with the support of the Ministry of the Environment. ProSPER.Net helped by supporting our background research on how business schools were dealing with sustainability in the UK; this was very helpful in developing the new curriculum for the new degree. In 2008, ProSPER.Net also supported a very useful workshop at the Asian Institute of Technology on teaching sustainability in business schools, and we were able to contribute to this project too.

In April 2012, I joined the Environment Leader Training Programme at Tohoku University and in July that year, Tohoku University became a member of ProSPER.Net. As a new member, we were very keen to participate in network activities and we collaborated on Hokkaido University's AUA project. The AUA project started within ProSPER.Net in June 2009 with the goal of supporting universities in their advancement of education for sustainable development activities. This project developed a methodology for evaluating performance in sustainable development education, and for creating a learning community where practitioners could share their experience and learn from each other. Tohoku University volunteered to provide the AUA evaluation team with a pilot study in December 2012. It was beneficial to both the institution being appraised and the appraisal team.

Being a member of ProSPER.Net has also supported our bilateral relationships with some of the other member universities, and we were happy to join the special meeting organized by the Prince of Songkla University in May 2013 looking at research for sustainability under the ASSUREnet project. I and my colleagues at Tohoku University Graduate School for Environmental Studies look forward to continued collaboration in the ProSPER.Net framework both within the network organization itself and with individual members.

Michael Norton
Professor, Graduate School of Environmental Studies
Tohoku University

Integration of Sustainability in Curricula
Integration of sustainability in curricula may take various forms, sometimes dwelling on the introduction of SD and ESD general courses as either mandatory or elective in curricula. This type of work is already happening at many ProSPER.Net universities, such as at AIT, Tongji University and Universitas Gadjah Mada. The integration can also take the form of SD-related specialized courses in sciences and engineering. Research, being an integral component of higher education, also ought to advance sustainability. A more advanced and deeper level of integration is when individual courses are embedded with SD issues, and sustainability is mainstreamed in programme policies in respect to content, conduct and decision-making. This is not to say, however, that these programme and institutional sustainability processes have to be delivered as a ProSPER.Net joint project. The expectation is that members introduce these sustainability changes by themselves having subscribed to the principles of engagement adopted by the network. In fact, ProSPER.Net membership is open not to beginners but to institutions that are already engaged and have some experience in these sorts of processes. This way, ProSPER.Net membership further bonds the top active institutions in the region.

As for network projects, integration of sustainability in curricula has been addressed in postgraduate degree offerings in business, engineering and the built environment, biodiversity, health, and in the assessment of sustainability in HEIs. New courses on sustainability have been introduced by some member institutions either as a result of project development or participation in the network, and ESD has been mainstreamed in certain academic courses and programmes[9]. Network projects of this kind are expected to increase in the years ahead. Even without independent external funding, network projects could harness individual resources while working in a network fashion. ProSPER.Net initiatives are aligned with the UNDESD thrust of reorienting existing education programmes. By targeting postgraduate education, the initiatives bear fruit by way of trickling down to tertiary, secondary and primary sectors, through new academic leaders and teachers that were educated or trained under the new education paradigm. As soon as these models of change created through ProSPER.Net projects are felt to have demonstrated success, the domino effect would continue within the ProSPER.Net community and hopefully beyond.

Capacity Development
Capacity development is a response to the UNDESD thrust of public awareness and training-of-trainers in all sectors of society. At the degree level, graduate students, especially doctoral students who are future leaders in their respective fields, are invited to participate in an intensive two-week programme where they are exposed to sustainability issues while developing their research skills. They also become a part of a growing network of students and young professionals working on sustainable development. The programme is known as the ProSPER.Net Young Researchers' School (YRS). It is offered annually under a rotating SD-related theme and in collaboration with the Green Talent programme of the German Federal Ministry of Education and Research. The YRS renders a multiplier effect as its alumni continue to propagate what they have gained at the workshop throughout their careers.

ProSPER.Net has also established the ProSPER.Net-Scopus Young Scientist Award in Sustainable Development (YSA) in collaboration with Elsevier and the Alexander von Humboldt Foundation, to recognize the work of young scientists and researchers in SD. The award was created in 2009 and its SD-related award categories change on a yearly basis. Eligible candidates are young scientists and researchers who obtained their PhD within a span of five years prior to the award year, who are also based in the Asia-Pacific region and made significant contributions to sustainable development. It is hoped that the award would provide inspiration and impetus to current and future scientists and researchers to work with sustainability-related projects.

The network is also implementing a "post-postgraduate" leadership programme for young and aspiring leaders through its ProSPER.Net Leadership Programme. This capacity development programme develops leadership skills conducive to knowledge management and application, and serves as a testing-ground for potential implementation through partnerships with local government, communities and the private sector, addressing the lack of opportunity to further local sustainable development and influence policy and decision-makers. The idea is also to further enhance the growing network of researchers and young scholars, since participation is open and offered to YRS graduates, YSA winners and finalists, as well as young professional graduates from ProSPER.Net member universities.

Over the years, ProSPER.Net embarked on a number of differentiated capacity development projects, including an e-learning programme for government policymakers on SD, developing a faculty training manual on how to incorporate SD in courses and programmes, as well as development of pedagogies in poverty reduction. All of these successful initiatives will be elaborated upon in later chapters.

Policy Influence
The third component of ProSPER.Net's thrust is policy influence. As an academic network, ProSPER.Net is limited in terms of its ability to directly engage with policymakers. However, it is always exploring different avenues for influencing policy through education and research, such as through capacity development, contributing to the international agenda, influencing institutional policies and providing a forum for ample discussions with a wide range of stakeholders.

In terms of capacity development and as described in the previous section, ProSPER.Net has been offering a leadership programme targeting young academics and professionals to further their leadership skills and prepare them for potential future engagements with policy processes. The network also developed an e-learning programme targeting policymakers directly, providing them knowledge about sustainable development and its cross-sector application. ProSPER.Net members also produced training materials comprised of learning cases in sustainable production and consumption that are being used for the annual ASEAN+3 Leadership Programme on Sustainable Production and Consumption, offered to senior officials of environment ministries and departments or related government agencies in the 10 ASEAN Member States and three dialogue partner countries of China, Japan, and the Republic of Korea. This programme is one of the activities in the implementation of the ASEAN Environmental Education Action Plan.

[9] See, for example, Chapter 3 on the integration of sustainability in business schools curricula.

[10] Some of the collaborating networks are: EcoLead, COPERNICUS Alliance, International Association of Universities (IAU), Global University Network for Innovation (GUNI), Regional University Consortium (RUC), Global University Partnership for Environmental Sustainability (GUPES), Mainstreaming Environment and Sustainability in African Universities (MESA), Association for the Advancement of Sustainability in Higher Education (AASHE), European Association for University Campuses (EAUC), Australian Campuses Towards Sustainability (ACTS), Higher Education Sustainability Initiative (HESI).

ProSPER.Net is also cooperating with similar networks[10] for sharing experiences and furthering the recognition of higher education as one fundamental component of building a sustainable future. In this regard, several networks joined forces to organize a side-event at the UN Conference on Sustainable Development in Rio de Janeiro (Rio+20), providing concrete inputs into the outcome document published as "The Future We Want". Indeed, paragraphs 229 to 235 are dedicated to education, transdisciplinary approach, research for innovation, sustainable campus operations, and the sharing of good practices, among other items[11]. In addition, ProSPER.Net and several of these networks endorsed the Higher Education Sustainability Initiative (HESI), initiated by UN Agencies, namely UNU, UNESCO, UNDESA, UN Global Compact and UNEP. More than 200 universities signed the Higher Education Declaration, which was a call for action for higher education institutions around the world[12]. HESI partners will gather once again during the UNESCO World Conference on ESD in November 2014 in Nagoya, Japan. Framed around the GAP proposed by UNESCO as a follow-up to the UNDESD, UNU and HESI partners will host the International Conference on Higher Education for Sustainable Development that aims to capture higher education contributions to the implementation of the UNDESD. ProSPER.Net members will actively participate in all these events[13].

The platform for discussions provided in the ProSPER.Net organizational meetings, comprised of two Board meetings and one General Assembly every year, involves the participation of high-level representatives from member universities. In these meetings, besides formal reports about network activities, the Secretariat has been steering the discussions to allow members to reflect upon network strategies and new projects to increase ownership and active participation. Indirectly, this collective thinking feeds back to member institutions, influencing institutional policies and further action towards improving bilateral or multilateral collaboration in sustainability-related projects and integration of sustainability in universities' programmes and activities.

With a view to expanding the discussions carried out in ProSPER.Net organizational meetings to a wider audience, the network also promotes an annual forum, the ProSPER.Net Forum on Sustainability in Higher Education, to share the network's accomplishments regarding the implementation of ESD in Asia-Pacific. Key experts are invited to contribute to these talks and provide new insights on general trends in sustainability in higher education in the region and beyond. At the first of these forums, hosted in 2013 by Universitas Gadjah Mada in Yogyakarta, Indonesia, the discussion centred on key issues, such as: major policy challenges and barriers in mainstreaming sustainability in higher education; how to overcome these challenges and barriers; how HEIs can influence policymaking for sustainability in higher education; and discussions around the post-2014 ESD framework content to strengthen policies for sustainability in higher education. ProSPER.Net members also shared experiences based on their own programmes as well as on ProSPER.Net joint projects.

Among some of the conclusions deriving from the first forum was the need to nurture future leaders, an aspiration that should be engrained in institutional and national policies. Students must be educated to solve societal problems and thus curricula must contain community service-type courses. Also, sustainable development cannot only be mandated; it has to be practiced. In some countries there is no real link between sustainable development and higher education.

Another aspect raised by participants is that universities should be seen as partners in development processes, not just as knowledge providers. This would need commitment from top management that trickles down to the lower echelons of management, as well as the need for the embodiment of sustainability tenets and practices in policies and procedures of institutions. New reward systems for faculty and research staff should be introduced to embrace mainstreaming of sustainability. In terms of policy influence, HEIs must understand and speak the language of policymakers. Networking and linking with various stakeholders would pave the way for raising attention on sustainability in higher education.

A major conclusion was the recognition that for capacity-building no single curriculum can fit all situations. Sustainability challenges differ according to specific contexts, therefore tailor-made curricula is often the best approach to fit a target audience. When that is not possible, providing the means to understand and devise ways to adapt solutions to different localities should be considered. In this regard, ProSPER.Net has been providing specific platforms for the various stages of education and research in terms of postgraduate activities, and reaching out to graduate students, postdoctoral fellows, faculty members, researchers and high-level representatives of universities.

Outputs, Lessons Learned and Challenges

After six years, ProSPER.Net initiatives have produced tangible outputs and contributions toward the ambitions of the UNDESD. Reorientation of business school curricula was implemented in respective institutions as described in Chapter 3. The integration of sustainability in built environment curricula has developed a guide to share ways in which transformations can be fostered in the field, according to what is discussed in Chapter 4. Capacity-building projects such as the YRS and the leadership programme have produced trained individuals and raised the awareness of trainers who are making contributions to their organizations and to society at large (Chapters 9 and 10). A tool for sustainability appraisal for academic institutions was developed and used by member universities to promote further discussions and thinking on how to advance the integration of ESD into all of universities' activities, as can be seen in Chapter 11. Training materials were developed to introduce faculty members and researchers to sustainability thinking, as presented in Chapter 7. An e-learning programme in sustainable development for policymakers was designed and provided a unique experience to faculty and students alike, according to Chapter 6.

The results of these projects and activities can be viewed on the ProSPER.Net portal, *prospernet.ias.unu.edu*, which is a virtual space that also provides related publications, news and other ProSPER.Net related information. This is part of the outreach efforts carried out by the network's Secretariat, but also motivated by ProSPER.Net members, who wanted to share with a wider audience the work that has been done within the collaborative alliance.

The network must be robust and have a strong governance system in order for it to make a marked difference through its initiatives into the future. It must have a portfolio of innovative and game-changing network activities, and be active in promotion and resource generation to fuel its joint activities.
Three years ago, ProSPER.Net members embarked on a review process of what had been done until that point in time and to look into ways to further develop the network. Generally, the outcomes of this process demonstrate a concern around how to make the network – its governance, activities, promotion, and resource generation – even more responsive to attaining its vision and mission.

The three-year review process was conducted by a UNU-IAS task force that used a survey to gather views of ProSPER.Net members. It revealed important findings such as the importance of making ProSPER.Net objectives clear to members and sharing this common understanding adequately. Institutional change to integrate sustainability into lectures and curricula in graduate schools, which is the original objective of ProSPER.Net, had not yet been fully accomplished, and therefore there is a need to reconfirm the objectives of ProSPER.Net. The network also needs to clarify and recognize its strengths compared to other sectoral approaches and aspire to enhance linkages with other international networks. Other findings that were gathered were the need for transparency of decision-making, securing participation at the management level of the institution, enhancing quality assurance of joint projects, and stressing the importance of strategically increasing the quality and number of member institutions.

This review process made constructive recommendations against the backdrop of the task force's findings. The overarching recommendation was on re-emphasizing and reaffirming the ultimate goal of the network, which is "transformation to integrate a sustainability agenda into courses, curricula and programmes of higher education institutions" and focus its future development on this central mission. Other recommendations were to emphasize network strength, clarifying and sharing fundamental objectives, enhancing collaboration with regional networks that pursue similar objectives, improving international visibility, mainstreaming SD and ESD internally at member institutions, promoting more joint projects, and strengthening network governance. These recommendations, learning from the past and projecting into the future, have become the bases for the ProSPER.Net roadmap.

[11] United Nations, The Future We Want.

[12] The Declaration and information about signatories and endorsing institutions can be found at http://sustainabledevelopment.un.org/index.php?menu=1073

[13] More information can be found at http://ias.unu.edu/en/events/upcoming/higher-education-for-sustainable-development-beyond-2014.html

After this process, the Secretariat promoted numerous Board discussions aimed at involving members in the construction of a roadmap based on the general findings of the three-year review process. Three strategic areas were identified: governance, activities, and promotion and resource generation. Respective actions were then listed in each of these areas. Some of the recommendations described therein were already incorporated in ProSPER.Net's activities. For instance, the suggestion to hold side-events together with organizational meetings was being done within the ProSPER.Net Forum on Sustainability in Higher Education. Below is a summary of the discussions generated with Board members that formed the basis for the ProSPER.Net Strategy and Roadmap (see Chapter Annex).

Governance

To ensure good governance, it is important to establish clear, participatory and transparent decision-making, implementation and evaluation processes in an inclusive manner. The governance process can also be enhanced by establishing a system of e-governance, including utilizing contributions from members through the network website. Participation in governance need not only be confined to academic institutions; non-academic partners may also be solicited for advice and comments. It is also important to involve the top management of member institutions in the affairs of ProSPER.Net.

In expanding network membership, an effective approach would be for current members to proactively encourage potential ProSPER.Net members to join. Side events in conjunction with Board and General Assembly meetings for local universities, companies, and government agencies should be organized regularly. Inclusion of non-Board members as a criterion in project proposal evaluation could enhance wider involvement.

To improve the sharing of resources and expertise of members, it is necessary to adopt a mutual recognition of resource-sharing systems. Joint initiatives should be organized, such as the YRS, jointly-delivered training, curriculum development, joint programmes, and cooperation with other networks. It is also important to provide a platform for mobility of faculty, researchers and students, the latter enhanced through an agreed credit-transfer system.

Activities

Strategic areas of concern include: ideas for new projects, quality assurance and synergies among projects, linkages with other networks, and policy work. Members should also recognize their role in becoming a source of ideas for projects. Discussion forums on the ProSPER.Net portal are to be used to foster dialogue about new proposals, for structured discussion sessions as part of ProSPER.Net official meetings, for invitations to international and governmental agencies as well as NGOs, and to contribute ideas based on actual needs.

In terms of quality assurance, three elements are considered to be essential for sustainability-related projects: interdisciplinarity, problem-based and policy orientation, and the underlying assumptions clearly contained in projects. Projects shall be reviewed and evaluated; it is imperative that the process is simple and cost-effective, while being rigorous and keeping turn-around times short. In addition, the institutional context for projects should be clear so that it supports policy-related analysis, implications and recommendations.

Ideas for strategies regarding linkages with other networks involved: connecting the current ProSPER.Net portal to members' websites, developing other research and postgraduate education opportunities to exchange practices and to share common thrusts as regards ESD, selecting a small number of networks to communicate with their members about ProSPER.Net project outcomes, supporting mobility of postgraduate students and faculty with other networks, and seeking ways to collaborate with the global network of Regional Centres of Expertise on ESD, especially in terms of performance and operations.

For policy work, project proponents need to map the policy field within which they are working. In support of this activity, they must also create a framework to assist proponents in analysing and describing the policy field and invite relevant experts in policy analysis to exchange ideas and contribute to the discussion.

Promotion and Resource Generation

In terms of promoting ProSPER.Net, it would be desirable to: come up with publications from projects and convert them to newspapers and magazines for the wider readership; develop road shows and seminars; work collaboratively with other similar networks; have a ProSPER.Net channel on YouTube especially to feature films on important joint projects; create mandatory budgeting for dissemination in project proposal; find fits in relevant international conferences; hold side events using themes around current projects; and involve media in side events and have more press releases. It is also necessary to proactively send ProSPER.Net brochures, booklets and other promotional materials to donor agencies, businesses, banks, government agencies, and regional networks.

As for resource generation, it would help to do the following: engage a professional fundraiser or use institutional fundraisers for ProSPER.Net; take ProSPER.Net to business houses; invite businesses to ProSPER.Net Board meetings and other activities; involve businesses and donors in the YRS; tap corporate social responsibility funds within businesses; and participate in business forums. It would also be useful to compile cases of success stories in SD and ESD for showcasing and to encourage possible support.

Impact and Policy Implications

The intended impacts of ProSPER.Net initiatives are immediately realized. However, the desired transformative change that they may effectuate on institutions and the wider regional academic and scientific communities can only be felt over a longer period of time. For example, the joint projects on curricula are making immediate impacts since these outputs are part of the implementation process. Similarly, capacity development programmes are already producing trained personnel. The component that needs a longer gestation period is on policy influence, since knowledge does not automatically guarantee transformative change.

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In the long run, ProSPER.Net institutions themselves will become beacons of ESD and SD, transformed as institutions and serving as a source of inspiration for others to emulate. The curriculum-building initiatives would then become models for how to proceed with mainstreaming sustainability; capacity-building programmes would be instruments for learning and sharing of information as advocated in the UNDESD.

ProSPER.Net's initiatives have an overarching objective to generate inspiration for influence in policymaking that leads to policy changes. There may be three levels of policy influence on transforming higher education: at the department or faculty level, at the institutional level, and at the national level of higher education systems involving government policymakers. It is ProSPER.Net's article of faith to contribute to this transformation process.

The impacts of ProSPER.Net can be more pronounced if members expand the sharing of resources and expertise. Participatory processes that stimulate ownership and inclusiveness in governance and management are crucial to consolidate the network's momentum. Quality of the initiatives is also essential for the network to exert influence in changing processes regarding higher education. This is addressed from the instance when collaborative initiatives are proposed and is much reflected in the network's policies and procedures, especially for developing and assessing joint projects. These issues, as well as the sharing of responsibility and accountability, are the cornerstones upon which the network's impacts are realized and felt.

A wider impact may be constructed through network activities that emanate from innovative ideas and establish synergies across projects including linkages with similar undertakings carried out by other cooperative networks. All these activities should be translated into policy documents for more prominent impact. Finally, through information sharing, the level of recognition and visibility of ProSPER.Net in the international arena will certainly increase.

Ways Forward

The UNDESD envisioned "a world where everyone has the opportunity to benefit from education and learn the values, behaviours, and lifestyles required for a sustainable future and for positive societal transformation". As the Decade ends, the vision for ESD lives on. The GAP on ESD is due to take effect from 2015 and aims to mobilize education and learning to accelerate progress and scale up actions in all levels towards sustainable development. It will do this by reorienting and enhancing the role of education and learning in five priority action areas: advancing policy, transforming learning and training environments, building capacity of educators and trainers, empowering and mobilizing youth; and accelerating sustainable solutions at the local level.

ProSPER.Net, with its expanding membership, continues to fulfil its mission and aims to be a partner in the implementation of GAP on ESD. To be able to cope with future aspirations, it must be robust and effective. The network must sustain its participative, transparent and inclusive governance and spirit of accountability. Members should exercise leadership in sustainability and this should be reflected in programmes and actions both within the institution as well as externally, in cooperation with other ProSPER.Net members.

An enabling policy environment is crucial for mobilizing education and learning for sustainable development and the scaling up of ESD action in formal, non-formal and informal education. The various projects and initiatives of ProSPER.Net in curriculum development, capacity-building and in providing platforms and forums for sustainability processes are meant to support policymaking at all levels.

The whole-institution approach to ESD encompasses the reorientation of teaching content and methodology, but also other related aspects such as research, outreach, governance, and the process of decision-making in the institution. This approach is projected in the way higher education institutions are assessed. In this regard, ProSPER.Net undertook a joint project to develop a pragmatic and simple tool for institutions to reflect and act upon a pathway to sustainability. This tool may also be particularly useful for institutions just commencing their journey to sustainability.

More can be done to address the issue of strengthening the capacity of educators, trainers and other change agents to become learning facilitators for ESD. Transdisciplinary and interdisciplinary approaches are important components to be fostered in this regard and ProSPER.Net's guidelines for academics on how to integrate a sustainability paradigm in courses and research are useful tools that can assist implementation of a more integrated approach to learning and cooperation in joint research projects.

In terms of supporting the younger generation in their role as change agents for sustainable development through ESD, ProSPER.Net has a portfolio of regular activities to promote youth development, namely the YSA in SD, the YRS, and the ProSPER.Net Leadership Programme. All of these activities are hosted by ProSPER.Net members on a rotating basis and shall continue, perhaps expanding as models to be adopted by members in their own countries. They function as complementary capacity development activities and also stimulate transformations through the integration of innovative methodologies for learning in multidisciplinary environments.

ProSPER.Net also supports outreach activities as part of the whole-institution approach to sustainability. In this regard, network members are encouraged to involve local communities and stakeholders through participation in ESD and SD activities. For instance, further engagement between universities and local constituencies are explored in light of sustainability challenges and scientific contributions through field trips offered in ProSPER.Net capacity-building programmes. In addition, projects such as the one looking into innovative methodologies for capacity development in poverty reduction aim at providing opportunities for working professionals to pursue complementary education that can assist local communities in seeking simple and alternative solutions for their socioeconomic and environmental issues[14]. These types of educational approaches can be scaled up and transferred to other contexts and have significant potential to improve the livelihoods of communities.

While the official implementation of GAP on ESD is yet to commence, ProSPER.Net's past and ongoing activities are already in line with GAP's priority areas and these activities will be maintained and further expanded in the future. ProSPER.Net's aim reflects a global pathway to transform higher education for the creation of sustainable societies.

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[14] See Chapter 8 about the poverty reduction project

Chapter Annex:
ProSPER.Net Strategies and Roadmap

Introduction
ProSPER.Net has made significant achievements during its initial years of existence as clearly demonstrated by the findings of the 3-year review commissioned by UNU-IAS. The review provided recommendations deemed useful for developing a strategy and a roadmap for the network, in close consultation with the ProSPER.Net Board.

During the 10th Board Meeting held at TERI University, Board Members discussed strategies to achieve identified goals in three areas: governance, network activities and promotion and resource generation. This document, in addition to reinforcing ProSPER.Net aspirations, is the result of the findings contained in the 3-year review report and recommendations by Board Members, comprising various strategic elements and a roadmap for the network.

ProSPER.Net Vision
ProSPER.Net aims to create a community of institutions of higher learning that plays a leading role in societal transformation for sustainable development. Towards this end, as a unique academic alliance, ProSPER.Net strives to transform knowledge institutions, through its members and partners in Asia- Pacific and beyond, introducing innovation in governance, education, research, and outreach, and thus producing a new cadre of leaders equipped with the knowledge and skills required to build sustainable societies.

Strategic Focus Areas
The strategic foci are aligned with the specific recommendations of the 3-year review. These are clustered into three main objectives:

I – Strengthen Governance and Accountability

A) Improve decision-making process through transparent and inclusive process aimed at achieving network objectives

B) Implementation of monitoring and evaluation process of all network activities

C) Share resources and expertise

II – Enhance Network Activities

D) Promote innovative research, methodologies and pedagogies through projects and other activities

E) Influence policy for higher education

F) Enhance collaboration with other networks sharing similar objectives

III – Promotion and Resource Generation

G) International recognition of ProSPER.Net

H) Enhance network sustainability

I) Improve information sharing among and within member institutions

For each of these objectives, strategic actions were recommended by Board Members during the 10th ProSPER.Net Board Meeting. All of the suggestions are included in the next section's table.

Roadmap
The following table provides the objectives, strategies, indicators and timelines for progress assessment regarding the implementation of the strategies described in this document. It is recommended that the Board creates a committee that will present periodic progress reports to the Board and in other relevant meetings, so that the objectives, strategies and roadmap are constantly revisited and new actions are appropriately proposed.

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Strategic Focus Areas		Strategic objectives	Strategic actions recommended by the Board	Indicators	Timelines
Governance and Accountability	**Sub-areas** 1. Improve decision-making process through transparent and inclusive process aimed at achieving network objectives 2. Implementation of monitoring and evaluation process of all network activities 3. Share resources and expertise	Share responsibility and ownership for network activities	Establish a decision-making, implementation and evaluation process Establish an e-governance system Involve the top management of member institutions Establish a working group or committee dealing with ProSPER.Net within the member institution chaired by the leadership of the institution (e.g. president or designate)	Involvement of a maximum number of member institutions as possible, and participation of institution heads/top administration in network activities	Ongoing process
		Ensure quality of network activities	Review and evaluate projects Identify names and contact details of potential peer reviewers from member institutions for joint projects.	Achievement of all project objectives and successful and sustainable implementation of results.	Ongoing process
		Expand the network and involve all including non-Board members	Current members encourage potential members to apply and provide guidance Continue the practice of side events in conjunction with Board/General Assembly meetings for local institutes	Target of 50 members Participation of non-Board members in joint projects Successful organization of ProSPER.Net Forum on Sustainability in Higher Education and Young Scientist Award Symposium	by 2014
		Improve the sharing of resources and expertise	Adopt a mutual recognition of resource-sharing system (Learn from Erasmus Mundus and Copernicus Alliance networks resource-sharing programmes) Organize joint initiatives with other networks Provide a platform for mobility of faculty, researchers and students	Creation of database of experts, including YSA winners that may facilitate exchange of faculty and researchers as well as joint research supervision Mutual recognition of credits and eventual recognition of credits for network activities such as the YRS	Ongoing process
Network Activities	**Sub-areas** 1. Promote innovative research, methodologies and pedagogies through projects and other activities 2. Influence policy for higher education 3. Enhance collaboration with other networks sharing similar objectives	Generate new ideas for projects	Foster dialogue using the discussion forums in ProSPER.Net portal	New projects, in addition to the existent ones	New ideas for next Board meeting
		Establish synergies between projects	Encourage cross-project interaction in forums and meetings Harness synergies of joint projects	Coherent links between projects	Through ongoing projects (YRS)
		Improve links with other networks	Actively use the ProSPER.Net portal Make a symbol in members' websites to link with the ProSPER.Net portal Link with websites of other networks Develop research and postgraduate education opportunities to exchange practices Select networks to communicate about ProSPER.Net project Support mobility of postgraduate students and faculty with other networks Collaborate with RCE community	Concrete collaborations with other networks	Ongoing process
		Transform current work into policy documents	Project proponents to map the policy field they are working in Include policy aspects in all joint projects and map science to policy	Policy papers	All projects to contribute starting in 2013
Promotion and Resource Generation	**Sub-areas** 1. International recognition of ProSPER.Net 2. Enhance network sustainability 3. Improve information sharing among and within member institutions	Improve ProSPER.Net's international recognition and visibility	Encourage and compile information on refereed publications from projects, including journals and book chapter Convert project publications to newspapers and magazines, Road shows and seminars, piggy-back on other similar networks Create a ProSPER.Net channel on YouTube Mandatory budgeting for dissemination in project proposal Find fits in international conferences Hold side events with themes around current projects, Media involvement in side events More press releases, Disseminate promotional materials to donor agencies	Increasing number of members and collaboration with other regional and international networks	To be assessed every year
		Information sharing within member institutions	Develop a human-resource/expert data bank	Increasing participation of members in network activities/ joint projects	To be reported by members
		Develop an effective fundraising strategy	Engage a professional fund-raiser Integrate ProSPER.Net in own institutions' fundraising activities (use ProSPER.Net as a benefit for fundraising) Invite businesses to ProSPER.Net activities Invite businesses and donors in YRS through prizes Seek CSR funds of businesses Participate in business forums Compile cases of success stories in SD/ESD Use of media and members' own newsletters Expand mailing lists	Additional sources of funding	Follow-up in 2014

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Designing, Creating and Innovating for a Sustainable Future

Aurea Christine Tanaka *(UNU-IAS)* and Mario Tabucanon *(UNU-IAS)*

The annual ProSPER.Net-Scopus Young Scientist Award in Sustainable Development (YSA) is based on one fundamental idea: combining concrete contributions for improved levels of sustainable development with scientific achievements that have a potentially significant social impact. Since ProSPER.Net and its partners at Elsevier created the award in 2009, they have consistently identified accomplished young researchers who have been making the connections between their work and sustainable development, recognizing those who go beyond theories and experiments to implement viable solutions to improve people's lives. The award demonstrates ProSPER.Net's contribution to creating a conducive environment of scholarly inquiry for young scientists; an environment that promotes and nurtures originality, innovation and quality of practice for sustainable development.

Unlike other awards that are given periodically in specific areas, the categories for the YSA changes every year to reach different fields of expertise, following the idea that sustainability permeates all realms of knowledge and integrates knowledge from various disciplines. As such, the award has been given in business, agricultural and natural resources, science and technology, health, biodiversity, energy, water, sustainable infrastructure, and transport, to name a few. (For a comprehensive list of categories and winners, see Table 1).

The winners and eligible candidates are all recent PhD graduates, having completed their degree within a span of five years from the award year, and affiliated with Asia-Pacific institutions. A panel of three experts[1] for each category judge the nominees based on quality and number of publications, number of citations of the candidates' work, and evidence of the social impact of their research.

The Young Scientist Award recognizes researchers who go beyond academic work to design, create and innovate for a sustainable society. In this sense, one of its most important and positive spin-offs is the attention it has brought within the region to how research affects and fosters sustainable development. Through the award, ProSPER.Net is gradually creating a network of highly accomplished researchers who understand the need to integrate sustainability thinking in daily activities and who will most likely lead future transformations, introducing innovations and creating the foundation for a more sustainable lifestyle within local communities.

Asia in the Global Research Landscape

When the award was created in 2009, Asia had surpassed North America in number of published scientific articles, according to data extracted from SCImago, a tool developed by Elsevier based on data contained in Scopus (Table 2). The following year, Asia surpassed Western Europe and since then, Asia has been at the top of the three regions, with almost 100,000 more documents published in relation to Western Europe in 2012 and a little more than 150,000 compared to North America (Table 3).

Within Asia, the top four countries publishing scientific documents are China, Japan, India and South Korea (Table 4). Further analysis shows a stable pattern of publications for Japan, a slight increase in India and South Korea after 2009, and, since 2004, an exponential growth in the number of documents in China (Table 5). This incredible growth in Chinese figures certainly contributed to Asia's lead over Western Europe and North America.

It is worth noting that these are figures for all indexed research areas and they only reflect the quantity of research outputs, not necessarily quality. However, the numbers indicate that Asia is contributing to the global research landscape, though it still falls behind Western Europe and North America in terms of international collaborations involving more than one country (Table 6). It is even more interesting to compare the four top countries in Asia and see how the countries with a long-standing tradition in the research scene – namely Japan and South Korea – are also those that have been collaborating more with peers in other countries (Table 7).

Against this background, it seems a natural progression that, without exception, the YSA often receives the most applications from Chinese researchers. Researchers from India and Malaysia also rank high in terms of applications. Indeed, when looking at researchers' affiliations, not nationalities, China, India and Malaysia also appear at the top of the list (Tables 8 and 9).

These figures could be interpreted in various ways. It is possible that better dissemination efforts have been extended in these countries, or awards and recognitions

[1] Panellists are also affiliated with Asia-Pacific institutions and are either nominated by or chosen from among ProSPER.Net members.

are sought more in some countries as a way to obtain acknowledgment by international independent institutions, opening possibilities for career advancement and so on. Whichever is the case, the undeniable fact is that China has been attracting much attention by research analysts. According to a survey conducted by *Nature*, Japan and Australia are considered to currently have the greatest scientific impact in Asia but China tops the list of countries predicted to have the greatest impact in 2020[2].

Recognizing ProSPER.Net's work identifying top Asian researchers and the ascending position of Asia in the global research landscape, the German Federal Ministry of Education and Research approached the ProSPER.Net Secretariat with an offer of a fellowship for YSA winners. The fellowship would allow the winner to spend up to 18 months in any research institution in Germany. After this successful partnership was established in 2010, the Alexander von Humboldt Foundation through the German Federal Ministry of Education and Research expressed their interest in replacing the Ministry in offering the fellowship, given its primary mission of promoting academic cooperation between researchers from all over the world and Germany. A memorandum of understanding was signed with the Foundation in 2012 and since then the YSA winners receive a cash prize as well as the prestigious Foundation fellowship that offers the same conditions as the Ministry's initial fellowship or allows them to collaborate with any research institution in Germany. ProSPER.Net is indeed honoured with these partnerships, which are a recognition and endorsement of the work that has been developed over the years.

From Laboratories to the Real World

In the past six years, 18 young scientists have been recognized by the YSA for their research. As the judging process involves a symposium where three finalists for each category present their work before their respective panels, the number of young scientists involved in the final round of screening surpasses 60, winners and runners-up included. The high quality of work often sparks challenging discussions among panellists. The format used for the screening, comprising a review of candidates' applications and a symposium with the opportunity for further interaction and specific questioning on various aspects of the finalists' work, has proven to be ideal to identify promising young leaders who are applying their research for the benefit of the communities in which they live.

The ProSPER.Net-Scopus Young Scientist Award Symposium is usually organized back to back with ProSPER.Net organizational meetings, namely the ProSPER.Net General Assembly and ProSPER.Net Board Meeting. Due to this arrangement, a different ProSPER.Net member usually hosts the symposium every year. As it is an event that gathers top experts and researchers in particular fields, panellists engage in a panel discussion to provide an overview of updates regarding top-notch research and policies related to their work. Since the finalists present their research, over the years ProSPER.Net has introduced a series of rules for the finalists' presentations. These rules help ensure that finalists provide relevant information, which panellists can easily judge and audience members can easily understand. The rules for presenters also help the young researchers improve their communication skills, especially their ability to summarize their ideas within a limited period of time and with minimal use of visual aids[3]. Prior to this type of coaching, finalists often presented lists of publications and conference papers, reading short bios about their extensive publication in peer-reviewed journals and other outlets. Although these are considered very important elements of the finalists' careers, ProSPER.Net panellists are not looking solely for academic impact, which is restricted to the scientific community. Instead, the panellists are after an understanding of scientific achievements in light of its meaningfulness for society.

While impossible to summarize the great work that all the 18 winners have been doing[4], some traits are common to them all: they are all working with innovative solutions that are changing people's lives, such as providing access to health care, ecosystem services from a less polluted environment, different sources of food, and clean water in disaster stricken areas. These outcomes ultimately promote social inclusion, improve overall livelihoods especially in poor local communities, and also encourage better understanding and utilization of natural resources.

Another aspect that is noticeable in many of the winners' work is awareness regarding the need to influence policy so that local solutions developed and successfully implemented in their communities can be scaled up and applied in other contexts. Several of them are already working with various stakeholders, including local governments, national governments, NGOs, the private sector, and international organizations, advising and providing scientific knowledge for policymaking processes. Some of the winners have also been working in other countries, taking their work across borders to help local communities struggling with similar problems in other parts of the world.

The main common feature is that all of them are a part of a change process in which scientists are invited to bridge the gap between research and application, to generate knowledge and dialogue with other stakeholders, translating the findings into relevant information to assist the formulation of policies, and ultimately contribute to more sustainable livelihoods.

Impact and the Future

"The ProSPER.Net-Scopus Young Scientist Award plays an important role in encouraging young talented researchers to work in sustainable development. There are not many avenues for recognition and support for young academics in this area; government and industry support is much more common for more obviously profitable areas of research," said Ed Cutrell, panellist of the Information and Communication Technology (ICT) for Sustainable Development category in 2011. "The Young Scientist Award is a small but important effort to recognize excellence in academic research in sustainable development, with the particular goal of recognizing work that has a real impact on people's lives."[5]

Cutrell's words summarize the views of the majority of panellists who have been working with the ProSPER.Net Secretariat on the YSA over the past five years. All of them are dedicated and enthusiastic, sparing their time to screen several applications each year and join the symposium where finalists present their work.

As the award categories change every year, it is difficult to assess the impact that the award has or the degree of the initiative's consolidation in terms of number of applications. Despite this challenge, the increasing inquiries about each year's award categories is a sign that the award is producing interest among young scientists. The symposium is an opportunity for finalists to meet with peers as well as established experts in their respective fields; it is a platform to share their work and expand their collaborations, a further point of attraction for potential candidates. In addition, the award fellowship from the Alexander von Humboldt Foundation offers an ideal infrastructure for winners to carry out research work in collaboration with German institutions.

As science evolves and new research areas and topics emerge, the global research landscape also changes and the YSA's open model of awarding different categories every year is an ideal way to keep the research agenda attuned to contemporary and complex problems, recognizing innovative work, novel technologies and optimal solutions for the pressing challenges of current times.

[2] Van Noorden, R., 'Science on the Move', p. 328.

[3] Although the rules for the YSA presentations slightly differ, the introduction of the rules was inspired by the Australian 3-minute thesis competition, an activity whereby researchers present an outline of their research in three minutes using one slide. It is aimed at an educated but non-specialist audience and graded according to three criteria: clarity of presentation, comprehension and the engaging nature of the research. ProSPER.Net has been successfully running this activity in the ProSPER.Net Young Researchers' School, with great results to build communication skills. For more information, see Chapter 9.

[4] For more details on winners' work, please see specific articles that were published about each year's award.

[5] In Tanaka, A.C., 'Rewarding Scientific Knowledge for Sustainable Development'.

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Recently, in an attempt to establish synergies between several ProSPER.Net activities, YSA winners and finalists have been invited to participate in other programmes. For example, YSA finalists have joined the team of resource persons at the ProSPER.Net Young Researchers' School and have participated in the ProSPER.Net Leadership Programme, an advanced capacity-building activity for early-career researchers, young faculty, young professionals from public and private sectors, civil society, NGOs and other organizations[6]. With activities designed to bring different constituents together and with a strategic approach to furthering its networking potential, ProSPER.Net is steadily building a research environment that thrives with regional and international collaborations, with sustainability, applied research, and societal contribution as fundamental signposts for the future.

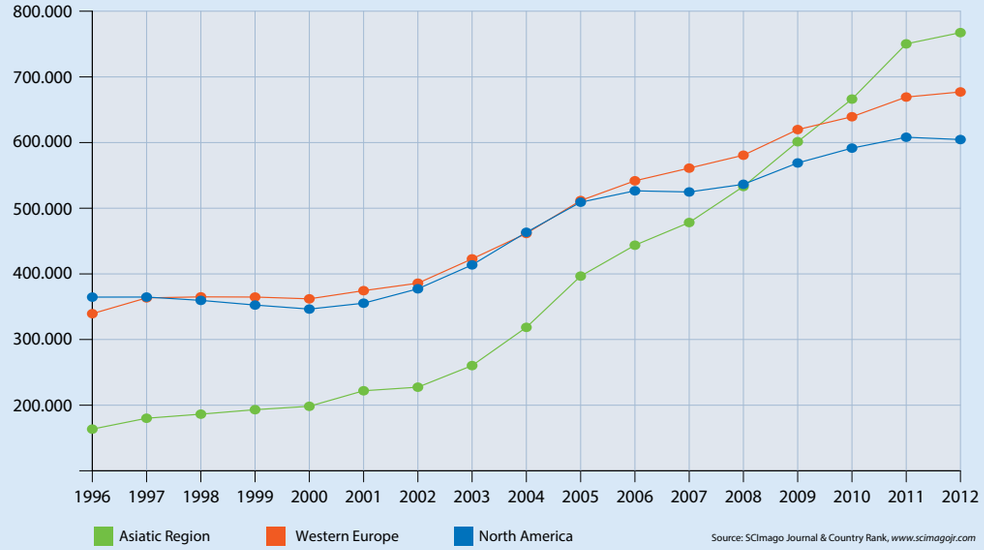
Table 1. **YSA Winners 2009-2014**

	Category	Winner	Affiliation
2009 YSA	Engineering and Technology	Jiang Yong Hu	National University of Singapore
	Agriculture and Natural Resources	Ian Charles	University of Western Sydney
	Business and Sustainable Development	Kee-Hung Lai	Hong Kong Polytechnic University
2010 YSA	Energy	S. Venkata Mohan	Indian Institute of Chemical Technology
	Water	Bingcai Pan	Nanjing University
	Agriculture and Food Security	Chin Ping Tan	Universiti Putra Malaysia
	Economics, Business and Management	Peng Zhou	Nanjing University of Aeronautics and Astronautics
2011 YSA	ICT for Sustainable Development	Arul Indrasen Chib	Nanyang Technological University, Singapore
	Science & Technology with a Focus on Poverty Eradication	Rajeev Bhat	Universiti Sains Malaysia
	Biodiversity and Natural Resource Management	Junguo Liu	Beijing Forestry University
2012 YSA	Sustainable Infrastructure	Tanapon Phenrat	Naresuan University, Thailand
	Sustainable Consumption and Production	Jun Yang	Chinese Academy of Sciences, Institute of Plant Physiology & Ecology
	Health with a focus on Poverty Eradication	Yodi Mahendradhata	Universitas Gadjah Mada, Indonesia
2013 YSA[7]	Transport	Liangfei Xu	Tsinghua University
	Water	Shi Lei	Nanyang Technological University, Singapore
2014 YSA	Disaster Risk Reduction	Riyanti Djalante	University of Haluoleo, Indonesia
	Sustainable Agriculture	Md Shafiquzzaman Siddiquee	Universiti Malaysia Sabah
	Waste	Jaya Narayan Sahu	Institut Teknologi Brunei

[6] For specific information on these programmes, please see the chapters on the ProSPER.Net Young Researchers' School and the ProSPER.Net Leadership Programme.

[7] In 2013, the award was also open for ICT for Sustainable Development, but despite numerous nominations, no winner was chosen.

Table 2. **Number of Documents published in Asia, Western Europe and North America from 1996 to 2012**



Source: SCImago Journal & Country Rank, *www.scimagojr.com*

Table 3. **Number of Documents published in Asia, Western Europe and North America from 1996 to 2012**

	Asiatic Region	Western Europe	North America
1996	163,495	339,383	364,640
1997	180,076	363,427	364,687
1998	186,372	365,024	359,685
1999	193,113	364,740	352,518
2000	198,361	361,920	346,333
2001	221,945	374,375	355,299
2002	227,403	385,809	377,306
2003	260,318	422,809	413,616
2004	318,524	461,570	463,282
2005	396,630	511,761	509,159
2006	443,652	541,747	526,445
2007	478,146	561,103	524,775
2008	533,060	580,780	536,431
2009	601,277	619,787	568,968
2010	666,208	639,242	591,487
2011	750,298	669,333	607,999
2012	767,503	677,115	604,484

Source: SCImago Journal & Country Rank, *www.scimagojr.com*

Table 4. **Top 15 Countries in Number of Documents and Citations from 1996 to 2012**

	Country	Documents	Citations
1	China	2,680,395	11,253,119
2	Japan	1,776,473	20,347,377
3	India	750,777	4,528,302
4	South Korea	578,625	4,640,390
5	Taiwan	398,720	3,259,864
6	Hong Kong	162,812	2,004,708
7	Singapore	149,509	1,616,952
8	Malaysia	99,187	356,918
9	Thailand	82,209	621,817
10	Pakistan	58,133	243,958
11	Indonesia	20,166	146,670
12	Bangladesh	19,481	115,329
13	Viet Nam	16,474	125,927
14	Philippines	13,163	141,070
15	Sri Lanka	8,239	61,175

Source: SCImago Journal & Country Rank, *www.scimagojr.com*

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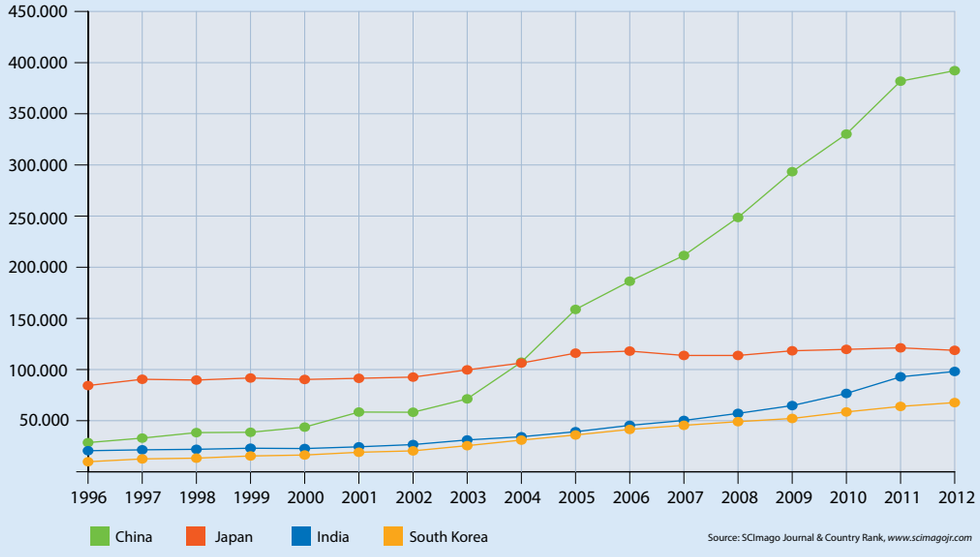
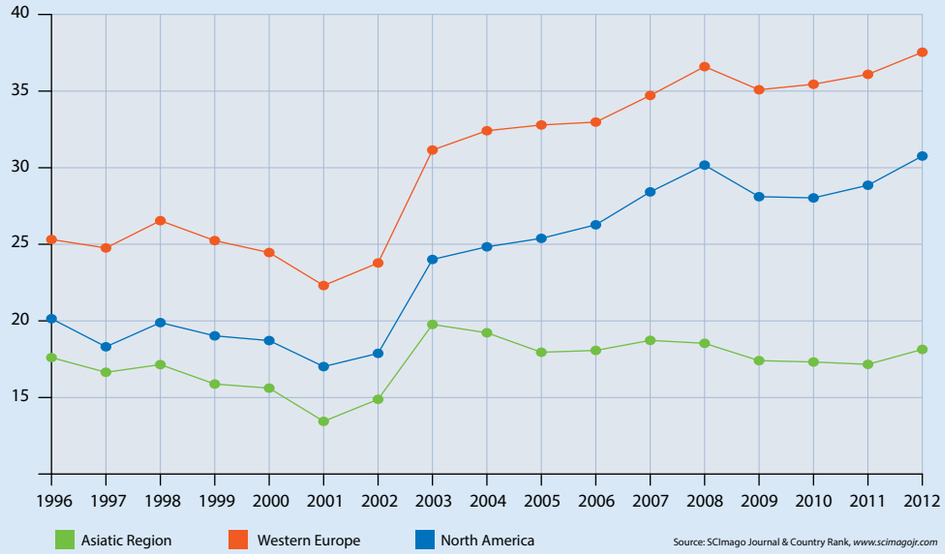
Table 5. **Number of Documents published in China, Japan, India and South Korea from 1996 to 2012**



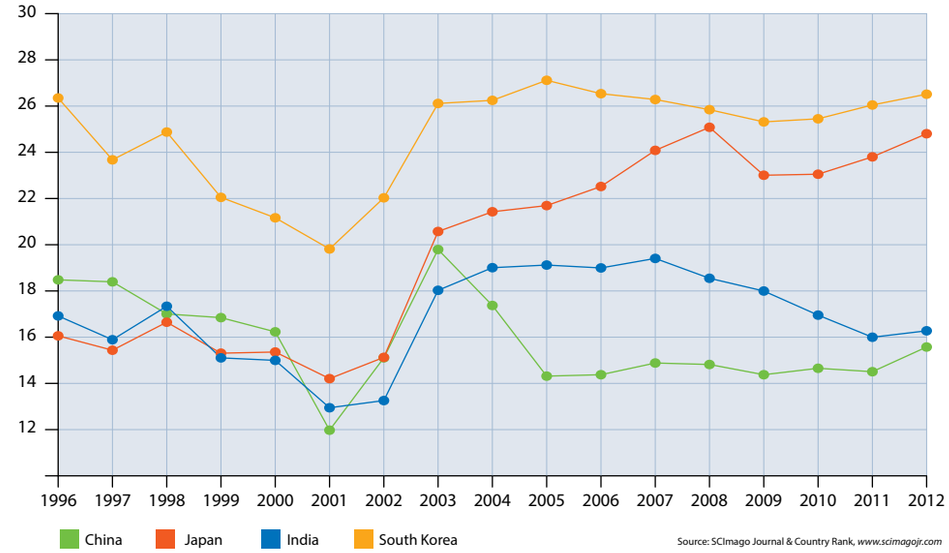
Source: SCImago Journal & Country Rank, *www.scimagojr.com*

Table 6. **International Collaboration in Asia, Western Europe and North America from 1996 to 2012**



Source: SCImago Journal & Country Rank, *www.scimagojr.com*

Table 7. **International Collaboration in China, Japan, India and South Korea from 1996 to 2012**



Source: SCImago Journal & Country Rank, *www.scimagojr.com*

Table 8. **2013 YSA Applications by Nationality**

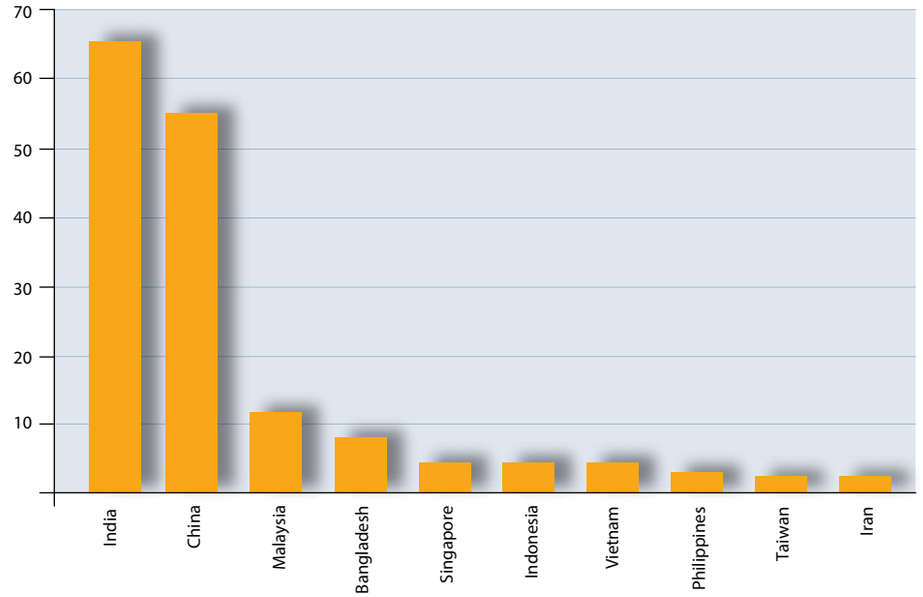
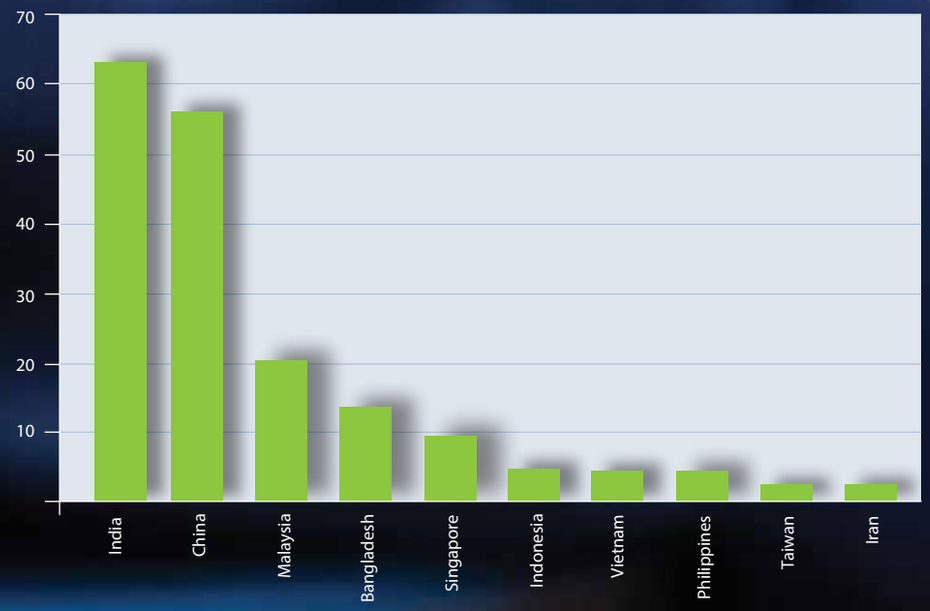


Table 9. **2013 YSA Applications by Country of Affiliation**



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CONTENTS

Integrating Sustainability in Asian Business Schools

Barbara Igel *(AIT-SOM)*, Mark Neal *(AIT-SOM)* and Sheikh A. Prince *(AIT-SOM)*

This chapter discusses the ProSPER.Net initiative to integrate sustainability into business schools in the Asia-Pacific region. The project deserves scrutiny, as it led to positive change within each of the partner universities, involving innovative research, curricular transformation and the development of regional case studies. As such, the project is an instructive case in its own right, highlighting the successes, as well as the obstacles encountered, in introducing and coordinating education for sustainable development (ESD) in diverse organizations. The experience of the project clearly shows that whereas there is a recognized need to promote ESD in business schools throughout Asia, the process of achieving this is difficult and complex. Through a consideration of the achievements and frustrations of the project, it is hoped that this chapter will contribute to a better understanding of these issues, and will help in subsequent efforts to integrate sustainability in business education.

Introduction

In recent years, awareness has grown in the corporate world and in management education that business as usual is no longer viable given the pressures on global resources. Environmental, economic and social changes are undermining traditional business models, and there is thus a pressing need for creative leaders and managers who are able to develop and implement sustainable business solutions. Sustainability does not fit into any one particular management discipline, but involves systematic thinking and acting at all levels of organization for effective change to occur. Achieving this involves reshaping the way business is done, in order to proactively deliver innovative open-system solutions in product development, sourcing, production, marketing, financing, and the management of supply chains.

In the face of ongoing criticism, corporate scandals, and financial and environmental crises, corporations have increasingly adopted the view that they are not merely accountable to investors, but to broader stakeholders such as customers, employees, local communities, and the natural environment. Businesses worldwide are increasingly evaluating how their goods, production processes, delivery, and reporting impact upon their stakeholders, the environment and society at large. These changing priorities and values were recently reflected in a global survey of CEOs by the UN and Accenture[1]. Ninety-three per cent believed sustainability issues to be important in the future success of their businesses. Eighty-one per cent thought that a company's reputation on sustainability influenced consumer-purchasing decisions; and 78 per cent stated that cross-sectoral partnerships were crucial in pursuing sustainability objectives. Meanwhile, there was strong agreement that companies should monitor sustainability impacts, and deal with them as top level priorities. Ninety-three per cent agreed that businesses should measure the effects of their operations on sustainability outcomes; while 94 per cent believed that companies should address these issues at board level.

Given such changes in corporate priorities, it is important that sustainability issues are integrated into business education programmes[2]. In the educational context, many students are already concerned about green issues such as climate change, recycling, saving energy and water, and engaging with local communities, with awareness of these matters already growing during early education in many parts of the world. This being so, it is incumbent upon universities to enhance and develop students' understanding and interest in these issues. Doing so is important in terms of intellectual development and critical thinking in today's changing world. It is also vital in terms of equipping students with the ability to integrate sustainability into management decision-making and business processes[3].

Higher education in general and business education in particular have, however, been slow in responding to these issues. Scholars such as Christopher Grey have criticized the corporate ethos of much management education[4]; and one could argue that business schools are still producing materialistic, uncritical, money-oriented graduates who undermine sustainability, rather than enhance it.

On the other hand, however, there have been some positive changes in the institutional context wherein business schools operate. Since 1988, the largest

[1] Accenture & United Nations Global Compact, 'The UN Global Compact-Accenture CEO Study on Sustainability 2013'.

[2] Persons, O., 'Incorporating corporate social responsibility and sustainability into a business course: a shared experience'.

[3] Persons, O., op. cit.

[4] Grey, C., 'Reinventing business schools: The contribution of critical management education'.

accrediting body in business education, the Association to Advance Collegiate Schools of Business (AACSB), has encouraged business schools to develop responsible managers who conduct themselves in ways that enhance well-being and sustainability; in 2010, it distributed tools and advice for sustainability education. In recent years, there have been other notable institutional developments in the United States, Europe and Australasia (see next section).

As SD grew into a prime focal concern for businesses and for educators, academic staff at Asian business schools such as AIT School of Management (AIT-SOM) became conscious of gaps in their knowledge and skills about ESD and sustainable business, in spite of there being an awareness of, and passion for, sustainability issues among students. This need to learn about sustainability issues motivated AIT-SOM to participate in the ProSPER.Net activities so as to develop business cases rooted in Asia and the Pacific, along with partners from the region who faced similar challenges, but who also were willing to experiment in how to integrate sustainability into their curricula and teaching. Recognizing the benefits of ESD[5], and the uneven progress in its adoption, the ProSPER.Net partner universities sought clearer insight into the extent to which ESD was being implemented by institutions in Asia and around the world. Whereas the ESD movement had made progress in the first decade of the new millennium, its impact was inconsistent due to locally embedded sociocultural factors, and the multilevel complexities involved in leading organizational and pedagogical change in different institutions across diverse regions[6]. Thus, while top business educators, such as the University of Michigan, were famously abreast of the issues, the realization of embedding sustainability in business schools around the world had a long way to go.

The situation in Asia was a case in point. Few business schools were offering core courses in sustainability; though some were addressing related issues in one or more of their modules. There was thus some evidence of progress in the region; however, most schools were seemingly not yet sensitized to these issues. The overall picture of ESD in the Asia-Pacific was hence inconsistent and unclear[7]. Such was the context within which this business school project was launched.

About the Project

The ProSPER.Net joint project "Integrating Sustainability in Business Curricula" was initiated in 2008 to understand and tackle the lack of progress in the region. One objective of the project was to establish a consortium of regional universities and institutions committed to restructuring their provision of business education in order to mainstream sustainability issues in their curricula, teaching, and learning activities; with the rationale that sharing cases, experiences, research and information among the universities would have a positive and sustainable impact upon the provision of business education. This was one of the initial three joint projects planned by ProSPER.Net before the network's formal launch and resulting from discussions at the network's organizational and research meeting held in March 2008 in Yokohama, Japan. Complementary to the business school initiative, two parallel projects led by other ProSPER.Net members were also launched: one on public policy and sustainability, which involved developing an online postgraduate curriculum; and another assembling a manual for teachers and researchers on how to integrate sustainability into teaching and research agendas.

As part of the project, Naeem and Neal sought to add clarity to understanding the impact of ESD in business schools in the region, and carried out a survey of more than 40 business schools in South and Southeast Asia[8]. The study found that although there were signs that institutions were becoming more sensitive to sustainability issues, the realization of education for sustainable business development through new curricula was mainly absent. Few institutions offered core courses in sustainability, in contrast to claims that they were integrating such issues into one or more of their offered courses. That said, a large number of schools appeared to be working on developing courses in these areas, though few had yet embarked on offering full degree programmes. A considerable number of the institutions were obviously not sensitized to the issues as yet, and did not have plans to offer sustainability-related courses in the near future. Traditional courses addressing sustainability issues – namely, business ethics and corporate governance – were taught as core courses by a number of business schools in the region; however, arguably equally important themes, such as social business and corporate social responsibility (CSR), had not yet received attention from many.

There has long been a lack of good quality course material and teaching case studies about sustainability in business, and this was reflected in the study findings. The research also found little in terms of systematic approaches, or strong experiential learning elements that developed sustainability skills. This lack of experiential and critical learning approaches mirrored the low level of integration of sustainability in business school curricula.

One objective of the project was to establish a consortium of regional universities and institutions committed to restructuring their provision of business education in order to mainstream sustainability issues in their curricula, teaching, and learning activities

Respondents identified a number of actions that could help promote and support the issues, such as joining regional networks of universities committed to mainstreaming sustainability in business education, having access to regional case studies, and bringing in speakers, such as social entrepreneurs, with practical experience in tackling sustainability issues. Respondents felt that such developments would help in developing the competences required by faculty members and institutions in the promotion of ESD.

In light of this study, it is clear that in order to provide students in the Asia-Pacific region with the transformative knowledge and commitment consistent with ESD, much work is still to be done. Integrating SD into education systems is a complex and problematic endeavour.

At the practical level, in many regional schools there are not enough resources related to sustainable business models. At the political level, instead of promoting sustainability, mainstream curricula and teaching methods are designed primarily to equip students to enhance business performance and profitability; and many faculty members support this status quo. Given such obstacles to change, it is no surprise – as Grey observed – if business schools continue to produce uncreative students, lacking critical skills, who prioritize profit or career advancement over wider socio-environmental well-being[9].

At the ideal level, ESD is interdisciplinary, holistic and values-driven, involving critical thinking and problem solving. It is multi-methodological in approach, participatory in decision-making, and locally meaningful and beneficial. Education for sustainable development research and development deal with multiple functions and disciplines designed to advance conceptual and theoretical frameworks. Studies have highlighted the kinds of systemic challenges involved in reconfiguring educational provision towards ESD[10]. One significant discussion of the issues involved in promoting this framework identified five challenges for improvement: (1) lack of human and financial resources, (2) difficulties in making linkages with ESD, (3) weak intersectoral collaboration, (4) lack of appropriate tools for ESD and (5) difficulties in assessing ESD[11]. Recognizing the multilevel complexity of these issues, and the uneven progress in different countries and institutions, Mochizuki and Fadeeva examined the competences required to implement ESD into higher education successfully, highlighting the importance of understanding the organizational changes required in terms of the localized relationships between individual and group agency, and those between macro-socioeconomic and inter-institutional structures[12].

[5] Rusinko, C.A., 'Integrating sustainability in management and business education: a matrix approach'; Sherman, P., Hansen, J., 'The new corporate social responsibility: a call for sustainability in business education'.

[6] Corcoran, P.B., Koshy, K.C., 'The Pacific way: sustainability in higher education in the South Pacific Island nations'; Jones, P., Trier, C.J. & Richards, J.P., 'Embedding education for sustainable development in higher education: a case study examining common challenges and opportunities for undergraduate programmes'.

[7] Fadeeva, Z., Mochizuki, Y., 'Higher education for today and tomorrow: university appraisal for diversity, innovation and change towards sustainable development'; Nomura, K., Abe, O., 'Higher education for sustainable development in Japan: policy and progress'; Su, H.J. & Chang, T.C., 'Sustainability of higher education institutions in Taiwan'.

[8] Naeem, M., Neal, M., 'Sustainability in business education in the Asia Pacific region: a snapshot of the situation'.

[9] Grey, C., op. cit.

[10] Thomas, I., 'Sustainability in tertiary curricula: what is stopping it happening?'; Springett, D., Kearins, K., 'Gaining legitimacy? Sustainable development in business school curricula'.

[11] UNESCO, 'Learning for a Sustainable World: Review of Contexts and Structures for Education for Sustainable Development 2009'.

Naeem and Neal found that faculty in South and Southeast Asia were often not convinced of the importance of sustainability in business education[13].

Many were skeptical about the relevance of ESD programmes – views sometimes grounded in the perception that such courses or programmes would have weak market demand. Many business schools marketed programmes that promised career opportunities and business success, while ignoring negative societal and environmental impacts. Although some faculty members recognized the importance of teaching sustainability in business schools, most had not incorporated it into their institutions. Inertia among faculty members, in terms of developing course content and orienting it to sustainability, was a key hurdle, followed by a lack of case studies and limited access to teaching materials.

As part of the ProSPER.Net project, AIT-SOM carried out a review of information and support resources for ESD available for lecturers and curriculum designers in higher education. This identified a number of institutional developments, such as: the Disciplinary Associations Network for Sustainability (DANS) (US); the Beyond Grey Pinstripes initiative at Aspen Institute Centre for Business Education (US); the Erb Institute at the University of Michigan (US); the United Nations Principles for Responsible Management Education (PRME) (International); the Australian Research Institute for Environment and Sustainability (ARIES) (Australasia); CEEMAN, the International Association for Management Development in Dynamic Societies; and the European Academy of Business in Society (EABIS, later renamed ABIS). Examining such developments revealed potential pathways for expanded efforts to support reform towards ESD in the region. Similar international networks or associations were, however, lacking in Asia.

While building awareness among students about the need for, and nature of, sustainable business development was felt to be important at AIT-SOM, most faculty members were reluctant to integrate sustainability issues into their courses because they felt insufficiently knowledgeable about the subject. It was apparently more convenient to let a few experienced colleagues teach stand-alone courses in business ethics, CSR or corporate governance.

The lack of case studies and reading material also hindered and deterred the integration of sustainability into the curricula; and, at the network level, the lack of contacts among faculty to organizations that had implemented sustainable and inclusive business initiatives, such as the World Business Council for Sustainable Development (WBCSD), limited the opportunities to arrange seminars or to invite corporate guest speakers to AIT-SOM to create awareness about sustainability in business.

AIT-SOM did, however, become part of ABIS, a network of universities and corporations committed to mainstreaming sustainability in business education. This provided access to case studies of global corporations, speakers, and adjunct faculty with practical experience in sustainability issues, to help promote and support sustainability in business education, albeit mainly in Europe and North America. AIT-SOM staff were also increasingly involved with environmental and social sustainability endeavours such as the Wetlands Alliance, CORIN-Asia and the PRME Anti-Poverty Working Group[14].

In spite of such initiatives, however, faculty members felt that AIT-SOM was somewhat ill-equipped to meet student preferences for more ESD content. It was thus decided to enhance the school's capabilities in this field by conducting more research on sustainable business development, in particular on the impact of sustainability issues in local communities. A complementary priority was to gain access to journals on sustainability issues and poverty reduction, as well as access to best practice case studies on social business and social enterprise.

Five regional universities were involved in the project: the lead institution, Asian Institute of Technology (AIT), Thailand; Shinshu University, Japan; Universitas Gadjah Mada (UGM), Indonesia; Yonsei University, Korea; and Universiti Sains Malaysia (USM).

The first project focused on social business and social entrepreneurship education. The aim was to develop short courses, and modules of degree programmes, on the analysis and management of such initiatives, involving the development of social entrepreneurial skills, with particular attention to poverty reduction and pro-poor development. The objective was to build practical modules for gaining degree credits, and to run short courses for people who were interested in setting up and managing such initiatives. In order to achieve this, there was a need to identify the skills required to develop and manage social businesses; and to integrate strong experiential learning elements, with the possibility of building mentoring into the programme. The project involved collecting and writing cases for classroom use on the successful development and operation of social businesses and social enterprises for poverty reduction and pro-poor development. The initiative was grounded in the ethos of experiential learning.

The first year involved substantial field work to build case studies on social business and poverty reduction. During that year, partners developed new courses related to sustainability that helped launch stand-alone sustainability-focused degree programmes. They also developed a collection of case studies on CSR and social businesses, and began to explore the integration of sustainability in business curricula in the Asia-Pacific region. There were numerous workshops and discussion groups among the partner universities, one of them being a workshop on "Integrating Social Business and CSR into Business Curricula". AIT hosted visiting faculty with expertise in sustainability and CSR. The Yunus Center for social business, and the Asian Center for CSR were established. This stage saw the involvement of numerous visitors and speakers; and led to the increasing engagement of AIT-SOM with sustainability issues. There was a workshop to discuss the initial ProSPER.Net proposal, and four series of workshops about integrating ESD into particular courses. There was a project integrating ESD into the Master of Management at Universitas Gadjah Mada (MMUGM) programme and a research visit to UK universities, business schools, and government organizations engaged in sustainability in business. CSR was offered as an elective course at AIT. Furthermore, the Shinshu University Sustainability Forum (SSF) was established, and a new MBA with specialization in SD was launched by Universiti Sains Malaysia.

The second year built upon those initial efforts to further enrich the body of knowledge and skills in sustainability in business education. The second project involved the development of training materials on the United Nations Global Compact to educate business school students about the global compact, and to encourage its adoption by companies.

A major objective was to integrate into management education key elements of the UN Global Compact, concerning human rights, labour issues, the environment and anti-corruption themes, with materials that could either be used as stand-alone modules or integrated into current teaching systems. Another objective was to encourage more businesses in the Asia-Pacific region to adopt the principles of the global compact, and to develop skills among current and future managers to implement them. Project actions included collecting case studies that covered the main areas of the global compact for use in class, and running experiential, problem-solving activities. Teaching slides and support materials were developed that covered an overview of SD in the context of business; and materials on each of the four areas of the global compact (human rights, labour, environment and anti-corruption) were developed, and shared among members in the class room.

The project partners aligned their curricular development initiatives with the 10 principles of the UN Global Compact. Embedding those initiatives in this way was seen as a means to encourage future managers to align companies with global standards, and to further develop the project's work on integrating sustainability into management education curricula through engaging with tangible pan-global CSR initiatives.

As well as developing the teaching materials, a particular area of cooperation between partners was in the writing of practical case studies for classroom learning. Those on social businesses, in particular, were used as material for courses in social enterprise and CSR. AIT, USM, UGM, Shinshu, and Yonsei University wrote 11 case studies of social businesses. AIT-SOM collected case studies on social businesses from three countries with high levels of poverty and deprivation: Sri Lanka, Pakistan and Nepal. The other partner business schools collected case studies from their own countries, i.e. Malaysia, Indonesia and the Republic of Korea. Such cases provided interesting and significant insights into the realities of engaging in sustainable business. For example, findings from social businesses in Malaysia highlighted the youth and energy of the entrepreneurs, and the challenges they faced. The cases documented their financial and human resources problems in detail, along with their strategies for overcoming such challenges.

[12] Mochizuki, Y., Fadeeva, Z., 'Competences for sustainable development and sustainability: significance and challenges for ESD'.

[13] Naeem, M., Neal, M., op. cit.

[14] PRME Anti-Poverty Working Group, 'Collection of Best Practices and Inspirational Solutions for Fighting Poverty through Management Education: An Open Online Compendium of Teaching Resources 2012-2013'.

The case studies on the integration of the UN Global Compact showed mixed results in terms of the level of integration. Out of three companies, only one had highly integrated the principles of the Compact. The drivers, challenges and benefits of practicing the principles in the compact were also investigated. A common driver found across all three cases was the commitment of top executives and management to the Compact's integration. In addition, the cases highlighted the difficulties faced in translating principles into practices, despite the fact that such companies were practicing some form of CSR before they signed on to the Global Compact.

Outputs
Activities among the five university business schools produced a set of teaching materials on sustainability related courses, diverse case studies of social business organizations and social entrepreneurship, new and refreshed curricula, and a set of training materials on the United Nations Global Compact, as well as an ESD course and programme directory. The partners involved in the project supported the sharing of materials in order to make a positive impact on student learning and development in the region.

The following are the individual partners' outputs from the ProSPER.Net project:

Asian Institute of Technology
AIT-SOM delivered a framework to mainstream sustainability issues in business education curricula and learning. Significant in-house developments and innovations were:

1. Six new MBA programme courses: one required (CSR) and five electives: Business & Social Sustainability; Sustainable Tourism Management; Business Solutions to Global Challenges; Exploring Issues in Sustainability, and Cases in Social Business Innovation.
2. A stand-alone degree programme (Professional Masters in CSR) i.e. a collaboration between SOM and the CSR Asia Center at AIT.
3. Eleven business cases from the Southeast Asia region on CSR and social businesses with teachers' packs for instructors.
4. Two refereed journal articles on the integration of sustainability in business curricula in the Asia Pacific region, one of which won the Emerald Literati Outstanding Paper Prize for best paper of the year in the *International Journal of Sustainability in Higher Education*[15].
5. The recruitment of a Post-Doctoral Fellow working on Ecomimicry and of several PhD students researching on sustainability issues in business organization.
6. Workshops and symposia on Sustainability in Business Education, with keynote speakers from AUT, New Zealand, RMIT and the University of Southern Queensland, Australia, Hong Kong University and CSR Asia.
7. In 2009 AIT-SOM launched the Sustainability in Business Education website, which shared articles, project reports, newly developed sustainability related course contents and teaching materials, research reports and case studies between consortium members, and with the wider interested community.
8. In 2010, the Asian Center for Corporate Social Responsibility (ACCSR) was established at AIT as a partnership between AIT-SOM and CSR Asia with the mission to enhance the provision and impact of CSR in the region's industries. SOM collaborated with ACCSR in developing a Professional Masters degree in CSR, which was launched in 2010. It has now produced three batches of graduates. SOM faculty assisted in the curricular design, development of teaching methodologies and course delivery of this innovative programme.
9. New academic partnerships with the ABIS, Korea University Business School, Hong Kong Polytechnic University, Griffith University, Australia; and CEEMAN.
10. New industry partnerships with Grameen Bank, DHL, Thailand, Intel China, Mahindra & Mahindra, among others.

Universitas Gadjah Mada
Universitas Gadjah Mada (UGM) integrated ESD into its programmes, which included its Master of Business Administration (MBA). As part of the development of this degree, the university conducted a workshop in 2008 to discuss options as to how to address SD in particular courses. The workshop participants were keen to include ESD into as many relevant courses as possible. Hence, in order to integrate ESD into the MBA programme curricula, UGM ran further workshops focusing on finance, strategic management, marketing, and business ethics. The project also involved seminars and training sessions, resulting in new curricula, syllabuses, cases, handouts, and modules.

The project produced the following:

1. A new curriculum for a Masters in Management at UGM rooted in ESD;
2. New course syllabi that engaged with sustainability issues;
3. Cases, handouts, and modules for courses that engaged with sustainability issues;
4. New equal access campus buildings, delivered through sustainable design, planning and execution; and
5. A case study on a social business in Indonesia, titled Micro-hydropower Plant.

Shinshu University
Shinshu University completed a series of visits to UK universities, business schools, non-profit organizations and government bodies working on sustainability in business. The UK experience highlighted the importance of developing social skills, teamwork building, and stakeholder engagement skills at the same time as teaching about sustainability. One major outcome from the British experience was the Shinshu Sustainability Forum (SSF) that was established in October 2008 as a network to bring together university and industry bodies, and individuals concerned with environmental management and sustainability.

While sustainability and CSR had been offered as an elective in some business schools, Shinshu University opted for new Masters courses that provided curricula and teaching methods founded on environmental sustainability, with the support of the Ministry of Environment's ELIAS project. During 2009-2011, Shinshu University implemented and evaluated two courses related to teaching sustainability principles and values, and assessing the implications of sustainability for business. These courses have been written up as books:

1. Teaching Environmental Sustainability in Japan. Motivating leaders in sustainable business [16]
2. Business and Sustainability – a Strategic Overview. Nurturing leaders in sustainable business [17]

The publications summarize the teaching approaches, materials used and outcomes of each course, including a detailed evaluation of participant performances. Teaching materials associated with the courses (including almost 1,000 slides) are available in English and Japanese.

The curricula for these new programmes include courses in Sustainability Principles, Environmental Management, Environmental Community Businesses, SME Management, CSR, Environmental Technologies I (Chemical Environmental Technologies), Environmental Technologies II (Environmentally Friendly Materials and Renewable Energy), and Fieldwork (Environmental Surveys).

Universiti Sains Malaysia
Universiti Sains Malaysia (USM) designed a new MBA curriculum specializing in SD. The MBA SD programme is made up of 12 courses, 44 units, and a project paper (eight units) on sustainability issues. Included in the 12 courses is one paper – Business Issues and Sustainable Development. The specialization courses are: Sustainability Concept and Issues; Natural Resources and Environmental Management; Green Business and Performance; and Corporate Social Responsibility and Social Enterprise.

The MBA SD programme is designed specifically with business managers in mind. The programme aims to prepare and equip existing and future managers, whether in the private or public sector, with important concepts, theories and models of social responsibility and SD.
As this new programme was developed on the traditional MBA platform there was limited space for manipulation. Nine traditional MBA courses were thus retained, while four new specializations were added. The students were supported to analyse and experience the wide ranging contextual, conceptual and thematic issues involved in the planning, management and practice of SD. USM Graduate

[15] Naeem, M., Neal, M., op. cit.; Naeem, M. A., Peach, N. W., 'Promotion of sustainability in postgraduate education in the Asia Pacific region'.

[16] ISBN 978-4-9905365-0-3.

[17] ISBN 978-4-9905365-1-0.

School of Business also prepared three case studies of social businesses in Malaysia, namely "Wild Asia", "Elevyn", and "Leaderonomics".

Yonsei University
Yonsei University and Columbia University's School of Business published a case study on SD in Yuhan Kimberley in 2009. The case examined the sustainability and social engagement initiatives of the company in the context of its origins, and its rivalry with Procter and Gamble, highlighting the company's family-friendly management programme, and policies including lifelong learning and flexible work schedules. The flexible work schedule programme allowed employees time to rest or to enroll in work-related or lifelong education programmes. Yuhan Kimberly subsidized the costs – not only for the employees, but also for their dependents. As an example of this, Yuhan Kimberly invested 1,912,600 KRW in 2007 and 1,621,778 KRW in 2006 in scholarships.

Yonsei University also contributed two cases on social enterprises in South Korea, titled "Posco" and "We Can Cookies".

ProSPER.Net thus initiated and supported a number of creative initiatives to mainstream sustainability into curricula, teaching and learning in the Asia-Pacific region. It also supported innovative work, examining social businesses and social enterprises; and was instrumental in the establishment of the Yunus Center at AIT.
The experiences and outputs involved in developing such programmes, curricula, learning materials and cases have subsequently been shared with universities in the region, so as to further promote ESD in more HEIs in East and Southeast Asia.

Lessons Learned
Such were the outcomes of the project as a whole.
The process of achieving them through the network of partner universities was complicated and multifaceted.

Management and Coordination of the Project
Responsibility for the progress and coordination of the business school initiative rested with a full-time faculty member at AIT-SOM, who undertook the role alongside regular academic teaching, research and administrative activities. The progress of the project was rather sporadic, and coordination, communication and relations between the leaders of the tripartite ProSPER.Net project and the partner universities were sometimes difficult to sustain. Initially, there were delays having to do with the receipt of funds required to begin the project and to recruit a qualified designated programme coordinator. Eventually, however, these start-up problems were resolved, and the project was launched; coordination and communication between those involved with the project remained somewhat problematic throughout.

The project was coordinated in three ways: face-to-face through workshops at AIT, involving members of the universities associated with the project; through emails; and later, through video conferencing with the programme coordinator. Collaboration was, however, sporadic in the early stages of the project. The principal investigator's decentralist standpoint was that each of the universities could be relied upon to get on with their projects, which was indeed the case. However, this hands-off approach meant that the universities did not coordinate or integrate to the point where they formed a consortium.
This was one of the initial objectives of the project, and the decentralized approach to the activities at the various universities meant that this objective was not formally achieved.

Gaining interest among faculty members in the lead institution of AIT, particularly in SOM, was also difficult. The principal investigator twice made formal presentations about the project to faculty at SOM, and although the reception for these initiatives was positive, commitment to achieving the goals of the project was patchy, though some members with prior interests in SD and CSR were enthusiastic supporters throughout. In this way, the lead institution of SOM at AIT was thus fairly typical of business schools around the region experiencing the kinds of organizational resistance and inertia mirrored elsewhere[18].

The resources for the lead institution were used to support the position of project coordinator, and to meet the expenses incurred in marketing and running the workshops and the ProSPER.Net Symposium on Sustainability in Business Education, held at AIT, which

[18] Naeem, M., Neal, M., op. cit.

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ProSPER.Net thus initiated and supported a number of creative initiatives to mainstream sustainability into curricula, teaching and learning in the Asia-Pacific region.

attracted more than 80 people, including members from all of the project universities. Resources were also spent on producing case studies of poverty reduction in Bangladesh, Thailand and Cambodia, and on producing the survey of business schools in the region.

After the first phase of the initiative, the principal investigator at SOM left AIT, and the project passed on to an expert in CSR issues in Asia. The project coordinator continued to work on the initiative with the programme coordinator, until he too relinquished the project. Such departures caused some turbulence, and raised challenges in keeping momentum and morale, and in enhancing the coordination of the project. With three changes of leadership to date, this initiative highlights the vulnerability of projects in the region when assigned to career-mobile academics on fixed term work contracts. It also shows the difficulties inherent in projects initiated in dynamic, politicized institutions with high turnovers of academics. Given these issues, an interesting feature of this particular project was that regardless of its operational turbulence, it retained commitment from those who had been involved with it; resulting in subsequent publications and online cases by those who had left.

The problems with the coordination and changing leadership of the project highlighted some important challenges of medium term regional projects such as this. One of these is the shifting nature of priorities that naturally comes from changes in a project's circumstances. From an experiential learning point of view – which is at the heart of the ESD ethos – it is helpful if funding bodies and those responsible for the birth of such progressive projects do not adhere inflexibly to the initial aims and objectives of the project. An investigative project such as this naturally changes directions and priorities, as those involved in it learn about the issues and about the limitations of their activities, networks and knowledge. In recent years, the commercial ethos of Management by Objectives – which has been so destructive in education – has been mirrored by Funding by Objectives, which is equally problematic in enabling real learning and transformation. This being so, perhaps, one of the main lessons of this project is that funders and those responsible for such projects would be better served by building wider flexibility into their expectations of a project, and their evaluation of its ultimate worth or success.

As discussed, the coordination of the project was often rather hands-off, and communication was sometimes problematic. In spite of this – or perhaps because of this – the project as a whole was highly innovative and productive. Each of the partner universities delivered high impact changes, and these were shared productively between them.

Further Developments

Having delivered the first set of projects focused on sustainability issues in business education, the next stage focuses on environmental dimensions. The topics selected concern the crises in biodiversity and climate change, which have become so severe in Asia. The latest project, phase three, is intended to respond to the complex threats Asian countries face due to climate change and the decline or extinction of many animal and plant species.

Developing countries in low-lying coastal areas are highly vulnerable to the negative effects of climate change. Particularly affected are Vietnam, Bangladesh and areas with many low-lying populated islands, such as Indonesia and the Philippines. Although developed nations with high carbon emissions have a significant role to play in the alleviation of climate change; increasing production, energy use and consumption in developing economies in Asia are exacerbating threats to global sustainability. Careful consideration of, and learning from the mistakes, experiences and innovations of developed countries are required to better manage human-environment interactions, the results of which will mostly affect low-lying, high population, Asia-Pacific countries. Helping future business managers and leaders to understand more about climate change impacts, mitigations and opportunities will complement the large-scale efforts of policymakers and regulatory institutions in enabling such countries to creatively embrace the green economy. This is thus a timely moment to explore these issues.

In terms of developing, and adding to, curriculum choices and their delivery, the activities in the next phase include creating a set of teaching study packs for off-the-shelf use, to include case studies, teaching notes, presentation slides, and curriculum outlines. It will also involve the production of smaller, single session learning modules, which can be added within an existing programme, as well as longer, more in-depth teaching modules that can serve as stand-alone course programmes. This increased flexibility and total package availability should enhance the appeal and potential applicability of the materials produced.

As well as harnessing the skills of the founding partners and related organizations, the project will be open to engagement and participation by all ProSPER.Net members. This should help increase the self-sustaining capacity of the network for sharing, collaboration and innovation. To this end, the end-of-year conference event will be run as a practical workshop, with support for the participation and engagement of members who might not normally be able to attend such an event.

Actual and Potential Impact

Networks such as ProSPER.Net encourage new ways of doing things in business schools, enhancing the ability of educators to be transformative not only of future managers and entrepreneurs, but also of the schools and the staff themselves. Although each of the partners in this endeavour undertook an individual project, there were powerful synergies among them. Because of the networking and exchange of information inherent in the overall initiative, each of the individual projects contributed to the integration of sustainability in learning and teaching in all of the partner business schools. The partners shared not only their experiences in integrating sustainability into curricula and learning; they exchanged teaching materials for newly developed courses on sustainability; and shared their frustrations in sensitizing their administrations and faculty members to the urgent need for change.

Networks such as ProSPER.Net encourage new ways of doing things in business schools, enhancing the ability of educators to be transformative not only of future managers and entrepreneurs, but also of the schools and the staff themselves.

Keeping in mind the full time academic responsibilities and activities of the principal investigators of each project, the network of universities achieved a great deal. AIT, USM, UGM and Yonsei University developed 11 case studies of social businesses, collected from their own or neighbouring countries, i.e. Thailand, Philippines, Pakistan, Malaysia, Laos, South Korea, Indonesia, Cambodia and China. AIT faculty and external resource persons developed a new curriculum on social business with training materials, and several teaching cases provided by the partners. The purpose of the case studies on social business was to use them as teaching material in sustainability-related courses. Therefore, each case study had to provide adequate information about the context that prompted the initiation of the social business, the challenges faced in establishing the endeavour, and the strategies adopted to overcome them. Each of the cases had a set of questions at the end, so as to engage students in thought-provoking discussions, and critical and innovative thinking.

Partners have used the materials and case studies developed by the project for their teaching on degree and short courses. In particular, the materials have been used on the AIT Professional Masters degree on Corporate Social Responsibility (PM CSR), with very positive feedback received from students. The case studies have also been used by other institutions outside of the network, for example by CSR Asia in its executive training programmes conducted in Hong Kong and Singapore, and in Thailand at AIT.

When considering the large number of university business schools in Asia, one can see positive, but patchy, signs of transformative learning for sustainable business. Certain problems remain, however. The rate of adoption of ESD in business education in the region is frustratingly slow. The time, effort and money required for business schools to transform themselves, and thereby their students, may deter them from proceeding in this direction. A related problem is the extent to which business school programmes provide – or rather do not provide – enough creative teaching of sustainability-related issues to enable this transformation to take place. This highlights the limitations that arise through single, isolated efforts which reinvent the wheel, leaving the major issues inherent in ESD unaddressed. Unless the thousands of MBAs who graduate each year from universities in the Asia-Pacific region are given the opportunity to view themselves and their business activities sufficiently differently to transform business operations towards sustainability, then ESD may fall short of its aspirations.

This project is but one endeavour. While it has catalysed a number of outstanding developments and new

transformative offerings, the majority of business school curricula in the region have not adopted the tenets or methods of ESD. While there has been a substantial effort and a shift of resources at the international, national and regional levels towards sustainability in education, there has been inadequate transformation of how university business schools establish and develop course and programme offerings. Because it has come late, ESD is held accountable to the persistent ethos of business as usual, of MBO, profit-seeking and material advancement. Teaching faculty are being expected to transform the curriculum using the existing resources and support allocated to them, within prevailing management systems, in the context of pre-existing pro-capitalist priorities and values. University business schools tend to develop market-oriented programmes through evolution rather than disruptive change, with limited ventures into radical new curricula and teaching methods, perhaps in collaboration with external partners. Such are the cultural, political and organizational complexities of integrating ESD in meaningful ways.

While there are moves towards open and more accessible content, such as massive online open courses, the region is at an early stage when it comes to developing innovative courses on sustainability in business. As we have seen, the overall realisation of ESD has been patchy, both in terms of content and teaching methodologies. ESD's transformative potential will only be realized if there are changes in how universities fund, develop, implement and protect programme portfolios and curricula. For ESD to become established, universities must learn to share, and to collaborate with each other in meaningful ways.

Policy Implications

In considering the progress of the ESD activities in the five business schools, one can appreciate the substantial effort and organizational support needed to implement and coordinate an initiative of this scale. It is apparent that there is more than just changing the curricula at stake in the process; multiple levels of engagement, as well as multiple directions of endeavour, are required to effectively implement change. A consideration of these efforts highlights how the process involves not just academics, but students, curricula, assessment, learning and teaching, and requires strong partnerships with corporate business leaders; and for social entrepreneurs to share their experiences of emerging business models, social value creation and inclusive, sustainable interventions. The experience of the five business schools reiterates the scale of effort required to move towards ESD, as well as highlighting the need to share resources and efforts. Enhancing this sharing within institutions, across institutions and across jurisdictions and traditional boundaries is a major challenge.

Reflecting upon these complex matters leads naturally to a consideration of next steps and of the nature and focus of future projects in ESD in business education. In terms of institutional context, it is apparent that regulatory agencies should actively encourage business schools to integrate sustainability into their educational systems as a part of their missions. Ministries of Education, for instance, should not only prioritize helping business schools promote sustainability education in curricula, but should monitor their progress systematically. Universities themselves can facilitate the implementation of ESD by implementing policies aimed at removing the kinds of barriers to change highlighted in this paper.

These projects and the ways in which they are intended to be implemented, represent a maturing of perspective that emanates from experiencing the opportunities and challenges afforded by education for sustainable business. During these experiences it became apparent that the challenges confronting those involved in, and with, the ProSPER.Net business school project could not be treated as different – or separate from – those confronting lecturers and curriculum designers in business schools around the world. ProSPER.Net's focus on postgraduate education in HEIs in the Asia Pacific region is but a part of the overall network of ESD champions and initiatives in educational institutions, and beyond schools and universities. Many of the issues confronting this project mirrored those experienced elsewhere. The experience of this project has highlighted realities that will, to a greater or lesser degree, influence future initiatives in university business schools, and in higher education generally. These are:

1. ESD is as much about the way it is delivered and provided – and what students are expected to do – as it is about the content.
2. ESD has made substantial progress on many fronts, but there has been limited progress in releasing content from institutional ownership, in regard to courses and programmes.
3. The reinforcement of mainstream business school teaching by accrediting bodies can detract from lecturers' ability and freedom to focus on the major reforms implicit in ESD.
4. Disciplinary research about each element of ESD is as important as cross-functional collaboration on major issues arising from ESD.
5. Cross-disciplinary collaboration with science, engineering and the social sciences is an important ingredient in ESD, as it encourages new thinking about how to deal with cross-cutting problems such as poverty, inequality, climate change, biodiversity, water management, and health.
6. Business school leaders should be aware that it is unlikely that they will effectively contribute to, or deliver, ESD unless they adopt disruptive perspectives on course and programme content. As such, they should be prepared for resistance to ESD, particularly if suitable content and resources are not available.
7. Business school leaders should be encouraged to adopt investment plans in concert with a group or network of similarly motivated organizations, such as ProSPER.Net and ABIS, which support research that delivers cross-disciplinary content and methodologies.

With these drivers in mind, there are significant benefits to be gained by business school leaders in building upon initiatives such as this, to increase the ease with which lecturers and course designers are able to develop, access and use ESD learning materials and methodologies.

Conclusion

This chapter has reviewed the progress of the business school project, which was a subset of the overall ProSPER.Net sustainability in higher education initiative. In so doing, it has identified local, global, individual and systematic issues for university business school leaders committed to sustainability in general and to ESD in particular. For researchers in ESD, there appears to be significant scope for critical but constructive research into the functioning of university business schools – their priorities, values, curricula and, more generally, their future. The extent to which researchers are able to actively collaborate with learning and teaching units to facilitate shared learning will be a significant factor in bringing much needed support to teaching faculty who struggle to keep pace with this and other university initiatives. Such are the push factors for change.

Regardless of such initiatives towards sustainability in education, however, ongoing changes in the business world, and demand for innovative managers, constitute pull factors towards sustainability skills, which will increasingly add pressure on educational institutions to change. Engagement by university business schools with projects such as ProSPER.Net to actively develop curricula and resources to support ESD, could help to overcome one of the most significant bottlenecks in the realization of sustainable systems, and tangibly demonstrate how Asia's business schools can not only improve local and individual organizational outcomes but also contribute towards upgrading regional skills and priorities. Doing so successfully will indeed have a positive global impact.

In trying to achieve such change, this project has had a considerable positive influence on each of the partner universities involved in it. This was apparent from the beginning of the initiative and the enthusiasm of the early workshops. With each year, the project's ethos, values and changes consolidated the transformation in each university partner. The benefits to faculty have thus been significant, as they have engaged with novel ideas, fresh challenges and new networks, opened up through teaching and researching responsible business. As it should be, however, the greatest impact of the project has been upon the students, who have benefitted from the new programmes, pedagogies and curricula, and used the various case studies and materials generated by the project. AIT School of Management has a proud record of continued engagement with its more than 3000 alumni from more than 40 countries, and the students who have benefited from – and indeed been transformed by – the sustainability initiatives remain in close touch with the school and with each other. Likewise, each of the partner universities has produced networks of upwardly mobile influencers who see their organizations and their activities within the context of SD. The continuous development of these alumni networks is perhaps the greatest achievement of the project – one that will influence business and management in the Asia-Pacific region for years to come.

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CONTENTS

Embedding Sustainability Education in a Built Environment Curriculum[1]

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The unique features and issues of sustainability have a profound effect on the way academic curricula in the built environment are structured. The general direction of education for sustainability is moving increasingly toward integration and innovation. However, there has been slow progress integrating sustainability in built environment curricula perhaps due in part to the practice-led approach, which is a hallmark of the discipline, and to the assumption that sustainability by its very nature already permeates curricula. This chapter reports on the outcomes and findings of the ProSPER.Net project *"Integrating sustainability education into existing engineering and built environment curriculum"*, which is aimed at integrating sustainability thinking and practice into engineering and built environment curricula through a professional development programme for university academics. The central approach of the project embraced a collaborative inquiry process wherein the role of industry was considered critical to achieve project outcomes. In focusing on the main issues about applying the principles of sustainability in the built environment and the tensions with regulatory and best practice approaches, a regional approach was adopted for the project. This took account of international, national, local and sub-regional concerns to sustainability teaching and learning, and expectations of both graduates and industry. The primary output of the project was the development of a guide in the built environment disciplines such as engineering, building, and architecture, at undergraduate and postgraduate levels. The wider aim of the project is to ultimately ensure that sustainability is firmly embedded in the expansion and development of further courses and offerings to students within this rapidly changing environment.

Sustainability Education and Built Environment Professionals

Buildings and cities are measures of economic health in most developed and developing economies across the globe. The built environment is constantly changing, reflecting government policies, legislative changes and community expectations. Strategies to deliver low-carbon, resilient built environments require a range of different stakeholders working effectively. Government targets, both voluntary and mandatory are putting pressure on new graduates to be fully abreast of relevant global and local issues. Increasing globalization is finding graduates and senior professionals working on projects far from their original communities. This is putting additional pressure on graduates to understand not just the requirements for meeting the local regulatory minimum but also best-practice requirements for sustainability in these regional centres.

It has now been well documented that growth in Asia will continue and will result in increased energy use and carbon dioxide emissions[2]. Key highlights of these findings are that:

- Asian GDP will expand from 27 per cent in 2004 to 34 per cent in 2030, the highest compared to other blocks including Europe and North America;
- Asian population will rise to half the world population by 2030, with India and China being the largest;
- Primary energy demand and attendant carbon dioxide emissions are expected to rise by 9 per cent in 2030 under a business-as-usual scenario; and
- Primary energy demand in Asia is expected to grow to 6.2 billion tons of energy equivalent by 2030, a growth of 200 per cent from 3.1 billion tons of energy equivalent in 2004.

Within Asian cities, it is anticipated that:

- Total energy consumption through building use is expected to rise 65 per cent to 1150 million tons of energy equivalent by 2030[3]; and
- Building energy consumption is predicted to comprise 18.5 per cent of total energy consumption in 2030.

Education has long been recognized internationally as fundamental to addressing the global challenges society faces[4]. The unique features and issues of sustainability have a profound effect on the way academic curricula are structured. The general direction of education for

[1] This book chapter has benefited from input from ProSPER.Net members, contributions from academics from participating institutions and feedback from industry representatives. The ProSPER.Net project was funded by UNU-IAS and is supported by RMIT University School of Property, Construction and Project Management. The authors acknowledge the contributions of the academics and industry representatives who collaborated in the project and participated in the workshop. They also thank the ProSPER.Net Secretariat and reviewers who provided input in the development of the various outputs associated with this project. Parts of this book chapter have been presented as conference papers and as a working paper.

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sustainability is moving increasingly toward integration and innovation. However, there has been slow progress integrating sustainability in the built environment curricula perhaps due in part to the practice-led approach, which is a hallmark of the discipline, and to the assumption that sustainability already permeates the curricula.

The ProSPER.Net project *"Integrating sustainability education into existing engineering and built environment curriculum"* aimed to develop a guide for university academics and curriculum developers for integrating sustainability thinking and practice into built environment disciplines, such as engineering and architecture at undergraduate and postgraduate levels. Drawing on the experiences of participating academics and industry members was critical for sharing experiences and for ensuring a collaborative inquiry process wherein the role of industry was considered to be vital in ensuring that sustainability goals of building projects are met. As students eventually become professionals of the built environment industry, it was essential to seek and incorporate industry input in the research.

The survey of literature demonstrated that this inquiry process would not only help build the capacity of institutions but also maintain enthusiasm and interest in change and sustainability issues through partnerships and networks. This, in turn, further enhances opportunities for collaborative action[5]. The project adopted a regional approach to applying the principles of sustainability in the built environment while recognizing tensions with regulatory and best practice approaches. This regional approach took account of international, national, sub-regional and local concerns in relation to sustainability teaching and learning, and the expectations of both graduates and the industry. A review of literature included desktop research that laid the foundation for the workshop; it was followed by discussions and insightful inputs from participating universities and institutions to help understand current programmes and course offerings in built environment curricula. The literature review focused on understanding the elements of sustainability currently being integrated into curricula, both from programme level and course development perspectives. The desktop investigation also canvassed the academic training and professional development of built environment practitioners in sustainability education.

The core activity of the project was a workshop, which brought together participants who shared knowledge and experiences with the objective of recommending practical approaches for integrating sustainability issues while understanding and interpreting the theoretical dimensions of sustainability, all while sharing experiences about approaches that best work for all stakeholders. The literature review helped identify the workshop's content and key priorities. The colloquium contextualized the current state of sustainability integration in the existing built environment curricula in the Asia-Pacific region and established opportunities for networking and building close links within and between academia and industry.

Participation in the project and workshop was not restricted to ProSPER.Net member institutions, but was open to other universities expected to benefit from workshop attendance and the broader outcomes of this project. The three-day workshop was conducted at RMIT University Vietnam, in Ho Chi Minh City from 20 to 22 April 2012. There were nine teaching academics invited by the ProSPER.Net Board and their representatives to participate in the workshop. A core group of three universities (Asian Institute of Technology, University of the Philippines and Tongji University) were identified by the ProSPER.Net Board; the remaining universities were selected through discussions with the Board. The aim was to select a mix of universities from the Asia-Pacific region because growth in the building and construction sector is expected to occur most in this region, with attendant growth in population[6]. The invited industry participants were selected from a mix of international and national Vietnamese-based participants.

The universities/institutions who participated in this project were:

- Asian Institute of Technology (Thailand)
- Tongji University (China)
- University of the Philippines (Philippines)
- National Institute of Advanced Studies in Architecture (India)
- Universiti Sains Malaysia (Malaysia)
- Universitas Gadjah Mada (Indonesia)
- International University, Vietnam National University – HCM (Vietnam)
- University of Tokyo (Japan)
- RMIT University (Australia)

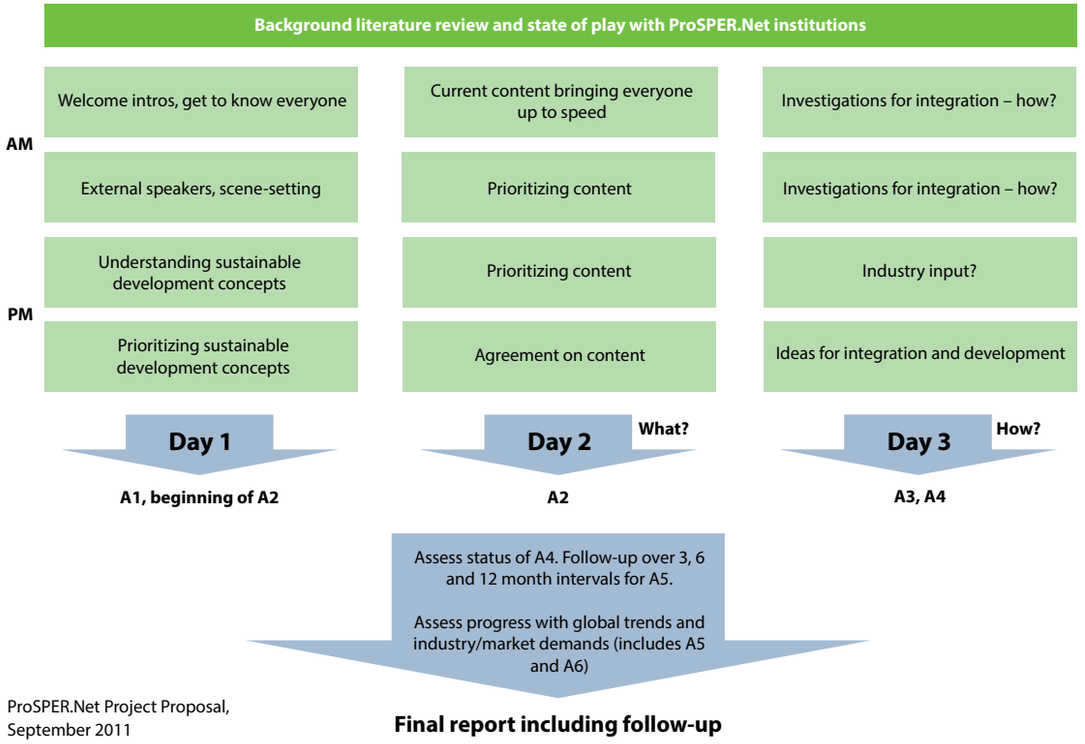
Industry participants included:

- World Green Building Council
- Vietnam Green Building Council
- Sino-Pacific Construction Consultancy Co. Ltd (Vietnam)
- Vietnam Centre for Research and Planning on Urban and Rural Environment (CRURE)/Vietnam Institute for Architecture and Urban-Rural Planning (VIAP)/Ministry of Construction (MOC).

Table 1. **Workshop Activities (see Figure 1)**

Activity	Description
A1	Understanding the sustainable development concepts
A2	What content needs to (can) be used? General agreement on content and integration of content among participants
A3	Investigating adequacy, appropriateness and effectiveness of integrating into current modules of curricula
A4	Ideas for development of new programmes/subjects or streams of integration
A5	Developing linkages and networks, monitoring the integration into existing courses, creating new courses and sharing experiences
A6	Industry/academic partnerships – what are the results?

Figure 1. **Workshop Outline**



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To achieve the objectives of the research project and guided by these overarching workshop activities, an action research framework was adopted. The workshop functioned as a participatory action research process, whereby progressive problem-solving (in this case, curriculum development) occurred with participants working with others in teams or as part of a "community of practice" to improve the way they address issues and solve problems. Using participatory action research[7] in collaboration with industry practitioners, the workshop identified how best to integrate sustainability thinking and practice into curricula. It identified the key priorities for inclusion, within global and local policy commitments. The final workshop programme was kept flexible to take account of the specific needs of workshop participants and planning of events leading up to the workshop. An action research approach used for the workshop demanded that planning, processes and delivery needed to evolve to maximize outcomes. The workshop structure was designed such that there was a clear link between the various segments leading to the outcomes.

Feedback was sought after each main segment of the workshop via a feedback form. The informal feedback from participants during the workshop and the formal feedback through forms allowed the workshop facilitator to adjust content throughout the workshop to maximize outcomes. This ensured that the framework of action research was implemented in practice.

The information collected throughout the workshop and the subsequent post-workshop survey informed the development of the guide aimed at curriculum developers, programme/course coordinators, and teachers in the engineering and built environment discipline. This guide is expected to catalyse change in existing curricula. The education framework informing the guide was set within an industry context where possible. The guide outlines key priorities to be included in the built environment curricula of participating institutions, with attendant suggested content information. Monitoring these priorities over the short, medium and long term while seeking academic, student and industry feedback is expected to determine the most effective priorities from academic, industry and student perspectives.

Education for Sustainable Development (ESD)

The United Nations declared the decade from 2005 to 2014 the Decade of Education for Sustainable Development (UNDESD). In the Asia-Pacific region, the strategy to address the needs and priorities of stakeholders in the region is identified in the UNESCO Working Paper for the Asia-Pacific Regional Strategy for Education for Sustainable Development[8]. The strategy strongly advocates for partnerships in the Decade's implementation and argues the need for collaboration and networking as key elements in enhancing participation, ownership and commitment to the success and maximum impact of activities for the UNDESD[9]. The SBCI (Sustainable Buildings and Climate Initiative) has been specifically set up under the umbrella of UNEP to work with academia and industry in promoting practical examples and case studies of sustainability in practice. It is a partnership of major public and private sector stakeholders in the building sector, working to promote sustainable building policies and practices worldwide[10]. Recently, another UNEP publication, the Greening Universities Toolkit[11], takes sustainability teaching and research from "arms length transactions" in universities right into the center of the debate. It takes a holistic approach to sustainability, from teaching, organizational and research perspectives in all aspects of curriculum development, including not just teaching and research but also the built form, governance and day to day operations of the university campus.

The further and higher education sector has acknowledged the importance of learning for sustainability through various declarations[12]. To equip all sectors of the society to actively engage in change for sustainability, curriculum change is recognized as urgently needed across all programmes of study offered by higher education and not just those programmes focusing on sustainability issues[13]. The literature review demonstrated that while ESD in Australia has evolved over the last three decades, the Asia-Pacific region has seen more modest trends, particularly given the anticipated growth in the region. That does not mean however, that nothing has happened in the region.

In the Asia-Pacific region, the demand for higher education has risen in tandem with overall population growth and increasing affluence, which adds urgency to the pursuit of sustainability[14]. Some attempts at integrating sustainability in education have been undertaken in the region, notably in India[15], and in the Pacific Islands[16]. These have not been without their share of challenges[17].

In a review of the contributions of the region to leading practice in sustainability in higher education, Nomura and Abe[18] and Ryan et al[19] show that the Asia-Pacific region offers many creative initiatives and has made considerable progress in ESD and in understanding the learning dimensions of sustainability. Nomura and Abe[20] highlighted how initiatives of higher education institutions in Asia and the Pacific region have been propelled by government policies and agencies as well as several regional and sub-regional efforts[21]. The internationalization of university education is increasingly evident in efforts such as increasing the number of international students and offering programmes offshore. This is not only creating centres of excellence but also offering opportunities for world-class research and sharing of ideas and case studies through teachers and students.

The challenge of sustainable development requires significant transformation of educational institutions in Asia and the Pacific if they respect regional diversity and cope with the impact of globalization at the same time. Sustainability learning must place value on being creative, reflexive, and respond to participatory processes, and inter and transdisciplinary approaches must be considered as an integral part of sustainability education with links wherever possible to real-life issues. Rather than being seen as just "add-ons" to curricula, sustainability thinking and practice must be wholly integrated, requiring rebuilding and redesigning of curricula. This also moves from taking a prescriptive approach to education to a more innovative, interdisciplinary, participative and holistic approach.

Engineering and Built Environment Sustainability Education

In this carbon-constrained world, the importance of the built environment to society places a high level of responsibility on those professionals who plan, design, construct, manage and maintain that environment. A sample of skylines observed in major Asian metropolitan centres show that the density of building and construction is very similar, and there are more similarities than differences in the issues faced in building and construction in Thailand or Indonesia. Educators in the built environment have become increasingly aware of their environmental responsibilities and the impact of buildings upon the quality of life, health and resource consumption[22].

In Australia, the findings of the Australian Research Institute in Education for Sustainability (ARIES) scoping study conducted by Macquarie University on the state of play of education for sustainability in the built environment sector in Australian university programmes[23] indicated a clear recognition that professional education in the sector for climate change adaptation and mitigation was limited and urgently needed. Professionals in the sector generally understand the need for climate change adaptation and mitigation, but not its practical

[7] Argyris, C., *Knowledge for action: a guide to overcoming barriers to organizational change.*

[8] UNESCO – Asia and Pacific Regional Bureau for Education 2005, *Working Paper: Asia-Pacific Regional Strategy for Education for Sustainable Development*.

[9] Tilbury, D., Cooke, K., *A National Review of Environmental Education and its Contribution to Sustainability in Australia: Frameworks for Sustainability*.

[10] UNEP 2013, *United Nations Environment Programme.*

[11] Osmond, P., Dave, M., Prasad, D., Li F., *Greening Universities Toolkit: Transforming Universities to Green and Sustainable Campuses, A toolkit for Implementers, UNEP.*

[12] Centre for Environment Education 2007, *The Ahmenabad Declaration 2007: A Call to Action,* 4th International Conference on Environmental Education, 28 November 2007; UNESCO – Education Sector 2006, *United Nations Decade on Education for Sustainable Development (2005-14): International Implementation Scheme;* University Leaders for a Sustainable Future (ULSF) 1990, *Talloires Declaration.*

[13] Tilbury, D., Adams, K., Keogh, A., *A National Review of Environmental Education and its Contribution to Sustainability in Australia: Further and Higher Education*, p. 19.

[14] World Bank 2012, op. cit.

[15] Chhokar, K.B., *Higher education and curriculum innovation for sustainable development in India.*

[16] Corcoran, P.B., Koshy, K.C., *The Pacific way: sustainability in higher education in the South Pacific Island nations.*

[17] Corcoran, P.B., Wals, A.E.J., *Higher education and the challenge of sustainability: problematics, promise and practice.*

[18] Nomura, K., Abe, O., *Sustainability and Higher Education in Asia and the Pacific*; Ryan, A., Tilbury, D., Corcoran, P.B., Abe, O. & Nomura, K., 'Sustainability in higher education in the Asia-Pacific: developments, challenges, and prospects'.

[19] Ryan, A., Tilbury, D., Corcoran, P.B., Abe, O., Nomura, K., op. cit.

[20] Nomura, K., Abe, op. cit.

[21] Nomura et al., op. cit.

[22] Edwards, B., *Sustainability and Education in the Built Environment*; Graham, P., *Building Ecology: First Principles For A Sustainable Built Environment*; World Bank, op. cit.

[23] Lyth et al., op. cit.

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implications[24], and therefore there are limited practical outcomes from the learnings. Similarly, in a review of schools of architecture in the UK, Edwards[25] noted that most architecture courses pay little regard to sustainability as a holistic concept and although low-energy design is widely understood, the notion of social sustainability, of lifecycle costing and of alternative technology is given little timetable space. The recently published book, Higher Education and Sustainable Development[26] provides specific guidance on curriculum renewal, particularly on embedding sustainable development knowledge and skills within curricula for engineering programmes. However, at the time of this research project, this resource was unavailable.

The unique features and issues of sustainability have a profound effect on the way academic curricula are structured. For the ProSPER.Net project, to contextualize the current state of sustainability integration in the existing built environment curricula in the Asia-Pacific region, the ProSPER.Net workshop participants provided a list of programmes and attendant courses currently taught in their respective universities and institutions. The preliminary information provided formed part of the desktop literature review. The final information collated from the participants underpinned the framework of the workshop and demonstrated the need for definition and resolution of issues such as:

- Curriculum design and structure;
- Capacity-building for academics in transforming sustainability knowledge;
- Learning outcomes – student experiences;
- Sustainability pedagogies;
- Pedagogical implications in the engineering and built environment disciplines;
- Industry input – students as employable graduates; and
- Challenges to professionals in the field of built environment, their institutional structures and boundaries.

Built Environment Programmes and Courses

In evaluating and reviewing the university programmes and courses at undergraduate and postgraduate levels, the template provided to workshop participants streamlined the information and allowed for ease in comparing the schools, programmes within schools, courses offered and the subject topics covered in the courses. To quickly and simply analyse the information, the frequency of keywords describing the content in the template was reviewed. Using the language of visual design, *tag clouds* (or *word clouds*) were generated as graphical representations of word frequency for the following:

1. Name of schools, departments within the discipline area of engineering and built environment (Figure 2);
2. Common names of programmes offered within these schools and departments (Figure 3);
3. Course names (subjects) offered within the programmes (Figure 4); and
4. Subject topics covered in the different courses (Figure 5).

Understandably and as expected, the schools, departments and institutes in the discipline area of built environment were predominantly within the schools of engineering and architecture (Figure 2). Interestingly, among the nine participating universities, only RMIT University (Australia) indicated having a school in construction and project management. This perhaps, could have a bearing on how the discipline generally relates to the industry and marketplace in a particular country and the professional accreditation requirements needed to practice in that profession.

Figure 2. **Schools, Departments and Institutes within the discipline area of Engineering and Built Environment (ProSPER.Net Workshop participants)**

[24] Snow, M., Prasad, D., *Climate Change Adaptation for Building Designers: An Introduction,* p. 11.

[25] Edwards, op. cit., p. 137.

[26] Desha, C.J., Hargroves, K., *Higher Education and Sustainable Development.*

Figure 3. **Common names of Programmes Offered (ProSPER.Net Workshop participants)**

Architecture and engineering also weighed heavily with regard to common names of programmes offered within the schools, departments and institutes (Figure 3). However, key terms such as *environmental, management,* and *planning* have also emerged as qualifiers for programme names.

Within the programmes, the courses are much more specific and indicated sustainability content (Figure 4). Keywords gleaned from the course and subject topics also reflected and supported the predominant terminologies in the course names (Figure 5).

Figure 4. **Courses (subjects) Offered within the Programmes (ProSPER.Net Workshop participants)**

Figure 5. **Keywords and Subject Topics Outlined within the Course Contents (ProSPER.Net Workshop participants)**

As Sherren[27] posited, the degree to which sustainability is tokenistic may be evaluated by examining where sustainability is mentioned in the programmes. In the ProSPER.Net project's review of university programmes and courses of the participating institutions, for purposes of pre-work and information for the workshop, dominance of certain terminologies in the course names was taken as indicators of how sustainability concepts are integrated. If sustainability terminologies appear in the description or subject topics, the integration of sustainability concepts was assumed. This was then included as one of the issues to be reviewed in the workshop discussions on framing the curriculum design and structure. During the workshops, the participants validated these assumptions in their own review of the programmes and courses and provided more in-depth clarification. The presentations of the academics revealed an extensive and diverse spread of programmes and courses both in breadth and depth. Similarities and differences in the different programmes and courses were also highlighted.

The scope of this project was confined to programmes and courses within the built environment disciplines and attendant discussions and shared experiences of the workshop participants highlighted the similarities and alignment of the programme objectives as well as the courses' design. The engineering and built environment programmes are predominantly professionally accredited courses and thus have a strong need to respond to external influences through the reframing of curricula so as to produce graduates equipped to work in an evolving and challenging context. The strong links with the professional bodies and industry, reinforced through the use of practitioners to deliver and support subject areas, needs to ensure that graduate entrants to the professions are appropriately equipped. Many schools, departments and institutions within universities have strong industry-based research and consultancy links, operating at the forefront of the discipline. However, it has also been identified that the skills based in the sector remain insufficient to meet the needs of the new sustainable communities' agenda[28]. This has been highlighted in a recent report by the World Bank[29] and has also been supported strongly by the CEO of the World Green Building Council[30].

[27] Sherren, K., *Core issues: Reflections on sustainability in Australian University coursework programs.*

[28] Bardi, U., *The Limits to Growth Revisited*; Lyth et al., op. cit.

[29] World Bank 2012, op. cit.

[30] Henley, J., *Green Skills for the Future.*

Integration of Sustainability

There have been a growing number of studies on how to integrate sustainability in higher education, and broad and general frameworks for its integration into curricula have been presented. The literature indicates that many core principles of integrating sustainability into higher education require substantial shifts in thinking and practice. Some may be out of reach of the individual lecturer and more challenging for some disciplines than others. Table 2 illustrates the magnitude of change and transformation required in teaching sustainability.

Sterling[31] argues that moving towards a sustainable education paradigm is not a choice between these opposites (Table 2), but a "change of weighting that moves away from the dominance of the old paradigm" and the transformation and conservation of "some of the characteristics rather than abandoning them in their entirety". Sterling[32] further contends that sustainability education implies a transformation in educational thinking and practice through which education becomes transformative learning. This indicates a paradigm that is holistic, systemic and participative. The approach espouses an "emphasis on contextualized knowledge; different ways of knowing (in addition to scientific approaches); real-world local issues as a focus of learning; the active role of the learner; and the need for participatory methodology"[33].

Table 2. **Integration of Sustainability in Higher Education**

Integration of sustainability within higher education implies shifts	
From	To
Transmissive learning	Learning through discovery
Teacher-centred approach	Learner-centred approach
Individual learning	Collaborative learning
Learning dominated by theory	Praxis-oriented linking theory and experience
Focus on accumulating knowledge and a content orientation	Focus on self-regulative learning and a real issues orientation
Emphasis on cognitive objectives only	Cognitive, affective, and skills-related objectives
Institutional, staff-based teaching/learning	Learning with staff but also with and from outsiders
Low-level cognitive learning	Higher-level cognitive learning

Source: Sterling[34]

Drawing from the literature on sustainability education, Rusinko[35] extended the studies and perspectives and developed a generic matrix of options (Figure 6) for integrating sustainability in higher education (SHE). The matrix outlines the use of a broad, non-discipline-specific perspective – including delivery and focus considerations – so that faculty and administrators can make appropriate and strategic choices with respect to integrating sustainability into higher education relative to their particular goals, desired outcomes, resource constraints and environment[36].

[31] Sterling, S., *An analysis of the development of sustainability education internationally: evolution, interpretation and transformative potential,* p. 57.

[32] Ibid., Sterling, S., *Transformative Learning and Sustainability: sketching the conceptual ground.*

[33] Ibid., p. 54.

[34] Ibid., p. 58.

[35] Rusinko, C.A., *Integrating sustainability in higher education: a generic matrix.*

[36] Ibid.

Figure 6. **Generic matrix to Integrate Sustainability in Higher Education (SHE),** *Rusinko*[37]

		SHE delivery: Existing structures	SHE delivery: New structures
SHE focus	**Narrow** (Discipline-specific)	1. Integrate into existing course(s); minor(s), major(s) or programme(s)	2. Create new discipline-specific sustainability course(s), minor(s), major(s) or programme(s)
	Broad (Cross-disciplinary)	3. Integrate into common core requirements	4. Create new cross-disciplinary sustainability course(s), minor(s), major(s) or programme(s)

Pedagogical Methods

In investigating the issues involved in establishing a green curriculum at RMIT University in Australia, focusing on the integration of waste minimization principles in the four diverse course areas of Accountancy, Architecture, Building, and Construction Economics and Nursing, Thomas et al[38] considered a number of models and approaches and the corresponding methods and associated resource requirements were identified (Table 3). It was apparent that more multidimensional understandings of waste minimization required more sophisticated models of integration[39].

Table 3. **Approaches for Integration of Sustainability into Higher Education Curricula**

Approach	Method	Resources
1. Modular approach	• Addition of a section dealing with some aspect of the project/topic material to an existing subject • Addition of interdisciplinary group work • Reconfiguring an existing element in current subject • Developing a new subject • Visiting speakers	• Academic and professional contacts • Guest speakers • Written resources • Sharing with colleagues/staff; use of frameworks • Practical examples of application and outcomes • E-learning/online forums
2. Intra-disciplinary framework	• Connections across subjects • Project work • Making issues explicit • Reconfiguring existing material	• Guest speakers • Forums for staff discussion • E-learning/online forums • Examples/case studies used • Practical examples of application • Sharing of outcomes • Seminars
3. Interdisciplinary framework	• Common subject or shared component in subjects; shared speakers • Project work • Exploring links with other courses • New shared module	• Written resources (textbooks, reports, etc.) • Case studies • Industry contacts • Guest speakers • Forums for discussions between staff and students • E-learning/online forums • Seminars

[37] Ibid., p. 253.

[38] Thomas, I., Kyle, L., Alvarez, A., *Environmental Education across the Tertiary Curriculum: a process*.

[39] Ibid.

Table 3. Continued

4. Exploring course culture	• Orientation activities • Faculty handbook • Questioning responsibility • Student association • Course learning outcomes among staff members within and across courses • Professional codes	• Teaching and learning strategies • E-learning/online forums • Seminars • Written resources (textbooks, reports, etc.) • Student orientation • Activities • Industry contacts • University policies
5. Professional practice	• Links with relevant professional associations for development and incorporation of new graduate attributes	• Industry contacts • Guest speakers • Forums/meetings • Conferences • Work placement, on-the-job training, etc.
6. Experiential learning	• Site visits/field trips • Exploring the project/topic in a material and spatial context	• Places/contacts • Written materials (reports, etc.) • E-learning/online forums • Seminars
7. Flexible learning resource	• Individual lecturers incorporate multiple entry points in a manner they see fit	• Case study • Project kit • Guest speakers • Written resources (textbooks, reports, etc.) • E-learning/online forums

Source: Adapted from Thomas et al[40]

In a later study on the extent to which concepts of environmental literacy and sustainability education have been adopted and how they have been introduced in Australian Universities, Thomas and Nicita's[41] findings show that a range of approaches were used with some indicating the use of multiple approaches (*Table 4*).

Table 4. **Approaches for Presenting Environmental Literacy/Sustainability Education**

Approach	Method	Modes for delivery
1. Addition	• Introduction of new subject or modules which deal with environmental/sustainability issues relevant to the host discipline	• Seminars • Work placement • Guest speakers • Projects • Group work • Field/site visits • E-learning/online forums • Lectures/tutorials • Participation in relevant voluntary groups
2. Incorporation	• Integration of environmental/sustainability themes into existing subjects	
3. Engagement	• Integration of an environmental/ sustainability component into most or all subjects within a course/programme	

Source: Adapted from Thomas and Nicita[42]

[40] Ibid., p. 327.

[41] Thomas, I., Nicita, J. *Sustainability Education and Australian Universities, Environmental Education Research.*

[42] Ibid., p. 483.

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Based on the prioritized expectations on the learning outcomes and the marketplace requirements for built environment graduate attributes discussed in the workshop, the ideas and suggestions for the integration of sustainability into the curricula (Table 5) interestingly echoed those approaches and models outlined by Thomas et al[43] (Table 3) and Thomas and Nicita[44]. It is worthwhile noting that Day 3 of the project workshop in Vietnam focused on developing a curriculum representing an existing built environment curricula wherein the following measures were explored: (1) What changes are needed to the existing built environment curricula?; (2) What will it take to make the change?; (3) How will educators make the change?; and, (4) How will educators engage with industry? Drawing from the workshop discussions and insights offered by both the teaching academics and industry representatives to address and effect targeted learning outcomes, it was imperative that multiple approaches be employed.

Table 5. **Development and Changes to Built Environment Curriculum (ProSPER.Net Workshop)**

Development and changes to built environment curriculum	
How educators will make the change	How to engage industry
Change teaching content	Continuing professional education
Research collaboration	Open lectures/seminars open to all in the university rather than just within the programme
Sharing/networking lessons learned	Research collaboration
Best practice examples/case studies used where possible	Form partnerships: students and industry through conferences such as Green Building Councils, etc.
Dialogue/discussions with industry	Getting industry speakers
Invite industry to: student presentations, faculty presentations	Accreditation considerations
Dialogue/discussions with other university staff/officials	Organize activities with industry (e.g. conferences, seminars, etc.)
Keep looking for funding	Send graduates to individual companies
Lobbying politicians	Mentoring
	Alumni tracking/surveys
	Advisory boards
	Adjunct professors
	Feel good stories/testaments

Learning Outcomes

Learning outcomes are the foundation of teaching and learning. They are the point at which education principles and other principles meet[45] and these are the pivotal links between teaching intentions and the assessment of student learning[46]. The literature review for this project was validated by the workshop discussions. The literature review and the workshop discussions demonstrated that sustainability pedagogies are rife with the need for different approaches to teaching and navigating the difficult transformative changes to higher education curricula. There are, however, limited parallel discussion on the learning outcomes associated with these different approaches[47].

[43] Thomas, I., et al., op. cit.

[44] Thomas, I., Nicita, J., op. cit.

[45] Thomas, I., et al., op. cit.

[46] Biggs, J.B., Tang, C., *Teaching For Quality Learning At University: What the Student Does*.

[47] Fenner, R.A., Ainger, C.M., Cruickshank, H.J., Guthrie, P.M., *Embedding sustainable development at Cambridge University Engineering Department;* Hopkinson, P., James, P., *Practical pedagogy for embedding ESD in science, technology, engineering and mathematics curricula.*

In the RMIT University study on integrating waste minimization principles in four course areas[48], a categorization of learning outcomes was developed in parallel with the discussion of the associated approaches (Table 6). Thomas et al[49] developed a set of learning outcomes that reflected the possibility of different levels of sophistication and engagement with sustainability issues based on how the integration of an understanding on waste minimization adds to the students' learning. Designated as lower, transitional and higher learning outcomes, each of the three levels required more advanced and enhanced understandings and more complex interventions by the academic staff of the course. Simple learning outcomes were considered to be understanding of the issues/concepts and identifying strategies; transitional outcomes included understanding change processes for structure and content; and using critical thinking and inter- and cross-disciplinary collaboration were considered to be higher learning outcomes. To achieve this however, teacher education was also considered to be essential.

Table 6. **Student Learning Outcomes**

	Student Learning Outcomes
Lower outcomes	• Understand what environmental/sustainability issues and concepts mean in various contexts (e.g. personal, professional) • Identify strategies/opportunities for sustainability in these contexts. • Demonstrate awareness of environmental/sustainability issues and concepts and opportunities
Transitional outcomes	• Familiarity with agencies, regulations and organizations • Understanding of the change processes (e.g. political) involved – to course structure and content, work practices and professional culture
Higher outcomes	• Engagement with issues through practical application of principles in a variety of different contexts • Initiate projects • Critical thinking about sustainability concepts and understanding of how it is changing • Inter- and cross-disciplinary collaboration

Source: Adapted from Thomas et al[50]

Using action research as the guiding framework, this research using industry and academic participants would help determine educational responses around the question of: What would be the educational responses and focus of a curriculum in the built environment that espouses sustainability education? Through the facilitator, the participants of the workshop outlined their expectations on the learning outcomes and anticipated attributes of graduates (Table 7). Essentially, both professional competencies and softer skills were expressed by academics, whereas industry participants were expecting to see softer skills and transdisciplinary skills.

Table 7. **Learning Outcomes and Anticipated Student Attributes (ProSPER.Net Workshop)**

Student Learning Outcomes	
From academics	From industry
Genuine concern	Motivation to make change
Discipline / competence / sustainability	Life-cycle thinking
Good team player	Open to other disciplines
Right attitude	Environmental / social / economic implications of their work

[48] Thomas, I., et al., op. cit.

[49] Ibid.

[50] Thomas, I., et al., op. cit., p. 328-329.

This outcome aligned with trends observed in Australia[51]. The responses show that learning outcomes are not all about professional competence. Anecdotal evidence points to this as well. In the built environment sector in Australia, in particular, industry is concerned with work-ready skills that graduates seem to lack, particularly in understanding the practical implications of sustainability issues. Remarks by the CEO of the World Green Building Council are similar, highlighting the need for graduates to ensure they have flexible skills in an ever-changing world of sustainability[52].

Perhaps learning outcomes would have to be dealt with individually in specific programmes and courses. Sterling and Thomas[53] argue that "the principles of sustainable development are ideally best explored with students where these principles are infused in the curriculum that is currently used in the discipline area". Sterling and Thomas[54] contend that furthering the discussion on education for sustainability necessitates knowing what the learning outcomes are that are desired by the students and what are the capabilities, abilities or competencies to be achieved. Some examples of studies on crafting capabilities for sustainable development have been outlined by Sterling and Thomas[55]. Parker et al[56] identified three categories of capabilities as being requirements of education for sustainability: knowledge and understanding of specific knowledge areas/attributes, skills in specific knowledge areas/attributes, and values/attitudes in specific knowledge areas/attributes (Table 8). These capability requirements resonate well with the academics' expectations on the learning outcomes and anticipated attributes of graduates and correlate with industry requirements (Table 7).

Table 8. **Student Learning Outcomes**

Knowledge and understanding of	Skills in:	Values and attitudes:
• Social justice and equity	• Critical thinking	• Sense of identity and self-esteem
• Diversity	• Formulating arguments effectively	• Commitment to social justice and equity
• Globalization and interdependence	• Challenging injustice and inequalities	• Value and respect for diversity
• Sustainable development	• Showing respect for people and things	• Concern for environment and commitment to sustainable development
• Peace and conflict	• Cooperation and conflict resolution	• Belief that people can make a difference

Source: Parker et al[57] cited in Sterling and Thomas[58]

Thus, it is not just about the sustainability pedagogies *per se*, it is also about the interdisciplinary, transdisciplinary or whole institutional approaches that need to be considered. Sterling and Thomas[59] argue that only a minority of higher education institutions have looked at curriculum change in this light, either within disciplines or in terms of whole institutional approaches.

Challenges and Barriers

Successfully introducing sustainability concepts into course and curricula[60] requires an understanding of how learning takes place and how the process of change can be successfully incorporated into course and curricula. The typical barriers to incorporating sustainability in

[51] Iyer-Raniga, U., Arcari, P., Wong, J., 'Education for Sustainability in the Built Environment: What are the students telling us?'; Sterling, S., Thomas, I., 'Education for sustainability: the role of capabilities in guiding university curricula'; Thomas, I., Nicita, J., op. cit., p. 13.

[52] Henley, op. cit., p. 11.

[53] Sterling, S., Thomas, I., op. cit., p. 363.

[54] Ibid.

[55] Ibid., p. 359-366.

[56] Parker, J., Wade, R., Van Winsum, A., *Citizenship, and community from local to global: Implications for higher education of a global citizenship approach.*

[57] Parker et al., op. cit.

[58] Sterling, S., Thomas, I., op. cit., p. 361.

[59] Ibid.

[60] Fenner et al., op. cit., p. 15.

any organization, such as a university, is presented by Lozano[61] (Table 9) and highlights the notion that "capacity-building of educators" must then be considered to be the cornerstone of transforming universities to become effective in empowering students to become change agents for sustainability[62].

Professional development for educators needs to occur at all dimensions, from overcoming the resistance to change to embracing deeper issues relating to stepping outside one's comfort zone.

Table 9. **Levels of Barriers to Change in Sustainability Education**

Typical barriers to change	
Level 1: Resistance to the idea of sustainability itself	Generally produced by a lack of information, disagreement with the idea, lack of exposition and confusion in the application of examples and case studies
Level 2: Resistance to involving deeper issues	Usually produced by feelings of loss of control or power, status loss, respect or separation of the individual from the others
Level 3: Deeply embedded resistance to change	Makes a serious contrast with the organization; the individual might be in accordance with the idea of change, but nevertheless takes the situation to a personal dimension

Source: Adapted from Lozano[63]

The workshop discussions on the extensive and diverse programmes and courses taught in the participating institutions revealed that the issues, challenges and barriers for implementation in sustainability education were similarly not divergent among the different programmes and courses. These issues, challenges and difficulties in the educational responses to change in sustainability education could be summarized as follows:

- Rigidity of institutional structures
- Rigidity of people and disciplines
- Lack of facilities, resources, etc.
- Lack of or perception of lack of empowerment to make changes

The academics advocated strongly for information and resources to further explore the insights and address the key messages discussed in the workshop. They also indicated that they needed support to develop some or all of the resources. They agreed that a programme of implementation and review and sharing of experiences was critical for them to stay focused and on the right track for ensuring lasting changes (Table 10).

[61] Lozano, R., *Incorporation and institutionalization of SD into universities: breaking through barriers to change.*

[62] Lozano-García, F.J., Gándara, G., Perrni, O., Manzano, M., Hernández, D.E., Huisingh, D., *Capacity building: a course on sustainable development to educate the educators.*

[63] Lozano, op. cit., p. 790.

Table 10. **Issues and Challenges (ProSPER.Net Workshop)**

Information	Resources	Implementation and Review
• What is the state of sustainability education in ProSPER.Net member institutions and beyond (wider community) • Organize forum for industry/academics/ stakeholders to understand the best practice/case study examples; online chat forums, etc. • Establish a repository of best practice models • Survey of industry in countries to examine what is required in research and education • Build close relationship with research and education, and continuously close feedback loops	• Textbooks for learning modules on sustainability education • Resources for teaching need to be developed both in breadth and depth • Detailed curriculum development • Support at high level of university for promotion of innovativeness in curriculum, e.g. meeting senior management at the university such as the Vice-Chancellor or Rector	• Monitoring (medium and long term); • Follow up with students post-graduation to determine if concepts are applicable in industry and whether learning media are appropriate

Source: Parker et al (2004) cited in Sterling and Thomas (2006, p361)

Workshop Follow-up

As a follow-up to the workshop, an online survey was deployed to participants about a month after the workshop, the aim of which was to validate workshop discussions. The survey questions were particularly designed to substantiate the workshop learning outcomes to recommend practical approaches for integrating sustainability issues in the curriculum for engineering and built environment courses. The questions were structured according to the following themes:

1. Educational responses and issues
2. Framework for curriculum design
3. Additional and further insights

Findings of the post-workshop survey assisted in providing further context for the formulation of the framework and direction of the guide. On the approaches for the integration of sustainability into the curricula, the survey results showed an inclination towards a combination of the following teaching approaches and methods (refer to Table 3):

- Use of interdisciplinary framework
- Capacity to include experiential learning
- Contextualization in an intra-disciplinary framework

The use of flexible learning resource or having lecturers incorporate multiple entry points in a manner they saw fit ranked low as an appropriate teaching method. The availability of and access to resources to deliver the courses also emerged through the survey, as well as how those courses may be made more accessible to students.

Somewhat surprisingly, the academics also indicated that they have difficulty in accessing industry contacts/ guest speakers. A common trend that emerged from responses in the open-ended section of the survey was difficulty in collaborating with industry and networking/ sharing experiences with other academics and universities regarding built environment courses/programmes.

Curriculum Design: Interdisciplinary versus discipline-based

In higher education, disciplines largely form the organizing framework for learning, teaching and research. However, the many interrelated dimensions of sustainability disregard containment and easy compartmentalization into disciplinary silos[64]. Interdisciplinarity is any approach that goes beyond a single discipline. The logic of interdisciplinary approaches to sustainability issues derives from the consensus that these issues cannot be sufficiently understood in isolation[65].

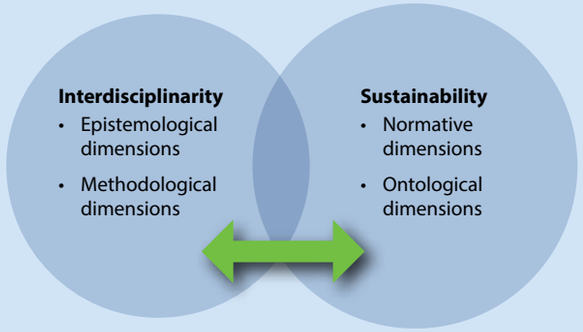
[64] Selby, D., *The catalyst that is sustainability: bringing permeability to disciplinary boundaries.*

[65] Blewitt, J., Cullingford, C. (eds.), *The Sustainability Curriculum: The Challenge for Higher Education*; Parker, J., *Competencies for interdisciplinarity in higher education*; Tilbury, D., *Rising to the Challenge: Education for Sustainability in Australia.*

Jones et al[66] define interdisciplinarity as disciplines working collaboratively, sharing their insights and methods in an attempt to go beyond their own boundaries to address issues or questions. On the other hand, multidisciplinarity is largely recognized in the literature as being the least integrated form of interdisciplinarity, where "disciplines might work together cooperatively but without sharing ideas, assumptions and methodologies and without being influenced or changed by the other"[67].

A major driver for more interdisciplinary approaches to teaching and learning is the sustainability agenda. Jones et al[68] explored the relationship between sustainability and interdisciplinarity and suggested that sustainability had primarily ontological dimensions and normative dimensions (Figure 7). Interdisciplinarity on the other hand is an approach to knowledge and inquiry, and has both epistemological and methodological qualities. Thus, sustainability presents an overarching and complex socio-economic-ecological context wherein interdisciplinarity – as a holistic mode of understanding, organization of knowledge and inquiry – seems appropriate[69].

Figure 7. **Linking Sustainability and Interdisciplinarity**



Adapted from Jones, Selby & Sterling[70]

The complex nature of sustainability-related issues requires commensurate approaches to knowledge, research, teaching and learning. There appears to be an emerging consensus that sustainability issues cannot be sufficiently understood or addressed without a primary recognition of interrelationships, and therefore also an assumption of the need for interdisciplinary approaches[71]. However, while there is expertise and experience in interdisciplinarity in higher education institutions, it still appears on the margins of the mainstream, which remains dominated by discipline-based practices and structures.

Development and Framework of the Built Environment Sustainability Education Curriculum Guide

Informed by the literature review and the workshop outcomes, the formulation of the framework of the curriculum guide drew on the following seminal and foundational reports and key text references, which focus primarily on the built environment and construction sector and point to sustainability education in the built environment:

- Guidelines on Education Policy for Sustainable Environments[72]
- Shifting Towards Sustainability: Education for climate change adaptation in the built environment sector[73]
- AGENDA 21 on Sustainable Construction[74]

[66] Jones, P., Selby, D., Sterling, S., *More than the Sum of their Parts? Interdisciplinarity and Sustainability.*

[67] Ibid., p. 24.

[68] Ibid.

[69] Ibid., p. 19.

[70] Ibid., p. 20.

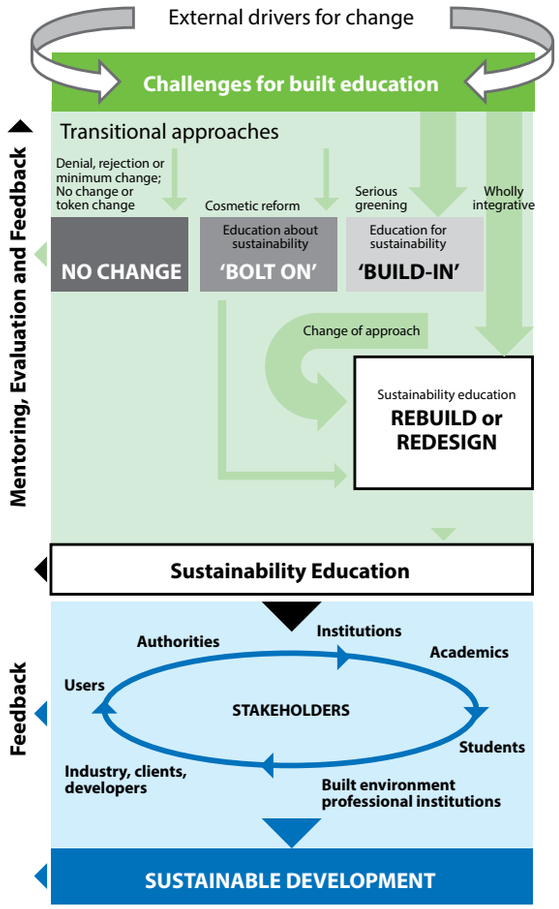
[71] Jones et al., op. cit.; Parker, op. cit.

[72] Graham, P., *Building Ecology: First Principles For A Sustainable Built Environment*.

[73] Lyth et al., op. cit.

[74] CIB 1999, *CIB Report Publication 237: AGENDA 21 on Sustainable Construction*; du Plessis, C., *Agenda 21 for Sustainable Construction in Developing Countries: A discussion document*.

Figure 8. **Learning Process to Sustainability Education**



Adapted from Strategies and Actions for Sustainable Construction[75]

The guide for university academics and curriculum developers in the built environment disciplines emphasized the process of integrating sustainability thinking and practice into the built environment curricula and the key role the professions play in the creation of sustainable built environments. The iterative and continual learning process is described in Figure 8 and hinges on addressing the key challenge of building sustainability progress on the local and regional contexts and the academic strengths of particular higher education institutions[76].

The guide contains four sections with a view of facilitating rather than directing change in an interactive format to capture feedback and experiences (See Chapter Annex for the guide):

- **Section 1** – A proposed common framework for developing curriculum for engineering and built environment programmes, which outlines the priorities in the professional development programme and provides context for capacity-building among different stakeholders
- **Section 2** – The broad framework from Section 1 provides a rationale for the guiding principles for teaching and learning issues, identifying learning aims and developing learning outcomes; using a civil engineering programme as a case study, the guide provides a programme design format and content structure
- **Section 3** – Using the civil engineering course case study, this section provides a template of programme and curriculum content, transformative sustainability pedagogies for built environment courses and references and useful resources
- **Section 4** – This section outlines the available knowledge networks for faculty development and provides a platform for reporting and monitoring of progress and evaluation; it is intended to be developed based on post-workshop feedback and participant evaluations

Further Development of the Guide

As part of the development of the guide and with the aim of facilitating further collaborations and discussions with all project participants, ProSPER.Net has helped provide a platform for the online discussion via the project website: "Engineering and Built Environment Curriculum"[77].

The project team has made the guide available in the online discussion forum for feedback and further evaluation. As the final report of the project was being written, active engagement from project participants,

[75] CIB, op. cit., p. 21.

[76] Ryan et al., op. cit.

[77] ProSPER.Net: Engineering and Built Environment Curriculum, available at: http://www.ias.unu.edu/prospernet/index.php/projects-2/current-projects/integrated-sustainability-education/

particularly academics, had lost momentum. However feedback from industry participants was immediate. Preliminary investigations into this phenomenon show that industry recognized the value of "work ready" graduates, which academia did not. On top of already existing work that academics do it is difficult to engage with them over attributes that, while important, were not highly valued in traditional academic learning outcomes.

Directions and Imperatives

Taken overall, the general direction of education for sustainability is moving increasingly toward integration and innovation[78]. The slow progress of integrating sustainability in the built environment curricula may be due in part to the practice-led approach underpinning the discipline and by the assumption that sustainability, by its very nature, already permeates the curricula[79]. In looking across built environment education, Bradley et al[80] posit that sustainability is being addressed at four levels:

1. Sustainability as knowledge
2. Sustainability as process
3. Sustainability as practice
4. Sustainability as a paradigm

The diverse experiences of the academics and industry representatives in the ProSPER.Net workshop point to the following issues, which are key to professional education for sustainability:

1. Pedagogical implications in the built environment discipline – transformative learning
2. Learning outcomes – student experiences
3. Interdisciplinary rather than discipline-based
4. Industry input – students as employable graduates
5. Challenges to built environment professionals, their institutional structures and their boundaries

To successfully introduce sustainability concepts into course and curricula, educators must understand the process of change[81] and the "capacity-building of educators" must be considered the cornerstone of transforming universities to better empower students to become change agents for sustainability[82].

Interestingly, the findings of the ProSPER.Net research project closely align with those identified by Desha and Hargroves[83], notably on the drivers and barriers to education for sustainability, organizational change, the key considerations for curriculum renewal (graduate attributes, learning outcomes, pedagogical approaches for transformation of curriculum) and engaging in institutional collaborations and industry. Desha and Hargroves' model on curriculum renewal (whole institution approach – curriculum helix)[84] for engineering programmes is a practical preliminary framework for educators to consider and sets a benchmark for other disciplines to follow. Much of the work of Desha and Hargroves was informed by case studies and projects in Australia, Europe and the United States. It is noteworthy that the authors have recommended trialing the curriculum renewal model through action-based research[85] in one Asia-Pacific country for contextualization, which has been the proposed next phase of the ProSPER.Net project.

The development of the built environment curriculum guide may present a direction for universities and industry to engage with each other and set up a framework for integrating and embedding sustainability in the built environment curricula through an innovative and transformative approach. It may also lead to the development of a community or network of practice in the future. The immediate direction of the next phase of the project is the application and testing of the guide in context, specifically in identified countries in the Asia-Pacific region, thereby sanctioning the development of resources, implementation, monitoring and evaluation.

[78] Lyth et al., op. cit., p. 2; Snow, M., Prasad, D., op. cit.

[79] Bradley, J.F., Sayce, S., Lewis, A., *Sustainability and Built Environment Professionals: A Shifting Paradigm*; Wright, J., *Introducing sustainability into the architecture curriculum in the United States.*

[80] Bradley et al., op. cit.

[81] Fenner et al., op. cit.

[82] Lozano-García et al., op. cit.

[83] Desha, C.J., Hargroves, K., op. cit.

[84] Ibid., p. 89-93.

[85] Ibid.

Conclusion

The literature demonstrates that the built environment discipline will benefit from integrating sustainability into course curricula. Industry is supportive of curricula that lays the foundation for green skills for undergraduate students. It is critical that curricula and attendant learning take a non-prescriptive approach where the focus is on:

- change *for ensuring* sustainability outcomes rather than change *about* sustainability;
- immediate changes to avoid "lock-in", so that graduates can be work-ready in a changing environment; and
- working with industry to ensure that graduates in the work force have the requisite foundational knowledge to hone green skills in their professional lives, thus bridging the gap between industry and academia.

This will set the direction for a future that will provide sustainable built environments in a region that is expected to have the biggest growth and attendant impact.

The research undertaken and the guide developed are essential steps to facilitate more engagement between universities and industry. This is a notable feature of the UNEP *Greening Universities Toolkit*[86], which therefore validates this research. By using universities holistically as "learning laboratories" for all aspects that a university represents and engages in, there are clear opportunities for ensuring that "the sustainable university can help catalyse a more sustainable world"[87]. Policy implications for this are clear – universities as institutions need to think and act sustainably in all areas of their business. Universities should not just focus on teaching and research in sustainability, they also need to engage with the community, manage their built and non-built assets and demonstrate by example, leading transformative practice for low carbon futures.

As indicated by Geli de Ciurana[88], "One of the great challenges of the 21st century for institutions of higher education is training professionals who are critical of the present-day development of our society and capable of acting in favour of more sustainable development. Therefore, universities have to work from all perspectives… to promote teaching and research programmes that provide solutions to the present problem."

[86] Osmond et al., op. cit.

[87] Ibid., p. 53.

[88] Geli de Ciurana, A.M., *Education for Sustainability in University Studies*, p. 3.

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CONTENTS

Chapter Annex: A Guide for Integrating Sustainability Education into Engineering and Built Environment Curricula

Framework
The strategies and actions outlined in the document Agenda 21 on Sustainable Construction (CIB, 1999) illustrates the learning process of continual improvement of sustainable practices in the built environment sector. This course of action (Figure 1) underpins the framework of this Guide for university academics and curriculum developers to integrate sustainability issues and facilitate innovation of sustainability education in built environment disciplines.

The emphasis will be on the learning process of integrating sustainability thinking and practice into the built environment curricula and the key role the professions play in the creation of sustainable built environments. The iterative and continual learning process hinges on addressing the key challenge of building sustainability progress on the local and regional contexts and the academic strengths of higher education institutions rather than on generic approaches.

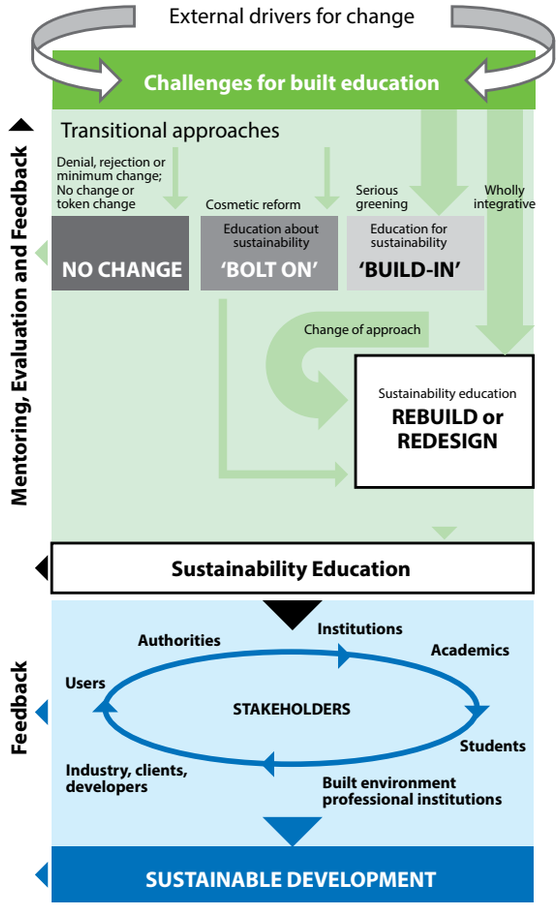
Structure of Guide
The Guide is structured in four sections with a view of facilitating rather than directing change:

Section 1
A framework, which outlines the priorities in the professional development programme; contextualizing these priorities and strategies for capacity-building for the different stakeholders are presented.

Section 2
The broad framework established and developed in Section 1 provides a rationale for the guiding principles for teaching and learning issues, identifying learning aims and developing learning outcomes; transformative sustainability approaches and methods.

Section 3
This section provides a template of programme and curriculum content, sustainability pedagogies for built environment courses and references and useful resources. The outline of themes for the curriculum content and the list of references are not exhaustive but provide a general guidance to curriculum design.

Section 4
Platform for curriculum dissemination and distribution, best practice models of curricula and case study examples. This section outlines the available knowledge networks for faculty development and provides a platform for reporting and monitoring of progress and evaluation.



Learning process to sustainability education

Learning process to sustainability education Adapted from Agenda 21 on Sustainable Construction (CIB, 1999, p21)

Section 1

Framework for engineering and built environment sustainability education

Objective: A common framework for developing curriculum for engineering and built environment programmes

1.1. Sustainability thinking in engineering and built environment

- Clarify definitions and sustainability terminology used within the context of built environment :
  - **Technical definitions:** construction of built environment as site activities, comprehensive cycle of building projects
  - **Non-technical definitions:** sustainable development – built environment as a sector of the economy, sustainable human settlements – construction of built environments as human settlements (physical structure, use patterns, social patterns, operational patterns)
- Define/clarify/outline knowledge base on sustainable built environments (efficiency, climate change adaptation, mitigation, etc.)
- Demonstrate where possible with practical examples/ case studies

1.2. Priorities in the professional development programme – establish requirements and issues (challenges) for

- Governments (local, regional and national) – policymakers, bureaucrats, professionals
- Industry and private sector
- Communities
- Tertiary education institutions with engineering and built environment programmes
- Nurture networks and encourage cross sectoral discussions

1.3. Contextualize priorities and requirements

- Global governing policies
- Local/community governing policies (including education policies)
- Industry marketplace (local, regional and national)
  - Building industry
  - Design professions – architecture, engineering, planning, surveying, landscape architecture, interior design and urban design
  - Built environment professions – construction management, property management, construction economists, quantity surveying, cost planning

1.4. Strategies for capacity-building

- Curriculum review
  - Audit of existing curricula; identify gaps and learning opportunities
- Networks and partnerships
  - Identify network and partners within schools, departments and university
  - Form national and international teaching and learning partnerships
  - Promote interdisciplinary teaching and research
  - Strengthen links between teaching, research and community engagement
- Student involvement
  - Engage and involve students in curriculum design and review; seek feedback
  - Monitor attributes/learning outcomes post graduation
  - Encourage on-the-job training
- Industry engagement and collaboration
  - Contextualize knowledge via community based engagement case studies and projects
  - Incorporate industry and community engagement programmes/projects in courses
- Professional accreditation
  - Cooperation with relevant professional associations
- Continuing education for educators
  - Develop CPD courses, work-placements, training programmes and resources
  - Mentoring staff and students

Section 2

Built environment curriculum design and structure

Objective: Outline a programme design format and content using a civil engineering programme as case study

Case study: Civil Engineering course (4-year/5-year curriculum) offered at the International University – Vietnam National University (IU-VNU)

2.1. Guiding principles for sustainability education: teaching and learning issues

- Values-based
- Learner centred; learning in context
- Holistic in scope and practice
- Future-oriented and action-oriented
- Experiential and collaborative
- Interdisciplinary, intra-disciplinary, transdisciplinary
- Critical, participatory and self-reflective
- Locally relevant
- Culturally appropriate
- Inclusive of minority and community knowledge, wisdom and opinion

2.2. Identifying learning aims (case study format: 4-5 year engineering course)

	Year	Semester	Learning aims
Inter/cross disciplinary built into the programmes	Year 1	One	Understanding the concepts of sustainability
		Two	Systems thinking + critical thinking/ life-cycle thinking
	Year 2	One	Critical thinking + systems thinking
		Two	Communication skills
	Year 3	One	Problem-based approaches
		Two	Interactions (e.g., architecture, engineers, allied professions)
	Year4/5	One	Application for industry
		Two	Life/social/communication skills

**Holistic: systems thinking/life-cycle thinking/critical thinking

2.3. Developing learning outcomes – translate concepts/learning aims into outcomes hinged on the following (but not limited to) capability requirements

Knowledge and understanding of	Skills in:	Values and attitudes:
Social justice and equity;	Critical thinking;	Sense of identity and self-esteem;
Diversity;	Ability to argue effectively;	Commitment to social justice and equity;
Globalization and interdependence;	Ability to challenge injustice and inequalities;	Value and respect for diversity;
Sustainable development;	Respect for people and things;	Concern for environment and commitment to sustainable development;
Peace and conflict	Cooperation and conflict resolution	Belief that people can make a difference

Source: Parker et al (2004) cited in Sterling and Thomas (2006, p361)

Section 3

Built environment curriculum content

Objective: Outline a programme design format and content using a civil engineering programme as case study

Case study: Civil Engineering course (4-year/5-year curriculum) offered at the International University - Vietnam National University (IU-VNU)

3.1. Curriculum Content (Themes)

- Knowledge – concepts
- Issues (in the built environment)
- Perspectives (global, national, local)
- Skills
- Values (formation of attitudes)

3.2. Transformative sustainability pedagogies (approaches/methods) for building environment courses – establish/outline the following:

- Strategies for curriculum design
- Integrated "learning" activities for built environment courses
- Assessment for learning

3.3. References and Useful Resources

- Summary of references and resources on sustainability education in built environment and higher education

Template to outline a course curriculum:

Year	
Semester 1– Identify learning aims for the semester	**Resources** Identify references and resources to achieve learning aims
Semester 2 – Identify learning aim for the semester	**How** Identify methodology / teaching approach, learning activities, assessment
Issues: Identify challenges and issues; limitations, seek feedback through surveys, etc.	

Section 4

Curriculum dissemination and distribution

Objective: Identify a platform for curriculum dissemination and distribution

4.1. Exemplars – models of curricula and programmes (engineering and built environment)

- Best practice/case study examples

4.2. Knowledge networks

- Faculty development

4.3. Reporting and monitoring

- Closing the loop/seeking feedback for improvements

4.4. Evaluation and Update

- "Sustainability content" checklist evaluation

Mapping out the curriculum content hinges on the selection of knowledge that will support the sustainability vision and goals of the university (school/department) programme.

3.1. Curriculum Content (Themes): Knowledge – Concepts – Principles

- Broadscope views of environmental issues and sustainable development (Brundtland 1987; Daly 2005; UNEP 2009)
- Metrics and meaning for environmental sustainability (Thompson & Creighton 2007)
- Concepts defining sustainability and sustainability knowledge:
  - Triple-bottom-line model (Elkington 1997)
  - Hierarchical model – integration of ecological thinking into all social and economic planning (Lowe 1996)
  - Panarchy framework and theory of adaptive change (du Plessis & Cole 2011; Holling 2004; Holling & Gunderson 2002)
- Sustainability and economics (Kats et al. 2003; Pittman & Wilhelm 2007)
- Sustainability mindset:
  - Systems thinking (Bateson 2000; Cook 2004; Robèrt 1997; Senge et al. 2008)
  - Academic and practical grounding (Orr 2011b)
  - Ethically motivated (Cohen 2007; Fox 2000)

Issues in the built environment

- Major social, economic and environmental issues were identified in the 1992 Rio Earth Summit – understanding and addressing these issues are central to sustainability (UNEP 1992).
- Contemporary issues in architecture, engineering and built environment programmes (CIB 1999; du Plessis 2002; IPCC 2007b)
- Key discursive issues that impact architecture, engineering and the built environment:
  - Climate change and global warming (Garnaut 2008; Samuels & Prasad 1994; Steffen 2013; Stern 2007; UNEP 2007; Washington & Cook 2011)
  - Climate change impacts and actions (Flannery, Beale & Hueston 2012; Potsdam Institute for Climate Impact Research and Climate Analysis 2012; Smith 2009)
  - Adaptation and mitigation (Australian Government Productivity Commission 2012; Larsen et al. 2011; Lyth, Nichols & Tilbury 2007)
  - Energy and energy efficiency (Cheng et al. 2008; Hall & Klitgaard 2012; OECD & IEA 2004)
  - Design and Construction (Birkeland 2002; Kibert 2005; Vale & Vale 1991)
  - Low-carbon buildings/zero-energy buildings (OECD 2003; Torcellini & Crawley 2006; Torcellini et al. 2006; UNEP 2009)
  - Life-cycle assessment (Berge 2000; Graham 2009; Horne 2009; Horne, Grant & Verghese 2009; Kotaji, Schuurmans & Edwards 2003)
  - Digital revolution (Kotkin 2001; Rifkin 2011)
  - Cultural heritage (Hawkes 2001; Janes 2009)
  - Sustainable cities and urban development (Brown 2003; Haughton & Hunter 2003; Newton 2008)

Perspectives

- Understanding of global issues as well as national and local issues in a global context. (IPCC 2007a, 2007b; Kamal-Chaoui & Robert 2009)
- Ability to consider issues from a perspective or viewpoint of different stakeholders essential to education for sustainable development – partial list of perspectives that students should understand (Sanusi et al. 2011, p193):
  - Social and environmental problems change through time and have a history and a future (Elkington 1997)
  - Contemporary global environmental issues are linked and interrelated between and among themselves
  - Humans have universal attributes (i.e., they are social, they love their children and care for their future)
  - Look at own community as well as look beyond the confines of local and national boundaries to understand (Larsen et al, 2011)
  - Acknowledge and understand that every issues has multiple points of view, depending on who are involved (who are the stakeholders effected by or affecting the issue)
  - Considering differing views before reaching a decision or judgement is necessary
  - Economic values, religious values, and societal values compete for importance as people of different interests and backgrounds interact (Stern 2007)
  - Technology and science alone cannot solve all our problems (Petroski 2010, Rifkin, 2011)
  - Individuals are global citizens in addition to citizens of the local community
  - Individual consumer decisions and other actions effect resource extraction and manufacturing in distance places.
  - Employing the precautionary principle by taking action to avoid the possibility of serious or irreversible environmental or social harm even when scientific knowledge is incomplete or inconclusive is necessary for the long-term well-being of the community and planet.
  - Overview and understanding of sustainable public policy (Chiras 2005b)
  - Sustainable building policies (OECD 2002, 2003)
  - Energy efficiency policies (IEA 2011)

Skills

- Broad skills – critical thinking, etc. (Holmberg & Samuelson 2006; Svanström, Lozano-García & Rowe 2008; Wals & Jickling 2003)
- Discipline skills: Built environment specific skills (ILO 2011; Larsen et al. 2011; Lyth, Nichols & Tilbury 2007)
- Global practice approach (Parker, Wade & Van Winsum 2004; Steiner 2010)

Values and Attitudes

- Sustainability values (Leiserowitz, Kates & Parris 2004)
- Misconceptions on the concept of sustainability (Leal Filho 2000)
- Value change (Guo, Vale & Vale 2010)

Sustainable development requires practicing designing and testing mutually beneficial social, economic and ecological relationships in built environments, rather than simply limiting the vision to creating "less-harmful" designs (Graham & Booth 2010, p52).

What is taught in the built environment discipline will need to change with both time and place but how educators teach should be examples of sustainability. Curriculum reform should not only be in content, but in the process and context of education – framing sustainability as a way of thinking and acting and as a quality of the mind of the built environment professional.

3.2. Transformative sustainability pedagogies (approaches/methods) for building environment courses

- Designing constructively aligned outcomes-based teaching and learning (Biggs & Tang 2011; Jones, Selby & Sterling 2010)
- Education in the age of technology (Collins & Halverson 2009)
- Education strategies for built environment (Graham & Booth 2010)

Integrated learning activities for built environment courses

- Effective teaching for higher education (Biggs & Tang 2011; Ramsden 2003)
- Practical pedagogy (Cotton & Jennie 2010; Cruickshank & Fenner 2012; Hopkinson & James 2010; Segalàs, Mulder & Ferrer-Balas 2012)
- Integration of sustainability (Thomas, Kyle & Alvarez 1999; Thomas & Nicita 2002)

Assessment for Learning

- Assessment for understanding and learning (Biggs & Tang 2011; Ramsden 2003)

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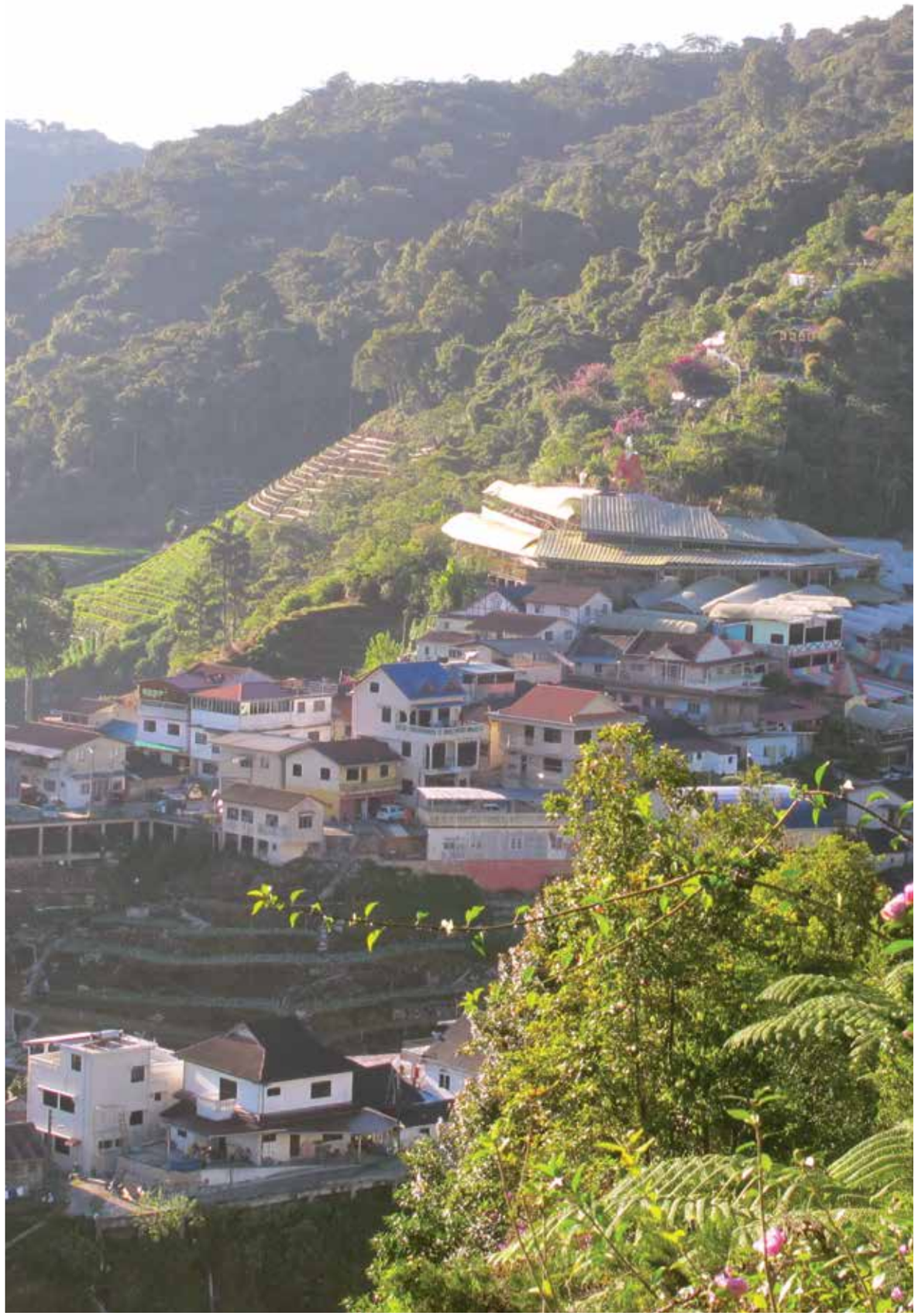


CONTENTS

Sustainable Production and Consumption and Education for Sustainable Development: Using the learning case method approach

Ellisha Nasruddin *(USM)*

This chapter explains the development of learning cases by ProSPER.Net institutions and partner organizations, and can be used as resource materials to enhance awareness on sustainable production and consumption (SPC) issues as well as for providing targeted participants necessary SPC knowledge, skills, and tools. It describes the imperative of the learning case method approach as an avenue for useful and effective pedagogy to be applied in addressing the SPC challenge, the specific SPC areas covered by the learning cases, as well as various possible policy influences resulting from engagement of participants in these learning cases.

Introduction

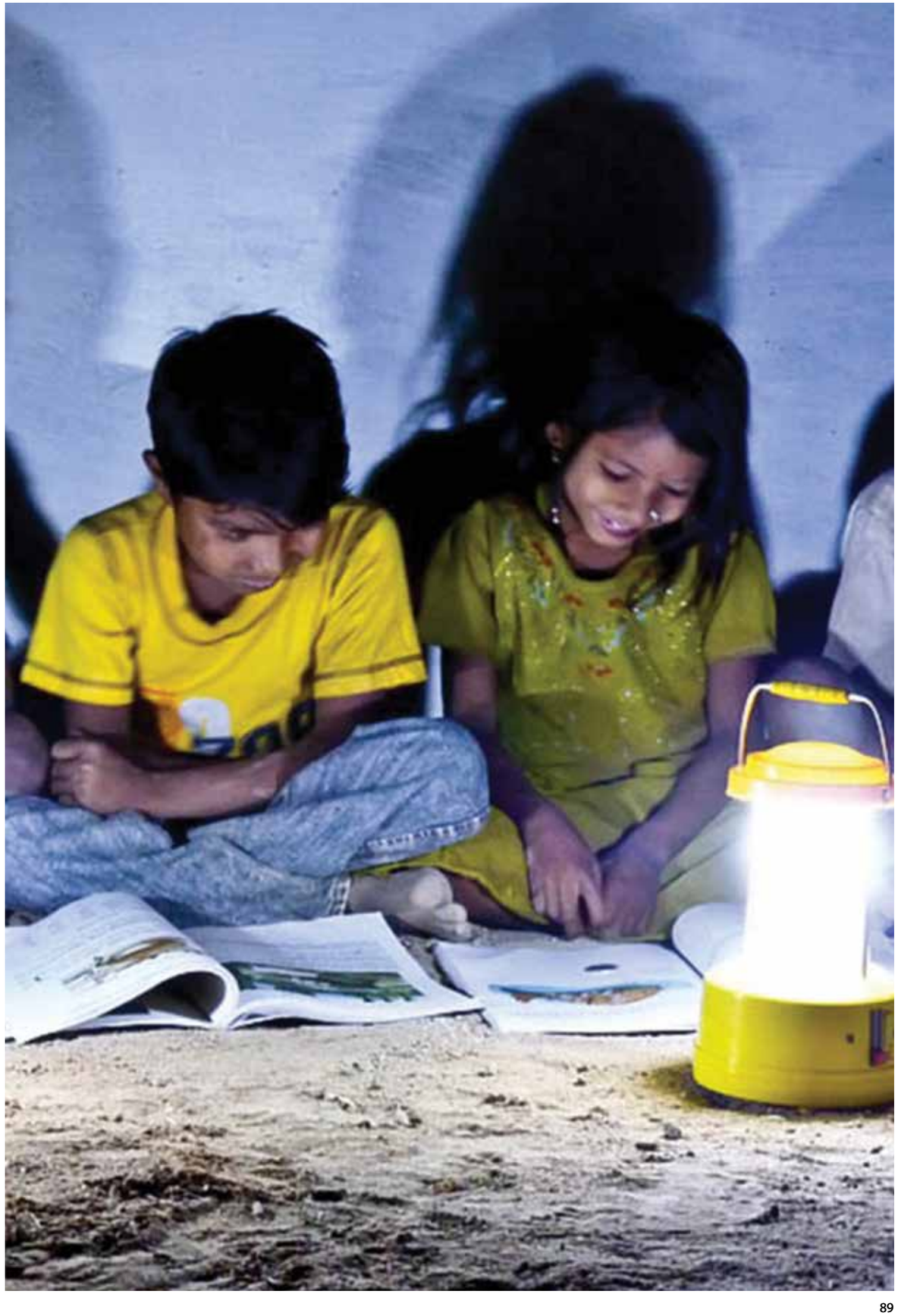
Green economy conjures the idea of economic growth, which promotes sustainable development and resides within the context of multi-stakeholders living together within an ecosystem which functions not only to provide for society's basic needs and human development, but also to reduce environmental degradation. The green economy depends upon key stakeholders willing to accept a culture of behaviour change around the way resources are used, through SPC. This behaviour change emphasizes resource efficiency and includes the application of innovative processes and technologies in using resources to develop products, services, and new initiatives/strategies for how resources are consumed. It is expected that such efforts would contribute towards the decoupling of economic growth from its current negative impact upon environment.

The challenge for developing nations in the ASEAN region is to aim for development oriented towards sustainable growth and consumption, at the same time. However, in doing so, the government sector needs to play a leading role in ensuring that producers do not exploit sustainability in their search for profit and a competitive advantage. Perhaps then, the biggest challenge for developing and newly industrialized nations is to ensure that genuine contribution towards nature and humanity can be achieved simultaneously. Recurring issues such as the need to narrow the gap between rich and poor, unequal employment opportunities, poverty, poor access to health and education services, lack of clean water and sanitary equipment, lack of access to patented drugs for HIV-related patients, and lack of access to fair-priced seeds for farming competes with any new SPC change programme or initiative at the top of any development agenda.

Hence, in order to make SPC a central part of day-to-day living, indigenization of knowledge and practices of SPC principles becomes crucial. For these nations, what is at stake is to not necessarily duplicate the SPC practices of developed nations, but to understand that realization of any SPC changed programme would require tailor-made solution models that capture nation-specific values with regards to sustainable production and consumption. Answers to how to improve the upstream and downstream end of processes in a particular value chain or how to develop collaborative waste reduction models among stakeholders (both producers and consumers), would need to be driven by an understanding of critical success factors unique to particular nations. Since the indication of success for any SPC change programme is a nationwide social capacity for change, and the biggest change is the measurable impact of any change programme (beyond the attitudinal, knowledge, and behavioural dimensions), the successful materialization of any such programme must come from the local level which, in turn, would need to interpret SPC so as to fit with local culture. Hence, while the broad underpinnings of SPC are fixed, the materialization of SPC techniques/systems/methodologies would need to be culturally sensitive. In other words, for these nations, successful materialization of trends related to SPC (such as sustainability as a driver of innovation, sector-specific codes of conduct, tracking unethical footprints, and value-driven production and consumption) would show rich local knowledge content.

ESD and the SPC Challenge

Education for sustainable development (ESD) questions the assumptions of how growth, environmental protection, and social relations should coexist and emphasizes cultural respect as the main underpinning of sustainability and sustainable development. Situating economic growth, environmental preservation and social well-being together is a challenge, which ESD stresses. While it is clear that SPC suggests the need for balancing increasing economic growth and reducing environmental degradation, and that various innovative strategies such as eco-efficiency, cleaner production, zero waste manufacturing, and life cycle assessment, among others, could be implemented and monitored, it should be stressed that all efforts towards reducing environmental degradation should somehow benefit society, improving the peoples' livelihoods and raising the living standards of humankind.



In ESD, the critical aspects of SPC that needs to be addressed relates to:

- Developing the SPC knowledge of decision makers (government and private sector) and providing them skills to apply such knowledge and transform it into favourable SPC-related policies;
- Nurturing appropriate values and attitudes to fulfil the SPC challenge;
- Inculcating capacity-building for behavioural change over the short and long-term; and
- Nurturing solutions for the multi-stakeholder involvement in the promotion of required partnerships in various sustainability programmes within SPC-related areas.

Learning about SPC thus requires a useful and effective learning case method pedagogy. There are several reasons for this requirement. First, SPC-related topics are diverse, and different cultural contexts require a learning approach that easily transforms knowledge about the fundamental underpinnings of particular SPC-related topics into practice, while considering the appropriate cultural values and attitudes. A deep understanding of the constraints put forth by stakeholders from political, economic and social spheres would be needed.

Second, creative solutions born from a systematic analysis of particular SPC-related issues are needed in learning about leadership within the SPC-related agenda. Different learning triggers are required for such solutions to appear, from understanding the problem, to analysing it, and then to identifying solutions and understanding the consequences of actions towards those solutions. These learning triggers are effective pedagogical methods that could be used to build new perspectives and develop discriminative and discovery learning. They include probing questions for systematic reasoning, relevant topic-related conceptual mapping, frameworks for thinking on contextual development, schematic representation of knowledge through sequential and non-sequential approach, and reflective information processing.

Third, as solutions on capacity development programmes related to SPC require multi-stakeholder engagement, learning on aspects of SPC would require diverse stakeholders as learners of SPC, to engage and debate on critical issues based on their capacity and experiences. Hence, a learning process that incorporates small group interaction and discussion, which challenge assumptions and foster constructive transference and creation of new knowledge, would be essential.

Fourth, a large part of SPC is targeted towards policymakers who need to link knowledge with change practices and enhance their ability for deeper engagement in order to explore policy alternatives that might lead to more rational choices. This requirement would necessitate the need for policymakers to learn about SPC through exposure to multidisciplinary and multicultural settings. While learning about policy development could be done through an academic setting with an eventual examination or project-based assessment, or through field studies, the former focuses on content mastery without exposure to synergistic knowledge development and the latter may be limiting in terms of full access to the required settings.

SPC and the Learning Case Method

Learning about SPC through the learning case method is the closest viable alternative to having a lived experience of the different facets of SPC; it also responds to the four key issues above. In a learning case, learners are presented with a learning topic, varied cues on learning issues through background and details of the case, and finally, particular learning questions. Particular learning triggers are provided and are aided by instructors, who have particular learning outcomes to achieve. In the learning process, learners are directed towards internalizing and processing of knowledge, constructing their own meanings, and engaging in a simulated environment. This learning approach involves a strategy that provides an appropriate medium for discussion and for solving problems that learners encounter in real life situations. Hence, the quality and nature of discussions influence the learning process.

A learning case emulates and simulates an actual environment and portrays real life practices, allowing learners to have a deeper exposure to the topic at hand. The strength in applying such learning cases is that it may offer perspectives for the same level of solutions in similar contexts, which are useful for any new effort towards improving capacity-building projects and change programmes.

In addition, the learning case allows for the application of a creative process and methodical approach in uncovering solutions, allowing case participants to explore solutions within guided, yet open-ended boundaries. Good analytical frameworks within cases facilitate complex and creative solutions in terms of sharpening decision makers' behavioural competencies.

Another crucial point about the learning case method is that cases are written in such a way as to provide sufficient background knowledge about the multicultural, industry, and governance setting. Cases that cover a multitude of industry and community sectors and which have implications for policy-building and development of capacity-building programmes would inspire discussions that weigh the trade-offs among alternative solutions.

Last but not least, continuous efforts in SPC initiatives require leaders to understand the policy implications behind such initiatives. Short and long-term policies on SPC are needed. Scrutinizing each angle of capacity-building projects and change programmes could be daunting without knowledge on what works and what does not, within each specific context. Hence, a case learning approach offers the opportunity to divulge the intricacies and complexities in implementing SPC initiatives, capacity programmes, and change programmes.

The Development of Learning Cases on SPC Project

Universiti Sains Malaysia (USM) acted as coordinator of this SPC project, with participation from several ProSPER.Net member institutions (i.e. Prince of Songkla University (PSU), TERI University, University of the Philippines (UP), and Yonsei University) and partner organizations (i.e. UNEP, the United Nations Industrial Development Organization (UNIDO), RCE Greater Phnom Penh, Cambodia, and WWF Philippines). The coordinating university and each participant contributed at least one learning case.

The project's main purpose was to address production and consumption related challenges – alongside issues related to the green economy, good practices, policy choices, and other diverse topics in different regions – through the development of learning cases as resource materials. The SPC issues that the project aimed to address included cleaner production and resource efficiency, supply chain management, stakeholder engagement, procurement practices and sustainable consumption, financing of sustainability and development projects, education and capacity development for sustainability, and sustainable regional development.

The expected outcomes were not only to provide resource materials for the ASEAN Plus Three Leadership Programme on SPC[1] but also for other capacity-building initiatives of UNU-IAS and partners on SPC and related fields, including those offered by the RCE and ProSPER.Net communities.

The project objectives were:

- To develop learning cases on SPC to be used for capacity development programmes, including the ASEAN Plus Three Leadership Programme on SPC; and
- To produce learning cases to enhance awareness on SPC and to equip policymakers in government and private sectors with the necessary knowledge, skills, and tools for integrating sustainable thinking into practice and developing strategies for sustainable development.

Based on these objectives, the following activities were carried out:

- Development of learning cases, which includes gathering inputs pertaining to issues on SPC as they relate to policy issues, and potential country-level change initiatives;
- Presentation of draft write-up of cases at the 5th ASEAN Plus Three Leadership Programme on SPC;
- Revision of cases based on shared experiences and comments of programme participants, as well as editorial reviews and development of teaching notes and slides;
- Preparation of cases for online publication on the ProSPER.Net website; and
- Publication of a ProSPER.Net working paper.

Project Execution

Learning cases were developed by ProSPER.Net institutions in the following SPC areas:

- Sustainability-led Institution: Universiti Sains Malaysia (by USM): The Universiti Sains Malaysia case is designed to encourage discussion and improve understanding among administrative and campus communities on the challenges of implementing sustainable consumption

[1] The ASEAN Plus Three Leadership Programme on Sustainable Production and Consumption has been offered annually since 2008 under the framework of the ASEAN Environmental Education Action Plan (AEEAP) endorsed by the governments of ASEAN member states. One of the strategic actions of the plan is on capacity-building, which prioritizes the leadership and governance of organizations in addressing the pressing sustainability challenges of the region. Participants come from the 10 ASEAN member states, as well as from the three dialogue countries, namely China, Japan and the Republic of Korea.

in a learning institution, especially with regards to capacity-building and solution frameworks for sustainable consumption.

- Green Business and Impact Assessment: A case of Malaysia's Rare Earth Processing Plant: (by USM): This learning case discusses sustainable production and consumption in the context of impact assessment and nurturing greening capabilities for rare earth industry in Malaysia.
- Greening a Campus-led Economy Through Low-Carbon Transport: The Case of Prince of Songkla University (by PSU): This learning case revolves around the development and planning of an electric vehicle bus programme for Prince of Songkla University on-campus and neighbouring community transport.
- Financial Gradients: Methods and Perspective for Financial Policy in Sustainable Development Action (by TERI University): This case study focuses on using financial gradients to analyse capital inflow, and the implication for securing long-term stable finances, for projects on sustainable development.
- Participatory Development of Indigenous People in the Bataan Natural Park (by UP): The case focuses on designing and implementing sustainable production and consumption into community development strategies and programmes – how government, business, non-governmental organizations, community representatives, and donor agency representatives can work effectively with indigenous communities such as the Magbukún Aytas of Kanawan in Morong, Bataan, in the Philippines, by taking into consideration their peculiar culture, traditions, community organization, decision-making, and limited resources.
- The Dilemma of the Cheonggyecheon Restoration in Seoul (by Yonsei University): This case focuses on the Seoul Metropolitan Government's strategies to foster public acceptance and collaboration with local merchants, for the restoration of Cheonggyecheon, a stream that flows through downtown Seoul.

Learning cases were developed by partner organizations in the following SPC areas:

- Resource efficient, cleaner production for rice milling (by UNIDO): The case is written to build awareness on the critical issues associated with rice milling and resource efficient and cleaner production in Cambodia.
- Supply chain integration for sustainable rattan and bamboo crafts (by UNIDO): This learning case draws on UNIDO's technical cooperation work under its Green Industry Initiative in the bamboo and rattan value chain with Vietnamese small and medium-sized enterprises in Nghe An Province, emphasizing resource efficient and cleaner production, and value chain diagnostics.
- Introducing Green Technology in Developing Nations – A Case of Indian Railways (by UNEP & Indian Railways): This case demonstrates how Indian Railways use sustainable procurement as a tool to create synergy with existing international instruments, such as the Kyoto Protocol, in getting household consumers to adopt energy-efficient green product as part of day-to-day living.
- Effective Collaboration on SPC in the Philippines: DENR-CCC-WWF SPC and Green Economy Project (by WWF Philippines): This case presents a partnership among the United Nations Environment Programme (UNEP), the Department of Environment and Natural Resources (DENR), the Climate Change Commission (CCC) and the World Wide Fund for Nature, Philippines (WWF Philippines) towards initiating a collaborative environment among various stakeholders on the green economy in the Philippines.
- Sustainable Rural Development in Greater Phnom Penh: Promoting Eri-Culture in Cambodia (by RCE Greater Phnom Penh): This learning case focuses on the promotion of eri-culture in the Greater Phnom Penh region of Cambodia and how it raised the environmental awareness of local farmers, especially regarding the reduction of agricultural chemical use, such as chemical fertilizers and pesticides.

Many of these cases were tested on participants from the ASEAN member states during the 5th ASEAN Plus Three Leadership Programme in 2012. The impact of this programme is obvious at various levels:
1) participants recognized the importance of tackling issues on SPC;
2) participants gained new ideas on initiatives for possible replication in their respective regions;
3) participants were interested in contributing their own cases as good practice cases; and
4) a new possibility of seeking assistance from partner agencies to provide change management process initiatives emerged.

Each of these cases above portray the development of key content components, which are critical to building an effective pedagogy through the learning case method:

- Balancing breadth and depth of topics discussed: showing broadening of learning orientation, from understanding the problem and analysing it, to indentifying solutions and understanding the consequences of actions towards those solutions;
- Providing teaching notes to guide the learning: teaching notes describe in detail how innovative pedagogy could be applied, and the solutions for each case, bearing in mind creativity and the diverse range of possible solutions;
- Developing working sessions that link to learning outcomes: A thorough analysis of particular aspects of SPC issues/topics are integrated within the working sessions through learning activities;
- Facilitating a learner-centred approach in working sessions: case-participants could conceptualize and realize potential alternative solutions from their own experience, through the analytical frameworks; and
- Applying creative thinking in innovative pedagogy: case participants could extend logical thinking through multiple perspectives and multiple levels of analyses.

Policy Influence

This project has shown that a useful pedagogy on ESD, such as the learning case method, has significant potential in terms of facilitating different facets and issues of SPC, which can than be communicated to and acted upon by learners who represent stakeholders from a variety of sectors. The potential of this project must be seen in terms how policy is influenced and, as a result, how change programmes could be better developed, implemented, and monitored. The resource materials (i.e. cases) are expected to facilitate a change process from a business-as-usual scenario to one that changes, or has the potential to change, behaviour and systems. A number of future policy influences that could be considered by participants using these resource materials include:

1. Change programmes on SPC require significant stakeholder engagement, from which appropriate solutions on capacity development activities can be considered. As such, change agents and leaders implementing intervention programmes need to approach stakeholder engagement using a methodical approach, applying appropriate negotiation skills and citizen participation strategies that allow for successful implementation of change programmes. Therefore, an integrative policy on SPC change programmes should include a thorough understanding of the stakeholders' needs, identification of critical factors for cross-sectoral collaboration, creation of clear mechanisms for conflict resolution, and the development of collaborative models and practices in governance for SPC.

2. The ultimate impact of change programmes on SPC is whether a positive impact garners real results in attitudes, behaviours, and cultural change, in addition to improving livelihoods. Therefore, policy influence that cultivates initiatives on any such programmes would need to seriously consider the operationalization and mobilization of agents of change who enforce and monitor successful implementation, and encourage corrective actions related to intervention strategies and actions.

3. A crucial part of the ESD philosophy in SPC is that all intervention programmes need to consider social sensitivities. All programmes must respect the culture of specific communities. Policy solutions that have the potential to deliver triple-bottom line benefits (i.e. economic competitiveness, improvements to livelihoods, and environmental preservation) and consider the cultural peculiarities of specific communities would be more successful. Hence, policies on SPC should be intrinsically linked with this consideration. The key policy influence is on how project leaders can effectively engage with communities, especially indigenous communities, towards self-leadership in formulating and implementing community development plans, and evaluating progress towards plan objectives. In that process, a parallel effort towards indigenization of knowledge becomes imperative.

4. Sustainable production and consumption programmes could be linked to specific development priorities. As such, all programmes related to the application of new methodologies on SPC that show a direct benefit towards improvements in the environment must also show a parallel benefit in terms of improvements in the lives of those living in that community, either in terms of income, poverty alleviation, health improvements, or otherwise. Hence, policy focused on a social impact analysis that complements an environmental impact analysis would

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consider the impact of SPC throughout the value chain, both further up and down stream.

5. Knowledge and awareness of the basic principles in SPC techniques and methodologies, and how these techniques contribute towards socio-development and poverty alleviation, is the forerunner in SPC implementation. Policy coherence that promotes a systematic approach to knowledge acquisition on SPC systems at national and sub-national levels could be another key outcome.

6. A further outcome could be an influence on the development of policy that facilitates self-leadership on SPC uptake by producers from the business sector. Such policy would promote a collaborative environment and coordinated initiatives among stakeholders from multiple business sectors, as well as collaboration with non-business sectors. Furthermore, producers would seriously consider self-policing or voluntary compliance as a major part of their day-to-day business operation.

7. A sustainable procurement policy that goes hand-in-hand with the introduction of any change programme is probably one of the more important impacts that could be made by this project. In relation to this effort, designing financial policies that support the successful implementation of sustainable procurement policy and encourage the public and targeted groups to modify their behaviour towards the expected outcomes of sustainable procurement would be essential. Such financial policy would entail diversification of sources of funding and scaling up investments from all sources, making finance more readily available for appropriate target groups and lowering barriers for SPC project financing.

Conclusion

While it is clear that an innovative pedagogy is crucial for the effective and efficient transfer of knowledge and skills on SPC, there is a need for more leading examples of good practices on SPC to be turned into learning cases. Initiatives that support creative platforms for sharing of more useful cases in the ASEAN region and beyond are therefore most necessary. In addition, diverse project settings that deal with diverse SPC topics would add value to the expected impact the project is expected to deliver. Such diversity would allow for a variety of SPC cases that would meet the different needs of a variety of practitioners, leaders, and policymakers.

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E-learning Programme on Sustainable Development for Policymakers

Arun Kansal *(TERI)*, Arabinda Mishra *(TERI)* and Rajiv Seth *(TERI)*

To meet today's challenges of sustainable development, policymakers need to understand cross-sectoral linkages and have a basic understanding of the scientific, economic, and social aspects of specific problems. With the objective of developing regional SD campaigners, TERI University in New Delhi led an initiative among ProSPER.Net universities to develop an open-access learning platfom relevant to SD problem-solving in the Asia-Pacific region. The idea was to provide convenient, easily accessible, quality-controlled and relevant learning tools through a unique combination of modern web-based technologies and pooled resources of an expert network. Most of the participants of this programme come from developing nations, in particular from small-island nations. Information sharing and providing access to the best SD practice case studies have long-term regional impacts.

Introduction

Due to globalization and economic reforms, policy decisions at all government levels are required to be increasingly multifaceted in order to contribute to the sustainability of the development process. Private not-for-profit and for-profit business entities also have a bearing on development-related policy decisions. To respond effectively to these issues, civil servants in particular, but also those engaged in the non-governmental sectors, need to (1) be trained in the politics and economics of public policy and in sophisticated methods and tools of analysis, and (2) refresh their knowledge of the important development issues at hand.

In order to foster a systematic development of core competencies in the practice of SD, TERI University launched an e-learning programme for development practitioners and policymakers in the Asia-Pacific region. This initiative to pilot-design a curriculum and produce suitable learning resources on sustainable development practice (SDP) was a collaborative activity under the ProSPER.Net initiative of the UNU-IAS, and was sponsored by the Ministry of Environment, Japan. Five universities from the Asia-Pacific region participated in this joint initiative. The aim was to develop an online postgraduate diploma programme on SDP in public policy.

The objective of this collaboration was to align public policy development and governance frameworks towards common regional objectives, and to create environmental leaders.

About the Project

Starting August 2008, TERI University led an initiative among ProSPER.Net member universities to develop open access learning resources relevant to SD problem-solving in the Asia-Pacific region. Five universities joined this initiative (Table 1). The initiative's main objective was to foster cross-border and multidisciplinary collaboration in learning activities using web technology and to promote skills in environmental leadership and SD practices. Finally an online postgraduate diploma programme on Sustainable Development Practices in public policy was developed in three phases during FY 08-09; 09-10; and 10-11.

Table 1. **Participating Universities to Develop the E-learning Programme**

	University	Key role
1	TERI University, India	Project coordination, finalization of course outline, development of learning resources, designing learning activities, and participation in evaluation and feedback.
2	University of South Pacific (USP), Fiji	Finalization of course, development of learning resources, designing learning activities and participation in evaluation and feedback.
3	Asian Institute of Technology (AIT), Thailand	Finalization of course, development of learning resources, designing learning activities and participation in evaluation and feedback.
4	Tongji University, China	Engaging senior policymakers and practitioners, programme dissemination, securing participation in the programme.
5	Universiti Sains Malaysia (USM)	Engaging senior policymakers and practitioners, programme dissemination, securing participation in the programme

The project was carried out in four stages:

Stage I (August 2008 to mid June 2009) –
Preparation stage: The partner universities finalized the course contents, prepared a plan of action, sought feedback from policymakers, and disseminated the programme.

Stage II (mid June to August 2009) –
Launch stage: Activities such as, development of learning resources and a dedicated website for the programme, invitation for online applications, selection of students, mid-term programme evaluation by partner universities.

Stage III (August 2009 to September 2011) –
Execution stage: Completion of the programme and active engagement of the students.

Stage IV (September 2011 to December 2011) –
Final stage: Grading of assignments, result declaration, programme evaluation by the students and a peer review.

Faculty members from various knowledge domains produced learning resources that:
1) explained the transboundary nature of natural resources, 2) described limitations and opportunities of resource sharing at the regional level, and 3) were in coherence with sectoral issues.

Project Planning and Execution

Curriculum and programme design, dissemination and feedback workshops

TERI University organized the first event in this area – the SDP Curriculum Inception Workshop (20-22 October 2008) with the broad objectives of: (a) developing a structure for pilot course modules covering resource management, economic reasoning, and field methods, and (b) generating consensus among the partners on key details of the programme. The plan of action developed in this workshop identified the roles and responsibilities of the different partner universities in curriculum development of the programme and its dissemination among policymakers in the region.

Following the workshop, the activities focused on programme design and course content development. Three courses were selected for the programme: Natural resource management, economic reasoning in public policy, and climate science and policy. Technical notes, case narratives, mock scenarios, self-help tutorials, challenge questions, and other learning tools were accompanied by learning activities such as quizzes, essays, online debates, and experience-sharing. Course guides provided structure to these learning activities.

A series of interactions via video conferences with partner universities led to valuable consensus-building on project activities and a mutual understanding of the planned outcomes of the e-learning programme. This was followed by a one-day dissemination workshop in March 2009 to publicize the programme among a selected group of mid-career officials of the Indian government. In order to receive feedback on the course outline, AIT and Tongji University disseminated and discussed the programme during personal meetings with government officials in May and June 2009, while the University of South Pacific (USP), Fiji organized a stakeholder meeting in July 2009.

These activities have helped to design the course curriculum and effectively disseminate the programme in the region, as is evident from the 100 applications that were received within one month and about 50 more applications of interest that were received after the application deadline.

Needs assessment study

The need for capacity-building for SD practice in South Asia and Southeast Asia is well acknowledged. However, little research has been done to identify the specific competencies needed among development professionals of different functional domains, such as intergovernmental organizations, national ministries, aid agencies, non-governmental organizations, and academic institutions. It is well known that to meet the challenges of sustainable development, generalists and specialists engaged in development policymaking and practice need to understand the cross-sectoral linkages of specific problems and have a basic understanding of science, economics, and policy[1]. TERI University assessed the specific capacity needs for sustainable development practice in the South Asia region. The assessment drew from a similar exercise carried out by the University for the International Commission on Education for Sustainable Development (ICESD) in 2008[2]. In total, 47 completed questionnaires were received. In addition to the questionnaire-based survey, the researchers carried out focused interviews and discussions with a selected group of professionals.

The survey revealed an acute scarcity of training resources that are truly cross-disciplinary in nature. The conventional lecture-based training method rarely provided the stimulus to find innovative solutions and was ineffective for transdisciplinary aspects of SD. The faculty often conveyed subject-specific knowledge to the students leaving it to them to draw linkages with other domain aspects. During the interviews, the importance of field training, professional mentoring, peer interaction, and team activities were revealed. Respondents were clearly in favour of the concept of lifelong learning. Web-based platforms like the internet, web-postings, e-mail groups, virtual forums, online exchanges, and multimedia presentations were identified as key instruments for sharing professional experiences.

Field work was unanimously registered as a core component of any development training programme. It seemed to be particularly important for developing a better understanding of the complexity of social processes and institutions in different cultural contexts. Most of the professionals thought there were very few examples where classroom theory was applied in the field. Exposure visits, participatory first-hand information gathering and analysis, as well as internships were typical examples of current fieldwork. However, these activities were often designed in an ad hoc manner and without clear specifications regarding expected learning outcomes.

Most of the respondents believed that any training programmes should include a follow-up professional mentoring system. Mentoring would help to evolve the trainees' personality and enhance their ability to cope with a variety of adverse situations. At the same time, this was associated with many challenges, such as the ability of mentors to provide constructive suggestions without being overbearing. In campus-based programmes, the distance between mentors and students often resulted in disinterest from both sides and poor follow-up.

The majority of respondents regarded peer interaction as the most productive activity in the lifelong learning process. However, in many campus-based programmes, interaction became difficult once the training period ended. Along with the development of a suitable learning programme, there was a need for e-tutoring.

With the rapid development of web-based technologies and the spread of internet-enabled communications in large parts of the Asia-Pacific region, the potential of e-learning programmes to bring about significant social transformation through education and training cannot be over-emphasized. What is currently needed is a radical change in the mindset of both educators as well as policymakers in favour of introducing the right incentives, that will make such programmes valued and accepted in society.

[1] Report from the International Commission on Education for Sustainable Development Practice, 2008

[2] Report on South Asia Regional Consultations on Development Policy & Practice, TERI University, June 2008

Development of learning resources

The above activities combined with a series of interactions through video-conferencing with partner universities and brainstorming of faculty resulted in the design of a model curriculum (Table 2). The aim was to convey an understanding of the global context and regional capacity needs, with an emphasis on critical thinking and problem-solving skills. Additionally, the goal was to provide an incentive to creative thinking in terms of cross-sectoral linkages by illustrating key topics through case studies and providing useful web-links for in-depth information. The draft of the chapters was shared among partner universities for input and feedback.

Table 2. **Levels of Barriers to Change in Sustainability Education**

Semester 1	Title	Cdts
1.	Water resource and quality management	3
2.	Natural disaster management	3
3.	Air quality management	3
4.	Basic microeconomic theory	3
5.	Government, market and regulations	3
6.	Tools correcting market and government failure	3
7.	Mechanisms of climate change	1
8.	Impact of climate change	2
9.	Climate change adaptation and mitigation	4
10.	International negotiations related to climate change	2
Semester 2	**Title**	**Cdts**
1.	Life cycle assessment	3
2.	Environmental systems modelling	3
3.	Macroeconomics in a global perspective I	3
4.	Quantitative analysis for public policy I	3
5.	Basics of climate modelling	2
6.	Tools and methods for climate change impact and vulnerability assessment	2
Semester 3	**Title**	**Cdts**
1.	Macroeconomics in a global perspective II	3
2.	Quantitative analysis for public policy II	3
3.	Assessment of climate change adaptation options	2
4.	Economic assessment of climate change	2
Total credits		53

Launch of the programme and enrolment of students

In June 2009, a dedicated website was launched in the public domain with the following features:

(i) Details of collaborating universities

(ii) Description of the programme

(iii) Eligibility criteria, expectations and application form

(iv) Description of individual courses and structure

(v) CV of course coordinators

(vi) Contact and general information

A draft of the website was circulated among the partner universities and finalized upon consensus. The website was structured at different levels: programme, course, module, and topic. The general programme and the course level pages were open-access. However, to access the modules covered during the course and to view the contents of each topic, individual user IDs and passwords were required.

The online application asked for general information about the candidate, choice for certificate course/diploma, proficiency in English, current job profile and years of experience, academic records, and the candidate's expectations of the programme. Applications were accepted through the project's website. Completed application forms reached the administration panel where the course coordinator approved or rejected the candidature.

Thirty-eight students were selected for the programme representing 13 countries. Tables 3-6 show types of selected candidates when the programme was launched.

Table 3. **Distribution of Candidates According to their Profession**

Profession	No. of Participants
Education (college, university, institute, school etc.)	10
Ministries	9
Other government sector	9
Commissions	2
Semi-government	1
Private companies	7
Total	38

Table 4. **Distribution of Candidates According to years of Experience**

Experience (yrs.)	No. of Participants
< 1	1
1 – 3	6
3 – 6	14
6 – 10	8
>10	9
Total	38

Table 5. **Country Representation**

Country	No. of Participants
India	13
Solomon Islands	3
Fiji	11
Tuvalu	1
Palestine	3
Afghanistan	1
Cook Islands	1
Columbia	1
Papua New Guinea	1
Samoa (WSM)	1
Estonia	1
Mauritius	1
Australia	1
Total	39

Table 6. **Distribution of Candidates According to Age**

Age (yrs.)	No. of Participants
20 – 25	2
26 – 30	15
31 – 40	15
41 – 50	5
>50	1
Total	38

Programme execution and active engagement with students

The delivery of learning resources started in August 2009. Many interactive features were incorporated to keep learners engaged. A variety of learning formats, such as video, audio, flash/media player, and HTML pages were used, which included suitable instructional strategies. Most of the topics were delivered as HTML pages using multimedia components, such as images, flash animation, audio and video clippings.

All topics included some form of animated explanations of scientific concepts. Critical concepts were explained on the main page. Additional information, short discussions, and interesting questions were given in pop-up formats to maintain the interest of the student. Case studies and important data available for downloading were adequately highlighted on the screen.

Two other key features of the topics website were embedded hyperlinks to further studies and a list of other relevant links. Quiz questions were provided at regular intervals. These questions did not form part of the evaluation system, but provided a logical break in the content to prevent information overload and recapitulation.

Structured assignments, descriptive in nature, were given for each topic and helped learners evaluate their conceptual clarity. A learner could download questions, prepare answers and upload the same for evaluation. Automated e-mail alerts were sent to faculty members, whenever a student submitted an assignment.

Figures 1-5 illustrate some of the highlights of the programme delivery method and student engagement.

Figure 1. Embedded Video Lectures with Download capabilities

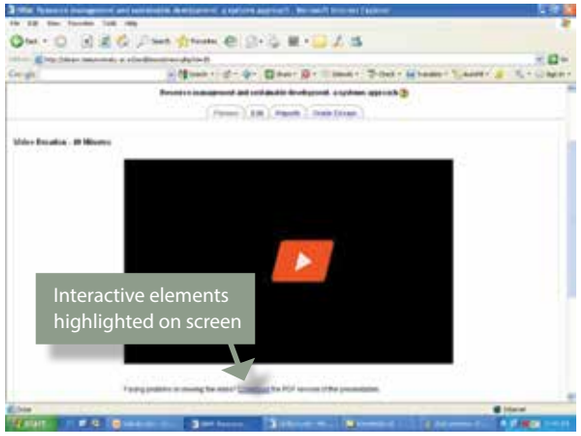

Figure 2. Important References and Case Studies are highlighted on the Screen

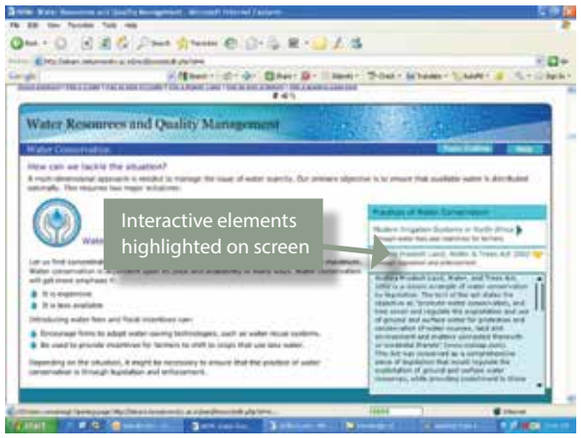

Figure 3. Interactive Elements to keep the Learner Engaged: Description of each category appears on the screen by clicking on the category icon. Links are provided for further studies on the topic under discussion.

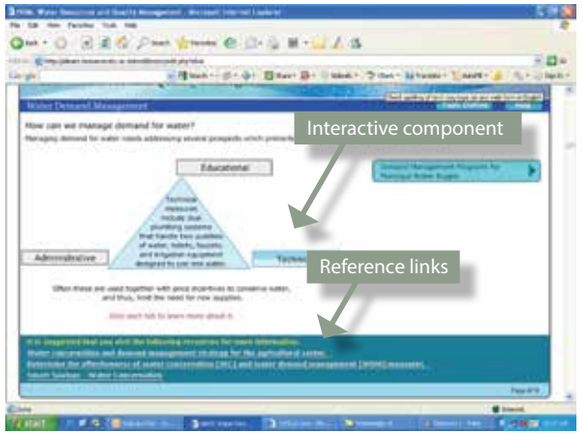

Figure 4. Important Information highlighted on the Screen

Figure 5. Interactive Elements, throughout the Topics, keep the Learner Engaged

A glimpse of the case studies draws the attention of the learner. Details pop up when clicking on them.

Project progress evaluation

The project progress was evaluated at three stages: (1) pre-launch feedback on the joint activity by all partner universities in July 2009, (2) student feedback during the execution stage, and (3) feedback from faculty and peers in June 2011. The aim of the pre-launch evaluation was to exchange information and lessons among the partners to strengthen the collaboration. The exercise provided important insights and leads for future activities (A1, Chapter Annex). One of the major impediments identified was the lack of penetration and affordability of a well-developed communication network in developing countries and specifically in small-island nations of the Asia-Pacific region.

During the execution stage, students were prompted to regularly provide feedback about the programme. Students also provided feedback during regular chat sessions, leading to ad hoc modification of the interactive features of the website. (A2, Chapter Annex).
On completion of the first semester, students were asked to give feedback on various aspects of programme delivery. The partner universities jointly structured this feedback form.

There were both quantitative and qualitative questions (A3-A6, Chapter Annex). Most of the participants found it difficult to devote sufficient time and commit to the defined schedule, due to reasons such as their other professional commitments, their jobs, and natural disasters in their home countries. Not being able to take leave for fieldwork also created difficulties.

Towards the end of the programme, six external experts and 12 faculty members from TERI University participated in the course content evaluation workshop, which was held on 20 June 2011. The members of the workshop were divided into three groups related to the course modules (i.e. natural resource management, economic reasoning in public policy, and science and policy of climate change). The members analysed the course contents and presented their thoughts on course quality, checked for plagiarism and suggested topic changes (A7, Chapter Annex). This will help to upgrade the course content when replicating the programme in future.

Gathering other funding resources and completion of Phase II

The Ministry of Human Resource Development and the government of India supported TERI University in the development a multimedia laboratory to produce high definition video-based educational resources. The lab became fully functional and a video lecture on environmental decision-making tools was introduced. Students appreciated the blend of video and text-based learning resources leading to a steeper learning curve.

Outcome and impacts

The objective of this programme was to enrich the understanding of SD professionals in the region. The learning resources were deliberately presented via an open platform thus giving access to all SD practitioners. Input from partner universities provided important insight into the transboundary nature of resources, the understanding of limitations and opportunities in regional-level resource-sharing, the coherence in sectoral issues, the need to assimilate the approaches to public policy development and finally the importance of governance frameworks.

Another interesting aspect was the unexpected large number of applications. E-learning methods seem to be effective and less time consuming, adding progressively

to professional competencies. Further, the asynchronous nature of e-learning exercises made it easier for professionals to access the learning resources.

The outcome of this project has reinforced the belief that this activity will benefit all ProSPER.Net member universities. The learning resources and training materials can be shared by all universities in the Asia-Pacific region. In the long-term, member universities can convert the material into a more common language, customizing it to make it relevant to their local and regional priorities and issues, and run the programme in their country at a decentralized level. The initiative can also be expanded by adding more online learning resources and developing additional course modules. In the future, TERI University and its partner universities can offer a capacity-building programme for faculty of non-participating universities of ProSPER.Net that may be interested in adopting such programmes.

Policy Implications

A sustainable future can only be achieved if all elements, including environmental and social aspects, are given as much importance as the economic dimension. This realization has yet to reach every part of society. For this to happen, policymakers need to be aware of the cross-disciplinary issues at hand, in order to include them in mainstream policy discourse.

Considering the need for increased efforts by both governments and the private sector to engage in sustainable development, awareness levels of policymakers need to be reinforced. On any issue, whether it is climate change, water scarcity, biodiversity loss, food security, or even the ongoing financial crises, policymakers must have a fundamental awareness of the issues involved. Existing policies have contributed to much of the planet's problems. There is thus a need for better public policies and regulatory measures.

The cross linkages among various sectors in today's society require an understanding of the interactions. Typical examples include the relationship between water demand and energy use, recycling, and the reduction in waste management load. Prioritizing government investments and spending in areas that reduce the use of natural resources, coming up with policies that encourage consumer preference shifts towards green products, and appropriate regulatory frameworks are today's most pressing issues.

The e-learning programme on SD practices for policymakers is an attempt towards strengthening the capacity of policymakers to identify opportunities, analyse challenges, understand the issues at hand, consider interventions, and come up with enabling policies. The programme is especially relevant to policymakers, who by the sheer nature of their work, are unable to get away from regular work and participate in a regular face-to-face programme. This would be even more relevant in countries, where policymakers exist in small numbers and cannot be spared to go to a different country for capacity-building.

The programme allows for self-paced learning, flexibility, while at the same time providing a structured approach. The collaborative angle to curriculum development allows for an integrated approach to the capacity-building effort. Simultaneously, country-specific cases and issues can easily be integrated in the programme.

Conclusion

The e-learning programme is an example of the successful integration of collaborative efforts towards curriculum development. It is probably the first example of an international collaboration in developing an online programme for capacity-building of policymakers. The large interest shown in the programme is an indication of the need that exists in this area.

While developing the programme, the need for an interdisciplinary approach to capacity-building for policymakers, in terms of sustainable development, became evident. Participant feedback indicated a better understanding overall and a comprehensive approach to the issues at hand. Case studies were an important aspect of this programme. Besides creating an interest during the teaching-learning process, they also provided a scope for customization of the programme to better suit the needs of different countries and regions, and allowed for cultural diversities.

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Chapter Annex:
Project Evaluation

A1. Feedback from partner universities on the joint activity during the preparatory stage

	Criteria	Feedback from USP, Fiji	Feedback from AIT, Thailand
Programme goals and objectives			
1.	Does the programme suit the educational needs and learning style of the target students/stakeholders?	Yes, it does target a wide spectrum of people – government officials, NGOs, and other development practitioners, many of whom would have had either disciplined based training or learned the theoretical underpinnings in their first degrees. With their work experience, this provides a good practical and applied approach to the common problems they deal with. It is an integrated approach and gives good interdisciplinary understanding. The course provides these linkages.	Yes, I think it does.
2.	Does the programme have the potential to generate sufficient interest from policymakers on a sustained basis in future years?	Yes, a lot depends on how the pilot project will run, and how the lessons drawn will help to further streamline the successive offerings. The publicity will also be a factor, and the ease with which participants are able to interact with each other to ensure that they remain motivated. The costs are reasonable, this may be a factor considering that the first offering is free, and may lead to very high interest.	Yes but only if it runs well and is publicized among the relevant government departments, ministries and NGOs.
3.	Will the job market recognize the value of such competencies among professionals?	Yes, with capacity-building, i.e. increasing knowledge and skills in order to link science, policy and economics to make rational decisions on environmental planning and management.	I guess there will be two types of participants: a) officials of government agencies and managers of NGOs and development organizations b) students of different universities. For the first group, it will help in their capacity-building whereas for the latter it will help them to get jobs.
4.	What other organizations are doing similar work? Is there a similar programme?	Not aware of any online course of this nature which gives a professional recognition with a certificate or diploma.	I am not aware of any. This is the strength of this programme.

Programme assessment and evaluation			
5.	Resource input/output analysis? (Resource means human as well as financial)	In theory, the programme is ideal and its central coordination has been efficient. However, while this is an internal matter, in practice at least in the case of USP, there have been major constraints with changes in staff, restructuring and timing of activities, when initial people engaged in the project left. Internal commitment and better coordination is required, in the way the programme is managed. The project was initiated late during the semester, and the commitment initially required by the project was too much for most relevant staff to cope with due to sudden additional work load, with little compensation for either time or resources. Hence, most relevant staff declined to participate. As a lesson, therefore, the actual distribution of work (expectation of partners) need to be clarified well in advance, as is the timing of activities.	Satisfactory
6.	What are the strengths and weaknesses of the programme?	The topics covered are relevant and practical towards sustainable environment management, touching on issues currently being dealt with in the field. However, logistics of running an online course are yet to be tested. There could be several problems, the authenticity of participants, since it is a credit course, and whether there will be a continued level of motivation, since there is no face-to-face interaction. Given that many students are already working, they may give priority to work commitments. Drop-out rates are yet to be seen.	The major strength of the programme is that it is unique. If it is done well, it will help in building capacities of policymakers and practitioners. The topics are interesting and practical. However, there are some weaknesses: a) There is a provision of turning it into a diploma but will it end in a final degree? How can one continue to do a Master's degree? b) In developing Asia, IT is not well developed, this may cause problems. c) Practitioners and policymakers prefer to have face-to-face interaction with the teachers. d) It is not clear what, if any, link has been created with the other Pro.SPER.Net activities. A close link between the activities could make the programme better. e) Policy analysis is very important which is rather weak in this programme. f) Language and communication is a major problem in many parts of the Asia-Pacific region. Until now, the programme is only in English. g) To get further information most students may not have access to good libraries. Development of an online library may help.
7.	Is the partner of this joint initiative satisfied with what they gained from the programme?	Generally yes, except the timing.	In general, yes.
8.	Do the partners feel they were part of this project?	Yes, for that reason, a consultant was hired to prepare the module, because the topics were so different, that no readymade course modules were available in the areas required by the programme.	Yes, indeed.
9.	What else should be done to ensure successful continuation of the programme?	The programme does not need to be rushed and requires a better planning and timeline to work with. Preferably the writing of the course should be outside of the main university semester commitments, since materials need to be adapted and modified.	A strategic plan for the next five years needs to be written. There is a need for more promotion of the programme among the relevant ministries, departments, and development agencies. The programme can be advertised on the web, newspapers and other print media. There should be funds allocated for that purpose too.
Planning and implementation of the programme			
10.	Where are we now and where should we be?	Perhaps, on track – difficult to comment, given the individual weaknesses and backgrounds.	The programme is on the right track. However, more promotion is needed.
11.	How do we reach our goals collectively and efficiently?	After the pilot offer, partners should meet to discuss lessons learned, timelines, budgets, and strategies needed to move forward.	More interaction is needed and maybe more meetings.
12.	Were the financial and staff resources adequate?	Not really	No
13.	Was the communication among the partners effective?	Acceptable	To a large extent acceptable.
Monitoring, new issues and knowledge			
14.	Has the joint activity had the desired impact?	This is yet to be seen. However, from the Pacific perspective, it was a good opportunity for participants from different island countries to participate without having to relocate to a common location, providing a cost-effective solution. It also allowed for flexibility to pick and choose topics beneficial for different participants. The case studies provided a wider coverage broadening the students' analytical skills.	It is too early to say. However, the programme will have a larger impact if the target is on countries of low human development and/ or recovering from conflict. Those countries have a much larger need for such a programme.
15.	Are there any other concerns?	The fluidity of staff movements (an internal matter). Whether participants need some initial training or familiarization on how to do web-based learning?	No concerns.

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A2. Feedback of the students during the execution of the programme

Respondent	Feedback
1	I just wanted to say thank you for a well presented and thought-provoking lecture on system approach. Although I was so late to get into the e-diploma, I am thoroughly enjoying the new insights I am getting
2	I must congratulate you for the excellent and innovative method of presentation on the topic science and policy of climate change. The students will really find it easy to learn the concepts, as you have started with the basics and put in a lot of study material. I must congratulate you on the course content and methodology, selected so far in the course. It has been quite enriching.
3	First of all, I would really appreciate it if the course coordinators could summarize the topics without cutting into important facts, figures and examples. I also liked the way you provided the further reading links. I was surprised to find such good examples regarding water resources and quality management, even for smaller countries. It was an eye opener to find out that so many regions are fighting water scarcity and poverty. Your texts also include efforts taken by various countries and regions towards conserving and legislating water uses. I also found these texts extremely resourceful. All the subjects and topics are well covered, and in such a manner that a middle-level working professional can understand it with ease. I also found these texts were supported nicely with pictures that convey the essence of these topics. I really find reading the entire material a treat.
4	I would like to congratulate TERI University and the other partner universities that made this pilot programme possible. It is very useful for people working on sustainable development topics around the world.
5	Really, it was a good opportunity to participate in such a programme, especially getting to know such kind, supportive and cooperative professors.

A3. Students feedback on various subjects on a scale of 1 – 5 (1=poor and 5=best)

	Subject	Mean score on			
		Learning objectives	Contents coverage	Questions, assignments and discussions	Case studies and related web-links
1.	Resource management and sustainable development (video)	4.1	4.0	4.0	4.0
2.	Water resources and quality management	4.2	4.2	4.1	4.2
3.	Natural disaster management	4.0	4.1	4.3	4.5
4.	Air quality management	4.5	4.3	4.4	4.6
5.	Basic microeconomic theory	4.2	4.0	3.6	3.5
6.	Rationale for public policy	4.3	4.0	3.7	3.5
7.	Correcting market and government failure	4.1	4.0	3.8	3.5
8.	Basics of climate science	4.5	4.3	4.5	4.6
9.	Science behind climate change	4.5	4.1	4.4	4.5
10.	Impacts of climate change	4.6	4.2	4.3	4.4
11.	Adaptation and mitigation options	4.7	4.0	4.2	4.3
12.	International negotiations	4.5	3.9	3.8	4.0

A4. Mean score on courses on a scale of 1 – 5 (1=poor and 5=best)

	Course	Satisfaction	Course material
1.	Natural resource management	4.2	4.5
2.	Economic reasoning in public policy	3.8	4.1
3.	Science and policy of climate change	4.5	4.5

A5. Student feedback on delivery platform on a scale of 1 – 5 (1=poor and 5=best)

	Use of information technology	Mean score
1.	Graphics	4.6
2.	Friendliness of website	4.0

A6. Feedback of the students on various aspects of the programme

	Opinion sought	Summary of feedback
Course contents		
1.	Anything that could be included to improve topic delivery?	Students found the course content quite exhaustive. It covered all the facets of the subject. A few of them pointed out that more case studies should be included in the economic course.
2.	Strengths and limitations of the course	**Strengths:** students found the content and presentation of the course well researched and compiled systematically. Videos, links, and downloadable material gave an edge to the course. **Limitations:** students found the course too lengthy.
3.	Any information incorrect or incomplete?	Students found the course content and data correct at every level of the course. There were small suggestions on different subjects.
4.	Are sufficient case studies given for each course?	In general, students were satisfied with the amount of case studies provided during the course.
5.	Response from the faculty on queries	Students found faculty responses to be very prompt.
6.	Estimated time spent for each subject	Students found study time for the courses adequate, but time allotted for the assignments was not enough. As most of the students were working professionals, they found it difficult to complete assignments in the given time.
7.	Was the course helpful in practicing sustainable development?	Students found the course very helpful. It gave them a better insight into decision-making processes. It has helped them to develop practical ideas and solutions to practical issues.
Course delivery		
1.	Use of IT in the programme	Students found using IT very effective.
2.	Strengths and weaknesses in mode of delivery	Strengths: students found the questions asked between topics a good practice keeping them devoted to the topic. Weaknesses: students found it difficult to upload the answers on the website. They found writing answers in the box space very unpractical and user-unfriendly.
3.	Problems related to the web-technology	Some students found the course was too dependent on the internet, which, at times, was a problem. Better navigation methods could be adopted. Students could not pick a random page and study it.

4.	User-friendliness of the website	Students found the website hassle free and easy.
5.	Technical support	Students were satisfied with the technical support provided.
6.	Addition of any feature	Students had different views regarding this issue. Many found it was perfect, but others wanted to have more presentations with voice-enabled features. A few students mentioned that all parts of the course should be downloadable.
Course planning		
1.	Was there sufficient time to complete the programme?	Many students expressed that they could not devote sufficient time, due to professional commitments. Assignments were lengthy. Objective-type questions should be introduced, and the time allotted to cover the material should be increased.
2.	Duration of the semester	If all the courses were launched at the same time then time would be sufficient. Students found the semester duration too short.
3.	Any leave taken to devote time to the course?	A few students took leave for two to three days and some took leave for a couple of weeks.
4.	Participation in group exercise with partner universities	All students asked to participate in group exercises with partner universities, to increase their knowledge and skills.
5.	If group exercise were compulsory, would leave be possible?	Students could take leave if the activity was planned well in advance. However, many students expressed their inability to take leave. Many found it difficult to take leave for any type of activity.

A7. Summary of course content and evaluation outcome

	Subject title	Key recommendations
1.	Water resource and quality management	Suggestions were to include case studies on water conservation. The course should also cover the linkages between water quality and climate change.
2.	Natural disaster management	The course should include a section on disaster insurance.
3.	Air quality management	The entire section of air quality modelling can be removed, as it was overlapping with other parts in environmental modelling. There was ample scope for improving the contents about the policy aspects of air quality management. It was further suggested that the section on air quality monitoring be shifted before the section on emission inventories.
4.	Basic microeconomic theory	The course started with a section on consumer behaviour, but some experts thought that the section on producer behaviour should come before consumer behaviour. It was unanimously suggested that two new sections should be added in the course i.e. equitable distribution of economic resources and sustainable consumption patterns linking it to the Gandhian philosophy.
5.	Government, market and regulations	The course in the present form is too technical to sustain the interest of policymakers. Some case studies should be included under the sections government and market failures.
6.	Tools correcting market and government failure	The working team appreciated the contents. It was suggested to change the title to integrated assessment and decision-making tools.
7.	Mechanisms of climate change	It was suggested that the course should start with the introduction on types of climate systems. Secondly, factors such as aerosols and volcanic dust should be included in the second section of the course as drivers of climate change. Finally, a section on land use change should be introduced in the course.
8.	Impact of climate change	The course was adequate except that a topic on various ecosystem services should be introduced.
9.	Climate change adaptation and mitigation	Members suggested some important references that could be added to the list of suggested readings.
10.	International negotiations related to climate change	The course was well received. However, caution was voiced on the relevance of course contents. Recent developments since Copenhagen 2009 should be included.
11.	Life cycle assessment	No specific recommendations.
12.	Environmental systems modelling	No specific recommendations.
13.	Macroeconomics in a global perspective I	Two new topics were suggested for green accounting and green economies.
14.	Quantitative analysis for public policy I	Suggestions were made to combine section three and four.
15.	Basics of climate modelling	The course missed the important topic on limitations of climate models.
16.	Tools and methods for climate change impact and vulnerability assessment	A few further references were suggested for the list of suggested readings.
17.	Macroeconomics in a global perspective II	The contents were appropriate in relation to economics, but did not provide and adequate link to sustainable development practices.
18.	Quantitative analysis for public policy II	No specific recommendations.
19.	Assessment of climate change adaptation options	No specific recommendations.
20.	Economic assessment of climate change	A section on the criticism of economics in relation to climate change could be included in this course.

CONTENTS

Development of Faculty Training Module Towards Mainstreaming Education for Sustainable Development

Zainal A. Sanusi *(USM)* and Hamoon Khelghat-Dhoost *(USM)*

This article discusses the need of materials to aid teachers and researchers in their endeavours to integrate a sustainable development paradigm in courses and programmes. This need encouraged some ProSPER.Net members to jointly collaborate in a project that resulted in the publication of a book entitled *Education for Sustainable Development: Issues, Principles and Practices for Global Application* comprising a collection of diverse case studies and sustainability initiatives carried out by member institutions of ProSPER.Net, as well as the best practices of other sustainability-driven organizations that have made the integration of sustainability a priority in their undertakings. The publication serves as a manual, playing the role of a working handbook which can assist the reader in obtaining a better understanding with regard to the implementation and inclusion of sustainability in areas as diverse as business, education, health and technology, and also find the inspiration and the practical know-how needed to make sustainability integration an integral part of his or her respective institution(s).

Introduction

The vast cultural, political and economic diversity that exists in the world today has resulted in many challenges that are unique and specific in the pursuit and implementation of sustainable development practices. This is especially true given the extreme importance many developing countries, especially in Asia-Pacific, place on the need to attain socioeconomic prosperity and a higher quality of life. The need to satisfy the appetite of new consumer demands and subsequently an increased production output has resulted in an increasingly higher need for larger amounts of energy that can consistently fulfil the requirement of the open market and growing economies. This increase in consumption patterns, however, has been shown to be lopsided, in that a vast majority of the buying power is formed by a small percentage of the world's privileged and does not consist of a fair distribution in global communities, thus exemplifying a pattern of economic growth that is not equitable.

As a result, it is governments with the strongest buying power that are now shaping what is known as global trade. Because countries in the developing and under-developed world are undoubtedly reliant on the continued investment and patronage of these strong economies, the ecological and environmental degradation that takes place in the pursuit of keeping up with the consumption patterns of developed countries are sidestepped in favor of economic prosperity.

A growing number of countries, however, have now begun to realize that such a pattern of economic growth is no longer viable, nor is it profitable in the long run; they have initiated a new direction for the socioeconomic growth of their countries – one that is centred on sustainability and the responsible utilization of the Earth's finite resources. Given the planet's societal diversity, it is quite apparent that methods of SD adoption will also vary greatly among countries and governments. That being said, the dilemma of sustainable development, which is essentially the ability to successfully juggle and maintain equity between society, economic prosperity and the environment is nonetheless one that is faced by all and sundry.

Background of Module Development

The transition to a sustainable world is a daunting one, and as with all changes and challenges, a guiding beacon in times of change is always welcome. To answer this need, a ProSPER.Net project was conceived and resulted in the publication entitled *Education for Sustainable Development: Issues, Principles and Practices for Global Application*[1]. The book consists of a collection of diverse case studies and sustainability endeavours that were carried out by member institutions of ProSPER.Net. The publication also provides best practices of other sustainability-driven organizations which have made the integration of sustainability a priority in their undertakings. This training compilation for faculty members serves the objectives of Chapter 36 of Agenda 21 (the outcome document of the UN Conference on Environment and Development 1992) entitled "Promoting Education, Public Awareness and Training"[2].

The case studies and projects that have been compiled and included in this book are a collaborative effort among partnering institutions of ProSPER.Net, with Universiti Sains Malaysia spearheading the endeavour. Members of ProSPER.Net that have contributed to the compilations include TERI University (India), Hokkaido University (Japan) and Universitas Gadjah Mada (Indonesia). The publication should serve as a manual, playing the role of a working handbook that will assist the reader in obtaining a better

[1] See full reference in the bibliography.

[2] United Nations Conference on Environment and Development 1992, *Agenda 21*.

understanding with regard to the implementation and inclusion of sustainability in areas as diverse as business, education, health and technology and also find the inspiration and the practical know-how needed to make the integration of sustainability an integral part of his or her respective institution(s).

Objectives of the Project

The main objective of the project was to develop a training module for the introduction and integration of sustainability into various disciplines of the education and teaching processes at higher education institutions. According to the UNESCO-Pacific ESD Framework, "The overall goal of ESD is to integrate the values inherent in sustainable development into all aspects of learning to encourage changes in behavior that allow for a more sustainable and just society for all"[3]. Aware of the need to provide the means for ESD goals to be implemented, the aim of this project was to produce a sustainability handbook that facilitated the sharing of various ideas and good practices that currently exist in available literature and also new sustainability practices from member universities. During the course of the project, the critical issues of awareness-raising among faculty members on the need for SD integration, as well as how this can be accomplished in their respective disciplines, were simultaneously addressed.

Despite an abundance of resources on ESD – including some on good teaching practices and the integration of sustainability into the curriculum – there is yet to be a handy and practical manual that functions as a quick reference for ESD. Resources and publications that are currently available are either on SD or the implications of SD and ESD with no particular resource that encompasses all three components of SD. In light of this, this module includes resource materials that provide general readings to improve one's understanding of SD as well as define the meaning of SD in relation to faculty members and the possibilities through which they can teach SD in their various disciplines. The module is generic in nature and contains introductory-level material to acclimatize faculty members from any discipline. This is in line with the vision of UNESCO for ESD that "can provide critical reflection, greater awareness and empowerment so that new visions and concepts can be explored and new methods and tools developed"[4].

It should be mentioned that the handbook is not meant to be an exhaustive reference that pushes new approaches or advocates new principles and practices but rather an easily readable compilation of references and materials that were developed by many researchers and practitioners in the area of sustainable development. That being said, the novelty of the handbook lies in the major framework that was developed by a group of experts and practitioners. This framework was then utilized as a base on which relevant materials and references were compiled into a handbook ultimately serving as a quick reference guide.

Process of Content Development

For the purpose of developing this module, a series of workshops, training exposures and meetings were conducted in two major phases of: 1) gathering information and data, and 2) analysing and processing the collected data. To facilitate the process of producing this module, the mentioned two major phases were later divided into 10 steps, including a workshop for the development of the programme model, distribution of results from the developed draft module, gathering responses and comments on the draft model, training/exposure of the training module to participating faculty members, a test-run of the model programme/module(s) by member universities, a workshop for the finalization of module use, printing and publication of the document and manual, implementation in collaboration with as many ProSPER.Net institutions as possible, receiving feedback from participating universities and, launching and disseminating the completed document among the institutions of higher education in the Asia-Pacific region.

The first workshop for the development of the framework and content was held in November 2008 at Universiti Sains Malaysia. It was attended by 20 faculty members comprising representatives from ProSPER.Net member universities, resource persons and experts. A survey on the current sustainability approaches and practices in training and education was conducted and the results compiled and presented by member universities and resource persons. The participants of the workshop then proceeded to produce a draft framework that was distributed for comments to the member universities. Each member university was assigned a contribution toward the final outcome of the framework.

[3] UNESCO 2006, *Pacific Education for Sustainable Development Framework 2006.*

[4] UNESCO 2005, *UNECE Strategy for Education for Sustainable Development.*

In a period of four months from December 2008 to March 2009, the proposed framework in the first workshop went through an extensive process of refinement and adjustment. At the same time, the process of compiling the relevant case studies for practices and approaches for integrating sustainability into faculty curriculum and affairs kicked off. As the case studies depict, the attainment of global sustainability coincides in a virtually parallel manner to the fulfillment of the Millennium Development Goals (MDGs). The MDGs were selected because of their achievability and relevance to today's global sustainability problems, and also because they were deemed issues that warranted immediate global concern. It is hoped that the availability of these case studies grant people from different parts of the world a chance to involve themselves in the issues of other communities by analysing, dissecting and determining if the measures taken to address certain issues are best practice and if they tackle the issues being discussed.

In November 2009 the module's framework was presented at the 3rd International UNESCO Chair Conference on Higher Education for Sustainable Development at Univesiti Sains Malaysia, Penang. The session was attended by more than 20 interested individuals and experts. The session provided some interesting inputs to be integrated in the final draft of the module. The feedback received in the session demonstrated a strong interest among the audience about the concept of the project and to participate in the process of creating the module.

Following this session in February 2010, the first exposure workshop for this module was held at TERI University, India. The objectives of the workshop were to expose the module for comments and to pilot test the content among participants. The workshop was attended by 15 faculty members from different academic disciplines. The second workshop of the same nature was conducted in May 2010 at Universitas Gadjah Mada, Indonesia. The main objective of the second workshop was to circulate the module to gauge its feasibility while providing an opportunity for participants to channel their feedback and inputs. The workshop also created awareness and confirmed the needs for such a module in the form of a handbook or a reference kit that can be easily referred to and used for integrating sustainability into teaching and research. Hokkaido University of Japan hosted the third and final exposure workshop in June 2010. As in the previous two workshops, the developed module was disseminated among participants in the form of a handbook to allow all contributors to critically analyse and assess its content for final amendments and adjustments. After receiving mutual consent from all parties involved, the accumulated feedback that was gathered from all the exposure workshops was then incorporated into the module, which was edited and finalized for publication.

Content of the Module

The module consists of three main sections, namely Section 1: Sustainable Development Background and Core Ideas; Section 2: Sustainable Development – Issues, Implications and Case Studies; and Section 3: How to Apply ESD in My Context or Field of Discipline. Through these three sections, the module is designed to create a logical flow of argument from the definition of SD to its implications and, later, to the concept of ESD. As McKeown argues, "from the time sustainable development was first endorsed at the UN General Assembly in 1987, the parallel concept of education to support sustainable development has also been explored"[5].

Following this trend, the module tries to demonstrate the holistic and organic relationship between SD and ESD through conceptual arguments, implications, and case studies. Like sustainable development, the dynamic for ESD is generic and holistic. This new dynamic breaks the traditional disciplinary structure of education systems, especially in higher education. According to the definition given by UNESCO, "ESD is based on the principles and values that underlie sustainable development and it is harnessing all of education, including public awareness and training, to make progress toward more sustainable societies"[6]. Therefore this module tries to incorporate the holistic notion of ESD into the texture of higher education teaching and research.

The first section of the module demonstrates some of the various definitions and doctrines of sustainable development. According to Carroll, "one study alone has identified over 500 different attempts to define

[5] McKeown, R., 'Education for Sustainable Development Toolkit'.

[6] UNESCO World Conference on ESD 2009. *EFA-ESD Dialogue: Creating Synergies and Linkages for Educating for a Sustainable World*, Workshop 18.

[7] Carroll, B., 'Sustainable Development: An Elective View'.

sustainable development"[7]. Section 1 contains some of the highly acknowledged definitions of sustainable development from various resources. In this section, the reader would also be familiarized with different core issues of sustainable development such as principles, paradigms and perspectives through exploring a range of different resources and references. This section also discusses in further details the need for and ways by which sustainability can be implemented in different aspects and levels, through exploring the holistic view and ethical substrate of sustainability. The latter part of this section demonstrates how different disciplines such as engineering, business or law can conceptually contribute to the understanding of sustainability. This section tries to provide relevant facts to a reader wishing to explore the concept of sustainability and its effects on people's lives and to offer a methodical route by which to view relevant areas that need to be addressed in the journey toward sustainability attainment.

The second section of the module provides a range of case studies to demonstrate how sustainability can affect us in different ways. Governments, multinational corporations, NGOs and various stakeholders all around the world have increasingly started moving toward the goal of sustainable development, having realized that progress or development that occurs without taking the sustainability factor into consideration is not a state of progression but one of regression and that the sustainability phenomenon is not an isolated event but one that now has far-reaching global consequences. Issues that deal with the management of resources such as fossil fuels, water, land, agro-forestry, sustainable energies and also with the well-being of populations such as health, developmental equity and many other relevant and pertinent areas of concern involving the prosperity of not just the current population but that of the future is now taken into consideration with the realization that any other form of development would not be inclusive of the well-being of global populations and their surroundings.

The case studies in this section were specifically selected in order to provide the reader with an idea of how unsustainable development affects populations around the world and of how the potential applications of sustainability in various facets of daily life ultimately has far-reaching, inclusive and positive consequences. An SD state of being only exists when environmental, social and economic demands reconcile. These demands are collectively known as the three pillars of sustainability. In order to maintain a successful SD initiative, it must be understood that these pillars are non-exclusive by nature and have to be mutually reinforcing. A condition that prioritizes social and economic benefits will result in an economy that is highly equitable but one that is also highly detrimental to the environment. The prioritization of environmental and social factors with neglect towards the economy would in turn result in economic crisis; development that disregards the social pillar will lead to an overwhelming increase in social ills that could cripple the overall well-being of a community. It is therefore generally (although not universally) agreed that the best model for development is the sustainable one, i.e. SD.

Given that SD is traditionally recognized as an offshoot of the environmental movement, the emphasis has traditionally been on strengthening the environmental pillar – the pillar that is generally accepted as the frailest of the three. However, with the enforcement of various environmental protocols and green movements around the world, there is growing awareness that the emphasis should now be placed upon ensuring stability between all three pillars instead of focusing on a particular pillar. Economic advancement alone, therefore, is insufficient to sustain a populations' well-being and neither is the independent advancement of the other two pillars at another pillar's expense. It goes without saying that to ensure stability between all three pillars, a great degree of cooperation and/or partnership is needed among the experts in the respective pillars, as well as other stakeholders like NGOs, government institutions, the private sector and other organizations involved. This then, is the challenge facing the global community today, i.e. the challenge of incorporating SD, or specifically the aspect of sustainability, into everyday decision-making procedures.

This section demonstrates different case studies from across the world on how sustainability can affect us in different ways, such as: poverty, health, gender, human rights, energy, governance, water, waste management, production and consumption, biodiversity, urban environment, and globalization.

The third section of the module is focused on the concept of ESD and the ways this concept can be incorporated into the context of different academic disciplines. As McKeown argues, "ESD addresses learning skills, perspectives, and values that guide and motivate people to seek sustainable livelihoods, participate in a democratic society, and live in a sustainable manner"[8]. Undoubtedly incorporating these issues and values in the current highly compartmentalized system of higher education is not an easy task. This section tries to address the main question on how to enable learning for sustainable development. It also covers various aspects of ESD in higher education, such as reorienting the formal and informal education system towards sustainability, challenges and barriers ahead for ESD, and ESD success stories. Case studies offered in this section create the platform for other institutions of higher education to explore the practical aspects of implementing sustainability in higher education teaching and research. This would be complemented by a wide range of conceptual theoretical frameworks gathered from well-acknowledged resources.

Conclusion

With the publication and dissemination of the book, the project is now completed. The development process demonstrated the benefits of strong network connections among not only the member universities but also participants who attended the exposure workshops from universities near New Delhi, Yogyakarta and Sapporo. The book, in its current format, has benefitted significantly from participants and provided them benefits as well in terms of sharing good practices. The compilation is now being used as a reference in training related to ESD and is recommended for further reading to participants who attend the training programme at the Higher Education Leadership Academy of the Ministry of Education in Malaysia, for example. The book is envisaged to serve as a manual that would be adopted by the wider ProSPER.Net community not only for use by their teaching faculty for the formal curriculum but also for their outreach activities; the benefits from using the manual could then influence policymaking at both institutional and national levels.

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CONTENTS

Innovative Pedagogies for Poverty Reduction

S. Kumar and Amandeep Sangha[1] *(AIT)*

This chapter describes a new approach to education, addressing professional development and individual competence to alleviate poverty. The approach involves local capacity-building through an innovative professional degree programme in which a "fit-for-purpose" oriented approach to professional competency development at the local level is utilized. With this approach, progress is measured not just in terms of an increase in knowledge and skills, but also in terms of measurable impacts on the livelihoods of poor communities. To achieve this objective, curriculum, courses and teaching methods are tailored to the needs of the community and through project implementation, students then apply the knowledge acquired, aiming to reduce poverty levels. The measurable impact of poverty reduction is observed in terms of improvements in well-being and the livelihoods of those living in poor communities. Extension officers are empowered with additional skills, learned by undergoing a professional degree programme, and implement these projects. This ProSPER.Net project was developed based on the Poverty Reduction and Agricultural Management (PRAM) initiative carried out by the Asian Institute of Technology and its partner institutions of the Wetlands Alliance (WA) in Laos and northeast Thailand; PRAM focused on building the competencies of grassroots development workers to reduce poverty and promote sustainable wetlands development.

Introduction

The Asian Institute of Technology (AIT) initiated a capacity-building programme for aquaculture development in northeast Thailand in 1987 and subsequent programme reviews in 1993 and 2006 assessed the need to strengthen local capacity and reduce poverty. To harmonize regional development agencies' efforts and align them better with development agendas at the local level, and to improve the effectiveness of development cooperation in the Mekong region[2], the Wetlands Alliance Programme (WAP) was established in 2005. The Ministry of Agriculture and Forestry for Laos, in collaboration with WAP, launched the Poverty Reduction and Agricultural Management (PRAM) initiative in 2007. This initiative, for local-level capacity building for improved wetlands and aquatic resources management, was spearheaded by the Department of Livestock and Fisheries (DLF) with four regional institutions, namely AIT, Coastal Resources Institute (CORIN) of the Prince of Songkla University[3], The World Fish Center, and the Living Mekong Programme of the World Wide Fund for Nature (WWF)[4]. The PRAM initiative is an innovative educational bachelor's degree programme designed to empower government extension officers at the local level with the tools necessary to reduce poverty in their districts[5].

Lao PDR, being one of the poorest countries in Southeast Asia, lacks access to quality education and availability of qualified human resources. Over the last few decades this has resulted in a lack of technically experienced staff. There was little knowledge of the basic skills needed to implement tailor-made programmes run by the government to generate employment opportunities and reduce poverty. Therefore, building the capacity of its local staff to address the immediate needs of the country was and continues to be one of the top priorities for Lao PDR. Towards this aim, WAP started implementing broad skill-based programmes at the grass-root level for professional development of government staff. WAP identified the need for knowledge-based and work-based courses that took into consideration the local context. Professional training programmes and skill-building programmes were developed to train district level staff, with a focus on the poorest districts, through community level Technical Service Centres.

This chapter presents and discusses the innovative approach to local capacity-building that was carried out in Lao PDR.

[1] This chapter was compiled by the authors based on available project documents and other materials left by the original project investigators. In this regard, the authors acknowledge the work previously conducted by Dr. Nick Innes-Taylor, coordinator of PRAM and the ProSPER.Net project.

[2] The Mekong region designates the collective area of six countries which form the Mekong river basin, namely Cambodia, Laos, Myanmar, Thailand and Viet Nam.

[3] PSU joined ProsPER.Net in July 2012. News available at *http://www.interaffairs.psu.ac.th/international-news/246-psu-accepted-as-a-member-of-prospernet.html*

[4] DLF 2014, *Laos Completion Report.*

[5] PRAM 2011, *PRAM Overview*, provides details including curriculum, teaching methods and student projects, as well as archived information.

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About the Project

PRAM was an initiative of the Ministry of Agriculture and Forestry (MAF) of Lao PDR for the professional development of its agriculture extension officers working in poor areas of Laos. The programme focused on poverty alleviation and was based on sustainable natural resource management, increasing agricultural products for food security, and improving health and quality of life[6].

PRAM used the lessons learned from the AIT Aqua Outreach Programme by partner institutions of the Wetlands Alliance in Lao PDR and northeast Thailand to develop a new fit-for-purpose oriented approach to professional competency development at the local level. This approach is focused on building the professional competency of grass-roots development workers to reduce poverty and promote sustainable wetlands development by ensuring that all students graduating from the course apply fit-for-purpose approaches to reduce poverty and are able to make a measurable impact on the well-being of those living in poor communities. PRAM was developed and piloted under transboundary collaboration among local government agencies in Laos and northeast Thailand (coordinated by MAF/DLF in Laos and Udon Thani International Cooperation and Development Office in northeast Thailand), and in seven provinces of southern Laos. The PRAM students (Lao PDR extension officers/local staff) were evaluated on the basis of norms and standards established by PRAM consortium educational institutions[7]. This included:

i. Creating modified versions of courses and curricula that target the required workplace competencies of an extension worker which covers his/her skills, knowledge and attitude.
ii. Creating a quality assurance framework on the basis of the fit-for-purpose oriented approach. In this scenario the evaluation would be done on the basis of impact on poverty reduction. This is a unique and innovative criterion for assessment.
iii. Creating new approaches for teaching methods and learning.
iv. Valuing the student's performance upon completion of their participation in the professional degree programme.

These officers, who were assigned to live and work in areas of extreme poverty, were tasked to work with rural communities to increase productivity and reduce poverty.

The PRAM curriculum broadly consisted of three parts: (1) orientation courses, made of two sub-parts, each of 9 credits; (2) core courses of 25 credits; and (3) community projects, of 35 credits. These projects were primarily graded on whether they measurably reduced poverty. The project supervision was the responsibility of the PRAM consortium of educational institutions in partnership with the local development agency and with feedback from the community.

Thirty-five officers have now completed the programme and have been awarded a Bachelor's degree by Savannakhet University based on an external assessment of their impact on poverty reduction[8].

ProSPER.Net and PRAM

The ProSPER.Net consortium was involved in PRAM following the discussions held during the June 2009 ProSPER.Net Board Meeting, which agreed that the network would work to increase its focus on poverty reduction and look for opportunities to link more closely with ongoing poverty reduction programmes in Asia. The network of local-level institutions in Laos and northeast Thailand working within the framework of the WAP was thus identified as a suitable partner for ProSPER.Net. Lao government officers working closely with local communities on poverty reduction were the focus of this educational programme. The aim was to provide these officers, many of whom are based in remote rural areas, with a practical programme of professional competence development for poverty reduction. By partnering with the PRAM initiative and actively engaging with the local institutions responsible for its development, ProSPER.Net members could also have the opportunity to develop a more in-depth understanding of the dimensions of poverty reduction programmes. Many of the issues faced by the PRAM institutional network in developing collaboration for educational development are similar to those of ProSPER.Net, but in a different context. This project could therefore help ProSPER.Net members to develop a programme of engagement with the PRAM consortium and thus focus on extracting the key experiences and lessons that were learned in working in curriculum development at the local level. Through this engagement, ProSPER.Net members would have the opportunity to jointly explore ways in which students can be evaluated in terms of their impacts on poverty. The project would thus provide a forum for discussing how such evaluations could be undertaken in a consistent and reliable way and how student performance in poverty reduction at various levels could be defined and measured[9].

To effectively engage with the PRAM initiative and develop a dialogue with its local-level and regional partners, it was proposed that ProSPER.Net support a series of workshops and consultations. ProSPER.Net members could learn about the PRAM experience and assist the PRAM consortium in distilling and documenting some of the lessons learned during PRAM's development. ProSPER.Net members participating in these consultations were the University of the Philippines, Universitas Gadjah Mada, and Universiti Sains Malaysia[10].

When the PRAM programme neared the completion of its pilot phase in southern Laos, stakeholders held a weeklong workshop to look back at the PRAM creation process and its methods of implementation. The workshop emphasis was to collectively determine the key lessons learned during the process of making the PRAM programme. Participants included representatives from the following organizations: Ministry of Agriculture and Forestry (Lao PDR), Department of Livestock and Fisheries (Lao PDR), Savannakhet University (Lao PDR), ProSPER.Net (regional), Udon Thani International Cooperation and Development (Thailand), Udon Thani Agricultural College (Thailand), Udon Thani Rajabhat University (Thailand), Sisakhet College of Agricultural and Technology (Thailand), Asian Institute of Technology (regional), and Wetlands Alliance (regional)[11].

The workshop began with a field visit to a Technical Service Center located in one of the poorest areas in Laos. Participants were divided into groups and sent to observe projects being implemented by district agricultural extension officers (PRAM students). In the remaining days of the workshop, participants listened to presentations on components within the PRAM programme. After each presentation, groups discussed assigned topics to determine the key lessons learned, challenges, opportunities and future recommendations for PRAM.

Output and Lessons Learned

The PRAM initiative followed the principle of developing new approaches to professional training and education using existing local institutions. It was developed through ample consultations with local partners and after analysis of existing curriculums, teaching methods and learning approaches. This method allowed new ideas and approaches to be introduced, thereby promoting local ownership and ensuring that these new approaches were integrated into local training systems as well as applied in a regional context[12].

The process of developing the programme and piloting it in southern Laos took three years and was coordinated, supported and facilitated by national government agencies in Thailand and Laos, and regional partner institutions of the Wetlands Alliance.

The success of the PRAM initiative in rapidly developing professional capacity at the grass-roots level to address both local and regional development agendas has attracted considerable interest from other government agencies working on fisheries in the Mekong region. In response to this growing interest, MAF/DLF initiated a dialogue with its regional partners, such as the Fisheries

[6] Ibid.

[7] Taylor, N., *Lessons learned from strengthening local capacity for poverty reduction in Laos.*

[8] DLF 2014, op. cit.

[9] AIT 2009, *Developing closer linkages to poverty reduction, Proposal document.*

[10] Ibid.

[11] PRAM 2010, *Poverty Reduction and Agricultural Management (PRAM) Workshop, Key Lessons Learned and Future Recommendations.*

[12] DLF 2013, *Poverty reduction through human resource development – a strategy to improve regional cooperation on human resources development for poverty reduction.*

Administration of the Cambodian government (FiA), to explore ways in which the PRAM approach could be scaled-up and expanded to other areas of the Mekong region.

For the PRAM projects involved in fish raising and livestock vaccination, the key outcomes, outputs and lessons are summarized in Table 1. The indicators give a clear quantitative based approach to assess the outputs[13].

The recommendations that came from this exercise were many, including:

i. **Establishment of regional standards:** Develop transboundary collaboration and establish regional standards for agricultural extension and professional education for poverty reduction[14].

ii. **Education assessment:** Follow agreed norms and standards established for PRAM course delivery and assessment.

iii. **New pedagogic approaches:** Utilize a problem-based learning approach to teaching and a fit-for-purpose oriented approach to assessment and carry out projects based on community inputs[15].

iv. **Coordination:** Effectively communicate PRAM activities among consortium members and within different government ministries.

v. **PRAM partnership charter:** Future collaboration should begin with the creation of a PRAM partnership charter that could:
   a. Clearly establish the mission and vision of PRAM;
   b. Clearly establish the specific roles each partner is expected to fulfil;
   c. Outline which responsibilities belong to which partners, as well as a follow-up system;
   d. Detail how meetings should be conducted; and
   e. Outline what expectations exist before meetings and workshops.

vi. **Visibility:** For potential donors, highlight key elements of PRAM, such as:
   a. How the PRAM programme relies on the creative input of many stakeholders and draws strength from this diversity.
   b. How the PRAM programme is designed in such a way that it reaches the poorest of the poor.
   c. How the government of Lao PDR owns the PRAM programme; how they have taken the initiative to outline their need for a capacity-building programme that has an immediate impact on poverty; and how they have coordinated with the necessary partners to make this happen, in a way that is radically different than that of a typical NGO.
   d. How PRAM is at its core a government capacity-building programme and how the whole programme strives to make use of existing institutions and personnel within the Lao government as the ultimate way of reducing poverty. Whereas many NGOs seek to alleviate poverty through their own efforts, the PRAM initiative seeks to empower government workers to accomplish this task.

vii. **Funding:** Proposals could be made to various donors to establish a trust fund where interest from the fund could be used for PRAM student scholarships.

viii. **Documentation:** Document the ways in which this educational programme works to (a) conserve the environment, (b) reduce vulnerability to climate change, and (c) conserve biodiversity.

ix. **Needs-based curriculum development:** Ensure flexibility in the PRAM curriculum so it can respond to the changing needs and problems faced by extension officers and their communities.

x. **Feedback:** Students should be surveyed upon completion of the programme to gather input on curriculum. To date, three elements were observed to be the most significant during the project implementation phase:
   a. Increased confidence among extension workers
   b. The ability to work effectively with the community and gain their trust.
   c. The ability to solve problems and develop their own ideas.

   These three elements should be reinforced in future courses.

[13] PRAM 2010, op. cit.; PRAM 2011, op. cit.; DLF 2013, op. cit.

[14] Taylor, N., op. cit.

[15] Ibid.

Table 1. **Key Outcomes, Outputs, Indicators and Lessons of three PRAM projects**[16]

Outcomes	Outputs	Indicators	Lessons Learned
PRAM Project 1 (Fish Raising)			
1. Effective communication skills of extension officers 2. Application of technical skills by extension officers	1. Change in behaviour and attitude of local people 2. Improved livelihood	Increase in number of local people participating in training programmes	Building trust among local community is important for successful implementation of local project
PRAM Project 2 (Fish Raising)			
1. Application of broad knowledge-based skills by extension officers 2. Ability to implement new ideas at community level 3. Biodegradable waste utilization	1. Food security 2. Alternate sources for income generation 3. Social empowerment of community	1. Fish pond 2. Establishing chicken cooperative 3. Growth of phytoplanktons and zooplanktons	PRAM curriculum structure and content is important to impart broad skill-based knowledge to extension officer
PRAM Project 3 (Livestock Vaccination)			
1.Increased knowledge and communication skills of extension officers 2. Ability to impart management skills	1. Increased awareness among community 2. Community participation in vaccination programmes 3. Planning, managing and distribution of vaccines	1. Increase in number of vaccinated animals 2. Number of vaccination programmes organized by villagers	1. Networking and coordination skills are important 2. Value addition is important to encourage more participation

xi. **Content:** Some PRAM students had the opportunity to learn the orientation courses at the partner agricultural college in Thailand. Teachers noticed a positive difference between those students who had this opportunity and those who didn't. The teachers felt that it was important for students to get out of their context and be in a different environment as it helps them to have a greater perspective and more ideas to use in their work.
   a. Project-based and problem-based learning are key elements to the success of PRAM.
   b. A training video on how to implement project/problem-based learning in an agricultural context could be created to highlight the benefits of project/problem-based learning.
   c. Role-playing could be used in the classroom as a tool in teaching the PRAM students. This might be especially useful to practice community collaboration skills by acting out scenarios that might occur in the field. For example, what would a student do or say if, as they were teaching new skills to the community, they began to experience opposition from the village elder?

xii. **Creation of evaluation indicators:** Assess student work throughout the programme to enable teachers and partners to make necessary adjustments to PRAM components.

xiii. **Future collaboration:** Encourage student, staff and lecturer exchanges among member universities to share learning experiences from PRAM, as well as organizing workshops and study tours to share PRAM experiences among consortium members. Develop joint proposals based on learning from PRAM.

[16] PRAM 2010, op. cit.; PRAM 2011, op. cit.

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One of the important lessons learned from the PRAM pilot programme is that a human resources development platform can be an effective way of addressing fundamental elements of the relationships among local government and poor communities. By learning together, local government officers and community volunteers in southern Laos had an opportunity, not normally available in their workplaces, of analysing and discussing problems relating to poverty reduction in the presence of local teachers who could act as facilitators and mentors. This dialogue works to improve government services, makes them more accountable to local communities and helps to ensure communities participate more effectively in development processes.

Impact

PRAM is a unique knowledge-sharing initiative that has helped practitioners re-think the concept of developing competencies. The PRAM model is a novel approach that strengthens the competencies of specific stakeholders and strengthening them by addressing their weaknesses and gaps. The PRAM model has a visible impact in terms of defining the role of collaborators, where communities play the role of partners instead of becoming target areas for outreach and extension activities of a university or government department. This approach provides an opportunity to the community to express ideas through extension workers who, in turn, implement poverty reduction projects with a sense of ownership. The actual impact could be measured by a tangible reduction in the poverty level of community members and their improved well-being.

An innovative model such as PRAM links education and professional development for poverty reduction. Mochizuki and Fadeeva[17] have also reviewed other ESD models, such as TUNING (a European survey involving 100 European higher education institutions), Science, Technology, Engineering and Mathematics (STEM) and Arizona State University's School of Sustainability (ASU-SOS) programme. They conclude that the "… PRAM model…radically redefined its relations with local communities by reframing what traditionally constitutes extension or outreach activities of the main campus in close collaboration with the Laos Government, the Thai NGO and other stakeholders…", and observed that "…the PRAM model…provides a key insight to reorienting higher education based on competence approaches…".

Through its capacity-building approach, the PRAM initiative has impacted poverty reduction at the local level (community, stakeholders, government officials), the district and provincial levels, and the national and international levels (aid agencies, NGOs, educational and research institutions, and regional partners). Some of these impacts are highlighted below[18].

i. **Ownership:** Promoting local ownership is a core element of the strategy, and it is vitally important because it is an expression of self-confidence that promotes cooperation and creates favourable conditions for developing regional partnerships, where each party shares the same rights and conditions. Partnerships cannot be sustained if local stakeholders do not have confidence to act at the regional level or feel that another regional partner is directing their work. The Wetlands Alliance has developed regional partnership mechanisms that have started to put into practice these principles of local ownership. It has also developed tools that enable local partners to use their own systems of reporting, to be shared at a regional level.

ii. **Demand-driven "backstopping":** Consistent with the current global vision for reform of traditional support to development programmes, the Wetlands Alliance has worked to develop partnership arrangements that provide backstopping support to local partners on a demand-driven basis and are designed to support local partner ownership. For example, local government agencies in northeast Thailand (coordinated by UDICAD, a local partner alliance), provided most of the backstopping support required by Laos for the PRAM initiative. WAP policy required this support be provided on the basis of formal requests and payments.

iii. **Integration of ICT into local working systems:** New opportunities exist to make more effective use of Information and Communication Technology (ICT), as internet access is now available in even some of the remotest areas of the Mekong region. Under the PRAM initiative work has already begun to develop a Knowledge Sharing Network (PRAM-KSN *http://pramksn.iist.unu.edu/en*), which is an internet-based platform developed to facilitate learning between district extension officers (peer-to-peer learning). MAF/DLF led the design of this system, which allows district officers in Laos to share stories about their work and professional experiences online. This has attracted the interest of district agricultural extension officers throughout the country and also offers partners in Cambodia and Myanmar with a potentially new approach to the development of local-level human resource development strategies. The platform uses free and globally supported software (Open Source), which allows local languages to be used for both the interface and for content. Video clips of farmers experimenting with frog culture, village volunteers facilitating a community meeting, or a short article describing local ideas on climate change adaptation can all be easily uploaded to this platform, for example by mobile phones. Work has also been done through PRAM-KSN and with the University of Bremen, Germany, to develop a more effective early warning system in case of disaster. A new mobile phone application was developed for local MAF staff to allow them to immediately alert others within the ministry about actual or potential disasters. The PRAM experience demonstrates that strong local ownership of the platform leads local government staff and members of local communities to contribute, resulting in rich resource learning materials.

To showcase stories of change resulting from the PRAM initiative, students were interviewed and asked to describe the most significant change he/she experienced as a result of the PRAM programme. One student, Ms. Weelawan Pomachan, who works for the Department of Livestock and Fisheries in Bolikhamxay Province, Lao PDR, observed that before joining PRAM, she lacked confidence in her job. Now she feels confident in her ability to speak with the villagers and she has seen more enthusiasm from the villagers to work with her[19].

[17] Mochizuki, Y., Fadeeva, Z., 'Competences for sustainable development and sustainability: significance and challenges for ESD'.

[18] DLF 2013, op. cit.

[19] DLF 2013, op. cit.

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iv. **Impact-based quality assurance:** A new hybrid system of impact-based monitoring and evaluation, called the PRAM Quality Assurance (QA) framework, uses the impact assessment tools of development line agencies, such as LogFrame indicators. PRAM students are expected to demonstrate that they can measurably reduce poverty. As such, it brings impact assessment to the forefront of their development activities and their work becomes more results focused. Curricula, courses, teaching methods and students all had to be fit for the purpose of poverty reduction, and students (government extension workers) only passed if improvements in the livelihoods of poor people could be independently verified.

Policy Implications and Future Prospects

There are many policy implications of this initiative in terms of capacity-building, not only for poverty alleviation but also in other areas like climate change and skill building, and especially in the low income developing regions of the world. The problem-based learning approach, fit-for-purpose curriculum design, impact-oriented assessment of the participants, local trust-building, promotion of regional cooperation, introduction of modern technologies for communication, knowledge sharing, and skill development could be readily applied in similar situations in other parts of the world. Based on its initial success, MAF has already started exploring how the project could be scaled up so as to serve a larger proportion of the 5,000 extension workers throughout the country[20]. The PRAM initiative has also attracted the interest of those in other countries in the Mekong region for replication and scaling up.

Government policies that help to promote such innovative approaches will lead to more focused, targeted and immediate benefits, as compared to conventional educational approaches. There are, however, challenges to be addressed in mainstreaming this approach. Training workshops and broad course-based education may only solve some immediate problems. Since PRAM is based on the students' project-driven approach, there may be a lack of interest on the part of the government to develop long term projects. Additionally, if there is a supportive national policy to channel the funds for an innovative poverty reduction project idea, students would feel more encouraged and motivated to perform better.

While the current operation of this transboundary collaborative platform is formally integrated into local government work plans, the platform itself is not yet officially recognized at either national or regional levels. An important part of the proposed strategy moving forward will be to develop official awareness of this platform as it expands, establishing a regional Working Group to discuss the PRAM approach within a regional dialogue on aid effectiveness. The southern Laos PRAM experience demonstrates that moving national cross-sectoral dialogue to a regional forum is an effective way to catalyse collaboration among different national sectors. Using the WAP regional platform to promote collaboration, MAF/DLF has been able to significantly accelerate the process of reforming Lao agricultural education in a relatively short time.

It is clear that for this initiative to succeed, the role of the government cannot be underestimated. The interest and commitment to sustain such a project would be greatly enhanced if relevant policies and organizational frameworks are put in place and kept well-informed. Once such a commitment is ensured, the involvement of regional donors and consortium members is also more easily leveraged.

The expansion of the PRAM approach requires a large group of regional partners, willing to use the tools, methods and approaches that have been developed. It is important to involve all relevant national ministries and departments to implement and oversee such an expansion. To prepare for this expansion, a regional workshop was organized during 28-29 March 2013 by the Laos Department of Livestock and Fisheries to explore possibilities for improving the effectiveness of regional collaboration in the fisheries sector. Recognizing the growing number of regional projects and programmes in this sector, the workshop aimed to explore opportunities to jointly develop a regional framework to improve the effectiveness of existing programmes and their impact at the local level. It was also an opportunity for WAP local partner government agencies in Cambodia, Laos and Thailand to explore possibilities for improving the effectiveness of regional collaboration in the fisheries sector. The workshop was a first step in developing such a common framework, and provided an opportunity for relevant government agencies of Cambodia, Laos and Thailand to discuss a strategy for closer collaboration[21].

For ProSPER.Net, one of the important lessons from this learning approach is how to expand the methodology into areas and other countries, through pilot programmes and initiatives. The results obtained clearly indicate the value of the approach, and for a regional consortium like ProSPER.Net, the next step would be to align its member partners to devise ways of utilizing this approach to pedagogy, as well as to assess the impact of the learning experience of the students in the various universities of the consortium.

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[21] DLF 2013, op. cit.

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ProSPER.Net Young Researchers' School: Building Research Capacity for Sustainable Development

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The ProSPER.Net Young Researchers' School (YRS) offers doctoral students ample opportunities to discuss local sustainability challenges in a multicultural and multidisciplinary environment. The YRS aims to further knowledge, understanding, and skills in sustainability research and practice through a mixed programme that includes lectures, field trips, development of research planning and science communication skills. The school also promotes a network of researchers and future professionals working with sustainability-related projects. Hosted in different locations in Asia, the theme of the school changes every year to reflect local sustainability challenges; lectures and field trips are thus tailored to fit the year's theme. The various elements of the school are essential pieces that form an integrative experience, a real opportunity for students to envision how research can be applied in creative ways and catalyse more sustainable practices. The chapter describes the model created for the YRS and also highlights the advantages that a network of expertise and resources brings when developing such capacity-building programmes.

Introduction

There is a common view that ESD requires an integrated understanding and approach that enable us to solve complex problems that variously cross disciplines, geographical boundaries, and involve multiple stakeholders[1]. Whereas this is a major assumption that often permeates the debate on sustainability, how is this translated into practice and, with a vision to the future, how does one nurture specific competences in ways that graduating professionals are then able to identify and tackle multidisciplinary, multi-stakeholder and cross-boundary issues[2]?

From its foundation in 2008, ProSPER.Net members discussed the creation of a summer school in sustainable development that was later denominated the ProSPER.Net Young Researchers' School[3]. Given the deficiency in graduate programmes that are often designed according to the traditional structure of disciplines, the idea was to develop a stimulating programme that would offer a broad understanding of the multitude of aspects that can be found in sustainability-related problems. Students would engage with researchers and practitioners through a differentiated experience to enhance doctoral students' comprehension of local sustainable development issues, while contributing to the expansion of a growing network of researchers in the region. Thus the school's concept developed along the idea to fill a gap in research capacity development, specifically focused on regional sustainability problems that can be transferred to other similar realities.

Early discussions based on ProSPER.Net members' experiences of designing sustainability-related programmes shaped the interdisciplinary focus that is ensured by a mix of resource persons and students from different fields of research[4]. The current globalized status of education that attracts students from other continents to the Asia-Pacific region, in addition to the collaboration between ProSPER.Net and the German Federal Ministry of Education and Research, contribute to make the YRS a diverse gathering of people from various parts of the world.

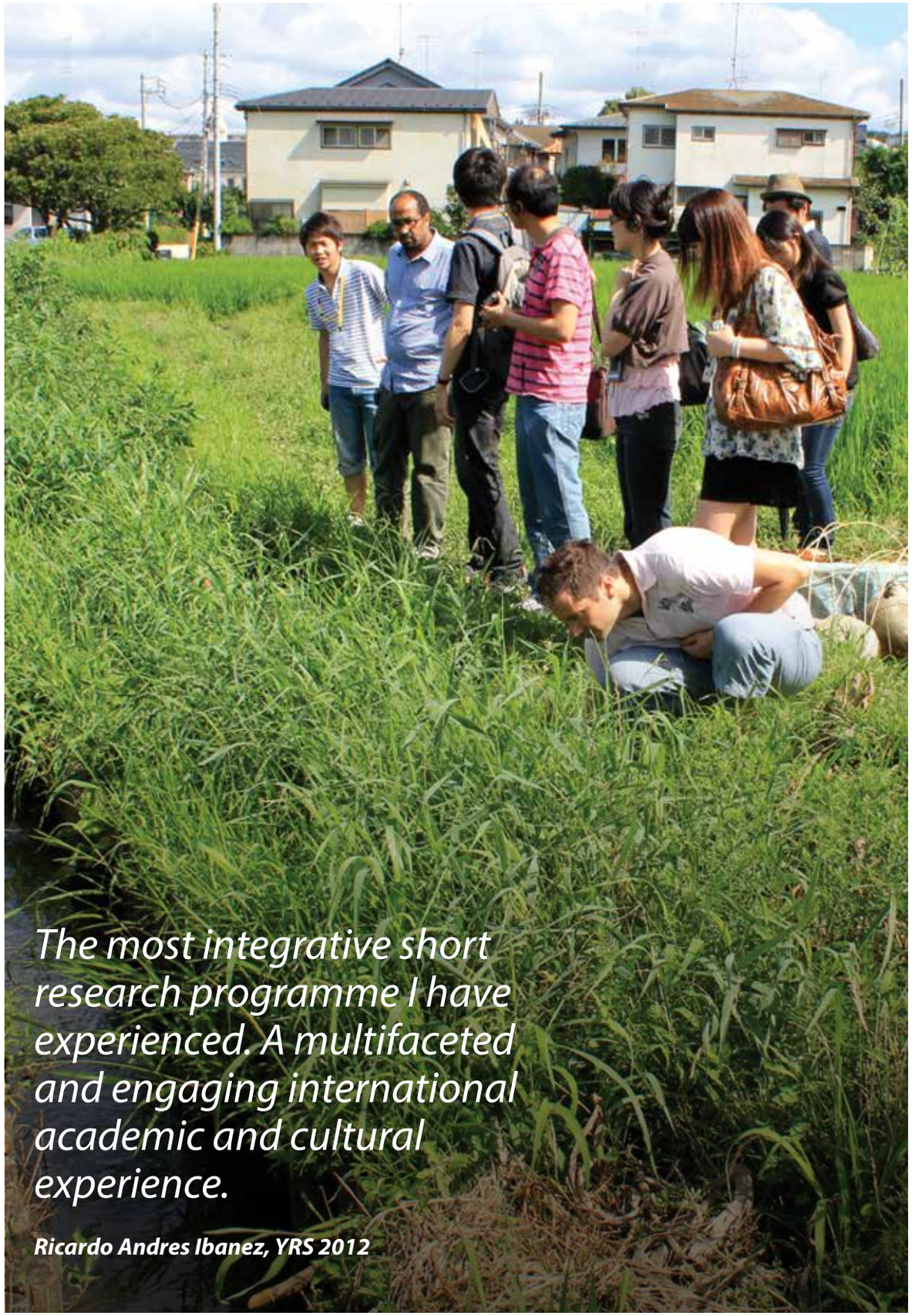
The school benefits from sharing resources and expertise of ProSPER.Net members, while providing an opportunity for student exchange. Other summer school programmes are frequently designed only to provide additional knowledge on specific issues and the mode of delivery is traditional, or else through lectures with little dedicated time for discussions. Bearing in mind these issues and understanding that sustainability demands a holistic approach, earlier discussions identified that the programme should be designed to expose participants to sustainability issues, while offering them ample opportunities to discuss local challenges in light of their field of expertise and background. The programme would

[1] See, for example, the Framework for the UNDESD International Implementation Scheme, p. 17, that lays out the features of ESD as interdisciplinary and holistic, values-driven, promotes critical thinking and problem-solving, applies multiple types of pedagogies to promote learning, fosters participatory decision-making processes, and allows opportunities to apply knowledge in locally relevant contexts.

[2] For further reading on competences for sustainable development, consult Mochizuki, Y., Fadeeva, Z., 'Competences for Sustainable Development and Sustainability: Significance and Challenges for ESD'.

[3] ProSPER.Net Meeting on Joint Activities held on 19 June 2008 at Hokkaido University, Japan. Discussions continued in subsequent meetings: 2nd ProSPER.Net Board Meeting on 4 November 2008 at the Asian Institute of Technology (AIT), 3rd ProSPER.Net Board Meeting on 2 June 2009, also hosted by AIT and after that, the YRS was finally approved with RMIT University being the lead organization, what will be described later in this chapter.

[4] These ideas were particularly discussed during the 2nd ProSPER.Net Board Meeting in 2008.



Working in teams for different tasks and pushing ourselves to think out of the box, enhanced my understanding of research. The school also gave me an opportunity to interact and discuss with researchers from different fields. This entire process … made me a more confident person.

Pratima Singh, YRS 2010

focus on specific needs of the Asia-Pacific region, given ProSPER.Net's thrust and regional approach, providing a forum to address relevant issues that have transdisciplinary dimensions.

This chapter provides an overview of the YRS model that was introduced in the first school and has been continuously developed over the course of the three subsequent years in which the school took place. The experience of each hosting school in applying the model with focus on their motivations, challenges and outcomes is also described. The feedback of students is an integral part of the model, so the next part of the chapter is devoted to their reflections. The chapter concludes with a discussion on institutional impacts of the YRS and suggestions for taking the model forward in the future.

The YRS Model

Students are invited to spend two immersing weeks in a collective learning process that happens through intensive interaction within a multicultural, multidisciplinary and small group of participants. The YRS comprises several components that involve furthering knowledge through lectures that provide the context for field trips, group and individual activities involving research planning development and communication skills. Lectures and field trips are tailored to each year's theme. Building on the various activities, participants develop a focused and structured research proposal on ideas emerging over the course of the programme, mentored by participating resource persons. One of the main features of the school is its rotation among different ProSPER.Net members, with the theme changing every year to reflect local sustainability challenges. By doing so, the school can cover a wide range of issues that affect the region. Since its inception, the YRS has covered themes (Table 1) ranging from urban development in an advanced economy to community-based resilience and disaster risk management.

The decision to hold the first YRS was taken at the 4th ProsPER.Net Board meeting held at Universiti Sains Malaysia in Penang in November 2009, when the RMIT representative presented a proposal for a "Transdisciplinary ESD Young Researchers' School". Their proposal was based on previous discussions in Board meetings and a number of explicit assumptions, or premises, that established a shared understanding of its scope and aspirations, as follows:

- A key challenge in the Asia-Pacific region, and beyond, is to enhance the capacities of graduate students so that they can understand the demands of sustainable development and provide innovative responses that are relevant to the needs of the region, be they in the technology and/or social/cultural domains.
- Current graduate students are tomorrow's leaders across the Asia-Pacific region. They are likely, as future leaders, to be key movers and shakers in addressing the many and varied challenges of sustainable development across the region.
- Graduate students are engaged with the demands of specific research projects within their chosen research discipline/domain, and often have only limited opportunities to address the broader transdisciplinary – social, economic, environmental and cultural – dimensions of sustainable development.
- The summer school format would not only give graduate students better understandings of the spectrum of challenges behind sustainable development but would do so in a way that fosters the growth of a network of sustainability scholars and professionals.

From the very beginning the experience being offered by the school has been evaluated by the students, allowing the continuous feedback to improve the design of the following year's school. The shifting location of the school and its organizers means that student feedback is critical to understanding how students are interacting and reacting to the YRS model. Some features introduced in the first school in 2010 are still included and over time, this has formed the core of the YRS experience with local variation giving each school a unique flavor.

The core components to assist students in developing research communication skills include activities such as a 3-minute thesis competition, an exercise in which researchers present an outline of their research in three minutes using only one slide[5], and an Our World 2.0 workshop offered by the UNU Office of Communications, where participants are invited to rethink the way research is disseminated and new possibilities opened by web-based tools like Our World 2.0, UNU's web magazine[6].

The various elements of the school combine to form an integrative experience for students, which serves as a real opportunity for them to envision how research can be applied in creative ways and catalyse more sustainable practices. During group work and discussions, students engage with people from different countries and with different academic backgrounds, building both interpersonal skills and the ability to communicate with people from different areas of expertise.
The research activities, research methodology, field work methodology and research proposal development are designed to complement their knowledge on how they can incorporate elements of sustainability into their own research.

The outcomes of such a programme are as diverse as their participants, encompassing learning in a multicultural and multidisciplinary environment, from and with each other, through group work and discussions, respecting diversity and different cultural perspectives. Students experience how to develop consensual and suitable approaches to concrete problems, overcoming language barriers, discipline and communication boundaries, as well as an appreciation of how enriching this process can be for their own research. Students also benefit from the opportunity of enhancing their creativity through experiencing innovative approaches for local sustainable solutions and other ways of living and dealing with sustainability challenges. Furthermore, the programme also offers a platform to discuss research development and improve research communication, presentation and interpersonal skills through individual and group activities, for example, facilitating discussions, introducing speakers, and interviewing locals. The interaction between students and resource persons from around the region affects both groups in their perception of teaching and learning experiences and after four years of programme delivery, it is possible to identify increased network activities and sharing of resources and expertise through this additional platform for student exchange, what certainly contributes to enhancing the international visibility of ProSPER.Net members in general, especially the host institution.

Table 1. **Details of each YRS Held (2010-2013) and those Planned*.**

Year	Location	Host Institution(s)	Theme
2010	Ho Chi Minh City, Vietnam	Royal Melbourne Institute of Technology (RMIT)	A Sustainable Future for the Mekong Delta Region
2011	Tokyo, Japan	Hosei University, UNU-IAS	Learning from Japan's Experience on Urban Sustainability
2012	Yogyakarta, Indonesia	Universitas Gadjah Mada (UGM)	Building a Resilient Society in Asia
2013	Bangkok, Thailand	Chulalongkorn University (CU); Asian Institute of Technology (AIT); Prince of Songkla University (PSU)	Partnerships in Water and Biodiversity for Sustainable Development
2014*	Shanghai, China	Tonji University	Urban Planning for Sustainable Development: Water Resources and Ecosystem Management
2015*	Delhi, India	The Energy Resources Institute (TERI)	Sustainable Energy for Transforming Lives: Availability, Accessibility, Affordability

Taking these elements together, ProSPER.Net managed to design a unique programme to assist students in enhancing their knowledge on sustainable development, developing presentation skills, research planning and

[5] The 3-minute thesis competition is aimed at an educated but non-specialist audience and graded according to three criteria: clarity of presentation, comprehension and the engaging nature of the research. This activity was introduced in the first YRS hosted by RMIT University, inspired by its wide application in Australia, where a national competition is annually held.

[6] Our World 2.0 is an online publication that includes contributions from a wide range of academics, researchers and students – their work, thinking, solutions and innovative approaches to global challenges of climate change, food, biodiversity and oil. For more information, see http://ourworld.unu.edu.

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networking. As will be described below, the school was initially designed and delivered by RMIT University in Vietnam, followed by schools in Japan, Indonesia and Thailand with two further schools planned in coming years (see Table 1). The selection is made upon receipt of proposals and once accepted the host institution works closely with the ProSPER.Net Secretariat. Student applications are made online and selected by a committee composed of the Secretariat and the host institution. Below is a description of each YRS, detailing their planning, content and outcomes.

ProSPER.Net YRS was truly an enriching experience for me. … I feel it's a great opportunity for young researchers to broaden their horizon of thoughts and to refine them further.

Richa Sharma, YRS 2011

2010 YRS: A Sustainable Future for the Mekong Delta Region

Planning and hosting the school

RMIT University hosted the first YRS at its Ho Chi Minh campus in October 2010. The proposal was to hold this first school on its campus in Ho Chi Minh City in Vietnam, an Asian campus of the Melbourne-based university, for approximately 20 postgraduate research students from ProSPER.Net member universities.

Like many initiatives with broad objectives involving a number of collaborating organizations, the initial timeline was too ambitious. A programme of lectures had to be designed, student application and assessment processes established, group projects designed, field visits planned, accommodation booked, hosting arrangements with RMIT Vietnam arranged, and visa and travel arrangements made. All of this took more time and effort than first envisaged, which led to the school being rescheduled to October 2010.

The scale of the YRS project became evident as the number of collaborators expanded. In summary it involved: RMIT University (Australia) which led the YRS planning with the support of a project officer and also supported three PhD students to participate; RMIT University (Vietnam) which provided on-campus rooms for lectures and workshops, IT support to participants, an official welcome and arranged in-country transport and hotel accommodation; UNU-IAS in Yokohama which supported RMIT communications with ProSPER.Net universities, selection of applicants, and funded PhD student travel and UNU-IAS staff resource persons; ProSPER.Net universities supported PhD student applications and provided staff as resource persons to participate; the German Ministry of Education and Research supported participation by postdoctoral fellows who were winners of the 2009 Green Talent Competition and other resource persons; and the Live and Learn Environmental Education organization, an NGO working in Vietnam and Cambodia. Other plans to involve a Vietnamese university and another local NGO could not be developed in time.

The YRS programme

The YRS programme was framed around eight elements: sustainability lectures, of which there were 15; using social media to disseminate research outcomes; student presentations using the 3-minute thesis competition format described previously; research proposal writing; panel discussions about undertaking a PhD and life after a PhD; a game on the management of the Mekong River and resource use; field trips; and social events. The two elements that required student participation were research proposal writing and the 3-minute thesis competition that has become a feature of subsequent YRS programmes. A third programme element that was originally set for student participation was the preparation of a short plain language essay on their research. However, it was recognized that there was insufficient time in the programme to accommodate this academic task alongside the 3-minute thesis competition and the research proposal project. Instead this skill was discussed in a lecture and future one-on-one assistance offered.

The research proposal writing was designed as a centrepiece of the YRS and required significant commitment from the PhD students, who worked in groups supported by academics who later became resource people. Four groups prepared a Research Proposal Project. Their initial task was to select a research topic of interest to all members of the group. Teams were introduced sequentially to templates at key points, which they used to guide the development of the proposal. Before the introduction of each new template the groups presented their ideas and received feedback.

It was through this process that the students identified a field of research and prepared a statement of the problem that their research would help to solve. The first step in developing the proposal that would respond to the problem was to pose a principal research question. This question then had to be broken down in a way that led to objectives that would guide research data collection and analysis. They were then asked to develop a plan for data collection and analysis that responded to the research objectives. This required them to consider methods for data collection, data sources and data analysis techniques.

Through the course of the programme, four research proposals were prepared. The topics were: low carbon industrial parks; the Saigon South Master Plan style of urban development featuring luxury high rise apartments on former farmland and wetlands; micro-financing for environmentally sustainable rural and industrial development; and climate change adaptation in the lower Mekong Delta focused on community capacity-building and disaster risk reduction.

It was through this group work that the postgraduate students had the opportunity and requirement to address the broader transdisciplinary – social, economic, environmental and cultural – dimensions of sustainable development. The outcome of the application and selection process had brought together a group of students from quite different disciplinary backgrounds. They included disciplines within the physical sciences, the social sciences and the humanities. Grouped around four tables, the students were required to develop their skills in understanding the contribution of other participants who used different intellectual frameworks to define ESD problems for research.

Learnings

Participants were asked to evaluate the YRS at the end of the first week and at the end of the second week. At the end of the first week there were small group discussions focusing on the strengths and weaknesses of the YRS so far. While at the end of the second week they were asked to score and develop comments on each of the eight elements, in terms of achievements and considerations for future programmes. Also participants, including resource persons, were invited to submit supplementary comments on the YRS.

A few themes came through in the discussion of achievements, indicating that the premises underpinning the development of the YRS were appropriate. Students affirmed that they were learning more about sustainability and the challenges that more sustainable forms of development posed. In particular, students appreciated the opportunity to think about the way in which their research linked to the bigger picture of climate change and ESD. PhD research by its very nature is highly focused on a particular research question. The YRS provided an opportunity for students to think about connections to other research and important policy issues. Indeed, this initial evaluation showed that students wanted more opportunities to consider how their research related to policy agendas. It was also confirmed that students recognized that the YRS provided an opportunity for skill development, including different ways of learning, presentation skills, English language proficiency, and developing networks.

At the end of the second week and the conclusion of the YRS, the eight elements of the programme were evaluated by the students through group discussion and scored. The results of this evaluation are presented in the table below.

Activity	Rating	Summary comments
Sustainability Lectures	7.5/10	**Achieved:** Maturity, knowledge and skills **Future:** Structure to triple bottom line topics a little more as well as include more case studies to demonstrate sustainable/unsustainable practices
Social Media Lectures	8/10	**Achieved:** Writing skills for a non-specialist audience **Future:** More time to apply knowledge and skills acquired in writing for social media
3-Minute Thesis	7/10	**Achieved:** Presentation skills
Panels on PhDs	8/10	**Achieved:** Clarifying potential career goals **Future:** More target oriented discussions as different schools have different requirements

Activity	Rating	Summary comments
Mekong Game	4/10	**Achieved:** Greater appreciation of the subtleties of international disputes and conflicts **Future:** Games should be less theoretical and be more applicable to the real world
Field Trips • Can Tho • Saigon South	6/10 8/10	**Achieved:** Exposure to real life experiences in relation to sustainable development **Future:** Should visit more rural villages
Research Proposal	8/10	**Achieved:** Increases ability to make connections with unfamiliar subjects as well as practice interdisciplinary research skills **Future:** Present more examples of completed research proposals
Social Events	9/10	**Achieved:** Fun and food; making friends; networking

In addition to the evaluation of these elements, participants as a whole group identified two other issues, which they wanted noted by those who organized future schools. First, the issue of English language fluency of young researchers whose first language is not English was raised. It was acknowledged that a "high level of understanding of written and spoken English language" was a selection criterion specified in the application process. However, even though all participants met this criterion, some participants whose first language was not English were less confident in asking questions and participating in groups. This led to the suggestions that presenters be encouraged to speak slowly and that more small group discussions be conducted earlier in the programme. Secondly, there was discussion of the timing of the "writing a research proposal" group project. This work was undertaken during the second week of the YRS. There was a consensus that work on the proposal should have commenced during the first week so that there was more time to develop greater collaboration and more depth in the proposals.

In sum, the organizers of the first YRS concluded that the students had benefited considerably from setting aside two weeks and participating in this learning experience. Using the initial working assumptions that guided the design and organization it is reasonable to conclude that students:

- Developed their capacities to better understand sustainability challenges and possible responses;
- Better understood the role of highly educated leaders in addressing challenges and proposing solutions;
- Developed their capacities to make connections between the social, economic, environmental and cultural dimensions of sustainable development; and
- Further developed their networks of sustainability scholars and professionals.

At the same time the participants provided good thoughtful feedback on their YRS experience, which was passed to the organizers of the second YRS.

2011 YRS: Learning from Japan's Experience on Urban Sustainability

Hosting the YRS in Japan provided an invaluable opportunity for Hosei University to build and strengthen internal connections between several departments as the planning for the YRS evolved during the months prior to the programme, held from 1 to 12 August 2011. With curricula and activities vertically divided, the university was not adequately addressing transdisciplinary topics such as sustainability until then. Therefore, the YRS served as an internal learning process, bridging the gaps between vertical divisions, enhancing cooperation among young researchers and senior scholars, and fostering networking within the university, initiating a more meaningful integration of education and research activities[7].

The triple disaster – earthquake, tsunami and nuclear accident – that happened in Japan in March 2011 raised concerns about the school's organization during summer of that year, but at the same time, contributed to expanding the issues to be discussed during the YRS. Whereas urban sustainability was previously the main focus of the school, due to the increasing urbanization process occurring especially in Asia[8], the incredible resilience that Japanese people demonstrated after the disaster, and the responses to recover and rebuild affected areas were also included as topics to be discussed. In fact, coming from other parts of Asia that also face disaster risks, the students appreciated very much the opportunity to learn more about disaster preparedness, management and recovery efforts in Japan.

[7] See Box 3 in Chapter 1.

[8] Asia already hosts half of the urban population in the world and according to the UN Department of Economic and Social Affairs, Population Division, by 2025 the number of mega-cities will increase. See World Urbanization Prospects, The 2011 Revision, Population Division, World Urbanisation Prospects, The 2011 Revision, available at http://esa.un.org/unup/pdf/WUP2011_Highlights.pdf

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ProSPER.Net YRS at Yogyakarta, was an exhilarating experience due to its innovative approach to deliver knowledge to the participants … The summer school gave a deep insight into the major challenges faced by communities and individuals of Yogyakarta and their ability to cope through adaptive human behaviour.

Pooja Arora, YRS 2012

The selection process ensured a balance between ProSPER.Net membership representation and a diversity of backgrounds, with the main part of the programme being hosted at Hosei University's Tama campus, located around 30 kilometres from downtown Tokyo. Two other events were also envisioned and, though adding logistical challenges, a symposium marking the opening of the YRS was organized at Hosei University's Ichigaya campus and the closing ceremony was held at UNU headquarters in Tokyo. For the opening and final day, students stayed in Tokyo, close to the venues, but for majority of the two weeks, they enjoyed the tranquility and green areas of Tama campus. For the organizers, it proved an ideal place to focus, allowing students to walk and exercise in the surrounding forests during their free time, but the isolation was noted as preventing students from experiencing Tokyo's urban life.

For the opening symposium, Ms. Wakako Hironaka, former Director General of the Environment Agency of Japan (forerunner to the current Ministry of the Environment of Japan) gave a keynote speech relating Japan's experience with increased resilience built upon integrated measures to cope with urban development and disaster risks. During the week, Hosei University faculty and resource persons from the University of Tokyo, UNU and RMIT offered specific lectures on urban sustainability, multicultural coexistence in urban settings with the example of Tokyo's Shinjuku district, case studies on urban agriculture (*satoyama*), disaster management with a focus on earthquake recovery, urban planning based on green building development, and Our World 2.0.

Given the objectives of the YRS and also due to the excellent outcomes and great enthusiasm demonstrated about activities such as the 3-minute thesis competition, the panel on life after a PhD, and the group research proposal development, this YRS continued these activities and sessions were appropriately organized throughout the programme to accommodate practice for the 3-minute thesis competition and the research proposal development, based on the templates described in the previous section. The life after PhD panel was highly interesting, with researchers from UNU and young academics discussing the challenges surrounding the pursuit of a doctoral degree and the possibilities opened for careers thereafter.

The field visits that constituted an important part of the programme were also organized to reflect in practice what was discussed in the classroom. Therefore, students walked around the north districts of Tokyo, comprising Ueno and Asakusa, observing geography and understanding how urban settings developed in Japan. During the day spent at the University of Tokyo Kashiwa campus, a visit to the local Urban Design Centre was also organized and it was possible to see how the city developed, with close collaboration between the local government, the private sector and academia. In addition, students also had the opportunity to visit urban agricultural areas that were indicative of practical satoyama initiatives, as well as a recycling centre where it was possible to understand the infrastructure involved in waste management process.

During the second week, students worked on research proposals, bringing together the lectures and the field visits. Three groups were formed to prepare proposals on policy, knowledge and technology and how lessons learned could be transferred to other realities. The proposals presented were on: "Learning from Japanese Waste", looking at policy recommendations for the implementation of source separation for waste management systems in medium-sized Indian cities; "Traditional Knowledge for Reducing Disaster Risks from

Floods", with a specific focus on the Ganges-Brahmaputra and Shinano River Basins; and "Using Technology to Make Nuclear Production Fail Safe, yet Safe to Fail".

The final day coincided with International Youth Day, and was celebrated with a collaboration between Hosei University, UNU and iuventum, a German NGO that gathers students from Europe and Asia for a summer programme in Japan. The one-day joint programme "Inspiring the Next Generation of Researchers in Sustainability" comprised a keynote speech by Ambassador Mutsuyoshi Nishimura and a panel discussion highlighting local projects led by youth within the framework of RCE Chubu, ESD activities and the UNESCO Associated Schools Project Network (ASP-Net) in Osaka, as well as local government endeavours in urban sustainability by Citynet. The afternoon was dedicated to several activities developed during the YRS and was facilitated and presented by the young PhD students. The students shared their experience pursuing a PhD degree and also the research proposals developed during the two-week programme, based on lectures, field trips and focused group discussions. The final session of the 3-minute thesis competition was also arranged and participants cast votes to choose the winner. The programme was designed to be delivered by youth, to youth, focusing on academic work relevant to raising awareness and demonstrating that young individuals can identify robust solutions for the collective problems faced by humanity, with hopes that it would inspire the next generation to engage with sustainability research.

The 2011 ProSPER.Net YRS … was a perfect blend of lectures, field trips and workshops to enable participants to explore new avenues in the field of urban sustainability.

Fawzia Tarannum, YRS 2011

For the evaluation, instead of distributing a questionnaire that would be filled out individually, the world cafe format was utilized. The students were divided in three groups designed to maximize the full participation of the group as a whole, with three facilitators helping the discussion with initial questions around the programme, objectives and activities. The overall feedback was positive, but because several Japanese professors delivered their talks with consecutive interpretation, this decreased the time for further interaction and prevented direct discussions; participants felt that much was lost in translation. Because of that, future schools tried to secure English speakers for talks and the discussion time was extended to half of the lecture sessions.

The 3-minute thesis competition that consisted of three rounds for selection of finalists was changed after the 2011 YRS. It was noticed that better English speakers could present their research with more clarity and therefore were inevitably chosen to be finalists, which was demotivating for the rest of the group. From 2012 onwards, the 3-minute thesis competition comprises a general section at the end of the first week when all students present and receive feedback from attending resource persons and peers. The final session is organized on the last day and all of the students compete equally, with attending resource persons marking each candidate on three criteria: slide design, presentation comprehension, and level of engagement. The highest aggregate scores select the winner and two runners-up.

Although there was the suggestion of starting the group work on the research proposal development earlier in the programme, after much discussion, this activity was kept in the second week since the proposals should, as much as possible, connect the lectures and the field visits and only after a week of these activities would it be feasible to engage in a more meaningful discussion regarding a research proposal. It also provides more time for students to identify issues related to their own research, familiarize themselves with each other, and feel comfortable to immerse themselves in focused group activity.

In conclusion, besides proving to be an excellent opportunity for internal capacity-building and more meaningful engagements between different faculty members within the university, the 2011 YRS also contributed to establishing some foundations for the school that were tested the previous year and subsequently improved in following years. The task was then transferred to UGM in Yogyakarta, Indonesia, which hosted the 2012 YRS.

2012 YRS: Building a Resilient Society in Asia

The notion of resilient community gained more relevance in Yogyakarta in the aftermath of the 2006 earthquake and 2010 volcanic eruption. These disasters brought serious impacts to local communities, especially those who resided in the hardest hit areas. Many people were severely injured, lost their family members and properties. The disasters also accentuated their social and economic vulnerability. After the earthquake and the volcanic eruption, communities in Yogyakarta received great attention from people all over the world. Government and non-governmental organizations, scientific communities, students and volunteers contributed a great effort to assist local communities through hardships; many of them committed with a long-term perspective.

UGM implements a Community Service Programme or Kuliah Kerja Nyata (KKN), in which undergraduate students from different backgrounds or disciplines are assigned into working groups with specific proposed themes that address issues at the local level. Utilizing their knowledge and skills, students work for two months in designated areas, applying a problem-solving approach to challenging issues faced by the local community[9]. The idea is to strengthen local efforts to anticipate and deal with future natural disasters. Working in close collaboration with local government, UGM continuously engages with policy formulation, including measures for disaster risk reduction with a broader view of supporting sustainability-related policies in Indonesia. This experience provided a useful set of connections upon which a stimulating two-week course could be planned.

Hosting the 2012 YRS was therefore an opportunity for UGM to continuously support capacity-building of its scholars in responding to issues related to resilience. Besides reflecting on local challenges and community responses, the theme "Building a Resilient Society in Asia" was also proposed with a vision of establishing synergies within ProSPER.Net, and bringing collaborative research activities and capacity-building programmes together. The expertise and competence of UGM's scholars and their dense linkage with the local community was expected to facilitate knowledge sharing and learning. By hosting the 2012 YRS, UGM also aimed to build stronger linkages with international counterparts through active collaboration and exchange deeper ideas and views on resilience. Through sharing experience with international scholars, UGM wished to explore the role of local resources, knowledge and their relevance to the dynamic changes in international society. The school was expected to provide an environment that enabled participants and resource persons to nurture innovation that would be sensitive to local culture while taking advantage of the modernization of knowledge and science.

The preparation of the YRS faced diverse challenges, especially matching the lecture themes (disaster management, social enterpreneurship, and community development) with sites for field visits. Related to the first theme, attention was given to sites that would provide a context about two types of disaster (volcanic eruption and earthquake) affecting the region. Another challenge was the minimal response by UGM students during the application process. Circulation of information was not very effective due to the absence of a centralized system that linked the university with PhD students. Also, fixing the schedule of local resource persons proved to be difficult because the school was held during the first semester of the academic year, leading to several revisions of the timetable. Intensive coordination with UNU-IAS was an important factor to identify and communicate problems, while provisioning for logistics.

The 2012 YRS was held from 17 to 28 September at the university's Center for Environmental Studies. A combination of students from 10 countries contributed to a very dynamic school. Among resource persons, representatives from AIT, Hokkaido University, Hosei University and UGM were responsible for talks and participation in different panel discussions. The lectures were organized surrounding themes focusing on disaster management, poverty eradication, social enterpreneurship, health, nutrition and food. In 2012, based on previous feedback, lectures on qualitative and quantitative methodologies were introduced to assist students on data collection methods. As happened with Hosei University, a variety of faculty members joined the programme, coming from diverse departments such as engineering, geography, culture, social science, political science, and economy, as well as the medical school. Continuing the tradition, besides lectures and field visits, there was also the 3-minute thesis competition and the Our World 2.0 workshop provided by the UNU Office of Communications. The session on life after PhD became an interesting forum for all participants to envision their future role in the community and to get insights from resource persons about career plans and development.

[9] See Tanaka, A.C., 'Empowering Youth in Rural Indonesian Villages'.

During the field visits, students had an opportunity to learn directly from the experience of local communities about disaster response and recovery, especially the utilization of local resources to address impacts of earthquake and volcanic eruption. The first field visit to the Merapi Volcano Museum provided a scientific perspective on volcanic eruption, but also local myths and beliefs that connect the community with the land and natural disasters. After that, the group visited one of the most affected villages where temporary shelter had been established, and also the permanent shelter area provided by the local government in which the affected villagers built new housing and facilities. Participants and villagers engaged in a very stimulating informal discussion in between these activities[10]. The second field visit linked the conceptual understanding of social enterpreneurship to actual practice. In these sites, local actors developed resilience through strengthening local capacity utilizing permaculture and integrated farming, connecting biophysical and social activities in a continuous and closely integrated system. Environmental sustainability, energy efficiency, and food security were also discussed during the visit. The third field trip was an empirical observation of community development through communal activities. The first village visited was Sukunan Village in Sleman District which utilizes a community-based waste management system[11]. The second visit was to Kasongan Village in Bantul District, where local artisans work on pottery making, their main economic activity. The increased sales for local market and exports showed the slow recovery from the initial impact of the earthquake. Students also had the opportunity to make pottery and were able to take their art back to their countries.

One of the expected outputs of the school was the group work on research proposals to develop research and communication skills within a multidisciplinary and multicultural learning environment. As happened in the previous year, this activity was conducted during the second week, providing sufficient time for students to generate a common research agenda. Interestingly. three proposals were connected utilizing a fictitious village to look into different sustainability and resilience building aspects: "Conceptual framework for integrating village resources with a view to increasing resilience", "Communication and diffusion strategies to transfer an innovative model of village development to other contexts", and "Disaster risk management and preparedness to support resilience of local villages'". In addition to the research proposals, some students also produced short articles about the YRS experience and some reflected on how the lessons could be applied to their own research[12].

During the implementation of the programme, there were challenges in engaging some participants in a full commitment. Personal issues such as health and problems to communicate in a multicultural environment raised concerns about the group's harmony and was a clear sign that the immediate benefit of the programme might not be equally distributed. Notwithstanding, the school was able to stimulate a dynamic debate among participants during in-class and outdoor activities. It was also a very precious momentum for UGM scholars to have an intensive exposure to ideas and experiences shared by all participants. The success of the school was attributed to the ability to match the needs outlined in the school programme with local resources, so that stronger linkages between themes introduced in the class lectures and the empirical context of communities in Yogyakarta were tightly secured.

Based on the evaluation process that continued to be done in the world cafe format, the school met individual expectations in terms of providing relevant knowledge on the issue of resilience, knowledge integration and innovativeness, especially regarding community development. There was however a need to focus more on how the lectures could serve students' diverse backgrounds. As for communication skills, activities such as the 3-minute thesis competition, group work discussion, introduction of speakers and facilitating class discussions were very helpful to increase participants' confidence and to introduce different methods of presentation and managing public forums. This was particularly true for students who never had such an opportunity and who had limited experiences in public presentations and delivering speeches. Participants said the school was able to develop a good platform in this regard and they enjoyed the learning by practice methods. Some participants raised issues such as miscommunication with lecturers due perhaps to language problems, although consecutive interpretation was not utilized in any of the lectures, except for the field visits.

[10] For a visual account of the actual experience in this field trip, see Tanaka, A.C., Schmidt, S., 'Researching Resilience: Young Scholars Look to Communities as Classrooms'.

[11] See Tanaka, A.C., Schmidt., S., 'Indonesian Communities Tackle Waste Issues'.

[12] Dublin. D., 'Satoyama Principle in 2012 ProSPER.Net Young Researchers' School', Torabi, N., 'Role of Social Enterprises (SEs) in Creating Resilience at Local Levels: The Case of Indonesia and its Application to an Australian Context', Liming, Z., 'Renewal of Tiexi Old Industrial Area', and articles on the YRS by Aggarwal, P., and Tumilba, V.

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The group activities gave us opportunities to closely interact with research students with diverse ideas and backgrounds. … The field visits to sites like mangrove forests, waste management, and wastewater and water treatment plants helped us to interact with all stakeholders and understand the challenges of sustainability of such services.

Ruchira Ghosh, YRS 2013

At the end of the programme, participants provided valuable inputs to be considered for future schools. There was a suggestion to offer more comparative cases on Asia and case study oriented lectures in order to give a broader scope of empirical issues being discussed. Participants suggested a lecture on how to build communication and research skills. The balance between indoor and outdoor activities was also an issue, with students suggesting more outdoor lectures. Participants were very much interested in the session on international journal paper writing and suggested its duration should be longer. As for the group research proposal, there was a suggestion to start group work from the first week rather than putting them together in the second week, when the participants would also need to prepare for the 3-minute thesis competition. Such organization may help reduce the intensive workload during the second week.

In terms of a platform for networking, the school provided a prospective network for research since they had more information regarding relevant contact persons from various institutions and their specific expertise. Most of the participants found that the structure of the school was already well developed, although perhaps the YRS tried to achieve too many objectives in too short a period of time. One suggestion made was to provide more information on institutional profiles and the work these institutions were conducting in the area of sustainability, in addition to information on individual projects being implemented by resource persons. This aspect was not much covered in the school though the development of an alumni database for future information exchange and collaboration could be very useful.

Two major lessons learned can be drawn from hosting the 2012 YRS. First, the role of the host university should not only be to provide a stimulating environment for successful programme delivery, but also to create relevant opportunities to stimulate the development of collaborative projects within the hosting university and with other potential stakeholders. Secondly, because the school is developed on the basis of multicultural and multidiciplinary approaches, there is a need to provide activities that would enable people from different cultural backgrounds to engage more actively in all activities, lectures, group work discussions and also informal sessions.

2013 YRS: Partnerships in Water and Biodiversity for Sustainable Development

With the YRS mainly designed for doctoral students to experience an interactive and group-based approach to key sustainability challenges, in 2013, it was the turn of ProSPER.Net Thailand members to host the school with the theme "Partnerships in Water and Biodiversity for Sustainable Development". A tripartite collaboration between AIT, Chulalongkorn University (CU) and PSU was a novel proposition to host the YRS.

The 2013 YRS was physically hosted at Chulalongkorn University in central Bangkok from 9 to 20 September. Dr. Hubert Gijzen, Director of the UNESCO Regional Science Bureau for Asia and the Pacific gave a keynote speech at the opening day symposium, highlighting challenges regarding water use and management, linking with biodiversity and, most importantly, looking into the future and how water can be saved and used in innovative ways to preserve life in the planet. A panel discussion was organized around the school's theme with representatives from government, the private sector, civil society and academia. It was an interesting debate that set the tone for the discussions during the following days.

The programme comprised lectures on the school's themes with resource persons equally chosen among the three hosts. Topics discussed with students ranged from climate risks and adaptation in coastal cities to floods and management in the Greater Bangkok area, risk of coastal biodiversity, watershed management and biodiversity, climate change and water management in agriculture, along with specific talks on research methods[13].

Three field trips were organized to provide exposure to different issues affecting Thailand with regard to water and biodiversity. The first one was to AIT campus where students discussed with local faculty about disaster caused by floods, management and adaptation mechanisms. A special talk was given by Dr. Arun Kansal from TERI University on the water, energy and climate nexus, and students visited other facilities at AIT to learn about projects being undertaken in renewable energy and food security. The second field trip took students to Map Ta Phut Industrial Estate in Rayong, where students actively discussed local problems caused by industrial discharge that affects health, water quality and biodiversity in the region. They were mainly guided by Dr. Tanapon Phenrat, winner of the 2012 ProSPER.Net-Scopus Young Scientist Award in Sustainable Development in the category of Sustainable Infrastructure[14]. Phenrat's research focuses on decontamination of groundwater and soil, and he works with local stakeholders trying to improve communities' health. The third field trip was arranged to learn about conservation activities being undertaken by the Sirindhorn International Environmental Park (SIEP) with various local stakeholders. The group also visited the Laem Phak Bia Environmental Study, Research and Development (LERD) project, focused on solving wastewater and solid waste management problems using natural treatments[15]. These were opportunities for students to learn about how communities are finding appropriate local solutions to cope with sustainability problems.

The 2013 YRS theme was highly relevant to spread awareness and knowledge on water and biodiversity. The region has been recently affected by heavy rains causing floods and droughts. Because of these disasters, there is an urgent need to raise awareness about conservation of water and biodiversity, secure resources while preserving the nature, especially among the young generation in view of an ever-growing population and increased demand for food, urbanization and limited availability of land. Of the three proposals developed from this group, one was closely matched to the Rayong field visit and focused on the sediment quality in the area using a partnership between industry and the public. Another concerned developing mechanisms to promote corporate social responsibility in the rubber industry, and the third looked at climate change impacts in the Songkla watershed and associated adaptation measures.

The 2013 YRS again garnered very positive responses in all areas. When pressed on specific drawbacks, comments were expressed about the imbalance of topics in the programme given the title "Water and Biodiversity for Sustainable Development". The general feeling was that water had been overemphasized at the expense of biodiversity. Furthermore, a greater connection between the lectures and the field trips would have enhanced the experience and there was also a feeling that the field trips did not sufficiently emphasize the negative aspects of the issues at hand. Regarding the thesis proposal, one participant suggested it was not suitable for complicated proposals and another would have appreciated a section on obtaining research funding. The issue of guidance on attracting funding or scholarships has also been mentioned in other YRS though not in specific relation to the proposal development exercise. Regarding the logistical aspects, some students found the quality of English spoken by the guides to be difficult to understand, the issue of more time for discussions, interactions with resource persons as well as intercultural exchange were also brought up. One commenter mentioned that there should be a session on the sustainable development policies of the host nation. Regarding follow-ups, one participant suggested that lectures could be collated as podcasts and shared among YRS alumni.

[13] Each student was responsible to introduce the speaker, facilitate discussions, keep time and produce a summary of the lecture that was later published in the ProSPER.Net website. All the summaries are available at http://prospernet.ias.unu.edu/index.php/projects-2/young-researchers-school-yrs/2013-yrs/2013-yrs-student-voices/

[14] For more information on the ProSPER.Net-Scopus Young Scientist Award in Sustainable Development see Chapter 2.

[15] See group report on this third field trip by Ghosh, R., Tuntiwiwattanapun, N., Wijaya, N., Pandohee, J., Aung, Y.H., 'The Royal Projects for Sustainable Development in Petchaburi Province, Thailand'.

Current and Potential Impact of the YRS

Student perspective

Generally, the initial feedback to the school experience is very positive with the first crucial comment being that the school is an intense experience that requires very substantial amounts of work and commitment from students. Beyond that, the world cafe format seeks comments that can be separated into those that are specific to that school (e.g. comments on food, weather, local interpretation) and those that are explicitly related to how the YRS is organized in terms of content and activities.

The exposure and experience gained by being involved in such activities certainly leads researchers and students to play more effective roles in building sustainable communities. In this regard, the YRS provides an excellent platform for students to share a common ambition for the world's sustainability and inclusive globalization, and thus feel part of the international community. This platform is extended through social media connections after the school; the YRS has its own 'ProSPER.Net Sustainability Scholars' group on LinkedIn[16] and many alumni keep in touch through their own personal social media accounts.

In general, students who join the YRS benefit a great deal from the experience of working with other students from different institutions, besides gaining confidence and a deeper understanding about sustainability thinking that can eventually be integrated in their own research. Indeed, for some, it is their first experience of foreign travel and meeting people from other countries.

The current YRS concept and design is a result of these four years of listening to the students and assessing positive and negative aspects to create an ideal learning environment that aims to complement what students learn in their own universities.

In addition to the responses taken at the conclusion of each YRS, an online questionnaire was also distributed to YRS alumni. The questionnaire sought to gain reflections from participants on the school but also find out whether and how the school had changed their attitudes on their sustainable development research and career direction. A series of open-ended questions were asked to get their reflections on the school and how it had impacted their research careers. Thirty-two respondents replied to the survey, which corresponds to 52 per cent of the participants (see Box 1).

Box 1. The 10-question survey was distributed on 10 March 2014 and was open until 25 March 2014. Below are the summary of results for the open-ended questions.

1. What were the primary reasons for applying to the YRS and did you have any specific expectations?
Just over half the respondents said it exceeded their expectations, with the other half saying it fitted with their expectations, two respondents said it was far from what they were expecting. The most often cited reason was the opportunity to build contacts followed by a cluster of reasons relating to their interest in sustainability or topic of the schools being of either direct or complementary interest. The opportunity to learn new skills was also cited by five respondents.

2. How did you find the experience of being in contact with other researchers from different backgrounds? Is that important for your personal/professional development?
Overwhelmingly most (22) respondents said it was important, a further seven said it was helpful. The remainder said they had not had time, or it would be later. One said no.

3. What was the single most valuable take away?
Encouragingly, there was a wide range of responses to this question suggesting that many parts of the school's activities will resonate with different participants. The knowledge and expertise gained was most often cited (10) with three to five respondents each citing field trips, team-working, the 3-minute thesis, contacts/networking, and an increase in confidence/motivation. The remaining three responses related to the diversity and multicultural nature of the school.

4. Did the YRS broaden your research perspective?
This was nearly unanimously positive. The reasons given focused on the content of the school with 10 mentioning a new outlook and seven mentioning learning about other research. Other responses equally mentioned clarifying sustainable development for them and seeing applications.

[16] An alumni network of students and resource persons is maintained through the ' Prosper.Net "Sustainability Scholars"' LinkedIn group: https://www.linkedin.com/groups/ProsperNet-Sustainability-Scholars-3673414

5. Did it increase your awareness of sustainability issues beyond the scope of your research area?
Twenty-five said yes, one partly, but three said no. Delving into why 16 mentioned new perspectives to what they were doing, a further set of responses clustered around field trips demonstrating ideas they had heard about or providing local context to what they had studied. A smaller set mentioned linking to other researchers.

6. Did your participation in the YRS stimulate any change in your long-term professional aspirations?
Nineteen said yes, four partly and seven no. "To be honest," wrote one participant, "I still have some doubts with sustainable development but that does not mean I want to give up". Another wrote: "I have realized that collaboration is key to development. Since YRS I have been more involved in talking about my research, presenting and getting professional contacts for future collaboration after my PhD".

7. Do you have any future recommendations for the school?
Around one-third of the respondents said no. Of those that did offer suggestions, the biggest one was about increasing the amount of interaction between resource persons and students and more field trips. Possibly connected to this sentiment was that the school was rather busy and has a packed schedule. Another couple of responses mentioned tightening the subject areas the school covered and issues with the quality of English. One-off comments included a call for a reunion, career advice and wider participation from smaller countries in Asia-Pacific.

It would appear the key takeaway that participants obtain from the YRS is the broadening of perspectives around what they already know. This is quite an important point. PhDs can be lonely and intensifying experiences as one probes further and further into a research question. Taking students out of this and exposing them to context and connected areas is often a refreshing and potentially transformative experience.

Institutional perspective
Many academic institutions are helping society achieve sustainability by teaching the three "E's"– environment, economics, and equity. In so doing, they are fostering awareness of sustainability among young individuals, communities, institutions, and governments. In coming decades, education for sustainable development has the potential to serve as a tool for building stronger bridges between the classroom and business, and between schools and communities. In addition to bridging disciplines, ESD can be the means to reach beyond schools to involve businesses and individuals with specialized expertise throughout the community. In the 21st century, learning about economic and social development as well as the built environment and natural resources will be a collective responsibility of public and private institutions, communities, businesses, and individual citizens worldwide. Partnerships among governments, educational institutions, industries, NGOs, and community groups are increasingly important.

The YRS was created utilizing the same philosophy and aiming to contribute to the capacity-building of future sustainability practitioners. In this regard, the YRS provides a platform for young researchers and scientists to brainstorm and gather thoughts around possible ways of sustaining and utilizing natural resources more effectively. In addition, the YRS increases the opportunities to work closely in partnership with UNU-IAS and ProSPER.Net institutions, especially in the case of the 2013 YRS, hosted by AIT, CU and PSU. The preparation stage enhances networking within and beyond host institutions, which also happened during the 2011 YRS as mentioned previously, providing a space to discuss future collaborations in academic, research and outreach activities.

Besides that, the YRS exposes students from across Asia to host institutions' knowledge, sustainability-related research and projects, increasing universities' institutional visibility. Potentially, with continuous interaction among universities within ProSPER.Net, clear institutional policies, plans and new activities related to sustainability will be developed and implemented. Projects aligned with the concept and with objectives such as greening the campus, greening research and strengthening local communities will possibly gain more acceptance and be implemented. These activities will also support the university in terms of meeting the needs of local communities and positively influencing the pursuit of sustainable development within the country and the region.

The research proposals developed by students over the years have proven to be highly interesting and collaborative in nature but are currently underutilized beyond an academic exercise for the students. Although it is difficult for the students to undertake such projects in addition to heavy loads associated with their doctoral studies, host universities may further develop their proposals and include these projects in their research agenda. This may happen with the proposals from the 2013 YRS, though it is yet to be developed. One way members can make more use of this effort, is to offer topics of interest to YRS students for them to develop further. For the collaborations that started during the YRS to endure over time, there is a need for investment, especially in nurturing these incipient networks, keeping active participation so that more collaborative projects can be initiated. In this regard, ProSPER.Net is offering the leadership programme as a means to stimulate the networking process among different generations of YRS alumni, mixing them with finalists and winners of the ProSPER.net-Scopus Young Scientist Award in Sustainable Development and thus expanding the connections among people and fields towards more integrative approaches[17]. It would be good if more ProSPER.Net members sent students and resource persons to the YRS, given the overwhelmingly positive feedback of students who have participated in the YRS programmes.

The efforts of the YRS secretariat at UNU-IAS are commendable in bringing various prestigious institutions together for creating and sharing knowledge in the broad spectrum of sustainable development.

Preeti Agarwal, YRS 2012

The YRS experience further suggests that there is scope for ProSPER.Net members to run short intensive events on ESD for doctoral students across a number of universities within the same city. This would enable more students to benefit from this type of interdisciplinary learning while reducing the costs of accommodation and travel. In fact, RMIT University attempted to involve local Vietnamese universities in the YRS as mentioned in a previous section. Although the collaboration with local universities did not happen due to time and other logistical constraints, perhaps this is a feature that could be explored in future offerings, to expand the reach of the school, possibly attracting new ProSPER.Net members by diffusing the model locally.

Conclusion
There are various international networks established with an ambition to lead sustainable activities. In order to state their commitment, colleges and universities across the globe are making efforts to incorporate sustainability issues into their teaching, research, operations, and outreach. ProSPER.Net is among the existing networks with similar aims, and although ProSPER.Net membership is increasing, universities cannot play an active role without support from the universities' administration. The YRS is a key project being annually implemented, but its impact on policy process and change in higher education for sustainable development in each member institute and in national education policies remains limited. More involvement of policymakers in the planning process of ProSPER.Net activities may be an alternative to improve impact in this regard. While ProSPER.Net objectives and the types of projects the network is undertaking are admirable, the core administrative members alone may not be sufficient to drive significant change. There is a need for institutional funding for more development of the model and project implementation. It is likely that funding could be obtained with dedicated fundraising efforts directed to development agencies and national governments as well as local networks. The development of sister programmes could assist in the network expansion and improvement of network visibility within the higher education community. In this regard, the YRS could be a way to expand the network's reach through acceptance of students from outside ProSPER.Net, given the interest that the programme is generating in other regions. The Secretariat received inquiries and applications from the UK, Turkey and other countries in the past and, besides the collaboration with the German Ministry of Education and Research that ensures participation of candidates from other parts of the world, accepting students from other regions would assist current efforts to maintain the diversity of cultures and fields of expertise.

[17] See Chapter 10 on ProSPER.Net Leadership Programme.

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In relation to dissemination of activities and sharing outputs with larger audiences, increased use of internet communication technology facilitates the access of materials that can be shared by members and university students along with well-designed follow-up activities, but it is important for member universities to develop clear policies to drive sustainability forward, through integrating sustainability in the curriculum or adopting models like the YRS to gather students working on sustainability-related topics. In any case, individual members' progress can be monitored through annual publications to be shared among other ProSPER.Net members and beyond through the ProSPER.Net website, for example. If the network really wants to promote change, its administration may have to spend more time with top policymakers of member institutions. The YRS experience is clearly benefitting students; members also need to think about how to reap its benefits too.

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ProSPER.Net Leadership Programme: Practicing to Lead for a Sustainable Future

Aurea Christine Tanaka *(UNU-IAS)*

Traditionally, higher education institutions foster compartmentalized centres of knowledge creation, producing researchers that are often disconnected from other areas, who face numerous hardships in communicating their research to non-scientific audiences, and struggle to engage and mobilize community action. Yet, instead of intellectual stove-piping, reality demands an integrated approach, with dialogue among various stakeholders so that local problems can be addressed to improve sustainable livelihoods. The need to build capacity for bridging gaps between science, its application, and policy that necessarily involves various stakeholders in the process has led ProSPER.Net to create a leadership programme for early career researchers and young professionals. The aim is to bring together like-minded people, who work on diverse sustainability-related research to share relevant experiences and enhance communication among stakeholders. Such focused dialogue will likely transform challenges into opportunities, promote effective actions, leverage powerful sustainability-driven networks to forge a clearer strategic vision with greater community engagement.

Leadership, Systems Thinking and ESD

In The Man who Mistook his Wife for a Hat, Oliver Sacks describes a patient who could only recognize parts of objects and people, but was unable to easily identify their wholeness because of an inability to recognize them in their entirety. When Sacks showed the patient a glove for example, the description the patient gave was of "a continuous surface" with "five outpouchings", further mentioning that it could be a container, but he failed to recognize the object might contain a hand. The case underlines how important the faculty of judgement is: an ability that makes humans able to "see how things stand, in relation to one another and oneself"[1]. Sacks writes further on how cognitive science suffers from a similar pathology; an approach that merely classifies, is abstract and computational, leaving aside the judgemental part that would help understand the relations between processes, and that would make the patient relate the hand shape and the glove, establishing a connection and the implicit purpose of protecting the hand.

The anecdote's focus is on neurological science, but nonetheless it can be a metaphor to represent how knowledge is structured and compartmentalized in disciplines and specializations, and how professionals are taught to see the parts, but unable to perceive the relations between the various elements and how they fit a bigger picture or system[2]. More importantly, it highlights how fundamental the judgemental ability is to establish connections and construct meanings. It is an important trait for leadership and especially leadership for sustainable development in view of the need to build consensus about actions that involve conflicting priorities, a characteristic of sustainability challenges, which will be discussed further.

The sustainability discourse advocates the need for integrative knowledge and actions that respond and constantly evolve according to a dynamic reality. These ideas are derived from three factors: the first relates to the demands of different structures of knowledge, one that is integrated and recognizes the interdependence and interconnection of various interventions contributing to common outcomes and multiple effects; secondly, sustainability challenges call for a coordinated approach with the participation of multiple stakeholders working collaboratively in integrating frameworks, policies and actions; and finally, the dynamic, uncertain and unpredictable reality of the present day requires a degree of adaptability and flexibility that becomes an essential feature of the strategies for building resilience and implementing sustainable practices. Perspectives and actions need to be reflexive; as humans transform the world around them, generating consequences and unintended results, there is a constant need for adjustments to be holistic, to privilege systems thinking, and to be conducive to knowledge integration and multi-stakeholder collaborations. Such constructions can be identified in different degrees in diverse fields:

[1] Sacks, O., *The Man who Mistook his Wife for a Hat*.

[2] This statement needs to be historically contextualized, but the purpose is to indicate how education systems evolved towards increasing specialization and privileging technical expertise and solutions for problems. The global interdependence and complexity of systems provide other rationalities that need to be observed. In this regard, Hiroshi Komiyama, *Beyond the Limits to Growth*, talks about one of the 21st century paradigms being that of exploding knowledge and the need to integrate "compartmentalized knowledge in accordance with our objectives and create the whole picture as a solution for achieving our objectives". Sustainability science, in his view, is one avenue for knowledge to be structured in an integrated manner and for research to contribute to problem-solving "not bounded by conventional methods that prevent from seeing alternative pathways or innovative solutions to contemporary problems", op. cit. p. 19.

ESD[3], governance for sustainability[4], conservation science[5], socio-ecological systems analysis[6], and also leadership[7]. It is only natural that the same premises of living in an interdependent and complex world generate similar conclusions. However, the very fact that humanity continues to struggle to reach a level of development while respecting the biophysical limits of the world indicates there is still much to be done in understanding the connections, collaborating across sectors, and building bridges between the various sciences to create a sustainable world.

In this realm, what also surfaces is the need to raise awareness about unsustainable practices and promote major shifts in terms of behaviour, in order to transform the dark prospects of a planet that is naturally limited and does not offer sufficient resources for humanity to continue enjoying the prospects of future needs regarding water, food, energy, and others. Education plays a significant role to make brighter perspectives a tangible reality, as leadership emerges as equally relevant to inspire transformations and actions, forge common visions, and mobilize people towards commitments to create a more sustainable world. The challenge is then how to design systems and educational programmes that produce the desired outcome. In this regard, the International Implementation Scheme published by UNESCO in 2006 laid out a framework for the UNDESD based on its objectives to "facilitate links and networking, exchange and interaction among stakeholders in ESD" and to "provide a space and opportunity for refining and promoting the vision of, and transition to sustainable development – through all forms of learning and public awareness", while developing "strategies at every level to strengthen capacity in ESD"[8].

This chapter will discuss how the ProSPER.Net Leadership Programme tried to translate these objectives into a pragmatic model that was designed to advance learning and capacity of academics and young professionals from the public and private sector, including civil society. By gathering young professionals from different fields, the programme intended to reproduce a setting in which they would have an opportunity to harness their expertise and strengths through dialogue, participatory approaches and networking. The programme also aimed to nurture skills that could assist the process of envisioning alternative options for common challenges and promoting implementation through collaboration and partnerships. These would be delivered through a combination of leadership training to build specific capacities to influence change, with tools to understand what kind of leadership would be needed and the context in which leadership would unfold.

If "the effectiveness of the Decade will ultimately be judged by the degree of change in attitude and behaviour in the lives of communities and individuals at the local level", and the types of learning promoted by ESD would result in "committed and aware individuals with a global view, but also with the capacity to envision alternative futures and create change within their societies (…), to work with others to bring about structural or institutional change within society so that efforts can be embedded within the mainstream" with ESD "going beyond self-development to promote structural social change"[9], the ProSPER.Net Leadership Programme became the one vehicle to deliver all these outcomes. The programme ultimately created a space to perceive individual strengths and weaknesses in a journey of self-discovery, favouring a systemic approach to problem-solving that brings together different expertise in a comprehensive and integrated manner.

The sections below discuss the importance of leadership for the sustainability debate, and the rationale that led to the design of the leadership programme. It captures the strategies and activities put forth when ProSPER.Net was created under the auspices of the ESD Programme at UNU-IAS, and the vision for Environmental Leadership Initiatives for Asian Sustainability in Higher Education (ELIAS), established by the Ministry of the Environment of Japan (MOE-J). The pilot programme will also be described, together with feedback received from participants and future possibilities for development.

Leadership for Sustainable Development

Relations across borders have intensified on a planetary scale. Allied with advancements in information technology and communications, it created the possibility of increased participation by different stakeholders in matters affecting people, countries and regions around the world. This was accompanied by the realization that problems and solutions are shared, with interlinkages being observed in diverse issues such as social and economic development – and its consequences on the environment, poverty and health – water, and energy access. Such issues are also affected by climate change, biodiversity loss due to pollution, and impacts on agriculture and food security, among others.

Environmental degradation and its consequences are not restricted to political borders and affect all of humanity without discrimination. If the world was rationalized around compartmentalized expertise to prevent politicization of decision-making processes, and privileged technical knowledge-based actions[10], the sustainability crisis, with an increased interconnection of problems, demonstrates that a different rationale is clearly needed; one that utilizes a problem-solving approach based on integrated solutions stemming from collaborations involving experts and various stakeholders such as scientists, policymakers, local communities, civil society, and the public and private sectors[11]. It was thus natural that partnerships for SD were emphasized as an implementation strategy at the 2002 World Summit on Sustainable Development (Rio+10) held in Johannesburg. Thereafter, several multi-stakeholder initiatives were created, fostered by international and regional organizations, local communities, and governments, with relations being structured in a network fashion, following the logic of complex relations of various specialized stakeholders operating at multiple levels[12].

In such a complex and interconnected world, and given the shared challenges faced, it is increasingly important to take into consideration the way institutional relations are established, how policies are implemented, actions are monitored and how these influence specific outcomes in creating more sustainable practices for a resilient society. In other words, it is crucial to understand the process of how problems are defined and analysed, goals are established, solutions are formulated, and strategies for actions are coordinated[13]. These are often referred to as governance, and understood as "the structures and processes by which people in societies make decisions and share power"[14]. As sustainable development unfolds in different dimensions, encompasses cross-border issues and affects different levels of human interaction, governance also evolves in this dynamic setting of multi-level frameworks, guidelines and strategies for actions, implementation plans, together with various stakeholders interacting according to their diversified mandates, areas and structurally organized institutions, all playing their part in the process.

The multitude of institutional frameworks, the existence of uncoordinated or even isolated actions, and the lack of synergies and coherence between similar or what could be complementary initiatives, result in an increasing

3 See for example, Lots-Sisitka, H., Raven, G., 'South Africa: applied competence as the guiding framework for environmental and sustainability education'; Wals, A., Social Learning Towards a Sustainable World, and Mochizuki, Y., Fadeeva, Z., 'Competences for sustainable development and sustainability: significance and challenges for ESD'.

4 See, for example, UNEP 2007, Global Environmental Outlook 4 (GEO4), especially chapter 8 on governance for sustainability.

5 Looking at the intersections between conservation science and leadership, see Manolis, J. et al., 'Leadership: a New Frontier in Conservation Science'.

6 Various papers in this field will be cited in the next section.

7 Redekop, B., *Leadership for Environmental Sustainability*, Harris, A., *Distributed School Leadership: Developing Tomorrow's Leaders*, Wielkiewicz, R., Stelzner, S., 'An Ecological Perspective on Leadership Theory, Research and Practice', Hershock, P., 'Leadership in the Context of Complex Global Interdependence: Emerging Realities for Educational Innovation'.

8 UNESCO 2006, Framework for the UNDESD, International Implementation Scheme, p. 24.

9 UNESCO 2006, op. cit., p. 38.

10 After World War II, the main strategy adopted internationally was one of decentralization and international consensus to be built in specialized "clubs": IMF (financial), GATT/WTO (trade), NATO (defence), to cite a few. In this regard, see Ruggie, J.G., 'The United Nations and Globalization: Patterns and Limits of Institutional Adaptation' and Keohane, R., Nye, J., Introduction to the book *Governance in a Globalizing World*.

11 Note that this configuration changed the way the international sphere was structurally organized. With new actors, the "clubs" had to open membership to other relevant stakeholders through demands of accountability, transparency and inclusiveness. See, among others, Keohane, R., Nye, J., op. cit.

12 This is related to the concept of subsidiarity, the idea that "matters ought to be handled by the smallest, lowest or least centralized competent authority. This applies in sustainable development governance as in other areas, with the possible qualification that by its nature sustainable development governance involves effective horizontal and vertical coordination among institutions". In UNDESA 2011, Regional, national and local level governance for sustainable development.

13 See Voß, J., Kemp, R., 'Sustainability and reflexive governance: introduction', p. 9.

14 In Folke, C. et. al., 'Adaptive governance of social-ecological systems', p. 444. Keohane and Nye also mention the informal aspect of processes and institutions: "By governance, we mean the processes and institutions, both formal and informal, that guide and restrain the collective activities of a group", op. cit., p. 12.

number of sustainable practices that could be better managed, enhanced and scaled up if human and financial resources were efficiently channeled. There is a need to transform this current scenario to rationalize and thus optimize sustainable actions that integrate environmental considerations with societal and economic development according to local needs, respecting institutional settings and cultural traditions.

Although a governance model for sustainable development is yet to be formulated[15], observation of case studies in social-ecological systems (SES) offers general characteristics of ideal components that when functioning together can contribute to interventions more effectively. Given the nature of sustainability-related problems, "what we need is a major step forward in our understanding of how to structure governance systems to maximize resilience, while at the same time, including procedures allowing for timely adjustments of the sort needed to maintain a good fit between socio-ecological conditions and institutional arrangement"[16]. Therefore, in view of dynamic changes that cause more complex, unintended and unpredictable consequences, any decision-making process that deals with these problems needs to be flexible, with a high degree of adaptability. Furthermore, the operationalization of interventions needs to consider the existence of multiple stakeholders, with contributions from different sectors of society. Because of that, management, participatory processes and settings that promote ample dialogue with a multi-level perspective can improve legitimacy, ownership, and compliance to implementation plans with shared responsibility. Such are the characteristics of the adaptive governance approach that relies on several stakeholders connected through networks in a nested arrangement, or else involving local, regional or international stakeholders, not always hierarchically placed, but linked through common issues and policy implementation and maintaining flexibility to a degree that the system is highly adaptable depending on the conditions presented by a dynamic reality, allowing experimentation, learning and change[17].

Leadership in such a networked environment is crucial to move things forward, and assist the various stakeholders in forging and disseminating a common vision, bringing people together to share responsibility, and collaborate with knowledge, actions and strategies to enhance implementation of more sustainable practices. According to Carl Folke, "leadership is essential in shaping change and reorganization by providing innovation in order to achieve the flexibility needed to deal with ecosystem dynamics. (…) Furthermore, entrepreneurial leaders have proven their significance in the development of international institutions by functioning as agenda setters, popularizing issues at stake, devising policy options to overcome bargaining impediments, brokering deals, and lining up support for salient options. Leaders can provide key functions for adaptive governance, such as building trust, making sense, managing conflict, linking actors, initiating partnership among actor groups, compiling and generating knowledge, and mobilizing broad support for change. Key individuals also develop and communicate visions of ecosystem management that frame self-organizing processes. These individuals often have the ability to manage existing knowledge within social networks for ecosystem management and further develop those networks"[18]. These leadership functions may be entrusted to individuals as agents of change, but leadership of this type can also be collectively pursued by groups of engaged people who are committed to act for the benefit of local communities, or to solve specific environmental problems[19].

From the perspective of ecological principles, leadership is thus seen as an emergent process, or "it emerges from the interactions and actions of individuals within an ecological system"[20]. Leadership in this context is characterized by how decisions are made together with others, while identifying processes that promote change and emphasize adaptation measures given the planet's limitations, identifying appropriate knowledge, both practical and scientific, that can be applied in meaningful ways, and while embracing diversity and disruptive transformations as a learning process that can refine methods of coping with uncertainty and unpredictability, thus increasing communities' resilience levels. However, it is worth noting that leadership in the observed cases seems to have happened naturally, either because of the existence of charismatic leaders who are the connectors of relevant people to the cause at stake, or because of the severe nature of environmental problems that urge community mobilization to work collaboratively for immediate interventions[21].

Research in the field of effective governance approaches to secure sustainability in conservation demonstrated the importance of leadership for successful undertakings, although some scholars associate leadership with knowledge leadership or with an understanding restricted to consultation to a higher authority[22]. However, while the role of leadership is recognized and some necessary characteristics are laid out – for example the ability to "reconceptualize issues; generate and integrate a diversity of ideas, viewpoints, and solutions; communicate and engage with key individuals in different sectors; move across levels of governance and politics, i.e. span scales; promote and steward experimentation at smaller scales; recognize or create windows of opportunity; and promote novelty by combining different networks, experiences, and social memories"[23] –"the emergence of leadership does not necessarily lead to improved governance of SESs"[24]. In this regard, scholars in the conservation field observed that despite leadership being highly relevant, it is extremely variable and hard to predict. Therefore, questions about the randomness or existence of social mechanisms that increase opportunities for leadership emergence, and what type of leadership can transform SES towards an adaptive governance path, are often left without clear answers, especially regarding ways to institutionalize, diversify and secure leadership functions.

Looking at leadership literature, and particularly the intersections between leadership and sustainability, Michael Shriberg conducts a historical analysis of traditional, and environmental and sustainability leadership, demonstrating that both types started in opposed points. While the traditional leadership model was the command and control type, the environmental and sustainability leadership model utilized in early stages of environmental activism was "radically distributed", being "a counterbalance to the dominant corporate and governmental forces". However, as environmental degradation became a globalized matter and responses to the sustainability crisis were increasingly institutionalized, the leadership approach also changed and its features became, in his words, "more professionalized". That was the moment when a convergence was observed, with the traditional leadership approach evolving to embrace transformations according to social and institutional demands of organizational change in complex systems. Shriberg then observes that "the concept and practice of sustainability has the potential to bridge the leadership divides by merging environmental leadership with standard leadership theory, through its emphasis on systems thinking, long-term relationships and ability to catalyse organizational and individual actions"[25].

Benjamin Redekop indeed provides an overview of how leadership scholars have been peripherally making the connection and addressing leadership for environmental sustainability. Redekop analyses how Peter Senge and Ronald Heifetz provided a starting point for the convergence mentioned above when respectively discussing organizational and systemic change in complex systems with environmental constraints, and adaptive challenges that lead to other rationales, rather than merely technical, for possible solutions[26]. To address this

[15] Various projects address governance-related issues for sustainable development. See, for example, the Earth System Governance, a global project developed with a network approach involving researchers from all over the world: http://www.earthsystemgovernance.org/. UNU-IAS also produced various policy briefs on the role of governance to contribute to the debate around the Sustainable Development Goals (SDGs): see bibliography for references.

[16] Young, O., 'Effectiveness of international environmental regimes: Existing knowledge, cutting-edge themes, and research strategies', p. 19858.

[17] Dietz, T. et al., 'The Struggle to Govern the Commons'; UNEP 2007, op. cit..

[18] Folke, C. et al., op. cit., p. 451.

[19] See, for example, the case studies presented by Olsson, P. et. al., 'Shooting the rapids: Navigating transitions to adaptive governance of social-ecological systems', especially the Goulbourn-Broken Catchment (GBC) in Australia.

[20] Wielkiewicz, R.; Stelzner, S., op. cit., p. 21

[21] Olsson, P. et. al., op. cit., p. 7.

[22] Kenward, R. E. et al., 'Identifying governance strategies that effectively support ecosystem services, resource sustainability, and biodiversity', p. 5309.

[23] Olsson, P. et. al., op. cit., p. 14.

[24] Olsson, P. et. al., op. cit., p. 16.

[25] Shriberg, M., 'Building Sustainability Leaders: A Framework to Prepare Students to Thrive on Complexity and Lead Transformative Changes', p. 22.

[26] In this regard, Garret Hardin in the classic 'Tragedy of the Commons' had affirmed that for some problems, there is no technical solution; they rather require "a change in human values or ideas of morality", op. cit., p. 1243. A critique of his work can be found in Dietz, T. et. al., 'The Struggle to Govern the Commons'.

tangential approach, Redekop outlines the ecological perspective on leadership taken by some scholars, who reach similar conclusions to the conservation science analysis mentioned above; that leadership emerges in a complex system with adaptive challenges that need to be addressed by diverse actors with different expertise to create optimal solutions. As leadership is exercised within a context, leaders of today need to be aware of the constraints in behaviour posed by the current environmental problems in order to establish a vision for the future that embraces sustainability as a goal to be pursued by all.

More specifically, when addressing the emergence aspect of leadership in environmental issues, Richard Wielkiewicz and Stephen Stelzner highlighted leadership as not being based on individual actions, but on the relations among people, turning the focus to the process of decision-making and sharing responsibilities for implementation, utilizing a participatory approach. Furthermore, the authors observe that given the existence of adaptive challenges and the complex and interdependent context of ecological systems, there is an inherent "tension between devoting resources to thoroughly understanding this context versus being more action-oriented, which means making timely and effective decisions based upon an admittedly incomplete understanding of the context"[27]. To address this issue, they argue organizations need to be structured in a way to allow flexibility and adaptability, promoting a type of learning that makes change processes to be carried out through experimentation. Successful approaches are thus kept, due to their functionality[28]. In order to create resilience in such environments, diversity is essential as it allows a wide range of options for strategies to be designed and actions to be undertaken, so that the most successful and adaptable approaches will continue to be applied until there is a new disturbance in the system that demands new solutions in such a way that the cycle might be repeated[29].

In addition to the ecological approach that provides important insights to understanding leadership for sustainable development, looking at leadership literature in education and leaving aside the mention of sustainable development, environment, and other related terms, the response that is distilled in terms of leadership challenges can be applied and also become the basis for delineating strategies for effective leadership for sustainable development. The context in which these challenges unfold is the same: a globalized and interdependent world, comprising, though not limited to, the interconnections of environmental degradation, the speed through which information is shared, and how systems are complex and established within a web of interrelations where minor interventions in a peripheral point can cause disruptions at the other end. In this sense, the analysis of leadership with emphasis on educational innovation by Peter Hershock, or the distributed leadership in education systems to deliver quality education that focus on the learning aspects of all involved stakeholders by Alma Harris, can be abstracted and applied to leadership for sustainability.

Peter Hershock, for instance, builds upon the contradictions of globalization to identify pluralism and associated diversity, issues of scale and how global and local influences need to be considered to determine what leadership skills are required, and how education systems should respond to new demands. In doing so, Hershock reflects upon the construction of shared values in diversity, considering different scales and multiple stakeholders. Using biological systems as a parameter for comparison, he observes that there is a natural limitation to the extent we are able to scale-up initiatives, especially in complex systems. Disturbances have varied effects and organisms adapt to changes according to responsive adjustment mechanisms that function based on feedback loops, an aspect that can also be found in the ecological approach to leadership. As these changes happen in a system where there is a web of interrelations and continuous adjustments, it is impossible to have a one-way type of adaptation. This requires a process of self-renewal or, "self-correcting trajectories of innovation, as well as an increasingly refined coordination of both means/strategies and meanings/interests", jointly built with various involved stakeholders. Furthermore, when discussing about the types of issues emerging from a complex and multi-scaled reality, Hershock affirms that "the possibility of [a] simple factual solution decreases". What humanity faces is actually not problems, but predicaments that he believes "are always to some degree moral, expressing the presence of competing and at times conflicting needs, interest, priorities and values". He adds "most fundamentally, they announce the presence of impediments or blockages to pursuing our existing ends and interests – an incompatibility among our own values that demands a shift in the pattern of our own commitments and not simply a factual revision of our circumstances. Predicaments defy solutions: successfully responding to them involves enriched clarity and commitment"[30]. All these features are at the core of the sustainability debate, the types of challenges in which there is an intrinsic need to revisit values and beliefs to influence change of behaviour, a reflexive response based on a reality that is dynamic and reacts to interventions, and resembles the analysis aforementioned in the conservation field, and the identification of leadership traits that are conducive to sustainable development.

Utilizing schools in England as a setting for analysis, Alma Harris starts from the notion that leadership is "the most powerful influence on learning outcomes, second only to curriculum and instruction"[31]. Defining distributed leadership as "a set of functions or qualities shared across a much broader segment of the school community that encompasses teachers and other professionals and community members both internal and external to the school"[32], Harris conducts an extensive examination of how it is applied in practice, looking at the nurturing and development of leadership capacities within and across schools, and how it influences learning outcomes. As Harris observes, the distributed leadership model looks into practices and interactions, not actions from individuals in leadership positions, and implies the participation of all involved stakeholders in the practice of leadership[33]. As an inherent characteristic of leadership, Harris also analyses how leadership takes place and, when doing so, takes into consideration the school as an organization situated within a reality that is fast-changing with the advent of globalization, new technologies, speed of information sharing and so on. However she also places the school in relation to others – how networks are formed and can be sources of innovation by capitalizing on diversity[34] – and highlights how creativity may spring more easily from a collective setting. Advocating transformation in structures in order for schools to be ready for new challenges posed by today's dynamic reality, Harris points out that this cannot be done without a cultural change. This conclusion, despite being focused on leadership in education, is also relevant for leadership challenges in sustainability. As the conservation science analysis also demonstrated, governance structures need to be redefined. However, if it is not accompanied by leadership that sets a vision, mobilizes people, and inspires behavioural change, results can be limited. For this to happen, Harris then discusses communities of practice and how knowledge is generated and shared in this context, functioning as an additional stimulus for more collaboration. Finally, when setting a vision for future leadership, Harris lays out the characteristics of what leadership should look like, and it is thus possible to note similar leadership qualities for sustainable development[35]:

- Collective leadership, in the sense that in a complex and networked system, leadership from different parts of the system will be required to respond swiftly to a dynamic reality;
- Flexible, inclusive and self-renewing;
- Responsive to internal demands, but still considers external changes;
- Driven by learning before results, through synergies and connectivity that are enhanced across organizations and systems;
- Multilayered and networked, considering the levels at which coordination of activities take place: local, national, regional and global, but also bearing in mind horizontal exchanges;
- Focused on leadership capabilities: capacity development for distributed leadership through which a wide range of stakeholders interact with autonomy and shared responsibilities;
- Existence of new leadership spaces in which there will be a focus on knowledge transfer;
- Fit-for-purpose approach to organizational structure: only best fit arrangements will be kept to maintain the mission attuned to new demands;

[27] Wielkiewicz, R., Stelzner, S., op. cit., p. 24.

[28] Wielkiewicz, R., Stelzner, S., op. cit., p. 21-23.

[29] Wielkiewicz, R., Stelzner, S., op. cit.

[30] Hershock, P., op. cit.

[31] Harris, A., op. cit., p. 4-5.

[32] Harris, A., op. cit., p. 28.

[33] Harris, A., op. cit., p. 37-38.

[34] See OECD 2003, *Networks of Innovation: Towards New Models for Managing Schools and Systems.*

[35] Cited with modifications from Harris, A., op. cit., p. 152-154.

- Innovative leadership practice, requiring a future vision that will be committed to generating relevant knowledge to ensure that the organization and systems are at the forefront of needed transformations; and
- Outward facing, forward looking and distributed: constant monitoring of external demands, with a future vision that is shared, together with the responsibility for implementation.

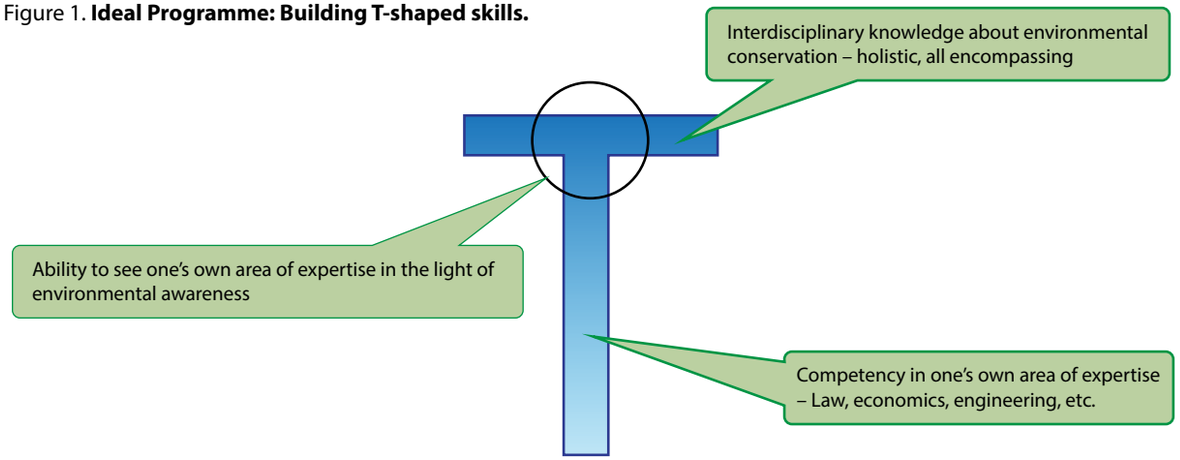
As previously affirmed, it is only natural that similar reflections around leadership and possible responses can be found in different fields. Complex systems develop at the same time as other systems, equally complex, forming a network of sub-systems that affect and can be affected by disruptions in others. Pursuing sustainability as a goal and facing similar challenges of imparting knowledge, creating understanding, mobilizing people with a shared vision, and working collaboratively are common to any undertaking in which more than one individual is involved. The achievement of sustainable levels of development, meaning protecting the environment while developing social and economic activities, demands a collective commitment towards a shared goal. Therefore, given these similar conclusions, a confluence of paths is perhaps the best to follow in terms of leadership ideas, so that it becomes possible to provide strategies and structures conducive to better practice and learning for leadership for sustainable development, be it in conservation efforts with local communities, educational settings, within a company, in the public sector or others. As questioned earlier in this chapter, the daunting task is how to design a programme that develops the required leadership qualities. In view of these findings and instead of waiting for leadership to emerge spontaneously within communities of practice or in multi-stakeholder settings, and having in mind that leadership capacity can be developed, the ProSPER.Net Secretariat started to foster a vision for a leadership programme.

Rationale and Complementary Model

In 2008, the MOE-J formulated and adopted a vision for ELIAS, that would be implemented through a series of activities to foster the development of higher education programmes increasingly permeated with sustainability issues, environmental leadership training programmes, as well as partnerships between governments, the private sector and academia to facilitate and promote synergies between their various activities (EcoLeaD), and a network of universities in Asia for environmental leadership training (ProSPER.Net).

All these strategies were developed around the idea of building T-shaped skills, through which specific expertise (vertical part) is important and should still be fostered, but also contributes to and consists of a broader perspective that is holistic and interdisciplinary (horizontal part).

Figure 1. **Ideal Programme: Building T-shaped skills.**



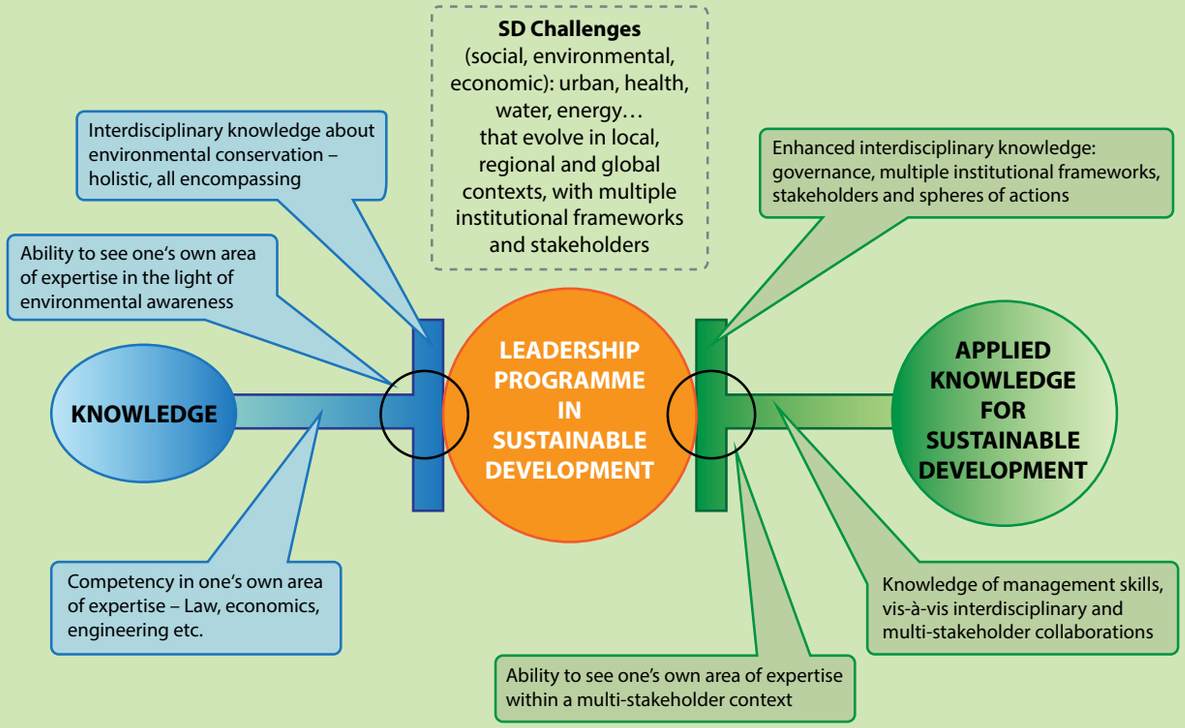
Source: Ministry of the Environment of Japan, Environmental Leadership Initiatives for Asian Sustainability (ELIAS) brochure.

Within ProSPER.Net, members are working on projects to integrate sustainability issues in curricula, initiatives that recognize applied research in sustainable development, as well as programmes to build research capacity by providing an environment in which students are exposed and are able to relate their own research to sustainable development. These network activities are certainly contributing to increased opportunities for students to enhance their understanding regarding sustainable development and to look into their own field of expertise and related research through sustainable lenses.
In summary, projects being developed by ProSPER.Net members are addressing the vertical, horizontal and intersectional area of the T-shaped skills in Figure 1.

However, in addition to these, given the complex setting in which actions take place in the real world, there is a need to provide students and researchers with an understanding of how various stakeholders implement ideas and projects, interact with each other, and tackle sustainability challenges as they unfold to enable them to put their knowledge into practice. In other words, there is a need to create a complementary model to the T-shaped one, to provide a framework where acquired competences and skills can be tested within a context where students and researchers have an opportunity to apply their knowledge and influence policy, bringing science into the decision-making process, while focusing on local development that translates regional and global perspectives (see Figure 2).

For this purpose, the leadership programme was conceptualized for participants to develop a comprehensive understanding of the levels in which sustainable actions needed to be negotiated, agreed upon, planned and executed. Furthermore, specific leadership capacities would be practiced, especially combining

Figure 2. **Leadership Programme: Applying Knowledge for Sustainable Development.**



knowledge application within a multi-stakeholder setting. Such a programme would be added to a flipped T-shaped skills model to link the knowledge that is generated and its application at the other end, resulting in enhanced interdisciplinary knowledge and skills that enable knowledge management, consideration of governance issues in sustainable development challenges, multiple institutional frameworks, stakeholders, spheres of actions and impacts on different sectors. These additional competences would be developed in such a way that ideal collaborations involving local community, government, academia, and the private sector would become possible through focused interventions aimed at adding value to grass-roots activities and foster collective responsibility for local development through a participatory approach that promotes consensual decisions, joint implementation of actions, and monitoring of results.

In summary, the conceptualized programme addresses the natural development of ProSPER.Net activities towards increasing knowledge application in partnership with relevant stakeholders, the actual demand for processes that can support more effective transformations in local governance efforts focused on sustainability of social-ecological systems, and finally the UNDESD aspirations to enhance capacity in ESD, promoting active multi-stakeholder networks and learning spaces for sharing good practices, which are transferrable to other contexts.

Programme Features

With the aim of providing a multi-stakeholder and multidisciplinary context for actions to be planned and implemented, imparting local, regional and global governance considerations, as well as political vision and ability to nurture and realize local development, the leadership programme was designed to have a pragmatic approach. Unlike the ProSPER.Net Young Researchers' School, where the purpose is to develop research capacity in sustainable development considering different themes that change every year according to the host university's local challenges[36], the leadership programme would focus on how to use existing knowledge to formulate, test and implement policies, assess the impact in different sectors, disseminate the results and eventually scale up successful undertakings through a network that would be formed among participants.

In view of these objectives and following the logic of fostering leadership in multi-stakeholder settings, targeted participants were postdoctoral fellows, early career faculty members and researchers, but also young professionals from public and private sectors, NGOs, and so forth. As the intention was to also promote synergies among ProSPER.Net's various programmes and expand networking among attendees of its various activities, winners and finalists of the ProSPER.Net-Scopus Young Scientist Award in Sustainable Development[37] and alumni from the ProSPER.Net Young Researchers' School were invited to apply for the first ProSPER.Net Leadership Programme hosted by the East-West Center in Hawaii. The programme focused on combining collaboration, expertise and leadership for sustainable development. The East-West Center was the ideal ProSPER.Net member to take up such an undertaking, given its innovative education programmes, linking advanced and interdisciplinary analysis of emergent regional issues with experiential leadership learning[38]. More than 50 years of experience with multicultural and interdisciplinary cohorts was definitely an additional element considered, together with Hawaii as the venue, "an island with limited and fragile resources that necessitates cross-sector collaboration to maintain healthy human and natural systems", with lessons for sustainable development that are relevant to societies in other contexts[39].

The envisioned programme and what was actually delivered differed slightly, due to a reality check in terms of feasibility, especially the optimum duration of the programme. Leadership capacity-building is a process that stretches over time and cannot be simply constructed over lectures. It demands experiences in group leadership challenges and time for reflection to understand individual reactions and stimulate self-development for transformational learning. In this sense, previous experience with students from the ProSPER.Net Young Researchers' School and their visible outcomes in communication skills, learning from each other, and about local sustainability challenges, especially derived from working in multidisciplinary and multicultural environment, provided an initial assurance that much could be accomplished in a short period of time. Although the programme was initially planned for two weeks, the same length as the ProSPER.Net Young Researchers' School, the important feature of involving participants from different sectors, including public and private sectors, and the fact that these young professionals would most likely face constraints in obtaining permission to attend such a programme, influenced the final decision to design the programme to last only seven days.

The programme was designed to develop some of the leadership capacities needed for sustainability challenges and therefore, besides practicing consensual decision-making processes through specific exercises and developing individual leadership challenges that would function as a map for further transformations during the programme and beyond, previous reading assignments were given to familiarize participants with leadership ideas. These comprised Ronald Heifetz's adaptive leadership and a series of other readings that connect leadership with environment and nature, drawing lessons from natural systems, emphasizing relationships within networks, and adaptation according to changes in the environment[40]. A panel discussion with experts from various sectors and lectures on topics such as networks, adaptive leadership, resilience and crisis leadership, futures[41], and strategic communication were organized to share insights about diverse leadership challenges for participants. The selection of topics and specific activities tried to address the development of leadership qualities that are required for implementation of successful sustainability practices, as described in previous sections.

One important additional feature was the inclusion of field visits to connect participants to real leadership challenges and how local communities addressed those challenges. Prior to the visit, participants were divided into groups to discuss problems and envision possible solutions based on their own expertise. During the visit, the groups would engage with local leaders and exchange information about the problems, what solutions were applicable, what was successful, and what had failed, in a mutual learning process. The purpose of this exercise was to provide an opportunity to apply knowledge and at the same time experience a multi-stakeholder approach to negotiate solutions. Also, as described in the curriculum, this activity was "designed to simulate real-world challenges in which leaders must often make decisions with limited information under tight timelines. The experience creates a common platform in the cohort for successful project work beyond the programme. As an analogy, leadership challenges are like a bridge. They provide a bridge between the theoretical and experiential learning (…), and between the ideal and the realistic leadership responses"[42].

The three sites chosen were Kako'o Oiwi: He'eia Wetlands Restoration, the Hawaii Institute of Marine Biology and the Navigating Change Programme at Camp Mokule'ia, each providing a specific set of challenges, but all of them with the common feature of working with the community to promote transformations driven by sustainability. In short, the He'eia Wetlands Restoration brought to light a community struggling to return an area to its original productivity, utilizing sustainable agriculture as the means to achieve its goals[43]. In the Hawaii Institute of Marine Biology, participants could interact with several researchers who discussed projects such as the Eyes of the Reef Hawaii, through which local communities are involved in the monitoring of diseases, invasive species and others, supporting a major conservation work across the islands[44]. The Navigating Change Programme at Camp Mokule'ia, offered insights about a project that involves various stakeholders in the quest for education to protect and restore natural habitats threatened by human

[36] See Chapter 9 on the ProSPER.Net Young Researchers' School.

[37] See Chapter 2 on the ProSPER.Net-Scopus Young Scientist Award in Sustainable Development.

[38] ProSPER.Net-East-West Center, Overview of the ProSPER.Net Leadership Programme, p. 3.

[39] ProSPER.Net-East-West Center, op. cit., p. 2-3.

[40] Heifetz, R. 'The Theory Behind the Practice'; Stone, M., Barlow, Z., 'Seven Lessons for Leaders in Systems Change'; McFetridge, N., Willliamson, P., 'Natural Leadership'; Gordon, J., Berry, J.K., 'Becoming an Essential Leader'; Wheatley, M., Frieze, D., *Using Emergence to Take Social Innovation to Scale*; Kennedy, A., 'Super Organisms: Learning from Nature's Networks'.

[41] The "futures" lecture provided an idea of possible scenarios that can help participants to envision different paths and strategies to reach a previously set goal, making necessary adjustments as reality unfolds. The exercise in which participants had to position themselves in the courtyard according to their individual perspectives on goals, work approach etc., was particularly helpful for some participants to understand that people function with "different timelines", what can profoundly affect how teams work together, how to communicate different visions and inspire people for action.

[42] ProSPER.Net-East West Center, 2013 ProSPER.Net Leadership Programme, Curriculum & Leadership Challenges.

[43] In addition to visiting the project's website for more information www.kakoooiwi.org, the Leadership Programme participants also wrote about their experience during the field visit, an article available at http://unu.edu/publications/articles/a-hawaiian-community-restores-traditional-land-use.html

[44] See the project website at http://eorhawaii.org

activity, invasive plants, utilizing traditional knowledge mixed with science[45].

The programme was also punctuated by debriefing sessions, in which participants were invited to reflect upon the lessons and share their experiences with the group, to encourage and stimulate mutual learning. Among the many comments shared in these sessions in relation to the leadership challenges, participants identified some relevant lessons. For instance, they highlighted the importance of networks and partnerships, the need for communication strategies in project implementation and tailored language and approaches to mobilize more people, and how traditional values can complement scientific findings. They also observed that context, including local culture, plays a significant role in carrying out initiatives. In relation to overall feedback on the programme, participants highlighted: the reassuring feeling and inspiration from being with like-minded people who were working with sustainability-related issues in different fields; that interdisciplinary is much more than a mere gathering of people, but about building bridges between them; the need to find "the other" and establish ways of communicating with different audiences; the need to recognize diversity and realize that different perspectives need to be understood and internalized so that more meaningful collaborations can be efficiently undertaken; and the importance of networks and connections to strengthen collaborations that bring different dimensions to one's own work.

With a mix of activities that included lectures, group discussions, site visits, interactions with local communities and debriefing sessions, many objectives of the leadership programme were accomplished and the feedback from participants demonstrated that perhaps much more than expected was achieved in a short period of time. It was a highly valuable experience for all involved, including the organizers, who worked to translate a vision into a concrete programme that delivered specific outcomes. From this perspective, the pilot programme confirmed that the development of leadership capacity is one effective way to provide skills for people who are already working with sustainability issues to take the message further, and to learn about ways to engage, inspire and mobilize others to navigate through the necessary changes, while implementing more connected sustainable practices and initiatives.

Looking to the future, although the programme is in its early stages of further improvement, it has promoted an incipient network of sustainability-focused professionals that could eventually work collaboratively in joint projects, across fields, countries and regions. Part of the initial plan was to enable the monitoring of how these collaborations took place, and how leadership capacity unfolded over time. However, organizational constraints, including financial, will prevent this feature from being realized in the short-term, unless the ideas for collaboration can be incorporated into major research projects already undertaken by affiliated institutions, governmental agencies and so on. Perhaps a deeper integration of sustainability analysis and leadership capacity, a bridge that still needs to be consolidated, may offer a more favourable environment for such collaborations to take place, facilitating the transfer of relevant knowledge for local implementation of sustainable practices.

Conclusion

Asia is the most populous region in the world comprising around 60 per cent of the world population[46]. The region faces diverse sustainability challenges that demand concerted actions by various stakeholders collaborating to change the likelihood of adverse impacts occurring from environmental degradation, natural disasters and social inequalities. For the necessary transformations to be effectively implemented, leaders in various fields, especially in local communities, will be essential to mobilize people towards a common goal. Most importantly, such leaders should also work together so that their actions are part of a critical mass of sustainable practices that can possibly flip the odds and change the current situation. For example, more than 83 per cent of water-related disasters in 2013 occurred in Asia-Pacific[47], resulting from climate change effects, deforestation and other human interventions. So with a view of a distant future that looks healthier, brighter, and greener, there is a need to start nurturing today the leaders of tomorrow. This was the main driver for designing a programme that, while exposing participants to sustainability challenges in a multi-stakeholder fashion, also offered leadership capacity development through experiential learning focused on mechanisms that can assist the implementation of appropriate solutions in the local level.

As with any educational programme, the expected impacts will take some time to be fully observed. However, as one participant shared her impressions at one of the ProSPER.Net organizational meetings, it seems that ProSPER.Net is moving towards the right path. The participant mentioned how she improved personally and professionally thanks to the programme, especially changing her perspective on how to collaborate with all stakeholders. She realized the importance of communication for change, and that leadership is not about a single individual, but rather a collaborative effort[48]. Although the number of participants is currently limited, in the long-term, as ProSPER.Net steadily develops such capacity-building programmes and provides a platform for meaningful collaborations in the region, the hope is that the participants of these programmes will take the message further and continue learning with their peers about how to better live, work and do things together.

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CONTENTS

SUSTAIN for the ESD Learning Community

Eijun Senaha *(Hokkaido University)* and Zainal A. Sanusi *(USM)*[1, 2]

SUSTAIN, which stands for SUStainability Tool for Academic INstitutions, is a tool originated from the Alternative University Appraisal (AUA) project led by Hokkaido University (HU) as a collaborative undertaking of ProSPER.Net. It supports the creation of a learning community to promote ESD as a way of contributing to the mission of ProSPER.Net, whose charter states that its members should collaborate to uphold the vision and aspiration of creating a sustainable world and advocates that education and research for sustainable development is a pathway that involves the active participation of higher education institutions[3].

The AUA Project as Origin of SUSTAIN

The AUA project was aimed at supporting universities in the advancement of their ESD activities and creating a dynamic ESD learning community where institutions could share their concerns and good practices with others in their areas of interest[4].

The project was developed against a background of growing attention to sustainable development since the 1987 publication of the UN report "Our Common Future, From One Earth to One World: Report of the World Commission on Environment and Development"[5]. Later, participants in the 1992 UN Earth Summit in Rio de Janeiro recognized the importance of education based on development of the ESD concept, stating that "Education is the foundation for achieving sustainable development," incorporated in Agenda 21, further adopted on that occasion[6]. In 2000, ESD was recognized as an essential vehicle to foster sustainable development in the 21st century. The UN Millennium Declaration and the Millennium Development Goals (MDGs)[7] were also approved, setting ESD's aims as "[to] help people to develop the attitudes, skills and knowledge to make informed decisions for the benefit of themselves and others, now and in the future, and to act upon these decisions"[8]. ESD again became a point of focus at the UN World Summit on Sustainable Development in 2002, when the UNDESD was adopted upon the recommendation of the Japanese government[9]. Even with such a background and despite the approach of the final years of the UNDESD and the MDG initiatives (2014 and 2015, respectively), increasing global uncertainty has led to apprehension and a rethinking of SD policy. At the 2012 UN Conference on Sustainable Development (Rio+20), attending members reaffirmed their commitment to Agenda 21 in an outcome document titled "The Future We Want"[10], and proposed further steps towards sustainability implementation through the formulation of the Sustainable Development Goals (SDGs)[11] to be introduced in 2015 as a follow-on from the MDGs. Individuals and organizations are thus taking action in relation to ESD in order to carry out their missions, thereby bringing greater hope for the future[12].

Review of University Assessment System and Need for Specific Tools for ESD

In order to develop the SUSTAIN tool, several existing higher education institutions' (HEIs) assessment resources were carefully analysed and evaluated based on their relevance to the goals of self-evaluation in higher education.

[1] The following project members are duly acknowledged to have contributed to project development and discussions: Tae Joon Lah, Associate Professor at Yonsei University; Tomi Haryadi, Project Manager at the Center of Excellence on Sustainable Development in the context of Climate Change, Asian Institute of Technology; Arun Kansal, Associate Professor at TERI University; Saeed Ul Hassan, former Fellow at the UNU International Institute for Software Technology (UNU-IIST); Asyirah Rahim, Associate Fellow at Centre for Global Sustainability Studies, Universiti Sains Malaysia; Gp Capt Rajiv Seth (Retd), Registrar and Professor of Finance at TERI University; Dr. Mario Tabucanon, Emeritus Professor of the Asian Institute of Technology (AIT) and UNU-IAS visiting professor.

[2] The authors would also like to thank all project participants and HU AUA/SUSTAIN Secretariat staff for their reviews and valuable comments, and are similarly grateful to the many other people involved for their cooperation.

[3] ProSPER.Net Charter, Article 3 – Principles of Engagement.

[4] See Senaha, E., 'The Alternative University Appraisal Project: Construction of a Learning Community in the Asia Pacific'.

[5] United Nations, 'Our Common Future, From One Earth to One World: Report of the World Commission on Environment and Development'.

[6] MEXT, 'ESD: Education for Sustainable Development'.

[7] United Nations, 'Millennium Development Goals (MDGs)'.

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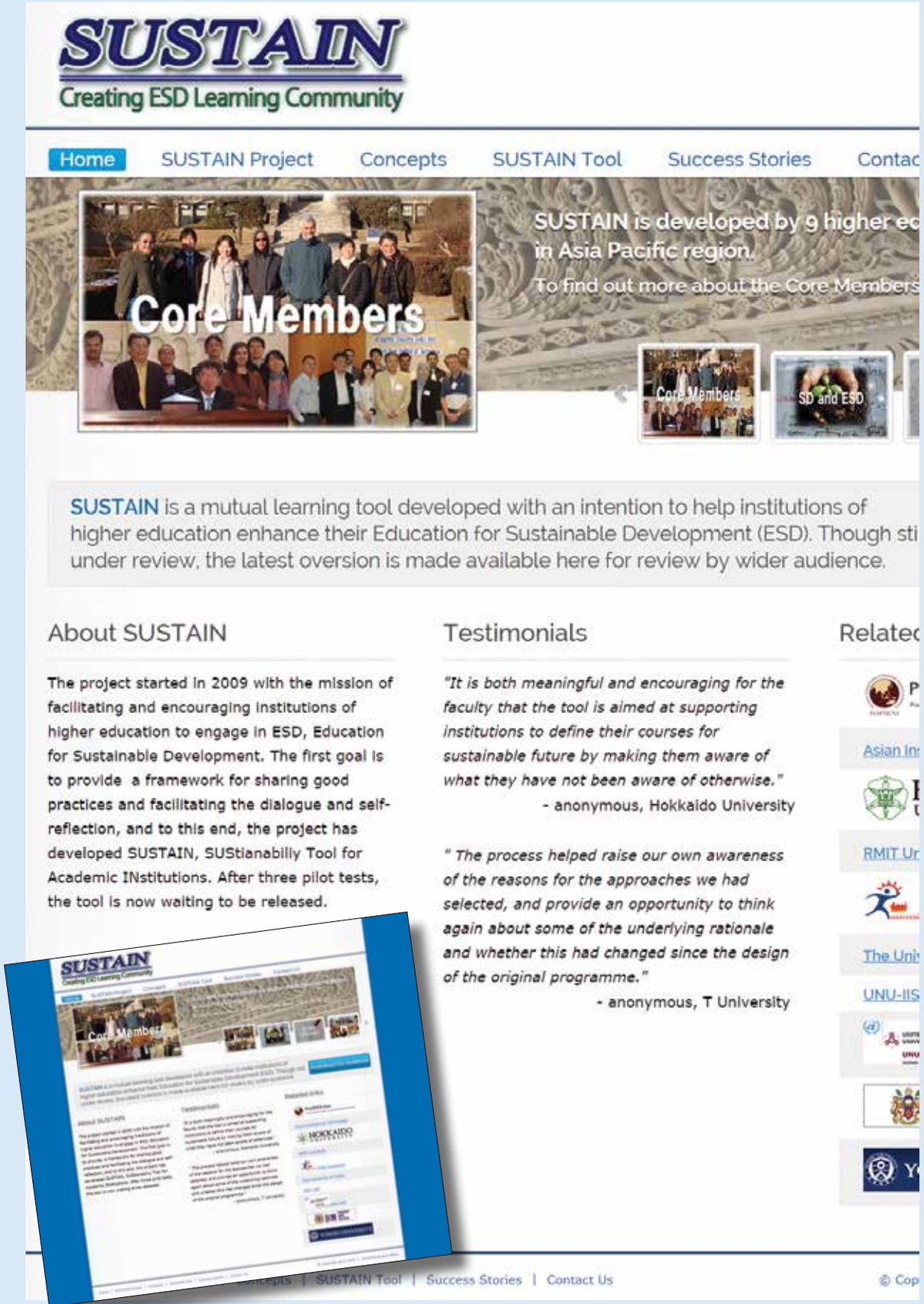

Conventional ranking systems have been around for decades. They involve the use of a rigid and rather inflexible approach toward the grading of tertiary education providers. It is clear that such guidelines are counterproductive to the well-being of institutions that wish to pursue alternative forms of educational development (such as sustainability integration) or lack the means to fund related research and secure grants (as seen with HEIs in developing nations). In the long run, the parameters used to determine rankings inhibit creativity and stunt the growth of universities that would otherwise be open to new, creative development ideas, and only serve to further strengthen the position of HEIs that comply with these now increasingly irrelevant and archaic criteria.

The full benefits of a university can only be manifested when both the university and the society in which it is located are organically linked. In other words, university's activities must be flexible enough to factor in the rapidly changing needs and trends of its host society. As Tyehimba argues, "The education system reflects the norms, values, biases, assumptions, and socio-economic priorities of the ruling elite. From kindergarten, children are indoctrinated according to the dominant values of the mainstream"[13]. Based on these observations, one of the major criticisms of higher education rating or ranking assessments is their failure to consider the contributions made by developing nations to the global body of science and knowledge. The existing criteria for assessment and measurement are arguably limiting factors that are accessible and attainable only by certain groups of universities. Variables such as numbers of patents, amounts of research funding and number of international faculty members and students are not key areas of focus in evaluation for more than half of all universities worldwide. As these considerations are not widely used as determinants of university performance, especially for those in developing and least developed countries where contributions to local or regional development are the main purpose of existence, such universities often find themselves marginalized in ranking systems.

In response to these issues, various alternative assessment frameworks have emerged over the past 10 years. This is particularly true in the context of sustainability perspective, by which university performance is assessed and recognized for specific kinds of education toward national development and concern over global development and environmental issues. The approaches and parameters adopted for these assessment systems focus on the university's education and research towards addressing the development challenges identified. Ongoing initiatives based on such frameworks include: the College Sustainability Report Card; EC-Assess; Monitoring and Assessing Progress during the UNDESD in the Asia-Pacific Region; the Sustainability Tracking, Assessment, and Rating System (STARS); the Auditing Instrument for Sustainability in Higher Education (AISHE); Graphical Assessment of Sustainability in Universities (GASU); the Sustainability Tool for Auditing University Curricula in Higher Education (STAUNCH); and other regionally or locally implemented programmes[14].

Learning from the experiences of these systems, SUSTAIN aspires to promote the idea of university education tailored to individual development potential and allow universities to function in their own areas of priority while serving the needs of the host society rather than having to compete to meet an arbitrary universal standard[15]. For these purposes, AUA differs from other initiatives based on the following approaches:

a) No standardized comparison
In relative assessments (rankings) and absolute assessments (ratings), many tools are used to evaluate institutions based on uniform standards reflecting individual ideas of how ESD should be. With AUA, efforts made by different institutions to address issues from alternative perspectives are considered because diversity is part of ESD's essence. Thus, institutions are not assessed via unilaterally imposed standards. Some people believe that a world dominated by specific values is not sustainable, arguing that even minority values should be treated as equal in a sustainable society.

[13] Tyehimba, R., *Education: Myths and Implications.*

[14] For further information on these seven assessment tools, please visit the websites of the *College Sustainability Report Card; the EC-Assess; Monitoring and Assessing Progress during the UNDESD in the Asia-Pacific Region; the Sustainability Tracking, Assessment, and Rating System* (STARS); N. Roorda, *AISHE: Auditing Instrument for Sustainable Higher Education; Graphical Assessment of Sustainability in Universities* (GASU); and consult Lozano, R., Peattie, K., 'Assessing Cardiff University's Curricula Contribution to Sustainable Development Using the STAUNCH (R) System'.

[15] For further discussion, please see Razak, D. A., et. al. 'Alternative University Appraisal (AUA): Reconstructing Universities' Ranking and Rating toward a Sustainable Future'.

b) Empowerment based on perception sharing among stakeholders
Many tools are used under the assumption that certain facts are true, and these facts are used as baselines against which improvements are measured over time or compared with "facts" of other institutions. With AUA, facts are treated as unconfirmed and truth as multifaceted. Its self-assessment is not a process to decide whether the institution meets the criteria or not. Rather, it provides opportunities for institutional stakeholders to get together, reciprocally recognize perception differences stemming from different roles or responsibilities, and reach common understandings.

c) Emphasis on action
From an academic point of view, assessment helps people judge the superiority of outcomes. The trend of assessment is toward increased emphasis on outcomes and reduced focus on processes, and this is especially evident in Western countries. However, in societies where outcomes are emphasized, action tends to be prioritized in such a way that outcomes are maximized in the shortest term, which leads to the marginalization of low-profile action.

AUA is based on the belief that proposing specific states as ideal outcomes discourages diverse efforts toward ESD, which could be detrimental in Asia where diversity is more complicated. It recognizes institutions that actually take necessary action regardless of the types and scales of perceived outcomes.

d) Community orientation
In general assessment, assessors and those being assessed do not usually work on an equal footing; assessors either evaluate unilaterally or provide fee-based consultation services. With AUA, however, both sides are community members; their roles are simply switched depending on the time and situation. Dialogue is designed to ensure that all participants have learning to do beforehand and have something to take away.

Adopting these four principles, it is hoped that AUA will promote the idea of university education as a process of individual development potential and encourage the universities to function according to their own areas of priority with the ultimate mission of serving the needs of the host society, rather than being engrossed in the struggle of climbing the ranking ladder.

The Conversion of AUA to SUSTAIN
The SUSTAIN tool[16] consists of the previously known AUA Model and the ESD Archive. The AUA Model is a framework for assessing universities, whereas the ESD Archive is an information repository used for reference. For these two components to work effectively, it is important to de-emphasize competition among universities and avoid off-the-shelf or fit-for-all models. Rather, AUA is intended to foster an environment in which universities with diverse perspectives can enhance their ESD activities reciprocally, while also embracing their individual traits.

It was in 2013 when AUA was put into operation and the tool was launched under the new name of SUSTAIN, which stands for SUSTainability Tool for Academic INstitutions. For the project to bear fruit that directly benefits higher education communities, the system must run with high accessibility and usability. In addition to service development, the need to maintain the models used must also be emphasized. Based on recognition for the importance of diversity, innovation and change toward sustainable development, the models must be continuously reviewed and refined to accommodate such changes.

The SUSTAIN Tools
SUSTAIN was developed as a means to create a learning community among universities that are engaged in ESD in the Asia-Pacific region. It is one of a number of projects that has emerged within ProSPER.Net, and seeks to "facilitate and encourage institutions of higher education to engage in education and research for sustainable development, and to raise the quality and impact of these activities by providing benchmarking tools that support diversity of mission, as well as a framework for sharing good practices and supporting dialogue and self-reflection." A fundamental goal of the SUSTAIN undertaking is to bring about an Alternative University Peer-Consultation System that focuses less on the ranking of universities.

In addition to the above-mentioned constructive qualities of the SUSTAIN Model, the initiative also functions as a tool for self-reflection between partnering institutions, thus enabling HEIs to assess their individual ESD involvements. It is believed that through this process, HEIs can specifically identify areas of ESD which need to be addressed in the future with a vision of protecting and enhancing the diversity of tertiary education and also to recognize the

[16] For more information, please visit http://sustain.oia.hokudai.ac.jp/aua/

contextual strength of an individual university, which is against the one-size-fits-all approach of the mainstream conventional assessment system.

The SUSTAIN model was developed in consultation with a variety of stakeholders through international and local conferences, meetings and consultations. It is not intended to intensify competition among HEIs or to impose a uniform, pre-determined ideal university model upon them; rather, it aims to provide perspective to enable consideration in their efforts to reorient themselves towards a sustainable future and help them identify specific areas to be addressed and improved. SUSTAIN can be applied to the whole university as one institution or also to a smaller unit such as the academic department, programme or any sub-project related to ESD.

SUSTAIN consists of three components: Self-awareness Questions (SAQs); Activity Checklist (AC); and Dialogue.

1. Self-awareness Questions (SAQ)
This is a set of narrative questions and an institution profile used for reviewing or revisiting a particular ESD initiative of an institution that shall form stakeholder committees, whose members will eventually come to understand one another's perspectives through the process of discussion.

The SAQ focus on four components as below:

A) Governance
In terms of governance, the purpose is to assess the overarching administrative structure and policy directions of the HEI. Governance indicates a basic framework to promote ESD that impacts most on ESD-related research and education. This section of the SAQ is developed to assess the institution's understanding of and commitment to the chosen assessment sub-theme, as well as to check if the assessment sub-theme is incorporated in its management strategy.

B) Education
Indicators/questions in this part of the SAQ are designed to assess curriculum, teaching, capacity development and other learning opportunities that the institution offers to its students, faculty members, staff, and communities. This section of the SAQ mainly aims to assess mechanisms of delivering an understanding of sustainable development to students.

C) Research
This part of the SAQ is designed to assess the institution's efforts and commitment to ESD and SD research and consultancy.

D) Outreach
This part helps to assess the extent of transformation that the institution has undergone toward ESD and to understand the institution's outreach. The purpose of this component is to mainly gauge the institution's involvement in the assessment sub-theme with the local community or with broader networks.

2. Activity Checklist (AC)
The AC is a 1 to 4 scaled survey about institutional-level ESD activities. It is intended to support the visualization of progress in ESD enhancement and the identification of trends. In the research category, the Global Research Benchmarking System (GRBS; a computerized scoring method developed by UNU-IIST) is adopted to highlight the institution's research accomplishments. Accordingly, the AC can be used as a tool to find the institution's relative position among HEIs. However, as SUSTAIN is not intended as a tool to enable institutional comparisons, this function is optional.

3. Dialogue
The exchange of ideas between the institution's stakeholder committee and representatives from other institutions in the community (referred to as dialogue partners) is called the Dialogue. The SUSTAIN Secretariat[17] receives input from the institution in the form of answers to the SAQ, and provides it to the dialogue partners for individual pre-recommendations. Dialogue partner representatives include experts with experience in the SD field in question and/or with views and ideas to share with the institution. The Secretariat also assigns a leader and a facilitator. The facilitator integrates the individual recommendations into a single pre-recommendation report to trigger dynamic and relevant discussions during the Dialogue. The report is then submitted to the institution in advance. The outputs of the three phases are documented in the ESD Archive to serve as a resource in enhancing ESD practices.

The SUSTAIN system also seeks to facilitate and encourage HEIs to engage in education and research for sustainable development, and to raise the quality and impact of such activities by providing benchmarking tools that support the diversity of missions as well as offering a framework for sharing good practices and facilitating dialogue and self-reflection. The core members of this endeavour come from a multi-faceted background, comprising a number of institutions that are focused on the sustainability agenda and acting as agents of change in their respective capacities. The core members are Hokkaido University, TERI University, Yonsei University, Universiti Sains Malaysia, and the Asian Institute of Technology, with UNU-IAS as an observer.

Conclusion
SUSTAIN is a comprehensive tool for the holistic ESD management of HEIs. It also represents a response to ProSPER.Net's initial idea that "…was simple yet groundbreaking: recognize the essential role HEIs play in forming new generations of leaders and help those institutions impart sustainable practices to future professionals"[18]. SUSTAIN has gained a reputation as a potential initiative for the Platform for Sustainability Performance in Education (PSPE; an international organization providing sustainability assessment tools). PSPE is a platform designed to support the commitments of the Higher Education Sustainable Initiative (HESI) signatories by providing a range of tools and options for assessing and improving their sustainability performance. It offers further support for complementary Rio+20 initiatives, such as the People's Sustainability Treaty on Higher Education (PSTHE).

Despite the project's clear mission and potential, two issues were discussed in its final stages: financial sustainability and the branding of the tool. The approach now is to take maximum advantage of the SUSTAIN website and make the SAQ and AC available on the site so that interested institutions can peruse and try them out. Institutions wishing to become further involved and improve their ESD activities can contact the SUSTAIN Secretariat to arrange a Dialogue session that provides both parties with learning opportunities regarding ESD and further promotes an ESD learning community development. As for branding, it is clear that many ESD assessment tools are intended to encourage quality through processes such as ranking, rating and certification, providing useful information not only for users but also for providers. In this sense, SUSTAIN provides a tool for reflection on quality assurance, focusing exclusively on the development of a community that shares the value of such quality.

HEIs interested in ESD improvement can visit the SUSTAIN website via the HU homepage[19]. As ProSPER.Net's membership grows, SUSTAIN will enable the collection of more data and the creation of a larger ESD learning community in which individual members collaborate and support mutual progress. This, in turn, will help ProSPER.Net increase its membership, creating synergetic effects that will support the contributions of ProSPER.Net and SUSTAIN to foster the development of an ESD learning community for a sustainable world.

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[17] The SUSTAIN Secretariat functions at the Office of International Affairs, Hokkaido University, e-mail: sustain_office@oia.hokudai.ac.jp

[18] For more information about ProSPER.Net's mission and vision, see 'Foreword', in *ProSPER.Net: Developing a New Generation of Leaders.*

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Becoming a ProSPER.Net Member

Membership in ProSPER.Net is limited to higher education institutions located in the Asia-Pacific region that offer postgraduate education and research in sustainable development and in ESD related fields. ProSPER.Net also has an affiliate membership category for higher education institutions located outside the Asia-Pacific region, working for the benefit of the region. Inquiries about membership should be made through the network's Secretariat at United Nations University Institute for the Advanced Study of Sustainability (UNU-IAS) by sending an email to: *prospernet@unu.edu*

List of Abbreviations

AACSB:	Association to Advance Collegiate Schools of Business
ACCSR:	Asian Center for Corporate Social Responsibility
ABIS:	Academy of Business in Society (*formerly known as EABIS*)
AIT:	Asian Institute of Technology
AIT-SOM:	AIT School of Management
ASEAN:	Association of Southeast Asian Nations
AUA:	Alternative University Appraisal
CEEMAN:	International Association for Management Development in Dynamic Societies
CSR:	Corporate Social Responsibility
CU:	Chulalongkorn University
EABIS:	European Academy of Business in Society (*later renamed ABIS*)
ESD:	Education for Sustainable Development
GAP:	Global Action Programme on ESD
HEI:	Higher education institution
HESI:	Higher Education Sustainability Initiative
HU:	Hosei University
ICESD:	International Commission on Education for Sustainable Development
MOE-J:	Ministry of the Environment of Japan
PSU:	Prince of Songkla University
PRAM:	Poverty Reduction and Agricultural Management
ProSPER.Net:	Promotion of Sustainability in Postgraduate Education and Research Network
RMIT:	Royal Melbourne Institute of Technology
SD:	Sustainable development
SDP:	Sustainable development practice
SES:	Social-ecological systems
SPC:	Sustainable Production and Consumption
SSF:	Shinshu University Sustainability Forum
SUSTAIN:	Sustainability Appraisal for Academic Institutions
TERI:	The Energy and Resources Institute
UGM:	Universitas Gadjah Mada
UN:	United Nations
UNDESD:	United Nations Decade of Education for Sustainable Development 2005-2014
UNU:	United Nations University
UNU-IAS:	United Nations Institute for the Advanced Study of Sustainability, formerly known as the United Nations University Institute of Advanced Studies
UP:	University of the Philippines
USM:	Universiti Sains Malaysia
WAP:	Wetlands Alliance Programme
WBCSD:	World Business Council for Sustainable Development
YRS:	ProSPER.Net Young Researchers' School
YSA:	ProSPER.Net-Scopus Young Scientist Award in Sustainable Development

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