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Title	Developing an International Education Alliance for Global Human Resources in Sustainability : The Case of the Sustainability Leader Program (StraSS) Alliance
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Citation	高等教育ジャーナル : 高等教育と生涯学習, 21, 1-8
Issue Date	2014-03
DOI	https://doi.org/10.14943/J.HighEdu.21.1
Doc URL	https://hdl.handle.net/2115/56828
Type	departmental bulletin paper
File Information	No2101.pdf

Hokkaido University Collection of Scholarly and Academic Papers : HUSCAP

Developing an International Education Alliance for Global Human Resources in Sustainability: The Case of the Sustainability Leader Program (StraSS) Alliance

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Abstract — The StraSS Alliance was inaugurated in 2009 at the Center for Sustainability Science(CENSUS), Hokkaido University. This coalition of Asian and African universities was founded to create a global classroom for the teaching of sustainability science. Although many such initiatives exist, the StraSS Alliance differs in that it is truly a shared initiative. All partners are accorded equal status within the alliance, which encourages educational content to flow both ways across the North-South divide. Each member institution in the alliance brings a unique set of values (both knowledge and cultural-based) to the StraSS global classroom. In real-time interactions, students from up to 7 campuses around the world gain a much deeper understanding of how common problems can affect different countries in different ways. This paper outlines the origins of the alliance, its content and procedures, the reasons behind its inception and the process of making it operational. Finally, we consider possible future directions for the StraSS Alliance.

(Revised on 30 October, 2013)

1. Introduction

The recent globalization of economic activities has promoted extremely rapid forms of economic growth. In developing countries this often results in severe environmental and social issues such as environmental degradation and pollution, exhaustion of natural resources, wage inequality and ethnic conflicts. The effects of issues such as these are not limited to the developing countries in which they arise (Prasad et al. 2007). Developed countries are also deeply connected to these problems because they promote the rapid economic growth of developing countries for their own purposes. Such destructive forms of economic development cannot continue indefinitely. We have to search for new sustainable methods to replace out-dated conventional ones, and cooperation between developed and developing countries is essential for sustainability in human societies around the world.

Although many sustainability issues could undoubtedly be solved by technical methods alone, such methods are often too expensive to introduce into developing countries on the local-scale necessary. Alternatively, other sustainability issues could be alleviated simply through education programs aimed at developing an awareness of the issues in the people living

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in affected areas. The need to train human resources capable of guiding local people to resolve sustainability issues with locally available resources has never been more urgently required in developing countries.

Several joint endeavours between developed and developing country universities to train human resources capable of resolving environmental problems have previously been conducted. Keio University, for example, together with other 26 universities in 13 Asian countries, has been using satellites and the Internet to broadcast lectures from developed countries since 2001 (Basu et al. 2007). School on Internet Asia (SOI Asia), as this project is known, focuses on various environmental and social issues in Asian countries. The United Nations University established a master course program on sustainable development in Africa in collaboration with universities in Anglophone African countries and international institutions like UNESCO, UNEP, and UN-HABITAT (Antwi 2010). Eleven African and 9 Japanese universities and educational institutions participate in activities and lectures that are shared both through the Internet and through field programs in African countries. A closer look at these pioneering initiatives show that resources are not shared at all, but merely provided by developed countries to developing ones. If we are ever to resolve the sustainability-related issues that are ongoing in developing countries, input from those countries is essential.

In 2008, the Center for Sustainability Science, Hokkaido University (HU-CENSUS hereafter) was established to offer a certificate program on sustainability science to graduate students at Hokkaido University, namely the Hokkaido University Interdepartmental Graduate study in Sustainability (or HUIGS hereafter). Interested students, in addition to studying traditional major subjects at their chosen graduate schools, can take introductory courses on sustainability science provided by HUIGS - courses designed to instil a sustainability mindset into students. In 2010, HU-CENSUS introduced a more comprehensive certificate program to foster global leaders able to build a sustainable society - the Special coordinated training program for Sustainability Leaders (StraSS) hereafter. This certificate program provides learning and practical opportunities for Hokkaido University graduate students to gain the knowledge and skills needed to realize a sustainable society.

In conjunction with four other Asian and African universities: National Cheng Kung University (NCKU-Taiwan); Zhejiang University (ZJU-China); University of Palangka Raya (UNPAR-Indonesia); and the International Institute for Water and Environmental Engineering (2iE-Burkina Faso); Hokkaido University and HU-CENSUS established the StraSS Alliance to nurture human resources capable of guiding people living in local communities to focus their limited resources on resolving sustainability-related issues that affect their communities. One key aspect of the alliance is how each stakeholder contributes equally to the implementation of the training programs, enabling the alliance to collect valuable input from developing countries, which can then be used to nurture competent human resources capable of actively addressing developing country issues once they have graduated from alliance universities. In this paper, we first explain: 1) the unique curriculum of the StraSS leader program as a graduate certificate program in sustainability science, 2) our motivation for establishing the StraSS Alliance, an international alliance of universities. These two elements make the StraSS leader program unique and notable. Secondly, we describe how the alliance was established and explain how its structure encourages each participating university to contribute to it's functioning. Finally, we discuss our activities and the future of the alliance in light of what will be necessary to transform it into a textbook example of an internationally shared sustainability science education initiative.

2. Overview of the StraSS Education Program

The term Sustainability Science can be cause for confusion as it implies an established discipline with shared conceptual frameworks and theoretical backgrounds. But Sustainability Science is actually the Science of Sustainability dependent on the notion of multiple disciplines all addressing a common theme, Sustainable Development. Sustainability Science is problem-driven, with an ultimate goal of creating and applying clusters of interdisciplinary knowledge to support decision-making for Sustainability Development (National Research Council, 1999).

With most education systems still conducted under a disciplinary basis, universities can easily incorporate new certificate programs into existing graduate education systems without disturbing the status quo of the

institution. Such an arrangement has allowed us to work towards our objective of raising professionals capable of engaging in problem-oriented sustainability projects under any geographic, disciplinary, cultural, linguistic, or ethnic situation. New professionals are expected to utilize and augment their conventional professional skills by collaborating with other professionals, stakeholders and interested parties and individuals. Any newly designed program must provide trainees with practical field skills.

The StraSS Leaders education program is intended to educate such professionals. Students must undertake an amalgam of Hokkaido University's existing sustainability science courses and newly established StraSS Leaders special lecture courses (see Table 1).

The StraSS program consists of:

1) An introductory course to sustainability science (*Sustainability I and II*)
2) A leadership skills course (*Practical Environmental Leadership*)
3) A course to help understand cultural diversity (*Culture, Language and Regionalism*)
4) A practical skills course for policy formulation (*Environmental Policy*)
5) A training course for normative discussion and thought (*Environmental Ethics*).

Any graduate student that completes all five parts and obtains a master degree from their "home" graduate school is awarded a StraSS Leader certificate.

3. Objectives of the StraSS program

For the StraSS alliance, these courses are divided into three separate and distinct categories: 1) StraSS alliance shared lectures, 2) ECOSUS field-training courses, and 3) Pre-existing programs on sustainability policy and sustainability ethics taught at each affiliate university

i) The StraSS alliance shared lecture series provides basic introductions to important sustainability science issues and to effective problem-solving skills and techniques. Many of the lectures are shared in real-time among affiliate universities through Internet-based videoconference systems.

ii) ECOSUS field-training programs focus on providing students with opportunities to develop practical skills and encourage students to devise hypothetical action plans that can enable local communities to achieve a greater degree of sustainability through the utilization of locally available resources.

iii) Utilizing pre-existing programs on sustainability policy and environmental ethics enables each university to focus on the specific local topics that form the basis of the different cultural and social backgrounds present in each region. HU-CENSUS also accepts a wide range of substitute lectures offered by several different graduate schools, providing HU students with multiple opportunities to take HU-CENSUS courses.

Dividing the StraSS education program into three separate units lets StraSS alliance universities draw upon

Table 1. Unit structure of the StraSS Leaders Educational Program. 7 courses are divided into 3 categories: i) StraSS shared lectures, ii) Field-training course, and iii) Environmental Policy and Environmental Ethics lecture series.

	Course title	Hokkaido University		StraSS affiliate Universities
		No. of credits	Treatment	Treatment
1	Sustainability Science I	2	Requisite	To be shared among StraSS partners
2	Sustainability Science II	2		
3	Practical Environmental Leadership	1		
4	Culture, Language and Regionalism	1		
5	Field training for making sustainable regions (ECOSUS)	2		To be established in each partner university
6	Environmental policy	2	Requisite / Elective	From existing courses / Establish new course
7	Environmental ethics	2		

existing education resources to provide specific content to local StraSS Leader students. When combined with a videoconference system and student/staff exchanges among affiliate universities, StraSS affiliate universities provide complementary educational content to each other and gain the real-time feedback necessary to achieve and maintain high program standards.

4. Assessing and evaluating shared activities

One typical method to allow meaningful interactions among programs is the establishment of credit transfer mechanisms, which can enhance student mobility via student exchanges. The StraSS alliance has yet to implement this approach. As such, HU-CENSUS encourages each alliance partner to assess its own students according to its own academic criteria. This can be illustrated using the example of an undergraduate course HU-CENSUS shares with NCKU and UNPAR. Students from these 3 universities meet in real time once a week via an Internet videoconference system for 10 weeks to share lectures and to exchange opinions and ideas. HU-CENSUS and NCKU students study to earn credits to put towards their degrees, whereas UNPAR students study to earn a non-credit diploma. For HU students this 2-credit course is comprised of a series of lectures (shared) and a practical fieldwork excursion (unshared). The situation is different for NCKU. The academic year starts in February in Taiwan compared to April in Japan, meaning NCKU students have already been meeting regularly for 2 months by the time the shared lecture component starts at HU. NCKU deems the shared 10-session course to be worth one credit, and integrates it as a module into a separate larger NCKU course worth 3 credits.

At the conclusion of the course, HU-CENSUS and NCKU use their own assessment procedures to independently determine whether their students have successfully completed the course and can obtain credits. UNPAR provides HU-CENSUS with a list of students they consider to have successfully satisfied their course completion requirements. HU-CENSUS then issues a non-credit CENSUS Diploma to each of these students. In summary, each participating institution has the autonomy to use the shared lecture series as it chooses and each is responsible for assessing its own students. At no point are students from one alliance partner assessed by staff from another partner.

5. Structure of the StraSS Alliance

To ensure the self-sustainability of StraSS educational programs in each affiliate institution, we have attempted to combine lecture sharing through Internet videoconference systems with pre-existing educational resource materials from each university whenever possible.

Under the StraSS Leader Course system, programs provided by each university automatically focus on issues affecting local sustainability. For instance, UNPAR can provide program content on the integrated management of tropical peat land and 2iE may offer field training and policy courses on the effective use of water in arid regions. As a result, each university can provide programs to foster specialists on the sustainability issues that affect its region.

Before we could establish a university alliance to implement StraSS programs, we first had to make agreements for collaborative research and education with each candidate university. Universities with outstanding records in sustainability research and education in Asian and African regions and/or a rich history of collaborative research and education on sustainable matters with HU were considered as candidates.

Among these candidates, we specifically focused on universities that were conducting research projects with HU under financial support from external agencies like Japan International Cooperation Agency as such projects permit mutual student exchanges between universities, which in turn allows us to provide StraSS education programs to exchange students from alliance partner universities. Such collaborations between universities are beneficial not only for exchange students, but also for HU students, because each affiliate university can support the ECOSUS field training program when these programs are conducted in that country.

Agreements to implement education programs are concluded under the umbrella of general memorandum of understanding agreements between universities. As HU already had prior agreements in place with most of the current StraSS affiliate universities or with institutions within the candidate universities, HU-CENSUS could

formalize agreements to conduct the StraSS program under the umbrella of these overarching agreements.

For NCKU, it worked the other way around. StraSS related activities lead to the institution level agreement in 2010 and eventually to the university level agreement signed in 2013. For the first agreement, HU-CENSUS became one of two corresponding institutions on the HU side. Usually, such an agreement mentions student exchanges between universities, a fundamental condition for exchange students being exempted from entrance examinations and tuition fees. As HU-CENSUS does not have any of its own students, the Graduate School of Environmental Science (HU) agreed to accept exchange students from NCKU on behalf of HU-CENSUS. In this way, we could satisfy one of the crucial prerequisites for establishing the StraSS Alliance by the summer of 2010.

HU-CENSUS decided the terms of the StraSS agreement would remain valid until March 2014 but with the proviso that the agreement is to be updated prior to its expiration. This is because StraSS is financially supported by the Strategic Funds for the Promotion of Science and Technology from Ministry of Education, Culture, Sports, Science and Technology (MEXT) until that time. StraSS affiliate universities are expected to continue their activities by their own expenditure after MEXT's financial support expires.

In principle, all universities participate equally in the alliance. Each university has equivalent voting rights to decide the contents of StraSS educational programs and the management of the alliance, and each is expected to contribute equally to the program operations. The rights and obligations of participating universities are stated in the Terms of Reference (TOR) of the alliance.

Two committees, the Academic Committee and the Coordination Committee, manage the StraSS Alliance activities. One or two members from each university are chosen to sit on each committee, the functions of which include: managing the StraSS educational programs, organizing annual symposia and meetings, and sharing information between Alliance members.

Professors occupying either director or deputy-director roles at the institutions that manage the StraSS program in each alliance university are appointed as Academic Committee members. Their primary task is to ensure the efficient management of the entire StraSS program: this includes strategy meetings about curriculum content for quality assurance, grading, credit transfers, installation of joint certification systems, and other related tasks such as the provision of sustainability classes as regular courses within each alliance university. Academic committee members discuss such matters in annual meetings, which all affiliate universities are required to attend. Young faculty members and researchers are appointed as members of the Coordination Committee. They are charged with the scheduling of the lecture series and organizing field-training programs. They also provide logistical support when staff members and students move between affiliate universities to take part in field training programs and annual symposia.

The Alliance secretariat will be located at HU-CENSUS until March 2014. The secretariat's role is to conduct all the regular tasks associated with managing the alliance: planning annual meetings and symposia, scheduling shared lectures and field-training programs, for example. Ultimately, the role of the secretariat will rotate every three years with each participating university expected to provide the financial and human resources needed to manage the StraSS program.

6. The development of an educational alliance

6.1 Obtaining agreement for the StraSS alliance

The first step to formulating the StraSS alliance was to build collaborative agreements between HU and other prospective candidate universities. A meeting to explain the concepts of the StraSS Alliance to delegates from each candidate university was held on October 28, 2010 in Sapporo, Japan. During the meeting, HU-CENSUS outlined the details of its plan and discussed the obligations that each university would need to commit to. It was agreed that five Asian and African universities would found the alliance: HU (Japan), the International Institute for Water and Environmental Engineering (2iE, Burkina Faso), Zhejiang University (ZJU, China), the University of Palangka Raya (UNPAR, Indonesia), and National Cheng Kung University (NCKU, Taiwan) (Fig. 1). Delegates took the concept back to their universities for further discussions. Ultimately, all universities agreed to commit to the alliance.

After receiving unofficial agreement from all universities, HU-CENSUS started to draft the StraSS Alliance TOR. After review by legal experts in the

field of international collaboration at the Hokkaido University Office of International Affairs, the draft was sent out to each university for legal review. At the second international meeting held in Palangka Raya, Indonesia, on September 26, 2011, all universities except NCKU agreed to the TOR conditional to a slight amendment to the text. NCKU informed us they needed permission from the Ministry of Education in Taiwan before they could enter into an alliance that contained a Chinese university as an affiliate member. As their participation in the StraSS Alliance was under review by the Ministry of Education in Taiwan, NCKU requested more time to officially formalize the agreement.

6.2 Organization of Annual Meetings and Symposia

As mentioned above, all participating universities are expected to contribute equally to the management of the alliance. Therefore, each university has a duty to manage the education programs, annual symposia and meetings, and secretariat in turn.

The TOR of the StraSS Alliance requires an affiliate university to hold an annual meeting every year. Program qualifications, shared lecture schedules and field training programs, as well as feedback on shared lectures and requests from each affiliate university are discussed at this meeting. In addition, the university that will organize the field training course the following year is selected and the scheduling is roughly agreed upon. The university that will organize the next annual meeting and symposium is also decided at this time. The alliance has additional meetings as needed with HU-CENSUS staff members visiting affiliate universities and vice versa. Videoconferencing systems are also frequently used to ensure smooth communication among affiliates.

During the annual meeting period, the StraSS alliance also conducts a one-day symposium on sustainability education. The first symposium was held at Hokkaido University in October 2010 with the theme of "Establishment of Global Campus for Sustainability Education through Internet Lecture System." Staff from all StraSS affiliate universities participated in this symposium. The second symposium was conducted at Palangka Raya City, Indonesia, in September 2011 in collaboration with UNPAR. The theme was "The Establishment of Human resources wanting to start Social Entrepreneurship." The third annual meeting and symposium was held in Ouagadougou, Burkina Faso, in September 2012 in collaboration with 2iE. The theme was "Sustainability in Education and Science:

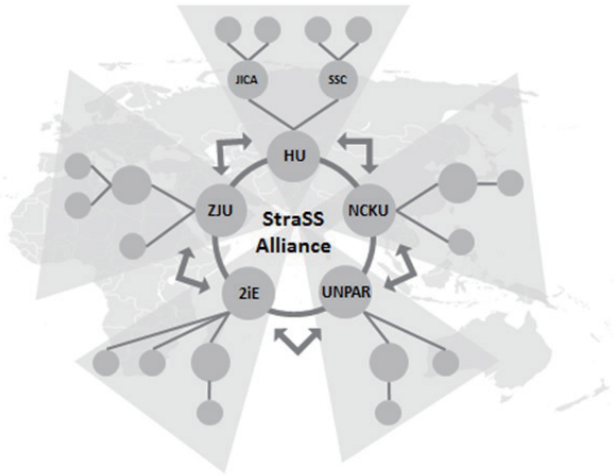

Figure 1. Schematic diagram of the StraSS Alliance, founded by five universities. Initially, only StraSS courses were shared among the affiliates, but each alliance university also brings its own network of universities, agencies, research and higher education institutions, local government groups, companies (shown in connected circles, but the number of circles is not directly related to number of counterparts of each university). Each university is expected to establish a local StraSS program in connection with its local counterparts. Finally, StraSS courses are to be shared among the local networks with local educational resources.

which innovation for sustainable development?" The next meeting will be hosted by ZJU in Hangzhou in September 2013.

7. Discussion: Reflecting on the StraSS Alliance

Since the StraSS Alliance was only recently inaugurated, it is too soon to discuss its achievements. Yet, for the alliance to be successful and sustainable, several key elements need to be ensured. Chan (2004) proposed six fundamental factors for international cooperation in higher education; a) *mission and objectives*, b) *partners*, c) *people*, d) *projects*, e) *time and resources* and f) *communication*.

Mission and objectives emphasizes a shared identity within the alliance. In the case of the StraSS Alliance, there are two missions; 1) establish joint programs to train new human resources into sustainability professionals by sharing educational resources and opportunities among the alliance members and 2) issue joint certificates for completion of joint programs. Under the auspices of this two-pronged mission, each university lists the educational resources it is prepared to contribute and share within the StraSS Leader program, and embarks on facilitating the program within its campus.

Partners need to be carefully selected in accordance with missions. Even before the StraSS leader program was initiated, participating institutes were willing to establish education programs on sustainability. In addition, the StraSS alliance universities were initially chosen from universities that already possessed full university-level exchange agreements with Hokkaido University. If any new university seeks to join the alliance, it must first discuss entry requirements and criteria with HU-CENSUS. Next, approval must be obtained from the other alliance members. Five StraSS alliance partners currently share a common mission within the alliance.

People committed to the long-term success of the StraSS alliance are crucial for the sustainability of the alliance. People from each university, usually junior faculty members likely to provide long commitment, are nominated to assume secretariat duties. A pressing future issue will be how to develop/provide incentives for staff to conceive and engage in activities beneficial to the StraSS Alliance.

Projects need a clear definition of their participants (i.e., students taking the StraSS leader program, faculty members taking active roles within the StraSS alliance), and of leadership within the alliance. At each level within the StraSS alliance, participants are defined as either graduate students interested in sustainability science or as faculty members associated with sustainability issues.

Time and resources are required to maintain the alliance. The StraSS program was initiated by HU-CENSUS with a special fund for the Promotion of Science and Technology from MEXT of Japan. This funding is available until March 2014. Securing long-term funding to continue the StraSS alliance is a key issue.

Communication within the alliance is indispensable. As Chan (2004) mentioned, regular and effective communication is crucial for the survival of any alliance. In addition to its regular annual meetings, the StraSS alliance may need to establish additional regular communication routines to ensure the alliance stays dynamic.

8. Concluding remarks

Sharing components of the StraSS educational program between StraSS affiliate universities first started in 2011. These programs are already authorized parts of the regular curricula at UNPAR and 2iE, and students at these universities take the courses to obtain credits. We are continuing to develop both shared lecture and management courses to further establish StraSS Leader courses in each affiliate university. The unit education program mentioned above is part of our objective of establishing StraSS-compatible programs in each affiliate university.

An enhanced system of shared courses will enable students to take StraSS Leader Course education programs at affiliate universities. We expect the establishment of a StraSS Leader approval system to be the first activity of the StraSS Alliance academic committee when the StraSS Alliance formally becomes active. Under this system any student at any StraSS affiliate university will be able to obtain StraSS Leader certification. This will be an international certification with the signatures from representatives of all StraSS affiliate universities.

Each StraSS affiliate university has its own network of universities, local government departments, research institutions, companies, and NGOs in its region. StraSS affiliate universities are expected to be hub universities for sharing StraSS program activities within their own networks. These regional networks are also expected to construct StraSS compatible programs from the institutional resources of the local networks. For example, since its establishment by 24 Francophone African countries, 2iE has grown into a hub institution on water and environmental engineering, successfully attracting excellent staff and students from many of these 24 founding countries. As a result, 2iE is now able to provide many appealing courses to its collaborators through the Internet. Therefore, 2iE is expected to provide StraSS program courses to its own university network as well. HU-CENSUS also shares its courses within its network of Japanese universities. From 2012, Hokkaido University, the University of Tokyo and Yokohama National University have shared field-training programs. Furthermore, in 2010 NCKU started its Master's program in Sustainable Development Practice (MDP), now known as Certificate Program in Sustainable Development (CPSD). This diploma program combines NCKU's own educational resources with HU-CENSUS ECOSUS field-training program. We will continue to work towards establishing an international approval system for our StraSS Leader program and other compatible courses at affiliate universities under the StraSS alliance umbrella hereafter.

9. Acknowledgement

This work is supported by the Strategic Funds for the Promotion of Science and Technology of The Ministry of Education, Culture, Sport, Science and Technology Japan.

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