Book of Abstracts

ISCN 2018

Sustainable Development:
Acting with Purpose

ISCN 2018
June 11-13, 2018
KTH Royal Institute of Technology
Stockholm, Sweden
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This year, we had an open call for abstracts for presentations at the conference. Each abstract was peer reviewed and assigned to different presentation formats.

165 abstracts were submitted
123 abstracts will be presented
by 66 different schools
in 31 different countries
Day 1 | 11 June 2018
Aalto University

What do our students know about sustainable development and how to assess it?

Meeri Karvinen, Thomas S. Grindsted, John Hermansen, Anne Keränen

Description:

Many suggestions exists on the sustainability competences universities should teach and the methods, which should be used to educate future game changers. However, research is scarce on how to assess the conceptions of students on sustainability: what the students know about global sustainability challenges, how do they define sustainability, are they promoting sustainable lifestyles, and are they willing to promote sustainability in their careers? Moreover, generic competences, into which sustainability-related competences can be included, are hardly measurable with grades and tests, since they relate to personal growth as much as to acquired knowledge. Instead, multiple methods are needed to gain comprehensive picture on students' sustainability conceptions. This project 1) studies the sustainability conceptions of Nordic students, and 2) discusses two assessment methods: The Nordic students' sustainability literacy is assessed using an online Sustainability Literacy Test (the Sulitest), and a deeper comprehension about students' sustainability conceptions is gained through interviewing 30 master's level students. The results improve our understanding on what and how we should teach in a region, which is internationally renowned very sustainable, and gives valuable information on different assessment methods.


Contact:

Meeri Karvinen, Doctoral candidate
meeri.karvinen@aalto.fi
Chalmers University of Technology

Integrating sustainable development in engineering education- Comparison of change processes and results at two higher education institutions

Ulrika Lundqvist and Emma Strömberg

Description:

Chalmers University of Technology and the Royal Institute of Technology (KTH) in Sweden have worked separately for several years to promote integration of sustainable development in their engineering educations. In this paper, we compare the change processes and results at these two higher education institutions in order to learn for continued and future curricula development. The objectives are to describe relevant parts of the change processes and results, identify similarities and differences, and discuss success factors and challenges. The comparison is based on the Deming cycle: - Plan: Goals of the change process. - Do: How the change has been implemented. - Check: How the results have been evaluated, as well as examples of results. - Act: Challenges identified and continued work. Several similarities in the implementation of the change have been identified. Some success factors are: clear objectives that are rooted in management, centrally organized support for study programme directors and teachers, and continuous follow-up to highlight successes and challenges. The higher education institutions have identified similar challenges to continue to act on, for example, the integration of the social dimension of sustainable development as well as progression from the basic to the advanced level.

http://www.chalmers.se/sv/konferens/utvecklingskonferensen2017/Sidor/Program.aspx

Contact:

Ulrika Lundqvist, PhD
ulrika.lundqvist@chalmers.se
École Polytechnique Fédérale de Lausanne (EPFL)

Act for Change, a Challenge to experiment a more sustainable lifestyle on EPFL campus

Aurore Nembrini

Description:

EPFL launched Act for Change in November 2015. This program invites the community to experiment a more sustainable lifestyle on our campus. This strategic project aimed at anchoring sustainability at the heart of EPFL’s culture and exemplarity. Act for Change is a 3-week team challenge aimed at changing one’s habits. Through an online platform and a smartphone app, participants can choose simple and concrete actions they want to carry out. For example, bike to work or eat a vegetarian meal with colleagues. Since 2015, two challenges have been organized for our students and two other for our employees. Between 560 and 750 people took part each challenge, representing 10% of the targeted community each time. Another goal is to promote the exchange of ideas around sustainability. During the challenges, participants suggest dozens of actions on the platform. The best of them are selected and carried out on campus. These include the introduction of reusable dishes for take-away food or an event at the end of each year to express our gratefulness to those who keep our premises clean. This presentation would provide an opportunity for us to share the key factors for success and lessons learned from such an initiative.

Contact:

Aurore Nembrini, Sustainability Manager

aurore.nembrini@epfl.ch
Environmental Management on a distance

Ullika Lundgren

Description:

Environmental Management on a distance - A web-based action-learning project between Latin American and European universities. Environmental management at universities aims to reduce universities' environmental impact and to integrate sustainability systematically into their activities. The University of Gothenburg works according to ISO 14001 and EMAS since 2006. In a joint project with Columbus Association on sustainable development at higher education institutions, we developed a web-based action-learning project with 15 universities in Europe and Latin America in order to implement environmental management and address sustainability issues at campus, in research and in teaching. All institutions participated with a trans-disciplinary team in order to increase collaboration between different functions within the universities. The project ran for 18 months. 16 webinars were performed and the project revealed extensive knowledge and commitment among teachers and staff regarding environmental and sustainability issues. In addition to the execution of concrete projects on campus, several participants expressed the positive outcome of sharing experiences with peers and having developed a network of practitioners for sustainable development at universities. This method for experience-sharing, action and learning addressing environmental management and campus sustainability allowed 15 participants across the world to simultaneously take part in web-sessions without any travelling or costs.

Contact:

Ullika Lundgren, Sustainability Controller
ullika@gu.se
Keele University

Listening for Sustainability: Creating conversations for change

Dr Zoe Robinson Christa Appleton

Description:

There are many examples which demonstrate our lack of willingness to listen to others with different perspectives to our own, but also examples of when listening has led to the avoidance of conflict and to greater understanding. In the majority of disciplines in higher education there is an implicit assumption that "communication skills' means speaking, with a focus on developing skills in presenting to large audiences, or oral debates and "winning' arguments. Other than for professional practice there is rarely much acknowledgement of the need for the development of skills relating to one-to-one communication despite the crucial role this plays in our personal and professional lives. Goal 17 of the Sustainable Development Goals focuses on "Partnerships', and we know that inter- or trans-disciplinary working is essential to tackling the UN's Sustainable Development Goals. Yet partnership and transdisciplinary working can only happen with effective communication and respect for other viewpoints, established through listening; skillsets which see little specific development in our traditional disciplinarily siloed education system. This session explores the role of listening for sustainability and the different ways that transdisciplinary conversations for sustainability can be created in the university environment.

Contact:

Zoe Robinson, Director of Education for Sustainability
z.p.robinson@keele.ac.uk
KTH Royal Institute of Technology

**Continuity, flexibility and accessibility of living labs through Virtual Reality**

Liridon Sopjani, Andrea de Giorgio

**Description:**

Digitalization and data-driven science will drive innovation processes which will enable design and development of new technologies, products, and services in time and resource efficient manner. Virtual reality (VR) as a tool in interdisciplinary research can be used to explore and understand phenomena by bringing new layers to the scientific method. Scientific data visualization and virtualization of research projects and experiments enable us to explore socio-technical systems complexity both in depth and in a more volumetric way. Such systems are becoming more connected and dependent on each other (e.g. energy systems, transport systems, production systems, etc.) which today are only being explored through living labs which are limited in their physical design and learning mechanisms. In fact, they mainly focus on the involvement of stakeholders and learning about technology, whose lifespan is typical of time-limited projects. In order to ensure continuity, flexibility and accessibility of living labs, serving as foundational structures for continuous research and development, a VR layer can be added. A group of Ph.D. students at KTH is designing and developing the Virtual City Platform with the goal of doing research, education and scientific divulgation using VR as a means to exploit the digitalization of KTH.

**Contact:**

Elena Malakhatka, PhD Candidate
elenama@kth.se
KTH Royal Institute of Technology, Sustainable Development Environmental Science and Engineering (SEED)

A showcase of indoor urban farming at KTH

Annika Carlsson-Kanyama Magnus Svensson Fredrik Göndahl

Description:

A showcase of indoor urban farming at KTH Indoor urban agriculture permits cultivation of products such as vegetables, fish and algae throughout the year thus offering a fresh and local supply of certain foods to urban residents. Such cultivation requires efficient use and reuse of water and energy as well as smart and attractive solutions for use of built up spaces and places such as roofs, walls and basements. At KTH, the potential for constructing a greenhouse within the campus where techniques for efficient indoor urban farming will be demonstrated has been investigated by students from energy technology and architecture during the past years together with discussions among the staff at SEED. The result is a proposal for a greenhouse of about 50 m² built at a central location at KTH with a wooden frame where techniques such as aquaponics and vertical farming will be demonstrated and a building permit has been applied for. Several challenges have been encountered in this process related to legislation, the internal organization structure at KTH and finance, which have been partly solved. This presentation describes the process of developing the idea for a showcase of indoor urban farming at KTH and discusses the challenges encountered.

Contact:

Fredrik Göndahl, Head of Department
fgro@kth.se
KTH Royal Institute of Technology

Bottom-up integration of sustainable development in engineering educations

Anders Rosén & Emma Strömberg

Description:

In the development plan for 2018-2023 of the KTH Royal Institute of Technology, it is explicitly stated that the sustainability perspective must be integrated and clearly progressed in the study programmes. Sustainable development is however a complex concept which still is considered vague and difficult to understand by many teachers. This paper presents a taxonomy of so called Sustainable Development Integration Indicators which can be used as a framework for supporting bottom-up integration of sustainable development in engineering educations. The application of the framework is demonstrated when analysing and characterizing the level of integration of sustainable development in a number of individual courses and the related progression through a Master of Science program at KTH which has been used as a case study. The presented framework is concluded to be a practical tool which can develop teachers’ understanding and engagement and facilitate collegial discussion and collaboration on enhanced integration of sustainable development in educations. The results of such processes can also be used in evaluation and quality assurance of courses and study programs.

Contact:

Anders Rosén, Associate Professor
aro@kth.se
Environmental Management as a tool for sustainability in Higher Education Institutions (HEI).

Kristina von Oelreich, Sustainability Manager, KTH, Ullika Lundgren, Environmental Coordinator, University of Gothenburg

Description:

Environmental Management as a tool for sustainability in Higher Education Institutions (HEI). Environmental Management System at HEI enables a systematic managerial approach of sustainability in all its dimensions. The purpose is to work with continual improvements supporting the Sustainable Development Goals (SDG). Environmental management does not only require taking into account direct and indirect environmental impact but also to consider stakeholder requirements and legal requirements, risks and opportunities, life cycle perspective and management responsibilities. In this example we show how procurement and sustainability in education is managed through the EMS at two different universities, KTH and GU. According to the Environmental Management Regulation state authorities shall determine its environmental requirement for the procurement of products and services, as appropriate. KTH has developed procedures for integrating the sustainability requirements into the procurement, prioritized according to the University sustainability goals. In the context of its environmental management system, KTH has also analyzed the procurement process and how sustainability requirements are taken into account throughout the different steps in the process. In order to promote sustainability according to the Higher Education Act the University of Gothenburg has developed criteria for sustainability labelling of courses and programs. The University also offers teacher training through a toolbox for sustainability, developed specifically at each faculty.

Contact:

Kristina von Oelreich, Sustainability Manager
krvo.kth.se
KTH Royal Institute of Technology

KTH Campus Plan 2018-2023

Sara Eriksson, Ingela Wettermark

Description:

The campus plan for KTH’s five campuses in Stockholm is based on KTH’s development plan, KTH’s sustainability objectives, property owner Akademiska Hus’s sustainability model and UN’s Global Sustainability Goals.

The Campus Plan is a strategic planning tool, but also includes concrete activities and follow-up goals.

Together with our property owner Akademiska Hus, we have worked to establish a broad foundation. For example, a signboard was placed on campus where students could express their ideas for development. A number of inclusive workshops have been held with representatives from property owners, municipalities, county administrative boards and other stakeholders as well as students, researchers and administrative staff.

Integration in the city is an important issue in all our five campuses, and the sustainability perspective will pervade all the issues. After major construction projects are completed, there is also a need to activate the spaces, find places for temporary placemaking, and to find areas for makerspaces, so that students can manually test and build. We will also continue to work for the campus to act as a living lab.

Contact:

Sara Eriksson, Project Manager
saerik@kth.se
KTH Royal Institute of Technology

**KTH Global Development Hub**

Ramon A Wyss; Margareta E B Norell Bergendahl

**Description:**

The opportunity to turn SDG challenges into actionable tasks through Challenge Driven Education has been the driving force for KTH to develop the Global Development Hub – with the purpose to provide our graduates with the skills to act on transitions towards a sustainable society. To achieve these goals, KTH GDH has established partnerships with at present five universities in sub-Saharan Africa. Students and teachers work in joint teams with students and teachers from KTH on real-world challenges in a mutual learning setting with specified relation to one or several of the SGDs.

Our new partnership model for mutual innovation capacity towards the SDG is built on three pillars:

- Mutual interaction and learning with external stakeholders to formulate local societal challenges related to the sustainable development goals.
- Turning challenges into actionable tasks where multi-disciplinary teams of students from KTH with students from the local partner university develop proposals for solutions as part of the regular education program.
- Teacher training and pedagogical development is key – the role for the academic teacher in the challenge driven education setting has to be specifically considered, the role going from lecturing to coaching.

**Contact:**

Margareta Norell Bergendahl  
[maggan@kth.se](mailto:maggan@kth.se)

Ramon Wyss  
[wyss@kth.se](mailto:wyss@kth.se)
Kyoto University

Promoting an Asian model for campus sustainability

Jane Singer and Maki Ikegami

Description:

The green campus movement initially emerged at universities in North America and Europe in the late 20th century. Universities in Asia were slow to follow suit, although a few Asian university initiatives, like the GreenMetric World University Rankings initiated by the University of Indonesia in 2010, gained global attention. Some Asian universities have questioned the universal applicability of the Western model of campus sustainability, seeking a more contextualized approach exemplified by a campus assessment platform created in Japan and burgeoning national and regional university networks. Many universities in Asian developing nations previously considered campus sustainability the prerogative of elite, well-endowed Western universities, but this is now changing. Increasingly green campus approaches are viewed as a means of overcoming constrained financial, administrative and faculty resources and limited sustainability education in primary and secondary schools by fostering development of green technologies and student-led initiatives on campus and greater campus-community collaboration to tackle issues like waste management, sustainable agriculture and climate change adaptation. The presentation will introduce examples of unique Asian university achievements and a collaborative effort between Kyoto University and universities in central Vietnam to further campus sustainability.

Contact:

Jane Singer, Associate Professor
singer.jane.6e@kyoto-u.ac.jp
Massachusetts Institute of Technology (MIT)

Living Lab Immersion

Paul Wolff

Description:

As students and faculty become more adept at navigating in digital environments and engaging with online content, opportunities are emerging to explore and test strategies for deeper learning. This paper rethinks the traditional case study approach to include, text, images, games, sounds, comics, animations, videos, artwork and other interactive, multimedia experiences. The goal is to create something new that is part film documentary, part web app and part academic paper that encourages engagement of participants in today's visually oriented culture. The author proposes to create a Living Lab Immersion Case Study that will explain the characteristics of MIT's emerging frameworks through real-world story of the Solar Test Bed, a Living Laboratory that seeks to provide a connection between the precedent-setting, 60 megawatt Summit Farms PPA project, to existing labs and centers studying and researching solar technology with the campus commitment to mitigate GHG emissions on-site. The case study will include documentation of the construction process of the 600-acre farm, illustrate the complexity of the data provisioning process (5000+ data points) and describe the ongoing collaboration with researchers seeking to advance the solar technology industry and the aspiration to become the pre-eminent outdoor solar testing site for the Northeast Region.

Contact:

Paul Wolff, Living Lab Design and Strategic Engagement Manager
peripherypauljoon@gmail.com
Mount Kenya University

Promoting education for sustainable development: the role of technology in supporting the development of graduate employability

Pamela Ocheng

Description:
The purpose of the study was to assess the role of technology in supporting the development of graduate employability. Graduate employability is becoming increasingly important in policy and strategy across the Higher Education (HE) and skills sectors. Qualifications are increasingly seen as a stepping stone to employment. There is evidence of an ‘employability gap’ in the skills that graduates are starting with on day one of employment and the skills that employers are expecting from them. The research question was; what is the role of technology in supporting the development of graduate employability in Kenya. The study utilized an eclectic approach with a focus on concurrent triangulation design. The sample comprised two universities in Kenya. The study participants comprised six deans of schools, twelve heads of sections and 200 students. The study found that institutions are using technologies in five key ways to support development of graduate employability providing significant benefits to graduates, employers and institutions. The study findings are significant to educators, policy developers and policy implementers with regard to promoting education for sustainable development in Kenya, Africa and worldwide.

Contact:
Pamela Ochieng, Associate Professor
pochieng@mku.ac.ke
Nanyang Technological University

**Sustainable campus operation through Mobility-as-a-Service (MaaS) Testbed and Research**

Jin Zhanhe Ryan

**Description:**

Transportation plays a key role in our daily life. General public perception of freedom of mobility has been around ownership of private cars, resulting to traffic congestion and air pollution in many cities. In addition, with increasing demands for personalized transportation services, the traditional transport services providers are not able to cater to these demands.

The Jalan app is an integrated Mobility-as-a-Service (MaaS) solution based on concept developed by NTU, JTC and SMRT, to improve users' commute experience by seamlessly integrating public and private transport services with next-generation transport modes, including autonomous vehicles, on-demand ride sharing and Personal Mobility Devices sharing.

Using NTU as a living lab, the Jalan app allow users to select a list of transport options available on NTU campus based on preference such as cost, time, transport modes or carbon footprint. The app will also crowd-sourced data for transportation modelling, smoothening of peak demand and predictive scheduling to improve NTU campus operation and achieving NTU’s vision of a car-lite campus.

**Contact:**

Zhanhe Ryan Jin, Project Manager  
[najat_mohd@yahoo.com](mailto:najat_mohd@yahoo.com)
Universities, Research and sustainability in Mexico.

Alberto Ken Oyama, Institutional Development Secretary Universidad Nacional Autónoma de México. Ayari Pasquier, Assistant of Institutional Development Secretary, Universidad Nacional Autónoma de México

Description:

Universities are key spaces for the development of scientific knowledge and independent thinking, both of which are fundamental conditions to understand the challenges that face the planet in terms of sustainability, propose solutions and analyze their applicability, thus contributing to the construction of a more sustainable future.

This paper looks at the ongoing incorporation of sustainability in the research agenda of the National Autonomous University of Mexico (UNAM), the main public university in the country and one of the most important universities in Latin America.

UNAM currently has 58 institutes, centers and specialized research programs, whose academics –40,184 at the present– published more than 85,000 texts (WOS, 2018) and developed 253 patents (Scopus, 2018) in the past 30 years. This paper looks at the incorporation of sustainability in research at the university over the last 10 years. The study recognizes the quantitative increase in research projects and publications related to the topic and analyzes the developments in predominant disciplines, approaches and methodologies. It also discusses the national and international exchange networks of researchers and the institutional support that have allowed this development. Finally, it presents a critical balance of this process and its main challenges and areas of opportunity for the future.

Contact:

Ayari Pasquier, Assistant of Institutional Development Secretary
ayaripasquier@gmail.com
National University of Singapore

sustainABLE NUS Showcase - Education, research, engagement and partnerships for a greener campus and beyond

Wei Xuan YEH
Presenter: Amy Ho

Description:

In Singapore, the sustainable development agenda is guided by the Sustainable Singapore Blueprint for a more liveable and sustainable country. In support of the Sustainable Singapore Blueprint, NUS organised the sustainABLE NUS Showcase in August 2017 - an inaugural event highlighting actions that the University is taking to transform NUS into a greener campus. The Showcase was an opportunity for NUS offices, faculties, research institutes and student groups to work together to showcase NUS’ efforts in operations, research and education to meet sustainability challenges of today and the future. Partners for the Showcase also included key government and community agencies leading Singapore’s sustainable development efforts. Held at University Town from 29 to 30 August 2017, the Showcase was in line with the NUS Sustainability Strategic Plan 2017 - 2020. Featuring a total of 28 booths involving NUS offices, faculties, research institutes and student groups, as well as relevant government agencies, the Showcase reached out to approximately 10,000 students and staff. The event's opening ceremony was graced by Minister for the Environment and Water Resources, Mr Masagos Zulkifli.

Contact:

Wei Xuan Yeh, Manager (Communications and Outreach), Office of Environmental Sustainability
weixuan@nus.edu.sg
Politecnico di Torino

A Self Tailor-Made Sustainability Communication Strategy

Giulia Sonetti, Paolo Tamborrini, Andrea di Salvo

Description:

The Politecnico di Torino (PoliTO) Green Team conducts an extensive programme of environmental and energy actions, but it hasn’t had a great deal of success in engaging students and staff over its first year of activity. This case study shows the result of the prosumer strategy put in place by the Green Team with its communication manager in the co-creation of a student engagement campaign via in-house resources at PoliTO. Students and professors at the “Communication Design Course” have been asked to create a joined-up vision for future sustainability and energy communications at PoliTO contributing to take ownership of the campus, encouraging environmentally / energy responsible behaviors in order to reduce energy and resources consumption whilst highlighting the power of the single action in the overall impact.

The project outputs have highlighted a lot of learning outcomes, while the availability of ‘green’ campus facilities – bike storage, water fountains, a permanent “critical mass” of campus experience – could eventually be translated in a more solid community, making easier to leverage on single’s action for improving the PoliTO’s environmental performance.

Contact:

Giulia Sonetti, Research Fellow
giulia.sonetti@polito.it
Portland State University, Institute for Sustainable Solutions

Building Powerful partnerships: Lessons from Portland’s Climate Action Collaborative

Jennifer Allen, Fletcher Beaudoin, Beth Gilden

Description:

There is growing interest in understanding how partnerships between universities and community partners can help address the wicked challenges facing the world today. Such partnerships represent a shift from universities as ivory towers, where knowledge is pursued without reference to how it relates to “real world” problems, toward a focus on “use-inspired” research and engaged scholarship. As institutions of higher education seek greater relevance in the 21st century, many are exploring how to build mutually beneficial relationships with community partners. At the same time, urban communities face increasingly complex challenges, ranging from climate change adaptation to housing affordability; addressing such issues requires both better information and more effective integration across agencies than currently exist. Developing mutually beneficial collaborations between institutions of higher education and community partners that go beyond a project-by-project focus and bridge organizational boundaries and cultures represents an emerging area for innovation and experimentation.


Contact:

Fletcher Beaudoin, Assistant Director
beaudoin@pdx.edu
Swiss Federal Institute of Technology in Lausanne (EPFL)

**EPFL Mobility Plan**

Luca Fontana

**Description:**

About 18,000 people commute daily to the EPFL campus. To guarantee long-term accessibility to the University and limit its environmental impact, EPFL has put in place a Mobility Plan both ambitious and innovative. Feedback over 15 years between infrastructure improvements, community awareness-raising and implementation of innovative projects. Since 2003, the share of individual motorized transport has fallen from 34% to 20% in favor of public transport (+5%) and soft mobility (+9%). An evolution made possible by a proactive parking policy and a parallel strengthening of cycling and public transport infrastructure. Incentives and awareness-raising campaigns have contributed significantly to this transition. Mindful that a revolution in mobility is taking shape, EPFL is experimenting future mobility, for instance with driverless autonomous shuttles, as well as the first self-service bikes and cargobikes system in Switzerland. The Mobility Plan also aims at controlling business mobility by air that generates 1/3 of the University's CO2 emissions. The Presidency has decided to reduce and compensate these through a procedure agreed upon with academia. Promoting videoconferences will be an essential element of the action plan. Controlling commuting and professional mobility is an integral part of EPFL's sustainability strategy that aims at instituting a carbon-neutral campus by 2020.

**Contact:**

Luca Fontana, Sustainable Mobility Manager

[luca.fontana@epfl.ch](mailto:luca.fontana@epfl.ch)
Thammasat University

Thammasat @ Rangsit Campus: A Leading Model of Smart Campus - Smart Travelling

Chanan Phonprapai and Prinya Thewanarumitkul

Description:

Last year, Thammasat University presented the successful attempt about Solar Electric Vehicle, one of the “Climate Action” program. This program was done in parallel with promoting awareness of university members including visitors about energy saving and alternative way of energy consumption. This year, the focus is on CO2 reduction by addressing the environmental pollution generated from motorcycles taxis. They are a popular mode of transportation because they are fast, affordable, and can avoid the heavy traffic, but are much less safe and generate a lot of pollution. Thammasat has improved motorcycle taxis with “SMART MODEL” which consists of two implementations. The first is “Smart Meter”, based on Internet of Things and runs by smartphone application. Registered riders will have their QR codes on the back of their jackets, where customers will use their smartphone to scan these codes to activate the meter. Smart Meter will record the data of registered rider and calculate the service fee of each trip based on actual distance using Global Positioning System. The second is “Electric Bike”, the electric motorcycles. It is arranged and serviced by private operators who also provide battery charging stations from solar energy, and will charge appropriate fees to the riders. Speed of the Electric Bike will be set and keep under control for safety. Therefore, electric bike is then safer and more environmental friendly.

Contact:

Chanan PHONPRAPAI, Assistant to the Rector for Rangsit Administration
chanan@tu.ac.th
Universität Hamburg

Rapid prototyping on peer-learning practitioners’ partnerships for sustainability between universities: The case of collaboration between TU Delft, MIT and Universität Hamburg


Description:

Within the context of open innovation, approaches such as design thinking and rapid prototyping are quite common. But applying these to inter-university collaborations is still in an infant stage. We propose to systematically set up multi-party peer-learning partnerships for sustainability at universities according to these approaches, thus applying latest insights from innovation research to foster sustainable development. In this paper an interdisciplinary conceptual framework on experiential peer-learning partnerships is introduced. Exemplifying a rapid prototyping process, the emerging collaborations between Green Office TU Delft, Sustainability Office Massachusetts Institute of Technology and Center for a Sustainable University (KNU) Universität Hamburg are described. All institutions briefly portrait their approach towards engaging with third parties and networks (such as ISCN; HOCHN), shed light on similarities and differences and outline their common challenges. Based on this, shared perspectives on how to address these challenges via peer-learning settings and design thinking techniques are presented. Main objectives of this paper are to report on designing and implementing mutual learning processes concerned with the implementation of sustainable development at universities, to contribute to its profound scientific conceptualization, and to discuss peer-coaching potentials in order to specify further research as well as practice on organizational development for sustainability.

Contact:

Claudia Thea Schmitt, Managing Director & Scientific Coordinator Center for a Sustainable University (KNU)
claudia.schmitt@uni-hamburg.de
University of Edinburgh

University Social Responsibility - Supporting Student Learning Through International Collaboration

Matthew Lawson (and partners from the European Students’ Sustainability Auditing Project)
Presenter: Michelle Brown

Description:

Climate change, human rights, supply chains and widening access to education are all critically important issues to universities across the world. These issues transcend the local and the global, and students are increasingly wanting opportunities to critically engage with them. The European Students Sustainability Auditing Project aims to promote a better understanding of university social responsibility through audits of participating institutions in Lithuania, Portugal and Scotland. By developing a set of open educational resources, the three-year Erasmus + funded project, will provide an experiential learning opportunity for a diverse range of students to audit institutions, whilst gaining academic credit. Students have undertaken audits of the University of Edinburgh and Kaunas University of Technology, using the Benchmark Standards for University Social Responsibility across the European Higher Education Area. Students going through a reflective learning experience are developing valuable skills, including critical thinking, intercultural communication and audit skills for future academic studies or employment. The learning experience empowers students to provide recommendations to institutions, as well as bringing back examples of best practice to their home universities. The presentation or session will be a catalyst for discussing opportunities to encourage international collaborations which support student learning on social responsibility.

Contact:

Matthew Lawson, Programme Manager
Matthew.Lawson@ed.ac.uk
University of Genoa

The University of Genoa Smart City Living Lab

Stefano Bracco, Federico Delfino, Paola Laiolo, Daniela Zucchiatti

Description:

The presentation will be focused on the “demonstration” activities carried out by the University of Genoa at Savona Campus facilities in order to implement the “Living Lab Smart City”, working in partnership with the Italian electric Distribution System Operator (DSO), ENEL S.p.A. The idea is to transform the Savona Campus in a Living Lab of the City of the Future, installing new technologies in ICT and energy sectors in order to show a real application of the Smart City concept to population and external stakeholders. This scientific cooperation is also aimed at testing the capability of the strategic Research Infrastructures (RIs) of the Campus, namely the Smart Polygeneration Microgrid and the Smart Energy Building (see “Energia 2020” project at www.energia2020.unige.it), to operate disconnected from the National Grid, relying only on the supply of renewables and storage systems. Moreover, the project includes remotely controlled LED lighting fixtures and an advanced charging system for electric vehicles, the so-called Vehicle-to-Grid (V2G), able to deliver power from the car batteries to the electrical network of the Campus. The Living Lab Smart City is an important action to reduce the carbon footprint of the Savona Campus and to increase the awareness of students, teachers and researchers towards Sustainable Development in Higher Education Institutes.

Contact:

Federico Delfino, Full Professor
federico.delfino@unige.it
Universidad de Guayaquil

Proyecto Delta

Héctor Danilo Hugo Ullauri, Felipe Espinoza Ordóñez, Galo Salcedo Rosales, Ivethyamel Morales Vergara

Description:

The University of Guayaquil, linked from its origins to the city that gave it its name, holds the title of most populated and densest in Ecuador, with a population of 75,000 people on a 22-hectare campus; it faces the challenge of revitalizing itself. Each part of the University has been thought with autonomy, without establishing concrete links with the others. It expands by its necessity and by parts in a city that does it in the same way. We detect, therefore, a virtual continuity, and not so much a real urban continuity, based on the continuity of the structure and the urban fabric. The Delta Project is connected through a common strategy with the built infrastructure of the city that houses it, and has the participation and acceptance of the community, and Local and National Authorities. Both from an urbanistic point of view and that of mobility, the aim is to promote the precise sequence of free spaces, ecological pedestrian corridors and university buildings that are articulated around the South-North spatial axis, through the intermodal use of land transport (transport Public and cycle paths) and Fluvial-Maritime (Public and Tourist Transport) generating sustainable mobility networks.

Contact:

Héctor Danilo Hugo Ullauri, Arquitecto
hector.hugou@ug.edu.ec
KTH, Energy Technology

KTH Live- In Lab - Testbeds for increased innovation

Jonas Anund Vogel, Per Lundqvist

Description:

KTH Live-In Lab is a platform handling multiple testbeds for research and development within the building and housing sectors. The multidisciplinary nature of buildings and the coming digitalization of the built environment is challenging for both the industry and academia. KTH Live-In Lab is designed to facilitate knowledge sharing between researchers and industry, facilitating contacts and helping arrange meetings between different research fields. KTH Live-In Lab stands on three legs: Research, Education, and Interaction with the society. By using KTH Live-In Lab in courses, students from different programs can contribute and collaborate to the evaluation and validation of research projects that are in progress. KTH Live-In Lab creates a natural point of direct contact between students and industry, which often is missing in today's educations. Many research groups and teachers are currently lacking data and research and teaching rely on simulations based on fabricated data sets to test and validate models or prototypes. KTH Live-In Lab will provide real time data to research groups that do not have access to data, and we also deliver the dynamics behind the data in order to correctly interpret the data, leading to results that are stronger and validated to a new level.

Contact:

Jonas Anund Vogel, Director KTH Live-In Lab
jonas.anund-vogel@energy.kth.se
Cyprus University of Technology

Taking a SUSTAINable shortcut

Dimitris Tsaltas, Andreas Dionysiou, Myria Astanioti, Alexandros Charalambides, Soteris Kalogirou & Marios Zervas

Description:

Cyprus University of Technology is a young university, therefore difficult to create critical mass and far more history, traditions and academic culture within and to the society. Important in this process and under current social and environmental requirements is the development of a sustainable, spiritually and socially open space, with high values and long-term vision. For this reason, a bottom up proposal led the University to bring on board an independent initiative of faculty and administrative staff developing a self-motivated group for sustainable education, research and development for the benefit of the University. The main goal of the Group is to consult the University towards sustainable growth, taking in consideration the SDGs in all relative aspects of academic and social presence of a university. The Group acts independently from the management and University bodies, in order to be flexible and operate productively with a bidirectional approach (bottom-up and top-down) supporting staff and students alike. Its immediate and direct responsiveness, acting as a reference center, as an initiative launchpad and a network hub for the field of Sustainability but not exclusively, actively supports the 17 SDGS of the United Nations. The Group’s flexible status assists in thinking, suggesting and acting at organizational, local or national matters and more importantly prepares students and its society with unique tools for holistic thinking, collectivity/cooperativeness and social solidarity towards a better tomorrow.

Contact:

Dimitris Tsaltas, Associate Professor
dimitris.tsaltas@cut.ac.cy; andreas.dionyssiou@cut.ac.cy
Harvard University

Living Labs for sustainability: Towards a learning system for University Campuses

Purcell, W.M.

Description:

Higher education institutions are "locally rooted and globally connected' with huge opportunities to make significant contributions to delivering against the Sustainable Development Goals (SDGs), working with their stakeholder communities and student/alumni body. Here we articulate the role of a university as the engine of transformational sustainability and the new order of social agreements required to sustain change. We explore a public university in the UK which adopted its route to sustainability as a means to secure institutional differentiation in a disrupted marketplace. This mission-led transformation became a source of inspiration for the transformation of business and civic society. In contrast, we examine a business sector-led sustainability-driven transformation working with a private university in the Republic of Bulgaria as a catalyst for sustainable economic regeneration and social innovation. Leadership and governance frameworks were observed to be central to the purposeful engagement needed to develop collaborative projects mapped to the benefit of the wider community. Projects were highly focused on stakeholder priorities where these aligned with delivering the academic enterprise mission of the university. In this way universities can maintain their full contribution to the SDGs in sustaining the economic, cultural and intellectual well-being of our communities and society at large.

Contact:

Wendy Purcell, Professor
wpurcell@hsph.harvard.edu
Macquarie University

Integrating the SDGs into universities

Leanne Denby

Description:

Knowing about the SDGs, and where to start or how to progress the SDGs at your university can feel worlds apart - but it doesn’t have to. There are numerous ways in which you can use the SDGs to progress sustainability, and implementation of the SDGs. This part presentation/part workshop will demonstrate how this has occurred at Macquarie University, while actively engaging participants in discussion and activity to determine opportunities within their own institutions.

Contact:

Leanne Denby, Director of Sustainability
leanne.denby@mq.edu.au
University of California, Berkeley

GLOBAL REFUGEES: Critical Issues and Relevance to Sustainable Development Goals

Khatharya Um

Description:

Of the 65.6 million of the forcibly displaced worldwide, 22.5 are recognized as refugees, and another 10 million as stateless individuals who have been denied a nationality and basic rights such as education, healthcare, employment and freedom of movement. Regarded simply as an object of rescue, refugees are often discussed in ahistorical and de-contextualized terms despite the fact that causes of forced migration are often deeply historicized and rooted in issues of inequity and exclusion, environmental degradation and other catalysts and forms of human insecurity. Both in terms of causes and consequences, the issue of forced displacement is integrally linked to concerns that are premises central to the UN Sustainable Development Goals. This session is a platform for dialogue about forced migration and SDGs, and about the roles and responsibilities of universities in promoting critical research, teaching, and public engagement that privilege and address the concerns, perspectives, epistemologies, and global imaginings of refugees, asylum seekers, and internally displaced and stateless human beings. The ultimate aim is to widen the circle of dialogue and trans-nationalize the critique, intellectual space, and network, dedicated to forging new and humane paradigms, dialogues, visuals and technologies that replace and reverse the dehumanization of refugees and embraces the SDG’s for an inclusive and sustainable future.

Contact:

Khatharya Um, PhD. Associate Professor and Coordinator, Asian American and Asian Diaspora Studies Faculty Academic Director, Berkeley Study Abroad Founding Member- Critical Refugee Studies Collective Affiliated Faculty- Global Studies; Center for Race and Gender; Center for Southeast Asian Studies University of California, Berkeley umk@berkeley.edu
POSTERS - Buildings

**POSTERS**

Posters will be on display June 12 and June 13.

**Buildings**

Keele University

**Communication of Sustainability through building infrastructure**

Zoe Robinson

**Description:**

There are many examples of (more) sustainable buildings being built on University campuses across the world, yet the extent to which the sustainable elements are communicated to the community that use these buildings is variable, and little is often done to explore how these buildings can be used as educational tools in themselves. Many sustainable features of a building are invisible to the user, and therefore there is a challenge in making the "invisible visible'. As Winter and Cotton (2012) claim, campus environment provides a "subject neutral' forum for users to learn about sustainability, able to counter Orr's (1993) claim that the campus environment itself is the "source of no useful learning", yet this potential has been little explored. This session seeks to explore with participants, examples of effective communication of "hidden' sustainability on the university campus and ways to make the "invisible visible' and use the campus as a further tool for education for sustainability.

**Contact:**

Zoe Robinson, Director of Education for Sustainability

z.p.robinson@keele.ac.uk
KTH Royal Institute of Technology

Creating change with seed funding

Karin Larsdotter, Göran Finnveden

Description:

Since 2011, researchers at KTH Royal Institute of Technology, have had the opportunity to apply for funding for projects related to research, education or collaboration that enhance sustainable development. The aim of the funding is to promote the testing of new ideas and create new collaborations. The criteria have changed slightly during the years but projects are usually required to be new initiatives, involve researchers from different disciplines and address the university’s sustainability objectives. Projects have typically received around 10,000 € in funding.

To date, more than 50 projects have been funded. Examples of activities are:

- Funding for transdisciplinary research projects leading to new research applications, e.g. the newly started research program Mistra Sustainable Consumption with a budget of 5 M€ which received funding for consortium building and writing of an application.
- Development of resources for teaching in sustainability within bachelor, master and doctoral programmes. E.g. a course in teaching for sustainable development, a web-based platform for university teachers with resources for teaching and course modules within sustainable development to integrate into different courses.
- Development of a multi- and transdisciplinary collaboration networks, seminars, and activities for students.
- Development of new collaboration projects within KTH leading to new research questions and interdisciplinary collaborations.

The bottom-up approach has proven successful. Taking advantage of the individual researcher’s drive and expertise has resulted in new collaborations, increased external funding for sustainability research and has led to new educational initiatives which have become permanent.

Contact:

Karin Larsdotter, Project Manager
karinlar@kth.se
Newcastle University

The Good, the Bad, and the Ugly: the Complexity of Sustainable Non-Domestic Buildings

Samantha Mitchell Finnigan

Description:

The built environment is an ongoing area of concern for sustainability researchers: office buildings in the UK, for example, consumed 23TWh of electricity in 2017 alone. There are under-explored opportunities in using technology to foster environmental sustainability in the context of buildings management. I present three case-studies in the area of technologies for managing the non-domestic built environment, developed with sustainability in mind: (i) how retrofittable sensor toolkits can augment and enhance existing processes of energy auditing in non-domestic buildings, the implications for future technology addressing this, and how novel technologies might be integrated into future standards; (ii) how environmental data can help office workers in shared open-plan workplaces negotiate their thermal comfort— an often contested and complained-about environmental factor which impacts productivity, wellbeing, and energy use; and (iii) how state-of-the-art smart buildings produce data which is utilised in their design evaluation, but does not take into account human factors— how the expertise of occupants is invaluable in creating quality spaces and ensuring their ongoing and sustainable use. This talk gives a view into my doctoral research, investigating how the deployment of such technologies can be leveraged in transforming data into decisions, problems into negotiations, and sensing into services.

Contact:

Samantha Mitchell Finnigan, PhD Student
s.j.finnigan@ncl.ac.uk
Princeton University

Accelerated collective impact through cross-network collaboration: the Ivy+ Sustainability and EVP Listening Post Pilot Initiative

Shana Weber, on behalf of the Ivy+ Sustainability Consortium and Princeton University

Description:

The Ivy+ Sustainability Consortium in North America is the only Ivy+ network with a strategic plan and pooled resources for organization of collaborative efforts. One of our strategic priorities is to leverage the expertise of our institutions to support executive-level leadership in sustainability across institutions, with accelerated collective impact as the desired outcome. Over the past year the Ivy+ Sustainability Consortium developed a pilot collaborative partnership with the Listening Post, a consortium of EVP-level administrators across a number of Ivy and non-Ivy institutions. The process leading to this pilot initiative, now in the early stages of priority project implementation across more than twenty institutions, was innovative and intended to collectively distill and implement priority and high-impact best practices, effectively share cutting edge research and implementation knowledge, and encourage parallel campus-as-living-lab efforts and shared results. If successful, this model is intended to be replicable for broader scale implementation. Princeton University played a key role in the development of this initiative, through both the Ivy+ and Listening Post consortia, and through this presentation will share the key potentially replicable process takeaways, priority projects underway, intended outcomes, and implications for other networks.

Contact:

Shana Weber, Director, Office of Sustainability
shanaw@princeton.edu
University of Oxford

Description:

The University of Oxford has a longstanding commitment to ensuring additions to its estate are as sustainable as possible. Since 2009 this has entailed a commitment that all projects over £1m will achieve BREEAM Excellent certification. The University has spent four years delivering a project to review that policy commitment, evaluate its impacts, analyse alternatives, develop a business case for a preferred option and steward the internal consultation and governance required to turn that proposal into a formal policy.

The outcome of the project is a completed Passivhaus certified building which is under ongoing performance analysis, a detailed design guide and a policy requirement (from February 2017) that ensures all future projects over £1m seek Passivhaus design advice from feasibility onwards. The University of Oxford is unique in the UK in this commitment and is undertaking a programme of engagement with other institutions and the wider construction industry to share this policy journey. The University has capital project expenditure of over £100m annually so the impact of this policy change is potentially very significant. The presentation would explore this policy journey, siting the evidence base and lessons learnt to help other institutions potentially replicate it and deliver emissions savings on their own estates.

www.admin.ox.ac.uk/estates/sustainability

Contact:

Tom Heel, Deputy Head of Environmental Sustainability
Estates Services | University of Oxford
tom.heel@admin.ox.ac.uk
University of Worcester

Towards a Sustainable University – Assess the effectiveness of www.susthingsout.com for embedding culture of sustainability within and beyond the institution.

Katy Boom, Sian Evans, Lorraine Weaver, Wendy Corbett

Description:

One of the University of Worcester’s core values is to promote sustainable development and active engagement with the community and fully accept our broad responsibilities to society. One way the University has chosen to help implement this is to develop a sustainability magazine website www.susthingsout.com its tag line is change today, protect tomorrow. It has an external facing side (as a publishing platform) and an internal learning side (VLE), which is private to the students and academics. Its impact is in linkages to sustainability projects (Academic, Social, Economic and Environmental) introduced into the curriculum by live internal and external events, student-led projects, talks, conferences, special features, guest contributors and case histories so students can see that we can change today to protect tomorrow.

The focus of this workshop is to look at how interactivity fosters deeper engagement and how this then facilitates learning – as a cross-university project there is scope for wide ranging benefits. We will be inviting participants to assist in assessing the effectiveness of www.susthingsout.com for embedding culture of sustainability within and beyond the institution. Inviting commentary on identifying potential methods to drive forward greater discourse and engagement with sustainability across students, staff, practitioners and the wider community.

Contact:

Katy Boom, Director of Sustainability
k.boom@worc.ac.uk
University of Worcester

Woo Bike share - demonstrating Collaboration between Campus, Community and Curriculum

Katy Boom; Andy Stevenson, Wendy Corbett

Description:

A student partnership at the centre of a project exploring the potential for a city-wide electric bike hire in Worcester UK, learning from successful European schemes. Two cohorts, Graphic Design and Environmental Science students worked on a 'live brief' with the City Administrations, Regional Funders and other key City stakeholders in support of active travel proposals. Local administrations support healthier and environmentally friendly travel choices not only for leisure, shopping, and for travel to work. This "live brief' covering one semester involved two sets of 3rd Year University of Worcester students, The University Sustainability department and Green Design tutor. The students worked in partnership between the two cohorts, the design students requiring the primary research from the environmental scientists, as well as working with the University Sustainability Department and other key City stakeholders. This demonstrates how students are working as change agents and as co-creators to improve their educational experience. Funding is secured, the student's work is incorporated, and a "24 hour Pressure Project' with a new cohort will provide additional graphic design support for project implementation. Once in the public domain, this work will be shared on the universities innovative website www.susthingsout.com, demonstrating Collaboration between Campus, Community and Curriculum.

Contact:

Katy Boom, Director of Sustainability
k.boom@worc.ac.uk
Urban Biodiversity Hub (UBHub)

Urban Biodiversity Hub: a new management tracker and resource database connecting cities, campuses, and researchers

Jennifer Rae Pierce

Description:

The Urban Biodiversity Hub (UBHub) is a new website that connects campuses and cities to one another and to urban biodiversity resources from around the world. It features a public searchable map of plans, reports, and other activities, as well as curated resource pages that compare the most useful tools. Its free member’s portal (myHub) allows for the creation and testing of biodiversity indicators and programs. UBHub serves two primary purposes: the first is to serve as a repository for urban biodiversity activities and resources, and the second is to aid campuses and cities in the creation and management of their chosen system for biodiversity planning, whether it be pre-existing or customized. We seek to promote biodiversity mainstreaming, link research and praxis, and improve biodiversity monitoring and measurement. UBHub is now developing a partnership with ISCN to assist universities that are putting together their biodiversity plans, to link urban biodiversity researchers to practitioners via UBHub’s forum, and to build city-university partnerships to apply urban biodiversity research with current needs. This session would explain the UBHub initiative and seek feedback from ISCN's members about how they would like to be involved and what resources would be most helpful to them.

Contact:

Jennifer Pierce, Head of Partnerships and Engagement
ubhub.org@gmail.com
Aalto University, Sustainability Hub and School of Engineering

**Nordic City Challenge – a collaborative course creating sustainable urban environments and building students’ international relationships**

Meri Löyttyniemi and researcher, doctoral candidate Katri-Liisa Pulkkinen, Aalto School of Engineering, Department of Built Environment

**Description:**

Nordic City Challenge brings together 20-25 talented students from the Nordic countries into an innovative and multidisciplinary three-day intensive 3 ECTS course around sustainable urban planning. It is an example of fruitful interaction between academics and sustainability office, with a larger societal impact. These real-life case challenges have been agreed by Nordic universities and cities as local stakeholders. Nordic Sustainable Campus Network and Hanaholmen, a cultural centre for Sweden and Finland initiated the project in 2014 and it has gained funding until 2018 from Nordic Council of Ministers and university partners.

This annual course connects master-level students from Iceland, Norway, Denmark, Finland and Sweden to work together on a real-life planning case, taking on the challenge of developing sustainable cities. Students’ backgrounds are from planning, architecture, landscape architecture, geography, natural sciences, arts management, social sciences and business.

**Locations of Nordic City Challenge -courses:**

- 2015 case Otaniemi peninsula and city of Espoo, waterfront walk way, Finland
- 2016 case Lindholmen area, Älvstaden close to the seashore in Gothenburg, Sweden
- 2017 case Pasila area, sustainability and art&desing in city planning, Helsinki, Finland
- Autumn 2018 Copenhagen, Denmark

The presentation will explain the projects’ and student’s learning outcomes and sustainability implications.


**Contact:**

Meri Löyttyniemi, Senior advisor for sustainability, chair and founder of Nordic Sustainable Campus Network  
meri.loyttyniemi@aalto.fi
Abdullah Gül University

You(th) think Sustainable: Abdullah Gul University (AGU), Youth Work Research and Application Center

Zeynep Tuğçe Çiftçibaşı Güç, Coordinator, AGU Youth Work Research and Application Center & Çağlar Yenilmez, AGU Youth Work Research and Application Center & Nigmet UZAL, Assoc. Prof., Civil Engineering Departhment Abdullah Gul University

Description:

AGU is a state university in Turkey, puts youth in the core of its design. Youth Work Research and Application Center, known as Youth Factory established and officially recognized by the Higher Education Council. This structure aims not only to serve to the students of AGU but also to the young people at local, national and international fields. Youth Factory, as a learner focused structure, trains the youngsters, develops the survival skills of youngsters, develops international vision of the youth, prompts youngsters to be creative and entrepreneur, encourages youth to be active citizens in the society, tries to harness the power of collective knowledge. We aim to ensure the long term sustainable campus development through our partnerships via municipality and various leading NGOs not only local level but also national and international. Such as taking part in ASHOKA Changemaker U initiative, being a member of UN Sustainable Development Solutions Network (UNSDSN) Youth, etc. AGU is also takes part in Social Economy Entrepreneurship Development Skills (SEEDS II) is a Capacity Building project to contribute to the development of the social economy and social entrepreneurship practice in the non-governmental sector, as an instrument for achieving financial self-sustainability and organizational development within the framework of the European Commission’s Erasmus + Program.

In 2016-2017 academic year we worked with 20 residential halls in 5 Universities, recruited 80 SEALs and saved more than 518 tonnes of CO2e.

Contact:

Nigmet Uzal, Faculty
nigmet.uzal@agu.edu.tr
Chalmers University of Technology

Integration of ethics in engineering education: Results and experiences from a change project

Ulrika Lundqvist and Karl de Fine Licht

Description:

Engineers' have a major influence on society as a whole and ethical competence can contribute to increased moral responsibility and promote sustainable development. Competence in ethics is also a requirement in the Swedish System of Qualifications. A two-year long project started at Chalmers University of Technology in the fall of 2016 with the aim to integrate ethics in all study-programs, with relevant content for each specific program. To the project, a doctor in Practical Philosophy was employed to support program directors and teachers, with the aim to secure good quality. His duties include conducting seminars, workshops, and providing individual coaching. In this paper, results and experiences from this project are shared, both concerning the change process as well as program and course design, with the aim to inspire and facilitate the integration of ethics into engineering education at other universities. The project has been successful, and a majority of the study programs have integrated ethics. A remaining challenge is for some teachers to gain confidence in teaching ethics by themselves instead of having a guest teacher, since there is a shortage of teachers at Chalmers who have a solid base in ethics.

Contact:

Ulrika Lundqvist, PhD
ulrika.lundqvist@chalmers.se
Gothenburg University

Brand New ESD master’s programme at the University of Gothenburg

Helena Pedersen, Kassahun Weldemariam

Description:

Brand New ESD master’s programme at the University of Gothenburg. In this session we will introduce a pioneering and interdisciplinary programme on ESD in Swedish higher education. It is developed and coordinated by the Department of Pedagogical, Curricular and Professional Studies at the Faculty of Education, University of Gothenburg. The programme is research based, 100% web based and it is jointly offered by four departments at the University of Gothenburg and Chalmers University of Technology. This cross-faculty endeavor is made given the wicked and complex nature of sustainability challenges and the inevitable necessity of co-production of knowledge from various disciplines. The programme is anticipated to be exemplary in terms of resource intensiveness: zero ecological footprint, no/less paper consumption, less costly and time conscious. The presentation addresses the whole process of the programme development, encountered challenges and lesson learnt during the process. However, since the programme is not yet effected, we are also interested in hearing comments from the audience. The first cohort of students will be admitted in autumn 2018.

Contact:

Kassahun Weldemariam, PhD Candidate
kassahun.weldemariam@gu.se
INPT

How to Make INPT a Local Focal Point for Mainstreaming Sustainability into the “Al Irfane” Campus Higher Education Strategies

Prof. Hicham Barakat, Prof. Mohamed Harrag Hala, Tachfine Louardi, Asmae Lesfari, Hicham Madjidi Abdoul Madjid A. Marboua Aubin Oullouk Fatima Ezzahra Ouafae Houssouf Oualloulou Anas Rais Fatima Fatima Ezzahra Rebii Alae Rawi Chaymae Samouche Marouane Souiba Hind Touhami Salma

Description:

A three-pillar blueprint that builds on the UN SDG number 4.7, and which constitutes the backbone of the National Sustainable Development Strategy should help mainstream sustainability across INPT and the Al Irfane campus:

- Student engagement: How students take up the role of change agents by advocating for and initiating sustainability projects;
- Partnership agreements: How stakeholder engagement impacts local and broader initiatives;
- INPT as a Living Lab: In-house sustainability education and R&D projects should lay the groundwork for piloting, outreach and knowledge sharing across campus.

This blueprint should broaden the scope of current sustainability initiatives while also reflecting the sustainable development commitments made by the government during COP22 in Marrakech.

Faculty, staff members, and students have unveiled a new plan that sets a twelve-year course for the school’s sustainability action. During this time, five wide-ranging “ambitions”, ten objectives and fifteen specific goals need to be attained. e.g.:

Ambition1: INPT should become carbon neutral by 2030, which fits in well with sustainability targets set by the government.

Objective: Student-led projects, such as drives to install more efficient LED bulbs in all dorms and solar-powered “smart” benches should make a difference.

Specific Goal: A decrease in greenhouse gas emissions by 5% compared to 2015 levels.

Contact:

Hicham Barakat, Professor
barakat@inpt.ac.ma
KTH, Dept. Sustainable Development, Environmental Science and Engineering

Integrating sustainability in research

Elisabeth Ekener, Anna Björklund, Göran Finnveden

Description:

In order to promote sustainable development, sustainability needs to be integrated in many research environments at universities, which are not traditionally focused on sustainability. In this paper, a case study on a research environment in Transport/Digitization - ITRL (Integrated Transport Research Laboratory) is presented. The aim is to find ways to assess the sustainability consequences of ITRL activities and to find new activities sprung from sustainability needs. The starting point is a project resulting in a framework for strategic sustainability assessment, specifically adapted to innovation environments. It comprises tools for working on sustainability at three levels; awareness raising; identification of the strengths and weaknesses; proactively identifying opportunities and risks, using scenario methodology. This framework is compared to similar existing frameworks; what are their purposes, what sustainability aspects do they cover, how do they involve actors, what is the processes to identify and prioritize sustainability aspects, and how do they deal with uncertainty about the future? The next step is to improve the existing framework based on this result, and adapt it to ITRL specific needs. The outcome is intended to be used at ITRL, but also to be easily adapted to be applied in other research clusters.

Contact:

Elisabeth Ekener, Researcher
eep@kth.se
KTH, Department of Urban Planning and Environment

Promoting social change and sustainability through course design

Malin Hansen, Åsa Callmer

Description:

This study is trying to address the question concerning the possibility of promoting social change and sustainable development through course design. Education for sustainable development is important in relation to the needed transition towards a more sustainable society. More importantly, we need to incorporate different forms of pedagogies and teachings activities with the potential of contributing to this transition into all forms of education. This study focuses on presenting experience from an attempt to incorporate different elements of pedagogics and teaching activities aiming at promoting a sense of hope, more profound change of mindsets and action-taking. Elements that could be implemented not only within education for sustainable development but into many different curriculum areas. The study focuses on the course “Political Economy for Environmental Planners” (AG2142, 7.5 hp), given as an elective course on master degree level. Methods for collecting data primarily consist of action research, course evaluations and a focus groups interview. The results indicate that the course design: promoted and enhanced the students’ awareness and thinking of sustainability; enhanced the students’ personal commitment and action taking in relation to sustainability; and increased the students’ hope concerning the possibility of creating an alternative, more sustainable future.

Contact:

Malin Hansen, PhD student
malin.hansen@abe.kth.se
Massachusetts Institute of Technology (MIT)

Pathways to Sustainability Leadership at MIT

Julie Newman

Description:

Given the interacting and evolving nature of sustainability challenges, and the technological, organizational, and political strategies needed to address them, MIT set out to develop a plan and leadership strategy entitled The Pathway to Sustainability Leadership: Incubation, Transformation and Mobilization. The five elements of this pathway collectively seek to formalize and build upon on-going and future efforts to address the challenges posed by sustainability and become a leader in this crucial arena. The Pathway to Sustainability Leadership calls upon MIT to become:

- An exemplar that incorporates sustainability considerations into campus infrastructure, operations, student life, and daily decisions
- A model of organizational transformation for sustainability leadership
- A generator of meaningful new sustainability ideas and research, building on our history and current capacity for contributing solutions toward vital global needs and priorities
- An innovator of deep educational experiences for the diverse communities on campus and beyond
- A thoughtful partner to the local and global communities in which we operate, a clearinghouse of good ideas, and a mobilizer of actors who can implement sustainability solutions

In the end, MIT seeks leverage its vision and act boldly to advance the Pathway to Sustainability Leadership and become an organizational standard-bearer for a sustainable future. This talk seeks to present the methodology and unique approach for developing a comprehensive framework that catalyzes and integrates teaching, research, operations and role of convener in the context of the campus, the city, the globe - to shape a model of organizational transformation for sustainability.

Contact:

Julie Newman, Director of Sustainability, MIT

j_newman@mit.edu
Technical University of Denmark, DTU Environment

Educating Future Environmental Engineers to Advise Policymakers on Innovation, Ethics and Sustainable Development

Steffen Foss Hansen, Lauge P.W. Clausen

Description:

Engineers play an important role when it comes to sustainable development as they are often heavily involved in all facets of the development of a given technology or product. Here we present the results of our work with integrating a mandatory course on environmental management and ethics into our education of environmental engineers. The course focuses on unsustainable activities in our society and their common denominators e.g. what is the problem? for whom and what can and should be done about the problem from a scientific and engineering perspective? And what are the societal and ethical implications? Outset is taken in numerous case studies (e.g. oil drilling in the arctic, nanoparticles in the environment) that the students worked on in groups. For each aspect of the case study, different teaching modules on classical ethics, environmental ethics, decision-support tools, environmental management and sustainable development are introduced, taught and discussed. Based on the student evaluations, we succeed in integrating considerations related to environmental management, ethics and sustainable development into our education program. Main challenges relate to “proving” relevance as many societal and ethical implications of engineering activities are considered beyond the scope of classical engineering by some students.

Contact:

Steffen Foss Hansen, Associate Professor
sfha@env.dtu.dk
University of Helsinki

Sustainability transition as an integrated process at the University of Helsinki

Janna Pietikäinen, Kaisa Korhonen-Kurki, Virpi Kuitto, Katriina Soini

Description:

Universities are experiencing a growing trend to redefine their strategies and organisations along the lines of sustainability. The University of Helsinki (UHEL) was recently joined this league of sustainability committed universities. We demonstrate that the sustainability transition of UHEL is an integrated process and accordingly sustainability is not seen only as a component of education, research and operations, but also as a social learning process. UHEL showcases transitions on all sectors: As UHEL renewed its educational structures, this created a window of opportunity for sustainability education and thus the MSc Programme in Environmental Change and Global Sustainability was initiated in Sept 2017. New incentives to guide Finnish universities in profiling their research agendas led UHEL to establish the Helsinki Institute of Sustainability Science with 19 research positions in sustainability science. The operations of UHEL are subject to sustainability-led changes. UHEL's pathway to sustainable campus is highlighted by means of two projects: renovation of an old office building into the Think Corner, and the solar power plant. We show that these processed are interconnected and resonate also in sustainability focused discussion forums, policy dialogues, science days and stakeholder cooperation between UHEL, other HEIs and research institutes.

Contact:

Janna Pietikäinen, university lecturer
janna.pietikainen@helsinki.fi
Wellcome Trust

A funders’ role in driving sustainable best practice within the research environment

Michelle Cohen, Sarah Manson

Description:

Wellcome believes the practice of research, as well as its findings, can improve human health by promoting the health of the environment. The principle that human health depends on the health of the planet has become central to our work. As well as funding research in this area, Wellcome have been making changes in our office to reduce its environmental impact. The next step is to extend this principle to the activities we fund. Research involves travel, buildings, materials, equipment - all things that can harm the environment and, indirectly, human health. Through collaboration with researchers, funders, universities and others across the sector, we will achieve our mission by autumn 2020. Wellcome recognises funders have an important role to play in sparking innovation and driving change and looks to understand the challenges and opportunities of developing this work on a global scale.

Contact:

Michelle Cohen, Programme Manager
m.cohen@wellcome.ac.uk
Chalmers - Johanneberg Science Park

Chalmers Five Star Campus – Living Labs for a Sustainable Future

Per Sunnergren, Jenny Forshufvud and Alf-Erik Almstedt

Description:

During the last couple of years several living lab projects with sustainability focus have been launched at Chalmers’ campus areas: HSB living lab, ElectriCity and Fossil-free Energy Districts (FED) are maybe the most well-known examples. Chalmers have recently launched the Five Star Campus programme as an umbrella under which various such projects and initiatives within sustainability are housed and showcased in a unified portfolio.

The program aims at facilitating the creation of new innovative living lab projects on campus and by that enhance the possibilities for Chalmers to take on global challenges and bring knowledge closer to the society, as well as bring the society closer to the university. An effect of this will also be a positive development of the campuses making them more attractive and experimental environments that embody and visualize Chalmers’ vision – “For a Sustainable Future”.

As an example, work is presently ongoing to facilitate testing of electrical autonomous vehicles on campus, as a first/last mile mobility solution, in collaboration with industry, institutes and local and national authorities.

Contact:

Per Sunnergren, Program Manager
per.sunnergren@johannebergsciencepark.com
Gothenburg University, Centre for Environment and Sustainability

Empowering students thru employment

Louise Jansson

Description:
As a student sustainability coordinator, I work part time at the center for environment and sustainability at Gothenburg University. My employment is a part of the Green Office Model, a European initiative that aims to empower the university community to act on sustainability. Thru this initiative, Gothenburg University has worked to integrate the student sustainability coordinators in the already established processes. During my time here, I have participated in working towards the environmental management system concerning both education for sustainable development and a sustainable campus. The idea that drives this initiative is that students tend to have innovative ways of thinking and therefore can bring new perspectives on solutions for complex sustainability issues. However, a critical issue of hiring students at the university is the need for leadership skills and tutorial to make sure the students get the knowledge they need to contribute to the ongoing work. Nevertheless, the empowerment and acknowledgement of students as important participants in developing sustainability in higher education makes this initiative a key factor to succeed with student engagement and knowledge sharing.

Contact:
Louise Jansson, Student sustainability coordinator
louise.jansson@gu.se
Gothenburg University, Institution of Global Studies

Urban Gardening Learning Lab

Tove Andersson

Description:

The need for growing sustainable food for sustainable cities is becoming increasingly recognized on a global scale. Naturally, Universities should take the lead in this development, using sustainable methods for growing food. In the University of Gothenburg, at the Institution of Global Studies, we are a group of students and staff that take research for a sustainable development to practise by growing edible plants on Campus Facilities. With inspiration from permaculture and organic production we have created an Urban Gardening Learning Lab for growing sustainable food. Emphasis is put on the social aspect of sustainability - knowledge is enhanced through a welcoming community of gardeners, becoming a natural and inspirational part of daily life.

Contact:

Tove Andersson, Student
gustovan@student.gu.se
Keele University

Campus-scale smart energy network and hydrogen to gas supply projects

Zoe Robinson

Description:

Keele University is a campus university the size of a small town, which operates its own sizeable energy distribution network, making it an ideal "living laboratory' for researching at-scale low carbon energy solutions. The University is developing a "smart energy network demonstrator' (SEND) to create a national research and development facility, to provide the infrastructure for research, development and testing of smart energy technologies, data management, and decision making processes and business models, as well as increasing business capacity in this area in the local economy and meeting ambitious carbon reduction targets. The University also has a project to reduce the carbon intensity of the gas network, working towards injecting up to 20% of hydrogen into the campus network, as part of UK trials, to inform future national roll out. This will make the campus the largest single integrated electricity, gas and heat smart energy network in Europe. This poster provides some background to these two projects and their aspirations.

Contact:

Zoe Robinson, Director of Education for Sustainability
z.p.robinson@keele.ac.uk
Massachusetts Institute of Technology (MIT)

The Living Lab Storytelling Machine

Paul J. Wolff III

Description:

The Discover Living Lab Web App is a new tool developed to collect and share stories of living lab research at the Massachusetts Institute of Technology. It provides a central repository for research assets (research articles, photos, videos, interviews and presentation materials), locating research where it happens and inspiring and connecting researchers with each other, and with more general audiences. The Web App also integrates functionalities such as natural language processing, key word searching, comparative analysis, user analytics, recommendation engines and predictive analytics. Users may create and print their own Learning Adventure Card, similar to hand-size trading cards for sports teams, to share stories of their work, to promotion themselves at conferences, and to make academic research more accessible. The tool was developed in a unique collaboration with Information Systems and Technology unit within MIT, and a global external consultant who utilized the Web App as a means to create and test a new data platform designed to rival products created by Amazon Web Services. These partnerships accelerated the design and development process, demonstrated new data provisioning practices and delivered a transferable and customizable platform for large-scale data collection and strategic engagement of diverse stakeholders.

Contact:

Paul Wolff, Living Lab Design and Strategic Engagement Manager
peripherypauljoon@gmail.com
Massachusetts Institute of Technology (MIT)

Living Lab-land: Learning from Daedalus and Icarus

Paul J. Wolff III

Description:

In an effort to express the thinking process, and to re-cultivate a kind of visual literacy that shapes us as children, I propose to create a mini-comic that demonstrates components of the Living Lab Construct, which utilizes the campus as a test bed for innovation in the realm of higher education. The mini-comic will integrate both text and images while exploring drawing as an essential component of thinking about complex concepts, as a means to embody and express ideas, and as a path to discovery. This experiment will examine the place-based learning environment at the heart of all living labs, which involves open, messy systems and uncontrollable variables in real-world contexts. Through narrative drawings and picture writing, the scope may also investigate curiosities such as the concept of distributed innovation, the notion of a 'sense of place,' and the process of cogeneration (of knowledge). First-hand observations from an auteur of real-world research will reveal specific characteristics of living labs, emerging typologies, and the evolving frameworks defining the Urban Living Lab Learning Platform at the Massachusetts Institute of Technology. The ambition is to capture a complex innovation processes, and explore how the materiality of making comics can inform scholarship.

Contact:

Paul Wolff, Living Lab Design and Strategic Engagement Manager
peripherypauljoon@gmail.com
University of Turin

Engaging students toward energy consumption reduction at the university: from ComfortSense to ESACOM

Stefano Magariello, Dario Cottafava

Description:

In 2015 the University of Turin was involved in the research project ComfortSense which allowed to gather objective environmental data from smart meter sensors and subjective data (users feedback) via mobile app within three University buildings.

The project aimed to reduce energy consumption, due to HVAC systems, and, at the same time, to maintain the same – or improve – users’ comfort, decoupling consumption and comfort data. The project approach was based on a codesign process: users’ engagement started with a co-design activity during which students gave suggestions on the mobile app design, while, in the second part, a living lab was set up, during which students provided comfort feedback during their daily university routine.

In 2017, a similar three years long project named ESACOM has started involving another building of the same university. Starting from the criticalities faced up in the previous project, a new system of engagement has been designed, considering the specific peculiarity of the new context. During 2018 it will be possible to compare the two adopted strategies and to evaluate students’ participation results within the living lab. The contribution takes into account both technical and social aspects of comfort and energy issues using a multidisciplinary approach.

Contact:

Stefano Magariello, Research Assistant
stefano.magariello@gmail.co
Erciyes University

Re-imagining the Spaces of Lifelong Learning in a Multi-functional Campus: Mobility Analyses of Different Age Groups in Erciyes University Campus / Turkey

Seda Calisir-Hovardaoglu, Ozan Hovardaoglu, Fulya Sinaci-Ozfindik, Yasin Bektas, Omer Faruk Bayram, Atacan Akgun

Description:

In terms of knowledge creation and innovation, Higher Education Institutions (HEIs) seem to become key actors of regional and national development. Contemporary economic development policies focus on HEIs as main components of human and social capital production in terms of knowledge creation and innovation within a scope of lifelong learning, and HEIs tend to restructure their academic and institutional capabilities to meet these targets. This institutional restructuring obviously has a spatial component. HEIs which located within campus areas adjust their spaces to meet their institutional purposes. Erciyes University is one of these HEIs in Turkey which began to restructure its academic and institutional capabilities including lifelong learning targets. With various academic, social and cultural facilities, Erciyes University has a multi-functional campus. We attempt to construct a new campus planning view which spatially combines multi-functionality and user variety within a scope of lifelong learning targets. We aim to present the results of mobility analyses of different users from different age groups in the campus area and the preliminary findings show that multi-functionality is relevant not only to different user groups but also to different age groups including a wide range from children to older people.

Contact:

Seda Calisir-Hovardaoglu, Associate Professor
sedahovardaoglu@gmail.com
Universitá degli Studi Milano Bicocca

Accessibility Index for Italian University
Massimiliano Rossetti, Mario Boffi, Matteo Colleoni

Description:

The Italian University Network for Sustainable Development (RUS) has carried out, for the first time a national survey about university commuting. 37 Universities joined the survey and almost 70,000 questionnaires have been collected. Years of academic mobility management policies and research show that Universities are players who must actively participate in the planning of urban and metropolitan policies for mobility and accessibility. Therefore, this pilot research shows the need to focus on students in a comparative perspective in order to put University in the forefront, together with the other institutions, in the urban mobility planning. We believe in the linkage between the right to education and right to mobility. It is crucial to sustain the right to mobility in order to promote better academic performances, mainly in absence of a serious national housing policy for students. University, thanks to its expertise, has to cope with students’ mobility as a strategic activity. The survey shows that, despite the expected differences regarding the localization and the size of the university, the students preferably move by public transit. Therefore, it has been developed an accessibility index with the intent to put forward national thresholds able to help institution to orient mobility management policies. The index considers 6 dimensions:

- Spatial, expressed by travel distance to the campus;
- Economic, expressed by travel cost;
- Environmental, Expressed by C02 emission
- Temporal, expressed by travel time and frequency
- Motility, which consider the main transport mode and alternatives (mobility as capital);
- Personal feelings, measured by personal evaluation of home work-trip

In this scenario the University becomes fully involved in the mobility management activities from national to local level. Thus, it comes to be a player who has to contribute in the mobility governance and not anymore only as a mobility attractor itself with over 1.6 million of students.

Contact:
Massimiliano Rossetti, Researcher
massimiliano.rossetti@unimib.it
KTH Royal Institute of Technology, Industrial Engineering

More socially sustainable student environment through Values-Based Leadership in and beyond courses

Dominic Von Martens, Niccolas Albiz

Description:

"Why do I do what I do?" A question which too few students receive help in answering systematically. This is in spite of research regarding the importance of autonomous motivation for performance and for well-being (drivers of social sustainability), and the centrality of the question for their future career choices. A collaboration between faculty, students and companies around interventions for greater values awareness has been fruitful in creating structures to enable students to begin exploring their purpose and values. Values awareness exercises have been shown to contribute to decreased stress, decreased defensiveness, and an increase in positive social interactions. Through the collaborative work performed by SelfLeaders, student-run World Values Initiative, and faculty from different parts of KTH (The Royal Institute of Technology), Chalmers Technical University, and LTH (Lund's Institute of Technology) these experience-based exercises have led to increased engagement in the studies, greater resistance to peer-pressure and testimonials reporting greater well-being as well as authentic decision-making power. Greater social sustainability requires autonomously driven individuals who can respond responsibly to challenges, creating resilience, and contribute positively to their surroundings. This presentation will recount the range of interventions, the process and results, in order to allow replication.

Contact:

Niccolas Albiz, Lecturer
niccolas@kth.se
Newcastle University, Open Lab

Fempower.tech: combining bottom-up and top-down approaches to equality, diversity, and inclusion

Samantha Mitchell-Finnigan, Angelika Strohmayer

Description:

We are a group of intersectional feminists who aim to raise awareness of feminist issues in HCI. Our attempts of doing this are focused in critiquing existing practices and playing an activist role in positively affecting these. We engage in out-reach and in-reach events such as support groups. Our members are made up of Masters and PhD students, as well as academic staff; working to develop bottom-up approaches to systemic problems while working with the institution to influence top-down policymaking. Our bottom-up approach provides us with a safe space to discuss personal as well as institutional concerns considering the development of university policies. While this kind of discussion is invaluable and often cathartic, we question to what extent we have been able to put our conversations into practice. Measuring tangible outcomes from bottom-up approaches is very difficult, and arguably too personal to be measurable, but within current neoliberal university structures, impact measurements are necessary to acquire funding and institutional support. To be able to carry forward the changes we hope to affect, we also need top-down support to provide sustainable equality, diversity, and inclusion impact. The question we ask ourselves here is how do we best combine our bottom-up approaches with the necessary top-down changes?

Contact:

Angelika Strohmayer, PhD candidate
a.strohmayer@ncl.ac.uk
Universidad de Guayaquil, Facultad de Arquitectura

Ecological Temporary housing projects for people affected by natural disasters

Ondina Moreira S.

Description:

The latest developments in natural disasters at the global level lead us to raise awareness of the urgency of building temporary housing projects for people affected by natural disasters. In South America one of the most affected area was the coastal Ecuadorian, the earthquake of great magnitude 7.8 left a bitter taste for the high rate of victims and affected. It is necessary and urgent to implement an efficient and adequate Ecological housing projects to the magnitude of the damage produced by these natural phenomena, as preventive measures, taking into consideration not only the materials but also the needs urgent in the face of such an emergency. The implementation of temporary housing projects by a group of students of the Faculty of Architecture of a higher institution whose objective is that during the emergency time, they can contribute to the affected people have a place to feel safe and regain strength for hard reconstruction tasks. The contribution the built environment can play to mitigate this phenomenon that has affected them. Homes that are built with accessible materials at that time of disaster. The materials to be used in accordance with the bioclimatic and ecological nature must respond to the double quality of their natural origin, their recyclability and reuse, as well as their suitability for the place and the technical and constructive possibilities of the area. With the application of sustainable materials for construction and architecture will reduce the proportion of waste generated and thereby improve the quality of life of the users of the house.

Contact:

Ondina Moreira, Master in Teaching English as Foreign Language
ondina.moreiras@ug.edu.ec
Veggie at my place

Gothenburg Students for Sustainability Alliance, GSSA, through Moa Persson

Description:

"Veggie at my place" is student project organized by Gothenburg Students for Sustainability Alliance at Chalmers and University of Gothenburg, aiming to inspire students to cook more vegetarian food while simultaneously finding new friends. The idea to the project emerged in the spring 2016 as we watched the Cowspiracy movie and many of us felt we like to eat more vegetarian food, but we needed a fun way to learn new recipes and discover the world of veggie food. So, the idea of coming together in each other’s home to eat and inspire each other to cook more vegetarian food took form. Many students seemed interested in the idea, so we decided to set up the project Veggie at my place, to be able to invite more students to take part. The concept goes like this: 1) Students are invited to sign up for taking part in the project. 2) We pair up the students in groups of four and invite all to a Kick-off event where they are presented for each other. 3) The students in the groups then go to each other's homes once a week for four weeks and enjoy a veggie dinner together that the host of the evening has cooked. 4) As a final event of the project we invite all cooking teams to join up for a potluck and share their experience and recipes and have a good time together. The first edition of the project took place in the autumn 2016 and was very well received, so we have continued running the project and 50-100 persons have taken part each semester. In addition to learning to cook more veggie food, many have also got to know new friends. We see this to be a successful project that can be spread to other universities as a creative common concept.

www.veggieatmyplace.com

Contact:

Moa Persson, Environmental coordinator
moa.persson@gu.se
University of Houston-Downtown

Saving Mother Earth

Mariana Ruiz

Description:

Living a vegan lifestyle is not limited to what you eat, it's also about what you purchase and where you're purchasing it from. Being vegan is about taking the personal responsibility in helping protect Mother Earth. According to The American Journal of Clinical Nutrition "sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources. It's our time to give back to Mother Earth, we must help heal her for a better future. From this knowledge, students attending the University of Houston-Downtown with similar interests and passions have come together to begin a new era at our campus. The university has welcomed with much enthusiasm UHD Vegan Club. Our objective is to educate, promote and assist other community members on their transition towards a complete vegan lifestyle. We will be accomplishing this by dividing veganism into different lifestyle sections, engaging in different activities for member participation and breaking down the stigma that veganism has. We will begin this journey once the semester resumes in January. With UHD recently offering a sustainability minor, the motive to attend ISCN 218 is to present UHD's Vegan Club advancement as well as to learn new ideas and policies from other university campuses around the world on incorporating more sustainable teaching and research at the University of Houston-Downtown.

Contact:

Mariana Ruiz, Student
ruizm33@gator.uhd.edu
Autonomous University of Tamaulipas (UAT)

On the way to neutralize our campus

María Teresa Maldonado Sada; Yolanda Mendoza Cavazos

Description:

Universidad Autónoma de Tamaulipas (UAT) is located in the state of Tamaulipas at the northeast of Mexico, it has a central campus with over 7000 students. During 2017, the Sustainable Office submitted a project at Supporting Program for Higher Education Development (PADES) called “UAT Sustentable”. This project included a CO2 emissions study at UAT Central campus. With this fund we were able to generate a CO2 emissions calculation for the campus, as well as a forestry reconnaissance with GPS location and data from all the trees located inside each school at UAT in order to obtain the CO2 potential sequestration inside campus.

The results showed what we already knew: we generate more CO2 than we have been able to absorb. However, this analysis allowed us to raise awareness on every student, faculty and staff participates in University’s Carbon footprint and create a plan to neutralize our campus emissions with several individual projects such as afforestation campaign, campus landscaping programmes, reducing water consumption, renewable energy projects and campus mobility campaigns.

Contact:

María Teresa Maldonado Sada, Strategic Projects Coordinator
mmaldonado@uat.edu.mx
KTH Royal Institute of Technology

Campus operations, Campus Facilities and Campus development

Greger Henriksson

Description:

On the KTH main campus Valhallavägen, Stockholm, several regular and pilot projects take place during the 2016-2020 period to increase the proportion of sorted waste and reduce the proportion of unsorted residual waste. Pilot projects for collecting food waste from lunchrooms are also ongoing, as well as regular collection of food waste from all major lunch restaurants on this campus. In addition, preparations are being made for a more complete source sorting of paper packages, especially from the lunch rooms. In connection with this, Stockholm’s waste disposal company has noted KTH that they can provide statistics in weight (kg) per month for each waste fraction in each waste room. However, the waste company cannot currently provide statistics on the mixed residual waste from these waste rooms. The company states that this is due to the fact that KTH currently disposes, and has a subscription for, collection in plastic bags, and not in containers. If KTH changes the subscription to containers, weight statistics for residual waste will immediately be possible to obtain. However, KTH says it is necessary to review the physical work situation of cleaners and janitors in order to change its subscription. If statistics on weight for residual waste will be introduced, KTH can follow up its environmental goals to reduce total waste volumes, reduce the amount of unsorted residual waste, as well as increase the proportion of sorted waste. If not, this follow-up will continue to be difficult to do in a reliable and meaningful manner. This paper aims at reporting barriers and opportunities for introducing weighing of unsorted residual waste by 2019.

Contact:

Greger Henriksson, researcher, teacher and environmental representative at the school of Architecture and the Built Environment (ABE), KTH Royal Institute of Technology
greger.henriksson@abe.kth.se
Norwegian University of Science and Technology

**Combining energy use profiles and time dependent import-export corrected GWP-factors for deeper understanding of an organizations’ energy use’ contribution to the carbon footprint**

Christian Solli, John Clauß, Magnus Korpås

**Description:**

The use of energy, and in particular electricity sourced from the grid, accounts for a large fraction of the carbon footprint of a university campus operation. We use time dependent electricity use profiles combined with hour-by-hour detailed regional import/export corrected grid supply data, to estimate the physical electricity supply mix of the university campus for a given year, as well as an energy related carbon footprint estimate.

The results show that the mix of production technologies varies considerably throughout the year, and that for the carbon footprint a large variation is seen between the hours with lowest and highest carbon intensity. This is to a large extent caused by the variation in imports from surrounding regions.

We discuss potential implications for the energy planning of the campus as well as ideas for the utilization of electricity supply data with hourly resolution in economic and carbon footprint optimization in the future.

We have also developed a simple day-ahead carbon footprint estimator, along with a simplified day-ahead electricity demand estimation tool for the university campus. Given the possibility of demand side flexibility (such as smart control of consumption pattern, self-production, thermal and electric storage systems) this enables consistent targeting and optimization of the university’s electricity consumption towards e.g. hours with lower carbon footprint or highest fractions of unregulated renewable power. Potential long-term market effects of such adaptations are discussed.

**Contact:**

Christian Solli, Environmental Advisor
christian.solli@ntnu.no
Norwegian University of Science and Technology

Organizational carbon footprint of a university

Christian Solli

Description:

The Norwegian University of Science and Technology in Norway has used a top-down organizational carbon footprint model to identify the most contributing factors to its carbon footprint. These factors have then been used to identify areas for goal setting and improvement actions. The top-down carbon footprint model is based on combining the economic accounts of the university with an environmentally extended input-output model. At the same time a bottom-up based environmental footprint model is used to evaluate the different actions and progress within specific areas of interest. The bottom-up approach is based on combining physical activity data with a (process based) life cycle assessment (LCA) model. Together the two models complement each other by exchanging information in an iterative manner. Energy related emissions and transport emissions (mainly from air travel) comprise the largest contributions to the carbon footprint, followed by purchases of various goods and services and investments in buildings. The footprint model allows drill-down of results to reveal the various departments that are (economically) responsible for the footprint. It also makes it possible to estimate the carbon footprint on a supplier level, providing a systematic targeting method for working with the supply chain emissions.

Contact:

Christian Solli, Environmental Advisor
cristian.solli@ntnu.no
RMIT University

A Tale of Two Cities

Linda Stevenson (RMIT) and Danielle McCartney - Manager, Sustainability (UTS)

Description:

RMIT University and the University of Technology Sydney (UTS) are members of the Australian Technology Network (ATN). In 2008 ATN members signed a Declaration of Commitment to Local, National and Global Sustainability, which pledges to make sustainability a focus in the University’s teaching and learning programs, research, infrastructure and operations. Ten years on the two institutions will share their success and challenges in driving the sustainability agenda forwards on two urban campuses.

UTS has steadily improved its sustainability performance over the past 10 years, integrating sustainability into governance, research, teaching and learning, operations and community engagement. Initiatives include high level sustainability policies and strategies; mapping research using the UN SDGs; creation of the Faculty of Transdisciplinary Innovation; Green Star certified ‘living lab’ buildings, off-site solar contracts, the ‘Think:Sustainability’ radio program and Social Justice Framework.

RMIT has recently completed a $98 million (AUS) energy efficiency project – the biggest of its kind in the Southern Hemisphere, with embedded learning and research outcomes. This work forms one piece of a jigsaw that along with strong governance, partnerships, planning and innovation has enabled the University to achieve a fundamental shift in sustainability.

Contact:

Linda Stevenson, Senior Manager, Sustainability
linda.stevenson@rmit.edu.au
Shiraz University

University Greening Process in Iran; Case Study of Shiraz University

Dr. Maryam Ekhtiari, Dr. Kaveh Fattahi, Soheil Dashti, Zahra Zamani, Bahareh Bannazadeh

Description:

Universities have a prominent role in forming education, research and learning to lead communities towards sustainable future. Furthermore, they have complex operations with significant environmental impacts, which give them social and environmental responsibility. However, implementation of sustainability in universities as a complex concept faces immense hurdles balancing between educational, social and environmental actions.

Shiraz University as a big size higher education institute with 19045 faculty members, staffs and students working at 485398 square meters of built area and 2511 hectares’ total space, faces complication as well.

Accordingly, Shiraz University Green Campus Assessment Task-Group (G-SAT) was established in September 2015 to observe and assess the green reality at the university and give practical recommendations.

Current article reveals how G-SAT through data collection, documentation, systematic interviews and questionnaires’ conduction has tried to propose an integrated and holistic framework to address campus sustainability. In addition to introducing the G-Sat's framework and methods, the article indicates how execution of proposed recommendations has enhanced sustainability for the case study of Shiraz University.

These green actions are ranging from environmental operations of monitoring energy uses via power-meters and flow-meters, water treatment and waste recycling policies to organizing several workshops or seminars for intra and extra-universities auditors.

Contact:

Maryam Ekhtiari, assistant professor
m_ekhtiari@shirazu.ac.ir
Shiraz University

Study the Contextual Approach of Greening Campus Evaluation and Ranking Model in Iran

Dr. Kaveh Fattahi, Dr. Maryam Ekhtiari, Bahareh Bannazadeh, Soheil Dashti, Sanaz Zamani

Description:

Nowadays, expanding higher educational activities and structures have significant impacts on the environment and society. In order to mitigate the adverse effects of these activities, evaluation system of universities have become a global phenomenon over the last decade. Correspondingly, from 2015, Iranian Ministry of Science, Research and Technology (MSRT) has started to evaluate Iranian universities based on their green activities. Thereby, Shiraz University Green Campus Assessment Task-Group (G-SAT) was assigned by MSRT to establish and develop this rating model. Current research focuses on how the Iranian Green Assessment Model literally called as TARAZ-e-SABZ, have evolved by G-SAT during years. Accordingly, this presentation highlights several limitations that G-SAT has faced during its executive phases and describes specific methods that have been used to overcome each dilemma. These methods vary from archival research and content analysis to observational research for the selected case studies. The research is based on ranking technique of systematic interviews and questionnaires. Currently, this model evaluates 142 universities, higher educational institutes and research organizations through its Green Assessment Toolkit. The updated model is comprised of three measures of Green Science, Green Socio-Cultural and Green Environmental Management each with four hierarchical levels of criteria, indicators, techniques and tools.

Contact:

Kaveh Fattahi, Assistant Professor
ka_fattahi@shirazu.ac.ir
Smith College

Using Institutional History to Make Change and Meet Ambitious Goals

Dano Weisbord, Jessica McKnight

Description:

Smith College has a goal of operational carbon neutrality by 2030. Our plan is to convert a 1947 fossil-fueled district steam heating system to a low temperature district ground-source heat exchange system. Cost estimates are high, which increases the need for a rigorous plan and business case. We believe that the decision-making associated with the 1947 energy system will help make the case for change in 2018. This tests an idea that Smith College has an organizational predilection and interest in its own history -- that institutional history is deeply a part of our organizational culture, and that through sharing historical precedent, we can influence organizational change. Our investigations lead us to discover that in 1947 the institution invested a comparable amount of money to develop the original district energy system as would be required to rebuild it according to today's vision. Perhaps more importantly, we learned that air quality and pollution concerns were a part of the decision making then as they are today. We are currently validating the air quality concerns of 1947 with oral histories from people who lived in our region in the 1940s. This project is a "Campus as Classroom" project involving students, faculty and staff.

Contact:

Dano Weisbord, Dir of Sustainability and Campus Planning
dweisbord@smith.edu
The Stone House Group

Developing an Energy Strategy for Sustainability to meet Climate Action Planning Goals

Larry Eighmy, James Hayes

Description:

As ideas related to sustainability continue to grow on college campuses, college administrators and facilities directors look to develop plans that align campus infrastructure and facilities to fulfill sustainability goals on campus. This presentation (followed by a Q and A) will cover how Lafayette College’s partnership with The Stone House Group developed an energy strategy for sustainability through:

- ASHRAE Level 1.5 Energy Audits
- ASHRAE Level 3 Energy Audits
- Energy Capital Investment Plan
- Detailed Lighting Inspections
- Utility Master Plan
- Carbon Reduction Strategy

The presentation will discuss how each study contributed to the overall energy strategy and what best practices were used and learned through the process.

Contact:

Lawrence Eighmy, Managing Principal
eighmy@theshg.com
Thompson Rivers University

The Solar Compass - Canada's First Solar Sidewalk System

Michael D. Mehta, Ph.D. and Amie Schellenberg (Instructor in Electrical)
Presenter: James Gudjonson

Description:

In the Summer and Fall of 2017, a team of faculty, staff, students, and community volunteers built and commissioned Canada's first solar sidewalk system.

These arrays were built in two stages with a smaller sidewalk connected with a grid-tie approach to the building that houses our sustainability offices, and a much larger array offsetting electrical consumption for the computer labs in the Arts and Education Building.

This work involved a unique public-private partnership, novel technology development, and provided students with an opportunity to participate in design and construction of the arrays.

Solar sidewalks like this will evolve to become carrier technologies for embedded fibre optics, sensors, and electric car charging.

Our project can be viewed at www.solarcompass.ca.

Contact:

Michael Mehta, Professor, Department of Geography and Environmental Studies
mmehta@tru.ca
Universitas Indonesia

Sustainable Campus Activities at Universitas Indonesia

Anom Bowolaksono, Ph.D

Description

Environmental knowledge over the last three decades has shifted from a ‘survival’ to responsibility and care. The Universitas Indonesia (UI) create an environmentally friendly and sustainable campus based on campus environmental issues such as setting and infrastructure including to the maintain land area for urban forest and green open space. Universitas Indonesia main campus have urban forest planning on the area at Depok was around 192 hectares from its total area of 320 hectares. This urban forest serves as vegetation collection and conservation area for trees around Indonesia and as Ciliwung’s river watershed catchment area. The urban forest is regulated too by Jakarta’s Governor’s decree that issued on 1999. It is mentioned that UI urban forest serves as conservation urban forest that consists of plants from the other places such as Sumatra, Java, and Kalimantan. There are around 186 plants species that had been planted in UI urban forest. The urban forest has tropical rainforest vegetation characteristics and divided into three advanced vegetation. They are vegetation from eastern part of Indonesia (East Wallacea), western part of Indonesia (West Wallacea), and original vegetation of Java. Those partition’s objective is to create a mini forest of Indonesia, that consists of plants from all area of Indonesia. As the biggest university in Indonesia, UI try to increase renewable energy for the campus life, including to the using of solar panel for some university facilities. In the area of water management, UI have six medium size of ponds and artificial reservoirs. Universitas Indonesia use the yellow bus, an eco-bus, and bicycles and trails for environmentally friendly transportation. Although it is still on the early phase, the development of campus environmental sustainability continues to be promoted and expanded to the greatest extent possible. We hope that the quality of our perceived campus environment can be perceived as well (without compromise and without diminishing equal rights) by future generations.

Contact:

Anom Bowolaksono, Ph.D
alaksono@sci.ui.ac.id
University of Guayaquil

Technological Park

Héctor Danilo Hugo Ullauri, Felipe Espinoza Ordóñez, Galo Salcedo Rosales, Ivetheyamel Morales Vergara

Description:

We must start by reviewing the postulates of Angus Madison (OECD and IMF) and Angus Deaton, the first one analyzes the cities in terms of their capacity to manage resources and technology to meet the population’s demands, and the second in terms of savings capacity and its poverty rates. Within the framework of new research on development, the University of Guayaquil could help promote the new development model of the city, the region and the country, if it promotes research and training in the areas of agro-industry, tropical medicine and housing, which are relevant for the development of the region and the country, and that a large part of this development would begin with the conversion of part of the Salvador Allende citadel into a special development zone that allows the establishment of technology parks in a public alliance private sector that promotes research and development in the sectors mentioned above, helping to promote from their skills an economy of the city and the region more varied and less focused on trade. The University would stop offering scattered research, concentrating its efforts to achieve more effective results in the search for resources for the sustainability of the population.

Contact:

Héctor Danilo Hugo Ullauri, Arquitecto
hector.hugou@ug.edu.ec
University of Iceland

Talking the Green Steps

Sigurlaug Lövdahl, Thorbjörg Sandra Bakke

Description:

The University of Iceland is now taking the so called Green Steps. The Green Steps idea is originally from Harvard (Green-Offices), and the program is designed to guide you through the process of greening your workspace. The program is monitored by The Environment Agency of Iceland under the direction of the Ministry for the Environment. It aims at helping public organizations / institutions to organize their daily practices in a more environmentally friendly way by following the five different steps from which the last one includes the implementation of the environmental management system ISO14001.

Each step includes six different categories:


In each category there are different criteria that have to be fulfilled and the criteria become more challenging with every step. There are more than one criteria in each category within each step.

Two persons are working part-time on the implementation of the Green Steps within the central administration. Meetings have been held with all divisions and departments. People are really willing to participate and understand the importance of the project. One of the results has been that plastic cups will soon disappear!

Contact:

Sigurlaug Lövdahl, Office Manager
sil@hi.is
University of Malta

Does Pro-Environmental Behaviour at Home Spillover on Campus?

Dr. Jonathan Spiteri Dr. Marie Briguglio

Description:

This study looks at whether pro-environmental practices at home translate to more sustainable behaviour on campus. This must be seen in light of recent efforts to promote greener campuses at universities across the world, coupled with a greater recognition of the crucial role that universities must play in leading the way in terms of sustainability education and research. To this end, we design and run an online survey at the University of Malta among a sample of 443 staff and students in order to measure environmental behaviour both at home and on campus, together with their perceptions regarding the University's efforts to promote sustainability, besides a number of socio-demographic indicators. The final data analysis will include a series of statistical tests in order to understand the link between pro-environmental behaviour at home and how this relates to respondents' actions on campus. The results will assist in understanding what drives environmentally-friendly behaviour at universities, and how such habits may spillover across domains. In particular, the findings will enable us to understand the extent to which the perceived adequacy or inadequacy of the university's efforts to promote sustainability may help or hinder the spillover of pro-environmental habits from the household to the campus.

Contact:

Jonathan Spiteri, Lecturer
jonathan.v.spiteri@um.edu.mt
Freie Universität Berlin (FUB), Environmental Policy Research Centre

Coffee to go becomes ART TO STAY - An interactive art lab at Freie Universität Berlin // Weaving new connections between art, society and university

Karola Braun-Wanke

Description:

The initiative SUSTAIN IT! developed an interactive art project together with three artists and 14 students from Berlin. The art lab addressed the waste and resource intensive consumer trend “coffee to go” in Berlin and at the campus of FUB. The goal was to demonstrate this trend in an esthetic and reflexive way and to minimize the use of coffee-to-go cups by promoting a lingering and enjoying way of drinking coffee. The art lab consisted of three interlinked elements: a photo studio, a mountain of cups and a cup museum. The ceiling-high sculpture of about 30,000 disposable cups was the art lab's eye-catcher and served as a communicative stimulus. Students and staff passing by were invited by an actress dressed as a "coffee addict' to choose a porcelain cup from the museum to have a coffee on stage of the photo studio. The photo artist took a picture of the “coffee lovers”. 2,000 people participated in the art lab and had their pictures taken. The presentation conveys the goals, the core concept and lessons learnt in order to inspire other universities to use, adapt, and implement our participatory art lab.


Contact:

Karola Braun-Wanke, project manager/senior researcher
k.braun-wanke@fu-berlin.de
Learning and teaching for a sustainable future

Karola Braun-Wanke

Description:

Schools@University is an innovative interdisciplinary educational format that builds bridges between academia and civil society. Young students of grades 5-6 and their teachers are invited to FUB twice a year to gain in-depth knowledge on sustainability issues to effect changes within their everyday world. The format is based on two pillars: 1) A one-week program for 10 -13 year-old young students featuring 75 interactive and participatory workshops. 2) A half-day practical teacher training to encourage the application of lessons learnt in their respective schools. We develop the workshop designs together with 90 partners from academia (students, scientists, and administrative staff), the city of Berlin, local businesses/enterprises, art and culture institutions, as well as NGOs. With so far 17 annual programs and teacher trainings we reached out to 24.700 students and 2.600 teachers. The format is collaboratively funded by the university, the city of Berlin and three enterprises, which are climate protection partners of the State of Berlin. Schools@University is an experienced and evaluated model, which can be easily replicated and adapted by other universities. A handbook and a resource guide compile the essentials from our education experiences in developing and organizing Schools@University programmes and trainings.

http://www.fu-berlin.de/sites/schueleruni/presse/publikationen/16_braun-wanke_learning-teaching/index.html
http://www.fu-berlin.de/sites/schueleruni/presse/publikationen/sauce_englisch/index.html

Contact:

Karola Braun-Wanke, project manager/senior researcher
k.braun-wanke@fu-berlin.de
Galway-Mayo Institute of Technology

Taking an incremental approach to embedding Education for Sustainability initiatives into existing programmes in the Galway-Mayo Institute of Technology

Dr. Mark Kelly

Description:

This study explores the embedding of Education for Sustainability (EfS) initiatives into existing higher education programmes in the Galway-Mayo Institute of Technology (GMIT) as part of their application to achieve Green Campus status under a national Green Campus Programme run by the National Trust for Ireland, An Taisce. The programme primarily aims to encourage both staff and students in a campus community to engage with and participate in meaningful long-term sustainability practice. This study outlines the development of a reciprocal learning framework that is utilising existing research, curriculum, campus management and community activities within the institute to design and implement several EfS initiatives including: an annual Green Campus Day as part of an institute-led student engagement programme; GMIT Green Campus Tours facilitated by student guides; the use of foresight methodologies and visual cue exercises to examine "wicked problems' of climate change and sustainability; and the development of staff workshops to identify further opportunities to embed EfS through pedagogical approaches and curriculum design.

Contact:

Mark Kelly, Lecturer
Mark.Kelly@gmit.ie
King Mongkut's University of Technology Thonburi

KMUTT: From Policy to Student’s Green Heart

Asst.Prof. Dr. Prasert Kanthamanon, Asst.Prof. Suchada Chaisawadi and Mr. Thanakarn Khumphai

Description:

Sustainability is one of the major challenges of current and future generation of students & staff. KMUTT committed to be Green University for SDG 2030 since 2017 which comply the global and national sustainable agenda and promote the development of sustainability leadership on our campus. Our sustainability commitments are to be a Green University providing a role model on energy, environment, safety management systems; promoting the application of all these activities within the university to encourage our students and colleagues become change agents which we call “Green Heart” for helping the community and society to achieve a better quality of life and to strive for continual improvement and sustainability for all. KMUTT set up university's Sustainability Office which play a major role to exercise on Green university for sustainability concept. This has been done to comprise of six key elements including Green Infrastructure, Energy and Climate change, Waste, Water, Transportation and Education& Learning with goal and target. Regarding outstanding contribution from student and staff, the system implementation has been running with significant progress over the past five years on our campus.

Contact:

Prasert Kanthamanon, Senior Vice President for Administrative Affairs
prasert@sit.kmutt.ac.th
KTH, Dept. of Fibre and Polymer Technology

Board games in secondary/higher education for sustainable development to improve teaching efficiency and interdisciplinary collaboration

Associate Professor Helena Lennholm, Dept. of Fibre and Polymer Technology, KTH Dr. Jon-Erik Dahlin, Dept. of Energy Technology, KTH

Description:

Depending on whether you are a scientist in chemistry, physics, social sciences, or engineering, you will choose different angles to discuss and teach about sustainable development. To be prepared for the future, students must be encouraged to learn interdisciplinary and take part in different views in the debate. In higher education, the teachers are often experts in a specific scientific area, and thus they may feel uncomfortable in teaching sustainable development in an interdisciplinary way. Nor are they comfortable with the opposing views of questions that will arise in a classroom debate. Secondary school teachers are expected to teach about sustainable development, but may have no training in the area. They may also lack time to develop interdisciplinary activities for the students. The use of board games as teaching tools is an effective way of improving efficiency, demonstrating opposing views and encouraging an element of collaboration in a non-threatening environment. Interdisciplinary topics are naturally invoked during the playing. We report experiences from students and teachers from playing the games in secondary schools and university classes, as well as a plan to promote teaching for sustainable development in the future.

Contact:

Helena Lennholm, Associate professor in Wood Chemistry
lennholm@kth.se
KTH Royal Institute of Technology

Mapping synergies and trade-offs between energy and the Sustainable Development Goals

Francesco Fusó Nerini, Julia Tomei, Long Seng To, Iwona Bisaga, Priti Parikh, Mairi Black, Aiduan Borron, Catalina Spataru, Vanesa Castan-Broto, Gabrial Anandarajah, Ben Milligan, Yacob Mulugetta

Description:

The 2030 Agenda for Sustainable Development—including 17 interconnected Sustainable Development Goals (SDGs) and 169 Targets—is a global plan of action for people, planet and prosperity. SDG7 calls for action to ensure access to affordable, reliable, sustainable and modern energy for all. Here we characterize synergies and trade-offs between efforts to achieve SDG7 and delivery of the 2030 Agenda as a whole. We identify 113 Targets requiring actions to change energy systems, and published evidence of relationships between 143 Targets and efforts to achieve SDG7. Synergies and trade-offs exist in three key domains, where decisions about SDG7 affect humanity’s ability to: realize aspirations of greater welfare and wellbeing; build physical and social infrastructures for sustainable development; and achieve sustainable management of the natural environment. There is an urgent need to better organize, connect and extend this evidence, to help all actors work together to achieve sustainable development.

https://www.nature.com/articles/s41560-017-0036-5

Contact:

Francesco Fusó Nerini, Assistant Professor
francesco.fusonerini@energy.kth.se
KTH Royal Institute of Technology

Evaluation of integration of sustainable development in higher education in Sweden

Göran Finnveden, Göran Carstedt, Eva Friman, Sofia Lundberg, Anna Mogren, Henrietta Palmer, Barbro Robertsson, Håkan Rodhe, Per Sund, and Linn Svärd

Description:

Since 2006, higher education institutions (HEIs) in Sweden, should according to the Higher Education Act, promote sustainable development (SD). In 2016, the Swedish government asked the Swedish Higher Education Authority to evaluate how this work is going. The authority chose to focus on education. All 47 HEIs in Sweden were asked to write a self-evaluation report based on certain evaluation criteria. A panel was appointed consisting of academics and representatives for students and working life. The panel wrote an evaluation of each HEI, a report on general findings and recommendations, and gave an overall judgement of each HEI in two classes: the HEI has well developed process for integration of sustainable development in education, or the HEI needs to develop their processes. This paper reports on this evaluation. Overall a mixed picture developed. Most HEIs could give examples of programs or courses where SD was integrated. However, less than half of the HEIs had overarching goals for integration of SD in education, or had a systematic follow-up of these goals. Overall only 12 out of 47 got the higher judgement. The importance of the leadership of the HEIs became clear.

Contact:

Göran Finnveden, Professor, Vice-president for sustainable development
goranfi@kth.se
National Autonomous University of Mexico

The Development of Teaching Programs Related to Sustainability in Mexico

Ayari Pasquier, Assistant of Institutional Development Secretary. Universidad Nacional Autónoma de México.
Alberto Ken Oyama, Institutional Development Secretary, Universidad Nacional Autónoma de México

Description:

Higher education institutions have a fundamental importance for the training of professionals with the skills to analyze the growing challenges we face in terms of sustainability and to generate solutions to consolidate a more sustainable future.

This paper describes the process of incorporating sustainability in higher education offer in Mexico, focusing the analysis on the case of the National Autonomous University of Mexico (UNAM), the main public university in the country and one of the most important universities in Latin America—with currently 238 higher education programs and 349,539 students—.

The paper considers both the individual subjects taught about environment and sustainability and the programs of study specifically focused on this subjects over the last 25 years at UNAM, analyzing the increase in options, the incorporation of an interdisciplinary approach and the integration of the environmental, economic and social dimensions of sustainability. Complementarily, it discusses some of the main challenges faced by programs focused on sustainability, among these, the appropriation of the perspective of sustainability by teachers and students trained in other disciplines and the implementation of interdisciplinarity. This discussion is based on the perspectives of key stakeholders linked to the development of educational offering in the university.

Contact:

Ayari Pasquier, Assistant of Institutional Development Secretary
ayaripasquier@gmail.com
Tecnical University of Madrid, Innovation and Technology for Development Centre (itdUPM)

The case of itdUPM: From projects to platforms

Julio Lumbreras, Sara Romero, Jaime Moreno, Javier Mazorra, Alejandra Rojo, Xosé Ramil, Mónica del Moral

Description:

There is an increasing recognition of the need to foster transformations towards sustainable and equitable societies. The Sustainable Development Goals constitute a visible sign at global scale. The Higher Education system has a relevant role to accelerate this transformation. There are already many prototypes showing alternative pathways in fields such as mobility, energy, design and manufacture, communication, or urbanism. However, it is usually difficult to move from a prototype to a transformative innovation outside those “niche” environments. Therefore, it is hard to develop sustainable practices with enough momentum to transform dominant systemic inertia.

Many of current pilot projects are showing the disciplinary and silo-oriented distribution of academic institutions. So, how could it be possible to overcome existing barriers to build innovation platforms starting from pilot projects while simultaneously designing structures to scale up transformative solutions?

There are some universities, like UPM (Technical University of Madrid) and other universities under ISCN (International Sustainable Campus Network) that are creating “intermediate” institutions to enable collaborative work and to develop action-oriented platforms designed to go beyond the traditional “project based” rationality. From our experience at itdUPM, critical factors to develop such integrative platforms are as follows: shared vision, incentive alignment, balanced diversity, availability of tools to both inspire people and facilitate knowledge management, and development of a safe context/environment where researchers from diverse disciplines can effectively connect their work, dialogue, and develop themselves both personally and professionally.

Combining all these factors itdUPM has structured its work around several platforms focused to: i) transform the campus to a test bed for public policies and sustainable technologies, ii) improve access to basic services in refugee camps, and iii) create knowledge networks in African and Latin American areas that are vulnerable to climate change. This presentation shows the organizational characteristics of these platforms, and includes first results and learnings to be discussed.

Contact:

Carlos Mataix, Associated Professor and Director of Innovation and Technology for Development Centre (itdUPM)
carlos.mataix@upm.es
The University of Manchester

Promoting ESD in Dentistry

Dr. Vitalia Kinakh

Description:

“Greening” of academic curricula is becoming an ever more prominent trend in the UK HE sector. In alignment with the University of Manchester 2020 Strategy and the Sustainable Development Strategy for Health, Public Health and the Social Care System 2014-2020 the Division of Dentistry shows a commitment to sustainability by embedding sustainability issues into its formal and informal curriculum. For the last four years, we have been promoting and running various initiatives concerning Education for Sustainable Development.

Some initiatives are teacher-led, and others are more student-led. A number of projects aim to encourage undergraduate students to explore Environmental Sustainability, so that later on in their professional career they will have a greater commitment to making dental clinics more environmentally friendly and sustainable. We also facilitate initiatives that encourage undergraduate students to experience the sense of Social Responsibility in order to integrate this also in their dental practice.

Thus, as a part of my presentation I would like to share the students’ attitudes towards sustainability and then to explore the teaching and learning approaches, which we utilise to increase the number of sustainability-literate dentistry graduates. It is envisaged that attendees will engage in an exchange of ideas and experience with regard to strategies of embedding/ delivering Sustainability topics in their subject areas.

Contact:

Dr. Vitalia Kinakh, Lecturer
vitalia.kinakh@manchester.ac.uk
University of Edinburgh

The Social Responsibility of University ICT

Michelle Brown, Liz Cooper, Caro Overy, Sarah Anderson
Presenter: Sarah Mason

Description:

Every staff and student use Information and Communication Technology (ICT). How can this equipment contribute positively or negatively to sustainable development? How was the equipment made, how much energy is used, where does it go when we are finished with it and how are we helping to support the wider community in terms of digital literacy?

At the University of Edinburgh, we have established a range of projects related to socially responsible ICT. We have looked at the risks and opportunities in ICT supply chains, have established a Conflict Minerals Policy, and were a founding member of Electronics Watch. A PC Reuse project has reused over 600 computers internally and supported a local social enterprise with over £10,000 worth of equipment. As part of our community engagement programme, student volunteers have been assisting digital literacy development.

A Sustainable IT Group oversees an implementation plan and brings together a cross section of stakeholders from across the University to consider priorities and actions.

The presentation or session will explore what is required for a University to consider the social responsibility of ICT through a whole value chain perspective, from supply chain issues through to carbon implications and community benefit, and wider impacts of waste.

Contact:

Michelle Brown, Head of SRS Programmes
M.H.Brown@ed.ac.uk
University of Gothenburg

UGOT Challenges - Global Societal Challenges

Eddi Omrcen

Description:

UGOT Challenges is a unique research initiative where the University of Gothenburg invests 300 million SEK in six multidisciplinary research centres. The premise is that a strong multidisciplinary research effort is needed to meet today’s global societal challenges.

The six research centres cover many research disciplines together. All of them have significant multidisciplinary elements. Some initiatives are new; others start from earlier research structures that have extended as a result of the global challenges perspective. UGOT Challenges is a six-year initiative that started 2016. The six research centres are:

- SWEMARC - The Swedish Mariculture Research Center
- AgeCap - Centre for Ageing and Health
- CARe - Antibiotic Resistance Research
- CCHS - Centre for Critical Heritage Studies
- CeCAR - Centre for Large-scale Collective Action Research
- FRAM - Centre for Future Chemical Risk Assessment and Management Strategies

In this presentation we discuss the organizing principles to initiate the UGOT challenges, the mix of a top-down and bottom-up perspective. The comprehensive assessment and competition process. And finally, the expected outcome from the six research centres, how and with what will they contribute? Are strong multidisciplinary research efforts the key to meet today’s global societal challenges?

Contact:

Eddi Omrcen, Sustainability Officer
eddii.omrcen@gu.se
University of Pune

Forest Accounting and Sustainable Development

Dr. Parashram Patil

Description:

Forest accounting is having direct input to ecological ecosystem sustainability in various way such as (1) reducing loss of biodiversity. (2) Mitigate inflated economic production figures. (3) Enable value chain and supply chain accounting starting with net forest produce. (4) Enable Gross National Happiness -GNH calculation that is dependent on forest living and environmental standards. (5) Enable balanced economic growth keeping future economic concerns. (6) Enable balance in regional economic diversity. (7) Safeguard biodiversity (both plant and animal). (8) Assess tradeoff between agriculture and environment preservation exercises (9) assess nature of food safety networks based on area specific nutrition availability and bring economic measures for balanced nutrition in regions. (10) Cause rational international economic and diplomacy dialogues based on hard data. (11) Measure economic sustainability. However, following are the specific objectives of present research work:

1. To explore relationship between forest accounting and sustainability.
2. To develop theoretical modeling of sustainability

The present study is explorative study on sustainability through developing forest accounting system. Essential data has been collected to find out present nexus.

Contact:

Parashram Patil, Post Doc Fellow
patiilparashram9@gmail.com
Abdullah Gül University

Born Sustainable and Grows Sustainably: Abdullah Gul University as a water efficient university model

Yusuf Cagatay Ersan, Nigmet Uzal

Description:

Wastewater reuse is expected to play a pivotal role in dealing with the foreseen global water crisis. In the 2030 Agenda of United Nations, sanitation and safe reuse of water is prioritized under the Sustainable Development Goal on Water (SDG 6). Being aware of the value of water, a recently established Abdullah Gul University implemented a greywater reuse system in its most intensively used main building which was brought into service by retrofitting a 16800 m² old factory building. The student capacity of the main building is 1079 and it also hosts 497 administrative and faculty staff. Here we present the implemented greywater reuse system which collects the water coming from drains of sinks and treats it by means of a chemical-free ultrafiltration membrane system for reuse in toilet flushing. Implemented greywater reuse system proved itself as a cost-effective solution for sustainable water management in the campus. Since 2014, Abdullah Gul University succeeded cutting its annual water consumption by 47% (6300 m³) which corresponds to 3517 $/year. Being a water efficient historic building, main building of Abdullah Gul University holds a silver LEED certificate since 2015.

Contact:

Yusuf C. Ersan, Asst. Prof. yusuf.ersan@agu.edu.tr
yusuf.ersan@agu.edu.tr
National University of Singapore

Applying the Concepts of Behaviour Insights to the Design of Recycling Bin to Increase Recycling Rate in the National University of Singapore

Thian-Guan PECK and Harry Wei-Xiang LIM
Presenter: Syam Kumar Prabhakaran

Description:

The contamination of recycling bins with trash is a major hurdle to recycling. Contaminated recyclables may become too costly to process and have to be disposed as trash. In this project, we applied the concepts of behaviour insights to get the community at the National University of Singapore (NUS) to deposit their waste into the proper bins - i.e. recyclables into the appropriate recycling bins and trash into garbage bins. One of the factors affecting contamination is the design of the bin. To minimise the chance of trash going into recycling bins and vice versa, the design of the bin has to convey to the users clearly whether the bin is for trash or recyclables. The recycling bins were redesigned to enhance its affordance (i.e. the qualities or properties of an object that define its possible uses or make clear how it can or should be used). Instructions on the bins were made more salient (quality of being particularly noticeable or important). Before intervention, almost 100% of the bins were contaminated. After deploying the new bins, more than 65% of all recycling bins were without contamination in the first instance. Further improvements of bin designs have reduced contamination levels further.

Contact:

Thian-Guan PECK, Director
oshhead@nus.edu.sg
Thompson Rivers University

**Developing a Pan-Campus, Closed Loop Composting Program**

Jim Gudjonson, Aaron Wiebe

**Description:**

We Litterally Want Your Waste! Developing a Pan-Campus, Closed Loop Composting Program Thompson Rivers University’s (TRU) composting program, part of a larger comprehensive waste management plan, has resulted in diverting 400 tonnes of organic waste from the landfill since 2013. Developing a composting program for a population of over 10000 on a compressed campus, however, is a complicated task. To ensure success, the program required support and engagement from the entire campus community and a significant financial commitment from senior administration. The composting program, now in its fifth year, has grown to include over 200 organic only bins servicing 3 large in vessel composters and digesters to near capacity. The savings from decreased waste disposal fees has enabled a full-time janitorial position dedicated to organic waste collection, with the finished product going into gardens and flower beds on the campus. TRU's case study will highlight the aforementioned benefits and discuss the following hurdles and misconceptions associated with developing a pan-campus, closed loop composting program: stakeholder outreach and engagement, pest management, development of bio-filters to manage smell, and collection systems. The emerging data will offer valuable insights for those contemplating an organic waste program on their campus.

**Contact:**

Aaron Wiebe, Research Assistant  
awiebe@tru.ca
Thompson Rivers University

Moving Towards Zero Waste: Sustainability, Reduction, and Diversion at TRU

Karl Fultz, Chair, ESAC, TRU James Gudjonson, Director, Environment and Sustainability Division, TRU

Description:

At Thompson Rivers University, much work has been done to reduce waste, divert it from landfills, and combat litter with over half of waste diverted from landfills. Much work remains. Fast food wrappers, beverage containers, and waste plastics still litter the grounds, usually around high traffic areas, or else taken by the wind across the campus. The TRU Sustainability Division has deployed various waste diversion initiatives such as Zero Waste Stations, Composting, high-efficiency hand dryers, and recycling/diversion at the source. Education and engagement of the campus community is a priority. Volunteer Student Sustainability Ambassadors lead the charge and set an example for the rest of their peers to follow. Everyone in ESAC and the Sustainability Division also shows leadership by modeling the behaviour themselves while working with stakeholders to integrate Sustainable practices into institutional policies. This study identifies the gains we have made in waste reduction and diversion from these initiatives and preview plans we hope will help us become a zero waste campus.

Contact:

Karl Fultz, Chair, Environmental Sustainability Advisory Committee of Senate
kfultz@tru.ca
Universidad Autónoma de Tamaulipas

Waste Diversion as Public Engagement

Yolanda Mendoza

Description:

UAT University established the sustainability committee since 2014, the aim of this committee is to develop projects in order to increase the institution sustainability performance. One of these projects is the diversion of solid waste. UAT has generated partnerships between several associations in order to provide welfare to the community through the diversion of solid waste from campus.

Through these programs almost 8 tons of paper and cardboard were recycled and converted into new textbooks for elementary schools by CONALITEG (National commission of free textbooks), 300 kg of plastic caps were donated to a Cancer association “Un Cachito de Luz” in order to provide more than 150 treatments for cancer patients and more than 100,000 PET bottles were donated to elementary schools in order to participate in Social Responsibility programs from FEMSA supporting equipment for kids such as computers or tablets.

These practices have not only allowed our university to improve sustainability performance in the operational area but also provided benefits for the community through the collaboration of the entire university community.

Contact:

Yolanda Mendoza, Strategic Projects Coordinator
ymendoza@docentes.uat.edu.mx
**KTH Royal Institute of Technology**

**Incorporating Sustainable Development into the design of a Student Project**

Authors: Zeev Bohbot, Johan Hellsvik, Roman Iakymchuk, Lauren McKee, Rajib Sinha

**Description**

In this talk, we intend to instruct other teachers in how to incorporate a consideration of Sustainable Development (SD) into the design of a student project, regardless of the education level or subject of study. As a group, we come from a diverse range of disciplines, but have all found common ground in being able to consider SD in project design in our own very different courses. As a result, we feel confident that we will be able to demonstrate that teachers in all fields can design a student project with an SD focus. This is usually in line with universities policies in Sweden, e.g. KTH’s directives, to integrate the subject of SD into all education, including project work. While maintaining the needs of the student as the highest priority, and the education of the student as the primary goal, we propose a framework based on physical resources and broader systems approach for a higher education student project to consider sustainability and environmental impact. Finally, we will present examples of student projects, which employ such framework, from our varying disciplines, including industrial ecology, architecture, biotechnology, computational physics, and computer science.

**Contact:**

Roman Iakymchuk, Postdoctoral Researcher
riakymch@kth.se
National Autonomous University of Mexico

Educational offer, research and management of the National Autonomous University of Mexico campuses.

Ayari Pasquier, Assistant of Institutional Development Secretary. Universidad Nacional Autónoma de México.
Alberto Ken Oyama, Institutional Development Secretary, Universidad Nacional Autónoma de México

Description:

Since 1972, the Stockholm Declaration recognized the central role of education and research for promoting environmental protection, but it was mainly after the Declaration of Talloires, in 1990, when universities began to assume their role as central actors for sustainable development. Since then, the world's higher education institutions have progressively incorporated this perspective into their development plans, facing different challenges according to the socio-environmental and economic contexts in which they are located. The National Autonomous University of Mexico (UNAM) is the main public university in the country and one of the most important universities in Latin America. Currently UNAM has 27 higher education units offering 238 programs, 58 specialized research centers, and a population of more than 400,000 people among students, academics and administrative staff. This poster describes the actions implemented at UNAM over the last decade to incorporate sustainability into teaching and research, and to consolidate its links with the government and civil society in this field. The poster also describes the innovations in the administration of its central campus, built in Mexico City in 1950, and those carried out in three of its newer campuses in the country, discussing the challenges faced to consolidate UNAM as a sustainable university.

Contact:

Ayari Pasquier, Assistant of Institutional Development Secretary
ayaripasquier@gmail.com
Smith College

**Framework for Adaptive Renewable Energy Coursework**

Denise McKahn

As Smith College articulates a need for face-to-face education that is inclusive, diverse and pedagogically advanced, we have taken project-based learning to a new level by embedding real-world global challenges within our educational mission.

As an example, in an advanced engineering undergraduate course: ‘Photovoltaic and Fuel Cell System Design’, students apply fundamental principles to the design, modeling, and analysis of photovoltaic and fuel cell hybrid power systems. Students are responsible for selecting a site, estimating solar availability and electrical needs, sizing power system equipment, and developing 30 year life cycle cost comparisons. Applying fundamentals in a real world setting enables students to design with constraints and fully realize tradeoffs.

Here we articulate a framework used to teach fundamentals applied to real world complex and urgent problems that change based on student interest and societal needs. By enabling students to shape the application, they become deeply invested in the outcome. These projects have led to a David Peace Prize to build a power system for a secondary school in Nepal, as well as Fulbright Scholarships ranging from grid penetration of renewable energy in Kuwait to biomass energy conversion in Finland. This year, we focused on portable power systems for disaster relief.

This project is a “Challenge driven education for Global Sustainable Development” project involving students and faculty.

**Contact:**

Denise McKahn
dmckahn@smith.edu
Trinity College Dublin

Inspiring sustainability across the Trinity community

J Borza

Description:

Trinity has been on a 25-year journey towards sustainability. The past year sustainability has been placed at the core of everything the university does, and we have learned lessons around what works and doesn't work when inspiring students and staff to join us on our journey.

Contact:

Joe Borza, Sustainability Lead
joseph.borza@trinityssi.com
University of Pennsylvania

Integrating Sustainability across the Curriculum at the University of Pennsylvania

Daniel Garofalo, Sustainability Director, University of Pennsylvania,
Jane Dmowchowski, Ph.D., Professor of Earth and Environmental Science, University of Pennsylvania

Description

Colleges and universities increasingly have the mandate and motivation to integrate sustainability into their curricula. The purpose of this case study is to share the strategy used at the University of Pennsylvania (Penn), provide an evaluation of its success, and offer guidance to others creating similar programs.

There is broad agreement for the need to integrate sustainability not only into university missions, facilities operations, and business practices but also into the curriculum, student and faculty life, community outreach, and beyond (Martin and Samels, 2012; Rusinko, 2010; Barlett and Chase, 2004). Numerous studies (Reid and Petocz, 2006) have stressed the importance of accounting for the perspectives of multiple disciplines when integrating sustainability into the university curriculum. As Barlett and Eise (2006) report, “issues and problems in the environment and sustainability are complex and require inter-disciplinarity to develop useful solutions and approaches.”

Mitchell Thomashow, Director of the Second Nature Presidential Fellows Program, proscribes that a university curriculum be “rigorously scrutinized as a repository of values [and] perceived as the most likely platform for educational reform.” He notes that while changes in the curriculum are often slow moving and inefficient because of administrative obstacles, it is essential to remain current, especially in the field of environmental sustainability and to engage faculty in the curriculum development process (Thomashow, 2014, p. 152).

Case Study Description – This case study summarizes Penn’s Integrating Sustainability across the Curriculum (ISAC) program. In concert with other Penn initiatives (a course inventory, faculty discussion groups and a research network), ISAC increases the numbers of Penn’s sustainability-related courses and creates dialogue regarding how various disciplines contribute to sustainability. The presenters will review the logistics of recruiting students and faculty, the challenges of managing the program, and summarize outcomes from recent years of the program at Penn.

Design/methodology/approach The ISAC program student/teacher teams include paid undergraduate research assistants and participating faculty, who work together for eight weeks over the summer to revise or develop a course that incorporates sustainability as a theme. Each selected student splits their research time between two faculty members, thereby gaining insights into two different fields and encouraging cross-disciplinary learning.

The program kicks off in the spring with a faculty workshop to introduce participating instructors and to establish the program intent. Each student research assistant starts work in June by identifying relevant materials and reviewing existing coursework, and spends the summer helping the instructor incorporate sustainability into his or her courses. Over the course of the summer, the students participate in three
mini-workshops and several sustainability-themed field trips to provide an opportunity to exchange ideas and share experiences with the other student participants.

At the end of the summer, the students participate in a program recap session, and present their course development work to the other participating students, faculty and staff.

Replicability – The program described is replicable at other institutions. The undergraduate research assistants are already on campus; their pay requirements are modest; and they are desirous of such research experiences. Faculty respond positively to the offer of engaged research assistants, who are provided at not cost to their department.

Social implications – The ISAC program inculcates a cultural and behavioral shift as students and faculty approach sustainability issues collaboratively, and it facilitates the development of a shared language of environmental sustainability. Such social implications are difficult to quantify, but are nonetheless valuable outcomes. Students also gain an insight into the process and discipline required to create new coursework, and an appreciation of the preparation and planning that go into establishing and running a university-level class.

Originality/value – The faculty–student partnership used to facilitate the integration of sustainability into courses at Penn is original. The program provides a framework for engaging students and faculty in curriculum development around sustainability in a manner that benefits the student research assistants, the participating faculty, and future students.

Since the launch of the program in 2012, over 48 professors have participated in the program, from such fields as diverse as economics, Latin American studies, communications, legal studies, environmental studies, systems engineering, urban design, business, Germanics studies, earth science, archeology, anthropology, and the history and sociology of science. Thousands of students have benefitted from the enhanced courses and taken the learning gained further into their academic and professional careers.

In the 2017/2018 academic year, Penn completed our sixth iteration of this program, which now has involved over 20 student researchers who contributed to the revised courses and new courses.

Contact:

Daniel Garofalo: danielg@upenn.edu
ETH Zurich

Virtual conferences to reduce academic air travel

Christine Bratrich, Lukas Buehler
Presenter: Reto Knutti

Description:

To combat climate change successfully, significant reductions in greenhouse gas emissions are urgently needed. However, global emissions are still rising, particularly those caused by international air traffic. Academic researchers are among the highest emitters and at some universities the main contribution of total carbon emissions stems from air travel. Each university thrives on the collaboration between its own members and other academic institutions. The advantages of physical attendance at conferences or project meetings should be balanced against the commitment to reduce institutional carbon emissions. Hence, we face a dilemma between strategic targets and interests. By organizing a showcase of a Virtual Conference in 2017, the host universities, ETH Zurich and the University of Zurich, aimed to motivate peer universities to critically reflect their own culture of business travel. Together with the participating Universities of Basel, Cambridge, Copenhagen, Oxford, Yale, and EPFL, we examined current opportunities and limitations of videoconferencing and virtual collaboration formats and systems. This included the transformation of standard conference set-ups into virtual analogs and integrated forms of local subgroup meetings, such as physical seminars, break-out sessions or networking events. We will present our first experiences and outcomes of the Virtual Conference, in order to trigger a discussion within the ISCN network on how to amplify an academic culture that integrates intelligent and attractive alternatives to air travel.


Contact:
Lukas Buehler, Project Officer
lukas.buehler@sl.ethz.ch
Swiss Federal Institute of Technology in Lausanne (EPFL)

Reducing the CO2 footprint of business air travel at EPFL

Aleksandra Mandic, Luca Fontana, EPFL Sustainable mobility manager

Description:

Relatively low travel costs and relatively abundant funding for science in Switzerland fuel international business travel and collaborations. In this study, EPFL has analyzed the environmental impact of its business air travel, shown to be responsible for over one third of its total CO2 emissions. To minimize EPFL’s environmental footprint and achieve a carbon-neutral campus by 2020, we analyzed travel habits by faculty and status. In particular, the study identified three pathways to reduce CO2 emissions by 41%. The most important reduction could be obtained by replacing all business and first-class trip by economy class. CO2 footprint can also be decreased by replacing short flights by train trips. Finally, significant reductions can be expected from replacing all indirect journeys with direct flights. This data analysis raises awareness on the impact of business trips by plane. Consequently, EPFL Senior Management decided to review the EPFL travel policy to implement the suggested actions. Discussions are underway on how to achieve a cultural change of the research staff without impacting negatively on academic performance. In particular, EPFL is evaluating the introduction of CO2 compensation through a tax on the total ticket price and the deployment of a more efficient system of videoconferences.

Contact:

Aleksandra Mandic, EPFL Doctoral assistant in Life Sciences / Member of EPFL ShARE Global Student Think Tank

aleksandra.mandic@epfl.ch
Description:

In order to balance employee CO2 emissions from air travels, the University use an internal climate fund for carbon offsetting. Employees and students can apply for funding for various projects that reduce greenhouse gas emissions from the university's activities. The purpose of the climate fund is to enable researchers, teachers, students and other employees to participate actively in the climate work. Funds are granted to projects that reduce the university's climate impact. These may include direct actions such as projects for energy efficiency or travel-free meetings, but also projects such as information dissemination or application of research. In the selection, particular consideration is taken to the project's climate relevance. An assessment of the application also concerns whether the project proposal is well planned, innovative and can be spread as a good example to others. Every faculty has the opportunity to assign one representative to the group of project assessors. In 2015-2017, 26 projects have been funded. A further 19 project has been granted funds for 2018 and these may share 2.3 million SEK (approx 230,000 Euros). In this presentation we will discuss some key experiences and results from the internal climate fund.

Contact:

Eddi Omrcen, Sustainability Officer
eddi.omrcen@gu.se
Aalto University and Aalto Campus and Real Estate, Finland

Aalto Green Campus and new headquarters retrofitted in Dipoli-building

Meri Löyttyniemi and Satu Kankaala, Head of workplaces and sustainability of Aalto Campus and Real Estate

Description:

The presentation will explore Aalto University implementing Green campus living lab projects but will especially provide a more detailed overview of Dipoli, a 50-year old building retrofitted to become the new headquarters of Aalto. The building was re-opened in summer 2017 and geothermal power produces ~50% of the heat. Socio-ecological aspects have defined the planning and implementation of the renovation. The building’s ownership switched from the Aalto Student Union to Aalto University during 2010’s.

Aalto University’s main campus is located in Otaniemi, Helsinki metropolitan region in Finland. We are aligning the university’s core mission with sustainability and thus facilities, research, and education are creating a “living laboratory” for sustainability. ASH (Aalto University’s Sustainability Hub) and ACRE (Aalto Campus and Real Estate) has plenty of living lab -projects like campus bikes, gardening area, innovative energy solutions, restaurant services and so on. The most recent development is the metro station at Otaniemi campus.

Contact:

Meri Löyttyniemi, Senior advisor for sustainability, chair and founder of Nordic Sustainable Campus Network
meri.loyyttyniemi@aalto.fi
Servicing the circular economy: establishing the cost and carbon case for adopting circular economy principles in MEP systems for higher education buildings

Ben Ashby, Richard Boyd, Simon Joe Portal, Dr. Kristian Steele, Ben Stubbs, Anusan Sugumaar

Description:

In the last five years the transition towards a circular economy (CE) has become a strategic imperative for the built environment, yet the promised benefits remain poorly defined and largely untested. CE claims to offer reduced cost-of-ownership, fewer carbon emissions and improvements in the health and carrying capacity of our global biosphere. This is delivered through radical change in the design, delivery, and operation of our built environment. In this study, these claims are tested. The proposed 20,000sqm mixed-use Marshgate building for University College London is used as a test case. The focus is on the building’s MEP systems, which are considered in detail given their high value and susceptibility to obsolescence, might they sit in a ‘circularity sweet spot’?

The project reimagines the Marshgate building through five scenarios describing potential CE implementations in the built environment. Barriers and opportunities presented by each scenario are identified qualitatively through a series of workshops and interviews with key collaborators and industry partners. Additionally, whole-life-carbon and whole-life-cost models are developed for each scenario to calculate the carbon and cost impact of CE implementation. The models use data for specific pieces of equipment, where available from manufacturer partners, in lieu of industry average data.

Contact:

Ben Ashby, Graduate Engineer
Ben.Ashby@arup.com
National University of Singapore

The Application of Policies, Practices and Technologies to Improve Energy Efficiency in a Research Intensive University - A Case Study of the National University of Singapore

Thian-Guan PECK and Syam Kumar PRABHAKARAN

Description:

As a research-intensive university with an expanding campus, the National University of Singapore's (NUS) most significant source of carbon emission is its electricity consumption. NUS has adopted five strategies to improve its energy efficiency: (1) introduction of energy management policies; (2) education and empowerment; (3) adoption of energy efficient technologies; (4) space management; and (5) active monitoring of energy consumption. This paper describes the various programmes implemented under these five strategies, and the results. Programmes include campus-wide initiatives as well as specific initiative to address high energy intensive buildings, as such wet laboratories. Located in the tropics with harsh environmental conditions throughout the year, a significant amount of energy is used in cooling and ventilation of its spaces. Campus-wide initiatives include district cooling system, chiller plant consolidation and optimization, and adjustments to operating conditions (e.g. operating hours of facilities, temperature of air-conditioned spaces). For high energy intensive spaces such as laboratories, sustainable features were incorporated into their design. In 2016, NUS received the Platinum Award for one of its Chemistry laboratories, under the Singapore Building Construction Authorities' pilot Green Mark Scheme for Laboratories. Sustainable lab design and best laboratory practices implemented under this Scheme are presented here in this paper.

Contact:

Thian-Guan PECK, Director
oshhead@nus.edu.sg
University of Copenhagen

**Sustainability in the Maersk Tower**

Tomas Refslund Poulsen, Lars Ole Munch Nissen, Theresa Schaltz

**Description:**

Sustainability and particularly energy efficiency have been highly prioritized in the construction of the 15 story Maersk Tower which is built to resist future climate changes. A number of solutions to sustainability challenges are integrated into the design and construction of the building. An example is the diversion and collection of rain water to make full use of this resource and to ensure consideration of the neighbouring buildings. Likewise, the energy use and ventilation system are based on principles of sustainability and energy conservation since frontline medical research requires advanced facilities with a significant energy consumption. 1. class bicycle facilities, district cooling, green roofs, PVs, biodiversity enhancing campus park are among the other sustainability achievements.

**Contact:**

Tomas Refslund Poulsen, Head of Energy & Sustainability

Trp@adm.ku.dk
Portland State University

Developing strategic city-university partnerships for advancing sustainability outcomes

Fletcher Beaudoin (PSU), Victoria Smith (UBC)

Description:

Universities have a critical role to play in helping address our most pressing and significant global and societal issues. Urbanization over the next 100 years is predicted to be unlike any movement we have seen in human history, one that represents both a significant challenge and opportunity for sustainability.

Universities have for decades been taking actions on their campus to advance sustainability, with investments leading to tangible outcomes on the ground. In contrast, universities have lagged when it comes to designing partnerships and programs that leverage student and faculty expertise to deploy sustainability solutions to their cities.

The conversation about strategic and high impact city-university partnerships has started and there are good case studies where these partnerships are deploying tremendous and enduring outcomes for the university and city.

This workshop aims to elevate the good practices in city-university partnership development and then provide a structured venue for participants to workshop the challenges and opportunities they when trying to build similar relationships.

The workshop will be two hours long and have three parts:

- Short presentations on three exemplar partnerships from three different contexts (USA, Canada and Europe)
- Synthesis presentation of tools and strategies
- Q&A
- Small group workshopping

Contact:

Fletcher Beaudoin, Assistant Director
beaudoin@pdx.edu
Hong Kong University of Science and Technology

Exploring competency-based approaches to teaching sustainability education

Davis Bookhart

Description:

The way that we think about teaching sustainability is undergoing an interesting transition, from focusing on content to focusing on competencies. Historically, sustainability has often been taught by focusing on the topics (content) that highlight the most pressing outcomes unsustainable actions (e.g., climate change, biodiversity loss, environmental externalities). However, a content-based approach is undermined by the fact that content changes rapidly and is often discipline-dependent. Moreover, in this “information age,” content is readily accessible and no longer dependent on exclusive content providers (professors). On the other hand, a focus on sustainability competencies – which are much more connected to skills and mental frameworks – allow for more flexibility in teaching across disciplines and building skills that are more valuable for career development.

This proposal is to lead a discussion on how we can explore new ways of developing, testing, and integrating a sustainability competency approach to teaching university students.

Suggested format: Brief presentation to provide an overview of different approaches in using competencies in teaching; then break into groups to brainstorm on developing new competency frameworks for discussion.

Contact:

Davis Bookhart, Head of Sustainability
dbookhart@ust.hk
KTH Royal Institute of Technology, Sustainability Office

Sustainable Development in Higher Education - What sustainability skills do Industry Need?
Hélène Hermansson, Göran Finnveden, André Schneider

Description:
Sustainable Development in Higher Education - What sustainability skills do Industry Need? Higher education must provide students with tools for a broad and holistic understanding of the complex situations they will meet in their careers after they graduate. This also includes issues related to sustainable development. Even though the integration of sustainable development into higher education has been ongoing for some time, few studies have been conducted where industry representatives specify what sustainability skills they require. In a project focusing on corporate-university dialogue industry opinions on sustainability skills were gathered in two ways: interviews were conducted with executives in different positions at companies and a workshop with sustainability directors from different sectors was organized. The result showed that the companies expressed primarily two needs regarding sustainability skills: 1) sustainability professionals/specialists are needed and, 2) there is an equal need for all managers and leaders to have a general and basic competence regarding sustainable development within a number of different areas. While sustainability specialists are well represented in industry the latter are rarer. There is a need for critical thinking regarding complex situations and a capacity to communicate these situations both within the company as well as to the public outside.

Contact:
Hélène Hermansson, Project Manager
heleneh@kth.se
Universität Hamburg

Interactive Workshop: Sustainability seen from a multilingual perspective
C.T. Schmitt (Universität Hamburg, Germany)

Description:

UNESCO’s Global Goals for Sustainable Development (SDGs) refer to the world society as a whole. They concern all nations and their collaboration on fostering sustainability world-wide. Thus, relations between internationalization and sustainable development have to be further specified and investigated from a scientific as well as a practical viewpoint. Highlighting an interdisciplinary research project dedicated to consider internationalization as a valuable resource within Higher Education Institutions, linkages between sustainability and multilingualism are outlined. After a short introduction, this workshop offers an open talking circle for participants and the following questions are posed:

- Do we share a similar understanding of sustainability, Nachhaltigkeit, βιωσιμότητα, etc. when talking about global goals?
- Which different interpretations and associations can be found in analyzing the notion of sustainability from a multilingual perspective?
- How might interdisciplinary research on the conjunction between multilingualism and sustainability contribute to social innovation processes towards achieving the SDGs and sustainability-oriented campus development in general?

Interactively discussing the questions mentioned above and using special tools and exercises, the workshop aims at reflecting the notion of sustainability and its connotations seen from different languages and cultures.

Contact:

Claudia Thea Schmitt, Managing Director & Scientific Coordinator Center for a Sustainable University (KNU)
claudia.schmitt@uni-hamburg.de
Western Michigan University

Sustainability in higher education: Instructor's perspective on Learning Outcomes of Sustainability focused courses in higher education institution

Saman Khan, Charles Henderson

Description:

For over a decade, the concepts of education for sustainable development have been recognized by many higher education institutes. A significant number of higher education institutions have come up with a consensus and declarations to teach learners in the field of sustainability. This research study has assessed the learning outcomes of these sustainability focused courses through examining the syllabi of these courses and interviewing instructors about how they integrate sustainability in courses. Qualitative responses were examined in light of a learning outcomes of sustainability education proposed American association for advancement of sustainability in higher education (AASHE) and higher education institute. Substantial responses recognized the conceptual understanding of environmental (81%), economic (50%) and social (31%) dimension of sustainability as LO of sustainability focused courses - but just one instructor highlighted all three dimensions. 50% instructors showed that they consider student attitude around concept as main learning outcome of their courses. The aspects of sustainability largely missing were to do with change agent skills, change personal Behaviors or actions and understanding of systems. Some instructors (37%) think that their course is related to teaching about science or knowledge behind sustainability. Half of the instructors were unaware of their course status as sustainability focused course and half of instructors did not think sustainability as major theme of their course. Course syllabus didn’t show explicit learning outcomes related to sustainability. Assessment of learning outcomes can make the effectiveness of sustainability programs strong.

Contact:

Saman Khan, Fulbright PhD Scholar
Saman.khan@wmich.edu
Freie Universität Berlin

A Network for Innovation: Fostering Sustainability in HEIs via International Cooperation

Wanke, Andreas, Head, Unit for Sustainability and Energy Management; Risch, Katrin, Program Manager ‘University Alliance for Sustainability’

Description:

Sustainability and higher education institutions (HEIs) have many intersecting priorities. Sustainable development is a task that needs to be addressed inter- and transdisciplinary, connecting diverse stakeholders in concerted action. Universities are institutions combining strong international ties in research and student exchange as well as a diverse set of stakeholders in their campus community. How do we bring the two together in a way that will benefit all? The University Alliance for Sustainability (UAS), founded by Freie Universität Berlin and its international strategic partner universities, focuses on that question by developing and implementing a whole-institution approach. Embracing sustainability as a cross-cutting topic, we address it in research, teaching, and campus management. This contribution presents a case study of the innovation potential that a network committed to sustainable development can unfold in the area of university teaching. Inspired and driven by its international cooperation, FUB has accelerated its efforts in ESD Teaching. The presentation will introduce projects regarding sustainability-related curriculum assessment, the development of an interdisciplinary B.A. courses, as well as the launch of a digital “Sustainability Toolbox” providing resources and hands-on information for lecturers and students. Following the short presentation participants will be encouraged to (re-)think the roles, responsibilities and opportunities international sustainability networks in HEIs could unfold. We will be exploring the question “How can sustainability networking in HEIs contribute effectively to the sustainability discourse?”. The ideas and recommendations resulting from the process will be discussed and mapped for all conference participants to review and comment on.

Contact:

Katrin Risch, Program Manager ‘University Alliance for Sustainability'
katrin.risch@fu-berlin.de
University of Toronto

Expanded Student Engagement Project (ESE)

John Robinson, Danielle Pal, Nathan Postma, Emily Shaw, Rashad Brugmann, Nicolas Cote

Description:

The University of Toronto’s Presidential Committee on the Environment, Climate Change, and Sustainability has been developing a program that allows students to engage with sustainability issues that challenge the university and its surrounding communities. This project, titled the Expanded Student Engagement Project (ESE), is working to expand student knowledge of sustainability-related course content and increase both on and off-campus student engagement through sustainability focused curricular and non-curricular projects. To achieve this, the ESE has developed a comprehensive sustainability course inventory which will be integrated into UofT’s course information system. This inventory was created by university-wide keyword searches based on the Sustainable Development Goals (SDGs), as well as separate keyword search which captured community engaged learning (CEL) courses. After cross-referencing the SDG course results and the CEL course results, twenty-four professors were identified at the intersection of sustainability and CEL. In Spring 2018, the ESE will be collaborating with UofT’s Center for Community Partnerships to facilitate a workshop with these identified professors. The intention is to create a visible, motivational network of sustainability champions on campus. Expertise and common challenges can be shared and structural barriers overcome, thereby creating a framework for the expansion of sustainability CEL options for UofT students.

Contact:

John Robinson, Professor, Munk School of Global Affairs, Professor, School of the Environment, Presidential Advisor on the Environment, Climate Change and Sustainability, University of Toronto
johnb.robinson@utoronto.ca
British Columbia Institute of Technology (BCIT)

The Campus as an Ecocity Fractal

Sarah Campbell, Jennie Moore, Alexandre Hebert, and Joe English

Description:

In 2006 the School of Construction and the Environment (SoCE) at the British Columbia Institute of Technology (BCIT) initiated a project on the North end of campus aimed at creating an ecologically sustainable microcosm, or “Ecocity Fractal”. Working as a living lab project we demonstrated sustainable practices on campus, providing opportunities to engage students in the transformation of the built environment as an ecologically sustainable learning space. The goal was to reduce our footprint while maintaining services. Through energy efficiency improvements, six buildings have reduced their greenhouse gas emissions by 50%. Future plans to connect our educational wood-waste-to-energy district energy system will achieve reductions up to 90%. In addition to reducing our carbon footprint we are working towards the ecological restoration of the area. Projects have included hundreds of students, faculty from over a dozen programs, and members of the BCIT service departments. The co-benefits of pursuing sustainability on campus have been numerous and provide a model for other communities and educational institutions. Students reported higher levels of satisfaction and improved workplace quality. We have improved health and safety, air quality, classroom delivery, campus look and feel, and improved the sense of pride and ownership in our educators.

Contact:

Sarah Campbell, Manager, Sustainability Programming
sarah.campbell@bcit.ca
Delft University of Technology

Living Labs for sustainability: Towards a learning system for University Campuses


Description:

Universities are important actors in advancing global sustainability as they are positioned to connect education, research, innovation, business and community interactions on a university campus to advance sustainability understanding and solutions. Living Labs are emerging as a promising ‘connector’ approach. The living lab approach fundamentally builds on multi-stakeholder engagement and co-creation, while fostering transformational processes at universities. In two recent workshops (Vancouver, Hamburg) with fifty universities, it has become clear that sustainability officers see value in a (global) structured learning approach to develop and enhance an outcome-based living lab framework with their peers in other universities. Within the ISCN, we are creating a Campus as Living Lab learning system comprising three emerging elements: conceptual and goal-specific foundation, knowledge/data base and data entry standards. The system describes Living Labs in terms of general information, scope, participant and stakeholder interaction, outcomes, impact on the campus and in the world, and self-reflection. This paper describes the development of the framework and corroborates how to use this Campus as Living Lab learning system for analysing, designing, and running a living lab. After describing the framework, we take a process-oriented approach for experimenting with implementation and overcoming common barriers, and reflect on the value and application boundaries.

Contact:

Leendert Verhoef, Sustainable Innovation Developer
l.a.verhoef@xs4all.nl
KTH Royal Institute of Technology, Department of Mechanics

**Including sustainability into doctoral studies**

Christophe Duwig, Anders Dahlkild

**Description:**

Doctoral studies in engineering science are often intense with a very narrow focus on a scientific question. We experienced that your doctoral students lack perspective and often do not realize how their knowledge and know-how can be used to solve societal challenges. In other words, they do not see how they can be driving actors of the revolution toward sustainability. To that end, we have start a new course, dedicated to doctoral students, with aim to provide new perspectives. The overall goal of the course is to give a sustainable and multidisciplinary perspective to PhD students and inspire by linking science and societal challenges. The students will learn to identify relevant data to address societal challenges, tools to analyses and quantify the challenges, methodologies for reviewing technological gaps, and to relate innovation needs with research. The first course instance was given recently and the presentation will focus on explaining our course layout, show details on the implementation and exploring the feedback from the students.

**Contact:**

Christophe Duwig, Associate Professor
duwig@kth.se
McGill University

Catalyzing a Culture of Sustainability at McGill University with the Sustainability Projects Fund

Francois Miller

Description:
The Sustainability Projects Fund (SPF) is a crown jewel of McGill’s sustainability efforts and a best-practice model for universities. The SPF’s main goal is to build a culture of sustainability on McGill’s campuses through the development and seed-funding of interdisciplinary projects. The SPF is one of the largest dedicated campus sustainability funds of its kind in North America, and is uniquely committed to collaboration between students and staff in its financing, decision-making, and project leadership. The financing of the SPF is based on a model of equal partnership between students and staff. It is funded by student fees matched dollar-for-dollar by the McGill administration for a total of approximately $900,000 (CAD) per year. Since its creation in 2010, the SPF has awarded funds to 175 projects worth over $6 million (CAD), which have yielded dramatic and lasting improvements to McGill’s social, economic, and environmental sustainability performance. Every significant sustainability achievement at McGill over the past several years—from local and sustainable food sourcing to carbon emissions reduction to Indigenous engagement—has been facilitated to some degree by SPF money.

Contact:
Francois Miller, Sustainability Director
francois.miller@mcgill.ca
Nanyang Technological University

Achieving Sustainability Campus Goals with Virtual Environment MultiPhysics Modelling

Priyanka Mehta, Shashwat, Rithika Thomas, Nilesh Jadhav, Rohan Rawte, Catherine Conaghan, Jimmy Lee
Presenter: Nilesh Jadhav

Description:

EcoCampus NTU (Nanyang Technological University) has partnered with several industries that provide active and passive green building solutions. To identify the most optimum of tested technologies and locations for full scale deployment, EcoCampus Collaborated with Integrated Environment Solutions (IES). IES is an expert in MultiPhysics building energy modelling and tested their Intelligent Community Lifecycle Solution through EcoCampus collaboration.

We have developed a 3D virtual model of the campus for wide scale MultiPhysics simulation and achieved an accuracy of 91%. For a large scaled campus wide simulation, 91% accuracy can give a fair idea on resource saving predictions. The project also developed a web based spatial app to visualize data in an intuitive format.

The project has delved into detailed building simulation for academic buildings in NTU. University campuses equipped with state-of-art laboratories often observe erratic energy behaviors which adds to energy modelling challenges. Highly granular buildings data were collected to overcome this challenge. MultiPhysics modelling complimented with data analytics could provide an accuracy of up to 98% for buildings simulated until now in the project. The results provide interesting insights and recommendations towards reaching EcoCampus goal and vision of making NTU the greenest campus in the world!

Contact:

Priyanka Rameshchandra Mehta, Research Associate
pmehta@ntu.edu.sg
Princeton University

Campus as Lab: Best Practices in North America

Caroline Savage

Description:

“Campus as a Living Laboratory” is a rapidly evolving model for deploying effective and innovative sustainability strategies. Princeton University, in collaboration with University of Calgary and others, has lead a +100 member best practices community for practitioners across North America to share strategies for implementing, funding, growing, and hiring for Campus as Lab programs. Session attendees will learn about trends in Campus as Lab programs across the region and the elements of successful Campus as Lab initiatives at Princeton and across North America. Attendees from any nation will also be invited to participate in the Campus as Lab Community of Practice, including access to the resources shared by members.

Contact:

Caroline Savage, Campus as Lab Manager
cs35@princeton.edu
Politecnico di Torino

When the buildings become sentient - Exploring tools for human centric energy strategy in Universities

Giulia Sonetti, Patrizia Lombardi

Description:

This paper presents the setting of the HOME (Human Observation Meta Environment) research project, aiming at studying new forms of relationships between university buildings and their inhabitants by means of interactive ICT tool, social network analyses and artificial intelligence. The paper is structured in two parts. The first describes the background of the HOME project, aiming at: observing and gathering information about human behaviors, their relationships and their use patterns of the university rooms; describing strategies that interconnect energy consumption targets and behaviors; showing visual and interactive outputs in various forms; involving the students and make them strategically aware of their behaviors and eventually their impacts. A draft of this concept has been presented to a wider audience of researcher and students from very different backgrounds in form of a multidisciplinary workshop, envisioning impacts of such "sentient buildings” on human life from many different perspectives. Preliminary results are presented in the second part of the paper, in order to represent all the possible technological, business-related, economical, psychological, cognitive, cultural, social, political and aesthetical impacts envisaged by the multidisciplinary assembly from Politecnico and Università di Torino, sites selected both for the workshop and for the future experiments.

Contact:

Giulia Sonetti, Research Fellow
giulia.sonetti@polito.it
Universidad Autónoma de Tamaulipas

Starting Sustainability. From Research to A Sustainable Development Plan

Yolanda Mendoza Cavazos

Description:

The UAT University began its sustainability efforts as an institution since 2014, however previous work in this subject was generated without any registration or impact. In 2015 the sustainability Committee was created according to a proposal from a PhD dissertation project from the Knowledge Transfer and Management program called Model for sustainable development in Higher Education Institutions in Tamaulipas.

Due to this research project the UAT started to participate at Greenmetrics world university ranking and STARS from the Association for the Advancement of Sustainability in Higher Education. This work allowed the university to generate strategies in order to improve its sustainability performance. Therefore, 4 years after the committee was founded UAT advance from a BRONZE to a SILVER (provisional to this date) medal at the STARS system turning into the first public institution in Mexico with this recognition.

Based on these results, work is being done to improve the sustainable performance of the institution as well as detect opportunity areas in order to concentrate efforts and generate future projects including the elaboration of the 2025 sustainable development plan for the Autonomous University of Tamaulipas.

Contact:

Yolanda Mendoza, Strategic Projects Coordinator
ymendoza@docentes.uat.edu.mx
University of Oxford

**Designing effective behaviour change interventions**

University of Oxford

**Description:**

Behavioural interventions have considerable potential to reduce energy use at universities, yet many initiatives to alter behaviours at universities are designed predominantly based on what "[seems] like a good idea at the time'. With funding secured from the International Alliance of Research Universities (IARU), the University of Oxford has undertaken research and produced a report designed to support the transition to an evidence-based approach to changing energy behaviours to reduce carbon emissions. Changes to building fabric may play an important role in reducing emissions, but the very long lifespans of buildings and retrofits locks-in energy use, necessitating behavioural change if energy use reductions are to continue to occur. As centres of research and knowledge, universities should adopt an approach to reducing their contribution to climate change based on the best available evidence and behavioural changes have among the greatest potential to achieve this. If policy targets on energy use are to be achieved, behaviour change interventions must play a central role in emission reduction strategies. The academic literature on non-domestic energy behaviour interventions is relatively sparse but contains firm evidence which is interpreted for a university context in this report.

**Contact:**

Tom Heel, Deputy Head of Environmental Sustainability
tom.heel@admin.ox.ac.uk