THE UNIVERSITY OF THE WEST INDIES

Trends in Higher Education

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Message from the Publisher

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As the global community adopt the UN IPCC 1.5 Report, it is critical that higher educational institutions take note of the developments in natural environment as they will have critical impact on their strategic and operational practices. This volume of Trends in Higher Education provides a rich overview of some of the most important developments in the Environmental landscape and shows how various institutions are responding. It covers issues such as: Food wastage, energy efficiency, the type of campuses that will represent the future among other things. The stories of how higher educational institutions around the globe have implemented initiatives to deal with these environmental challenges make for interesting reading.

Decision makers can use the examples provided in this volume to guide their own thinking on how best to strategize and implement operational initiatives in order to respond to the incipient environmental trends in 2018 and beyond.

Happy reading of Volume 1.4 in this series.

The Impact of Environmental Trends in Higher Education

Leading environmental experts agree that the dramatic environmental challenges being faced worldwide as a result of severe weather conditions will affect how tertiary level institutions sustain themselves in the future. This is also true for the Caribbean region which has suffered losses from hurricanes and flash flooding in some of its territories. Universities will now have to adapt to the changing environmental landscape by preparing for natural disasters while taking into account issues relating to improving energy efficiencies, measuring environmental footprint, rethinking campus physical structures in their overall planning process.
This Bulletin addresses some of these environmental trends which are most likely to affect the higher education landscape.

The Cambridge Institute for Sustainability Leadership or CISL (2018) notes that the following environmental trends will define 2018. These include: increased volatility, unprecedented climate events, growing levels of automation and public pressure for transparency. The World Economic Forum (WEF) Global Risks Landscape Report (2018) identifies the most pressing environmental issues for 2018 as follows:

- Extreme weather events and temperatures
- Accelerating biodiversity loss
- Pollution of air, soil and water
- Failure of climate change mitigation
- Adaptation and transition risks to a low-carbon futures

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Addressing the Sustainable Development Goals (SDGs)

The UN Sustainable Development Goals provide opportunities for Higher Education Institutions (HEIs) to deliver on their mission of teaching, research and service and thus contribute to the realisation of Agenda 2030. Examples of these activities by HEIs include:

- Sustainability is a required element of every degree programme that is delivered at Anglia Ruskin University (UK) and is also integrated into art exhibitions and volunteer programmes.
- The University of Oxford's Carbon Management System that develops and identifies projects could take action to reduce carbon emissions across campus.
- A Global Issues course offered to first-year science and engineering students at Ecole Polytechnique Fédérale de Lausanne (EPFL; Switzerland) helps them gain 'ready-to-use' skills for their working life on a range of topics relevant to sustainable development, such as health, food, mobility, energy, climate and communication.
- At Korea Advanced Institute of Science and Technology (KAIST; South Korea), the Graduate School of Green Growth (GSGG) seeks to tackle the important issues for sustainability-minded students and world-renowned climate and energy policymakers and scholars.

In the UK, the National Union of Students (NUS) undertook an online survey of higher education students experiences and demand for education for sustainable development, early in 2018 (NUS 2018). Of the total of 3,247 responses received, NUS found that:

- 91% agreed that their place of study should actively incorporate and promote sustainable development.
- 70% would like to see sustainable development issues actively incorporated and promoted through all courses.
- 81% stated that they would like to learn more about sustainable development.
- 45% stated that climate change has been included in teaching during their time in education.
- 31% stated that biodiversity and nature have been included in teaching during their time in education.
- 50% said their studies helped them to make changes to their lifestyles to help the environment.
- 61% stated they would be willing to accept a salary 15% lower than average, to work in a job that contributes to positive social and environmental change.

Environment/sustainability curriculum

Higher education plays a critical role in producing students who have a transdisciplinary understanding of social, economic and environmental sustainability and who can, in turn, play a role in seeking solutions to societal problems. One way HEIs seek to do this is to differentiate themselves and their curricula from other institutions by targeting different learning domains, different stakeholders, and using different teaching methods. For example, Mary Baldwin University, a private liberal arts, masters-level college in Virginia has started its first master's programme designed around environment-based learning (EBL). This programme trains high school teachers to use their local communities and environment to help students develop critical thinking skills, become better problem solvers, learn "deep" content knowledge and become more environmentally literate.[1] In the United Kingdom, The University of Manchester engages first-year students in a simulation programme focussed on designing a sustainable campus for a fictitious university ("Sustainability Challenge").

Food waste and Food Lost

The Sustainable Development Goal #12 focuses on "sustainable consumption and production patterns" and includes among its objectives to "halve per capita global food waste at the retail

[1] See Mary Baldwin University Master Of Education Environment-Based Learning (EBL) https://www.education.edu/program/environment-based-learning-ebl/ for more information.

and consumer level, and reduce food losses along production and supply chains by 2030."

Food waste[2] and food loss[3] have a harmful effect on the environment as up to 40% of the food produced winds up in landfills instead of being eaten (USF 2018,1, Gilliard 2017, 1). Overall, economic losses due to food waste and losses were valued at $27 billion in 2010, increasing to $31 billion in 2017 in Canada or $760 per person annually (Gilliard 2017, 1), while in the United States food waste "costs the average household of four $1365-$2275 annually" (Nikolaus et al 2018, 70). Food waste not only causes limited agricultural resources to be lost impacting on food and nutritional security, but also contributes to air pollution from decomposing food and water pollution due to the runoff from landfills.

Moreover, college campuses as a group waste about 22 million pounds of food each year, which equates to an average of 142 pounds per student living on campus and 38 pounds per student living off campus (USF 2018). Yet, between 11.2% and 13.5% of America's college students are food insecure, meaning these students lack the resources to be able to obtain adequate food, which negatively impacts academic performance, health, and mental health (USF 2018, 1).

University dining halls/cafeterias are generally identified as sources of wasted food. At dining halls at Rhodes University, South Africa "daily food waste generation was estimated at about 555 grams per student or 2 tonnes across all sampled dining halls, translating to about 450 tonnes per year." It is estimated that the "university could save up to US$80,000 annually for every 10% reduction in the current rate of food waste generation" (Painter et al 2016 Abstract).

In South Africa, food waste is influenced by several factors such as distance to dining halls, gender composition at meal times and meal options. Elsewhere, food waste is a by-product of limited experience with (and creativity for) food management as in Poland, while it is influenced by greater spontaneity levels, an alignment towards convenience, limited food management experience, and the 'on-the-go' culture of campus in the United Kingdom (Painter et al 2016, Abstract; Nikolaus et al 2018, 71). Nikolaus et al 2018 study of 58 food wasters at the University of Illinois who lived in a residence (e.g. residence halls at a university or off-campus dwellings) and who had control over some food purchases in the Spring 2016 found that there was a "low awareness and knowledge of the issue among this age group, and many estimated they wasted little, often shifting focus and blame onto other entities" (Nikolaus et al 2018, 76).

The findings of these studies have led to several initiatives at universities and colleges. These include:

- *Food waste audits*: Michigan State University
- *Food composting:* Ursinus College (a liberal arts college) in Pennsylvania, University of Iowa, and University of Regina.
- *Biodegesters/food waste dehydrators*[4]: Michigan State University, University of Michigan, University of California, Davis, Purdue University, University of Saskatchewan, James Cook University.
- *Diversion of food waste to local farmers*: Rutgers University.
- *Food recovery*[5]: Ursinus College, University of Michigan.

[2] Food waste is understood as discarding or alternative (non-food) use of food that is safe and nutritious for human consumption along the entire food supply chain (FAO, 2014).

[3] Food loss is understood as food that spills, spoils, incurs an abnormal reduction in quality such as bruising or wilting, or otherwise gets lost before it reaches the consumer. Food loss typically takes place at the production, storage, processing and distribution stages in the food supply chain (Gilliard 2017, 3).

[4] These produce commodities such as biogas (a blend of methane and carbon dioxide), animal bedding, and fertilizers.

[5] Food recovery refers to the collection of edible food by the poor, or for distribution to the poor and hungry. It takes several forms: gleaning, perishable food rescue/salvage, non-perishable food collection, and rescue of prepared food. See Slow Movement.com for further information. It is estimated that food recovery efforts can divert 1.1 million tons of waste annually, and increase food donations to hunger-fighting non-profits by nearly 1.8 billion meals. See Food Recovery Network e Fiscal Year 2017

- *Research into food waste management: Wageningen University & Research, University of Leeds Living Lab.*
- *Policies:* University of Nottingham and Swansea University in the UK have developed food waste policy/sustainable food policies.

Improving energy efficiency and alternate sources of power

Energy usage and costs are rising in higher education (it's the 2nd largest operations budget line-item after labour) (eCampus News 2017). According to Greenfield (2017, n.p.), "colleges spend 85% of their energy on lighting and heating, and exponential energy demands of additional computer processing are quickly adding to these costs." Further, typical higher education buildings average around 50,000 square feet and each use more than $100,000 of energy annually (Business Energy Advisor). To achieve energy efficiencies HEIs are tapping into new technology and/or making the shift to solar energy.

HEIs are either retrofitting their buildings to be energy efficient or using technology to manage energy consumption. The University of California Santa Cruz (UCSC) retrofitted buildings with more energy-efficient lighting and also developed an institution-wide road map to carbon neutrality.

Campus facilities are among the largest fixed costs that HEIs bear. Facilities management departments are using data in a more insightful and actionable way to save costs such as benchmarking their own performance against that of their peers. The University of Pennsylvania's Philadelphia campus[6] consumes approximately 70 megawatts a day and have an annual electricity bill of about US$28 million a year (Knowledge@Wharton 2016, 44). To reduce costs and increase the reliability of power availability, the University developed a data-driven model, sensors and other embedded systems to predict a building's power consumption. Known as the 'DR-Advisor', it scans historical meter and weather data and other inputs to inform on appropriate adjustments in energy use. In trial runs, it has slashed the cost of power by as much as $44,000 per building (Knowledge@Wharton 2016, 46).

Greenfield (2017, n.p.) notes that "more than 800 colleges or universities across the country [United States] offset a portion of their energy costs with some sort of solar array." For example, Denison University, a private, co-educational, residential four-year liberal arts college in Ohio, installed a large 350 acre solar farm which cuts the university's use of conventional electricity by 15%. Hampshire College, a private liberal arts college in Massachusetts, has successfully tested a system designed to help the college draw all its energy needs from solar power - some 15,000 solar panels will produce 4.7 megawatts of power annually — more than the college needs (SCUP Fall 2018, 13).

SCUP (Fall 2018, 13) observes that a downside of technologies that harvest wind and solar energy is that sunlight and wind vary greatly. According to SCUP, the "new hybrid approach addresses that by combining solar panels with wind turbines and adequate power-storage capacity."

There is also a growing social and environmental consciousness on the part of higher education trustees for ethics-based investments or fund-divestments. As part of an ethical thrust and a concern for the environment, trustees at Johns Hopkins University voted to stop investing in companies that produce thermal coal for electric power as a major part of their business, while Barnard College decided to divest endowment funds from companies that hinder efforts at climate change mitigation efforts. " (SCUP Spring 2018, 13).

Annual Report at https://www.foodrecoverynetwork.org/for more information.

[6] The campus has 185 buildings on more than 300 acres and staff of over 900 persons.

Measuring environmental footprint

The University of Virginia (UVA) recently assessed its nitrogen footprint, which Leach et al (2013, 212) argue has a deleterious impact on the environment and on humans. They note that anthropogenic sources of reactive nitrogen created by humans (e.g. combustion of fossil fuels) have been "identified as one of three global issues in which the rate of change cannot continue without significantly impacting the Earth-system" (212, 213). This reactive nitrogen once in the environment produces a multitude of negative impacts such as smog, soil acidification, eutrophication, biodiversity loss, the greenhouse effect, stratospheric ozone depletion, etc. According to UVA, in order to manage the impact of reactive nitrogen, the first step is assessing an institution's nitrogen footprint.

SCUP (Fall 2018) draws attention to the measuring of nitrogen footprint at campuses noting the collaboration between researchers at the University of Virginia (UVA)[7] (the first institution-level nitrogen footprint model) and the University of New Hampshire. This collaboration has resulted in the release of a comprehensive user-driven online reporting tool for campuses to track, report, and manage their carbon and nitrogen footprints. Sustainability Indicator Management and Analysis Platform (SIMAP) provides a broad picture of environmental impacts and future versions may add tracking of indicators like phosphorus and water (SCUP Fall 2018, 13).

Preparing for natural disasters

The Global Risks Landscape (2018, 3) identified EWE as the combined most likely and highest impact risk of 2018. EWEs' cause major property, infrastructure and/or environmental damage as well as loss of human life.

Following hurricanes Harvey, Irma, and Maria, HEIs administrators began to think about building/renovating buildings to be storm-resistant. After Hurricane Andrew's devastated large parts of South Florida in 1992, the headquarter building of the National Hurricane Center, located on the campus of Florida International University was constructed specifically to withstand Category 5-level winds of up to 185 mph. The building has 10-inch thick, steel-reinforced walls as well as a "central safe zone" protected by a roof of solid concrete that is separate from the building's main roof (SCUP Spring 2018, 14).

The same report notes that in preparation for a major earthquake, engineers at the University of Washington recently received funding to develop a building that can withstand waves from tsunamis. The concept is for a structure with "breakaway" walls on lower floors that could be wiped out by strong waves with the effect of strengthening the overall building to protect its higher floors.

Rethinking campus physical structures

The construction of new university facilities is generally viewed as a sign of that university growth and development. In the United States, between 2007 and 2016 there was a more than 10% growth in campus space eclipsing enrolment growth of just 8% percent for the same period (Sightlines 2017, 3).[8] On examining the sector by groups using the Carnegie Classification system, the gap between space growth and enrolment growth is even more pronounced for masters and baccalaureate institutions. Master's institutions saw an average enrolment growth of less than 4% from 2007-2016, but a 12% growth rate in campus space over that same time period. At baccalaureate institutions, where there was minimal enrolment growth, there was a 6% growth in campus space over the same ten-year period. From 2007 to

[8] Sightline drew on data from 366 HEIs in the U.S. and Canada, with a collective enrolment of 3.1 million students and 1.5 billion total square feet of campus space, including more than 52,000 buildings. Approximately 40 percent of the institutions in the study were private and 60 percent were public.

2016, it was noted that research universities had a 14% enrolment growth exceeding an average of 11% growth in campus space for the same period. This suggests that campus growth does not necessarily correlate with enrolment changes.

SCUP (Fall 2018, 14) cites an example where evaluation of institutional factors and demographics changes influenced physical planning. Fayetteville State University demolished two dormitories and decided not to rebuild them as the school is serving more adult students who do not need dorms.

SCUP (Spring 2018, 14) speculates that the campus of the future will most likely include hand-held devices as trends like online learning, modular learning, competency-based credentialing, and learning on demand become more popular. As a result, it is anticipated that the physical dimensions of campuses will also have to change as campus master plans focus on consolidation rather than expansion.

For campuses pursuing capital projects in the United States, SCUP (Fall 2018, 13) notes that "construction might get more expensive" as "most regions of the United States have a shortage of skilled laborers" who specialise in concrete, electrical, drywall, and erecting steel as well as green skilled labour. This shortage can drive up labour costs.

Considering the cost of "net zero" buildings are seen as crucial in the design phase. For instance, state budget woes have delayed the progress of the Electrical and Computer Engineering (ECE) Building at the University of Illinois at Urbana-Champaign (UIUC), a US$95 million project which commenced in 2011. It is expected that solar panels will be installed by the end of 2018, which would contribute to the building being a net-zero facility (SCUP Fall 2018, 14).

Rethinking Animal Research

Animal research has been used for scientific and medical purposes to develop medical treatments, determine the toxicity of medications, check the safety of products destined for human use, and other biomedical, commercial, and health care purposes. While proponents of animal testing say that it has enabled the development of many life-saving treatments for both humans and animals, opponents say that animal testing is unnecessary, cruel and inhumane, regardless of its purpose or benefit. The bioscience community notes that animals should be used for research only within an ethical framework.

SCUP (Spring 2018, 13) notes that many "colleges and universities maintain facilities for animal research that can be both expensive and controversial." A researcher at the University of Windsor (Canada) recognises that there is disconnect between information gained from animal experiments and results in humans, and founded a center that seeks to replace animals in biomedical research with research that instead uses human cells, biomaterials, and other methods.

Conclusion

Higher Education Institutions including The University of the West Indies can effectively promote sustainable development practices throughout its campuses by integrating plans for the managing the anticipated changes in the environmental landscape, in its overall strategic planning exercise. These include redesign of current buildings to withstand the shocks of inclement weather, the creation of more eco-friendly spaces for both students and staff while improving energy efficiencies and exploring alternate sources of power.

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UWI "Triple A" Strategic Plan: Revitalizing Caribbean Development

Do you know that the there are five **Core Values** of the current 2017-22022 Strategic Plan?

They are: Integrity, Excellence, Gender Justice, Diversity and Student Centeredness.