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Trends in Higher Education

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Message from the Publisher

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This issue of *Trends in Higher Education* comes at a time when the world is facing one of its greatest challenges of this era - the spread of the deadly COVID- 19 pandemic, which is threatening to wipe out huge segments of the world population, if not stopped as soon as possible. The COVID-19 pandemic brought about by the novel coronavirus has impacted every sector of society so far and will no doubt have tremendous impact on higher education institutions, now and in the future. The full impact of the virus is yet to be estimated, but all indications point to dramatic changes in the socio-economic and political fabric of life. It will not be business as usual when this virus is fully under control and eliminated. For higher education institutions like UWI, additional and unplanned costs have now been added to already dwindling budgets as universities are now forced to transition to virtual universities, delivering teaching and learning online. HEIs are now forced to rethink, restrategise on how they are going to cut costs and raise revenues simultaneously. Their very survival depends on it!

The materials presented in this volume provide insights into how developments in the environmental landscape can provide opportunities for cost reduction and revenue generation for HEIs globally and regionally as well. This issue covers areas such as reduction in carbon footprints; access for persons with disabilities; and developments on the climate front. These issues and others are explored more fully in the volume. Please enjoy.

Environmental Trends and Covid-19 Pandemic in Higher Education

The 50th Anniversary of Earth Day was celebrated on April 22 amidst the outbreak of the novel coronavirus under the theme "Climate Action" to inter alia protect against global heating, halt biodiversity and habitat loss and sustain planetary health. The importance of a safe, clean, and sustainable natural environment remains conducive to reducing the risk of future pandemics and protecting the rights and health of persons. The COVID-19 pandemic showed that human health is intricately linked to the ecosystem in which we live in with some experts noting that changes in the environment could impact the severity of the pandemic.[1] Experts argue that habitat and biodiversity loss are responsible for creating the conditions for the novel coronavirus and other zoonotic infections to be transmitted from animal hosts to humans, which can become pandemics. While the relationship between coronavirus and climate change is unclear according to the World Economic Forum (WEF (1) 2020), a key takeaway from the "COVID-19 pandemic and how it relates to climate change is that well-resourced, equitable health systems with a strong and supported health workforce are essential to protect us from health security threats, including climate change" (WEF 2020). The outbreak of the novel coronavirus had severe implications for higher education in the context of national lockdowns leading to closure of some campuses. In addition, isolation measures have led institutions to transition fully to online learning, remote work, and shifts in the pattern of energy consumption from the institution to households.

In late 2019, Australia experienced mega bush fires, which revived the conversation about global warming and climate change in that country. It also resulted in the Australian universities becoming a

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leading force in framing the conversation along these lines and making propositions to the public and private sectors, in this area. Speculation remains high on the direct impact on Australia's role in the international higher education industry. However, the mega bushfire underscores the importance of environmental issues and its impact. The WEF *Global Risks Report* (2020) identifies the most pressing environmental issues by likelihood over the next 10 years as follows: extreme weather events, climate action failure, natural disaster, biodiversity loss and human-made environmental disasters.

The Caribbean region is expected to be affected by an active 2020 Atlantic hurricane season with a forecast of 14-20 storms (Berardelli 2020). Disaster experts are concerned with the capacity of countries to manage the combined effects of landfalling hurricanes and the coronavirus. It means that evacuation and shelter plans will have to take into consideration distancing and other health-related protocols. Universities will have to adapt to this changed environmental landscape by reviewing and updating its own natural disaster plans and bringing it in line with the new normal resulting from COVID-19. HEIs will also have to contemplate issues relating to their built environment, and improving accessibility and measuring their facilities footprint in their overall planning process. Further, universities will have to consider the impending effects of global warming and climate change and their geographical location.

While fully autonomous vehicles may be a few years away, electric vehicles are transforming our society, economy, transportation system and infrastructure including that of universities. This Bulletin addresses some of these environmental trends which are most likely to affect the higher education landscape.

Autonomous vehicles and changing infrastructure

Campuses are transportation hubs with high vehicle use dependence by university-owned vehicles with a concentration of staff and students' drivers and commuters. This has implications for accessibility, traffic management, parking, and designated drop-off spaces, which impact the infrastructural designs of campuses. According to the International Energy Agency (2019), "electric car deployment has been growing rapidly over the past ten years, with the global stock of electric passenger cars passing 5 million in 2018, an increase of 63% from the previous year." Moreover, "EVs [electric vehicles] on the road consumed about 58 terawatt-hours (TWh) of electricity…. and emitted 41 million tonnes of carbon-dioxide equivalent (Mt CO2-eq), while saving 36 Mt CO2-eq compared to an equivalent internal combustion engine (ICE) fleet" (IEA 2019). In other words, EVs contribute to lower carbon emissions overall. Most universities in the United States are in urban areas, which is viewed as ideal for EV car-sharing programmes and short-distance trips. However, the presence of EVs on campuses will require the installation of on-campus charging stations that can connect to university ID cards to start charging.

According to experts, EVs contribute strongly to the advancement and adoption of autonomous vehicles because of its "faster charging infrastructure, battery durability, longer range, safe and regulated technology, and protection of personal and vehicle data" (Srinivasan n.d.). Fully autonomous vehicles (AVs) may be a decade or more years away[2], but it will transform our society, economy, transportation system and infrastructure. SCUP (2019) citing a report from McKinsey & Company drew attention to the infrastructural shifts required for AVs and what it may mean for campuses. The report offers suggestions for infrastructural designs that include building staging areas and modifying curbs, to create designated areas (perhaps supported with embedded sensors and other smart technology) where individuals will connect with ride-share services. Designated mobility hubs will help travelers connect with cars, scooters, bikes, and mass transportation (SCUP 2019). Moreover, SCUP (2019) envisages a future

where campuses might become host to facilities with shareable AVs, including university-owned AVs, that are stored, and serviced (SCUP 2019).

In an innovative research partnership between North Carolina State Campus and the North Carolina Department of Transportation, the university is testing an AV that can ferry 12 passengers and completes its one-mile route in about 12 minutes. It uses cameras, radar, global positioning systems and electronic sensors to navigate. During a six-month pilot programme the EasyMile's EZ-10 will use a specified route on NC State, which provides a robust space because of the "frequent use of multiple modes of transportation interacting with pedestrian traffic" (Peeler 2020). By piloting the state's first AV, it provides the university with valuable information on how future technologies will affect the infrastructure and transportation network in terms of traffic signal interaction, curb height, rider use and pedestrian traffic.

Improving accessibility for the visually impaired

Approximately 15% of the world's population, experience some form of disability (World Bank 2020) and at least 2.2 billion people have a vision impairment or blindness (WHO 2019). The National Federation for the Blind (US) estimated that 15.7% of those who reported having a visual disability in 2016 had earned a bachelor's degree or higher at an accredited higher learning institution. The needs of this sub-population will have to be considered in the design of new buildings and/or projects to rehabilitate existing facilities and make campus sites navigable.

The University of Guelph installed Blind Square, an app-based wayfinding system, which provides audible information about their surroundings. The system was installed in several high-traffic buildings providing users with information to navigate corridors, stairways and elevators and avoid indoor obstacles. Moreover, it "blends information from outdoor GPS and an indoor collection of beacons and QR codes" (SCUP 2019). The system provides the user with information to improve manoeuvrability indoors and information that allows them to interact with the external environment while maintaining their independence and dignity.

Reducing the facilities footprint

There is a growing disconnect between space growth and enrollment trends and between space growth and student success. In the last decade, a building boom on American campuses ranged from 8.5% to 19%, depending on institution type, which was related to replacement or renewal of ageing infrastructure and to keep pace with programmatic changes and rising student expectations (Gordian 2020). This highlights the importance of metrics used to assess space utilisation year by year, which could objectively gauge the effectiveness and usefulness of learning spaces (SCUP 2020).

Enrollment of traditional aged students, which has been declining over the years, is projected to increase by 2026. This call into question the value of the physical facilities expansionist strategy. Additionally, the contraction in revenues to annual investment targets for facilities stewardship and maintenance approached a 20% shortfall in 2018. Also a facilities backlog, which grew nearly 30% over the last decade has created conditions for deferred maintenance and physically displeasing facilities for incoming students and potential staff while placing student learning and research efforts at risk (Gordian 2020). With HEIs now utilising online learning for the remainder of semester II of 2019/2020 together with the projection of declines by most institutions in both domestic and international student numbers for the AY2020/2021(ICEF Monitor April 2020); HEIs are now offered opportunities to realistically explore space inventory and facility utilisation strategies and thus, build flexible plans based on different enrollment scenarios.

Based on space utilisation analysis, Oberlin College found that their overall physical footprint is significantly larger than it needs to be

to achieve its mission and that it can be reduced by 20% (SCUP Spring 2020). [3] Various methods are available to prioritise maintenance needs. For example, Western Illinois University uses a Strategic Building Renovation Matrix, which includes ten metrics such as utilisation, staff and student needs, and maintenance needs to help make choices about facilities upkeep.[4]

While improving financial and operational efficiencies, reduction in an institution's physical footprint will have an impact on staff complement needed to staff and maintain facilities. To help leaders achieve their institutional mission amid the current environment Gordian (2020) also proffered four key strategies: actionable institutional planning, aligning priorities, transparent communication and controlling and optimising facilities expenditures.

Sophisticated Acoustics

Classroom acoustics have not changed much since the 1960s according to SCUP (2019), but recent advances in building science, classroom configuration and materials are changing that. Changes in pedagogy, such as active learning, the flipped classroom, etc. are also necessitating a reconsideration of acoustics in learning spaces especially, in new or renovated buildings. Previously, microphones help teachers roam classrooms, but with new building materials (e.g. metal studs and drywall) it makes it easier to separate sounds. Cooper and Holden (2018) note that in the not-so-distant feature, "sophisticated, always-on voice amplification systems will be incorporated directly into the classroom, with mics installed in the ceiling."

Sustainable Building

As HEIs commit to sustainability, climate change action and carbon footprint reduction, many universities are looking at sustainable building practices. The outlook has shifted from how buildings can do less environmental harm to how can buildings do more to improve both the human and natural environment. Georgia Tech created a product from that regenerative design thinking, the Kendeda Building, which was designed to help restore a functioning ecosystem and the watershed that feeds it. In other words, the building was designed to be net positive in terms of clean energy, water, and "in the balance between materials that we diverted from the landfill and those that went to landfill" (SCUP 2020).

Also, Georgia Tech has a "tree-cycling" programme to mill fallen trees on campus for use on construction and furnishings and a warehouse that is used as a staging ground for harvesting salvaged materials in other construction projects. Further, HEIs account for their direct operational carbon footprint in new construction and renovation, but can overlook the "often larger impact of the embodied carbon hidden within the materials and goods procured throughout their supply chain" (Interface Inc.) such as flooring, windows, furniture and insulation. This hidden carbon footprint can significantly undercut the stated sustainability goals of many universities around.

The survival of campuses and climate change

A special report on climate change confirmed that climate change is already affecting all aspects of the society. It notes that "climate-related risks to health, livelihoods, food security, water supply, human security, and economic growth are projected to increase with global warming of 1.5°C and increase further with 2°C" (IPCC 2018). It requires increased and urgent mitigation efforts "incorporating strong linkages across sectors" and "facilitating partnerships among public, civic, private sectors and higher education institutions" to limit warming to 1.5°C (IPCC 2018).

The effects of climate change will also impact HEIs. Moreover, the scale of the challenge means that campuses will likely navigate increasingly difficult transitions. Concerns about how tertiary education would respond to climate change was considered by futurist Bryan Alexander.[5]

Specifically, the impact of temperatures and sea levels rise on cities and landscapes will lead to climate-induced migration (termed Great Academic Migration). Certain areas of United States due to rising heat, aridification/desertification or increase in sea-level or extreme weather may become untenable forcing HEIs to relocate inland (Appalachia or the Midwest) and/or upwards (the Cascades, the Rockies, or, once more, to Appalachia) and/or north (the upper midwest, upper New England, the Dakotas).

Campuses will have to contend with the associated financial cost as well as changes and cost for operations and plant revamping. Alexander (2019) speculates about the opportunity for climate change engagement between HEIs and businesses, governments and non-profits for climate change mitigation and adaptation. For example, in late 2019, Environment America Research & Policy Center launched 30 campaigns in 11 states urging colleges and universities to generate 100% of their energy from renewable sources. The initiative aims to get 150 schools to commit by 2021 to exclusively using renewable energy. Alexander (2019) also envisages that a climate change arms race will emerge which will encompass new buildings and academic programmes aimed at various aspects of the climate crisis to attract students, faculty, staff, and funding.

Academia's teaching mission will be forced to adapt with the new programmes or curricular changes. Also, climate-focussed schools (undergraduate or postgraduate) may appear within universities, or a climate change college may appear online (Alexander 2019). Moreover, the method of teaching will change – there is likely to be an increase in distance learning and other forms of remote collaboration. Pedagogical experiments like the use of gaming at the University of Chicago is used to teach climate change activism.[6] Campuses can act as anchors for discussion and action and "can serve as 'hubs' in their local communities for creating, testing, and disseminating knowledge about regional climate projections and adaptation strategies, and should work directly with their local communities to explain the science and implement solutions" (cited by Alexander 2019).

Conclusion

HEIs including The University of the West Indies can effectively promote sustainable development practices throughout its campuses by integrating plans for managing the anticipated changes in the environmental landscape, in its overall strategic planning exercise. These include considering the effects that global warming and rise in sea-levels would have on our campuses; reducing carbon footprint; infrastructural changes that would accompany technology changes; and how the academy can further engage in environmental advocacy.

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[1] Gao (2019, 2) noted that "The ever-increasing human population and their encroachment on undeveloped areas inhabited by wild animals have led to the emergence of previously unknown diseases. Zoonotic infections, transmitted from animal hosts to humans, account for approximately 60% of total infectious diseases in humans, and 75% of all new and emerging infectious diseases. Importantly, the infectious disease outbreaks during the 21st century have all virtually arisen from zoonotic infections." See https://doi.org/10.1016/j.bsheal.2019.03.001.

[2] According to IDTechEx's latest report titled "Autonomous Cars and Robotaxis 2020-2040", up to 10% of all new cars sold by 2030 would be Level 3+ autonomous (Conditional Driving Automation). Among the highly autonomous cars (Level 4+) sold, over 75% will be for shared mobility services, and the private autonomous cars will remain niche (mostly for premium cars) until 2030. Level 4+ private-owned autonomous cars will increase rapidly after 2030 as costs come down and the market share will reach 42 percent by 2040. See Na Jiao, "How Close are we to Autonomous Cars?" IdechEx. Website. December 13, 2019. https://www.idtechex.com/en/research-article/how-close-are-we-to-autonomous-cars/19191.

[3] The properties all have a ratio of deferred maintenance to replacement cost at or above 0.65, which is a national facilities guideline for determining when buildings have outlived their useful life (Gordian 2020).

[4] For the illustration of the **Western Illinois University's** Strategic Building Renovation Matrix and the indicators, see https://eab.com/insights/daily-briefing/facilities/10-criteria-to-consider-in-deferred-maintenance-decisions/.

[5] The analysis covers global higher education, with some emphasis on American colleges and universities. Its timeline covers the next two generations, or roughly from now (2019) to 2080 or so. It assumes a worldwide environmental change baseline of two degrees of global temperature increase, a significantly greater incidence of extreme weather, some stresses to food and water supplies, and economic fluctuations. See https://bryanalexander.org/climatechange/how-will-higher-education-respond-to-climate-change-part-1/.

[6] For more on this, see UChicago News, https://news.uchicago.edu/story/alternate-reality-game-sparks-innovative-student-ideas-about-climate-change.