

지속가능한 캠퍼스 조성을 위한 관리 운영에 관한 연구

- 7개 대학교 사례를 통한 전략 및 동향 분석 -

Critical Analysis of Sustainable Strategies in Higher Education Institutions

- An Eco-Friendly Approach Within the Campus Built Environment -

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Abstract

This paper aims to research and compare diverse university-based green sustainable office schemes along 7 universities with the intention of identifying different practices toward environmental preservation. Through examining sustainable offices' modalities across different universities - this paper expects shared norms as well as differing factors embedded within each institution's working dynamics - enabling the comprehension of similarities associated with them. Furthermore, sustainability measures regarding financial and operational performance are explored alongside demonstrating techniques for motivating personnel to adopt environmentally conscious practices.

키워드 : 친환경 건축, 지속가능성, 그린 캠퍼스

Keywords : University Sustainability Offices, Sustainability, Green Building, Green Campus

1. Introduction

As our planet's environment rapidly changes, academic institutions, such as higher education institutions, are addressing sustainability concerns. In recent years, these organizations have become more aware of how proactive cessation can help reduce climatic catastrophes. Moreover, universities with their intellectual histories stand out as centres of catalyzing knowledge transmission for leading the way toward a sustainable future. One encouraging approach these institutions have introduced is through establishing sustainable offices within their premises. These offices play a key role in promoting eco-friendly solutions, reducing carbon emissions in their respective spaces, and building a more environmentally conscious culture. Thus, this research discusses how a compilation of extensive practices in educational administrative spaces among these universities, are promoting sustainable operations.

1.1 Research Objectives

The focus of this analysis centres on analyzing sustainable office practices at universities through a comparative examination that identifies strategies for reducing

environmental impact while enhancing operational efficiency. Exploring various approaches and practices while analyzing their effects, this will provide actionable recommendations that can help ensure reduced carbon footprints and more ecologically friendly campuses that are realized by universities.

2. Background

When examining sustainable practices in university offices, it is important to identify both similarities and differences in their approach. Such critical analysis allows the knowledge to gain valuable insights about the benefits and challenges of each method. This research will look at the sustainability performance of universities after they have implemented operational and financial initiatives providing long-term benefits of environmental conservation. Additionally, universities seeking to achieve sustainability goals can adopt green building practices that promote eco-friendliness.

The Sustainability Tracking, Assessment & Rating System (STARS) developed by the Association for the Advancement of Sustainability in Higher Education (AASHE), presents a comprehensive framework that aids universities in measuring their performance across various dimensions such as academics, operations, engagement, and planning.¹ Participating in STARS enables institutions to track progress

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over time while setting benchmarks for internal decision-making processes. Furthermore, it provides a platform for communication of sustainability achievements with internal stakeholders as well as external partners.

Moreover, the International Sustainable Campus Network (ISCN) has developed the ISCN Sustainable Campus Charter 2018, which reflects guiding principles on issues regarding research education institutions' role in developing strategies required for a sustainable future through five calls to action for institutional leadership: embedding sustainability into governance organs such as operations learning/research community; cultivating a resilient environment; engaging with government and civil society to spread similar knowledge and best practices benefiting communities where they serve; support research initiatives that drive sustainable changes.² Universities that are part of ISCN experience various benefits such as elevated reputation, knowledge-sharing opportunities and possibilities for cross-collaboration efforts.

3. Method: University Implementation

A deliberate and strategic selection of universities was made to provide a comprehensive analysis of sustainable office practices across diverse academic environments. Harvard University's esteemed reputation and longstanding commitment to sustainability, alongside Cornell University's contribution to its expertise in sustainability initiatives tailored to the Northeastern United States. The University of Arizona offers unique perspectives on sustainability solutions for arid regions, while Stanford University's presence in Silicon Valley provides an opportunity to explore the intersection between sustainability and technological innovation. UC Berkeley's progressive values in its urban context and the University of Minnesota's insight into sustainable practices tailored to agricultural regions in the Midwest further enhance the analysis. Lastly, the University of British Columbia's dynamic academic environment within a natural setting offers valuable case studies. It is the objective of this study to identify common trends and innovative strategies within the sustainability practices of these institutions, focusing on environmental solutions and contributing to broader discussions about sustainability in higher education.

3.1 Renewable Energy in Higher Educational Institutions

Increasing the use of renewable resources has become vital in higher education. Innovative solutions such as solar power, wind turbines, or geothermal generators provide cost-effective sustainability alongside valuable academic opportunities in clean technology research that supports responsible natural resource management.³ Through the use

of carbon-neutral electricity production capabilities, universities can demonstrate their commitment to achieving a balance between economic necessities and ecological equity by incorporating sustainable energy options into the campus infrastructure design.⁴ As a result, institutions can allocate funds previously expended on utilities to essential areas such as academics or student programs, made possible with renewable energy savings.

3.2 Sustainable Practices

Today's universities recognize the importance of taking action against environmental issues by practicing various sustainable techniques aimed at reducing ecological harm. An example of such an approach is energy conservation policies such as using smart thermostats or installing efficient lighting fixtures while deploying renewable energy sources.⁵ Furthermore, recycling programs are common with institutionalized systems that are made available campus-wide for comprehensive disposal facilities specializing in paper reduction measures and single-use plastic avoidance campaigns.⁶ Sustainable transportation schemes, including bike-sharing and electric vehicle stations, have been another key aspect, with innovative implementations recommended along with eco-friendly transportation options such as car-pooling and public transportation.⁷ Additionally, menus featuring organically sourced food items from local farms, alongside food-waste minimization plans are enforced in various institutions.⁸

3.3 Green Building Practices

Green building has resulted in numerous efforts to make campuses more environmentally conscious. As a part, universities contribute to sustainable development by employing efficient construction techniques that meet or exceed environmental standards such as LEED (Leadership in Energy and Environmental Design) certification.^{9,10} Several innovative technologies are implemented in these green building structures, such as enhanced insulation materials that maximize heating/cooling requirements, high-performance windows that regulate sunlight and reduce energy costs, air quality-optimal ventilation systems that minimize energy loss, and HVAC systems made without harmful chemicals providing maximum performance levels when required in a sustainable manner.¹¹ Thus, to generate renewable energy and reduce water usage in external spaces, universities have implemented advanced technologies such as rooftop solar panels, rainwater harvesting systems, and green roofs that conserve resources.^{4,12} By incorporating these sustainable measures into the infrastructure, universities not only contribute to environmental conservation but also improve the quality of life for all occupants.

3.4 Educational Programs

Within universities, the increasing prevalence of educational programs focusing on sustainability demonstrates their awareness of the importance of addressing environmental challenges.¹³ Students and staff are provided with knowledge through these programs that comprise an understanding of principles such as those relating to environmental stewardship. A comprehensive curricular approach aimed at promoting diverse approaches creates opportunities for innovative solutions by promoting critical thinking skills and problem-solving, while supporting interdisciplinary interactions both within and outside of the classroom – thus empowering stakeholders to address complex environmental issues.¹⁴ In addition, such programs equip students and faculty with a sense of responsibility that encourages to adopt sustainable practices in their daily lives. As a result, this contributes to environmentally conscious individuals making informed decisions which leads to an equally conscious society.

3.5 School-Identified Green Rating Systems

Institutions are promoting environmentally friendly practices through customized green certification programs tailored to their needs. As examples of institutions that have advocated sustainability within their campuses through such measures, UC Berkeley, and Cornell University are exemplary. UC Berkeley’s “UC Berkeley Green Labs and Certification” is aimed at recognizing environmentally conscious laboratories for the implementation of sustainability and efficiency practices. Labs can achieve credits in the areas of Energy Efficiency, Water Efficiency, Waste Reduction, Chemicals, Purchasing, and Education, and evaluate potential areas of improvement.¹⁵ Cornell University’s “Cornell Green Office Certification Program” includes a point-based, self-assessment checklist which offices use to assess their current practices, set goals to initiate new patterns, and earn recognition for their efforts in the following areas; using this program to complete an office certification, or the guidelines to help target areas for improvement in campus units.¹⁶ These programs are an innovative approach, and environmental performance standards can be continuously improved through the recognition of these practices. These certification programs demonstrate commitment to shaping eco-ethical futures and set a framework for other educational institutions to follow.

3.6 Sustainability Funding

As part of sustainability plans, various universities have provided funding to help advance their goals.¹⁷ This enables universities to invest across a range of projects and initiatives geared towards making eco-friendly choices.

Providing funding for such efforts ensures its prioritization creating incentives for innovation while yielding an impact on sustainability. An example case would include the Campus Sustainability Fund (CSF), supporting sustainable projects and initiatives within the University of Arizona. Every student enrolled in CSF is assessed a small fee for the fund, which is intended to develop environmentally conscious students early in their academic careers, and reallocate the resources generated to environmental conservation initiatives on campus and in the surrounding communities. To meet collective goals for environmental conservation, the funding is used for a variety of practical projects to meet collective goals for environmental conservation.¹⁸ Furthermore, this fosters institutional values by promoting comprehensive engagement with students/staff participation. Providing such offices tasked with maintaining institutions’ active green status is exemplary in responsible commitment to protecting our planet.

Fig 1. Sustainable Office Implementations per University

School	Renewable Energy Use	Sustainable Practices	Green Building	School Identified Green Rating System	Sustainable Funding	Educational Program	STARS
Harvard University	0	0	0	-	0	0	0
Cornell University	0	0	0	0	0	0	0 (Platinum)
University of British Columbia	0	0	0	-	0	0	0
University of Arizona	0	0	0	-	0	0	0
UC Berkeley	0	0	0	0	0	0	0 (Platinum)
University of Minnesota	0	0	0	-	0	0	0 (Gold)
Stanford University	0	0	0	-	0	0	0 (Platinum)

4. Results

Below are the outcome statistics of sustainable offices:

4.1. Renewable Energy

As reported by the Association for the Advancement of Sustainability in Higher Education (AASHE) in 2023, 340 universities scored an average of 40.1% with the highest point of 99.7%, which has increased by 4.3% from 2019 - reporting successful implementation of renewable energy such as wind, solar, and geothermal power.¹⁹

4.2 Sustainability Practices

Universities across the world are swiftly moving towards more sustainable operations with a role in upgrading sustainability practices across campuses while simultaneously reducing excess campus-generated waste materials. On average, the schools analyzed, reported between 2020 and 2022, have diverted up to 50-65% away from landfills through programs such as targeted recycling campaigns and large-scale compost initiatives.

4.3 Green Building Practices

Encouraging outcomes can be directly linked to the adoption of green buildings. As evidence suggests a considerable fraction of higher learning institutions with such facilities now holding LEED certifications for their structures.

4.4 Educational Programs

Academic curricula prioritizing sustainability education in higher learning institutions equipped with such facilities can provide courses, dedicated towards learning about sustaining our resources for current and future generations. Consequently, this provides an opportunity for individuals to further understand environmental challenges whilst providing methods for innovative solutions.

4.5 School-Identified Green Rating Systems

Several universities are leading the way in promoting environmental stewardship with comprehensive green rating systems designed to evaluate progress toward achieving high standards in sustainability performance. Establishing relevant certification schemes within institutions results in campuses meeting ecologically sound criteria identified by such initiatives; demonstrating progress towards enhancing environmental responsibility within educational settings.

4.6 Sustainability Tracking, Assessment and Rating System

STARS, a comprehensive sustainability rating system developed by AASHE, has been instrumental in tracking and improving sustainability performance at universities. Over 1,000 universities worldwide have used STARS, with sustainable offices playing a key role in the data collection and reporting process.²⁰

4.7 Sustainability Funding

Funding secured by offices fully committed to ensuring sustainable practices across operations via various projects aimed at promoting sustainability. Universities are making a meaningful contribution to advancing the agenda through eco-friendly focused investments. Through the data presented, it is evident that universities have effectively integrated sustainable practices within their offices to yield tangible outcomes. These outcomes encompass facilitating movement towards a more sustainable environment.

5. Conclusion

Implementing sustainable offices at higher education institutions has proven to be a highly rewarding engagement, contributing to the achievement of sustainability goals while cultivating environmental responsibility among campus communities. It is achieved through various initiatives, including renewable energy sources, implementation of green

building standards, sustainability practices, funding mechanisms, rating systems, and educational initiatives. Educational institutions can increase visibility through the advancement of exemplary sustainability models that inspire communities to reduce environmental challenges and promote sustainable solutions. As society seeks solutions to mitigating climate change and promoting sustainable development, the ability to demonstrate dedicated commitment in sustainable aspects becomes increasingly important. As a result, these offices encompass a variety of efforts that impact individuals and institutions of higher education. Prioritizing sustainability remains crucial for universities striving to establish sustainable campuses and society at large.

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