



UNIVERSITI  
TEKNOLOGI  
MARA

Cawangan Perak

VINSPIREd  
Virtual Ispoh International Summit on  
Professionalism, Research and Education 2022

leGRESAFE  
2022

E-PROCEEDING OF

1<sup>st</sup> INTERNATIONAL  
E-CONFERENCE ON  
GREEN & SAFE CITIES  
2022

“Sustaining the  
Resilient, Beautiful and Safe Cities  
for a Better Quality of Life”

20 & 21 SEPTEMBER 2022

Organisers:



THE UNIVERSITY  
OF QUEENSLAND  
AUSTRALIA



Co-organisers:

OFFICE OF RESEARCH, INDUSTRIAL LINKAGES, COMMUNITY &  
ALUMNI (PJM&A), SERI ISKANDAR CAMPUS  
DEPARTMENT OF BUILT ENVIRONMENT STUDIES & TECHNOLOGY (JABT),  
FACULTY OF ARCHITECTURE, PLANNING & SURVEYING (FSPU)

<https://myse.my/gresafecities2/leGRESAFE/>



**e-PROCEEDING OF**  
1<sup>st</sup> INTERNATIONAL E-CONFERENCE ON  
**GREEN & SAFE CITIES**

“ **Sustaining the Resilient, Beautiful and Safe  
Cities for a Better Quality of Life** ”

**ORGANISED BY**

Gresafe\_Cities RIG  
The University of Queensland, Australia  
Kampus Hijau UiTM Perak

**CO-ORGANISED BY**

Research, Industrial Linkages, Community  
& Alumni Network (PJIM&A)

© Unit Penerbitan UiTM Perak, 2022

All rights reserved. No part of this publication may be reproduced, copied, stored in any retrieval system or transmitted in any form or by any means; electronic, mechanical, photocopying, recording or otherwise; without permission on writing from the director of Unit Penerbitan UiTM Perak, Universiti Teknologi MARA, Perak Branch, 32610 Seri Iskandar Perak, Malaysia.

Perpustakaan Negara Malaysia

Cataloguing in Publication Data

No e ISBN: 978-967-2776-13-0

Cover Design: Muhammad Falihin Jasmi

Typesetting : Ts Dr Azizah Md Ajis

## ORGANISING COMMITTEE

Patron	: Prof. Sr. Dr Md Yusof Hamid
Advisor	: Assoc. Prof. Ts Dr Norhafizah Abdul Rahman
Chairman 1	: Assoc. Prof. Ts Dr Siti Rasidah Md Sakip
Chairman 2	: Assoc. Prof. Sr Dr Nur Azfahani Ahmad
Secretary 1	: Ms Nur'Ain Ismail
Secretary 2	: Ms Nurhidayah Samsul Rijal
Treasurer 1:	: Dr Nor Nazida Awang
Treasurer 2	: Dr Nadiyah Mat Nayan

### MAIN SECRETARIAT

Invitation & Sponsorship	: Ts Dr Ida Nianti Md Zin (L) Dr Nor Eeda Ali Ms Nur'Ain Ismail Ms Nurhidayah Samsul Rijal Ts Ahmad Haqqi Nazali Abdul Razak
Participation, Registration & Certificates	: Dr Atikah Fukaihah Amir (L) Ms Marina Abdullah
Graphic & Printing	: Mr Muhammad Falihin Jasmi (L) LAr Ruwaidah Borhan
Promotion & Website	: Ts Nur Hasni Nasrudin (L) Ts Sr Dr Asmat Ismail
Information technology (IT & AV) & Media	: Mr Aizazi Lutfi Ahmad (L) Mr Muhammad Anas Othman Mr Tuan Sayed Muhammad Aiman Sayed Abul Khair
Scientific Reviewers & Publication	: Assoc. Prof. Sr Dr Thuraiya Mohd (L) – Sc. Reviewer Assoc. Prof. Dr Sallehan Ismail (L) - Journal Assoc. Prof. Sr Dr Siti Aekbal Salleh Assoc. Prof. Dr Kharizam Ismail Assoc. Prof. Ts Dr Siti Akhtar Mahayuddin Assoc. Prof. Sr Dr Nur Azfahani Ahmad Assoc. Prof. Sr Dr Natasha Khalil Dr Puteri Rohani Megat Abdul Rahim Ts Dr Azizah Md Ajis Sr Dr Asmalia Che Ahmad Dr Dzulkarnaen Ismail Dr Lilawati Ab Wahab Ms Marina Abdullah
Event Manager & Moderator	: Ts. Ahmad Haqqi Nazali (L) IDr Dr Othman Mohd Nor TPr Dr Kushairi Rashid Dr Mohd RofdziAbdullah Ar Haji Azman Zainonabidin
Banquets & Charities	: Ms Noor Faiza Rasol (L) Mr Afzanizam Muhammad Ms Siti Rohamini Yusoff

## CHALLENGES IN IMPLEMENTING GREEN CAMPUS INITIATIVES IN THE MALAYSIAN PUBLIC UNIVERSITIES

Ahmad Afiq Mohd Muhiddin<sup>1</sup>, Haryati Mohd Isa<sup>2\*</sup>, Siti Rasidah Md Sakip<sup>3</sup>,  
Daljeet Singh Sedhu A/L Janah Singh<sup>4</sup>

**\*Corresponding Author**

<sup>1,2,3</sup>Faculty of Architecture, Planning and Surveying, UiTM Perak Branch,  
Seri Iskandar Campus, 32610 Bandar Seri Iskandar, Perak

<sup>4</sup>Academy of Language Studies, UiTM Perak Branch,  
Seri Iskandar Campus, 32610 Bandar Seri Iskandar, Perak

ahmadafiq@yahoo.com  
\*harya966@uitm.edu.my  
sitir704@uitm.edu.my  
drdaljeetss@uitm.edu.my

### *Abstract*

The direction toward sustainability has become the most crucial issue globally, including in higher education institutions, due to its responsibility to produce future leaders of the nation. Therefore, the university should seriously play its role toward realizing environmental sustainability. Consequently, numerous Malaysian public universities have begun to take this issue seriously. However, there are several challenges encountered. This paper aims to examine green campus implementation in Malaysian public universities. Thus, the main objective is to determine the challenges faced by Malaysian public universities in implementing green campus initiatives. Semi-structured interviews with the senior Green Campus representatives from three Malaysian public universities were conducted, and the findings were analyzed using content analysis. The research revealed that although most Malaysian public universities had implemented green initiatives indicators outlined in the UI GreenMetric Guideline 2022, numerous challenges occurred. Some of the challenges are repetitively for numerous indicators. Among the challenges identified are limited spaces and infrastructures, lack of finance, lack of knowledge and awareness among campus communities, lack of support from the university management and stakeholders, lack of green campus implementation frameworks and policies, lack of well-coordinated team, limited economical options on water saving system, bureaucracy, uncertain climate and weather conditions, lack of safe and adequate infrastructure provided for cyclists and pedestrians in the campus, lack of interest and engagement among campus communities on sustainable environment education program and frequent restructuring of subordinates or top management positions. The research posits the necessity of developing new ways of thinking by all related parties to face the challenges relating to the green campus implementation as this initiative can provide various benefits towards realizing Sustainable Development Goals, as well as assuring more sustainable practices in the future.

**Keywords:** *Sustainability, Green initiatives, UI GreenMetric, Green campus indicators, Challenges, Public universities.*

## **INTRODUCTION**

Green Campus rewards long-term obligation to continuous environmental improvement from the campus community. Despite of teaching and learning, universities must also become an important institution to find solutions to the complexities of global environment issues (Nifa et al., 2016). According to Michael et al. (2020), higher education institutions are the primary producers of knowledge, and they may be a wonderful asset for creating a more sustainable future by educating students about the importance of sustainable development. Higher education institutions may contribute to achieve the sustainable Development Goals (SDGs) and serve as a significant means of assuring a more sustainable future. Zhu et al. (2020) also added that the exploration of sustainable development can never be stopped because the universities act as the base of creating advanced green concepts or new green technologies and play an important role in the process of achieving the global sustainable development goal.

Most leading universities worldwide have been obsessed with alleviating global warming and fostering sustainable campus growth by decreasing their carbon footprint (Alshuwaikat and Abubakar, 2008; Wang et al., 2013; León-Fernández and Domínguez-Vilches, 2015; Benjaoran and Parinyakulset, 2018). The notion of sustainability has been around for over two decades, and institutions of higher education worldwide attempt to practise and spread it (Hussin and Kunjuraman, 2017). Similarly, many universities in Malaysia, particularly public universities, have participated in UI GreenMetric World University Rankings by implementing various green initiatives on campus (Azahar et al., 2018; Razman et al., 2018; Gomez et al., 2019; Gholami et al., 2020, Mohd Isa, 2021). However, despite several global green campus initiatives, challenges are also encountered. This paper aims to examine green campus implementation in Malaysian public universities. Therefore, the main objective is to determine the challenges in implementing green campuses by Malaysian public universities.

## **LITERATURE REVIEW**

### **Green Campus and Its Importance**

Most researchers have similar views on green campuses. According to Green Office Movement (2021) green campus is an educational institution that fulfils its natural resource demands, such as energy, water, and materials, without jeopardizing people's capacity in other nations and future generations to satisfy their own. Ribeiro et al. (2019) stated that the Green Campus programme seeks to build university campuses with tangible effects on the environment, economy, and society. These effects will be attained through campus community participation, sustainable infrastructures, education, research, management, and outreach. These initiatives create materials for outreach towards environmental education programmes that educate students about sustainable development. Hosna Ajilian (2014) and Husaini and Jusoh (2017) share similar views on green campus concepts. They stated that a green campus could be characterized as sustainability agenda that was created and maintained the conditions in which humans and nature may coexist effectively, allowing social, economic, and environmental progress. Nonetheless, Xiong et al. (2013) viewed a green campus as green education via a green curriculum. Agreeing with this, Kay et al. (2012) emphasized that knowledge and information about green campuses can be distributed to all individuals through a green curriculum. It empowers individuals to build up the learning, value and aptitudes in making decisions that enhance personal satisfaction without harming the planet.

According to several scholars, implementing a green campus has various advantages and significant impacts. Efforts towards university sustainability are ways to reduce environmental consequences, which are the foundation of the "green university" idea.

Understanding trends and important aspects helped a green university operate well to plan and enhance performance for optimum effectiveness (Mongkoldhumrongkul and Sukkanta, 2022). Green campus programmes provide the stability of human well-being by incorporating economic feasibility, environmental conservation and preservation, and social equality through development, operation design, maintenance and waste management (Yiing, Yaacob and Hussein, 2013). A green campus will reduce the adverse effects on the environment, economy, society, and the impacts on campus communities' well-being, resulting in a more practical lifestyle (Foo, 2013; Kristanto et al., 2017; Ragazzi and Ghidini, 2017). Likewise, green campuses also enhance and promote sustainability, as well as engaging with others to implement and execute sustainable development (Omar et al., 2010; Yuan et al., 2013).

### Green Campus Initiatives in The Malaysian Public Universities

Green campus initiatives have generally been adopted by most universities in Malaysia and have participated in the UI GreenMetric World Campus Sustainability Ranking 2021. There are 17 out of 20 Malaysian public universities participating and listed in the UI GreenMetric 2021. Table 1 presents the Malaysian public universities participating in the UI GreenMetric World University Rankings 2021.

**Table 1**

*List of Malaysian Public Universities Participated in UI GreenMetric World University Rankings 2021*

No	World Rank	Malaysian Rank	Institution
1	27 <sup>th</sup>	1st	Universiti Putra Malaysia
2	32 <sup>nd</sup>	2nd	Universiti Malaya
3	67 <sup>th</sup>	3rd	Universiti Malaysia Sabah
4	109 <sup>th</sup>	5 <sup>th</sup>	Universiti Utara Malaysia
5	110 <sup>th</sup>	6 <sup>th</sup>	Universiti Teknikal Malaysia Melaka
6	128 <sup>th</sup>	7 <sup>th</sup>	Universiti Malaysia Pahang
7	149 <sup>th</sup>	8 <sup>th</sup>	Universiti Teknologi Malaysia
8	150 <sup>th</sup>	9 <sup>th</sup>	Universiti Teknologi MARA Shah Alam
9	165 <sup>th</sup>	10 <sup>th</sup>	Universiti Tun Hussein Onn Malaysia
10	168 <sup>th</sup>	11 <sup>th</sup>	Universiti Sains Malaysia

*(Source: Universitas Indonesia, 2021)*

The top five universities in the ranking among Malaysian public universities are Universiti Putra Malaysia (8425 points), Universiti Malaya (8375 points), Universiti Malaysia Sabah (8025 points), Universiti Utara Malaysia (7725 points) and Universiti Teknikal Malaysia Melaka (7700 points). These universities strive toward sustainability and conduct several strategies that can accommodate the need to become greener and more sustainable. However, the execution of green campus initiatives differs among Malaysian public universities (Gomez and Yin Yin, 2019; Gholami et al., 2020; Mohd Isa et al., 2021; Mat Taib, 2022; Mohd Muhiddin, 2022). Among the universities and their strategies are:

- a) Universiti Putra Malaysia - owns a reserve forest named Sultan Idris Shah Forest Education Center (SISFEC) as a centre for research and Education, organise tree plantation programme, rainwater catchment reused for watering plants and cleaning works, fully equipped with LED lighting with sensor system, utilises timer system for

power cut off system of HAVC, solar energy, initiated greenhouse gas emission reduction programmes, Biorefinery@UPM to treat organic waste, Waste Bank@UPM, Red Cube recycling centre, promotes recycling campaign, implemented water reservoir system, water filtration system and water harvesting system, shuttle service in the campus, car-free day and car-pooling campaign, provide efficient pedestrian facilities and offers sustainability-related courses/syllabus/programmes.

- b) Universiti Malaya - develop a green space i.e Rimba Ilmu, organise tree planting programme, underground flood retention pond in the campus to reduce the risk of flooding and improve water absorption system, replacing all lighting appliances into LED bulbs and LED street lighting, utilise Variable Refrigerant Volume (VRV) for HAVC system, smart building systems, greenhouse gas emission reduction programme, clean biomass, wind and hydropower, solar, UM Eco Campus Blueprint, UM Zero Waste Campaign, Takakura Composting, collaborating with other institution, cash or redeem Mesra Card points for waste recycle, UM Safety Handbook on managing toxic waste in the campus, providing adequate number of recycling bins, double-sided printing policy, displaying water usage bills and records in the website, water harvesting system, UM Water Warriors initiatives, shuttle service in the campus, bicycle and electric scooters rental, MRT feeder bus, efficient pedestrian facilities, organise programs/events related to sustainability.
- c) Universiti Sains Malaysia - implemented a future sustainable platform to support the major international goals such as the Millennium Development Goals and Education for Sustainable Development. In doing so, USM opted to venture forward based on the “Blue Ocean Strategy”, which requires a unique and innovative way of thinking, taking actions and setting goals compared to the norms.
- d) Universiti Utara Malaysia - won the global gold medal at the Green World Award 2016 for education and training and is known as the Ambassador of Green World 2016/2017. The university had implemented Electric Pedal Assisted Bicycles as its initiative towards promoting a green campus.
- e) Universiti Teknologi Malaysia - introduced preservation policy and framework of a comprehensive programme to give ordinary balance on the environment, reduce carbon, practice to protect resources, waste/garbage reduction and increase recycling.
- f) Universiti Teknologi MARA - has established the Institute Sustainable Initiatives UiTM, which consists of ten faculties and 39 excellence entities to initiate Greenation @ UiTM. This institute was undertaken to stimulate and encourage students and visitors on sustainability, experience, and interaction toward a healthy lifestyle.
- g) Universiti Sains Islam Malaysia - USIM’s Smart University Blueprint (2018-2025), tree planting programme, had its own team responsible for the landscape and biodiversity in the campus, maintaining existing forest and lake on the campus, PTJ Lestari project, solar, launched Go Green Ambassador and Green Caliphs programme, emphasise on Maqasid Syaria’, collaborating with an external organisation, adequate recycle bin, cooking oil recycling project and biodiesel project, water harvesting, shuttle service, double-sided printing policy, water harvesting system, shuttle service in the campus, bicycle and electric scooters rental, efficient pedestrian facilities, organise programs/events related to sustainability.

This notable strategy is an effort made by the universities not only to improve or achieve a high sustainability level, but these efforts are also made in order to improve the university’s ecosystem and environment and to educate the future generations, mainly students, to become

more aware of sustainability practices (Foo, 2013; Sahoo, 2013; Yuan et al., 2013; Mohd Isa et al., 2021). Moreover, students can actively participate in or initiate a movement to preserve the environment and promote a sustainable way of life to the public (Alshuwaikhat and Abubakar, 2008; Dagiliūtė et al., 2018).

### **Campus Sustainability Ranking Tool: UI GreenMetric**

Various global sustainability rating tools are available to measure green initiatives implemented by the university: GREENSHIPS, The Sustainability, Tracking, Assessment and Rating System (STARS), The College Sustainability Report Card @ Green Report Card and UI GreenMetric. Amongst these rating tools, UI GreenMetric is the most widely used in Asian, European and U.S. universities (Lauder et al., 2015; Ragazzi and Ghidini, 2017).

The UI GreenMetric, a tool to assess the sustainability of universities, was created by Universitas Indonesia in 2010. According to Suwartha and Sari (2013), it is founded on the notion of sustainable development, which includes the three Es, i.e., environment, economy, and society. Six categories are used in the ranking with their weighting and indicators (Benjaoran and Chunko, 2018; Universitas Indonesia, 2021). Thirty-nine indicators are provided for the categories, and each indicator is assigned a specific score. These are (i) Setting and Infrastructure (Weighting-15, six indicators), (ii) Energy and Climate Change (Weighting-21, eight indicators), (iii) Waste (Weighting-18, six indicators), (iv) Water (Weighting-10, four indicators), (v) Transportation (Weighting-18, eight indicators) and (vi) Education (Weighting-18, seven indicators). The final score is the sum of the scores achieved for each indicator.

### **Challenges in Green Campus Implementation**

Even though universities worldwide have taken several steps to ensure that their campuses run sustainably, emerging impediments are beginning to develop that provide significant difficulties for practitioners and ultimately prevent their implementation (Gholami et al., 2020). The main obstacles to developing the green campus idea were a lack of funds and insufficient administrative experience in carrying out green university incentives (Mongkoldhumrongkul and Sukkanta, 2022).

Amaral et al. (2015) stated that most higher education institutions lack a systematic framework to accurately measure the campus efforts on sustainability, as well as a shortage of professionals to provide green initiatives input for the university to implement. There is also a lack of incentive from universities to support green education and activities for communities on the campus. There is also a lack of construction standards and authority oversight to maintain a sustainable environment and manage high maintenance costs (Beringer, 2007; Abubakar et al., 2020). Moreover, Horhota et al. (2014) added that individuals are not rewarded for participating in sustainable activities, and a lack of infrastructure can also decrease community motivation to implement green campus agenda. According to Tiyyarattanachai and Hollmann (2016), a green campus may not be the ideal option if the institution is not sufficiently equipped. Most initial strategies to address sustainability in higher education vary substantially and remain fragmented today (McMillin and Dyball, 2009; Scott et al., 2012).

Neumayer (2010), Hopkins (2016) and Nawi and Choy (2020) concur that a lack of environmental knowledge and awareness among students and employees also contributes to impediments toward a green campus. Since the university is solely focused on research, education, community and operations, there is a lack of organisation activities to monitor campus sustainability (Hosna Ajilian, 2014; Husaini and Jusoh, 2017). There is also a lack of desire from universities to promote green education and activities to campus communities and a lack of building standards and authority oversight to assure a safe environment. Yuan et al.,

2013 stressed that all university stakeholders, including academic and administrative staff, parents and alumni, must support the green campus agenda. Alshuwaikat et al. (2017) asserted that greening the mentality is the next stage after greening the campus failed to achieve societal transition toward sustainability.

## **METHODOLOGY**

This research adopted a qualitative approach. Two top-ranked and the least ranked universities in the UI GreenMetric World University Rankings 2021 were chosen as the case study. A semi-structured interview with three representatives from these universities was conducted. All the interviewees have vast experience in green campus implementation. They were provided with standard-appropriate questions abstracted from the UI GreenMetric Guideline 2022 to ensure the information was consistent and comparable. The data obtained from the interviews were analysed thoroughly via content analysis. When conducting this research, there are several limitations, namely limitation of finance, covid-19 pandemic and movement control order.

## **FINDINGS**

The research highlighted the challenges faced in implementing green campus initiatives for all main indicators as outlined in the UI GreenMetric Guideline 2022.

### **Setting and Infrastructure (SI)**

#### ***Challenges in Implementing Initiatives to Increase Forest and Plant Vegetation Area***

The most common challenge faced by the universities in increasing forest and plant vegetation areas on the campus is a lack of finance. The cost of implementing this initiative is very high. There is limited availability of additional funds provided by the university, and the budget allocated is just for maintaining the current landscape, forest, and plant vegetation area on the campus. Thus, universities decided to preserve and sustain the well-being of the existing campus green areas. Another constraint highlighted is limited spaces and lands to be developed, particularly for the urban campus.

### **Energy and Climate Change (EC)**

#### ***a) Challenges in Implementing Energy Saving Initiatives***

Although all representatives agreed that full utilisation of renewable energy sources on the campus would maximise energy saving and is a good investment for the university in the future, they also highlighted several challenges in implementing this initiative. It is found that the university staff and students are not aware of effective ways to consume energy wisely. Consequently, excessive energy usage still occurs, although the university is fully equipped with energy-saving systems and appliances. It is also highlighted that the main issue in educating people is that it requires a lot of effort, time, support and cooperation from the campus community itself. Hence, the universities are working tremendously to educate and raise awareness of their communities' energy-saving initiatives.

One of the representatives claimed that energy efficiency and energy saving are not a significant issue in the university due to the availability and implementation of their current energy-saving initiatives. The only problem they face is improving renewable energy generation and usage on campus, as there is a lack of buy-in and support from the university's top management and stakeholders.

**b) Challenges to Achieve Targeted Carbon Footprint**

The university allocates limited finance towards achieving the targeted carbon footprint. Thus, the universities will continue their efforts to reduce carbon footprint through doable and affordable initiatives. They intend to fully utilise current available resources, expertise and experiences to implement creative and innovative initiatives to achieve the targeted campus carbon footprint. Moreover, the university also faced a lack of awareness and knowledge among the campus community on carbon footprint, particularly the newcomers to the green campus agenda. However, they are working enormously towards it.

**Waste (WS)**

***University's Challenges to Improve the Effectiveness of Waste Treatment in The Campus***

It is revealed that the main challenge in waste treatment initiatives faced by the university is the current waste disposal culture practices among staff and students and the lack of a waste management policy, especially for inorganic waste treatment. It is also found that the campus communities lack interest in managing their wastes more sustainably. Thus, the university needs to improvise inorganic waste separation before depositing them outside the campus. They also have to increase collaborative support and participation from everyone on the campus towards sustainable waste treatment initiatives. Furthermore, there is also a lack of well-coordinated teams to continuously maintain the current waste treatment initiatives in one of the universities due to lack of funding.

**Water (WR)**

***Challenges in Improving the Usage of Water in The University***

The main challenge for this initiative is the lack of awareness of water-saving practices in the university among staff and students. This results in high monthly water bills. Likewise, the initial cost to obtain water-saving technology and equipment is also expensive due to the limited economic options available for these systems in Malaysia.

**Transportation (TR)**

**a) Challenges to Reduce the Amount of Gas Vehicle in The University**

Reducing gas-powered vehicles in the university is quite a challenging attempt. The strict policy on bringing vehicles among students can be seen as a successful initiative except for the staff since most of them depend highly on their vehicle rather than public transport. The uncertainty of climate and weather conditions in Malaysia also contributes to one of the main challenges for high dependency on commuting using gas vehicles on campus. Although there is increasing demand for electric vehicles in Malaysia and several proposals to use electric-powered vehicles on campus have been brought forward to the university's top management, due to lack of funding, buy-ins and bureaucracy caused, the proposals to be put on hold until now.

**b) Challenges in Promoting Cycling and Walking in The Campus**

Lack of interest among students and staff in cycling and walking is one of the challenges in promoting cycling and walking practice on campus. There might be students and staff who do not know how to cycle, or they are physically unable to ride or walk for a long distance due to health problems or are unfit to do so. Most students and staff agreed that cycling and walking are time-consuming, especially with their busy daily schedules. Moreover, the uncertain climate and weather conditions make cycling or walking impractical in Malaysia.

For an urban campus, it is difficult for the university to provide adequate safe bicycle lanes or pedestrian infrastructure since there are limited spaces on the campus. Renovating the existing structures on the campus is deemed to be uneconomical and impractical. Currently, the university can only encourage cycling safely and impose strict regulations for other vehicles to ensure the safety of cyclists and pedestrians on the campus as they have no choice except to share the same road with other vehicles.

## **Education (ED)**

### ***Challenges Faced to Educate the Campus Community on Environment and Sustainability***

The main challenge to educating campus communities on sustainability is due to a lack of interest and engagement among them to participate in education programmes concerning sustainability and the environment. They viewed educational programmes as less appealing than other types of university programmes. In addition, frequent restructuring of personnel, subordinates and top management positions also makes the continuation of ongoing sustainability programmes on campus challenges.

It is found that there is a lack of policies regarding education for sustainability and the environment from the Ministry of Higher Education for the universities to refer. Furthermore, similar to other indicators, the lack of financial allocation for better educational programmes regarding sustainability and the environment is also a critical factor to consider.

## **DISCUSSION**

Generally, various challenges in implementing green campus initiatives are discovered in this research. Among crucial challenges highlighted are: -

- a) Limitation of finance is the most recurring challenge faced by the universities in multiple categories, namely SI, EC, TR and ED. This is in line with several scholars stating that the costs of green campus initiatives implementation might be unbearable for some universities (Beringer, 2007; Hoffman, 2008; Elliott and Wright (2013); Horhota et al., 2014; Hopkins, 2015).
- b) Lack of knowledge and awareness on sustainability by the campus community. This is also faced in EC, WS and WR categories. Concurring to this, Velazquez et al. (2005), Nejati et al. (2011), and Nur et al. (2019) highlighted the lack of knowledge, awareness and engagement by the campus communities on green campus initiatives. Concurrently, Alshuwaikat et al. (2017) stated that greening the mentality is the next step after greening the campus proved insufficient to bring about societal transformation towards sustainability.
- c) Lack of participation and engagement from the campus community, especially in WS and ED. Velazquez et al. (2005) highlighted the lack of engagement from the campus community to be a challenging issue in green campus implementation. Agreeing with this, Nifa et al. (2016) stated that campus sustainability has become complicated since it necessitates the active engagement and cooperation of other campus communities. Indeed, participation from all parties should be the primary focus of the green campus agenda (Kantamaturapoj et al., 2012; Benjaoran and Parinyakulset, 2018).

Lack of buy-ins, bureaucracy and lack of support from the university management are challenges in EC and TR. This is in line with Velazquez et al. (2005), Yuan et al., 2013 and Hopkins (2016). Tiyarattanachai and Hollmann (2016) stressed that the green campus may not be the best solution if the university is not adequately prepared.

Apart from that, there are also different challenges to implementing green campus initiatives between public universities for each category. For SI, land area and space are limited, especially on an urban campus. This had prevented the university from improving and increasing the green spaces, especially forest and plant vegetation areas. Foo (2013), Nifa et al. (2016), and Brandli et al. (2020) emphasized the importance of green spaces on the campus for ecological balance and human well-being. The depletion of green spaces in urban areas reduces opportunities for future generations to interact with nature and share their experiences and knowledge (Speake et al., 2013).

Another challenge in the WS category is the lack of waste disposal policies. Velazquez et al. (2005) stated that there is a lack of policies promoting green campus implementation either from the government or the university. Likewise, the majority of the universities that had successfully enlisted in the UI GreenMetric World University Rankings have worked hard and given continuous efforts towards sustainability and environmental policy at their respective campuses (Suwartha and Sari, 2013).

As for challenges in promoting cycling and walking on campus, issues of the uncertainty of weather and climate conditions contribute to a lack of interest in cycling and walking on campus among campus communities. In addition, the lack of facilities for cyclists and pedestrians also contributes to the discouragement of cycling and walking on the campus. In conclusion, Nifa et al. (2016) highlighted that universities should consider planning for facilities, improving public space and increasing accessibility and recreational space. The presence of adequate facilities and infrastructure on the campus will motivate campus communities to practice a sustainable culture in their life (Horhota et al., 2014).

Meanwhile, for the ED category, the main challenge being highlighted is frequent restructuring and change in university departments and bureaucracy that leads to the challenges in executing continuous efforts on sustainability in education. Implementing green campus initiatives could be challenging without strong management and administration in universities (US EPA, 2008). Moreover, according to Dacin et al. (2002), frequent changes in the organisational setting can clash with existing institutional settings and culture. Thus, modifying the organisation's norms, regulations, culture, and routines must be re-examined.

## CONCLUSION

The research data collected and the analysis regarding current green campus initiatives and the barriers toward green campus initiatives implementation in selected Malaysian public universities can provide different insights into green campus strategies that public universities in Malaysia have adopted. The findings also provide an added dimension towards achievable and manageable solutions to adopt green campus strategies in public universities. It highlights the cause and implications of the current issues in implementing green campus initiatives in Malaysian public universities. The universities have implemented several similar and distinctive current green campus initiatives.

This research will act as a reference and add to the body of knowledge for other green campus practitioners and players in the Malaysian public universities to assist in preparation for UI GreenMetric World Campus Sustainability Ranking. Based on the findings, most universities have adequate open spaces. Other than that, these universities also conducted programmes toward climate change awareness using their unique strategies and approaches. Sustainability in education is among the crucial factors to consider for green campus implementation. The common challenges in improving the setting and infrastructure, specifically in limitation of space and area on the campus and limitation of finance. The other

challenge in enhancing the effectiveness of waste treatment in the university is the current waste management culture and practices.

Future research can investigate the benefits of green campus implementation in terms of cost savings for Malaysian public universities. Furthermore, research on the current initiatives and the challenges of green campus implementation in Malaysian public universities can be conducted using different research methods and approaches.

## REFERENCES

- Abubakar, I. R., Aina, Y. A., & Alshuwaikhat, H. M. (2020). Sustainable development at Saudi Arabian universities: An overview of Institutional Frameworks. *Sustainability*, 12(19).
- Alshuwaikhat, H. M., & Abubakar, I. (2008). An integrated approach to achieving campus sustainability: assessment of the current campus environmental management practices. *Journal of Cleaner Production*, 16(16), 1777–1785.
- Alshuwaikhat, H., Abubakar, I.R., Aina, Y.A. & Saghir, B. (2017), “Networking the sustainable campus awards: engaging with the higher education institutions in developing countries”, in Leal Filho, W. (Ed.), *Handbook of Theory and Practice of Sustainable Development in Higher Education*, Vol. 2, Springer International Publishing, Cham, pp. 93-107.
- Amaral, L.P., Martins, N. & Gouveia, J.B. (2015), Quest for a sustainable university: a review. *International Journal of Sustainability in Higher Education*, Vol. 16 No. 2, pp. 155-172.
- Azahar Abas, M., Muhamad Nor, A. N., Abdul Malek, N. H., and Hizami Hassin, N. (2018). A Review of Sustainable Campus Concept in the Context of Solid Waste Management. *Journal of Education & Social Policy*, 5(4), 71–76.
- Benjaoran, V. & Chunko, K. (2017). Implementation of Construction Safety Knowledge Management via Building Information Model. Global Civil Engineering Conference GCEC 2017, 431-437.
- Benjaoran, V., & Parinyakulset, P. (2018). Green initiative in Suranaree University of Technology in Thailand. *MATEC Web of Conferences*, 174, 1–10.
- Beringer, A. (2007). The Lüneburg Sustainable University Project in international comparison: An assessment against North American peers. *International Journal of Sustainability in Higher Education*, 8(4), 446–461.
- Boulton, G. (2009). What are Universities for? University World News. Issue 69 (29 March). Retrieved May 5, 2021, from [www.universityworldnews.com/article.php?story=2009032620094498](http://www.universityworldnews.com/article.php?story=2009032620094498)
- Brandli, L. L., Salvia, A. L., da Rocha, V. T., Mazutti, J., & Reginatto, G. (2020). The Role of Green Areas in University Campuses: Contribution to SDG 4 and SDG 15. *World Sustainability Series*. Springer International Publishing.
- Crow, M. (2014). What is the role of universities in global development? Retrieved February 8, 2020, from <https://blogs.worldbank.org/education/what-role-universities-global-development>.
- Ghauri, P., Grønhaug, K., and Strange, R. (2020). *Research Methods in Business Studies* (5th ed.). Cambridge: Cambridge University Press.
- Gholami, H., Bachok, M. F., Saman, M. Z. M., Streimikiene, D., Sharif, S., & Zakuan, N. (2020). An ISM Approach for the Barrier Analysis in Implementing Green Campus Operations: Towards Higher Education Sustainability. *Sustainability*, 12(1), 363.

- Gomez, C. P., & Yin, N. Y. (2019). Development of a progressive green university campus maturity assessment tool and framework for Malaysian universities. *MATEC Web of Conferences* (Vol. 266, p. 01018). EDP Sciences.
- Green Office Movement (2021). Get Started with Sustainability Assessment at Your University. Retrieved January 5, 2021, from <https://www.greenofficemovement.org/sustainability-assessment>.
- Hoffman, A. J. (2008). Overcoming the Social and Green Building. *Organization and Environment*, 21(4), 390–419.
- Hooi, K. K., Hassan, F., & Mat, M. C. (2012). An Exploratory Study of Readiness and Development of Green University Framework in Malaysia. *Procedia - Social and Behavioral Sciences*, 50(July), 525–536.
- Hopkins, E. A. (2016). Barriers to adoption of campus green building policies. *Smart and Sustainable Built Environment*, 5(4), 340–351.
- Horhota, M., Asman, J., Stratton, J. P., & Halfacre, A. C. (2014). Identifying behavioral barriers to campus sustainability: A multi-method approach. *International Journal of Sustainability in Higher Education*, 15(3), 343–358.
- Hosna, A. (2014). Review of Factors Affecting Sustainability in the Universities by Michigan Technological University.
- Husaini, M. Z. & Jusoh, A. (2017). The Review of Sustainability Model and Indicators for Higher Education Institutions in Malaysia. *International Journal of Academic Research in Business and Social Sciences*, 7(11), 1170–1182.
- Hussin, R., & Kunjuraman, V. (2017). Exploring strategies for sustainable ‘ecocampus’: The experience of Universiti Malaysia Sabah. *Geografia: Malaysian Journal of Society and Space*, 11(3), 84–96.
- Kristanto, G. A. et al. (2017). Lessons Learned in Developing a Green Environment at the Engineering Faculty. *MATEC Web of Conferences*. University of Indonesia. 04008.
- Lauder, A., Sari, R. F., Suwartha, N., & Tjahjono, G. (2015). Critical review of a global campus sustainability ranking: GreenMetric. *Journal of Cleaner Production*, 108, 852–863.
- Leon-Fernandez, Y., & Domínguez-Vilches, E. (2015). Environmental management and sustainability in higher education: The case of Spanish Universities. *International Journal of Sustainability in Higher Education*, 16(4), 440–455.
- Mat Taib, S. (2022). Towards Net Zero Carbon Campus in UTM. Low Carbon Campus: A Way Forward (LCC 2022) Webinar. Green Campus Committee UiTM Perak and UiTM Green Centre.
- McMillin, J., & Dyball, R. (2009). Developing a whole-of-university approach to educating for sustainability. *Journal of Education for Sustainable Development*, 3, 55–64.
- Michael, F. L., Sumilan, H., Bandar, N. F. A., Hamidi, H. A. N. A., Jonathan, V., & Nor, N. N. M. (2020). Sustainable Development Concept Awareness Among Students in Higher Education: a Preliminary Study. *Journal of Sustainability Science and Management*, 15(7), 113–122.
- Ministry of Education Malaysia (MOE). (2013). Malaysia Education Blueprint 2013 - 2025. *Education*, 27(1), 1–268.
- Ministry of Higher Education (MOHE). (2021). Ekosistem Kondusif Sektor Awam (EKSA). Retrieved June 17, 2021, from <https://www.mohe.gov.my/en/laman-utama-eksa>.
- Mohd Isa, N. K. (2016). Sustainable campus and academic staff's awareness and behaviour in Malaysia's institutions of higher learning: A case study of UPSI. *Geografia: Malaysian Journal of Society and Space*, 12(6), 89–99.

- Mohd Isa, H., Sedhu, D. S., Lop, N. S., Rashid, K., Mohd Nor, O., & Iffahd, M. (2021). Strategies, challenges and solutions towards the implementation of green campus in Uitm Perak. *Planning Malaysia*, 19(16), 60–71.
- Mongkoldhumrongkul, K., & Sukkanta, P. (2022). Model of University Development in Thailand 4.0 Era toward “Green Campus Concept.” IOP Conf. Series: Earth and Environmental Science.
- Najafian, S. M., & Karamidehkordi, E. (2018). Challenges of sustainability efforts of universities regarding the sustainable development goals: A case study in the University of Zanjan, Iran. *E3S Web of Conferences*, 48, 0–4.
- Nawi, N. F. M., & Choy, E. A. (2020). Campus sustainability: A case study in Universiti Malaysia Sabah (UMS). *Journal of Sustainability Science and Management*, 15(1), 113–124.
- Nejati, M., Shah, A., Shahbudin, M., & Amran, A. (2011). Barriers To Achieving a Sustainable University in the Perspective of academicians. *The 9th Asian Academy of Management International Conference*, 402–407.
- Neumayer, M. D. E. (2010). Overcoming Barriers to Campus Greening. *International Journal of Sustainability in Higher Education*, 2(2), 139–160.
- Nifa, F. A. A., Wan Mohd Rani, W. N. M., Ismail, M. N., & Rahim, S. A. (2016). Towards developing a sustainable campus: Best practice approach. *International Journal of Supply Chain Management*, 5(4), 131–138.
- Nur, S., Mohd Noor, A., Loong, L. K., & Naamandadin, N. A. (2019). An Insight of Challenges in Implementing Green Campus: A Case Study of Universiti Malaysia Perlis. *Journal of Advanced Research in Engineering Knowledge*, 7(1), 34–40.
- Omar, Z., Saruwono, M. & Mohammad, N. (2010). Development of Sustainable Campus: Universiti Kebangsaan Malaysia. *Planning and Strategy*, 5(3), 273–282.
- Ragazzi, M. & Ghidini, F. (2017). Environmental Sustainability of Universities: Critical Analysis of a Green Ranking. *Energy Procedia*, 119, 111-120.
- Razman, R. (2017). A Model of Sustainable Campus Operations for Malaysian Public Universities.
- Razman, R., Abdullah, A. H., & Wahid, A. Z. (2016). Sustainable Development in Higher Education Institutions (HEIs): Towards Sustainable Campus Operations (SCO). *ARP Journal of Engineering and Applied Sciences*, 11(20), 11823–11826.
- Razman, R., Ramli, M. Z., Abdullah, A. H., & Zen, I. S. (2018). Critical Success Factors (Csfs) In Implementing Sustainable Campus Operation (Sco) Initiatives at Malaysian Public Universities. *AIP Conference Proceedings*, Vol. 2030, No. 1, p. 020238). AIP Publishing LLC.
- Ribeiro, J. M. P., Hoeckesfeld, L., BocaSanta, S. L., Araujo, G. G. M., Jonck, A. V., Berchin, I. I., & de Andrade Guerra, J. B. S. O. (2019). Students’ opinion about green campus initiatives: a south american university case study. In *World Sustainability Series*. Springer International Publishing.
- Sahoo, M. K. (2013). Green Campus: A Competitive Advantage and Sustainability for Management Institutions. (74), 74–80.
- Scott, G., Tilbury, D., Sharp, L. & Deane, E. (2012), Turnaround Leadership for Sustainability in Higher Education, Australian Office for Learning and Teaching, Canberra.
- Suwartha, N., & Sari, R. F. (2013). Evaluating UI GreenMetric as a tool to support green universities development: Assessment of the year 2011 ranking. *Journal of Cleaner Production*, 61, 46–53.

- Tiyarattanachai, R., & Hollmann, N. M. (2016). Green Campus initiative and its impacts on quality of life of stakeholders in Green and Non-Green Campus universities. *SpringerPlus*, 5(1), 1–17.
- Universitas Indonesia (2021) UI GreenMetric World University Rankings 2021. UI GreenMetric 2021 Guidline.
- Velazquez, L., Munguia, N., & Sanchez, M. (2005). Deterring sustainability in higher education institutions: An appraisal of the factors which influence sustainability in higher education institutions. *International Journal of Sustainability in Higher Education*, 6(4), 383–391.
- World Bank (2017) Atlas of Sustainable Development Goals 2017: From World Development Indicators. World Bank Atlas, Washington, DC: World Bank. Retrieved July 3, 2021, from <https://openknowledge.worldbank.org/handle/10986/26306>.
- Xiong, H., Fu, D., Duan, C., Liu, C., Yang, X. & Wang, R. (2013). Current Status of Green Curriculum in Higher Education of Mainland China. *Journal of Cleaner Production*, 61, 100–105.
- Yiing, C. F., Yaacob, N. M. & Hussein, H. (2013). Achieving Sustainable Development: Accessibility of green buildings in Malaysia. *Procedia - Social and Behavioural Sciences*, 101, 120–129.
- Yuan, X., Zuo, J., & Huisingh, D. (2013). Green Universities in China - What matters? *Journal of Cleaner Production*, 61, 36–45.
- Zhu, B., Zhu, C., & Dewancker, B. (2020). A study of development mode in green campus to realize the sustainable development goals. *International Journal of Sustainability in Higher Education*, 21(4), 799–818.

Surat kami : 700-KPK (PRP.UP.1/20/1)

Tarikh : 20 Januari 2023

Prof. Madya Dr. Nur Hisham Ibrahim  
Rektor  
Universiti Teknologi MARA  
Cawangan Perak



Tuan,

**PERMOHONAN KELULUSAN MEMUAT NAIK PENERBITAN UiTM CAWANGAN PERAK  
MELALUI REPOSITORI INSTITUSI UiTM (IR)**

Perkara di atas adalah dirujuk.

2. Adalah dimaklumkan bahawa pihak kami ingin memohon kelulusan tuan untuk mengimbas (*digitize*) dan memuat naik semua jenis penerbitan di bawah UiTM Cawangan Perak melalui Repositori Institusi UiTM, PTAR.

3. Tujuan permohonan ini adalah bagi membolehkan akses yang lebih meluas oleh pengguna perpustakaan terhadap semua maklumat yang terkandung di dalam penerbitan melalui laman Web PTAR UiTM Cawangan Perak.

Kelulusan daripada pihak tuan dalam perkara ini amat dihargai.

Sekian, terima kasih.

“BERKHIDMAT UNTUK NEGARA”

Saya yang menjalankan amanah,

**SITI BASRIYAH SHAIK BAHARUDIN**  
Timbalan Ketua Pustakawan

*nar*

*Setuju.*

*27.1.2023*

PROF. MADYA DR. NUR HISHAM IBRAHIM  
REKTOR  
UNIVERSITI TEKNOLOGI MARA  
CAWANGAN PERAK  
KAMPUS SERI ISKANDAR