Green campus universities: case studies on problems and prospects [version 1; peer review: awaiting peer review]

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Abstract
Background: Sustainability is a crucial social issue. In recent years, many scholars have suggested that the issue should be tackled at universities because they act as leaders in education, research and innovation. Universities are in a good position to foster progressive action towards global issues within current and future generations. As universities seek to create sustainable campuses, the green campus approach can create opportunities for a cultural paradigm shift, where universities become global leaders in sustainability. There have been various studies related to sustainability issues that include how universities can seek to create sustainable campuses. However, there are some gaps in the research on the “green campus approach” as a way to create sustainable campuses. This paper intends to examine the problems and prospects of creating a green campus university.

Methods: Data collection was conducted using the qualitative method. Structured interviews and observations were conducted via visits to the selected case-study universities as well as panels and discussions with experts in respective ministry and government agencies. All collected data were transcribed before being analysed using the NVivo software and thematic coding.

Results: Most universities in Malaysia have plans toward sustainability and the green campus approach. The awareness of going green and creating sustainability on university campuses has gradually increased. A strategic framework is needed as a guideline for creating green campuses in the higher education setting of Malaysia.

Conclusions: This study offers new insights into creating green campus universities in Malaysia as a means to create sustainability in higher education settings. The study involved three of the oldest universities in Malaysia. Future research may expand into other universities in Malaysia or internationally.

Keywords
Green campus, Sustainability, University, Problems, Prospects
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Introduction
Sustainability is an ultimate goal to many individuals, organisations, industries, and nations in creating a better world. Sustainability can be created in various ways. In most cases, it is driven towards the selected goals of energy saving and reducing emissions. For instance, in the higher education setting, there are many elements that support sustainability such as education, research, infrastructure, technology, finance and campus management system. These elements can be optimised to create a lasting impact.

Many scholars have suggested that the sustainability issue must be challenged at universities. Universities act as leaders in education, research and innovation. This places universities in a good position to foster progressive action and address any global issues within current and future generations. Nevertheless, many scholars have also argued that “becoming and being a sustainable university is not a singular ‘before and after’ event, rather it is a journey or process of transformation that takes place over time”.

A sustainable campus can be defined as: “[…] a higher education institution […] that addresses, involves and promotes […] the minimisation of environmental, economics, societal and health negative effects in the use of their resources [in] its main functions of teaching, research, outreach and partnership, and stewardship […] to [help] society make the transition to sustainable lifestyles.” In a similar vein, a green campus is a campus that combines education and environmental-friendly practices, with the aim to promote eco-friendly practices and sustainability.

As universities seek to create sustainable campuses, the green campus approach appears to be an ideal one.

Various studies have been done related to the sustainability issues including how universities seek to create sustainable campuses. However, there are some gaps in the studies related to the ‘green campus approach’ as a means to create sustainable campuses. The green campus approach leads to opportunities to initiate a cultural paradigm shift, where universities become global leaders in sustainability. This paper intends to examine the problems and prospects of creating a green campus university.

Research objectives
This research intends to achieve the following objectives:

1. To examine the current state of the green campus approach among Malaysian universities.
2. To assess how effective the green campus approach is.
3. To investigate problems in implementing the green campus practices.
4. To investigate prospects for the future development of green campus practices.

Literature review
Recently, many scholars have debated on topics such as green campuses and sustainable universities. The main discussion seems to focus on a single initiative by universities across the world. However, many of these studies are unreliable as they do not have a solid theoretical foundation. Therefore, the generalisation of results can be difficult as the insights obtained are beyond the limitations of the specific case. However, despite the limitation and challenges towards sustainability such as resource scarcity, green campus projects were still initiated. Politecnico di Bari at Italian public technical university became a reference for many universities.

Quantifiable evidence of sustainable universities has also been reported. Velazquez et al. (2006) propose a model of sustainable universities which are built based on the best practices from several universities around the world: literature reviews and simultaneous adoption of surveys. The model has evolved into a top-down approach: “a shift from defining the university’s own vision on sustainability and developing a consistent mission so as to lay a foundation for future actions and philosophies that underlie them.”

As for promoting the initiatives, universities are urged to leverage from internal drivers and focus on pressures coming from external stakeholders. This includes employee wellbeing, incentives and trainings for professional development. The need to achieve high performance from key people of the organization has also increased, mainly on sustainability issues. Alshuwaikhat and Abubakar (2008) identify three streams of an integrated approach for universities working towards sustainability: “(i) sustainability teaching and research; (ii) implementation of an environmental management
system that encompasses both infrastructures (what is called green campus) and day-by-day operations, such as energy efficiency, waste management, and pollution prevention; (iii) public participation and social responsibility, in terms of establishment of partnerships with stakeholders to promote various initiatives that range from spreading knowledge on sustainability to overcoming people’s disparities and discriminations.20 De Castro and Jabbour (2013) apply this framework to test an Indian university’s sustainability.21 Shi and Lai (2013) suggest another approach to rank and assess higher education institutions’ sustainability,22 applying a model by Velazquez et al. (2006).7

Today, a significant number of higher education institutions (HEIs) and universities have set their goals to the fundamentals of sustainability. This applies to universities’ role in bringing transformation toward sustainability which is also attested to in both the practitioner and scholarly literature.23,24 Typically, their initiatives consist of operational and wider stakeholder outreach activities, as well as academic activities,25,26 such as work on: the re-design of curricula27,28; greening campuses29,30; and building networks in local, regional and international areas to influence behaviour.31,32 Universities have also been expanding and experiencing the means to integrate sustainable thinking. Attempts include activities such as: developing institutional guidelines and frameworks; examining sustainability through campus life experience (e.g., campus as a living lab); and, maintaining programmes of sustainability audits by using, for example, the Auditing Instrument for Sustainability in Higher Education.2,28,33–35

In spite of such activity, there has been criticism on performance mainly in regards to it being technologically opportunistic and lacking coordinated leadership and coherence,23,36,37 which created debate and unaddressed questions on sustainability, such as the social dimension38 and a lack of enduring effects.39

Methods
Study design
The study uses the OECD (2015) Policy Coherence and Green Growth as shown in Figure 1. The notion is that the selected mechanisms and policy interaction in place will give way to lasting impact, as coherence.

Data collection
This research was conducted using a qualitative method. Data collection involved semi-structured interviews and observations via visits to the selected universities that promote green campus practices, namely Universiti Putra Malaysia (UPM), Universiti Kebangsaan Malaysia (UKM) and Universiti Malaya (UM). These universities were selected because they were among the earliest universities established in Malaysia. Participants were selected based on their position and seniority in their sustainability roles or within environmental facilities in the universities. They were contacted via email to set an appointment for an interview at their office. The interviews were conducted on a semi-structured basis to allow rich data collection. This enabled the researcher to understand the root cause of problems. Observations made via the campus tour during the visit to the campus included a composting centre and energy saving stickers pasted on all light switches. Interview appointments have also been arranged with panels and discussions with experts in respective ministry and government agencies including the Ministry of Agriculture & Food Industries (MAFI) and Solid Waste Management and Public Cleansing Corporation (SWCorp) for the second phase of the study.

Figure 1. Coherence of green growth.
Analysis
All collected data were transcribed before being analysed using the NVivo version 11 software using a free 14-day trial (download available here). Data analysis was conducted by focusing on the problems and prospects of going green in Malaysian universities. Interview transcripts and patterns were identified across different interviews by researchers Normazalila and Vincent. These are summarised in the findings. All transcripts were deidentified during data processing.

Ethics and consent
Ethical approval was obtained from Universiti Kebangsaan Malaysia (UKM), Universiti Malaya (UM) and Universiti Putra Malaysia (UPM) (ethical approval number: EA1162021). All participants were informed of the objectives and design of the study and a written consent form was received from the participants for interviews. Participants were informed they could leave at any time if they wish.

Results
The findings show that most universities in Malaysia have plans towards creating a sustainable approach if not the green campus approach. The awareness of going green and creating sustainability on university campuses has gradually increased across universities between 2016 and 2021. The full transcripts can be found under Underlying data.

The main challenges (see Table 1) arising from this came from maintenance, financial/resources, rapid change of technology, mindset/culture, space/logistic/infrastructure, and lack of support from municipal council or expertise.

Promising areas were found to be the commitment from universities, strategies, waste management (recycling, composting), cost saving, awareness, and the generation of income and sustainability. For instance, it is evident that these universities create strategies for sustainable green approaches in the university’s key performance indicators (KPIs).

In this study, most of the interviewees were males (87%) aged 35-60 years old who had worked for more than 10 years. Based on the qualitative analysis, other than problems and prospects, there were five main themes that emerged from the transcribed data, namely: “energy saving,” “greenery view”, “3Rs (Reduce, Reuse, Recycle)”, “waste management” and “change”. These themes were considered important factors in creating a green campus as they were found in all case study universities’ transcripts. The themes and the frequency they appeared in the transcripts are presented in Table 2.

Table 1. Challenges around creating green campuses.

<table>
<thead>
<tr>
<th>No</th>
<th>Challenges</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Maintenance</td>
<td>High maintenance is required in managing a green campus approach and in creating sustainability. It requires manpower and other resources.</td>
</tr>
<tr>
<td>2</td>
<td>Finances/resources</td>
<td>High cost is involved in the effort to sustain green campus activities.</td>
</tr>
<tr>
<td>3</td>
<td>Rapid technology</td>
<td>Due to rapidly changing technology, some machines are outdated and no longer reliable for use.</td>
</tr>
<tr>
<td>4</td>
<td>Mindset/culture</td>
<td>There is an overall poor mindset in promoting good civics. A culture of habitual littering is still evident.</td>
</tr>
<tr>
<td>5</td>
<td>Space/logistics/infrastructure</td>
<td>Allocating space, logistics and infrastructure are among the biggest challenges which lead to a dilemma for top management.</td>
</tr>
<tr>
<td>6</td>
<td>Lack of support</td>
<td>Lack of support from the experts and authorities makes these challenges worse.</td>
</tr>
</tbody>
</table>

Table 2. Main themes.

<table>
<thead>
<tr>
<th>Themes</th>
<th>Repetition</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Uni 1</td>
<td>Uni 2</td>
</tr>
<tr>
<td>Energy saving</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Greenery view</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3Rs (Reduce, Reuse, Recycle)</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Waste management</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Change</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>
Discussion

It is best to discuss further the problems and prospects in this section. Firstly, maintenance is an issue due to some initiatives for going green requiring experts. For example, one of the case-study universities had to hire a special arborist to monitor dying trees surrounding the campus area.

One of the interviewees said:

“Some of our trees are dying. They aged more than 60 years. We had to hire an arborist to maintain them and that costs us money.”

Just like many other research projects, funding is a common issue that poses challenges to the green campus initiative. Ironically, rapid changes in technology require these initiatives to keep up to date. This becomes an obstacle to universities as they may have limited funds. Some initiatives such as a composting centre may require a proper infrastructure, space and logistics. The resources, including people to organise and execute the green approach on the campus must be properly identified. If executed poorly, this will result in other failures. Similarly, knowledge management has to be in place in order to encourage knowledge sharing. Lack of awareness, littering, vandalism were other problems caused by a culture of low civic-mindedness. More importantly, despite all these efforts, strong support from all stakeholders must always be present. There were cases at one of the case-study universities where their green initiatives did not receive full support from the local authority (Municipal Council).

One of the interviewees said:

“It is hard when you didn’t get the support you need. It is even harder when that involves the Municipal Council.”

While the vast majority of people are becoming aware of how important the green campus initiative is to their campuses, there were still incidents of change refusal.

One of the interviewees said:

“Some people just want to stay in their comfort zone, forever.”

However, there were still some good prospects found in the study. For instance, there were many committed personnel with good leadership in the universities that have utilised their capabilities to filter down the information on green initiatives via a top-down structure. This comes with planning and strategising, steering committee set up as well as sponsorship from industries. The involvement from industries such as Coca-Cola in sponsoring a recycling facility at one of the case-study universities has inspired many other companies to do the same. So far, waste management, recycling activities and composting are the most popular initiatives achieved by these case-study universities. In fact, some of these activities are generating income to the universities to become self-sustaining.

One of the interviewees said:

“A sustainable university also means self-sustaining - that it is able to maintain itself by independent effort.”

In addition to that, there were also many cost saving activities: energy saving, and low CO2 emission campaigns conducted across campuses. In general, the awareness toward green initiatives has gradually increased. Universities have become a reference point for societies and agencies in various events such as seminars, talks and campaigns. The case-study universities have also won some international awards for their greening activities. Hence, it attracts many collaborators to approach them to collaborate further. The achievement awards have brought these universities to a higher level and have enabled further collaborations in the green campus approach.

Conclusion

Creating green campus facilities is viewed as a means of improving the effectiveness and quality of sustainable development initiatives in higher education. Some key points have been identified that can help campuses to achieve this result effectively, starting with awareness of environmental sustainability, the promotion of the well-being concept among campus communities and engaging them in all its components in order to participate in the change. The green campus initiatives by the case study universities such as waste management, energy saving, reducing pollution and green planting correspond with what was found in the literature reviews as to creating sustainable campus. It is clear that all themes identified in the study play an important role in its success. These themes are common and found in all case study universities. Thus, it suggests that their roles are crucial.
Furthermore, it is a duty of academia to promote societal development, to make use of the campus as a “test field” to implement any innovative methods to be sustainable. The green campus approach must lead to a wider spectrum of sustainability and not limit its focus. The findings from this study are beneficial to any organisation mainly in the higher education sector.

This study has involved only three case study universities in Malaysia and these are public universities, hence further research could consider involvement from private universities. Comparison can then be made between public and private universities in lining up their priorities toward creating a green campus.

Data availability

Underlying data


This project contains the following underlying data:

- Green Campus_Case Uni 1.pdf [interview transcript]
- Green Campus_Case Uni 2.pdf [interview transcript]
- Green Campus_Case Uni 3.pdf [interview transcript]
- Green Campus-Findings Report.pdf [list of findings]

Extended data

This project contains the following extended data:

- Consent Form_Green Campus.pdf [consent form to be completed by interviewees before interview session]
- Green Campus_demographic data.pdf
- Info Sheet_Green Campus.pdf [brief information on the study and the researcher’s contact details]

Data are available under the terms of the Creative Commons Attribution 4.0 International license (CC-BY 4.0).

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