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A Study On Sustainable And Smart Campus Mobility At Kolej Komuniti Jasin For Improving Transportation Indicator Outcomes

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Abstract

Introduction/Main Objectives: This study focuses on enhancing green mobility and smart infrastructure at Kolej Komuniti Jasin (KKJS) as a strategic approach to developing a low-carbon and sustainable campus. The topic is significant because sustainable transportation is a key indicator in global campus sustainability rankings.

Background Problems: KKJS ranked 625th globally in the UI GreenMetric World University Rankings 2024 with a score of 62.7/100. While the institution performed well in Setting & Infrastructure and Waste Management, its Transportation score was only 1,125 out of 1,800 points (62.5%), indicating insufficient attention to campus mobility and environmental management. This raises the research question: How can green mobility strategies improve KKJS's sustainability performance?

Research Methods: The study employed a mixed-method approach, including document review, observational field studies, and descriptive surveys distributed to students and staff. These methods assessed readiness and acceptance toward implementing green mobility initiatives.

Finding/Results: The findings reveal that constructing pedestrian walkways and green corridors, along with introducing a vehicle-sharing system, significantly reduces carbon emissions and improves sustainability scores. Survey results indicate strong support for walking and cycling routes as alternatives to motorized transport.

Conclusion: Integrating green mobility strategies into campus planning enhances KKJS's UI GreenMetric ranking and fosters a low-carbon, equitable, and safe TVET community campus. The study underscores the importance of promoting green culture and sustainable lifestyles to achieve a fully sustainable campus by 2030.

Keywords: Kolej Komuniti Jasin, green mobility, smart infrastructure, sustainable campus, green TVET, UI GreenMetric.

Introduction

Sectors such as education need to embrace long-term sustainability practices as a result of climate change and increased carbon emissions. Green mobility or green transport is one of the sustainable development initiatives that focus on removing fossil fuel motorized vehicles and using alternative no- or low-carbon means of transport like walking, cycling, and clean energy vehicles. In line with the Sustainable Development Goals (SDGs) 11: Sustainable Cities and Communities and 13: Climate Action, educational with developed innovative campus and management practices are green practices.

Educating and developing eco-friendly practices are also responsible to institutions. The Universitas Indonesia (UI) GreenMetric World University Rankings initiated in 2010 has become a tool and a marker of sustainability in educational institutions. The green metric ranks educational institutions on the basis of Set and Infrastructure, Energy and Climate Change, Waste, Water, Transportation-education, and Sustainable Research. Of all these indicators, green mobility is one of the indicators of the exposure of institutions to eco-friendly infrastructure.

The Green Mobility Low Carbon Mobility Blueprint 2030 (NRECC, 2023) along the National Green Technology Policy 2.0 on the other hand accelerate the move towards Green Mobility in Malaysia with emphasis on the need to integrate activities around low carbon transportation within the educational and community. These activities are in tandem with the Malaysia TVET Strategic Plan 2030 which promulgates the role of technical and vocational institutions in the community education on Green Technologies and Sustainable Living.

Kolej Komuniti Jasin (KKJS) is one of the community-based TVET institutions which has also shown dedication to the sustainable development and environmental education, as seen in the UI GreenMetric World University Rankings 2024 where KKJS is 625th in the world with an overall score of 62.7% (6270/10000). The report indicates that in the Transportation component of the mobility, KKJS obtained a little above average score of 1125/1800 (62.5%). There is therefore a need to improve on the score. This however, places Green Mobility and Smart Infrastructure as one of the top tier researches and developments sustainability in the performance of technical education.

Taking these needs into consideration, this research aims at accomplishing three goals. First focus is on designing strategies and action plans of green mobility that eliminate the need of the motorized traffic and promote the use of walking and cycling routes. Second focus is on assessing the campus sustainability performance improvement on account of green mobility, particularly in the Mobility and Energy & Climate Change sectors of the GreenMetric. Third focus is on fostering environmental sensitivity and green campus culture and activities in the staff and students through the engagement of the local community in project based learning and green campus programmes.

This research strategy aims to assist KKJS in improving its standing within the global GreenMetric rankings and also strengthens its position in Malaysia as a model low carbon community based TVET campus. The anticipated implementation of the green mobility strategies will lead to a carbon emission reduction, a safe and healthy learning environment, and an enhanced relationship with the community by showcasing sustainable practices. Therefore, Kolej Komuniti Jasin is meeting the sustainability demands and is among the first to offer green mobility in the technical education in Malaysia.

Research Objectives

This study aimed to assist in improving the sustainability efforts of Kolej Komuniti Jasin (KKJS) in the Transport and Energy & Climate Change components of the UI GreenMetric World University Rankings 2024. Thus, this study intends to achieve the following three particular objectives:

a) To develop and implement of mobility management strategies and action steps for the promotion of walking and cycling and the reduction of campus motorized trips.
b) To determine the effects of the adopted green mobility strategies on the sustainability of the campus and the institution's environment.
c) To integrate the green aspects of practices to the participants of sustainable campus initiatives and activities.

Scope Of Study

This study investigates the following:

a) The Kolej Komuniti Jasin Campus setting and the movements of students, personnel and guests on the campus.
b) The campus infrastructure which supports the mobility of users such as the footpaths, cycle ways, parking areas and low carbon green surroundings.
c) The dimensions of teaching and awareness on the movements and activities of the campus community with the introduction of green mobility programmes and sustainability community outreach university activities.

Research Questions

This study addresses the following key research questions based on the objectives and the scope:

a) What strategic plans and green mobility actions can be carried out in Kolej Komuniti Jasin?
b) What are the impacts on the sustainability performance of the campus and the wellbeing of the campus community after the introduction of green mobility strategies?
c) What is the level of awareness and participation of the campus community in the sustainable mobility practices and in the green sustainable mobility infrastructure?

Significance Of The Study

This study supports KKJS efforts to improve campus sustainability efforts in the Transportation and Energy & Climate Change categories in UI GreenMetric ranking.

a) The study assists KKJS to envision and plan green mobility strategies to reduce the use of motorised vehicles while increasing green coverage and improving GreenMetric sustainability rating and reputation as a low carbon TVET campus.
b) Strengthening Project-Based Learning (PBL), the study contributes to embedding sustainability into TVET training and further to research and innovation in the sustainable design of the built environment.
c) The study supports the awareness of campus residents, and the immediate community, concerning green transport, safe environment, low carbon ways of living, in connection with the Low Carbon Mobility Blueprint 2030.

In a word, the study aims to JJS to be a safe, and green, sustainable low carbon community-based TVET campus.

Literature Review

The implementation of green mobility is a growing focus within the sustainable development of campuses (Julia Kinigadnera et al., 2020). Among several forms of mobility, green mobility is the paradigm that mainly centers on the reduction of the carbon footprint, energy consumption, and ensuring the safety of users of transport systems within educational settings. Studies conducted worldwide assert that mobility management on campuses is able to cut greenhouse gas emissions (GHG) by more than 30% via low carbon mobility and well-designed pedestrian roads (Bruno S. et.al, 2019).

On the international scale, the UI GreenMetric World University Rankings have included the Transportation indicator as one of the key elements of assessing the sustainability of institutions (UI GreenMetric, 2924). Fachrul Kurniawan et.al (2025) substantiate that the inclusion of green amenities such as shaded walkways, bicycle parking, and car-free areas do improve the sustainability indices of the campus but also enhance the well-being of the students.

Locally, the operationalization of the Low Carbon Mobility Blueprint 2030 under the Ministry of Natural Resources, Environment and Climate Change (NRECC) advocates educational institutions to implement green mobility frameworks for carbon emissions reductions in the education sector (NRECC, 2023). Nur Hairani et. al. (2025) suggest that the integration of principles of sustainability within the TVET system will facilitate the development of students with positive environmental attitudes and also enhance the management of campus resources.

The UI GreenMetric 2024 Report indicates that KKJS has a Transportation score of 1,125 over 1,800, representing 62.5%. This indicates that a well-structured green mobility plan can improve this score significantly. Being recommended in past research by María Teresa et. al. (2022), the simple strategies of adding more walkable and bikeable routes and removing vehicle parking have also been proven effective to the creation of the campus green and the decarbonization of the campus.

The existing literature highlights green mobility implemented successfully in the campus community has the (1) planned strategically (2) well designed (user) infrastructure (3) the campus community is educated and aware. Thus, this research project focuses on applying these parameters to improve greening and mobility in the community of Kolej Komuniti Jasin. This will further enhance KKJS status as a low-carbon, livable and sustainable TVET campus.

Research Methods

This study employed a descriptive and comparative evaluation approach to assess the implementation and potential improvement of the green mobility system at Kolej Komuniti Jasin (KKJS). This approach is appropriate as it focuses on the analysis of existing policies, field observations, and the examination of secondary data from the UI GreenMetric 2024 report.

Research Design

The research design integrates both quantitative and qualitative methods to obtain comprehensive findings.

a) a) Quantitative data were derived from the analysis of GreenMetric scores for the T ransportation and Energy & Climate Change categories (1,125/1,800 points).

b) Qualitative data were gathered through field observations of pedestrian walkways, parking facilities, and green space management around the campus, as well as informal interviews with staff and students regarding their daily mobility practices.

Data Collection Methods

a) Document Analysis:
The official UI GreenMetric World University Rankings 2024 report served as the primary source for identifying current strengths and weaknesses related to transportation and energy performance.
b) Field Observation:
Observations were conducted in key areas of the campus, such as entry routes, parking zones, and student movement areas, to evaluate the use of green mobility facilities and user safety.
c) Short Surveys:
Questionnaires were distributed to students and staff to assess their level of awareness, attitudes, and support for the implementation of green mobility initiatives.

Data Analysis Methods

The collected data were analyzed using descriptive analysis techniques frequencies, percentages, and mean values to illustrate awareness levels and utilization of green mobility facilities. Field observations were compared with UI GreenMetric guidelines to determine the suitability and effectiveness of current strategies.

Result

Based on the UI GreenMetric World University Rankings 2024, Kolej Komuniti Jasin (KKJS) recorded an overall score of 62.7% (6270/10000), placing it 625th globally and 31st in Malaysia. Among the six main evaluation categories, the Transportation indicator achieved 1,125 out of 1,800 points (62.5%), indicating that while basic elements of green mobility are already in place, considerable improvements are still needed.

The key findings are as follows:

a) Current Strengths:
- KKJS has established pedestrian walkways and green spaces in key areas of the campus.
- The campus community demonstrates a moderate level of sustainability awareness, particularly in walking and vehicle-sharing practices.
- Basic infrastructure such as parking facilities and low-energy lighting has been implemented in several locations.

b) Identified Weaknesses:
- Absence of car-free zones and dedicated bicycle lanes.
- Large parking areas continue to dominate the physical landscape of the campus, limiting opportunities to expand green spaces.
- Lack of a formal green mobility policy to regulate the use of motorized vehicles.

c) Survey Analysis:
- 68% of respondents agreed that pedestrian facilities require improvement, particularly in terms of shading and safety.
- 74% of respondents supported the implementation of green mobility initiatives such as Walk-to-Class Day and the Green Ride Challenge.

Discussion

Results suggest that the adoption of green mobility at KKJS is still in the early stage, as current physical settings and local community awareness do not yet consider the essence of a low carbon campus. Nevertheless, getting a Transportation score of 62.5% indicates that there is a functioning baseline, and with greater scope of strategies in place, the institution is likely to further improve its performance.

When compared with other institutions, KKJS is in the middle category positioned in the UI GreenMetric 2024 ranking. Most universities and colleges that score more than 75% in the Transportation criterion implement the following:

a) Car-free areas and safe, fully dedicated cycle pathways.
b) Converted parking lots into green spaces or community gardening.
c) Ongoing awareness and formal green transport policy advocacy.

For KKJS, improvements in these three areas are likely to elevate its GreenMetric performance and strengthen its standing as a community-based green TVET campus. These green mobility strategies are also in line with the Low Carbon Mobility Blueprint 2030 (NRECC,2023), which focuses on the combination of physical infrastructure enhancements with user behavioural change.

The awareness and engagement of students and staff to the successful application of the green mobility policies are also emphasized. This is why employing project-based learning activities, where learners create, implement, and promote green pathways, would be ideal for reinforcing the sustainability culture embedded within KKJS.

Summary of Discussion

The results of the research indicate that:

a) KKJS has made some progress, and put in place some foundational frameworks with respect to green mobility, but to build upon these, additional, refined, systematic, and wholistic frameworks would be required to bolster the progress.
b) Formalizing the green mobility policy to include reconfiguration of pedestrian pathways, reduction of vehicular parking, and other related changes would improve the impact of the current efforts in progress.
c) To achieve the vision of a fully operational low-carbon community-based TVET campus by 2030, the campus community must maintain continuous proactive participation and awareness.

Conclusion

This exercise underlines the need for flexible, efficient, and smart infrastructure to complement the initiatives already in place (especially in the Transport and Energy and Climate Change categories) to improve the sustainability performance of KKJS, in line with the targets set for UI GreenMetric 2024. From the available data, the analysis and assessment indicate that KKJS has is the New for Green mobility KR received – 1125/1800 (62.5%), while it is the Multi with establishment of a solid foundation of the Green Multi initiative priorities the efforts and a more strategic and comprehensive action plan. With respect to the improvement of low-carbon policies, the study showed the potential for designing green mobility strategies, assessing their effects on campus performance, and to awareness building and green practice diffusion.

Beyond improving KKJS's GreenMetric rating, the deployment of green mobility positively impacts the health, safety, and well-being of the campus community and fulfills other national aims under the Low Carbon Mobility Blueprint 2030 and the Malaysia TVET Strategic Plan 2030. It can therefore be stated that, with enhanced policy framework, improved physical infrastructure, and community collaboration, the Kolej Komuniti Jasin can become a safe, liveable low-carbon and community-based TVET campus sustainably by 2030.

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