

# PERCEPTION TOWARDS SUSTAINABILITY POLYTECHNIC CAMPUS IN MALAYSIA

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## ABSTRACT

*The higher learning institutions in Malaysia are currently in the stage of integrating sustainable components in the campus planning and management. In the case of campuses that are located within a fast growing urban context and threatened by uncontrolled physical and social development, it is very important to ensure the sustainability of the campus environment. Due to the piecemeal planning, buildings are isolated and the public spaces are illegible. As a result, the campus environment is found to be less responsive, environmentally and socially. The aim of this study is to examine the aspects of green and eco-nature based on the users' perception that influence the environmental and social sustainability of polytechnic campuses in Malaysia. Questionnaire surveys were conducted on 300 polytechnic communities from two premier polytechnics to identify their perceptions towards the institution in the context of sustainability. It is discovered that comfort, health, green and safety are highlighted as the most important components of sustainable campus environment. The survey results indicate that polytechnic communities in Malaysia are strongly concerned with the recreational needs and the functional use of the spaces. The need is to provide learning and working environment that support the well-being of the campus community. The findings of this study are useful reference for planners, architects, urban designers and Department of Polytechnic, Ministry of Higher Education in their effort to create a sustainable polytechnic campus. This will be in line*

*with the aim of the polytechnics Transformation Plan 2010 to transform polytechnics into a preferred institution for higher learning.*

**Keywords:** Sustainable polytechnic campus, planning, eco-nature, green campus

## 1 INTRODUCTION

Higher education institutions across Malaysia have adopted the movement towards sustainable campus (Dola et al., 2011, Mohamad Nizal, 2010). Many universities and colleges are in the various stages of integrating sustainable components in the campus planning and management. Polytechnic is one of the higher education institutions in Malaysia which set the target for sustainability in their human capital as well as the environment (Polytechnics Transformation Plan, 2010). Polytechnics in Malaysia have been established for almost 41 years (Sahul et al., 2010) with the development of 27 polytechnic campuses nationwide which are managed by the Department of Polytechnic Education to cater for the national industrial sectors. Ministry of Higher Education through this department has to ensure that the country's semi-professional workforce and executive levels must meet the industries requirements and needs accordingly. Polytechnic campuses have been designed to be equipped with adequate facilities for teaching and learning,

however, it is observed that the existing physical and spatial environment does not fulfil the functional needs of the campus community. Thus, they are not considered sustainable as teaching, learning and working environment. Due to the piecemeal planning concept, buildings are isolated and the public spaces are not fully utilised. For example, it is evident by the lack of consideration on pedestrian needs for comfort thus unable to promote healthy lifestyles. There is a need to provide learning and working environment that support the well-being of the campus community (Mohamad Nizal, 2010).

As a result of the spatial disintegration, spaces in between buildings within the campus are not well defined to serve as spaces for informal learning and for social interaction thus unable to encourage an interactive learning space. Based on the analysis of the Politeknik Ungku Omar (PUO) in Ipoh and Politeknik Sultan Salahuddin Abdul Aziz Shah (PSA) in Shah Alam, the campus environment is found to be unfriendly to the pedestrians. With limited sheltered spaces, walking becomes very uncomfortable while lack of continuity of the pedestrian networks makes it difficult to move around the campus. Movement system is dominated by the circulation of vehicles while pedestrian routes are not clearly defined. This contributes to safety problems caused by the conflict between vehicles and pedestrians (Shuhana, 2007).

The polytechnic campus environment is typically not accessible to the neighbouring community due to the design and management of the main entry of the campus. Various control procedures, including inspections by the guards on duty are not only cumbersome and cause discomfort, it is also a hassle to visitors and outsiders. This is not in line with the idea of integrating the campus community with the surrounding communities through sharing of facilities and services. This study identifies the key criteria for sustainable campus environment and examines the elements that strongly support the qualities associated with sustainable campus environment based on the perception of the campus community. This may assist the management to identify appropriate approach in making the campus environmentally and socially sustainable in the years to come.

## 2 DEFINITIONS OF SUSTAINABLE CAMPUS

A sustainable campus is defined as a campus characterized by its operations, social and economy, which promote the long term survival of the environment and our own social structures (Mohdet al. (2011). It is also functioned as a framework to visualise the sustainability items and support the people within the campus community (USM, 2007). This study seeks to examine the influence of the green and eco-nature based on the users' perception of environmental and social sustainability of polytechnic campuses in Malaysia. It focuses on the sustainability principles of landscape design and architecture, the physical environment, activities and the relationship between buildings and landscape.

The definitions of sustainable campus vary according to the emphasis and appropriateness of the context. It generally covers four aspects of the university community namely the administration, the academic departments, the university research efforts, and the local community (<http://www.sustainable-campus.org/universities.html>). The objective is to achieve the balance between the protection of environment resources, economic efficiency and the well-being of the people. For example, a sustainable campus is defined as "a strategy that strives to reduce the ecological footprint of the institution via a rational use of resource and to educate the university community on the ethics of sustainability" (<http://www.international-sustainable-campus-network.org>). Another broad definition of a sustainable campus or university is developed by Cole (2003), Velazquez et al. (2006), and Habib & Ismaila (2008) that emphasised that health and well-being are the most highlighted components and imply a better balance between economic, social and environment. In order to enhance health and well-being of community in the campus, the campus planning and design can be adapted to reinforce sustainability by making it easier for the community to work, learn, play, shop, travel and eat in more sustainable manner (Rob Cross & Roger Spencer, 2010). In this study and in the context of planning and design, a sustainable campus is defined by a campus that integrates green elements (features) and nature to provide healthy

environment as well as spaces that support social integration among the community.

### 3 PLANNING AND DESIGN OF A SUSTAINABLE CAMPUS

The planning and design of a sustainable campus promote more environmental friendly spaces with consideration on the ecological factors in the campus area (Richard, 2000). This will provide a unique identity to a campus of higher education institutions, for instance the traditional setting which utilizes contemporary elements without abandoning the values of natural environment. In other words, greening the campus should take into consideration of the conservation of natural environment as well as to improve the aesthetic qualities of the spaces in the campus. By making the environment more attractive and more comfortable, the spaces can be used more effectively as social spaces. In addition, there is a growing need for students to have restorative and stress-reducing environment within a campus. In this study and in the context of planning and design, a sustainable campus is defined by a campus that:

1. Integrates green elements/features to provide healthy environment to support the well-being of the campus community (green campus).
2. Integrates nature as the main component of landscape for healthy environment and recreational facilities (eco-nature-campus).
3. Provides physically, psychologically and climatically comfortable/conducive environment (functional spaces) for teaching, learning and working activities (physically and psychologically conducive campus).
4. Integrates a spatial concept that supports social integration among its community for social well-being and sense of belonging (socially responsive campus).
5. Is planned for safety from crime and traffic and pedestrian-friendly for sense of security (safe campus).

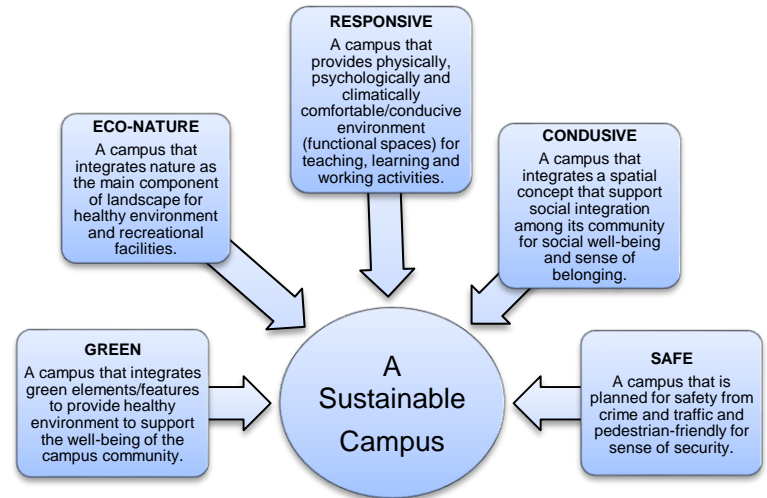


Figure 1: Definition of a sustainable campus concerning the planning and design aspects

### 4 QUALITIES ASSOCIATED WITH SUSTAINABLE CAMPUS

Sustainable campus supports preservation of nature, and provides social setting that opens up opportunity for financial benefits. It should be eco-friendly, embodies sustainable design principles and rich in architectural characters (Alan Ford, 2007). The sustainable practices include water conservation, energy efficiency, green materials and multipurpose spaces. The implementation of sustainable practices is relevant to polytechnics in Malaysia because the sustainable principles will lead to conducive and healthy environment for the well-being of the campus community.

In Malaysia geographical context, the hot and humid tropical climate influences the environmental comfort for users. For example, the idea of green campus can be translated in the provision of shade trees that can create a

refreshing atmosphere. In this context, green campus is regarded as a campus that integrates green spaces suitable for sitting, walking, talking, playing or studying (Clare, 1998). Some of the questions arise are whether or not the campus is accessible by various means of transportation. Is the access road clear? Is the design of the walkway can accommodate all pedestrians in campus? It is argued that the greener and the more natural the school environment resulted in a better academic achievement and behaviour (Rodney, 2010). Rodney (2010) discovered a positive relationship between the amount of trees and shrubs that can be viewed from the cafeteria and the classrooms with the examination results, graduation rates, percentage of students going to college, and a reduction in crime in schools. However, large areas of campus lawns, athletic fields, and parking lots which are lacking in natural elements do not support a positive learning environment. There is a need for students to have restorative and stress-reducing environment, and this can be contributed by the greens and natural elements in the campus. Since polytechnic campuses in Malaysia are located in both urban and rural settings, it is important to ensure that the campuses take advantage of the existing nature and recreate nature in the urban setting. Studies on the community's perception of the existing settings in terms of the integration of nature and greenery will highlight the needs and concerns of the campus community.

## **5 ENVIRONMENTAL PERCEPTION AND SUSTAINABLE ENVIRONMENT**

A sustainable campus should be planned to be a conducive campus in terms of the planning, building design, landscape design and social context (Shuhana, 2007). The planning should integrate a spatial concept that supports social integration among its community for social well-being and sense of belonging. It is argued that the existing polytechnic campuses can potentially be developed as sustainable campuses by adopting the sustainable planning and design principles for a conducive campus environment discussed above. A sustainable campus should adapt crime and traffic safety planning, pedestrian-friendly and walkable concept for sense of security (safe campus). In the case of USM, the lecture halls, library and other schools are located at the core area surrounded by hostels (USM, 2007). To design a walkable

campus, USM has taken the initiative to plant more shady trees along popular walking routes and also has provided safe routes for pedestrians.

As a result, the campus can function as integrated social spaces for learning which provides physically, psychologically and climatically comfortable environment. These spaces can be used for teaching, learning and working activities for the campus community and the communities outside the campus. In addition, it should support the integration amongst the campus community and integration between them and the general public. A socially sustainable campus is an entity that can integrate the community (Rohaniah, 2009) through a 'one-stop-centre' outside the classroom environment which functions as a learning space and help developing the campus identity. Since the users' needs and aspirations are the key aspects of concern in developing a sustainable polytechnic campus, this study examines the potential effects of green and eco-nature in making the campus ecologically and socially responsive to the existing inhabitants.

## **6 METHOD**

A questionnaire survey was conducted on a sample of 300 respondents from two premier polytechnics which are Politeknik Ungku Omar (PUO) in Ipoh and Politeknik Sultan Salahuddin Abdul Aziz Shah (PSA) in Shah Alam. Respondents were selected from every main department in both polytechnics. Using stratified sampling technique, the survey was to identify the campus community's perceptions towards the polytechnics in the context of sustainability. The respondents represented by staffs and students of the selected campuses. Key variables are identified from literature reviews and findings from previous researchers. The variables used to determine the sustainable polytechnic campus are green, eco-nature, responsive, conducive and safe. This study focuses on the influence of green and eco-nature since these criteria were highlighted from the survey as highly important in the users' identification of sustainable campus characteristics. The survey contains six parts: demographic, section A, B, C, D and E. Demographic survey of the respondents includes status (student / staff), gender, period of stay in the campus and their awareness towards sustainable campus. The

section A, B, C, D and E includes questions based on the five criteria of sustainable campus that reflect the respondent's perception of sustainable polytechnic campus environment. The survey is measured using the Likert-scale technique, where five answer choices are given to each of the question: strongly disagree (1 point), disagree (2 point), not sure (3 point), agree (4 point) and strongly agree (5 point). Figure 1 describes the sustainable campus criteria. The planning and design principles used to assess the sustainability of the polytechnic campuses were analysed using descriptive statistical methods and the data is presented by percentage, mean, standard deviation and median.

## 7 RESULT AND DISCUSSION

From the five criteria of sustainable campus surveyed, green and eco-nature campus have been identified as the most influencing criteria in determining the sustainability of the polytechnic campuses environment. Figure 2 shows the needs for a green campus based on the survey while Figure 3 further indicates the effectiveness of green campus on polytechnic campuses, sorted by priority based on the mean score. The respondents' feedback to all eight items scores a median of 4.0.

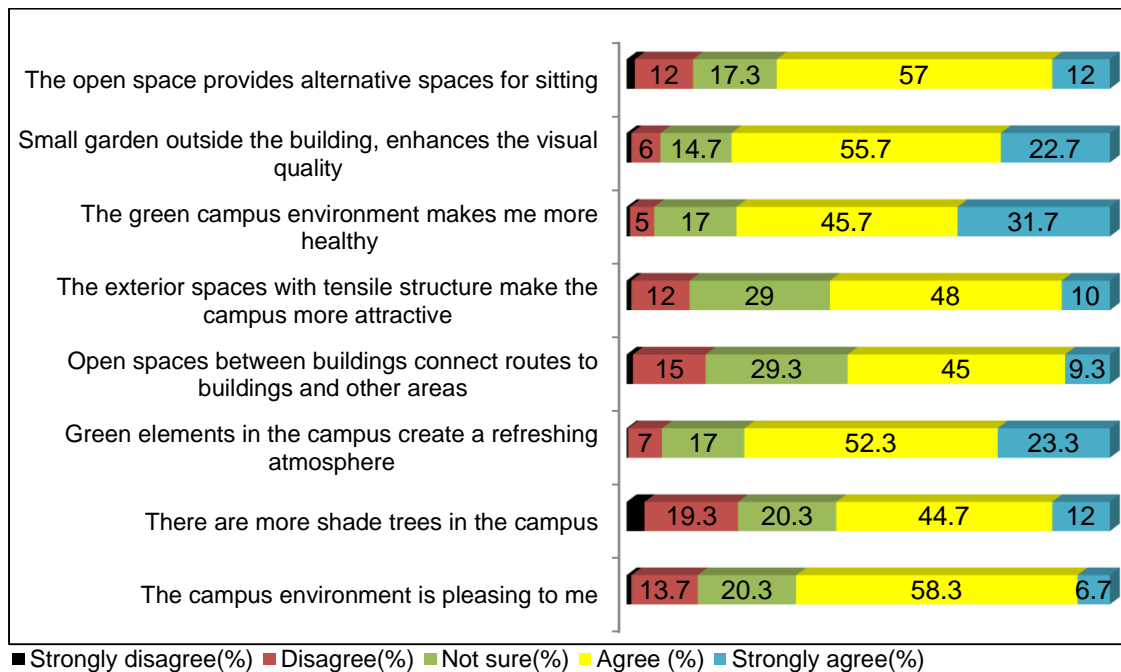


Figure 2: Respondents' perception towards green campus

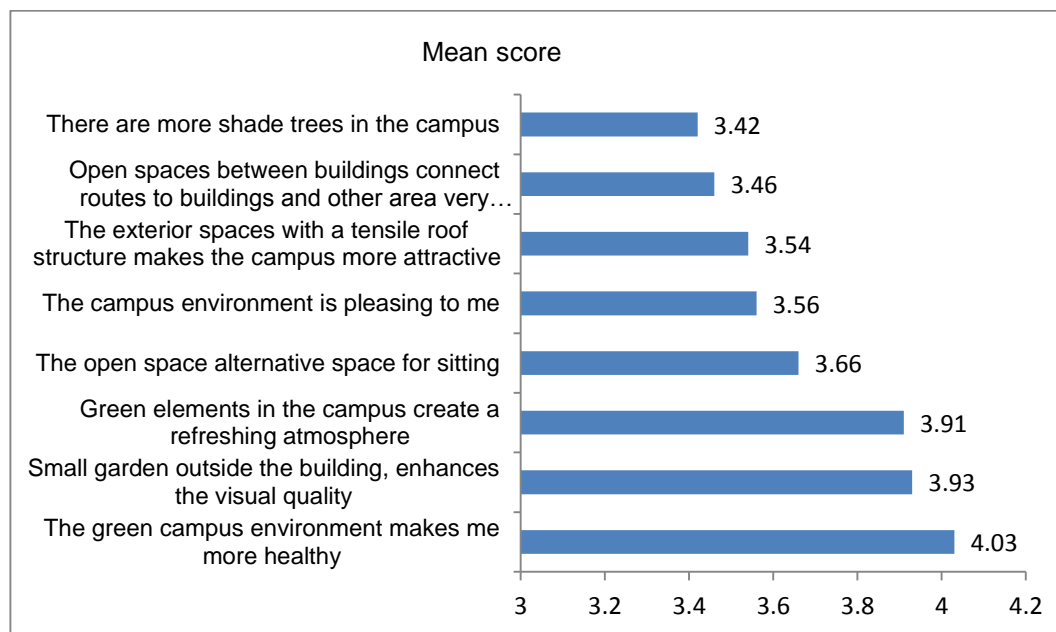


Figure 3: The importance of green environment on the polytechnic campuses in Malaysia based on respondents' perception towards sustainable campus

This means that all the respondents agreed that they are satisfied with their campus environment (65%). They felt that the green campus environment makes them healthier (77.4%), the green elements in the campus create a refreshing atmosphere (75.6%), and the small garden outside the building enhances the visual quality (78.4%). They thought that the green campus creates restorative and stress-reducing environments with the open spaces providing alternative spaces for sitting (69% high) under shade trees (56.7%) and covered sitting area (58%). In addition, the open spaces between buildings connect routes to other buildings and areas very efficiently (54%) which is easier for everyone to walk on campus.

The results support Rodney's (2010) finding that a campus should have an environment with a natural feature like a high density of trees and shrubs in

the landscape area to ensure students excel in all aspects. Moreover, prior research has shown that the decreased performance and increased frustration and stress as well as dissatisfaction with the environment occurred when nature is less available in the immediate view in the campus and working places (Heschong Mahone Group, 2003); Kaplan, 1993 and Tennessen and Cimprich, 1995).

From the eight items indicating characteristics of green campus surveyed, the items associated with health (mean 4.03) and green environment have been identified as the most influencing items to determine the sustainability of the polytechnic campus environment. However, having more shade trees in the campus is the less influencing item (mean 3.42). This result is similar to the findings by Mohamad Nizal (2010) whereby the polytechnic community are

positive towards green environment on campus which is proposed as one of the elements forming a sustainable campus. Furthermore Shuhana (2007) also found that there is a lack of consideration of the climatic aspect in the design of landscape and outdoor campuses in Malaysia. In hot and humid weather, social interaction in outdoor spaces is hardly observed in the polytechnic

campus environment due to the lack of shaded areas in the campus. This is related to the finding by Lin et. al. (2010) who agreed that shading provides by trees is sufficient to improve outdoor thermal comfort. Therefore, creating a comfortable outdoor space (Figure 4) is needed in promoting outdoor activities within the campus.



Figure 4: The outdoor space for eating and recreation.

Figure 5 indicates the needs of the campus community for an eco-nature campus. It is found that the respondents perceived the polytechnic campus as an eco-nature campus. They felt that it is important for a campus to integrate nature as the main component of landscape for healthy environment and recreational facilities (69.7%). They needed the natural elements on campus which can diversify the quality of views and experiences(83.3%), and to create a strong local identity of the campus

(87.4%). In this case, they agreed that the water elements produce a soothing atmosphere and comfortable environment (86.3%) and fairly agreed that most of the buildings have an attractive view of the lake (54.6%). They strongly agreed that pedestrian walkways which are closed with nature creates eco-friendly environment (79%) and the natural forest in the middle of the campus can be utilised as a recreational area (69.7%).

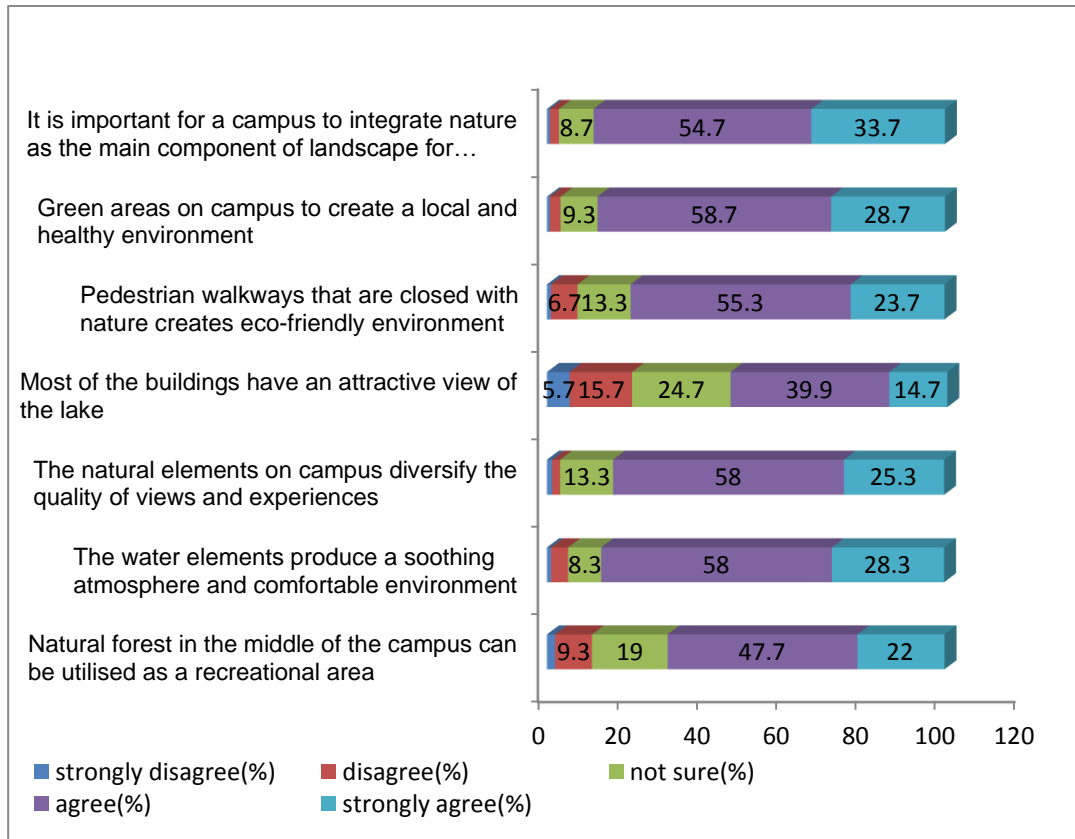


Figure 5: Respondents' perception towards eco-nature campus



Figure 6 shows that the respondents' feedback to all seven items of eco-nature campus is at a median score of 4.0. From the seven items of eco-nature campus surveyed, the integration of nature as the main component of

landscape for healthy environment and recreational facilities (mean 4.18) has been identified as the most influencing item in determining the sustainability of the polytechnic campus environment in Malaysia.

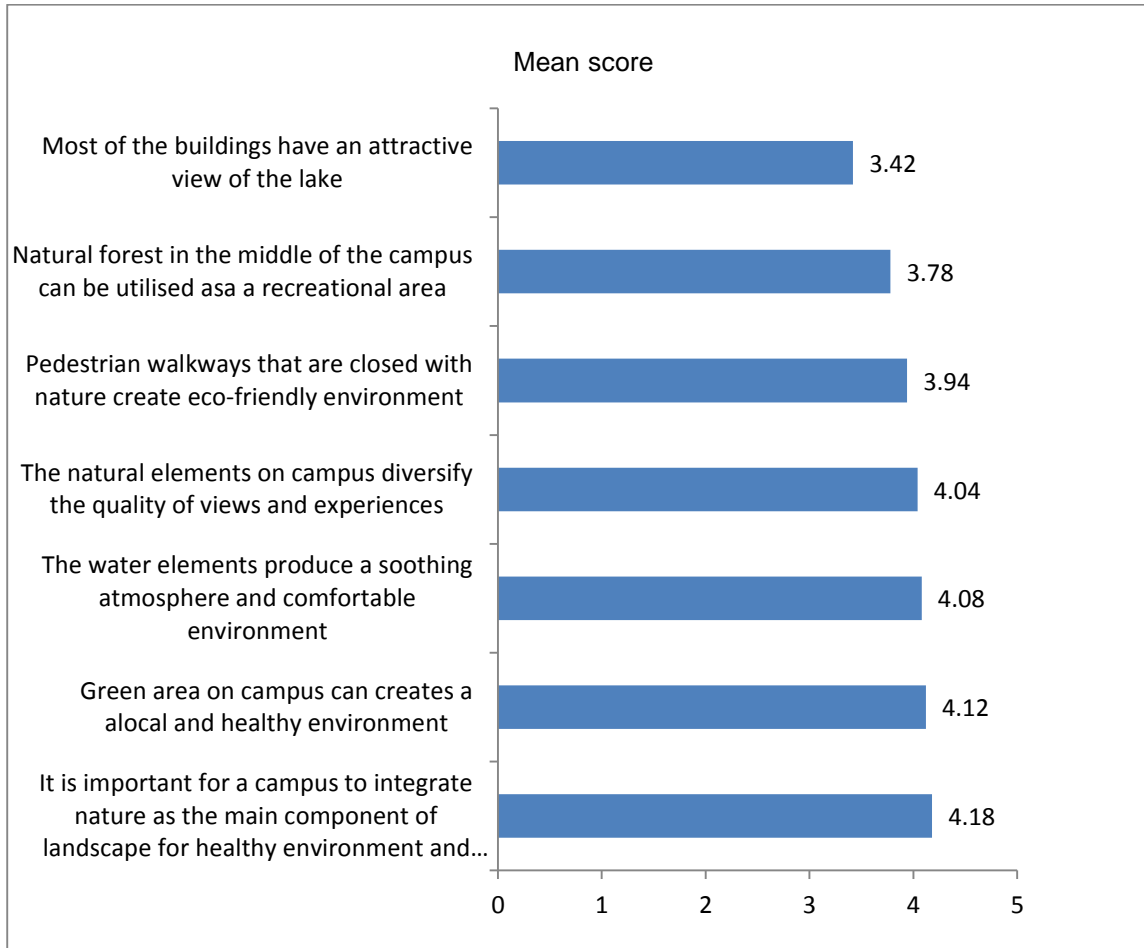


Figure 6: The importance of eco-nature environment on polytechnic campuses in Malaysia based on respondents' perception

However, most of the buildings have an attractive view of the lake (mean 3.42) is the less influencing item. This is consistent with the opinion of Habibet al. (2008) that the environmental quality can be achieved by promoting a beautiful and serene campus landscape free from traffic that promotes a quiet atmosphere for learning. Eco-nature features like water elements (river, streams, and fountains), mountain, and forests can be integrated in public parks and gardens, campus square and recreational activities for the campus community and the public. However, the lakes in the polytechnic campuses are lacking of natural elements that makes it less attractive in the eyes of the campus community.

Based on the observation of the existing campus settings and conditions, it is evident that the potentially adapted elements of nature as an integral part of the campus planning are not fully utilised. For example, in PSA campus in Shah Alam, the existing lake could be integrated with eco-nature elements with the presence of shade trees and sitting area as a place for eating, discussions and hang out spot to encourage social interaction. The results of the survey indicate that the polytechnic communities are strongly concerned with the green campus environment and agreed to the importance of nature integration as the main component of landscape for healthy environment and as recreational facilities. This is suitable to the campus lifestyle where learning is acquired formally in the classrooms and it is strengthened by the conducive, interactive and comfortable campus environment. Despite having vegetation around the campus or along the main routes, they are not adequate to fully integrate nature as the dominant elements in the campus. The areas should be more defined by softscape and natural landscape elements existed in the area.

## 8 CONCLUSION

The establishment of sustainable polytechnics in Malaysia is important to provide healthy environment for teaching, learning and working activities. The existing physical and spatial environments need to support social integration among its community for social well-being and sense of belonging. The research findings indicate that the polytechnics communities are strongly concerned with the recreational needs and the functional use of the spaces. Therefore, planting shade trees and shrubs along the pedestrian corridors, around the open spaces and the building need to be encouraged. It is important for a campus to integrate nature as the main component of landscape for health recreational needs. Nature and green environment create a conducive learning and teaching environment for the polytechnic campuses while integration among the building interior, the walkways, and the exterior landscape should be improved for a more positive visual impact. The findings of this study are useful reference for planners, architects, urban designers and Department of Polytechnic, Ministry of Higher Education in their effort to create sustainable polytechnic campuses. This will be in line with the aim of the Polytechnics Transformation Plan 2010 to transform polytechnics into a preferred institution for higher learning.

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