CAMPUS LANDSCAPE PREFERENCES: A FAVORABLE PLANTING COMPOSITION IN STUDY AREA

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ABSTRACT

The landscape is an important part of campus as source of beautification and healthy environment. The landscape preferences in campus usually explore by asking the participants to rate their most favourable landscape scene. This study aims to evaluate the favorable planting composition in students' study area. The objectives of the study are to identify the pattern of planting composition in the campus and to relate the impact of composition towards utilising the outdoor study area by students. Throughout the literature review, this research generates briefly discussion on the relationship between planting composition and students learning behavior in the study area.

Keywords: *landscape preferences, planting composition, study area, campus*

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INTRODUCTION

Plants or also known as soft landscape always play an important role in the living organism. In fact, plants become an aesthetic expansion in each development. Campus landscape provides information, ideas and instruction about planning and designing the green environment that situates, serves and symbolizes higher education (Dober, 2000). Traditionally, campus landscape is seen as a green carpet upon which buildings are placed, or it is articulated as a device to extend a building design concept into open space, with a garnish for an architectural feast (Dober, 2000). The previous study reveals that campus landscape can give a great influence on the quality of landscape visual (Jacob et al., 2015) and quality of life in campus (Dongying & Sullivan, 2016). Thus, this study aims to evaluate the favorable planting composition in a study area. Therefore, the objectives of the study will identify the favorable planting composition in the study area. Next is to investigate the relationship of favorable pattern with the utilisation of the outdoor study area. Lastly, this study will explore the impact of planting composition in the study area towards visual quality on campus. As well known, life in university is challenging (Stepan et al., 2014), which may lead to attention fatigue (Felsten, 2008) and stress (Dongying & Sullivan, 2015). The previous study has stated that engaging with plants in the landscape will release stress and tranquilise the mind and give therapy to human as determined by Lau and Yang (2009) cited in Stepan et al. (2014). However, many campus designs are defined to express the architecture of the buildings rather than human comfort needs (Hanan, 2013). That is shown soft landscape is less concerned in a campus. With an effective landscape on campus can improve and enhance the quality of life and create a healthier environment for students and faculty (Lau & Yang, 2009) in Stepan et al. (2014). Correspondingly, the part of the landscape for this study is planting composition. Planting composition is the most significant element in how the landscape was visually seen. Plant composition may consist of groundcovers, shrubs, and trees, and it is definitely important in reviving the condition of the surrounding environment (Noriah et al., 2015b). Therefore, this paper is highlighted the favorable composition of the plant in campus to visual the impact on utilisation index of the outdoor study area and the impact towards campus image.

LITERATURE REVIEW

Preferences are one of the most widely used in studies to assess the favorites or choices of a human for the certain elements. Other than that, preferences are used to evaluate the factors that influence the choice of people (Tzu-Kuang Hsu, Yi-Fan Tsai, Herg-Huey Wu, 2009). In term of landscape preferences study, it is usually referring to liking or appreciating the landscape and usually measured by asking participants to rate or rank each landscape scene individually (Leila Mirza, 2015). Preferences are proved as important in assessment in landscape studies to evaluate or rank a preferable landscape for future landscape planning. In this research, campus landscape has its own function towards students and how they utilise the outdoor study area. There are certain criteria that can be the factors to encourage students to be outside. Thus, the criteria can be used as an indicator in developing landscape in campus especially principles in planting arrangement.

The Principles of Planting Composition and its Relationship in Creating Favorable Campus Spaces

In the design field, most of the ideas will represent several principles to demonstrate the whole concept of design. As well to planting design, there must be developed according to principles as an extensive ingredient that manipulates the spaces and functions. Too much planting is done by those who have had no training in planting design principles. Once we have familiar with principles of planting composition, we will realise that much of our man-made landscape is poorly designed and maintained. Therefore, the composition plays an important role to make the plant functioning well. At the landscape scale, the composition of plants has linked towards the different spatial arrangement of plant species (Montserrat Bassa, Celine Boutin, Lourdes Chamorro, F.Xavier Sans, 2011). Hence, planting composition is the art of arrangement individual plant with similar or different species, size, color, texture, or form and it also composes the principles of planting design. According to Lynden (2014), good, lush, healthy plants are magnets that attract people, and mixed plantings give people something interesting to see and become favorable spaces. People always respond to beautiful, well-planted surroundings by respecting and protecting these places no matter whom they are or where they come

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from (Lynden, 2014). Planting composition entails devising a concept in the abstract and combining this abstraction with the environmental demands of the site will produce a beautiful, functional and appropriate (Leszczynski, 1999). However, improper planting design composition with no consideration on comfortable and safety design will invite more crises towards the site. Maruthaveeran (2010) argue that some planting area perceived as scary, disgusting and uncomfortable. That is reinforced by Herzog and Flynn-Smith (2001), which seeming planting area may conceal criminal activity. In the context of the study, the image of the higher institution will be degraded and cause the uncomfortable spaces in the campus. People prefer more natural looking areas which are more organised, maintained and managed or have a 'more formal' landscape setting (Maruthaveeran, 2010). Favorable spaces like well-maintained, grassy area certainly do not block views; widely spaced, high canopy trees have minimal effect on visibility; and flowers and low-growing shrubs seem unlikely to provide cover for immoral activities (Kuo & Sullivan, 2001). In other words, the principles used in planting design composition should consider the function and safety design besides beautification.

The Criteria of Plants and Preferred Composition in Campus Study Area

"Mostly, categories of plants that necessary be composed and planted in landscape design are trees and shrubs. Without trees, a garden becomes monotonous and uninviting" (The University in a Garden-special edition, 2004, p.12). According to William (2006) and Heimlich et al. (2008) cited in Noriah et al. (2015b), the large trees or wide canopy trees are preferable plants because it has an adequate size which can give shade and provide comfortable space for people. Most of previous research have proved that landscape with a good organisation and composition of plants can motivate people to visit or stay more longer in any spaces and become contributing factors that encourage them to visit again or live in (Noriah et al., 2015a; Nurul Nazyddah et al., 2014; Hua Zhang et al., 2013; Katherine, 2013; Howley, 2011). In addition, planting composition is beneficial to the environment especially in improving the microclimate on a campus. A previous study determined by Shashua-Bar, Pearlmutter, and Erell (2011), and Zhe Zhang, Yingmin Lv and Huitang Pan (2013), the measurement of thermal comfort on temperature are reduced with a combination of plants

communities. As a consequence, a combination of plants has reflected the art of planting composition which not only injects the beauty effect in landscape (Lynden, 2014) but also provides a comfort zone for learning spaces in a campus. However, most of the design is focusing more on beautification of plants without focusing on the practicality of them towards the space functions (Mohd Akmal, Noriah, 2012; Noriah et al., 2015b). These will definitely degrade the quality of plant composition and give bad consequences to users and environment (Noriah et al., 2015b).

There are several previous studies on landscape preferences or perception towards campus design. Hanan (2013) studied on open space as a meaningful place for students in ITB Campus in Indonesia. In Hanan's article, open space as a part of important landscape space which it must be functional and reviewed how it contributed to an effective learning environment. Through the survey and collection data, Hanan determined that the essential features that attracted students to use the spaces are shaded area which plants as the major contributor, areas that easy for students to access, full with facilities such as sitting area and power supply, and areas with open and tidy that provide angle for view people passing by. This article also shows the importance of students' preferences on campus landscape because it will exhibit the behavior and emotions of the student in learning and socializing. There is another supported research by Stepan et al. (2014) which study Studley campus' green spaces at Dalhousie University. This article measured that, the students' and faculty view on Dalhousie's green spaces are less and it's affected it's used. Most of the students at Dalhousie University recommended more green open spaces for the study area in order to encourage them to fully utilise the campus spaces. Moreover, the green open space can visually create soften view towards campus building and reduce the gray view of building hard surfaces. However, the green space measured was too general and not specifically stated the type or arrangement of plants in the green spaces.

Essentially, the landscape is an important part of the university. Plants will provide a good impact on visual and shape the campus look more aesthetically pleasing and soften artificial or man-made elements (Stepan et al., 2014). In this research, campus landscape has its own function towards students and how they utilise the outdoor study area. There are a lot of benefits when they utilise the outdoor spaces such as improve health

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and well-being, reduce stress and better emotion, environmental awareness (Dongying & Sullivan, 2016; Lynden, 2014; Hanan, 2013; Stepan et al.., 2013), impact on behaviour (Jacob et al.., 2015; Hazreena, 2011) and enhanced social, economic and aesthetic of the place (Lynden, 2014). The campus landscape is critical in providing an image of the institute (Hanan, 2013). Since the life on campus has different landscape personality, therefore the landscape preferences in this area are relevant to be studied. Planting composition is one component in designing the landscape in the campus which it reflected the identity and image of the university. Moreover, the quality of landscape setting in university beside academic reputation is the important criteria in determining universities to be selected by students (Shuhana, et al. 2007).

Landscape Preferences Assessment

The history of landscape quality assessment has featured a contest between expert and perception-based approaches, paralleling a long-standing debate in the philosophy of aesthetics. Kaplan, as cited in Isil (2012), sees preference as an indicator of aesthetic judgment and as a complex process which involves the perception of things and space and reacting to them in terms of their potential usefulness and supportiveness. The expert approach has dominated in environmental management practice and the perception-based approach has dominated in research. Both approaches generally accept that landscape quality derives from an interaction between biophysical features of the landscape and perceptual/judgmental processes of the human viewer (Terry C. Daniel, 2001). Many people have the different vision to express a preference for specific landscapes because of different reasons (Bjørn P. Kaltenborn, Tore Bjerke, 2002). To study on the people preferences at the study area, Noriah et al., (2015b) issued that comparison on the preferences between the expert and public should be made. To become an expert, it involves acquiring a different way of seeing things than one had before (Kaplan & Kaplan, 1989). That is important to be unbiased to the existing landscape planting (Noriah et al., 2015b). Therefore, this will reduce the perceptual gap between the experts and the layperson.

Landscape Preferences Theory by Kaplan's

To understand why people like what they like requires a theory of landscape aesthetics. Otherwise, it may be characterised as "rampantly empirical". (Lothian, 2012). One of the theories is the Kaplan's Informational Processing Theory. The theory is extract information from the environment to make sense and to be involved in it. In the theory, Kaplan's also relate how the people perceived a landscape to a cognitive map, which is built in the mind. The Kaplans' interest is in attention-based deficits which result from fatigue associated with everyday activities. The Kaplans' mention that, stress reduces one's directed attention which is restored by the soft fascination provided by natural settings. Referring to Kaplan's theory, plants as a natural element in campus landscape setting can be measured to see the significance of planting composition towards stress reduction which helps students in their learning process.

Table 1: Kaplans' Predictor Variables

	Understanding Making sense	Exploration Being involved
Immediate The visual array	**COHERENCE** Making sense now Orderly, "hangs together" Repeated elements, regions	**COMPLEXITY** Being involved immediately Richness, intricate Many different elements
Inferred Future, promised Three-dimensional space	**LEGIBILITY** Expectation of making sense in future Finding one's way there and back Distinctiveness	**MYSTERY** Expectation of future involvement Promise of new but related information

(*Source: Kaplan & Kaplan, 1982*)

According to Kaplan and Kaplan (1982), preference matrix divided into two domains. The first domain is the understanding or making sense of the surrounding environment and the second domain is the exploration or being involved with the environment. The first domain involves the immediate action of human and the second domain involves the degree

of inference that is required in extracting the needed information. The combination of these two domains found and identified four predictor variables which are coherence and legibility, and complexity and mystery. Coherence and legibility will help one to understand the environment while complexity and mystery will encourage human to get involved in the environment.

METHODOLOGY

The methodology used for this study is through analyses of criteria from the literature review. This research will describe the principles in planting composition and its relationship in creating a favorable campus space. The previous data from literature review is useful to carry out the characteristics of plants in the study area for students to utilise them. Thus, the secondary data will be assessed to demonstrate the preferred composition in campus learning space and criteria of plants which can attract them to stay in outside longer. Consequently, the identified planting composition and criteria of plants will be useful to the stakeholder to transform the study area towards full utilising campus spaces and simultaneously raise the image of the university through planting design. But, the limitation of this study is the species identification. Therefore, the form of plants is the determinant criteria for the preferences of plants.

RESULTS AND DISCUSSIONS

Based on Table 2, the favorable planting compositions in the study area are referring to criteria of plants. Most of the preferable plant categories are shaded trees due to tangible characteristic rather than shrubs. Shrubs are preferred to be as divided space, but not act as barrier or screening effect. Groundcover especially grass are the preferable plants because people love to see the open grassy lawn with neat and tidy open spaces for multipurpose activities. On that reasons, it is shown that people really want to have comfortable space under the wide canopy tree, by enjoy seeing through from the spaces. The conditions itself represent the safety setting that also important in creating the composition in planting design. Therefore, the principle such order, balance, transition, and simplicity are reflected from the preferable setting of the planting composition.

Result from the tabulation of preferences of planting compositions; it is found that, people on campus mostly depend on a cognitive process which is through visual people attractively will respond and interact with it. The preferences criteria reflect the Kaplan's theory; the coherence and legibility predictor are stronger in developing planting composition in campus space. According to Kaplan's (1979), coherence contributes to one's ability to make sense of the environment and it is providing the sense of order, organising and direct attention. While the legibility is reflected when people perceived high and wide canopy tree as a distinctive element in their campus spaces. Kaplan et al. (1998), state that familiarity and experience will increase memorable components of the place thus increasing legibility.

Table 2: Table of Planting Composition Preferences in Campus Study Area

PLANT CATEGORY	PLANT CHARACTERISTICS			ATTRIBUTES		
	FORM	SIZE	SPACE	LOCATION	STIMULUS	PRINCIPLES
Tree	Wide canopy/ Spreading	High / Large tree	Ceiling effect	Easy access	Legible/ Safe	Order / Balance / Formal
Shrub	Simple	Low growing	Define space	Easy access	Well-maintain, tidy	Order/ Transition
Groundcover	Open	Low growing	Floor effect	Easy access	Well-maintain, tidy	Simplicity / Openness / Formal

The significance of implementing an assessment on planting composition preferences in campus is to develop the standard quality of planting design and composition which can be referred as a guideline in achieving sustainable campus. The important of implementing the good planting composition is to improve the quality of campus space using soft landscape element while make it functioning and increase aesthetic value. By focusing on campus study area, the study will be able to identify the distinctions of preferred plant composition among students. The result gathered to provide an understanding of how current learning

spaces are being perceived, consequently allowing for the development of recommendations for universities to specifically design learning spaces with good planting design.

The previous study reviewed from Stepan et al.., (2014), stated that there has a correlation between the perception of green space and its utilisation. Therefore, to encourage students to utilise the outdoor study area, good composition between plants and spaces should be considered. The principles in planting composition play an important role in making the plant functioning well and injecting aesthetic value. In planting composition, characteristics of plants are the main criteria to be selected in design. As a result, the most preferred plants as discussed in the literature is shady canopy plants with clear trunk and tidy space which give clear view towards another space or for people passing by. In the review also determined that the form of campus landscape is different to express the identity of campus. University naturally composed of formal design and plant staff in approach order to suit the formal situation on a campus. However, the selection of different criteria of plants will give different perception towards people to react with the environment. Based on the Kaplan's theory, people will make sense with their environment cognitively and will reflect the reaction to be involved in the environment. Subsequently, the arrangement of planting should carefully compose to attract the user through visual quality. Then, the mind will give information and show the reaction of behavior towards the site. In addition, this studies also significance in creating assessment technique in measuring planting composition with focusing on campus. It is expected to motivate public universities in Malaysia progressively move towards sustainable campus by using planting composition as a guideline. Additionally, appropriate landscaping will establish and entrench meaningful features of the campus into the campus populace (Stepan et al., 2014).

The research concluded that, the assessment's procedure using the perception-based has solely relied on public's participation, while the expert based requires the trained professionals from the disciplines of art and design, landscape architecture, planning, architecture, ecology, psychology, geography and many more (Jamilah Othman, Nur Shazwani Rosli, 2014). Therefore, the preferences from layperson also have significance as guidance in designing and planning of space.

CONCLUSION

Overall, this study hopefully will increase the awareness on the important of planting composition in visual quality and human preferences towards soft landscape on a campus. Therefore, the importance of planting composition in campus will also encourage social interaction among the campus community. The attractive environments affect human behavior and enhance social interaction. The quality of our green space affects the quality of all our lives and John Prescott – Deputy Prime Minister of United Kingdom in 2002 also feel that it is important to create sustainable space for living, working and playing area (Hatherop Park Management Plan 2007-2012). Moreover, engaging with plants also can enhance healthily and quality of life. In the context of research for university spaces, selection of plants is very important because it symbolizes the image of the institution and it will include the costs, maintenance, safety, and comfort. The research summary will then clearly display the indicators and factors of successful green space in higher institution. This will help to develop a better policy and guidelines for the preparation of a good planting design composition in higher institution space that fulfills the needs of the campus community in the future.

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REFERENCES

Austin R. L. (1982). Designing With Plants. New York: Van Nostrand Reinhold Company.

Bjørn P. Kaltenborn, Tore Bjerke, (2002). Associations between environmental value orientations and landscape preferences. *Journal of Landscape and Urban Planning*, (59), 1-11.

Dober, Richard P. (2000). *Campus Landscape: Functions, Forms, Features.* United States of America. John Wiley & Sons.

Dongying Li, William C. Sullivan. (2016). Impact of views to school landscapes on recovery from stress and mental fatigue. *Journal of Landscape and Urban Planning*, (148), 149-158.

Felsten G. (2009). Where to take a study break on the college campus: An attention restoration theory perspective. *Journal of Environmental Psychology,* (29), 160-167.

Hanan H. (2013). Open Space as Meaningful Place for Students in ITB Campus. *Procedia – Social and Behavioral Sciences*, (85), 308-317.

Hazreena Hussein. (2011). The Influence of Sensory Gardens on the Behaviour of Children with Special Educational Needs. *Asian Journal of Environment-Behaviour Studies. Vol.2* (4).

Herzog TR. and Flynn-Smith JA. (2001). Preference and Perceived Danger as a Function of the Perceived Curvature, Length, and Width of Urban Alleys. *Journal of Environment and Behavior,* (33).

Howley P. (2011). Landscape aesthetics: Assessing the general publics' preferences towards rural   landscapes. *Journal of Ecological Economics*, (72), 161-169.

Hua Zhang, Bo Chen, Zhi Sun, Zhiyi Bao. (2013). Landscape Perception and Recreation Needs in Urban Green space in Fuyang, Hangzhou, China. *Journal of Urban Forestry and Urban Greening*, (12), 44-52.

Isil Cakci Kaymaz. (2012). *Landscape Perception*, Landscape Planning, Dr. Murat Ozyavuz (Ed.), InTech, from http://www.intechopen.com/books/landscape-planning/landscape-perception.

Jacob A. Benfield, Gretchen Nurse Rainbolt, Paul A. Bell and Geoffrey H. Donovan. (2015). Classroom With Nature Views: Evidence of Differing Student Perceptions and Behaviors. *Journal of Environment and Behavior, Vol. 47*(2), 140-157.

Jamilah Othman, Nur Shazwani Rosli, (2014). Whether Perception or Expert Paradigm? Assessing Scenic Beauty of Nature Based Landscape. *Journal of International Research In Emerging Science And Technology, Volume-1*(5), 36-43.

Katherine N. Irvine, Sara L. Warber, Patrick Devine-Wright and Kevin J. Gaston. (2013). Understanding Urban Green Space as a Health Resource: A Qualitative Comparison of Visit Motivation and Derived Effects among Park Users in Sheffield, UK. International Journal of Environmental Research and Public Health (10) 417-442.

Kaplan, R. & Kaplan, S. (1982). *Cognition and Environment: Functioning in an Uncertain World*. New York , Praeger.

Kaplan, R. & Kaplan, S. (1989). *The Experience of Nature: A Psychological Perspective*. Cambridge University Press.

Kuo, F. E., & Sullivan, W. C. (2001). Environment and crime in the inner city. *Journal of Environment and Behavior, 33*(3), 343.

Leszczynski. N. A. (1999). *Planting The Landscape Professional Approach To Garden Design*. New York. John Wiley & Sons.Inc.

Lynden B. Miller. (2014). *Beautifying Public Places: The Importance of Plants*. Ecological Landscape Alliance.

Leila Mirza. (2015). *Windowscape a Study of Landscape Preferences in an Urban Situation*. New Zealand. The University of Auckland.

Lothian, A. (2012). *Measuring and Mapping Landscape Quality using the Community Preferences Method*. New Zealand Planning Institute Annual Conference. Blenheim.

Maruthaveeran. S. (2010). *The Perception of Social Safety In A Green Environment: A Preliminary Study At Kepong Metropolitan Park*, Proceedings of the Asian Journal of Environment-Behaviour Studies, Malaysia, Volume-1-1.

Mohd Akmal, Noriah Othman. (2012). Towards a Better Tomorrow: Street Trees and Their Values in Urban Areas. *Procedia - Social and Behavioral Sciences*, (35), 267 – 274.

Montserrat Bassa, Celine Boutin, Lourdes Chamorro, F.Xavier Sans. (2011). Effects of farming management and landscape heterogeneity on plant species composition of Mediterranean field boundaries. *Journal of Agriculture, Ecosystem and Environment*, (141), 455-460.

Noriah Othman, Noralizawati Mohamed, Mohamad Hisham Ariffin, Mohd Ali Waliyuddin A. Razak. (2015a). Landscape Visual Studies in Urban Setting and Its Relationship in Motivational Theory. *Procedia – Social and Behavioral Sciences*, (170), 442-451.

Noriah Othman, Masbiha Mat Isa, Noralizawati Mohamed, Ramly Hasan. (2015b). Street Planting Compositions: The public and expert perspectives. *Procedia - Social and Behavioral Sciences*, (170) ,350 – 358.

Nurul Nazyddah Mat Nazir, Noriah Othman, Abdul Hadi Nawawi. (2015). Role of Green Infrastructure in determining House value in Labuan Using Hedonic Pricing Model. *Procedia - Social and Behavioral Sciences*, (170) , 484-493

Real, Arce, & Manuel Sabucedo. (2000). Classification of Landscapes using Quantitative and Categorical Data, and Prediction of Their Scenic Beauty in North-western Spain. *Journal of Environmental Psychology*, (20), 355-373.

Rutledge A. J. (1985). Anatomy of a Park. McGraw Book Company.

Shashua-Bar L., Pearlmutter D. and Erell E. (2011). The Influence of Trees and Grass on Outdoor Thermal Comfort in a Hot-arid Environment. *International Journal of Climatology,* (31) 1498-1506.

Shuhana, S., Bashri, A. S., Hasanuddin, L., Norsiah, A.A., Rozeyta, O., Masliyana, M.N. (2007). *Kriteria Rekabentuk Persekitaran Kampus yang Kondusif bagi Institut Pengajian Tinggi di Malaysia*. Universiti Teknologi Malaysia.

Stepan K., Schuster L., Cole J., Davision T. and McKay W. (2014). *Green Space Perception*. A Research Project.

The University in a Garden (special edition). (2004). Penerbit Universiti Sains Malaysia. Pulau Pinang.

Tzu-Kuang Hsu, Yi-Fan Tsai, Herg-Huey Wu. (2009). The Preference Analysis for Tourist Choice of Destination: A Case Study of Taiwan. *Journal of Tourism Management*, (30), 288-297.

Terry C. Daniel. (2001). Whither scenic beauty? Visual landscape quality assessment in the 21st century. Journal of Landscape and Urban Planning. Volume 54 (1-4), 267-281.

Zhe Zhang, Yingmin Lv and Huitang Pan. (2013). Cooling and Humidifying Effect of Plant Communities in Subtropical Urban Parks. *Journal of Urban Forestry & Urban Greening*(12) 323-329.

Zohre Bulut, Hasan Yilmaz. (2008). Determination of landscape beauties through visual quality assessment method: a case study for Kemaliye (Erzincan/Turkey). *Journal of Environ Monit Assess*, (141). 121-129.