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# KNOWLEDGE ON FUNCTIONS OF SCHOOL LANDSCAPE ON LEARNING ACHIEVEMENTS

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## ABSTRACT

*The main objective of this study is to identify the knowledge on functions of the schools' landscapes in the learning process. For the purpose of this study, data were collected through field observations using a checklist at 104 schools. Structured interviews were conducted with school managers and secondary data was obtained from various agencies. Results showed that the function of landscapes in assisting learning is at a high score, and rural schools are slight better than urban schools. There are a variety of learning activities held within the schools' landscape, mainly flower planting, followed by camping activities, cooking and carpentry. There is a significant relationship between the function of landscapes assisting in the learning process and academic achievements. This proves that landscape has an important role in the learning process and should be emphasised to create awareness amongst the school's community.*

**Keywords:** component; Knowledge on Landscape functions, assisting the learning process, components of landscaping, Klang Valley-Langat.

## INTRODUCTION

Compared to other current issues in schools such as curriculum development, learning in schools, students' nutrition and diet and issues of student obesity, not many other studies have been conducted on knowledge on the function of landscapes on the schools' environment. This is not consistent with landscape planning of schools by the Ministry of Education and the National Landscape Policy (2011), which provides an opportunity for the school's management to beautify their school environment to enhance the learning experience. The school's management still has little awareness of the importance and function of the landscape environment in supporting the learning process.

Landscapes around the school's compound either directly or indirectly assist in the learning process (Dayment & Bell, 2007). This can be seen in terms of cognitive, psychomotor and affective skills through various spaces for leisure, socializing, interactions with landscaping components, during indoor or outdoor revision of lessons. In addition, the landscaped environment may also be used to conduct related subject matters such as geography, biology and chemistry. Trees can provide shade, to reduce the amount of sunlight on the building and the ground so as to moderate the temperature of the environment (Alamah Misni 2013). The micro climatic conditions of areas surrounded by trees are usually more comfortable when compared to open areas. Plants also act as the green lung to the schools' environment by absorbing carbon dioxide and by releasing oxygen. Green areas provide more oxygen, vital for the school's environment in creating responsive conditions for mental development. Evidence of a theory of *attention restoration* (Kaplan 1995; Berman, et. al. 2008; Kaplan & Berman, 2010), associates the green environment to the calming of the mind and increased concentration, especially to students who are studying. On the other hand, trees are also able to reduce extreme heat, thereby reducing the usage of air-conditioning in schools.

The ambient atmosphere outside classrooms stimulates the mind and encourages the learning process. Past studies indicate that some plants can stimulate the thinking process through regular interactions with students (Ke-Tsung Han, 2009). The concept of attractive landscape can also provide opportunities for students, teachers and visitors to get information about its flora species, function and the diversity of plants within the school environment. As a result, the more the components and elements of the landscape that can be used to support and facilitate the learning process, either directly or indirectly, the better and higher the quality of the school's landscape and functionality.

According to landscape architects from the Department of Landscape, Putrajaya Holdings Ltd., which is also the opinions of schools' principals, hard landscaping such as gazebos, park benches and tables can be used by students to discuss, analyze and facilitate the learning process. Hard landscapes such as information signage and tree descriptions can provide invaluable knowledge to the students whilst creating awareness about the importance of protecting the environment. Signage of reminders and life's advice containing verses from the Quran forms a contributing element to the character building of students to respect their teachers, friends and parents.

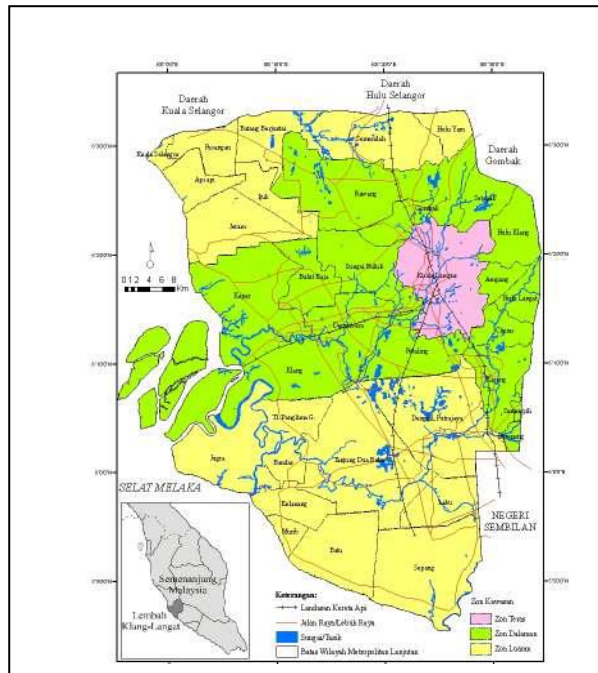
Soft landscaping components consisting of large, medium and small trees, along with fruit trees can cool temperatures within the schools and encourage students to review their lessons in the school compound. Moogk-Soulis, et. al. (2002), reported that trees can be used to provide shades against surfaces, acting as well as a barrier to hot winds and creating cool air instead.

Researchers also observed that artificial landscapes consisting of fish ponds, ponds and cascading ponds can provide therapeutic facilities to the school's occupants. Sounds of water elements soothe the mind, providing the ideal environment for the acumen of knowledge. Whilst the presence of koi fish, turtles and dragonflies can cultivate a sense of compassion for animals as well as care for the school environment. Students enjoy sitting near ponds during the breaks to feed the fish whilst playing with friends.

## **LOCATION AND METHOD**

The study was conducted in schools located in urban and rural areas in the Klang Valley - Langat, especially schools located in the state of Selangor. Schools located in the Shah Alam and Subang Jaya Municipality in the Petaling district; Selayang City Council in Gombak and Klang City Council in the Klang district were selected to represent schools in urban areas. Schools in the district of Hulu Langat and Sepang were chosen to represent schools in suburban and rural areas. Classification of urban and rural schools was based on criteria set by the State's Department of Education and the National Department of Education (2011). The Klang Valley-Langat districts in Selangor were chosen for this study due to several issues (refer Figure 1). First, its location is within areas of rapid urbanization with the highest population growth in Peninsular Malaysia. Second, schools within this region are experiencing rapid modernization since it is within the vicinity of innovation, in the extended metropolis of Kuala Lumpur. Third, the size of the available landscapes in the Klang Valley-Langat are limited and narrower, due to land shortage and escalating land prices that impacts on development patterns. Fourth, suburban and rural schools within the periphery of Klang Valley-Langat which are also experiencing dynamic changes, particularly in the district of Hulu Langat and Sepang (Katiman Rostam, 2006; Katiman, et. al., 2010).

This study uses primary and secondary data. Secondary data in the form of records, documents and other official statistics, gathered from various departments and agencies, particularly the State and Federal Territory Department of Education as well as the Ministry of Education. Basic data published by the Department of Statistics were also used. Information on students and teachers from the selected schools were also obtained. Other information that was collected includes the National Landscape Policy and National Philosophy on Education, which encompasses the planning and development of schools, population, socio-economic along with the Local and Structure Plans.



**Figure 1:** Klang Valley-Langat Metropolitan Region  
Source: Katiman Rostam, et. al., (2010).

Data were also obtained through government agency's website including the Economic Planning Unit of the Prime Minister's Department, the Ministry of Trade and Industry, Selangor State Economic Planning Unit and Department of Statistics, Malaysia. Tertiary sources include books, journals, technical reports, theses and dissertations. Prior to the formation of the structured interview form, references of procedures, including literature reviews and expert feedback in the field of landscaping, landscape architects from the National Department of Landscape, experts in the field of education, experienced school teachers and landscape consultants with deep knowledge and experience in the field were obtained.

Structured interviews were conducted with top school administrators involved in the development and management of the school landscapes. In addition to principal of schools, other teachers involved with the planning and development includes assistant principals, student affairs representatives, extra-curricular senior assistants and senior assistants of the afternoon session were interviewed. Structured questions posed to respondents were directly related to the management of the landscape in terms of financial allocation, maintenance, problems faced and the financial provisions of landscape works. The number of school administrators interviewed for this study totalled 104 respondents. The selection of sample size was based on Krejcie and Morgan (1970) Table which deneliate the sample required from a population for structured interviews which was analyzed using the SPSS software and results discussed in the next section.

The functional quality of the landscapes in schools was evaluated based on the functional aspects with relation to the learning process. The basis of evaluation is on the relative merits of each component of hard, soft, artificial landscapes, facilities, flora and fauna using a Likert scale, consisting of 'not related', 'related' and 'highly related'. Overall, the quality of the functionality of the schools' landscape in the Klang Valley-Langat was divided into three categories: low, medium and high.

## RESULTS AND DISCUSSIONS

In assessing the knowledge on the function of learning, majority of schools are in the category of high scores (47.1%). Rural schools are at 51.6 percent, ahead of the urban schools (45.2%). This suggests that school administrators of rural schools are more sensitive to the functional components of hard, soft and artificial landscaping and in the usage of the external learning environment. Only 9.6 per cent of schools are in the low category (*Table 1*). Schools that are in the low category are unable to maximize it landscapes as a learning tool due to limited finances and other financial constraints.

**Table 1:** Functions of landscape in the learning process

Score Quality	Category	Urban		Rural		Total	
		Frequency	%	Frequency	%	Frequency	%
123 - 153	Low	7	9.6	3	9.7	10	9.6
154 - 184	Medium	33	45.2	12	38.7	45	43.3
185 - 216	High	33	45.2	16	51.6	49	47.1
Total	-	73	100.0	31	100.0	104	100.0

For the high category, researchers took samples of schools located in urban areas located in Shah Alam, SMK 101 (a score of 215), followed by SMK 78 (score of 207) located in Subang Jaya and SMK 1 (with a score of 207) and a rural school in the district of Hulu Langat. Observations in these schools identified that the facility of parking, walkways, lighting and litter bins received the highest scores compared to other components. According to experts from the Ministry of Education, the State Department of Education and landscape architects from the National Department of Landscape; facilities such as walkways, toilets, litter bins and others used by the students is crucial in the learning process. Researchers observed that the facility component is the most frequently found in almost all schools in the study area.

The flora component scored the second highest after facility. Most urban schools prioritize the cultivation of plants to compensate for the hot climate in the city. This can serve as shade trees which absorb heat (Alamah Misni, 2013), cool the school and provide shade for students (Akbari & Taha, 1992). Comfortable shade trees increases enthusiasm and encourage students to gather and discuss extra-curricular activities, sports and recreation (Moogk - Soulis, 2002).

Other components that are equivalent in importance in assisting the learning process are hard landscape. Hard landscape consists of gazebos, pergolas, garden tables and chairs, decorative stones, signage and others. The presence of these hardscapes assists and encourages students to analyze, discuss and play. The peaceful and tranquil atmosphere assist students in the creative learning process assist in understanding the subjects taught. Some teachers utilise these hardscapes to maximise teaching and learning.

For rural schools, the hard landscapes are of a more important function in assisting the students. Many low-income families do not have basic facilities such as furniture or sufficient recreational facility or area. Thus, many rural students use the schools' environment as their second home to study, complete their homework or for recreation.

Artificial landscapes scored the lowest due to the number of artificial landscapes in schools within this region which are very limited. Construction and maintenance costs of artificial landscape are very high. The researchers did not find many artificial landscapes of fish ponds, cascading ponds or other types. Thus, the score for this component is low. Only a small number of schools with adequate financial resources were able to provide artificial landscapes. Although few in numbers, this component has high aesthetic value and serves as a therapy and a source of inspiration to the students. This in turn, assists the students in the learning process and the development of the students' personality.

The table shows the different learning activities held in the schools. For activities conducted outside the classroom, the mean activity of planting flowers obtained the highest value (6.98), followed by camping (6.85), cooking (5.88), carpentry (5.63) and others. The data were irregularly scattered amongst each other. All data are in standard deviation of between 0.800 to 5.500 units. Demonstrating that the school environment is used for the purpose of learning and co-curricular activities.

**Table 2:** Learning activities conducted in schools.

<b>Outdoor Classroom</b>	<b>N</b>	<b>Min</b>	<b>Standard Deviation</b>
Flower Planting	82	6.98	5.484
Camping	99	6.85	1.798
Cooking	73	5.88	2.248
Carpentry and Painting	89	5.63	2.145
Recycling	94	5.37	2.145
Gardening / Vegetable	59	5.08	2.238
Observations of insects and its habitat	76	5.05	1.825
Green Earth & Environment Club	89	4.70	1.921
Observations of plants	83	4.53	1.896
Experiments	70	4.34	2.126
Relating subject matters to the schools' environment	93	4.30	2.004
Marching	102	3.45	2.132
Revision of subjects	81	3.41	2.042
Uniform Bodies	104	2.88	1.585
Sitting down to discuss	89	2.70	1.991
Physical Education	103	1.50	0.862

## LANDSCAPE FUNCTIONS IN RELATIONSHIP WITH SCHOOLS' ACHIEVEMENT

Each landscape component was selected by hard, soft or artificial landscapes, facilities, fauna and flora based on certain scores. *Table 3* shows the mean of the dependent variables, in assisting in the learning process. The cognitive aspects of the landscape functions had the highest mean score with facility component (54.80), followed by the mean score of (43.59) for flora, and hard landscapes at 33.94. This proves that facilities such as guard posts, sidewalks, bicycle bays, lighting and fields have the highest contribution compared to other landscape components either directly or indirectly. This also proves that flora of trees with shade, fruit trees, shrubs, ground cover, plants are more prominent components used by students during their studies in identifying the name and function of plants, in relation to their science subjects, civil studies, geography, Islamic education and art. Standard deviation of hard landscapes, flora and fauna were high.

**Table 3:** Mean (dependent variables) representing the functional landscapes in assisting the learning process

<b>Landscape Components</b>	<b>Min</b>	<b>Standard Deviation</b>
Facilities	54.80	2.120
Flora	43.59	8.402
Hardscapes	33.94	6.270
Fauna	23.04	4.435
Softscapes	21.83	3.230
Artificial Landscapes	4.47	1.954
Total	180.20	18.270

The schools' landscapes should be able to assist in the learning process, particularly in academic results. The following test is conducted to identify possible correlations with academic achievements in SPM, PMR and other awards such as the High Performance School Award; National School of Hope and National Cluster Schools.

By using the chi-square statistic (Pearson correlation), the variable function of the landscape in assisting the learning process has been tested against variable segments of academic achievement. *Table 4* is determining the relationship between the function of landscapes in the learning process and that of academic achievement. The figure shows that the landscapes in assisting the learning process is in the high category (79.6%). There is a significant relationship between function of landscapes in assisting in the process of learning and academic achievement at the school level of 0.01 with the chi-square value 35.993.

**Table 4:** Relationship (Chi-Squared) between landscape functions (learning) and academic achievements (total)

Category of Achievement for School (Academic)	Scores for Functional Landscapes (Learning)					
	High		Medium		Low	
	No of Schools	%	No of Schools	%	No of Schools.	%
High	39	79.6	23	51.1	1	10.0
Medium	10	20.4	20	44.4	5	50.0
Low	0	0.0	2	4.4	4	40.0
Total	49	100.0	45	100.0	10	100.0

At the significance level of  $p < 0.01$ ,  $df = 4$ , Chi-square and Pearson 35.993

A more detailed test was performed between the scores of the functional components of the landscape in assisting the school’s academic achievements (*Table 5*). The test results showed a significant relationship at the weak and moderate levels (Guilford, 1956) between the total score of the functional landscape in assisting the learning process and that of academic achievements of schools ( $r = 0.504$ ,  $p < 0.01$ ). In general, these tests prove that there exists a relationship between the schools’ landscapes with the learning process in the Klang Valley-Langat. The test results show a significant reading for the landscapes assisting in the learning process by the achievements of SPM ( $r = 0.355$ ,  $p < 0.01$ ); of PMR ( $r = 0.370$ ,  $p < 0.01$ ); and of awards for quality ( $r = 0.243$ ,  $p < 0.01$ ). This indicates that the landscapes assist in the learning process and has a significant relationship with all segments of academic achievement.

**Table 5:** Pearson correlation of the relationship between landscape functions in assisting the learning process and academic achievement

Relationship	r	Sig	Relationship Level
Landscape functions (assist learning) with SPM achievements	0.355**	0.000	Weak
Landscape functions (assist learning) with PMR achievements	0.370**	0.000	Weak
Landscape functions (assist learning) with awards for quality	0.243*	0.013	Weak
Landscape functions (assist learning) with academic achievement (overall)	0.504**	0.000	Intermediate

Note: \*\* Correlation relationship significant at level 0.01 (two-tailed); \*Correlation is significant at the 0.05 level (two-tailed).

## CONCLUSION

Overall, there was a significant relationship even at moderate and high levels of landscape functions towards the learning process and academic achievements of the schools. At this juncture, the relationship with landscaping functions in facilitating the learning process consists of several components of hard landscaping elements such as gazebos, pergolas, benches, garden tables, signage, flower vases; and soft landscaping elements such as shade trees, shrubs, fruit trees, ground covers, and other herbal plants. It is anticipated if the school’s landscapes are better managed, especially the hard and soft elements of



landscaping, the quality and its function is expected to increase. In effect, it is also expected to increase the school's academic achievement. Teachers are also able to use the school's garden for science, geography and arts education. Artificial landscapes such as fish ponds or cascading water features can also be used by teachers to provide examples of aquatic habitats. Students have the opportunity to examine it closely by also utilising hard landscape elements such as benches and tables and gazebos for discussions. This demonstrates that landscape has an important role in the learning process of schools. Hence, knowledge management on the function of landscape to learning process of schools is crucial in the design of landscape projects in schools.

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