INTERNATIONAL ACADEMIC RESEARCH JOURNAL
ISSN :2289-8441
International Academic Research Journal of Social Science
Journal homepage: www.iarjournal.com

The Comparisons of Perceptions Among Landscape Professionals' on Tree Retention and Legislation

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Article Information

Keywords
landscape professionals; Kuala Lumpur City Hall; tree retention and legislation

Abstract

Environmental improvement has been on the national agenda since 1976, when the Parliament of Malaysia has announced the Town and Country Planning Act 1976 (Act 172) Part VA as a tool to preserve and conserve trees. The guidelines within the Tree Preservation Order (1995) stipulated in detail the interpretation of the 1976 Act. In addition to the Town and Country Planning Act 1976 (Act 172) Part VA, issues pertaining to tree retention were also mentioned in the Street, Drainage and Building Act 1974 (Act 133) Part II. The establishment of Federal Territory Planning Act (1982): Act 267 further strengthened the status of trees as the main catalyst of environmental conservation efforts in urban areas. The commitment to improve urban conditions continued in 1995 through the 'Garden the Nation' movement by the Federal Government. This study attempts to assess landscape professionals' perceptions towards the retaining of tree and legislation pertaining street trees in Kuala Lumpur. Data collected were based on the methodological framework. The methodological framework was divided into two: the quantitative section which deals with questionnaire surveys and the qualitative section for semi-structured interview. About 60 sets of questionnaires were distributed to the target group of various background of landscape professionals. The questionnaire was divided into three parts. Part one was allocated for questions aimed at obtaining personal information from the respondents. Part two and three were consisted of items measuring the respondents' perceptions towards their understanding on governance and practice, and tree biology. The design of the questionnaire was a combination of closed and open-ended questions, questions with 'Likert-scale' responses and also thematic drawing questions. There were disparities among the landscape professionals' in perceiving governance and retaining trees in Kuala Lumpur city. In conclusion, the knowledge on retaining tree and tree biology should be embeded in the curriculum of the education programme as to inculcate landscape professionals into a knowledgeable person.

INTRODUCTION

Environmental improvement has been on the national agenda since 1976, when the Parliament of Malaysia announced the Town and Country Planning Act 1976 (Act 172) Part VA as a tool to preserve and conserve trees. The guidelines within the Tree Preservation Order (1995) stipulated in detail the interpretation of the Act 172. In addition to the Act, issues pertaining to tree retention are also mentioned in Street, Drainage and Building Act 1974 (Act 133) Part II. However, in the latter Act focuses on street tree maintenance and street tree planting.

The establishment of Federal Territory Planning Act (1982): Act 267 has further strengthened the status of trees as the main catalyst of environmental conservation efforts in urban areas. The commitments to preserve and to improve urban conditions continued in 1995 through 'Garden the Nation' campaign by the Federal Government. The main objective of the campaign is to achieve a status of 'Garden Cities' status by 2010. However, problems like funding, staffing, and people's perception have resulted in slow progress since it launched 15 years ago.
To date, there is no particular Act, regulation or legal instrument solely devoted to tree retention. However under the Town and Country Planning Act (Amendment) 1995 (Act A933), protection for selected trees particularly in urban areas have been strengthened. Under Section VA of the Act, local planning authorities are responsible for retaining and preserving trees within their jurisdictions but in reality this law is enforced in big cities. In the Kuala Lumpur area, the Tree Preservation Order (TPO) is very much taken into consideration whenever there is any planning development whereas in other places the legislation is often ignored.

Although under the Act 172 legislation is available to retain and preserve trees, understanding of implementing TPO among decision makers is still vague due to lack of exposure and experience in planning and managing physical development. To date very little research or study has been conducted on the effectiveness of the TPO's in preserving and safeguarding trees.

Main objective of this study is to determine whether there is a significant association between the landscape professionals' perceptions to tree retention and legislation. The specific objectives of this study are to identify landscapeKuala Lumpur's public perceptions to tree retention and governance, to determine which demographic profiles affected the perceptions and to determine whether there was a significant association between demographic profiles of Kuala Lumpur's public perceptions to tree retention and governance.

LITERATURE REVIEW

Legislation Pertaining To Tree Retention

There is no particular Act, regulation or legal instrument solely devoted to tree retention in in terms of Malaysia as a case study. A number of Acts containing provisions in determining tree retention, can be adopted in circumstances where new urban areas are proposed.

Commonwealth countries experiences

Malaysia was British colony from 1948 to 1957 before gaining independence 45 years ago, and hence there is a similarity in rules and regulations. Since independence, United Kingdom law and legislations had been accepted and exercised widely throughout the country. For instance, the Malaysia Town and Country Planning Act 1976 (Act 172) is essentially a copy of the United Kingdom Act except that few amendments were made in October 2001 in order to adapt to the various multicultural background of Malaysian.

In the early 20th century, the United Kingdom was one of the most powerful countries in the world and apart from Malaysia, the United Kingdom had had colonized many countries. Many of these colonized or commonwealth countries are found in South East Asia and Asia Pacific region such as Singapore, Malaysia, Hong Kong and Australia. These commonwealth countries have incorporated and established the United Kingdom legislations system in their administrative system with several changes made to suit different circumstances.

Over the years, cross-cultural relationships between the United Kingdom and commonwealth countries have successfully accomplished a mutual understanding on various issues such as environmental and economic issues. As some commonwealth countries are originally from the "third world", efforts and attempts have been made to boost up their socio-economic status without seriously damaging the environment. Thus, a substantial number of legal instruments have been introduced to safe guard the environment, and in particular tree cover.

For instance in Singapore, under the Parks and Trees Regulatory Section (PTRS) administers acts and legislations pertaining tree retention. These are spelt out in The Parks and Trees Act (Chapter 216) (1996), The Parks and Tree Rules (1997) and The Parks and Trees Preservation Order (National Parks Boards; The Guidelines and Checklists, 1st October 1998). This legislation also states that an appropriate guideline is required to guide transparently with the developers and qualified persons in dealing with matters concerning trees and development. In regards with the important requirement to detail out the legislations, the National Parks Board of Singapore has taken the responsibility to produce guidelines (Guideline on types of submissions to be submitted to NParks) on 1st October 1998 that help developers to shorten the approval process and obtain immediate approvals from NParks through higher standard submissions.

In the case of Australia, a number of Acts contain provisions in protecting and controlling development that threaten the well being of trees exist in different circumstances. A person concerned about a threat to a tree needs to know which laws apply in the particular circumstances involved. Certain Acts such as the Nature Conservation Act 1980, Trespass on Territory Lands Act 1932, Endangered Species Protection Act 1992, Environment Protection and Biodiversity Conservation Act 1999, Trespass on Commonwealth Lands Ordinance 1932 (ACT) and the Environmental Planning and Assessment Act 1979 (NSW) are effective in retaining trees in Australia while the Land (Planning and Environment Act) 1991 is more towards indirect impact of the development on the landscape (Planning and Land Management, National Capital Authority and Environment ACT).

In the United Kingdom, the enforcement of tree retention is achieved through the additional orders and controls on the felling of trees such as A Guide to The Law and Good Practice published by the Department of Environment, United Kingdom in 1994 (cancelled), Town and Country Planning Act 1990 (in particular sections 197-214 as amended), The Planning and Compensation Act 1991 (section 23), Forestry Act 1967 (as amended), The Town and Country Planning (Trees) Regulations 1999 (Statutory Instrument number 1892), The Forestry (Felling of Trees) Regulations 1979 from The Forestry Commission, The Plant Health (Forestry) (Great Britain) Order 1993 (as amended), The Watermark Disease Local Authorities Order 1974 (as amended) and The Dutch Elm Disease (Local Authorities) Order 1984 (as amended). Through Tree Preservation Orders: A Guide To The Law And Good Practice (2000), every step in determining the process of tree retention has been spelt out intensely.

Malaysian perspective on tree retention legislation

In Malaysia, through the Town and Country Planning Act (Amendment) 1995 (Act A933) protection for selected trees particularly in urban areas have been strengthened. Under Section VA, local planning authorities are responsible for retaining and preserving trees within their jurisdictions but in reality this law is enforced in big cities. In the Klang Valley area where the federal government is situated for an example, the TPO is very much taken into consideration whenever there is any planning development whereas in other places the legislation is often ignored.

Although under Act 172 (Town and Country Planning Act 1976) legislation is available to retain and preserve trees, understanding of implementing the Tree Preservation Order (TPO) among decision makers is still vague in Malaysia due to lack of exposure and experience in planning and managing physical development. To date very little research or study has been conducted on the effectiveness of the TPO's in preserving and safeguarding trees.

The guidelines on 'Tree Preservation Order' released by the Department of Town and Country Planning, Malaysia in 1998 are an interpretation of the Town and Country Planning Act 1976 (Act 172) Part VA (Tree Preservation Order). The guidelines were tailored for the state local authority, planners and those involved directly with the physical development of certain area, to ensure trees are protected where they are important.
The efficiency of the TPO Act in controlling the felling of trees in urban areas has been below expectation (Che Seman, 1999).

Other than the Town and Country Planning Act (Amendment) 1995 (Act A933) which is specially design to protect selected trees particularly in urban areas, Acts such as Street, Drainage and Building Act 1974 (Act 133) (as at 1st August 2002) and Federal Territory (Planning) Act 1982 (Act 267) (as at 31st October 1996) are closely related to tree retention. Certain guidelines published by the Town and Country Planning Department Peninsular Malaysia such as the Guidelines of Tree Preservation Orders (1998), The Planning Guidelines ; The Preservation of Natural Topography in Physical Planning and Development in Accordance with the Town and Country Planning Act 1976 (Act 172) (1997) and the Guidelines of Development Proposal Report have complemented to the Acts. Under the Ministry of Science, Technology and The Environment, Malaysia a policy

on biological diversity has been endorsed in 1998 to show Malaysian Government consciousness in the decreasing number of animal and plant species in Malaysian forest lately.

As Malaysia is a developing country, increasing in the environmental awareness among Malaysians has reached to the extent that people are concerned about development activities in their area. In line with this our government has established relevant environmental legislation, rules and regulations that aim at controlling and protecting the adverse impact of project development on the environment. To ensure that we get the best result from the project development and at the same time protecting and minimizing the adverse impact that will occurs, an Environmental Quality Management (EQM) plan is being developed and incorporated in the Trees Conservation and Landscape Management (TCLM) programs during project implementation.

TCLM not only details the practices and procedures for effective EQM but also facilitates the implementation and management of sound practice and performance in the design, construction and maintenance of the project (Forest Research Institute of Malaysia and Department of National Landscape).

TREE BIOLOGY

Tree as a natural stand in the forest or planted in urban area is comprises of trunk and canopy structure living on the surface of land and the other half is root, embedded in the soil. Very much attention was given to tree structure on land however little concern was instigated to tree root lies in the soil. For the tree biology section, the description of tree root especially where the growing of root and physical planning of urban landscape that may influence the root growth was very much of the concern.

Conflict between tree root and infrastructure

The aboveground parts of a plant depend on roots for anchorage. It has proved that building activity in urban area or in the vicinity of building area will associate with the degradation of tree root system. With the extreme condition of urban environment where the level of exposure to air pollution is high, soil compaction and other mean of intolerable condition influence the well beings of tree.

In Britain after the disastrous dry summer and winter in 1975-76, perception about tree as an aesthetic and 'humanize' elements in a city or in housing area had totally changed (Aldous, 1979). They were assumed to be a nuisance and contributed to the damaged of adjacent building (Aldous, 1979). However, later the professionals found out that tree with root system of different species reacted to the different characteristics of soil and thus concluded that it was not tree the culprit but because of limited knowledge of tree root system behavior under stress condition.

Starting from that point, many studies had been conducted by western scholars on tree root especially that involved with pavement, sidewalk, curbs, roads and buildings (Sydnor et al., 2000; Randrup et al., 2001; D'Amato et al., 2002). Data on the repair sidewalk history for 5,726 city sidewalks in Cincinnati were obtained to investigate the association between sidewalk failures and soil complexes. Sydnor et al. (2000) found out that soil complexes with different characteristics affected the design of the sidewalk. Sidewalks with more than 20 years old considered a failure when it suffered broken and cracked conditions. A cracked and broken sidewalk encouraged root growth beneath the cracked blocks. It was also discovered that trees did not appear to be a major contributor to the failure of sidewalks during the design period. As root encroachment in sidewalks and curbs incurred substantial amount of costs, Randrop et al. (2001), tried to overcome the problems by reviewing all the possibilities that contributed to the root encroachment such as different tree species in urban area, the characteristics of soil structure, irrigation in urban area for the growth of roots and introducing root barriers to control root growth.

Further studies by McPherson and Peper (1996) and McPherson (2000) on the cost incurred by root damaged the sidewalk concluded that million of dollars were spent by the Chicago and California municipalities to tackle problem that existed between street tree root growth and sidewalks. In California cities alone, about $70.7 million annually were spent to overcome this problem with the largest expenditure was for sidewalk repair (McPherson, 2000).

In order to try to minimize the cost incur for sidewalk repair, preventive measures were taken as what being reviewed by Randrop et al. (2001). One of the measures is to identify suitable tree species for suitable location (Appleton et al., 2002 and D'Amato et al., 2002). For parking lots and pavement, chose trees that with small root surface and less dense tree canopies. This is to avoid root damage and to prevent rapid evaporation of precipitation (Appleton et al., 2002).

As different tree species performed differently under stress environment where by the root system are varies, it was suggested by D'Amato et al. (2002) to plant trees with the possibility of fewest root grow underneath sidewalk to avoid a greater damaged.

METHODOLOGY

Questionnaire survey

Questionnaire for the Landscape Professionals was different from the public; questions were more likely deal with their day-to-day working activities. The questionnaire was divided into three sections. Section A was allocated for questions aimed at getting some information about the individual characteristics and to have an overview of people with different characteristics and background. Section B (Legislation and Practice) contained three questions. Question B1 is designed to explore respondents experience working with tree in development sites while in Question B2, the landscape professionals respondents were asked to answer the question, which related to possible factors that are unable to conserve trees. Question B3 is designed to examine respondents' knowledge on legislation and tree biology.

A semi-structured interview was conducted purposely to clarify and verify further the findings of the questionnaire. The layout of questions for the interview is not included due to page restriction.

Statistical analysis

The data was analysed by using the SPSS version 12 software. Descriptive statistics was used to analyse the descriptive data and inferential statistics such as Chi^2 test of association was employed to assess relationships between tested variables in terms of frequency of scoring. The Mann-Whitney U, Kruskal-Wallis and Spearmen's rank correlation (rho) tests were employed to further explore the differences between the groups of respondents.

RESULTS AND DISCUSSIONS

Background of Respondents

Questionnaire survey was distributed to local authority and other government agencies employing landscape professionals' (Landscape Architect and Town Planner) in Kuala Lumpur. In total 60 questionnaires were distributed and 42 return successfully completed. Questions in Section B (Legislation and Practice) namely Question B1, Question B2, Question B3 and questions in Section C (Tree Biology) namely Question C3, Question C4 and Question C5 of the Landscape Professionals questionnaire are presented in this chapter. Question C1 and Question C2 referred to their level of understanding on tree biology and their capacity to make decisions based on their tree biology knowledge. The purpose of the landscape professionals' survey was to measure their knowledge and understanding on governance pertaining to tree retention and tree biology.

Response on legislation and practice

TABLE 1
CHI2 TEST, COMPARISON OF MEAN SCORES AND MANN-WHITNEY U TEST FOR QUESTION B1

Tested variables	Chi² test p-value	Mean Scores for Landscape Professionals n=21 Landscape Architect	n=21 Town Planner	Mann-Whitney U p-value
a. My practice always try to conserve trees where possible	NS	0.95	0.86	0.299
b. We always try to conserve trees but the client is often disinterested	**0.046***	**0.81**	**0.48**	**0.029***
c. My understanding of the provision of Town and Country Planning Act 1976 (Act 172) Part VA is vague	**0.011***	**0.19**	**-0.67**	**0.001***
d. We will try to minimize the construction cost by removing trees that would complicate site works	NS	0.24	-0.33	NS
e. We always try to replant young trees to replace trees lost	**0.015***	0.81	0.57	NS

*** p < 0.05 significantly difference at the level 0.05 – 2 tailed**
NS – Not significant results
bold * value – represent the graph below

FIGURE 1
COMPARISON BETWEEN LANDSCAPE ARCHITECT AND TOWN PLANNER PERCEPTIONS TOWARDS THE STATEMENT 'WE ALWAYS TRY TO CONSERVE TREES BUT THE CLIENT IS OFTEN DISINTERESTED'

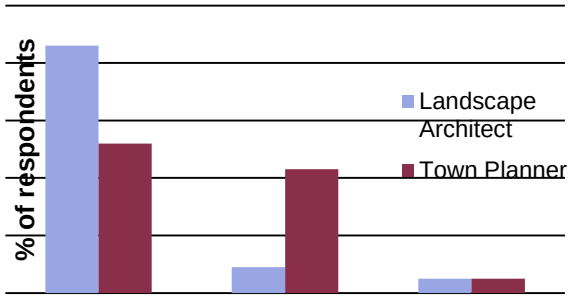
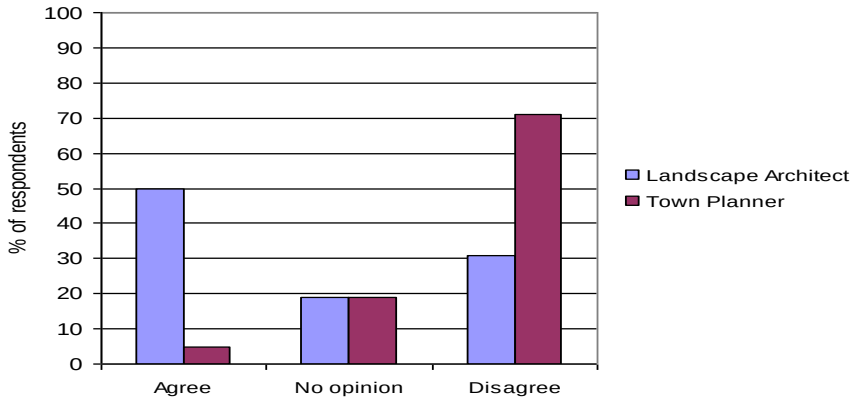


FIGURE 2
COMPARISON BETWEEN LANDSCAPE ARCHITECT AND TOWN PLANNER PERCEPTIONS TOWARDS THE STATEMENT 'MY UNDERSTANDING OF THE PROVISION OF TOWN AND COUNTRY PLANNING ACT 1976 (ACT 172) PART VA IS VAGUE'



There were major disparities between landscape architect and town planners in their responses towards the tested variable statements. The first of these disparities was for the statement *'My understanding of the provision of Town and Country Planning Act 1976 (Act 172) Part VA is vague'* (Mann-Whitney U test, p=0.001) (Table 1) (Figure 1). About half of landscape architects agreed with the statement, nearly 20% have no opinion and about 30% disagreed. As would be expected most (70%) town planners opposed the statement. Local authority's town planners are the persons responsible in the implementation of Town and Country Planning Act 1976 (Act 172) Part VA Tree Preservation Order. Town planners are also accountable for inspecting trees on site, which they feel it is appropriate to preserve. The procedure of enforcing Tree Preservation Orders is the responsibility of town planner where as the function of landscape architects are to confirm species of trees that need to be preserved in design proposals submitted for planning approval.

That 50% of landscape architects agreed that their knowledge about the provision of Town and Country Planning Act 1976 (Act 172) Part VA was vague, is cause for concern. Landscape architects are often working on behalf of clients such as developers, and liaise on the ground with other contractors who have a direct or indirect effect on the success of tree retention.

In the Town and Country Planning Act 1976 (Act 172) under Part IV for Planning Control, it is stipulated in Section 21A that a developer interested in developing an area has to submit a development proposal report which should include a survey of the trees and all forms of vegetation (Anonymous, 1976).

However, the effectiveness of the Act in controlling tree felling in urban development areas in Kuala Lumpur has not been extensively evaluated. The only study of this (Che Seman, 1999), the efficiency of the Act 172 in controlling the felling of trees in urban areas was below expectation. Mrs. S. Muhammad a Landscape Architect from a private agency, shares her experience on the practice of Act 172 Part VA (Tree Preservation Order) in urban area during a personal communication:

> '...It is not very popular among the developer…to be frank when working with the developer they will try their best to minimize the construction cost and at the same time maximize the benefits of the development place. When the developer see the proposed place is okay, have potential and TPO is not very much of their concerned. Most of the place in Kuala Lumpur is no longer a forested area or places that have big trees that need to be retained. The developers are actually dealing with a place where there are small trees and not fall under the provision of Act 172 Part VA. So they feel safe…
>
> 'I only know what Act 172 the TPO is all about but not so much about it…but just like I told you before that whatever it is and when it comes to rules and regulations we always advice the developers to follow the rules. You know, the planner, the developer and I, myself will sit together and discussed about things that should be done before submitting any proposal for land development'

It was more likely that the Landscape Architect respondents agreed with the statements compared with the Town Planner respondents. The disparities between Landscape Architect and Town Planner were greatest for the statements; *'We always try to conserve trees but the client is often disinterested'* and *'My understanding of the provision of Town and Country Planning Act 1976 (Act 172) Part VA is vague'* (see Figure 1 and Figure 2). Very small percentages for the 'No opinion' option were gathered for both tested groups in terms of perceptions towards the statement *'My understanding of the provision of Town and Country Planning Act 1976 (Act 172) Part VA is vague'* (Figure 2).

TABLE 2
CHI2 TEST, COMPARISON OF MEAN SCORES AND MANN-WHITNEY U TEST FOR QUESTION B2

Tested variables	Chi^2 test p-value	Mean Scores for Landscape Professionals n=21 Landscape Architect	Mean Scores for Landscape Professionals n=21 Town Planner	Mann-Whitney U p-value
a. No money to do this	**0.042***	**0.33**	**-0.38**	**0.015***
b. Little local public support for tree retention	NS	0.81	0.38	0.042
c. Sub contractors who fail to respect trees retention	NS	0.86	0.86	NS
d. The existing trees have no commercial or aesthetical values to be retained	NS	-0.33	-0.43	NS
e. Planners have agreed to building placement too close to tree	0.013	0.14	-0.29	NS

*** p < 0.05 significantly difference at the level 0.05 – 2 tailed**
NS – Not significant results
bold * value – represent the graph below

FIGURE 3
COMPARISON BETWEEN LANDSCAPE ARCHITECT AND TOWN PLANNER PERCEPTIONS TOWARDS THE MAIN FACTOR THAT WAS NOT POSSIBLE TO CONSERVE TREES WHICH WAS 'NO MONEY TO DO THIS'

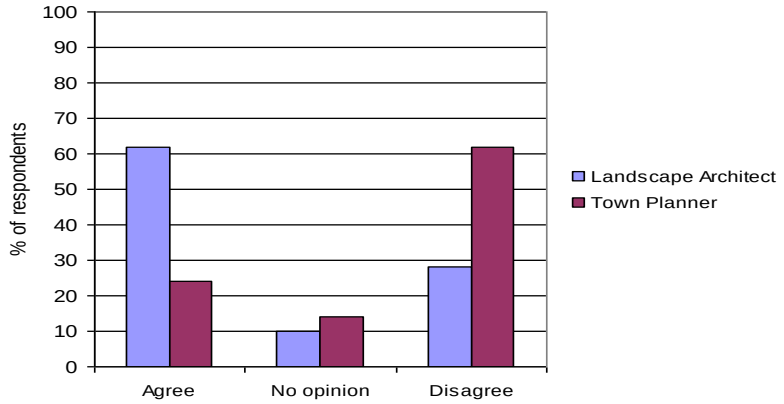


Figure 3 show the disparity of perception between Landscape Architect and Town Planner towards the statement *'No money to do this'*. Town Planner and Landscape Architect groups have significant difference in perceptions (Chi^2 test, p = 0.042, Mann-Whitney test, p = 0.015) (Table 2), as might be expected given their different roles in the development process.

Another disparity in responses that reflect the nature of work that both landscape professionals undertake, was their perceptions on monetary factors in retaining trees (Mann-Whitney U test, p=0.015) (Table 2) (Figure 3). About 62% of landscape architects agreed with the statement that *'No money to do this (retain trees)'* while another 10% responded for 'No opinion'. The remaining landscape architects (nearly 30%) disagreed with the statement. Their counterpart, the town planner, disagreed with the statement by 62%. This difference of view reflects the roles of town planners and landscape architects. The latter are ultimately involved in budgets to do works, where as the town planners are not and have a more detached policy view of the issue. Technically, in the planning reports prepared by town planner, it is the responsibility of town planners to notify the landowner about the TPO Orders. If problems arise due to issues of retaining trees, the landowner can appeal to an Appeal Body for consideration and their consent.

In Town and Country Planning Act 1976 (Act 172) Part IV Planning Control in Section 22 in which the treatment of applications is concerned, it was stated that tree felling of a certain size, age, type or species at any particular location is prohibited unless it is to comply with other legal requirements (Anonymous, 1976).

Despite the above, it is a normal practice in Malaysia to fell a tree in order to give way for a new building to replace it rather than retaining the tree. The developer or contractor will act to minimize the cost of development

by felling trees. With the consultation from the landscape professionals, the contractor can cut down the trees that are not within the specification of the provision of Town and Country Planning Act 1976 (Act 172) Part VA Tree Preservation Orders. New young trees will be planted in the new development area for the 'cosmetic' purposes and to follow the rules and regulation stipulated in the Town and Country Planning Act 1976 (Act 172) and Street, Drainage and Building Act (Act 133). Either with input from a LA trees on development sites can be removed as you suggest above except where they are subject to a TPO or the LA recommends retention for other reasons.

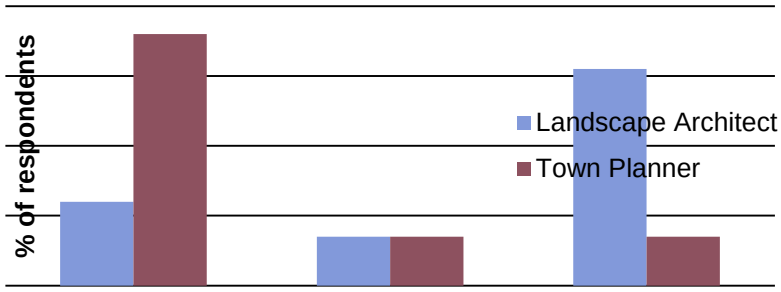
TABLE 3
CHI2 TEST, COMPARISON OF MEAN SCORES AND MANN-WHITNEY U TEST FOR QUESTION B3

Tested variables	Chi^2 test p-value	Mean Scores for Landscape Professionals n=21	n=21	Mann-Whitney U p-value
		Landscape Architect	Town Planner	
a. Decision on Tree Preservation Orders should only be made by experts in tree care	NS	0.24	-0.33	NS
b. My practice lacks expertise on tree biology	**0.001***	**-0.38**	**0.57**	**0.001**
c. Malaysian public are not yet prepared for tree retention in new development areas	NS	0.24	-0.24	NS
d. Serious implementation of Tree Preservation Orders in every development areas would make the total cost of development prohibitive	NS	0.43	0.33	NS
e.The failure of tree retention in new development area is a serious concern				
f. Understanding of Trees Conservation and Landscape Management Plan among landscape professional is vague.	NS	0.95	0.67	NS
	NS	0.48	0.38	NS

*** p < 0.05 significantly difference at the level 0.05 – 2 tailed**
NS – Not significant results
bold * value – represent the graph below

A very high significant difference was found for the statement *'My practice lacks expertise on tree biology'* (Chi^2 test, p=0.001) (Table 3). Figure 7.33 shows disparity in agreement and disagreement between the two tested groups (Mean value for Landscape Architect = -0.38 and mean value for Town Planner = 0.57) (Table 3).

FIGURE 4
COMPARISON BETWEEN LANDSCAPE ARCHITECT AND TOWN PLANNER PERCEPTIONS TOWARDS THE STATEMENT 'MY PRACTICE LACKS EXPERTISE ON TREE BIOLOGY'



In Town and Country Planning Act 1976 (Act 172) Part IV Planning Control in Section 22 in which the treatment of applications is concerned, it was stated that tree felling of a certain size, age, type or species at any particular location is prohibited unless it is to comply with other legal requirements (Anonymous, 1976).

Despite the above, it is a normal practice in Malaysia to fell a tree in order to give way for a new building to replace it rather than retaining the tree. The developer or contractor will act to minimize the cost of development by felling trees. With the consultation from the landscape professionals, the contractor can cut down the trees that are not within the specification of the provision of Town and Country Planning Act 1976 (Act 172) Part VA Tree Preservation Orders. New young trees will be planted in the new development area for the 'cosmetic' purposes and to follow the rules and regulation stipulated in the Town and Country Planning Act 1976 (Act 172) and Street, Drainage and Building Act (Act 133). Either with input from a LA trees on development sites can be removed as you suggest above except where they are subject to a TPO or the LA recommends retention for other reasons.

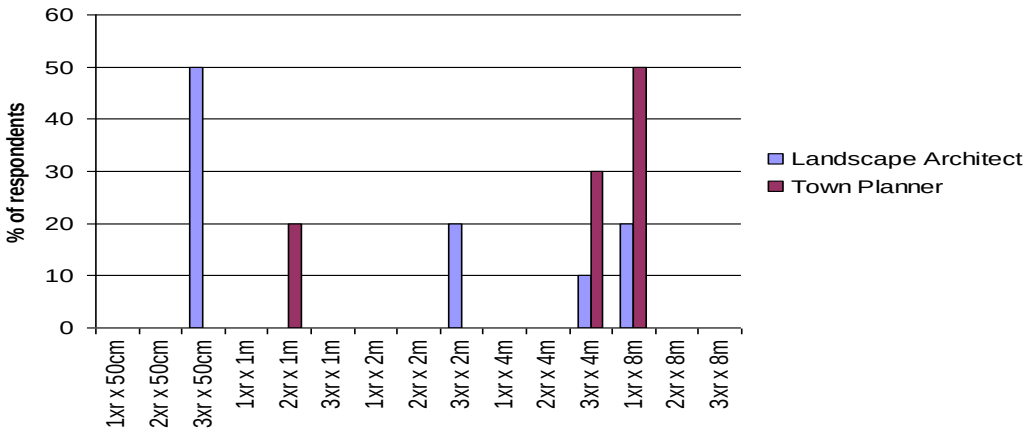
When the landscape professionals were asked about their perception on practice on tree biology, another disparity in responses was found (Mann-Whitney U test, p=0.001) (Table 3) (Figure 4). About 72% of town planner agreed with the statement that *'My practice lacks expertise on tree biology'* and the remaining percentages (28%) were for 'No opinion' and 'Disagree' responses. As for the landscape architects, about 62% disagreed with the statement and another 38% responded to either 'No opinion' or 'Agree'. This is what might be expected given that in practice Landscape architects are more closely involved in decisions on tree selection and use than are town planners, whose relationship is more at a distance.

Local authority planners will only release the Certificate Fitness of Occupancy for the development area if they are satisfied with the condition of trees planted by the landscape architects. In principle if trees planted on re-development projects under the supervision of landscape architects fail to grow healthy, the developer will have to replant and maintain trees to achieve this prior to hand them over to local authority care for long-term management.

Response on tree biology

In respond to the Question C3, there is a disparity of responses between Landscape Architects and Town Planners (Figure 5). Fifty percents of the landscape architects group responded to 3xr of root spread and 50cm of root depth. Another 20 percents answered for 3xr of root spread and 2m of root depth. While for the town planners, half of them or 50 percent responded to 1xr of root spread and 8m of root depth. Another 50 percents chose for a more shallow area of root depth (1m and 4m).

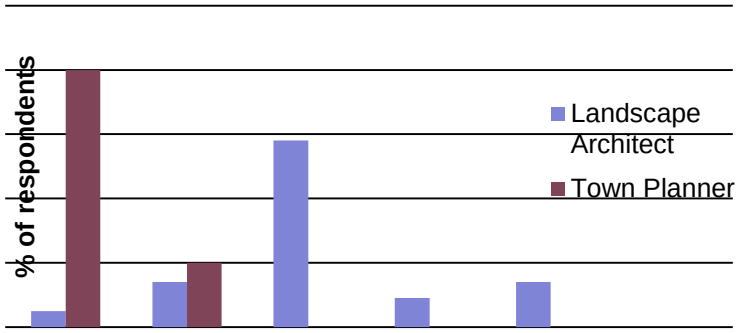
FIGURE 5
COMPARISON BETWEEN LANDSCAPE ARCHITECT AND TOWN PLANNER PERCEPTIONS TOWARDS TREE ROOT DEPTH AND SPREAD FOR THE FOLLOWING HYPOTHETICAL MATURE TREE IN THE SOIL



It is clear from the survey that landscape architects not only believe they are well informed on aspects of tree biology relevant to successful retention in urban landscapes, but can demonstrate this objectively. In Question C3, landscape professionals were asked to draw tree root depth and spread of a mature tree in the soil. These drawings were then used to assess how closely the perception of landscape architects and town planners reflected current scientific understanding of the position of tree roots in urban soils. Most landscape architects showed close agreement with current scientific understanding, ie that tree roots are typically very widespreading, extending well beyond the edge of the leaf canopy and shallowly placed in the soil (Dhyani et al., 1990; Stone and Kalisz, 1991 and Schroth, 1995).

In stark contrasts, most town planners' views of tree roots reflected a vernacular view of tree roots that roots were contained within the volume of space prescribed by the tree leaf canopy and were very deeply placed in the soil.
The consequences of these different understanding are profound for tree retention on development sites in Malaysia. Given that, Town Planners have a very inaccurate view of where tree roots are and in particular grossly underestimate their lateral spread; they are likely to agree to development schemes near trees that will prove catastrophic in terms of root loss. If town planners held the same understandings as seem to be present in Landscape Architects they would reject more of the harmful to trees development proposals.

FIGURE 6
COMPARISON BETWEEN LANDSCAPE ARCHITECT AND TOWN PLANNER PERCEPTIONS TOWARDS THE MINIMUM DISTANCE ALLOWABLE TO THE LARGE BUILDING TO BE PLACED



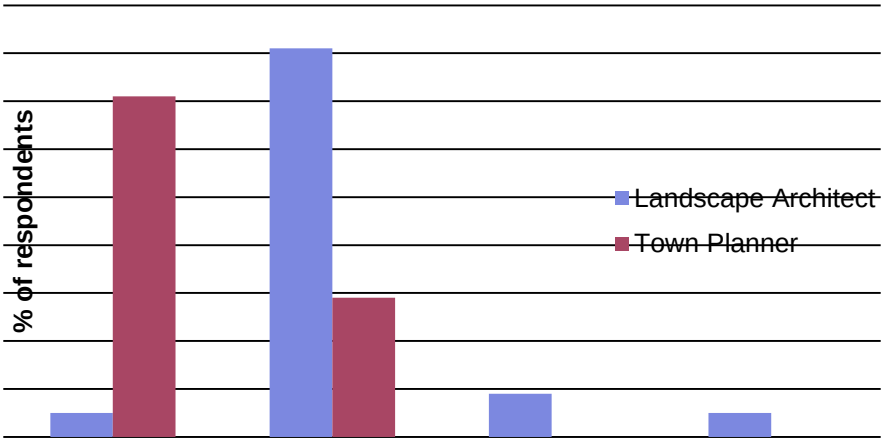
In respond to the question '*How close would you allow a large building to be placed next to a mature 20m tall tree with a canopy diameter of 15m in order to avoid serious root damage to the tree?',* there is again a marked disparity between Landscape Architects and Town Planners (Figure 6). Eighty percent of Town Planners thought 5m was acceptable and the remaining 20 percent thought that 10m from tree trunk was satisfactory for a large building to be placed next to a mature 20m tall tree with a canopy diameter of 15m in order to avoid serious root damage to the tree. The majority of the Landscape Architect respondents answered that 15m from tree trunk was the minimum distance for the tree to avoid serious injury to tree root. Chi^2 test shows significant association between the question and tested groups (Town Planner and Landscape Architect) ($p = 0.001$). This shows that Landscape Architect are much more cautious about building distances than were Town Planners.

How this plays out in practice is highlighted in Question C4, in which more than 80% of the landscape architects stated that a large building should be placed next to a mature tree no closer than 15m from tree trunk. More than 80% of town planners believed that placing the building as close as 5m away from the mature tree would not have an adverse effect. Cutler and Richardson (1981), state that to avoid tree root damage, the minimum distance from new building to existing mature trees is 20m, whilst recognizing that the likelihood of tree root damage depends on the tree species, type of soils and nature of the building construction (Cutler and Richardson, 1981; Aldous, 1979).
A review of the website for the degree in Bachelor of Urban and Regional Planning programme in Universiti Teknologi Malaysia, shows that there are no modules related to tree biology. In contrast to this, trees feature strongly in the programme for Landscape Architecture in the same University.

Apart from assessing the landscape professionals' understanding on tree roots growth, they were also encouraged to answer question that would reflect their knowledge on tree root damaged.

Another experience of tree felling in Malaysia is trees root conflict with utilities especially the drainage and pavement. Tree selection during the initial stage of developing proposal report, prepared by landscape professionals; always comprehend with the suitability of tree species, survival rate, growth, and toleration of the extremely poor conditions such in big cities. If trees could not manage growing under stress condition such as by tree roots encroaching the drainage system and pavement as the trees need space to grow and searching for water supply, the trees is most likely to be cut down to minimize the maintenance of drainage structure. Some trees may live longer in the extremely poor conditions but they are not growing well and healthy. Even though these trees may seem to adapt to the under stress condition in urban areas, it will turn out ugly and an eyesore to urban dwellers.

FIGURE 7
COMPARISON BETWEEN LANDSCAPE ARCHITECT AND TOWN PLANNER PERCEPTIONS TOWARDS THE PERCENTAGE OF ROOTS DESTROYED BY THE EXCAVATION FOR THE BUILDING



For Question C5, Figure 7 shows that about 71 percent of Town Planner respondents stated that 5 to 20 percent of the root system that might be destroyed by the excavation activity and another 29 percent answered for 30 to 50 of root system damaged. More than 50 percent of Landscape Architect respondents revealed that 30 to 50 percent of the root system affected when excavation activity for the building occurred. Significant value for Chi^2 was identified for the association between the question and the tested groups ($p = 0.000$)

In Question C5, majority of the landscape architects stated that about 30% to 50% of the root system might be destroyed by the excavation work for the building and about 15% of the landscape architects answered for other options. As for the town planners, about 71% of them answered 5 to 20 percent of the root system might be destroyed.

CONCLUSION

In the landscape professionals section, the disparities of responses between the landscape architects and town planners are notable. Issues such as legislation and practical; and tree biology were tested among the landscape professionals. The most significant results were gathered from the monetary issue on preserving trees, their understanding of Tree Preservation Orders (Town and Country Planning Act 1976 (Act 172)) and their knowledge on tree biology. When further questions were asked to the landscape professionals on the tree root biology, very few of the landscape architects could answered the questions right. Knowledge about tree root system and structure are lacking among the landscape architects and they have to undertake in-house training for the enrichment of their knowledge.

ACKNOWLEDGEMENT

The author would like to thank the Department of Civil Services, Government of Malaysia for the financial support throughout the study.

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