UNIVERSITI PUTRA MALAYSIA

INTEGRATION OF GEOGRAPHICAL INFORMATION SYSTEM AND MULTI CRITERIA EVALUATION FOR IDENTIFICATION OF SUITABLE URBAN SCHOOL SITES

ZUBAIDAH BINTI BUKHARI

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INTEGRATION OF GEOGRAPHICAL INFORMATION SYSTEM AND MULTI CRITERIA EVALUATION FOR IDENTIFICATION OF SUITABLE URBAN SCHOOL SITES

By

ZUBAIDAH BINTI BUKHARI

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in

Fulfilment of the Requirements for the Degree of Master of Science

NOVEMBER 2010

DEDICATION

Dedicated to my husband, kids, mom,
sisters and brothers

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

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Chairman : Associate Professor Ahmad Rodzi Mahmud, PhD

Faculty : Institute of Advanced Technology

Schools which are located in a strategic, healthy and safe area play an important role in improving students' performance and excellence. To ensure both success and long-term sustainability of the school planning, the finding of suitable sites for school is important and challenging. This study delves into a systematic site selection process to establish a new primary public school. It was carried out through the use of Geographic Information System (GIS) and multi criteria evaluation model (MCE). Decision makers' evaluation and community opinions have been used for developing a set of school siting criteria and school planning data model which were used to design a number of potential sites by using the spatial analysis model. Mukim Batu which is located in the Federal Territory of Kuala Lumpur (WPKL) had been selected as the study area. The demography analysis identified 18.1% of the study area is in rapid growth while the safety analysis identified 17.3% of the area is in a safe zone. Constraint analysis identified 5% of the study area is suitable for school development. Weighted Linear Combination (WLC) technique had been used to combine the 3 analyses namely demographic, safety and constraint analysis to identify 6

potential sites. The accessibility analysis was used to further analyze the potential sites by using community opinions. The potential sites were compared with the field validation data and it was found to be reliable. This study has improved the school planning guideline and has brought a new approach for school site selections which combine the decision makers and community needs in the school site selection on the decision making process.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

INTEGRASI SISTEM MAKLUMAT GEOGRAFI DAN MODEL PENILAIAN PELBAGAI KRITERIA UNTUK MENGENALPASTI KESESUAIAN TAPAK SEKOLAH DI BANDAR

Oleh

ZUBAIDAH BINTI BUKHARI

NOVEMBER 2010

Pengerusi : Profesor Madya Ahmad Rodzi Mahmud, PhD

Fakulti : Institut Teknologi Maju

Sekolah yang terletak di dalam kawasan yang strategik, sihat dan selamat memainkan peranan yang penting di dalam meningkatkan prestasi kecemerlangan murid-murid. Proses pembinaan sekolah merupakan tugas yang penting dan mencabar kerana pelbagai faktor perlu diambilkira sebelum pembinaan sekolah dimulakan. Kajian ini menyiasat mengenai proses pemilihan tapak yang sesuai bagi pembinaan sekolah yang lebih sistematik. Sistem Maklumat Geografi (GIS) dan Model Penilaian Pelbagai Kriteria (MCE) telah digunakan bagi menjalankan kajian ini. Satu set kriteria dan model data sekolah telah dihasilkan dengan mengambilkira pendapat daripada pembuat keputusan dan komuniti di mana ia telah berjaya menghasilkan senarai tapak sekolah yang berpotensi menggunakan model analisis geospatial. Mukim Batu yang terletak di Wilayah Persekutuan Kuala Lumpur (WPKL) telah dipilih sebagai kawasan kajian. Analisis demografi yang dilaksanakan telah mengenalpasti bahawa 18.1% dari keseluruhan kawasan kajian berada di kawasan yang mempunyai penduduk yang padat, manakala analisis sekolah selamat mendapati 17.3% dari keseluruhan kawaan kajian berada di zon

selamat. Peta kekangan pula mendapati hanya 5% dari keseluruhan kawasan kajian sahaja yang sesuai untuk pembangunan sekolah baru. Teknik WLC telah digunakan bagi menggabungkan ketiga-tiga analisis tersebut iaitu analisis demografi, analisis sekolah selamat dan analisis kekangan di mana sebanyak 6 tapak telah dikenalpasti untuk pembinaan sekolah baru. Kesemua tapak tersebut telah dianalisa dengan lebih lanjut menggunakan analisis kemudahsampaian di mana pandangan daripada masyarakat telah diambilkira. Keputusan akhir yang di dapati dari model tersebut telah dibandingkan dengan kajian lapangan dan didapati ianya adalah sesuai. Kajian ini telah menambahbaik garis panduan perancangan perletakan sekolah dan menemukan pendekatan baru di dalam proses pemilihan perletakan sekolah dengan menggabungkan pendapat daripada pembuat keputusan dan kehendak komuniti.

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I certify that a Thesis Examination Committee met on 3 November 2010 to conduct the final examination of Zubaidah binti Bukhari on her thesis entitled "Integration of Geographical Information System and Multi Criteria Evaluation for Identification of Suitable Urban School Sites" in accordance with the Universities and University College Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998 The committee recommends that the student be awarded the Master of Science.

Members of the Thesis Examination Committee were as follows:

Hussain Hamid, PhD
Associate Profesor
Faculty of Engineering
Universiti Putra Malaysia
(Chairman)

Saeid Pirasteh, PhD
Senior Research Fellow
Institute of Advanced Technology
Universiti Putra Malaysia
(Internal Examiner)

Helmi Zulhaidi Mohd. Shafri, PhD
Lecturer
Faculty of Engineering
Universiti Putra Malaysia
(Internal Examiner)

Ruslan Rainis, PhD
Professor
School of Humanities
Universiti Sains Malaysia
(External Examiner)

_____

BUJANG BIN KIM HUAT, PhD
Professor and Deputy Dean
School of Graduate Studies
Universiti Putra Malaysia

Date:22 February 2011

This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee were as follows:

Ahmad Rodzi Mahmud, PhD
Associate Professor
Faculty of Engineering
Universiti Putra Malaysia
(Chairman)

Abdul Rashid Mohamed Shariff, PhD
Associate Professor
Faculty of Engineering
Universiti Putra Malaysia
(Member)

Noordin Ahmad, PhD
Associate Professor
Faculty of Engineering
Universiti Putra Malaysia
(Member)

_____

HASANAH MOHD GHAZALI, PhD
Professor and Dean
School of Graduate Studies
Universiti Putra Malaysia

Date: 22 Februari 2011

DECLARATION

I declare that the thesis is my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously and is not concurrently submitted for any other degree at Universiti Putra Malaysia or other institutions.

ZUBAIDAH BINTI BUKHARI

Date: 3 November 2010

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