A FUZZY MULTI CRITERIA DECISION MAKING MODEL FOR STUDENTS' SELECTION PROCESS BASED ON TECHNIQUE FOR ORDER PERFORMANCE BY SIMILARITY TO IDEAL SOLUTION (TOPSIS)

INSTITUT PENYELIDIKAN, PEMBANGUNAN DAN PENGKOMERSILAN
UNIVERSITI TEKNOLOGI MARA
40450 SHAH ALAM, SELANGOR
MALAYSIA

BY

DAUD MOHAMAD
NOR HASHIMAH SULAIMAN
FUZIYAH ISHAK

MARCH 2006

SURAT PENYERAHAN LAPORAN

Tarikh : 27 Mac 2006
No. Fail Projek : 600-IRDC/ST 5/3/1001

Penolong Naib Canselor (Penyelidikan)
Institut Penyelidikan, Pembangunan dan Pengkomersilan
Universiti Teknologi MARA
40450 Shah Alam

Yg. Bhg Prof.,

LAPORAN AKHIR PENYELIDIKAN "A FUZZY MULTI CRITERIA DECISION MAKING MODEL OF STUDENTS' SELECTION PROCESS BASED ON TECHNIQUE FOR ORDER PERFORMANCE BY SIMILARITY TO IDEAL SOLUTION (TOPSIS)"

Merujuk kepada perkara di atas, bersama-sama ini disertakan 3 (tiga) naskah Laporan Akhir Penyelidikan bertajuk "A Fuzzy Multi Criteria Decision Making Model of Students' Selection Process Based on Technique for Order Performance by Similarity to Ideal Solution (TOPSIS)".

Sekian, terima kasih.

Yang benar

Daud Mohamad
Ketua
Projek Penyelidikan

TABLE OF CONTENTS

ABSTRACT

In many instances, decision-making problems are ill defined as their objectives and constraints are not precisely known or available. The introduction of fuzzy set theory in decision-making has somehow given a path to more convincing results. Due to vagueness in the information obtained, fuzzy decision-making has played a vital role in dealing with this type of difficulty. One of the methods that see its vast usefulness is the fuzzy multi-criteria decision making (fuzzy MCDM). In this research, we focused on the technique for order performance by similarity to ideal solution (TOPSIS), one of the well known classical MCDM under fuzzy environment to give an alternative approach to selecting students for particular programs in Universiti Teknologi MARA (UiTM). The research considered three levels of students' selections namely diploma, degree and master levels. In this method, the decision-makers would determine the weight for the criteria identified from the on-line application form and rate each applicant based on these criteria. The criteria are qualitative in nature and linguistic variable is most appropriate representation to use. The final output of the process using fuzzy TOPSIS would be the ranking of the students and the selection could be made based on this ranking. The results of the comparison made between rankings by the TOPSIS method and by the academic merit (CGPA) shows that there is a difference in the candidates' ranking. The proposed selection method by the TOPSIS seems to give a better and fair ranking for the candidates due to its rather comprehensive consideration of the evaluation criteria.

CHAPTER 1

INTRODUCTION

1.0 Introduction

Decision-making is very closely related to human activity from a simple decision making involving a person and a couple of constraints to a very complex system with exhaustive constraints. Turban (1988) described decision-making as a process of choosing among alternative course of action for the purpose of attaining a goal or goals. Decision making problems can be classified based on its outcomes, implicit constraints that will give explicit solutions and explicit solutions with implicit solutions. The classification can be summarized as in the following table (Zionts, 1989).

Table 1.1: Classification of decision making-problem

Outcomes	Implicit Constraints (Explicit Solutions)	Explicit Constraints (Implicit Solutions)
Deterministic	Choosing among alternatives or deterministic decision alternative	Deterministic mathematical programming
Stochastic	Stochastic Decision Analysis	Stochastic Mathematical Programming

There are few common terminologies involved in decision-making. Among others:

a) Alternatives – a set of objects, products, actions or strategies.

b) Attributes – each alternative is defined by a set of characteristic.