UNIVERSITI TEKNOLOGI MARA

AN INTEGRATED FUZZY APPROACH TO STUDENTS' ASSESSMENT

BADRUL HISHAM BIN ABDULLAH

Thesis submitted in fulfillment of the requirements
for the degree of
Master of Science

Faculty of Information Technology & Quantitative Sciences

February 2006

ABSTRACT

Assessment is a process of collecting data for the purpose of making decisions about individuals or groups. In education, instructors assess students by giving grades to express the overall performance of the students. The main objective of this study is to improvise the existing fuzzy approach in assessing students' performance. This study focuses on two types of assessments namely students' answer scripts assessment and students' group assessment. In the students' answer scripts assessment the trapezoidal fuzzy number is used to represent the standard satisfaction level for the grading scales and the students' fuzzy scores. The center points of both standard satisfaction levels and the fuzzy score is calculated using the center of gravity method. The minimum distance between the fuzzy score and the standard satisfaction level will determine the linguistic term that best represent the students' performance. In the students' group assessment instructors as well as students are involved in selecting and determining the assessment criteria. The pair-wise comparison technique based on fuzzy scales is used to find the relative strength between each criterion. The weights of selected criteria are represented by the normalized fuzzy eigenvectors. The fuzzy relation composition method is employed in order to combine the instructor and students' evaluation, which finally will give the overall students' group performance. Both the answer scripts assessment and group assessment processes can be easily performed with the aid of fuzzy assessment sheet. This integrated fuzzy approach provides additional information on students' performance and can be used as an option for instructors to assess students' performance.

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CHAPTER 1

INTRODUCTION

1.1   Introduction

This chapter provides the background and rationale of the study and also a general overview of the utilization of fuzzy set theory in assessing students' academic performance.

Science has some difficulties in dealing with uncertainty due to the fact that uncertainty involves ambiguity and vagueness. Ambiguity is the state of having more than one meaning while vagueness is the state of being unclear or not distinct (Oxford Dictionary, 2005, p.45, p.1691). However, at the beginning of the twentieth century the difficulties had almost been reduced with the appearance of statistical mechanics with two principal measures of uncertainty, namely statistical averages and probability theory. Statistical averages utilize the concept of mean, mode and median, while probability theory describes certain phenomena of uncertainty. It deals with the expectation of future event that is already known. Probability theory cannot deal with uncertainty that resulted from the meaning associated into a concept expressed by a linguistic term in natural language (Klir *et. al.*, 1997, p.5).

In 1965, Zadeh introduced a new theory of uncertainty, distinct from the concept of probability (Kosko, 1994). He introduced fuzzy set theory that deals with imprecision and vagueness. A fuzzy set is a set of which the boundary is not sharp or precise (Klir *et. al.*, 1997, p.7). A membership of classical set could be determined as being a