

**SUCCESSFUL MATHEMATICS PROBLEM SOLVING USING  
HEURISTICS**



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# TABLE OF CONTENTS

<b>CONTENT</b>	<b>PAGE</b>
Title page	ii
Research Team	iii
Acknowledgement	iv
Table of Contents	v
List of Tables	ix
List of Figures	xiv
Abstract	xvi
<b>CHAPTER 1: INTRODUCTION</b>	
1.0 Introduction	1
1.1 Background of the Problem	3
1.2 Objectives of the Study	5
1.3 Scope of the Study	6
1.4 Significance of the Study	6
1.5 Operational Definitions	7
<b>CHAPTER 2: LITERATURE REVIEW</b>	
2.0 Introduction	8
2.1 What is heuristics?	8
2.2 Heuristics Lists	12
2.2.1 Trial and error	17
2.2.2 Draw a diagram	17
2.2.3 Make a table	19
2.2.4 Look for patterns	20
2.2.5 Try a simpler problem	21
2.2.6 Analogy	22
2.2.7 Work backwards	22
2.3 The Importance of Heuristics	23
2.4 Summary	24
<b>CHAPTER 3: METHODOLOGY</b>	
3.0 Introduction	26
3.1 Purposes of the Study	26
3.2 Research Design	28
3.3 Sample of the Study	29
3.4 Instrumentations	31
3.5 Data Collection	31
3.6 Data Analysis	32

## ABSTRACT

This report presents the findings of a research study funded by The Malaysian Ministry of Sciences, Technology and Innovation, entitled ‘Successful Mathematics Problem Solving Using Heuristics’. The purpose of this study was to investigate the Form Four students’ use of heuristics in solving mathematics problems. It also sought to examine the impact of heuristics teaching on students’ mathematics problem solving.

Multi-stage sampling method was used to select 38 secondary schools and 1675 Form Four students as the required sample. The teachers teaching these students were also invited to participate in this study. This study, which was predominantly quantitative, consisted of two phases. Phase I was carried out in March 2005 when the participating students were given a Pre-Test. At the same time, both the participating teachers and students were also invited to respond to the questionnaire of this study. Phase II was carried out in June and September 2005 when the participating students were given the two Post-Tests after the teaching of heuristics to them. The data collected was analyzed using SPSS version 11.0. Statistical methods such as frequency, percentage, mean, inferential tests, correlation, factor analysis and regression analysis were used to narrate the findings of this study.

Even though heuristics had not been emphasized and there was seldom any heuristic teaching, students did pick up some of the ideas of employing heuristics from their teachers solving mathematics problems in front of the classrooms for them over the years. This study reveals that the participating students were employing seven of the eight heuristics emphasized by the Malaysian Ministry of Education in solving

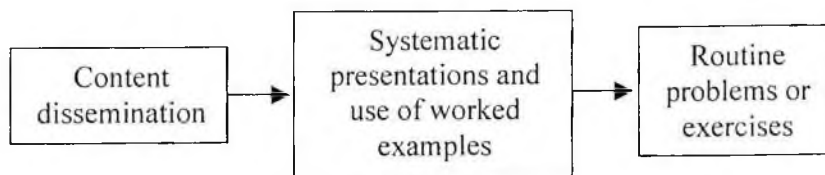
# CHAPTER 1

## INTRODUCTION

### 1.0 Introduction

Schools used to train young people to sit for many hours, working at repetitive tasks, an ideal preparation for a manufacturing job. However, the economies of many developed countries in this world have changed. Servicing, rather than manufacturing, is their major business now. In other words, there is a shift from 'industrial societies' to what is commonly termed 'information societies' in these countries, where information processing characterizes their economies now. This shift calls for a literate workforce with proficient problem-solving skills that can function in these 'information societies'.

Figure 1.1: A Structured Learning Model of the Traditional Education System



Many traditional education systems are characterized by a structured learning as shown in the above Figure 1.1. A typical mathematics lesson consists of either reviewing or introducing a new concept through examples, which a teacher presents to his students with step-by-step instructions. This is followed by other activities such as giving notes, assigning working problems or 'exercises' from the textbook and monitoring students while they are working on those problems. Learning is by