

CONTENTS

Chapter 1 Introduction	1
1.1 Introduction	1
1.1.1 Place of Mathematics in School Curriculum	1
1.1.2 Portrait of Mathematics Classroom	2
1.2 Conceptual Framework of the Study	5
1.2.1 Learning	6
1.2.2 Different School of Psychology on Education	6
1.2.3 Learning Styles	9
1.2.4 What is Mathematics?	13
1.2.5 Theoretical Foundations for Contemporary Mathematics Education	15
1.2.6 Diversity and Equity	21
1.2.7 Differentiated Instruction	23
1.2.8 Ability Grouping	26
1.2.9 High Ability Students	27
1.2.10 Average Ability Students	32
1.2.11 Low Ability Students	34
1.2.12 Mathematics School Education in Kerala	38
1.3 Rationale for the Study	40
1.4 Research Questions	42
1.5 Statement of the Problem	42
1.6 Objectives of the Study	42
1.7 Operational Definitions of the Terms Used	43
1.7.1 Ability Grouping	43
1.7.2 Differentiated Instruction	43
1.7.3 Academic Achievement	44
1.8 Delimitation of the Study	44
1.9 Hypotheses of the Study	44
1.10 Scope of the Study	46
1.11 Organization of the Report	47

Chapter 2 Review of Related Literature	48
2.1 Studies on Achievement in Mathematics	50
2.2 Studies on Ability Grouping and Differentiated Instruction	55
2.3 Studies on High Ability Students	60
2.4 Studies on Average Ability Students	62
2.5 Studies on Low Ability Students	64
2.6 Implication for the Present Study	66
Chapter 3 Methodology	67
3.1 Objectives of the Study	67
3.2 Population	67
3.3 The Sample Selected	68
3.4 Research Tools and Techniques Used	69
3.4.1 Ability Test in Mathematics	69
3.4.2 Attitude Scale in Mathematics	72
3.4.3 Designs for Differentiated Instruction	74
3.4.4 Achievement Test in Mathematics	88
3.5 Method Selected for the Study	97
3.6 Design Selected for the Study	97
3.7 Variables of the Study	98
3.8 Procedure Adopted for Data collection	98
3.8.1 Observation of Mathematics Classrooms	98
3.8.2 Administration of Ability Test	99
3.8.3 Obtaining Annual Examination Marks	99
3.8.4 Ability Grouping	99
3.8.5 Administration of Achievement Test and Attitude Test (Pre-test)	100
3.8.6 Differentiated Instruction	100
3.8.7 Administration of Achievement Test and Attitude Test (Post-test)	101
3.7 Statistical Method Used	103

Chapter 4 Analysis and Interpretation of Data	105
4.1 Organization of Data Obtained	105
4.2 Effect of Differentiated Instruction on Academic Achievement among Students in Ability Groups over Mixed Ability Group	107
4.2.1 Effect of Differentiated Instruction on Academic Achievement among Students in Ability Groups over Mixed Ability Group (Experimental groups \times Control group)	108
4.2.2 Effect of Differentiated Instruction on Academic Achievement among Students in High Ability Group over High Ability Students in Mixed Ability Group (Experimental group I \times Control group I)	115
4.2.3 Effect of Differentiated Instruction on Academic Achievement among Students in Average Ability Group over Average Ability Students in Mixed Ability Group (Experimental group II \times Control group II)	121
4.2.4 Effect of Differentiated Instruction on Academic Achievement among Students in Low Ability Groups over Low Ability Students in Mixed Ability Group (Experimental group III \times Control group III)	127
4.2.5 Summary of Analysis of the Achievement Scores among Students in Ability Groups and in Mixed Ability Group	133
4.3 Effect of Differentiated Instruction on Attitude towards Mathematics among the Ability Groups	136
4.3.1 Effect of Differentiated Instruction on Attitude towards Mathematics among the High Ability Group (Experimental Group I)	137
4.3.2 Effect of Differentiated Instruction on Attitude towards Mathematics among the Average Ability Group (Experimental Group II)	139

4.3.2 Effect of Differentiated Instruction on Attitude towards Mathematics among the Low Ability Group (Experimental Group III)	142
4.3.4 Summary of Analysis of the Attitude Scores among Students in Ability Groups	145
4.4 Effect of Differentiated Instruction on Attitude towards Mathematics among Students in Ability Groups over Mixed Ability Group	147
4.4.1 Effect of Differentiated Instruction on Attitude towards Mathematics among Students in Ability Groups over Mixed Ability Group (Experimental Groups \times Control Group)	148
4.4.2 Effect of Differentiated Instruction on Attitude towards Mathematics among Students in High Ability Group over High Ability Students in Mixed Ability Group (Experimental Group I \times Control Group I)	153
4.4.3 Effect of Differentiated Instruction on Attitude towards Mathematics among Students in Average Ability Group over Average Ability Students in Mixed Ability Group (Experimental Group II \times Control Group II)	158
4.4.4 Effect of Differentiated Instruction on Attitude towards Mathematics among Students in Low Ability Group over Low Ability Students in Mixed Ability Group (Experimental Group III \times Control Group III)	163
4.4.5 Summary of Analysis of the Attitude Scores among Students in Ability Groups over Mixed Ability Group	168
4.5 Findings and Discussion	170
Chapter 5 Conclusion	173
5.1 Purpose of the Study	173
5.2 Differentiated Instruction	173
5.3 High Ability Students	175
5.4 Average Ability Students	176

5.5 Low Ability Students	177	
5.6 Review of Related Literature	179	
5.7 Rationale for the Study	180	
5.8 Research Questions	182	
5.9 Statement of the Problem	182	
5.10 Objectives of the Study	182	
5.11 Operational Definitions of the Terms Used		183
5.12 Delimitation of the Study	183	
5.13 Hypotheses of the Study	184	
5.14 Methodology	186	
5.15 Tenability of the Hypotheses		189
5.16 Major Findings	193	
5.17 Implications of the Study	200	
5.18 Recommendations for Further Study		202
5.19 Discussions	203	
5.20 Conclusion	206	

References

Appendices

Appendix A Differentiated Instructional Designs
Appendix B Standardized Achievement Test in Mathematics
Appendix C Fennema-Sherman Attitude Mathematics Scale
Appendix D Kerala University Test of Spatial Ability
Appendix E Kerala Test of Perceptual Speed
Appendix F Kerala University Test of Numerical Ability
Appendix G Draft Achievement Test
Appendix H Discriminating Power and Difficulty Index
Appendix I Achievement Score and Criterion Score
Appendix J Achievement and Attitude Scores in Ability Groups and Mixed Ability Group

Appendix K List of Schools Visited for Observing Mathematics
Classroom

Appendix L List of Experts Consulted

Appendix M Confirmation Letter for the Experimentation

