Chapter 1
INTRODUCTION...................................................................................... 01 - 22

1.1 Background of the Study------------------------------------------02
1.2 Need and Significance of the Study -----------------------------09
1.3 Statement of the Problem ----------------------------------------14
1.4 Definition of Key Terms ------------------------------------------14
1.5 Hypotheses of the Study ------------------------------------------16
1.6 Objectives of the Study ------------------------------------------17
1.7 Methodology in Brief --------------------------------------------18
  1.7.1 Sample selected ---------------------------------------------18
  1.7.2 Analytical supports and techniques of the study.--------------19
  1.7.3 Statistical procedures employed ------------------------------19
1.8 Scope of the Study ---------------------------------------------20
1.9 Delimitations of the Study --------------------------------------21
1.10 Organisation of the Report -------------------------------------21

Chapter 2
THEORETICAL OVERVIEW ............................................................... 23 - 79

2.1 Conception of Reflection –A Dynamic Prospect -------------------24
2.2 Functional Architects of Reflection ------------------------------28
2.3 Multi-pronged Approaches towards Reflective Discourses ---------30
2.4 Celebrating the Radiance of Reflective Learning Practices ------37
  2.4.1 Toning up reflection through Problem based learning ---------37
  2.4.2 Out fielding reflective learning through Journaling.---------47
  2.4.3 Generating ambience of reflectivity through Thinking maps----56
2.5 Fueling Mathematics Learning through Reflection ----------------71
  2.5.1 Dimensional focus of mathematics proficiency ---------------71
  2.5.2 Towards a synthesized framework of reflection'-------------76

Chapter 3
REVIEW OF RELATED LITERATURE.................................................... 80 - 114

3.1 Studies on Reflective Learning -------------------------------81
3.2 Studies on Mathematics Learning -------------------------------89
Chapter 4

METHODOLOGY................................................................. 115 - 189

4.1 Methodology : A Precept ----------------------------- 116
4.2 Specificity of the Methodological Exploration --------------- 116
4.3 Phased Implementation of the Investigation ------------------ 119
4.4 Research Design- Towards the Process ---------------------- 121
4.5 Participants of the Study ------------------------------- 122
4.6 Variables Enacted for the Study --------------------------- 124
4.7 Analytical Supports and Techniques Accessed for
    Data Collection--------------------------------------------- 125
    4.7.1 Semi structured interview guide ------------------------ 127
    4.7.2 Achievement test in mathematics --------------------- 128
    4.7.3 Analytic rubric for synchronized assessment of
        mathematics proficiency------------------------------- 134
    4.7.4 Scale of reflective action ---------------------------- 142
    4.7.5 Strategy evaluation proforma ------------------------ 148
    4.7.6 Judgment schedule of lesson design ------------------ 149
    4.7.7 Reflective learning designs -------------------------- 150
    4.7.8 Focus group discussion ----------------------------- 182
4.8 Pathways of Investigation ------------------------------- 186
4.9 Statistical Procedures Resorted --------------------------- 189

Chapter 5

ANALYSIS AND INTERPRETATION OF DATA.......................... 190 - 330

Section I

5.1 Analysis of the predominant pedagogical space of
    mathematics learning at secondary school level focusing on
    the practices, challenges, conflicts and suitable mechanisms
    in unfurling mathematics proficiency. ------------------------ 195
    5.1.1 Analysis of the conception of componential dimensions of
        mathematics proficiency at secondary level. --------------- 196
    5.1.2 The challenges and constraints if any, experienced by the
        student scape at secondary level in the prevailing classroom
        practices as perceived by the practitioners. --------------- 200
    5.1.3 Affirmative dynamics credential to development of
        mathematics proficiency. ------------------------------- 202
Section II

5.2 Analysis of the preponderance of the select reflective learning designs by considering the performance outcome of secondary school pupils on: Scale of reflective action, Achievement test in Mathematics, Analytic rubric for synchronized assessment of Mathematics Proficiency, Strategy evaluation proforma and Focus group discussions.

5.2.1 Effectiveness of Reflective journaling design

5.2.1.1 Effectiveness of Reflective journaling design in promoting reflective learning practices with reference to Achievement of pupils in mathematics

5.1.2.2 Effectiveness of Reflective journaling design in promoting reflective learning practices with reference to Reflective thinking level of pupils

5.1.2.3 Effectiveness of Reflective journaling design in accommodating the select levels of Mathematics proficiency

5.2.1.4 Effectiveness of Reflective journaling strategy in praxis

5.2.2 Effectiveness of Problem based learning design

5.2.2.1 Effectiveness of Problem based learning design in promoting reflective learning practices with reference to achievement of pupils in mathematics

5.2.2.2 Effectiveness of Problem based learning design in promoting reflective learning practices with reference to reflective thinking level of pupils

5.2.2.3 Effectiveness of Problem based learning design in accommodating select levels of mathematics proficiency

5.2.2.4 Effectiveness of Problem based learning strategy in praxis

5.2.3 Effectiveness of Thinking maps design

5.2.3.1 Effectiveness of Thinking maps design in promoting reflective learning practices with reference to achievement of pupils in mathematics

5.2.3.2 Effectiveness of Thinking maps design in promoting reflective learning practices with reference to reflective thinking level of pupils

5.2.3.3 Effectiveness of Thinking maps design in accommodating the select levels of Mathematics proficiency

5.2.3.4 Effectiveness of Thinking maps strategy in praxis
5.2.4 Comparison of the effectiveness of the select three learning
designs namely, Reflective journaling design, Problem
based learning design and Thinking map design.---------------------281

5.2.4.1 Comparison of effectiveness of Reflective
journaling design among sub groups –
Achievement as dependent variable. ------------------------281

5.2.4.2 Comparison of effectiveness of Reflective
journaling design among sub groups-Level of
Reflective thinking as dependent variable --------------283

5.2.4.3 Comparison of effectiveness of Problem based
learning design among sub groups –
Achievement as dependent variable --------------------284

5.2.4.4 Comparison of effectiveness of Problem based
learning design among sub groups – Level of
Reflective thinking as Dependent variable -------------286

5.2.4.5 Comparison of effectiveness of Thinking maps
design among sub groups – Achievement as
dependent variable -----------------------------------------287

5.2.4.6 Comparison of effectiveness of Thinking maps
design among sub group – Level of Reflective
thinking as dependent variable ---------------------------288

5.2.5 Focus group discussions. 291

5.2.6 Tenability of the Hypotheses--------------------------306

5.2.7 Discussion of results ----------------------------------316

Chapter 6

SUMMARY AND CONCLUSIONS ...................................................... 331 - 373

6.1 The Study in Retrospect-----------------------------------------------332

6.1.1 Statement of the problem ---------------------------------------------332

6.1.2 Variables enacted for the study --------------------------------------332

6.1.3 Hypotheses of the study ----------------------------------------------332

6.1.4 Objectives of the study ----------------------------------------------333

6.1.5 Methodology in brief-----------------------------------------------334

6.1.6 Analytical supports and techniques employed.------------------------335

6.2 Major Findings and Conclusions------------------------------------336

6.2.1 Assessment of predominant pedagogical functions in
conceptualizing mathematics proficiency ------------------------336

6.2.2 The challenges and constraints if any, experienced by
the student scape at secondary level in processing the
pedagogical tasks in the prevailing classroom practices.----------338

6.2.3 Affirmative dynamics credential to development of
mathematics proficiency ------------------------------------------339

6.2.4 Effectiveness of Reflective Journaling design in shaping a
culture of reflective practice among pupils at secondary
level.----------------------------------------------------------------341
6.2.5 Effectiveness of Problem based learning design in radiating reflective dispositions among pupils at secondary level. 345

6.2.6 Effectiveness of Thinking maps design in attuning a reflective mind set among pupils at secondary level. 349

6.2.7 Comparison of each of the select reflective learning designs among the subgroups of pupils classified according to locale and ordinal status in mathematics achievement and level of reflective thinking 353

6.2.8 The intensified effect of the select reflective learning designs in the experiential space among the identified cohorts of pupils through focus group discussions. 355

6.3 Summary of Conclusions 359

6.4 Implications of the Study 360

6.5 Limitations of the Study 369

6.6 Suggestions for Further Research 370

BIBLIOGRAPHY 374 - 401

APPENDICES i - I