CHAPTER I: INTRODUCTION

1.1 Background
1.2 Characteristics of Self-Instructional material
1.3 Self-Instructional Computer-Assisted program (SICAP) and its importance
1.4 The current scene
1.5 Rationale for the study
1.6 Statement of the problem
1.7 Operational definitions of key terms
1.8 Objectives of the study
1.9 Research Hypothesis
1.10 Null Hypothesis
1.11 Assumptions of the study 40.

1.12 Scope and Limitations 40.
   1.12.1 Scope 40.
   1.12.2 Limitations 40.

1.13 Delimitations of the study 41.

1.14 Significance of the study 41.

CHAPTER II: REVIEW OF THE RELATED LITERATURE

2.1 A history of the educational development in Thailand 46.
   2.1.1 The National Education Commission Report 46.

2.2 Reform of the Basic Education Curriculum in Thailand 50.
   2.2.1 The Basic Education Curriculum B.E. 2551 (A.D. 2008) 51.

2.3 Learning Substance and Standards for Science 52.

2.4 Studies related to Self-Instructional Computer-Assisted program (SICAP) 56.

2.5 Developing Self-Instructional Computer-Assisted program (SICAP) 60.

2.6 Studies related to the effectiveness of Self-Instructional Computer-Assisted program (SICAP) 65.

2.7 Studies related to higher level concepts in science 75.

2.8 Concluding Remarks 82.
CHAPTER III: METHODOLOGY

3.1 Research Design 87.

3.2 The Product-Oriented Research 91.

3.3 Theories of Learning 93.
   3.3.1 Principles of designing SICAP follow the concept of theories learning 94.

3.4 Population and Sampling of the Study 101.
   3.4.1 Population 101.
   3.4.2 Sample 101.

3.5 Developing Self-Instructional Computer-Assisted program (SICAP) 103

3.6 A pilot study 122.
   3.6.1 Objectives of pilot study 122.
   3.6.2 Procedure of pilot study 123.

3.7 Result of a pilot study 127.
   3.7.1 The result of SICAP tried out 128.
   3.7.2 Feedback of the Pilot-study 129.

3.8 Tools of study 131.
   3.8.1 Questionnaire and interview 131.
   3.8.2 Pre-test and Post-test 132.
   3.8.3 Self-instructional computer assisted program (SICAP) 133.

3.9 Procedure of study 135.
   3.9.1 The procedure of the main study 137.
3.9.2 Explanation; Research design step of Experimental method  140.

3.10 Time table  141.

3.11 Statistical analysis  142.

CHAPTER IV: DATA ANALYSIS AND INTERPRETATION

4.1 Introduction  143.

4.2 Finding of the study  144.

Objective No 1; To find out the higher level concepts from Biotechnology and Biodiversity topics for grade IX and  144.

Objective No 2; To analyze the higher level concepts from Biotechnology and Biodiversity topics for grade IX  144.

Objective No.3; To develop Self-instructional computer – assisted program (SICAP) for students based on Biotechnology and Biodiversity topics of science grade IX  207.

Objective No.4; To test the effectiveness of Self-instructional computer – assisted program (SICAP)  211
CHAPTER V: CONCLUSIONS, SUGGESTIONS AND SUMMARY

5.1 Conclusions of the study

5.2 Suggestions for improvement
   5.2.1 Suggestions for Teachers
   5.2.2 Suggestions for Students

5.3 Areas of Further Research

5.4 Summary of the study
   5.4.1 Background
   5.4.2 Statement of the problem
   5.4.3 Objectives of the study
   5.4.4 Research Hypothesis
   5.4.5 Null Hypothesis
   5.4.6 Assumptions
   5.4.7 Scope and Limitations
      5.4.7.1 Scope
      5.4.7.2 Limitations
   5.4.8 Delimitations of the study
   5.4.9 A pilot study
   5.4.10 Methodology of the study
   5.4.11. Population and Sample
      5.4.11.1 Population
5.4.11.2 Sample

5.4.12. Procedure

5.4.13. Tools to be used in the collection of data

5.4.14. Findings of the study

5.4.15. Conclusions of the study

Bibliography

Appendices

Appendix A: Questionnaire and interview for Science Teachers and Students for grade IX in English medium in Thailand

Appendix B: Evaluation Form by Expert (Content and Technology)

Appendix C: Pre-test and Post-test on Biotechnology and Biodiversity

Appendix D: Storyboard