

TABLE OF CONTENTS

| | |
|-------------------------------------|-----------|
| APPROVAL SHEET OF THESIS | i |
| BIOGRAPHY | ii |
| ABSTRACT | iii |
| PREFACE | iv |
| TABLE OF CONTENTS | vi |
| LIST OF FIGURE | ix |
| LIST OF TABLE | x |
| LIST OF APPENDIX | x |
| CHAPTER I INTRODUCTION | 1 |
| 1.1. Background | 1 |
| 1.2. Problem Identification | 7 |
| 1.3. Problem Limitation | 7 |
| 1.4. Problem Formulation | 7 |
| 1.5. Research Objectives | 8 |
| 1.6. Research Benefits | 8 |
| 1.7. Operational Definition | 8 |
| CHAPTER II LITERATURE REVIEW | 9 |
| 2.1. Theoretical Framework | 9 |
| 2.1.1. Understanding Learning Model | 9 |
| 2.1.2. Problem Based Learning (PBL) | 10 |
| 2.1.3. Critical Thinking | 16 |
| 2.1.4. Computer Simulation | 19 |
| 2.1.5. Online Learning | 21 |
| 2.2. Relevant Research | 22 |
| 2.3. Learning Matter | 23 |
| 2.4. Conceptual Framework | 24 |
| CHAPTER III RESEARCH METHODS | 26 |
| 3.1. Location And Time Of Research | 26 |
| 3.2. Population And Sample | 26 |

| | |
|---|-----------|
| 3.3. Design And Variable Of Research | 26 |
| 3.3.1. Design Of Research | 26 |
| 3.3.2. Research Variable | 27 |
| 3.4. Critical Thinking Research Instruments | 27 |
| 3.5. Research Procedure | 27 |
| 3.6. Data Collection Technique | 30 |
| 3.6.1. Observation | 30 |
| 3.6.2. Test | 30 |
| 3.7. Regulation Of Research Instrument | 30 |
| 3.7.1. Content Validity | 30 |
| 3.8. Data Analysis Technique | 31 |
| 3.8.1. N-Gain Analysis | 31 |
| 3.8.2. Average Score | 31 |
| 3.8.3. Standard Deviation | 31 |
| 3.8.4. Normality Test | 32 |
| 3.8.5. Homogeneity Test | 32 |
| 3.8.6. Hypothesis Test (T Test) | 33 |
| CHAPTER IV RESULT AND DISCUSSION | 36 |
| 4.1 The Description Of Research Result | 36 |
| 4.2. Data Of Student's Critical Thinking Ability | 36 |
| 4.2.1. Data Of Pretest In Experiment Class And Control Class | 36 |
| 4.2.2. Data Of Posttest In Experiment Class And Control Class | 37 |
| 4.3. The Analysis Of Data | 38 |
| 4.3.1. Normality Test | 38 |
| 4.3.2. Homogeneity Test | 38 |
| 4.3.3. The Similarity Of Initial Ability Test | 39 |
| 4.3.4. Hypothesis Test | 39 |
| 4.3.5. Analysis Of N-Gain | 40 |
| 4.4. Discussion | 41 |
| CHAPTER V CONCLUSIONS AND SUGGESTIONS | 50 |
| 5.1 Conclusion | 50 |

5.2. Suggestion

51

REFERENCES

52



THE
Character Building
UNIVERSITY

LIST OF TABLE

| | | |
|------------------|--|----|
| Table 2.1 | Critical Thinking Indicator | 18 |
| Table 2.2 | Relevant Research | 24 |
| Table 3.1 | The Design of Research | 29 |
| Table 3.2 | Grid of Critical Thinking Instrument | 30 |
| Table 4.1 | Data of Pretest in Both Class | 39 |
| Table 4.2 | Data of Posttest in Experiment Class and Control Class | 40 |
| Table 4.3 | Normality Test | 41 |
| Table 4.3 | Homogeneity Test | 41 |
| Table 4.5 | Initial Ability Test | 41 |
| Table 4.6 | Hypothesis Test | 42 |
| Table 4.7 | N-Gain | 42 |
| Table 4.8 | Critical Thinking Ability Indicator N-Gain | 43 |

THE
Character Building
UNIVERSITY

LIST OF FIGURE

| | |
|---|----|
| Figure 2.1 Syntax PBL Model | 13 |
| Figure 2.2 The Results Obtained From The PBL Model | 15 |
| Figure 3.1 Flow Chart Of Research Procedure | 32 |
| Figure 4.1 Simulation Display Of Hypermetropic Eye Without Loupe | 46 |
| Figure 4.2 Simulation Display Without Glasses And Using Loupe | 46 |



LIST OF APPENDIX

| | | |
|--------------------|---|-----|
| Appendix 1 | Lesson Plan | 55 |
| Appendix 2 | Learning Matter | 63 |
| Appendix 3 | Student Worksheet | 66 |
| Appendix 4 | Syllabus | 75 |
| Appendix 5 | Instrument Test | 78 |
| Appendix 6 | Calculation Average, Standard Deviation, Variance | 80 |
| Appendix 7 | Normality | 81 |
| Appendix 8 | Homogeneity | 85 |
| Appendix 9 | Initial Test | 87 |
| Appendix 10 | Hypothesis Test | 89 |
| Appendix 11 | List of Value for Liliefors | 91 |
| Appendix 12 | List of Percentil Value of t Distribution | 92 |
| Appendix 13 | Table of Large area under Normal 0 to z | 93 |
| Appendix 14 | Table of F Distribution | 94 |
| Appendix 15 | Letter of Research Permit | 103 |
| Appendix 16 | Letter of Research Permit Reply | 104 |
| Appendix 17 | Instrument Validation | 105 |
| Appendix 18 | Media Validation | 106 |

THE
Character Building
UNIVERSITY