

## CONTENTS

APPROVAL SHEET.....	i
DECLARATION.....	ii
ABSTRACT.....	iii
PREFACE.....	v
ACKNOWLEDGEMENT.....	vi
CONTENTS.....	vii
LIST OF TABLE.....	xi
LIST OF FIGURE.....	xii
LIST OF APPENDIX.....	xiii
<b>CHAPTER I INTRODUCTION.....</b>	<b>1</b>
A. Background.....	1
B. Research Problem.....	4
C. Research Question.....	4
D. Limitation of Problem.....	5
E. Research Objective.....	6
F. Research Benefit.....	7
G. Organization Structure of Research Paper.....	8
<b>CHAPTER II LITERATURE REVIEW.....</b>	<b>9</b>
A. Science Virtual Test.....	9
B. Paper-based Test.....	10
C. Students' Critical Thinking.....	11
D. Living Things and Environmental Sustainability.....	13
E. Students' Multiple Intelligences.....	21
F. Gender.....	24
G. Students' Attitude.....	25
H. Teachers' Perspective.....	25

I. Relevant Research.....	26
<b>CHAPTER III RESEARCH METHODOLOGY.....</b>	<b>29</b>
A. Research Method and Research Design.....	29
B. Population and Sample.....	30
C. Operational Definition.....	30
D. Assumption .....	31
E. Hypotheses.....	32
F. Research Instrument.....	33
G. Research Procedure.....	39
H. Data Analysis.....	40
I. Research Flowchart.....	43
<b>CHAPTER IV RESULT AND DISCUSSION.....</b>	<b>44</b>
A. Result.....	44
1. General Comparison between Science Virtual and Paper-based Test.....	44
2. Comparison between Science Virtual and Paper-based Test based on Multiple Intelligences.....	47
3. Comparison between Science Virtual and Paper-based Test based on Gender.....	54
4. Analysis of Students' Attitude towards Science Virtual Test.....	55
5. Interview Result.....	58
B. Discussion.....	59
1 In General, There are No Significance Difference between SVT and PBT which Proved Equality and Validity of the Test Modes.....	60

2	Science Virtual and Paper-Based Test are Equal for Every Multiple Intelligence and Gender of Students.....	63
3	Both Students and Teachers Expect Science Virtual Test.....	66
<b>CHAPTER V CONCLUSION AND RECOMMENDATION.....</b>		<b>69</b>
A.	Conclusion.....	69
B.	Recommendation.....	70
<b>REFERENCES.....</b>		<b>71</b>
<b>APPENDIX.....</b>		<b>79</b>
<b>AUTOBIOGRAPHY.....</b>		<b>226</b>

## LIST OF TABLE

Table 2.1	Critical Thinking Elements.....	13
Table 2.2	Analysis on “Living Things and Environmental Sustainability” based on <i>Kurikulum 2013</i> .....	14
Table 3.1	One Shot Case Study Design.....	30
Table 3.2	Distribution of Science Virtual Tests’ Items.....	34
Table 3.3	Distribution of Paper-Based Tests’ Items.....	36
Table 4.1	Paired-Samples t Test of Science Virtual and Paper-Based Test based on Score.....	45
Table 4.2	Result of Wilcoxon Signed Ranks Test of Science Virtual and Paper-Based Test.....	46
Table 4.3	Wilcoxon Signed Rank Test of Critical Thinking Elements.....	47
Table 4.4	Frequency of Students’ Multiple Intelligence.....	48
Table 4.5	Cumulative Frequency of Students’ Multiple Intelligences ....	49
Table 4.6	Result of Paired-Samples t Test of Multiple Intelligences’ Groups.....	50
Table. 4.7	Result of Wilcoxon Signed Rank Test of Critical Thinking Elements between SVT and PBT based on Multiple Intelligences.....	51
Table 4.8	Result of Paired-Samples t-Test of Male and Female on Science Virtual and Paper-Based Test.....	54
Table 4.9	Result of Wilcoxon Signed Rank Test of Critical Thinking Elements of Science Virtual and Paper-Based Test based on gender.....	55
Table 4.10	Students’ Attitude towards Science Virtual Test.....	56
Table 4.11	Summary of Interview Result .....	57

## LIST OF FIGURE

Figure 2.1	Critical Thinking Elements by Inch.....	12
Figure 3.1	Research Flowchart.....	43
Figure 4.1	Frequency of Students' Multiple Intelligences.....	49
Figure 4.2	Students' Attitude on Science Virtual Test.....	57

## LIST OF APPENDIX

Appendix A : Research Authorization Letter.....	79
Appendix B : Instrument Judgement Forms.....	81
1. Summary of Expert Judgment Forms of Paper-Based Test.....	81
2. Instrument Judgments of Multiple Intelligences Inventory.....	107
Appendix C : Student Legibility Forms.....	115
Appendix D : Test Items.....	120
1. Screen Capture of Science Virtual Test Items.....	121
2. Paper-based Test Items.....	139
Appendix E: Multiple Intelligences Inventory.....	153
1. Original Version Multiple Intelligences Inventory.....	154
2. Translated Version of Multiple Intelligences Inventory.....	158
Appendix F : Students' Attitude Questionnaire.....	164
Appendix G : Interview Guidelines and Transcripts.....	166
Appendix H : Raw Result Data of Science Virtual and Paper-Based Test .....	170
Appendix I : Analysis of Students' Attitude Questionnaire.....	186
Appendix J : Statistical Data Processing.....	192
1. Normality and Homogeneity Test.....	193
2. Statistical Test of Hypotheses.....	195
Appendix K : Research Application Letter.....	219
Appendix L : Review Form .....	221
Appendix M : Documentation.....	223