

## TABLE OF CONTENTS

<b>MOTTO SHEET AND OFFERING .....</b>	<b>i</b>
<b>ORIGINALITY STATEMENT SHEET .....</b>	<b>iii</b>
<b>APPROVAL SHEET .....</b>	<b>iv</b>
<b>BIOGRAPHY .....</b>	<b>v</b>
<b>ABSTRACT .....</b>	<b>vi</b>
<b>FOREWORD.....</b>	<b>vii</b>
<b>TABLE OF CONTENTS.....</b>	<b>ix</b>
<b>LIST OF FIGURES .....</b>	<b>xii</b>
<b>LIST OF TABLES .....</b>	<b>xiii</b>
<b>LIST OF ATTACHMENTS.....</b>	<b>xv</b>
<b>CHAPTER I INTRODUCTION.....</b>	<b>1</b>
1.1. Background.....	1
1.2. Problem Identification .....	5
1.3. Scope of Research .....	5
1.4. Scope of Problem.....	5
1.5. Problem Formulation.....	6
1.6. Research Objectives .....	6
1.7. Research Benefits .....	7
<b>CHAPTER II LITERATURE REVIEW.....</b>	<b>8</b>
2.1. Learning Resources .....	8
2.1.1. Understanding Learning Resources.....	8
2.1.2. Classification of Learning Resources .....	10
2.1.3. Benefits of Learning Resources.....	13
2.1.4. Selection and Utilization of Learning Resources .....	13
2.2. Field Guidebook .....	15
2.3. Mangrove Ecosystem .....	16

2.3.1. Definition of Mangrove Ecosystem.....	16
2.3.2. Mangrove Habitat and Environment .....	17
2.3.3. Types of Mangrove Plants.....	20
2.3.4. Benefits and Role of Mangroves .....	39
2.3.4. Mangrove Ecosystem Management .....	40
2.4. Research and Development .....	42
2.4.1. The 4-D Development Models .....	43
2.5. Thinking Framework .....	45
<b>CHAPTER III RESEARCH METHOD .....</b>	<b>47</b>
3.1. Location and Time of Research.....	47
3.2. Population and Sample .....	47
3.2.1. Research Population .....	47
3.2.2. Research Samples .....	47
3.3. Research Design .....	48
3.4. Operational Definitions .....	48
3.5. Research Instruments.....	49
3.5.1. Validation Assessment Sheet .....	49
3.5.2. Scale Sheet and Assessment Questionnaire for Lecturers and Students.....	52
3.5.3. Field Manual Effectiveness Test Instrument.....	53
3.6. Data Collection Techniques.....	54
3.6.1. Interview.....	54
3.6.2. Questionnaire.....	54
3.7. Research Procedures.....	54
3.7.1. Defining Stage .....	56
3.7.2. Design Stage .....	57
3.7.3. Development Stage.....	58
3.7.4. Dissemination Stage .....	59
3.9. Data Analysis.....	60
3.8.1. Data Analysis Techniques Validation Sheets and Questionnaires .....	60
3.8.2. Data Analysis Techniques for Book Use.....	61

3.8.2.1. N-Gain Test .....	62
3.8.2.2. Paired t-test.....	62
<b>CHAPTER IV RESULTS AND DISCUSSION .....</b>	<b>64</b>
4.1. Research result.....	64
4.1.1. Results of Define Stage (Definition) .....	64
4.1.2. Results of Design Stage (Designing).....	66
4.1.2.1. Format Selection.....	66
4.1.2.2. Research Design.....	66
4.1.2.3. Research .....	67
4.1.2.4. Research Results.....	67
4.1.2.5. Initial Products .....	72
4.1.2.6. Book Description.....	72
4.1.3. Results of Development Stage (Development) .....	78
4.1.3.1. Material Expert Validation.....	78
4.1.3.2. Learning Design Expert Validation.....	81
4.1.3.3. Layout Expert Validation .....	84
4.1.3.4. Response from Course Lecturers .....	86
4.1.3.5. Field Trial of Student Responses.....	87
4.1.4. Result of Disseminate Stage (Dissemination) .....	90
4.1.4.1. Normality Test.....	91
4.1.4.2. Homogeneity Test .....	92
4.1.4.4. Paired Sample t-Test .....	93
4.1.4.5. N-Gain Test .....	94
4.2. Discussion.....	94
4.3. Constraints/Limitations .....	103
<b>CHAPTER V CONCLUSIONS AND SUGGESTIONS.....</b>	<b>105</b>
5.1. Conclusion .....	105
5.2. Suggestion .....	106
<b>REFERENCES .....</b>	<b>107</b>
<b>ATTACHMENT.....</b>	<b>112</b>

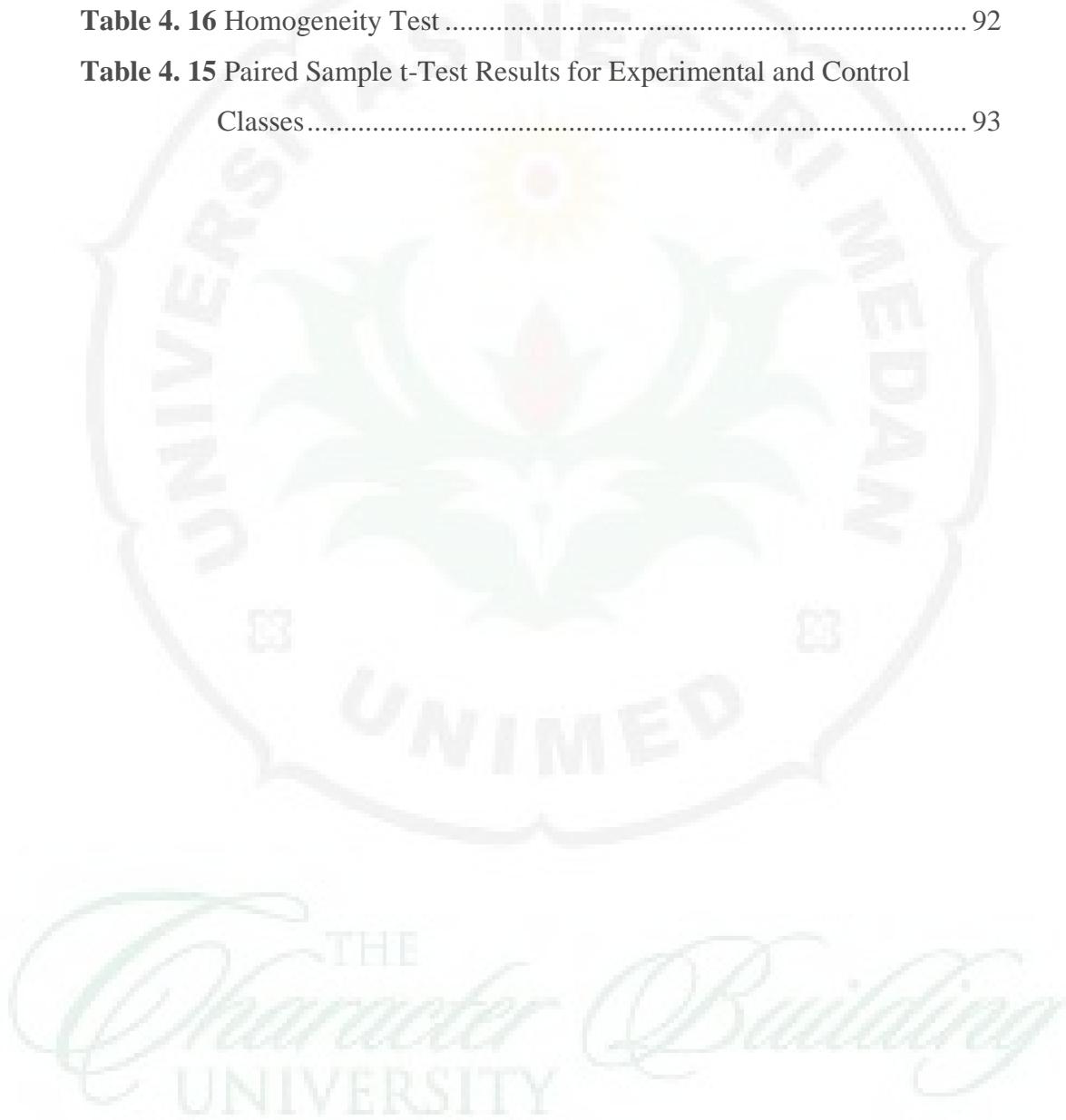
## LIST OF FIGURES

<b>Figure 2. 1</b> Learning Resources .....	9
<b>Figure 2. 2</b> Zoning of mangroves in Indonesia .....	19
<b>Figure 2. 3</b> <i>Avicennia marina</i> .....	20
<b>Figure 2. 4</b> <i>Avicennia lanata</i> .....	21
<b>Figure 2. 5</b> <i>Achantus illicifolius</i> .....	22
<b>Figure 2. 6</b> <i>Avicennia officinalis</i> .....	23
<b>Figure 2. 7</b> <i>Bruguiera gymnorhiza</i> .....	24
<b>Figure 2. 8</b> <i>Bruguiera sexangula</i> .....	26
<b>Figure 2. 9</b> <i>Ceriops tagal</i> .....	27
<b>Figure 2. 10</b> <i>Rhizophora apiculata</i> .....	28
<b>Figure 2. 11</b> <i>Rhizophora mucronata</i> .....	30
<b>Figure 2. 12</b> <i>Excoecaria agallocha</i> .....	31
<b>Figure 2. 13</b> <i>Lumnitzera racemosa</i> .....	33
<b>Figure 2. 14</b> <i>Lumnitzera littorea</i> .....	34
<b>Figure 2. 15</b> <i>Scyphiphora hydrophyllacea</i> .....	35
<b>Figure 2. 16</b> <i>Sonneratia caseolaris</i> .....	37
<b>Figure 2. 17</b> <i>Xylocarpus granatum</i> .....	38
<b>Figure 3.1</b> 4-D Modified Path .....	55
<b>Figure 4. 1</b> Description of the Field Guide Book Cover .....	73
<b>Figure 4. 2</b> Book Introduction Description .....	73
<b>Figure 4. 3</b> Initial Description of the Field Guide Book .....	75
<b>Figure 4. 4</b> Description of the Contents of The Lubuk Kertang Mangrove Field Guide Book .....	76
<b>Figure 4. 5</b> Mangrove Field Guide Book Closing Page .....	77
<b>Figure 4. 6</b> Results of Average Student Responses to Field Guidebooks .....	90
<b>Figure 4. 7</b> Results of Differences in Pretest and Posttest Scores for Experimental and Control Classes .....	91

## LIST OF TABLES

<b>Table 2. 1</b> Classification of Types of Learning Resources.....	12
<b>Table 3. 1</b> Material Expert Validation Sheet Grid.....	49
<b>Table 3. 2</b> Learning Design Expert Validation Sheet Grid .....	50
<b>Table 3. 3</b> Grid Layout Design Validation Sheet .....	51
<b>Table 3. 4</b> Questionnaire Grid Response to Lecturers and Students .....	52
<b>Table 3. 5</b> Grid Questions Pre-test and Post-test.....	53
<b>Table 3. 6</b> Outline of Mangrove Field Guidebook in Lubuk Kertang.....	58
<b>Table 3. 7</b> One Group Pretest-Posttest Research Design .....	60
<b>Table 3. 8</b> Criteria for Determining Scoring Guidelines for Likert Scale Types .....	60
<b>Table 3. 9</b> Book Eligibility Criteria in Each Aspect.....	61
<b>Table 4. 1</b> Types of Mangroves Found in Lubuk Kertang Village, West Brandan District, Langkat Regency, North Sumatra, Indonesia ...	68
<b>Table 4. 2</b> Composition of Mangrove Forest Vegetation in The Lubuk Kertang Area at Sapling Level.....	70
<b>Table 4. 3</b> Composition of Mangrove Forest Vegetation in The Lubuk Kertang Area at The Pole and Tree Level.....	70
<b>Table 4. 4</b> Comparison of Results Before and After Revision by Material Experts.....	79
<b>Table 4. 5</b> Percentage of Material Expert Validator Assessments .....	80
<b>Table 4. 6</b> Comparison of Results Before and After Revision by Learning Experts.....	81
<b>Table 4. 7</b> Percentage of Learning Design Expert Validator Assessments ....	83
<b>Table 4. 8</b> Comparison of Results Before and After Revision by Layout Design Experts .....	84
<b>Table 4. 9</b> Percentage of Learning Design Expert Validator Assessments ....	86
<b>Table 4. 10</b> Percentage of Responses from Lecturers Teaching Courses.....	87

<b>Table 4. 11</b> Percentage of Student Responses (Individual Trial) .....	88
<b>Table 4. 12</b> Percentage of Student Responses (Small Group Trial) .....	88
<b>Table 4. 13</b> Percentage of Student Responses (Limited Group Trial).....	89
<b>Table 4. 14</b> Normality Test Results for Experimental and Control Classes....	92
<b>Table 4. 16</b> Homogeneity Test .....	92
<b>Table 4. 15</b> Paired Sample t-Test Results for Experimental and Control Classes .....	93



## LIST OF ATTACHMENTS

<b>Attachment 1.</b> Interview Instrument for Course Teaching Lecturers .....	112
<b>Attachment 2.</b> Interview Instrument for Students .....	114
<b>Attachment 3.</b> Results of Student Needs Analysis Questionnaire for Field Guidebook Development.....	116
<b>Attachment 4.</b> Material Expert Validation Instrument .....	120
<b>Attachment 5.</b> Learning Design Expert Validation Instrument .....	125
<b>Attachment 6.</b> Layout Design Expert Validation Instrument.....	129
<b>Attachment 7.</b> Product Assessment Questionnaire by Lecturer .....	132
<b>Attachment 8.</b> Product Assessment Questionnaire by Students .....	134
<b>Attachment 9.</b> Results of Field Guidebook Validation by Material Experts..	136
<b>Attachment 10.</b> Results of Field Guidebook Validation by Learning Design Experts.....	141
<b>Attachment 11.</b> Results of Field Guidebook Validation by Layout Design Experts.....	145
<b>Attachment 12.</b> Results of The Lecturer's Response .....	148
<b>Attachment 13.</b> Student Response Results (Individual Group Test) 3 Students .....	150
<b>Attachment 14.</b> Student Response Results (Small Group Test) 10 Students .....	151
<b>Attachment 15.</b> Student Response Results (Limited Group Test) 20 Students .....	152
<b>Attachment 16.</b> Multiple Choice Pretest-Posttest Questions.....	153
<b>Attachment 17.</b> Experimental Class Pretest Results.....	160
<b>Attachment 18.</b> Control Class Pretest Results .....	161
<b>Attachment 19.</b> Experimental Class Posttest Results .....	162
<b>Attachment 20.</b> Control Class Posttest Results .....	163
<b>Attachment 21.</b> Descriptive Analysis Table of Pretest and Posttest Values ..	164

<b>Attachment 22.</b> N-Gain Score Data of Experimental and Control Class .....	165
<b>Attachment 23.</b> Normality Test Results for Experimental and Control Classes.....	167
<b>Attachment 24.</b> Homogeneity Test.....	167
<b>Attachment 25.</b> Semester Learning Plan .....	168
<b>Attachment 27.</b> Research License .....	179
<b>Attachment 28.</b> Certificate of Completion of Research .....	181
<b>Attachment 29.</b> Research Documentation .....	184