

## TABLE OF CONTENTS

	<i>Page</i>
Life Motto .....	i
Approval Page .....	ii
Originality Statement Sheet .....	iii
Approval of Publication Sheet .....	iv
Biography .....	v
Abstrak.....	vi
Abstract.....	vii
Acknowledgement .....	viii
Table Of Contents .....	x
List of Figures.....	xiii
List of Tables .....	xv
List of Appendices .....	xvi
<b>CHAPTER I INTRODUCTION.....</b>	<b>1</b>
1.1. Background of the Research .....	1
1.2. Problems Identification .....	5
1.3. Scope of Research .....	5
1.4. Scope of Problem .....	5
1.5. Research Questions .....	6
1.6. Research Objectives .....	6
1.7. Research Benefits.....	7
1.8. Operational Definitions .....	7
<b>CHAPTER II LITERATURE REVIEW .....</b>	<b>9</b>
2.1. 21st Century Education in the Industrial Revolution Era 4.0 .....	9
2.2. Scientific Approach .....	11
2.3. Interactive Learning Multimedia .....	12
2.4. Android-Based Application .....	14
2.5. Mobile Learning .....	15
2.6. Mobile Learning Application as a 21st Century Learning Tool.....	16
2.7. Mobile Learning Development Principles .....	17
2.8. Mobile Learning Application Requirements. ....	20

2.8.	Mobile Learning Application Software. ....	20
2.8.1.	Adobe Animate CC .....	20
2.9.	Android Based Mobile Learning Application Development Design.	20
2.10.	Assessment Criteria for Mobile Learning Application.....	21
2.10.1.	Assessment Criteria Based on Media Expert.....	23
2.10.2.	Assessment Criteria Based on Material Expert.....	24
2.10.3.	Assessment Criteria Based on User Expert (Biology Teacher).....	25
2.11.	Human Digestive System Learning Materials for Grade XI.....	26
2.12.	Framework of Thinking .....	31
<b>CHAPTER III RESEARCH METHOD .....</b>		<b>32</b>
3.1.	Place and time of research.....	32
3.2.	Research Subjects and Objects.....	32
3.2.1.	Research subject .....	32
3.2.2.	Object of research .....	32
3.3.	Research Type and Design .....	32
3.4.	Data collection technique .....	31
3.4.1.	Application Feasibility According to Media Expert. ....	31
3.4.2.	Application Feasibility According to Material Expert. ....	31
3.4.4.	Data Collecting Technique of Student Responses .....	32
3.5.	Research Instruments.....	32
3.5.1.	Student Needs Analysis Questionnaire.....	32
3.5.2.	Application Feasibility Instrument According to Media Expert ...	36
3.5.3.	Application Feasibility Instrument According to Material Expert	37
3.5.4.	Application Feasibility Instruments According to User Expert ....	38
3.5.5.	Student Response Questionnaire .....	39
3.6.	Research procedure .....	40
3.6.1.	Define Stage.....	40
3.6.2.	Design Stage .....	42
3.6.3.	Development Stage .....	46
3.6.4.	Dissemination Stage .....	46
3.7.	Data analysis technique .....	46
3.7.1.	Analysis of Application Assessment Data by Experts .....	47

3.7.2. Data Analysis of Students' Responses .....	48
<b>CHAPTER IV RESULTS AND DISCUSSION .....</b>	<b>50</b>
4.1. Research Result.....	50
4.1.1. Define Stage.....	50
4.1.2. Design Stage .....	50
4.1.3. Development Stage .....	67
4.1.4. Dissemination Stage .....	75
4.2. Discussion.....	76
4.2.1. Application Feasibility .....	76
4.2.2. Student Responses to Application.....	79
<b>CHAPTER V CONCLUSION AND RECOMMENDATION.....</b>	<b>69</b>
5.1. Conclusion.....	69
5.2. Recommendation .....	69
<b>REFERENCES.....</b>	<b>71</b>