

TABLE OF CONTENTS

TITLE PAGE	i
APPROVAL PAGE	ii
AUTHENTICITY STATEMENT	iii
PREFACE	iv
TABLE OF CONTENTS	vi
LIST OF TABLES	ix
LIST OF FIGURES	x
LIST OF ABBREVIATIONS	xi
ABSTRACT	xii
CHAPTER I: INTRODUCTION	1
A. Study Background.....	1
B. Problem Formulation	3
C. Study Objective.....	3
D. Study Benefits	3
E. Study Originality.....	4
CHAPTER II: LITERATURE REVIEW	7
A. Literature Review.....	7
1. Heart.....	7
2. Coronary Vasculature of the Heart	8
3. Coronary artery dominance.....	9

vi

4.	Three-dimensional printed learning model	10
5.	Anatomy curriculum in Faculty of Medicine, Public Health and Nursing Universitas Gadjah Mada (FMPHN UGM)	11
B.	Basic Theory.....	12
C.	Theoretical Framework	13
D.	Conceptual Framework	14
CHAPTER III: RESEARCH METHODOLOGY		15
A.	Research Design.....	15
B.	Time and Study Settings	15
C.	Research Respondent	15
D.	Research Variable	16
E.	Operational Definition of Variables.....	16
F.	Research Instruments	17
G.	Study Flow	18
H.	Data Analysis	20
I.	Ethical Consideration.....	20
CHAPTER IV: RESULT AND DISCUSSION.....		21
A.	Result	21
1.	Factors Related to 3D Models.....	22
1.1	Design of the model	22
1.2	Build quality.....	23

1.3 Cognitive load	24
1.4 Complexity	24
1.5 Orientation	25
2. Factors Related to Learner Characteristic	25
2.1 Innate visuospatial ability	26
2.2 Student's current ability	26
2.3 Prior experience with 3D model	27
2.4 Degree of learner control	27
3. Factors Related to Learning Environment/Curriculum.....	27
3.1 Topic difficulty	28
3.2 Time needed to understand learning objectives	28
3.3 Role in building understanding	29
3.4 Integration with other components in curriculum.....	30
3.5 Usage of model as a part of self-directed learning activity.....	30
B. Discussion	31
C. Limitations	35
CHAPTER V: CONCLUSION AND SUGGESTION	36
A. Conclusion	36
B. Suggestion.....	36
REFERENCES.....	38
ATTACHMENTS.....	41



LIST OF TABLES

Table 1. Previous 3-dimensional printing studies in cardiology.....	4
Table 2. Operational definition of variables	16
Table 3. Themes and subthemes for analysis.....	21

LIST OF FIGURES

Figure 1. Schematic figure of theoretical framework	13
Figure 2. Schematic figure of conceptual framework.....	14
Figure 3. Three-dimensional printed coronary artery learning model	18
Figure 4. Research Protocol	19

LIST OF ABBREVIATIONS

3D printing	: 3-dimensional printing
FDM	: Fused deposition modelling
LCA	: Left coronary artery
RCA	: Right coronary artery
FMPHN Gadjah Mada	: Faculty of Medicine, Public Health and Nursing Universitas Gadjah Mada