

Teaching and Learning

Mathematics

using

CDiCL

Making Sense Through
Computers Within Teamwork

Teaching and Learning
Mathematics
using
CDiCL
Making Sense Through
Computers Within Teamwork

**Mohd Sazali Khalid
Helmi Adly Mohd Noor**



2012



© Penerbit UTHM

First Edition 2012

Copyright reserved. Reproduction of any articles, illustrations and content of this book in any form be it electronic, mechanical photocopy, recording or any other form without any prior written permission from The Publisher's Office of Universiti Tun Hussein Onn Malaysia, Parit Raja, Batu Pahat, Johor is prohibited. Any negotiations are subjected to calculations of royalty and honorarium.

Cataloging in Publishing Data National Library of Malaysia

Mohd Sazali Khalid

Teaching and learning mathematics using CDiCL: making Sense through computers within teamwork/Mohd Sazali Khalid.

Includes Index

Bibliography:p.

ISBN 978-967-5457-74-6

1. Mathematics--Computer-assisted Instruction. 2. Mathematics--Study
2. And teaching (Higher).Title.
3. 510.785

Published by:

Penerbit UTHM

Universiti Tun Hussein Onn Malaysia

86400 Parit Raja,

Batu Pahat, Johor

Tel: 07-453 7051 / 7454

Fax: 07-453 6145

Website: <http://penerbit.uthm.edu.my>

E-mail: pt@uthm.edu.my

Penerbit UTHM is a member of
Majlis Penerbitan Ilmiah Malaysia
(MAPIM)

Printed by:

Penerbit UTHM

Universiti Tun Hussein Onn Malaysia

86400 Parit Raja,

Batu Pahat, Johor

Tel: 07-453 7051 / 7454



Table of Contents

Preface.....	Ix
Acknowledgments.....	Xi
Foreword.....	Xiii
Introduction.....	Xv

Chapter 1

1.1 Introduction.....	1
1.2 Current Needs Towards Technical Force In Malaysia.....	3
1.3 Current Problem In Teaching And Learning Mathematics.....	4
1.4 The Background Of Polytechnic Education.....	5
1.4.1 Polytechnic Education System In Malaysia.....	6
1.4.2 Types Of Students Enrolling Into Polytechnic Malaysia.....	8
1.4.3 Tracer Study – Polytechnic EducaTion.....	8
1.5 Objectives.....	9
1.5.1 Significance Of This Book.....	9
1.6 Population And Sample.....	10
1.7 Terminologies.....	10
1.8 Conclusion.....	12

Chapter 2

2.1 Learning Theories.....	13
2.1.1 Behaviourist.....	13
2.1.2 Cognitivist.....	14
2.1.3 Contructivist.....	14
2.2 Analysis Of The Learning Theories.....	15
2.3 Hermann Brain Dominance Model.....	15
2.4 Spectrum Of Issues.....	17
2.4.1 Mathematics Education.....	17
2.4.2 Mathematics Anxiety.....	18
2.4.3 Teachers Knowledge.....	19

2.5	Computers In Education.....	20
2.5.1	The Rationale Of Using Computers In Teaching Mathematics.....	20
2.6	Misconceptions In Technology.....	21
2.6.1	Misconception By Head Teachers.....	21
2.6.2	Misconceptions Among The Teachers.....	21
2.6.3	Misconceptions AmoNg The Students.....	22
2.6.4	Misconception By The Pta (Parent Teachers Association)...	22
2.6.5	Drill And Practice.....	23
2.7	Learning Individually Or In Pairs.....	23
2.7.1	The Strength Of Multimedia.....	25
2.7.2	Spatial Visualization.....	26
2.7.2	MInimalist.....	27
2.8	Collaborative Learning.....	27
2.8.1	Cooperative Learning.....	28
2.8.2	Competition In Learning.....	29
2.8.3	Sharing Knowledge In Learning.....	29
2.9	Memory.....	30
2.9.1	The Cognitive Theory In Multimedia Learning.....	31
2.9.2	The Impact Of Repetition On Memory.....	32
2.9.3	The Cognitive Theory In Mathematics Word Problem Csolving.....	34
2.10	Using Non-Mother Tougue Language In Teaching Mathematics.....	35
2.11	Conclusion.....	36

Chapter 3

3.1	Instructional Design (I.D).....	37
3.2	Developing The Courseware.....	42
3.2.1	Subject Content	42
3.2.2	Creating Test Materials.....	43
3.2.3	Rationale Of The Test And Recommended Solution.....	44
3.2.4	Choosing THe Computer Technology And Software.....	44
3.3	Addie Model.....	48
3.3.1	The Results From Addie Philosophy.....	53

3.4 Story Board.....	61
3.4.1 Story Board.....	61
3.4.2 Subject Content.....	62
3.4.3 Zooming On The General Weaknesses Called Fractions, Factorize, Simplify.....	62
3.4.4 Flow Charts.....	63
3.4.5 Action Scripts.....	70
3.5 Conclusion.....	82

Chapter 4

4.1 Pilot Testing.....	83
4.2 Validity And Reliability.....	84
4.2.1 Validity	84
4.3 Reliability.....	93
4.3.1 Reliability Of The Courseware.....	94
4.4 Multimedia Experts Involved.....	100
4.5 Lesson Plan.....	101
4.5.1 Lesson Plan For Week 1 To Week 6.....	101
4.5.2 Lesson Plan Week 7.....	102
4.5.3 Lesson Plan Week 8.....	102
4.5.4 Lesson Plan Week 9.....	103
4.6 Pre And Post Tests.....	103
4.7 Effectiveness.....	104
4.8 Publishing Onto The Web.....	104
4.9 Conclusion.....	104

Chapter 5

5.1 The Hottest Issues.....	105
5.1.1 Language Problem.....	105
5.1.2 Fraction And Number Manipulations On Computers.....	105
5.1.3 Exposure To Learning From Computers And Internet.....	106
5.1.4 Playing New Roles In Learning Mathematics Using Cdicl..	106

5.2	Students Who Are Positive Gainers.....	106
5.3	Students Who Were Losers.....	108
5.4	Issues Solved.....	109
5.5	Issues Not Solved.....	112
5.6	The Contribution Of This Study Towards The Body Of Knowledge.....	113
5.7	The Impact Of Hermann Brain Dominance Model In This Study.....	119
5.8	General Discussions And Future Recommendations.....	122
5.8.1	Problems In Collaborative Learning.....	126
5.8.2	The Impact Of Cdicl Within Collaborative Learning.....	127
5.9	Limitation In Cdicl.....	127
5.10	Conclusion.....	128
	Appendix.....	131
	References.....	167
	Index.....	175
	Vita.....	183