

Table of Contents

Introduction	5
Chapter 1: Computational Thinking	7
1.1 Introduction to computational thinking	7
1.2 Computational thinking and computer science.....	9
1.3 Decomposition.....	9
1.4 Abstraction	10
1.5 Pattern recognition.....	11
1.6 Algorithm design	13
1.7 Solution evaluation.....	15
1.8 The literature on computational thinking: Papert, Wing, Resnick	17
Chapter 2: Projects and Initiatives for IT Education	20
2.1 Introduction	20
2.2 Initiatives in the USA	22
2.2.1 Computer Science for All	23
2.2.2 The Beauty and Joy of Computing	25
2.2.3 CS50	27
2.2.4 Further initiatives in support of computing in primary and secondary education	29
2.3 Initiatives in Europe	30
2.3.1 UK and Ireland	30
2.3.2 France	31
2.3.3 Italy.....	32
Chapter 3: Block Programming Tools.....	35
3.1 Introduction to block programming.....	35
3.2 Scratch	36
3.2.1 Educational use.....	37
3.2.2 Language features and user interface	37
3.2.3 Community of users	40
3.2.4 Introduction to Scratch programming.....	41
3.2.5 Scratch syntax basics	44

3.3 Snap!	46
3.4 Stencyl	49
3.5 Blockly	52
3.6 Comparative table	55
Chapter 4: Research on Computing Education: An Overview of the State of the Field	58
4.1 Introduction	58
4.2 The debate over CT – What and Why?	59
4.3 Relevant research on CT education	63
4.3.1 Coding tools and research on interaction design	63
4.3.2 Assessing CT	66
4.4 Concluding remarks and suggestions for future enquiries	67
Chapter 5: Proposal for a Coding Course	70
5.1 Introduction	70
5.2 Lesson 1	71
5.3 Lesson 2	72
5.4 Lesson 3	75
5.5 Lesson 4	78
Conclusion	82
References	84
Literature	84
Online sources	88