TEACHERS VS. TECH? THE CASE FOR AN ED TECH REVOLUTION

Contents

	Foreword	7
	Introduction	13
	The history of the future	14
	Does education need to change?	19
	What will improve education?	21
	1: The science of learning	25
૾ૢૢૢૢૢૢૢૢૢૢૢૢૢૢૢૢૢૢૢૢૢૢૺ	What causes learning?	26
0 (1) 0	A science of learning	28
	Working memory	30
	Building knowledge: minimal guidance	
	vs direct instruction	34
	What about constructivism?	37
	Education technology and cognitive science	40
	2: How can we use technology to	
ϕ	personalize learning?	43
	One teacher, many students	44
	Can technology help give individualized instruction?	45
	Individual learning styles	48
	Student choice	55
	Adaptive learning	60
	3: Why can't we just look it up?	67
Q	Looking it up	68
T	We need facts to think	73
	We need facts in order to 'look it up'	77
	We need facts to make sense of lies	79
	Creating memorable content	84
	The jobs of the future	91

CONTENTS

97

98

Ð

4: How can we use technology to
make learning active?
Different types of activity

Projects	98
We remember what we think about	101
The testing effect: using technology	
to build memories	105
Improving feedback	109
Reducing cognitive load	112
Breaking down complex tasks	113
Different models of progression	120
Pendulums or pathways?	122



5: How should we use smart devices?	
Computers, tablets and phones	130
Devices aren't neutral	131
How do students use devices?	138
Is this a problem?	140
What's the solution?	143



6: The expertise of teaching:	
can technology help?	149
What about the teacher?	150
The expertise of teaching	152
Where expertise fails	154
How can technology help?	156
Why we need humans	158
Why we need technology	161
Combining technology and teachers	164
Future developments	166

TEACHERS VS. TECH? THE CASE FOR AN ED TECH REVOLUTION



7: The expertise of assessment:
can technology help?
Can we trust assessment?
What makes assessment hard?
Improving assessment

Can algorithms make the assessment	
of essays more reliable?	178
Comparative judgement: combining	
algorithms and human judgement	181
What about machine learning?	188





Endnotes	197
Glossary	220
Bibliography	221
Copyright acknowledgements	227
Acknowledgements	231
About the author	232