

Contents

1	Reading and Writing in the Digital Age	1
1.1	The Current State: A Rapid Change from Paper to Digital Media . . .	2
1.2	The Convenience of Digital Media in Reading and Writing	3
1.2.1	The Pleasures of the Kindle: The Convenience of E-readers	3
1.2.2	Writing Using Word Processors	5
1.3	Overdependence on the Web Has Changed Human Cognition	7
1.4	The Positioning of This Book	10
	References	12
2	Various Media and Their Characteristics	15
2.1	Paper	15
2.1.1	Definition of Paper	16
2.1.2	Roles and Types of Paper	17
2.1.3	Physical Characteristics of Paper	18
2.2	Digital Media	21
2.2.1	Display Panels	21
2.2.2	Digital Devices	23
2.3	Limitations on the Use of Digital Media	24
	References	25
3	The Ease of Reading from Paper and the Difficulty of Reading from Displays	27
3.1	Paper Is the Preferred Medium for Reading	27
3.2	Factors Contributing to the Difficulty of Reading from a Display . . .	31
	References	33
4	Effects of Presentation Quality in Reading	35
4.1	Influence on Reading Speed and Understanding Level	36
4.2	Impact on Eye Strain	38
4.3	Summary	40
	References	41

5	Effects of Operability on Reading	43
5.1	Various Types of Reading	43
5.2	The Cognitive Load of Operations	46
5.2.1	The Measurement of Cognitive Load	46
5.2.2	The Cognitive Load of Page Turning	48
5.3	Overview of Experiments	50
5.3.1	Operations Performed While Reading	50
5.3.2	An Overall Picture of All Experiments	51
5.4	Document Operations	52
5.4.1	Cross-Reference Reading of Multiple Documents (Experiment 1)	52
5.4.2	Ease of Document Movement and Alignment (Experiment 2)	57
5.4.3	Analyzing Window Operation Cost (Experiment 3)	61
5.5	Page Operations	64
5.5.1	Reading While Moving Back and Forth Between Pages (Experiment 4)	64
5.5.2	Reading to Find Answers Within Text Documents (Experiment 5)	71
5.5.3	Searching for Photos Within a Photo Book (Experiment 6)	76
5.6	Content Operations	82
5.6.1	Finding Contextual Errors (Experiment 7)	83
5.6.2	Reading from Paper with Restricted Operations (Experiment 8)	87
5.6.3	The Position and Orientation of Documents When Reading and Writing (Experiment 9)	90
5.7	Mixed Operations	97
5.7.1	Reading for Discussion Purposes (Experiment 10)	97
5.8	Summary and Discussion	102
5.8.1	Paper as an Operation Medium	103
5.8.2	Why Is Paper Easy to Handle?	105
	References	107
6	Ease of Concentration on Reading	111
6.1	Inability to Concentrate on Reading in a Digital Environment	112
6.2	Digital Environments Inhibiting Concentration on Reading	112
6.2.1	Distracting Stimuli Unrelated to Reading	113
6.2.2	Links with Hypertext That Disperse Thinking	114
6.2.3	Multifunctional Digital Devices Encouraging Multitasking	115
6.2.4	The Inconvenience of Performing Operations While Reading	119

6.3	People Pay Attention to Concrete Things in Digital Environments and Abstract Things on Paper	120
6.4	Summary and Discussion	122
	References	123
7	Effects of Writing and Drawing by Hand	125
7.1	The Convenience of Writing by Hand and Digital Writing	125
7.2	Do Word Processors Improve the Quality of Your Text?	129
7.3	The Advantages of Taking Notes Manually	132
7.3.1	Students Who Turn into Typing Machines in the Classroom	133
7.3.2	Handwriting Enables Thinking While Inputting Text	136
7.4	Hand-Drawing Sketches Is Superior to Using Digital Drawing Tools	140
7.4.1	Drawing Tools Require You to Make Decisions Before Drawing	141
7.4.2	Drawing Tools Guide Our Thought in the Wrong Direction	142
7.5	Why Are Handwritten Letters Preferred?	144
7.5.1	Method	145
7.5.2	Evaluation 1: The Personality of Senders	146
7.5.3	Evaluation 2: Evaluation of Letter Content	148
7.5.4	Evaluation 3: Feelings of Gratitude	148
7.5.5	General Discussion of the Three Evaluations	150
7.6	Summary and Discussion	151
	References	152
8	Discussion and Proposals	155
8.1	A Brief Review of the Experiments	155
8.2	Why Digital Displays Cannot Replace Paper	156
8.3	Future Media in the Office	158
8.3.1	Using Both Paper and Digital Media Wisely	158
8.3.2	Coordination of Paper and Digital Media	161
8.3.3	The Ideal Future Office: The Stockless Office	161
8.4	Toward Digital Active Reading	163
8.4.1	Personal Experiences of Digital Reading	164
8.4.2	Suggestions for Supporting Digital Reading	168
8.5	Media in Education	172
8.5.1	Concerns About the Digitalization of Education	172
8.5.2	The Digitalization of Children's Textbooks Should Be Considered Carefully	175
	References	176
9	Conclusion	179
	References	181