
Contents

List of figures and tables	vii
Preface	xi
1 Learning, development, and intervention	1
2 Describing and measuring cognitive development	11
3 A review of intervention programmes	38
4 Features of successful intervention	60
5 CASE: The development and delivery of a programme	78
6 Evaluating the programme	90
7 Implications for models of the mind	113
8 Other domains, other ages	128
9 Changing practice	149
10 Really raising standards	164
Appendix: Added value	183
References	192
Name index	200
Subject index	203

Figures and tables

FIGURES

1.1	A learning–development spectrum	5
2.1	Growth curves for height	12
2.2	The effects of medical intervention	13
2.3		19
2.4		20
2.5	A 2×2 treatments and effects table	22
2.6	Two possible nodes and antinodes of cognitive development during the concrete operations period	27
2.7	Cognitive development by age and ability – boys (based on CSMS survey data 1975–8)	32
2.8	Levels of thinking required to meet each Statement of Attainment in the 1991 Science National Curriculum; Attainment Targets 2, 3, and 4	35
3.1	Cognitive development: effect sizes on 11 year-olds	40
4.1	Floating and sinking jars	64
4.2	Balance beam	71
4.3	Summary of the features of a cognitive acceleration programme	76
5.1	A ‘wheelbarrow’	81
5.2	Estimate of operating range of <i>Thinking Science</i> lessons	84
5.3	Roller ball apparatus	87
6.1	Experimental design of the CASE project	91
6.2	Example of regression of GCSE grade on a pre-PRT score. Control group from School 11	93

6.3	Post-PRT residualised gain scores for experimental groups: means, etc., and distribution	95
6.4	Pre-, post-, and delayed post-test results for 12+ cohort schools	97
6.5	Cognitive development of CASE experimental group over two and a half years compared with a control group: laboratory school	98
6.6	Delayed post-science residualised gain scores (%) for experimental groups: means, etc., and distribution	99
6.7	Residualised gain in grades of experimental group on GCSE: science	100
6.8	Residualised gain in grades of experimental group on GCSE: mathematics	101
6.9	Residualised gain in grades of experimental group on GCSE: english	102
6.10	Residualised gain scores in standard deviation units from two Korean schools on four tests	111
7.1	The four-card test	114
8.1	Increments in brain growth against age	142
8.2	Age-dependence of resting brain alpha energy	143
8.3	Annual increments in the proportion of children using different levels of thinking, by task	144
10.1	Cognitive development by age and ability – boys (based on CSMS survey data, 1975–8)	169
10.2	Growth curves for height	170
A.1	Mean grades in GCSE science obtained in five schools	185
A.2	GCSE grades (1989) by school, class, and 1985 pre-test Piagetian test level	187
A.3	1989 GCSE grade against 1985 pre-test Piagetian levels for one school	188
A.4	Regression of control group's GCSE grades on pre-test Piagetian levels	188
A.5	Distribution of the residuals	189
A.6	CASE data on regression line for controls	189
A.7	Distribution of residuals	190
A.8	Histogram of GCSE science rgs for boys, School 11	190

TABLES

2.1	Test of the Longeot model on Piagetian interview tasks: percentage of success assessed at each level	28
2.2	Curriculum analysis taxonomy headings	33
2.3	Key Stage 3 science results for London region 1992	36
3.1	CoRT-1 thinking lessons	41
3.2	Instrumental enrichment cognitive functions	46
3.3	Pre- to post-test mean differences (experimental – control)	49
3.4	Means (and standard deviations) of pupils' mental ages in years on Raven's matrices during LPA	50
3.5	Effect-sizes (experimental – control) of IE on various measures	50
3.6	The nature and locus of cognitive impairments	53
3.7	Mean differences (experimental – control) on Piagetian tests	58
3.8	Effect-sizes for Rosenthal (1979) in relation to intervention style	59
5.1	Origin of CASE parameters	79
5.2	The activities of <i>Thinking Science</i>	82
6.1	Mean pre- to delayed post-test gains for schools and groups	96
6.2	Numbers of subjects gaining higher than expected GCSE grades (1990) related to Piagetian gains at post-test (1987): 11+ girls	104
6.3	Comparison of percentages of CASE and control students attaining rg scores greater than 1σ at GCSE: 11+ girls	105
6.4	Numbers of subjects gaining higher than expected GCSE grades (1989) related to Piagetian gains at post-test (1987): 12+ boys	106
6.5	Comparison of percentages of CASE and control students attaining rg scores greater than 1σ at GCSE: 12+ boys	106
6.6	Numbers of subjects gaining higher than expected GCSE grades (1989) related to Piagetian gains at post-test (1987): 12+ girls	107
6.7	Comparison of percentages of CASE and control students attaining rg scores greater than 1σ at GCSE: 12+ girls	107
6.8	Range in Piagetian levels in schools' 1989 intake (cumulative percentages)	109
6.9	Range in Piagetian levels of students at the end of year 8 (age 13+) (cumulative percentages)	109

7.1	Predicted maximum M-power values as a function of age, and their correspondence to the Piagetian substage sequence	126
8.1	Teachers' analysis form used for books in Fusco (1983)	136
9.1	Mean effect-sizes in standard deviation units of different INSET procedures on possible INSET outcomes	153
9.2	Implementation factors in two IE replications	155
10.1	Statistics of year 7 intake in three schools	175
A.1	Mean grade in GCSE science 1989 for 12+ boys cohort: controls	186
A.2	Mean grade in GCSE science 1989 for 12+ boys cohort: CASE	186
A.3	CASE – controls differences in mean GCSE grades	186