

DIAGNOSTIC AND REMEDIAL TEACHING

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IN EDUCATION**

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**DEAN OF THE SCHOOL OF EDUCATION
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EDITOR'S INTRODUCTION

A QUARTER of a century ago both teachers and principals paid but little attention to any individual differences that may have been evident in the learning ability of children under their control. Semi-annual promotions and an occasional special advancement of a capable pupil constituted practically all that was attempted by way of adjusting instruction to individual needs. The vast differences in pupil abilities which we now know to exist, and make some attempts to adjust our instruction to meet, were then largely ignored or entirely unknown. The coming of the test and measurement movement after about 1908, which revealed the wide differences in accomplishment of pupils, and the development of intelligence testing since 1911, which has made us aware of the vast differences in ability to learn, have in time changed the whole aspect of both school instruction and school supervision. What before had been but dimly sensed by a few now stands revealed to all, and it is seen that school work must be changed from guesswork to scientific accuracy, and school supervision from a managerial type of job for which little or no professional preparation is needed to an expert professional service for which careful preparation is required.

Since the beginning of the test and measurement movement we have traveled far. From one standardized test in 1908 we today have around six hundred standardized measuring instruments, in many school subjects and for many different educational purposes. Besides tests for intelligence and achievement, there are analytical subject tests, general survey tests, diagnostic tests, prognostic tests,

rate tests, accuracy tests, and personal-trait tests, to mention the more important types, and the problem now is how and when and for what purposes should these different types be used, how the results obtained from their use are to be interpreted in the light of pupil needs, and how teaching adjustments that will be effective are to be made. Stated another way, how can these new tools best be used as guides in adapting the instruction of the schoolroom to that wide range of individual differences which we now recognize that children possess?

The authors of the present volume have taken this problem for their theme, and have offered us a treatise dealing with diagnostic procedure and remedial treatment as applied to the work of the elementary school. After setting forth the nature and function of standardized educational tests, the aspects of intellectual progress that are to be measured, and the nature and the technique of educational diagnosis, they proceed, in some detail, to deal with diagnostic and remedial procedures for each of the elementary school subjects. For each subject considered they first set forth the agreed-upon objectives in instruction, the levels of attainment, and the specific skills that need to be developed. They next describe and illustrate the different standardized tests that may be used for different diagnostic purposes, explain how to measure progress and how to diagnose peculiar difficulties, for both individuals and groups, and finally they describe the different remedial techniques that have been developed.

A helpful book of this type, covering the elementary school field, has been needed for some time, and a study of the procedures here presented should be enlightening to both teachers and supervisory officers. The volume at the same time contains materials that make it an important classroom textbook in the use of tests and measurements, and an

exceedingly useful reference work on both diagnostic procedures and remedial techniques in the instructional work of the elementary school. It is a noteworthy contribution to our educational literature.

ELLWOOD P. CUBBERLEY

PREFACE

THE development of the measurement movement in education has influenced instruction in many ways. It has provided techniques whereby the individual differences of children have been determined quantitatively and portrayed in such a striking manner that the schools can no longer ignore them. More recently, efforts have been made to develop methods for the utilization of measuring devices in the adaptation of instruction to the needs, interests, and capacities of children. This book gives primary consideration to the ways in which test procedures have modified classroom teaching, the techniques that may be used to diagnose the nature and causes of pupil difficulties, and the methods by which remedial adjustments of various kinds may be made.

The discussion is directed to the teacher rather than to the specialist. Emphasis is placed on the techniques of diagnostic and remedial teaching which experience has shown can be effectively employed by the average teacher. In a number of places devices in early and imperfect stages of development have been included in the belief that they may be suggestive to teachers in their work of developing new techniques. A definite attempt has been made to show how teaching procedures related to the skill subjects may be based on test methods or other objective devices in such a way that the traditional mass instruction found in many of our schools may be broken down. Methods of adapting instruction to individual differences are described and evaluated. The typical causes of difficulty in the several school subjects are discussed, and types of remedial work that experimentation has found helpful are summarized. An

effort has been made to indicate to teachers how practice may be made purposeful and more effective through the use of self-diagnostic methods which enable the pupil to measure his progress and to determine the points at which his work is deficient or below standard. In this way much of the routine practice which has so frequently characterized the drill work in our elementary schools may be eliminated. Emphasis is given to the point of view that teachers who are conscious of the types of difficulty pupils encounter in their school work can do much to avert their development by "preventive teaching." The authors believe that the use of tests that is emphasized in this book is in accord with progressive educational theory and practice.

In the discussion of tests and other illustrative materials no effort has been made to mention all tests and materials available, those included having been selected because they illustrate various procedures that are presented. Much of the discussion involves the results of original research by the authors and their students, as well as of other workers. The names of these investigators appear in footnote references and bibliographies. The authors wish to express their appreciation for permission to quote from numerous studies. The authors also wish to acknowledge their indebtedness to the many publishers who have granted permission to quote copyrighted materials.

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CHAPTER I

EVIDENCES AND CAUSES OF MALADJUSTMENT IN OUR SCHOOLS

I. EVIDENCES OF MALADJUSTMENT

DURING the past three decades a large amount of information has been assembled showing that the schools have failed in many cases to adapt the curriculum and methods of teaching to the differences in ability, interests, and needs of individual pupils. The most significant sources of such information have been age-grade studies, studies of pupil progress, and the results of standard achievement tests. Age-grade studies have shown, in practically every case, that a large proportion of the pupils are over-age for their grade. The studies of rates of promotion and progress have shown that in many schools there is a very high percentage of pupil failure, which obviously results in an increased amount of over-ageness. The results of achievement tests have shown not only that many pupils fail to make satisfactory progress in their school work, but that there is also a wide overlapping in the abilities of pupils in the different grades. In an attempt to remedy the conditions revealed by these studies, many schools have conducted investigations to determine the causes of this maladjustment, and have made certain modifications which have in many cases greatly improved the situation.

Age-grade and progress. The first striking statistical presentation of data which brought to the attention of American educators the serious maladjustment in the schools of the United States was the age-grade table of Superintendent Maxwell, showing the extent of over-ageness,

in the schools of New York. Similar age-grade studies have been made in many of our cities, and in most cases a serious condition has been revealed. Table 1 contains a typical age-grade table showing the ranges in the ages of the pupils enrolled in the same grade.

TABLE 1. AGE-GRADE TABLE SHOWING NUMBER AND PER CENT OF OVER-AGE PUPILS FOR AURORA, ILLINOIS, FOR THE YEAR 1929-30

GRADE	1	2	3	4	5	6	7	8	TOTALS
AGE									
6.....	353	41	1						395
7.....	130	192	38						360
8.....	32	100	207	44	2				385
9.....	7	41	115	159	36	1			359
10.....	5	14	39	104	138	49	13		362
11.....	1	2	9	42	112	145	51	2	364
12.....		1	4	12	45	93	119	57	331
13.....				5	17	60	96	117	295
14.....			1	2	12	26	33	83	157
15.....				2	3	3	27	52	87
16.....							3	3	6
Totals.....	528	391	414	370	365	377	342	314	3101
Number over-age.	45	58	53	63	77	89	63	55	503
Per cent over-age.	9	15	13	17	21	24	18	18	16

Many problems are raised by the data contained in the table. Note, for example, the range in age from 8 to 15 in grade 4. Similar variations may be noted for each of the grades. The per cents of pupils over-age increase grade by grade from grade 1 to 6, when a falling-off occurs, showing that over-age pupils probably are being eliminated by leaving school. What readjustments can the school make to alleviate this condition?

The facts revealed by an age-grade table for an entire city conceal the variations that may be found among the several schools. In a recent report Superintendent Weet, of Rochester, New York, presented some striking information,

as shown in Table 2, regarding age-grade and progress conditions in twelve schools of that city.

TABLE 2. SUMMARY OF AGE-GRADE AND PROGRESS OF PUPILS IN TWELVE ROCHESTER SCHOOLS (1928) *

	TOTAL (per cent)	RANGE (per cent)		TOTAL (per cent)
Under-age. . . .	6.5	2.4-15	Rapid Progress	7
Normal age. . .	54.1	44.1-78.3	Normal Progress	45.5
Over-age.	39.4	12.1-53.6	Slow progress	47.5

* From *The Work of the Public Schools*. Board of Education, Rochester, New York, 1928.

In all twelve schools 6.5 per cent of the pupils enrolled were under-age, 54.1 per cent normal age, and 39.4 per cent were over-age. The range in per cents of pupils under-age in the twelve schools was from 2.4 per cent in one school to 15 per cent in another. The range in per cents of pupils over-age was from 12.1 to 53.6 per cent. Clearly the problems of administration and teaching in these schools must differ greatly. Any attempt to require all schools in a system to cover the same amount of subject-matter must result in serious maladjustments. The fact that 47.5 per cent of all pupils had not progressed at normal rates indicates that many of them had encountered such difficulty in their school work that they were not promoted at the end of the semester.

The extent of non-promotion. The amount of non-promotion in a school system is an indication of the extent to which attempts have been made to adjust instruction so as to eliminate pupil failure. Table 3 shows the variation in the per cents of failure in the schools of three cities.

The per cents of failure in Denver are lower in all grades than in either New York or Rochester. It will be noted also that the per cents of failure in New York were much lower in 1927 than in 1917. Records are available which show that

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in a single school system the per cents will vary as much as from less than 1 per cent of failure in one school to as much

TABLE 3. PER CENTS OF NON-PROMOTION IN THREE TYPICAL CITIES

GRADES	DENVER (1929)	ROCHESTER (1928)	NEW YORK (1927)	NEW YORK (1917)
1B.....	10.2	21.9	16.4	22.8
1A.....		12.2	9.1	11.7
2B.....	6.2	12.0	8.9	11.8
2A.....		10.1	7.1	9.2
3B.....	4.4	8.2	7.6	10.2
3A.....		7.9	6.6	9.4
4B.....	3.8	8.5	7.7	10.1
4A.....		10.8	7.1	10.3
5B.....	3.3	10.9	7.9	12.0
5A.....		8.9	7.1	11.5
6B.....	2.2	8.7	7.7	12.5
6A.....		7.9	6.5	11.5

TABLE 4. CAUSES OF NON-PROMOTION, ROCHESTER, NEW YORK *

* From *The Work of the Public Schools*. Board of Education, Rochester, New York, 1928.

	NUMBER OF CASES		NUMBER OF CASES
<i>Mental condition</i>		<i>Irregular attendance</i>	
Immaturity.....	284	Personal illness.....	159
Slowness.....	1094	Illness in family.....	10
Backwardness.....	313	Illegal absence.....	20
Subnormality.....	33	Late start.....	53
Poor memory.....	45		
Lack of attention.....	106	<i>Physical condition</i>	
Lack of application.....	289	General ill health.....	47
Lack of perseverance.....	20	Specific ill health.....	26
Special reading disability.....	61	Speech impediment.....	15
Special number disability.....	92	Defective hearing or vision...	16
		<i>Environment</i>	
<i>Wrong attitude</i>		Change of schools.....	62
Dislike of school.....	3	Change of school systems....	54
Indifference.....	82	Home environment.....	19
Carelessness.....	14	Foreign environment.....	38
Incorrigibility.....	8	Outside interests.....	10
Overconfidence.....	7		
Lack of confidence.....	6	<i>Administrative</i>	
Day-dreaming.....	15	Half-day sessions.....	12
		Unwise promotions.....	9
		Wrong classification.....	25