TESTS AND MEASUREMENTS FOR TEACHERS

BY

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DEAN OF THE SCHOOL OF EDUCATION
LELAND STANFORD JUNIOR UNIVERSITY

TO

LESTER BURTON ROGERS

DEAN OF THE SCHOOL OF EDUCATION

UNIVERSITY OF SOUTHERN CALIFORNIA

TO WHOSE GENIUS

FOR ORGANIZATION AND ADMINISTRATION

THE PROFESSION IS INDEBTED FOR THE DEVELOPMENT

OF AN OUTSTANDING INSTITUTION FOR THE

TRAINING OF TEACHERS, SUPERVISORS

AND ADMINISTRATORS

EDITOR'S INTRODUCTION

THE test and measurement movement arose, something like a quarter of a century ago, largely as an attempt, on the part of a few students of education, to find a means for transforming guess work as to school progress into procedures having scientific accuracy. To create a series of scientifically evolved and standardized tests of classroom progress, to provide units and norms for the measurement of school accomplishment, and gradually to substitute these tests and norms for the old type of examination and standardized unit-results for personal opinion in the measurement of progress, soon became the objective of the quest. This new measurement movement has, with time, become of large significance for both teaching and school administration, and the more recent important work in curriculum construction and educational reorganization would scarcely have been possible without this earlier development. As a result, we have for use today numerous scientifically derived scales for the measurement of both quality and quantity, by means of which teachers may measure their own progress and test the efficiency of their own work.

As the test and measurement movement grew, and the new subject matter began to be taught in our schools and colleges and in extension courses for teachers, textbooks describing and illustrating these new measuring instruments appeared. These new textbooks reproduced parts of the tests described, gave the norms so far derived, and the students were set to work studying about the tests in the expectation that they would later find use for them in their school work. As the number of standardized tests increased and the norms were further perfected, the manuals had to be revised and materially increased in size. With time, as the number of standardized tests mounted into

the hundreds, it became evident that a comprehensive study of all the tests was neither possible nor necessary, that many of the tests commonly studied were not worth while, and that a usable textbook must confine itself to a selected list of the more important and the more useful tests which had been evolved. This type of selective textbook next appeared, and for a time served a very useful purpose.

As the movement progressed, however, it came to be seen that the need for testing pupils by means of carefully standardized tests, as was at first thought necessary, had been greatly overemphasized. It was also seen that the new standardized tests, which had been very useful for comparative purposes, after all had quite limited uses and, in addition, were somewhat costly. A good classroom test for teaching purposes, it was in time seen, was one by means of which pupils might be tested widely, scored objectively, and ranked relatively, and that the test had not been standardized was not of importance so long as comparison between different groups was not attempted. With the attainment of this conception it was seen that the same principles and types of procedure employed in the construction of the standardized tests could be employed by classroom teachers in the construction of unstandardized new-type examination tests for their own use, and that when so constructed these unstandardized tests not only would have the advantages of the standardized tests in such matters as extent of testing, objective scoring, and relative ranking, but in addition the tests constructed by the teacher could be much more closely adapted to the subject matter that had been taught. With these teacher-constructed and unstandardized tests, which soon came to be called new-type examinations, the pupils could be tested frequently and cheaply, ranked on each test, scores from different tests equated and combined, the best type of review test organized and given, and teaching procedures and remedial measures evaluated.

This further development of the movement represented a new stage in the evolution of tests and measures, and gave rise to the need for a new type of textbook in the subject. If classroom teachers were to be trained to construct, give, score, and evaluate these new types of testing instruments, a textbook that would embrace the teachers' entire testing needs — the traditional examination, the objective unstandardized new-type examination, and the standardized tests — now was called for; one that would, for most teachers, enable them to make the transition from the old methods to the new procedures by repeating for them some of the experimental work which has formed the foundation for the new techniques. The vital thing for the teacher today to know is not a description of the general form and the field of usefulness of a selected list of standard tests — such information can now be obtained from a Manual of tests, or from an examination of sample copies of the tests — but rather how to use tests and testing procedures in the solution of classroom educational problems.

The present textbook has been constructed with this later point of view in mind. An average class of students in an introductory course in tests and measurements has many and diverse needs, and at different levels — elementary, secondary, and higher. Not more than five or six students in a class of thirty-five or forty ordinarily are preparing for identical fields of work. The teachers and prospective teachers who constitute the class also have need for a knowledge of many different types of measurement tools, including a limited use of the standardized tests, a wide use of informal tests for diagnostic purposes, and a moderate use of survey and inventory tests. Teachers using the type of textbook previously compiled, which dealt with one of these aspects only, and studying intensively a few types of tests, obtained but a poor conception of the meaning of the test movement and but little training in the use of tests and measurements in the classroom. Still more, the needs of the teacher of

today are not met by knowing only classroom testing procedures, as she is constantly being called upon to aid in the evaluation of tests and teaching materials and instructional procedures, and in devising plans for the evaluation of teaching efficiency. All of such a class, however, are interested in a study of the educational problems that tests are intended to solve. The fundamentals of measurement are alike at all levels; the differences lie in the application to specific fields. By having the members of a class study particularly the tests pertaining to the fields of their specific interests, the needs, both of individuals and of classes as wholes, can best be met.

The author of the present textbook, himself a very successful instructor of the subject to large classes of teachers, has had these different teaching problems in mind in constructing this volume. In a way the text may be said to have grown out of his combined experiences as a director of research in a large city school system and as a teacher of university classes in a large city university. The volume embraces the entire testing needs of the teacher, and cares for the diverse demands of the average college and university introductory class. Part I deals with those fundamentals of measurement technique that lie at the basis of all testing procedures. Part II deals with the actual and varied and useful school results that have come out of the testing movement. Part III is devoted to the construction, administration, scoring, and interpretation of informal objective tests, and the last four chapters to a brief description and selection of the more useful standardized tests for the different purposes and levels of educational work. The emphasis throughout the book has been placed on the use of tests rather than on a description of them, and on the activities and problems of educational work and how testing techniques will contribute to their solution rather than on a study of tests that some day may prove useful in the classroom.

ELLWOOD P. CUBBERLEY

PREFACE

THE improvement of teaching through the utilization of techniques made available by the scientific-measurement movement in education has raised the questions of approach, objectives, and procedures in the preparation of teachers in this field.

There have been two principal methods of presenting work in measurement: the first of these may be designated as the statistical or mathematical approach, and the other, the practical or psychological method. The first of these, because of the dependence of certain testing instruments upon statistical techniques, assumes that the logical approach to the problem is through a study of statistics; that as pure arithmetic precedes problem solving, so pure statistics should precede its application in educational measurement. It has repeatedly been pointed out that this mathematical approach has served as an obstacle to the development of measurement in education because of the teacher's fear of mathematics. To the extent that teachers are actually deficient in a knowledge of elementary mathematics, this becomes an approach from the relatively unknown to the more or less known.

The practical or psychological approach begins with such knowledge of tests and measurements as teachers may possess, and leads gradually to an understanding of the basic techniques of measurement. It is felt by many to be the most effective method of unlocking this treasure house of teaching aids. It does not prevent the attainment of such knowledge of the nature and uses of statistical tools as is necessary to understand the construction or selection, and the administration and interpretation of tests; but it does avoid the necessity of attaining skill in the use of statistical tools, which, after all, is the need of the test-maker rather than the test-user. Such

statistical knowledge as the student attains tends to prevent the use of tests in a purely mechanical manner; it prevents teachers from becoming mere technicians and routinists, with only a smattering knowledge of basic considerations, and makes them more intelligent and sympathetic utilizers of measurement techniques. It gives a fundamental perspective, a knowledge of relationships, an appreciation of fundamental assumptions vital to the use and interpretation of test results.

A textbook in tests and measurements should not be merely a series of descriptions of tests, with other considerations casually inserted in incidental fashion; such a plan suggests putting the student to work learning many facts about many tests in the hope that he may discover a use for some of them. It is better educational procedure to use as a point of departure the activities and problems of the educational program leading to an understanding of how measurement techniques will contribute to their improvement or solution.

Such an approach tends to take the mystery and the vagueness out of measurement; it aids teachers in attaining an understanding of the evolution of different types of measurement techniques, and the strengths and weaknesses of each. It aids them in deciding the particular type of measurement tool which may be most effectively applied in a given situation. It enables them to construct informal tests, and to select standardized tests with a maximum of discrimination and effectiveness.

In the attempt to attain these objectives, the work of the volume has been divided into three parts. In the first of these, measurement and measurement techniques are described as the foundation for succeeding work. In this part are established the weaknesses of traditional techniques, as well as the contributions of more modern methods of examination. The fact that measurement itself is undergoing an evolution side by side with teaching objectives and procedures themselves is

indicated. Opportunity is afforded for dispelling prejudices and superstitions as well as poorly founded enthusiasms. Students are introduced to the newer philosophy and concepts of the nature of ability and achievement which serve as the basis for new measurement instruments. Evidence gradually accumulates to indicate why the student is not qualified to diagnose educational difficulty and prescribe remedial work after the perfunctory study of a few new tests, any more than would be a physician who had applied himself only long enough to recognize a few symptoms and memorized a limited number of routine treatments.

In Part II is presented some of the major uses of tests in terms of the educational activities to which they are related. Learning and teaching difficulties, rather than the study of tests as such, are the points of departure. Learning and teaching are also related to such activities as the selection of textbooks and materials, construction of curriculum, and the like; hence, consideration is given to the use of certain tests and measurements outside the classroom.

The nature, construction, administration, and interpretation of informal objective tests as important measurement techniques of the teacher constitute an important section of Part III. The complementary nature of these instruments to standardized tests is described; the desirable features of the standardized tests as such are restated and reëmphasized; and tests of intelligence, traits and abilities, skills, knowledge, and achievement are briefly described as an aid in the tentative selection of tests for critical evaluation before acceptance for use.

These descriptions are intended only for general guidance; space does not permit a comprehensive treatment. A sample package containing the best tests in the various fields for intensive study is recommended for the student whose interest is general; students with specific interests should have available the best tests in specific fields as well.

The work covers most of the fields in which tests are used; elementary schools, junior and senior high schools, and to a limited extent, college. The fundamentals of tests and measurements are the same at all levels, and a single text may serve for all in an introductory course. A definite attempt has been made to avoid, wherever possible, the monotonous matter-of-fact treatment, so difficult to avoid in a textbook. It is hoped that in this way the general reader as well as the student in class may be better served.

The questions and exercises are intended for guidance in study. The bibliography is not intended to be exhaustive; experience indicates that the average student makes relatively little use of bibliography; hence, for beginners, quantity serves to confuse.

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