



## Improvement of Instruction Through the Use of Educational Tests

Walter S. Monroe

**To cite this article:** Walter S. Monroe (1920) Improvement of Instruction Through the Use of Educational Tests, *The Journal of Educational Research*, 1:1-2, 96-102, DOI: [10.1080/00220671.1920.10879028](https://doi.org/10.1080/00220671.1920.10879028)

**To link to this article:** <http://dx.doi.org/10.1080/00220671.1920.10879028>



Published online: 12 Jan 2015.



Submit your article to this journal [↗](#)



Article views: 1



View related articles [↗](#)



Citing articles: 1 View citing articles [↗](#)

# IMPROVEMENT OF INSTRUCTION THROUGH THE USE OF EDUCATIONAL TESTS

WALTER S. MONROE

*Assistant Director Bureau of Educational Research, University of Illinois*

A few years ago in conversation with the superintendent of schools in a city of about forty thousand population, I inquired concerning the use he was making of educational tests; he replied that he was using tests, that in fact, he made it a point to give each new test to a few hundred pupils. He then made a very significant statement. He said that he had given the Courtis arithmetic tests the year before, and that his teachers had failed to find the pupils doing any better in arithmetic after the tests were given than they did before.

Unfortunately, this incident represents the attitude of a considerable number of users of standardized tests. They consider such tests as teaching devices, and express dissatisfaction with them when they do not cause pupils to do better school work. Others have thought of educational tests as playthings which they might use for their own entertainment or for the entertainment of audiences at teachers' meetings. Beautiful charts in colored inks have been constructed to represent the scores obtained; and because such charts are new and tangible, they have attracted much attention.

Educational tests are not playthings; neither are they teaching devices. It is not their function to increase the abilities of pupils. They are designed to yield information in the form of measures of the abilities of pupils. Only as this information is interpreted in terms of pupil needs and these are in turn used as a basis in planning future instruction, will the use of tests increase abilities.

In the past the major use of educational tests has been by superintendents and principals. Their purpose has been to ascertain how the pupils of their schools stood in comparison with pupils in corresponding grades of other schools or with reference to standard scores. In some cases the tests have been used as a

basis for judging the efficiency of teachers. These uses are important and in the last analysis have as their function the improvement of instruction. Educational tests, however, may be used and indeed ought to be used directly by teachers as instruments for making more effective their efforts as instructors. We now have sufficient scientific evidence to show that the measurement of the abilities of pupils at appropriate intervals and the use of this information in planning future teaching will increase the abilities of the pupils. Hence, it is important that teachers learn how to use standardized tests to improve instruction.

Giving these tests, marking the papers, and tabulating the scores are only first steps. In many instances beneficial results have followed when the work has not been carried beyond this stage. The attention of both pupils and teachers may thus have been directed to the minimum essentials of the school subject. They may have been given a more definite aim and a stronger motive. But, in order to reap the full benefit, the scores obtained from giving a test must be interpreted in terms of pupil needs; and then the instruction must be modified in accordance with the interpretation. This article is, therefore, written to suggest a method of interpreting the scores of a group of pupils.

Interpretation in terms of pupil needs involves more than simply ascertaining that the class median is above, up to, or below standard or that certain pupils are above, up to, or below standard. Doing this is equivalent to a physician's telling his patient that his temperature is 103, that his liver is not functioning properly, that he has serious indigestion, and that he is threatened with a nervous breakdown. Clearly this is insufficient. If the physician is to be of service to his patient, he must interpret these facts in terms of his patient's needs. Then in accordance with these needs, the physician must prescribe for him—for example, tell him to eat no meat or starchy foods, to spend several hours out of doors each day, and to take certain medicines before each meal and at bedtime.

In interpreting scores of educational tests in terms of pupil needs, it is necessary to make similar prescriptions of changes in instruction. The scores of the pupils and of the class, together with the errors, correspond to the temperature, pulse rate, condition of tongue, location of pain, etc., of a patient. They are

the *symptoms*; and it is their meanings which are of real importance. Besides saying that the median of a certain sixth grade class in silent reading is below the standard for the fifth grade and that 25 percent of the pupils are below standard for the fourth grade, while only 18 percent are up to or above standard, we should add that as a whole the class needs to give less attention to oral reading, that it needs to devote a practice period of 30 minutes a day to the silent reading of simple descriptive prose, and that certain specified pupils need to give special attention to acquiring the meaning of words. An interpretation may also include a statement that certain pupils who made very high scores ought to be promoted to the next grade, or that they need not continue to study silent reading, but that they should spend the time thus saved in the study of arithmetic.

Different classes as a whole have different needs, and the individual members of a class have a great variety of pupil needs. The first step, however, in interpreting the scores of a class is to ascertain the needs that are common to the class as a whole or to large groups within the class. This should be followed by an individual interpretation of the scores of those pupils at the extremes of the group, particularly of those conspicuously below standard. At present, we do not have sufficient scientific information to permit us to formulate complete statements of the pupil needs which are indicated by the various combinations of symptoms. In the absence of such formulations, it will be helpful to outline a general procedure which may be followed in interpreting the scores of a class after they have been tabulated on the class record sheet. In order that the subject may be as concrete as possible, it will be stated in terms of the Courtis Standard Research Tests, Series B. However, one can easily adapt the general plan to any other test.

In a rough way we may group the great variety of combinations of scores of classes under six cases as follows:

Case 1. Class medians below standard in both rate and accuracy.

Case 2. Class medians for rate below standard with satisfactory or high accuracy medians.

Case 3. Class medians for accuracy below standard with satisfactory or high rate medians.

Case 4. Scores of members of the class widely scattered.

Case 5. Irregular development; class medians in one test up to or above standard with class medians in another test distinctly below standard.

Case 6. Class medians for both rate and accuracy up to or above standard with the individual scores grouped closely about the medians.

Any particular class may exhibit certain combinations of these conditions. For example, the median rate in a test (i.e., addition) may be below standard with a satisfactory or high accuracy median and at the same time the scores of the members of the class may be widely scattered. Such a class would be considered as coming under both Case 2 and Case 4.

For each of these cases, it is possible to list certain probable needs. All of these needs may not apply to a given class but some of them will almost certainly be appropriate. In general, it will be profitable to investigate these needs first and determine which of them apply to the class in question. The most probable needs for each case are given below.

*Case 1.*—This is probably a case of inefficient teaching. It is true, there may be some other explanation of the low median scores and it is well of course to investigate this possibility. For example, it may be suspected that pupils are below normal in general ability, and evidence on this question may be obtained by giving a test of general intelligence. Or, scores may be below standard because of an unusual course of study, and a comparison of the particular course with a number of successful courses may be made. Still other causes may be responsible to a greater or less extent for the condition; but inefficient teaching is the most probable single cause.

Instruction may be inefficient with respect to drill. Perhaps more time should be devoted to it, but it is more likely that the time already devoted to it should be used more effectively. Drill work ought to be organized so that every minute is used by every pupil. Many teachers waste time by allowing some pupils to be idle while others are occupied. When pupils are working examples at the board, some teachers dictate one example at a time and do not stop the work until the slowest pupil has finished. The result is that pupils who work rapidly are idle a large part of the time. It is easy to carry on drill work in such a way that loss of this kind will not occur. In the case just mentioned the

amount of time wasted will be greatly reduced if several examples instead of one are dictated at a time and the work stopped as soon as the most rapid workers have finished. Some teachers also waste time in having purely mechanical work explained when the pupils need drill rather than explanation. Again, drill may be inefficient because of the failure of the teacher to recognize *rate of work* as important. The need may be increased motivation. If this is the case, the teacher will find educational tests themselves helpful. In addition he can make use of a variety of devices for securing a stronger motive, including the assignment of work under timed conditions.

*Case 2.*—The most probable need of a class which is below standard in rate with satisfactory accuracy is for *speed drills*. In other words, it is likely that the teacher has not been placing sufficient emphasis upon the rate of work. A possible need is for the elimination of time-consuming methods of work, such as the use of an elaborate phraseology in performing the operations. For example, pupils may be required to name each successive digit in adding a column of figures instead of naming only the partial sums. In some cases slow work is due to the failure of pupils to concentrate attention upon the task. Under such circumstances they should be trained in giving continuous and undivided attention to the task assigned. This includes, among other things, the need for securing a stronger motive.

*Case 3.*—A low median score in accuracy may be due to the fact that, in working under the timed conditions of the test, the pupils become excited and that in attempting to do a large number of examples they become careless. When this happens, the test should be repeated; and it is likely that on the second trial, the median for accuracy will be much higher. If, however, the condition persists, the pupils should have frequent timed drills under the conditions of the test and should thus learn to assume the proper attitude toward the test. It may be that the need is even more fundamental. There are many different types of examples in a given operation—e.g., in addition. Pupils may have learned to do some types without having learned to do others. For example, they may be able to add short columns without being able to add long columns because of the increased span of attention required. It may be that the pupils have never been given instruction upon the particular type of example

occurring in the test. If so, they need to be taught how to do this type.

*Case 4.*—When the scores of the several members of the class are too widely scattered, the probable need is for individual instruction. The form of this instruction will depend upon the particular needs of the individual pupils. An analysis of the performance of a pupil is required in order to know his particular needs; but in general, the probable needs of individual pupils are the same as the probable needs of a class. The conditions occurring in Case 4 may often be met by promoting certain pupils to a higher grade and demoting others to a lower grade, provided the general organization of the school will permit such action. When this cannot be done, the teacher must devise some way to give to each pupil that instruction which will meet his needs. Practice exercises such as the Courtis Standard Practice Tests<sup>1</sup> have been designed to assist in meeting individual needs.

*Case 5.*—Irregular development is made possible by the fact that there are a number of different types of examples. Pupils may and do learn to do certain types without learning to do other types with anything like the same rate and accuracy. When irregular development is found to exist, the need is for a redistribution of emphasis in the instruction. Clearly, types for which the scores are low need to be given more emphasis while those for which the scores are up to or above standard need less attention. The Courtis Standard Research Tests, Series B, can only show irregularities between the four fundamental operations. A series of diagnostic tests will reveal irregularities between different types of examples within the same operation.

*Case 6.*—When a class is above standard in all respects it may be thought that conditions are satisfactory and that the pupils have no needs. This, however, may not be true. Among the most probable needs are (1) promotion to the next grade, (2) less time to this subject and more to others, (3) opportunity to take up more advanced topics. The meeting of these needs (especially

<sup>1</sup> The Courtis Standard Practice Tests in Arithmetic (published by the World Book Company, Yonkers-on-Hudson, New York) are practice tests in the four fundamental operations with whole numbers. The complete set consists of cabinet 1 (a set of 720 lesson cards for a class of fifty pupils), cabinet 2 (a set of 288 lesson cards for a class of twenty), a student's record and practice pad, a teacher's manual, and a teacher's record. A specimen set may be obtained from the publishers for a dollar.



the one involving promotion to the next grade) depends on the general plan of organization of the school. When a class is just up to standard, pupils may need a continuation of the present instruction or they may now be ready to go on to something else.

Locating a class under one of these cases and ascertaining which of the suggested probable needs apply are the first steps in interpretation. With the partial exception of Case 4 (irregular distribution of scores), it is mass interpretation and for that reason it is necessarily crude. Like mass instruction, it will not fit all pupils. While the members of the class probably have some common needs, there are also likely to be many individual needs. Thus such mass interpretation should be supplemented by an interpretation of the scores of individual pupils, especially of those having the highest and lowest scores.

In both class interpretation and individual interpretation, it is necessary to remember that the teacher has access not only to the scores but also to the test papers which give the performances of the pupils in detail. An analysis of these is helpful, especially where there is any uncertainty about the needs of the pupils. A score reveals nothing as to what was lacking in the mental processes of the pupil, but an analysis of his errors may reveal the defect and suggest corrective instruction. In making this analysis, it will be helpful to classify the errors which the pupil has made. In multiplication, the error may be one of multiplication, of placing the partial products, or of addition. In addition, and to a less extent in the other operations, it is frequently impossible to determine the nature of the error. In such cases, one should observe the pupil as he works or even have him "express orally his mental processes." Whenever such detailed studies of the performances of pupils have been made, significant facts have been revealed. This kind of study requires much time, but the time is profitably employed.

Although interpretation cannot be reduced to a mechanical basis, it is believed that the general procedure just outlined will be helpful as a beginning and will lead naturally to the individual analyses without which accurate individual adjustments cannot be made. The fundamental thing for the teacher to bear in mind is the principle that only when we interpret the scores of a test in terms of pupil needs and modify instruction to meet those needs will educational tests fulfill their function.