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Richard E. Waymire
Kansas State Teachers College

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RELATIONSHIP BETWEEN TEACHERS' ESTIMATES OF STUDENTS' MENTAL ABILITY AND THE STUDENTS' INTELLIGENCE QUOTIENTS

A Problem Submitted to the Department of Education in Partial Fulfillment of the Requirements of the Course in Research Problems 390b

By

Richard E. Waymire

KANSAS STATE TEACHERS COLLEGE

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CHAPTER I

INTRODUCTION

Statement of Problem

In many schools today the students cover material as rapidly as the teacher thinks the student's ability will allow. Grades are usually given on the basis of material covered in relation to the ability of the student. In many school systems, especially smaller and financially poor systems, little or no mental testing is carried on. In such cases, the teacher must base her estimates of mental ability on observed behavior.

It is the belief of the writer that in a number of cases the teacher may base her estimates on traits other than those which display general intelligence, such as personality and general appearance. In a study of 1,558 elementary school children Miller[1] found that most of the children who were found to be just average in mentality in all language tests, seemed to be overestimated on account of their pleasentness and hard work. Many children regarded as dull but found to be average in mentality were underestimated because of shyness.

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[1] J. Miller, Causes of Failure and Success in School, p. 7

Purpose of the Study

The purpose of this study is to show (1) the relationship between teachers' estimates of the brightest and dullest students in her classes and the intelligence quotients of the classes as measured by the "Kuhlmann-Anderson Intelligence Tests,"[2] (2) the relationship between teachers' estimates of the brightest and dullest students in her classes and their Intelligence Quotients as measured by the "Revised Stanford-Binet Intelligence Scales,"[3] and (3) the basis of the teachers' estimates.

Related Literature

Most teachers are cognizant of the fact that they cannot estimate intelligence objectively. Levine and Marks[4] listed the following limitations of teachers' estimates:

> 1. Teachers are prone to underestimate the ability of a young child and to overestimate the ability of an older child....
>
> 2. Wittingly or unwittingly, teachers' estimates are colored by sympathy or antipathy....
>
> 3. In departmentalized schools, teachers frequently base their estimates on school marks alone....
>
> 4. Teachers usually stress performance as against power. What a pupil does as evidenced by test is given greater prominence than what he can or does only sporadically.

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[2] F. Kuhlmann and R. G. Anderson, Kuhlmann-Anderson Intelligence Tests, Tests A, B, C, D, E, F, and G.

[3] L. M. Terman and M. A. Merrill, Revised Stanford-Binet Intelligence Scales, Form L.

[4] A. J. Levine and L. Marks, Testing Intelligence and Achievement, p. 258.

Recent criticisms and studies by leading psychological investigators concerning teachers' estimates of intelligence show that teachers vary in their ability to estimate intelligence. In a study made by Neterer about teachers' estimates she found: "The correlations between the estimates of individual teachers, and the Standord I. Q. ranged from .01 to .70, that is, from a "high" correlation to a "nonsignificant" one.[5]

The correlation between teachers' estimates and actual I. Qs. of two hundred pupils in a study made by Carroll[6] was .50. In some instances the I. Q's. and the estimates were identical. Forty-five of the most striking differences showed a difference ranging from twenty to fifty points. The study also revealed that the forty-five pupils were overestimated in eighteen of the cases and underestimated in twenty-seven of the cases. Carroll also pointed out that personal judgements, even after long acquaintance often showed a twenty-five or fifty per cent error.

It has been noted that a teacher can more closely estimate pupil intelligence by observing behavior than by basing her estimate on school achievement. In a study of an 8B class the teacher was instructed to arrange the pupils in order of standing, taking into account all school marks.

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[5] I. M. Neterer, A Critical Study of Certain Measures Of Mental Ability and School Performance, p. 39.

[6] R. P. Carroll, Fundamentals in the Techniques of Educational Measurements, pp. 2-3.

The teachers' ranking, when compared to the results of the "Otis Intelligence Test," showed a correlation of .40. The teacher was then asked to arrange the class once more in rank-order according to the pupils' potentiality. The correlation between the Otis scores and teachers' estimates now reached the significant figure of .82.[7]

Procedures

The comparison of teachers' estimates of her brightest and dullest students with the intelligence quotients of her entire class was carried out in Benedict Consolidated Elementary School, Benedict, Wilson County, Kansas. This school was chosen because of the availability to the writer and is a typical rural school that, as in many cases, does not have a standardized testing program.

Benedict Consolidated School has eight grades and an average enrollment of between ninety and a hundred students. The faculty consists of four teachers, each teacher having two grades.

Mental tests have not been given in Benedict Elementary School for at least five years and maybe for a much longer period. Teachers' preparation varies between seventy and 124 hours. All teachers have over four years experience in the elementary school.

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[7]Levine and Marks, op. cit., pp. 258-259.

Benedict Consolidated Elementary School began the school year 1954-1955 on September 6, 1954. During the second week in November, 1954, the writer requested each of the four teachers to choose two students having the highest mental ability and two students having the lowest mental ability from their respective classes. The writer also requested the teachers to prepare, in writing, the bases for their estimates.

During the first two weeks of December, 1954, the writer administered the "Kuhlmann-Anderson Intelligence Tests" to all the grade pupils. From January, 1955, to May, 1955, the "Revised Stanford-Binet Intelligence Scales" were administered to the individual students who the teachers had estimated to be of the highest and lowest mental ability in each of her classes.

In the study the "Kuhlmann-Anderson Intelligence Tests" are used to point out the bright and dull students. The "Revised Stanford-Binet Intelligence Scales" are employed to determine the accuracy of the Kuhlmann-Anderson findings.

In the final analysis of this problem the teachers' estimates were compared to the Kuhlmann-Anderson and the Stanford-Binet intelligence tests results. The basis of the teachers' estimates are also listed in order of frequency in which they were used.

CHAPTER II

PRESENTATION AND INTERPRETATION OF DATA

Relationship Between the Teachers' Estimates and the Pupils' Intelligence Quotients

In considering the first two aspects of this problem, the relationship of teachers' estimates and the intelligence quotients obtained from the "Kuhlmann-Anderson Intelligence Tests" and the "Revised Stanford-Binet Intelligence Scales," tabulations were made for the teachers' estimates and both tests by grades.

Tables I through VIII show the students' numerical ranking in mental ability as measured by the "Kuhlmann-Anderson Intelligence Tests." The second colum indicates the teachers' estimates of the two students having the highest mental ability and the two lowest. The third and fourth columns list the I. Qs. as measured by the "Kuhlmann-Anderson Intelligence Tests" and "Revised Stanford-Binet Intelligence Scales" respectively.

Table I indicates the teacher estimated one "bright" and one "dull" student correctly. The other "bright" and "dull" students were found to be of nearly average mental ability. It is interesting to note that one definitely deficient pupil was overlooked in the teachers' estimates. The "Revised Stanford-Binet Intelligence Scales" measured

a higher I. Q. in every case than did the "Kuhlmann-Anderson Intelligence Tests." However, the difference was not great in any case and the overall average difference was only six points.

TABLE I

RELATIONSHIP BETWEEN THE FIRST GRADERS' INTELLIGENCE QUOTIENTS AND THE TEACHER'S ESTIMATES

Numerical Ranking	Teacher's Estimates	Kuhlmann-Anderson I. Q.	Stanford-Binet I. Q.
1	Bright	109	118
2		108	
3		100	
4	Bright	98	106
5		95	
6		92	
6	Dull	92	96
7		83	
8		68	
9	Dull	65	67

Table II shows the teacher was correct in one case. The range of the class was only twenty-four points, making it very difficult to distinguish between the various intellec-

tual levels of the students. The Stanford-Binet I.Qs. averaged nearly four points higher than Kuhlmann-Anderson I. Qs. Both tests were in near agreement in relation to the teacher's estimates.

TABLE II

RELATIONSHIP BETWEEN THE SECOND GRADERS' INTELLIGENCE QUOTIENTS AND THE TEACHER'S ESTIMATES

Numerical Ranking	Teacher's Estimates	Kuhlmann-Anderson I. Q.	Stanford-Binet I. Q.
1		109	
2	Bright	106	114
3		104	
4	Bright	102	109
5	Dull	101	98
6		100	
7		98	
8	Dull	85	87

In Table III, the I. Qs. from both tests pointed out the correctness of the teacher's estimates in one case of "bright" and one of "dull" mental capacities. The teacher's other two estimates were found to be of average mental ability. Here, again, the difference between I. Qs. in all cases was

very slight, with the Stanford-Binet scoring an average of a little less than three points over the Kuhlmann-Anderson I. Qs.

TABLE III

RELATIONSHIP BETWEEN THE THIRD GRADERS' INTELLIGENCE QUOTIENTS AND THE TEACHER'S ESTIMATES

Numerical Ranking	Teacher's Estimates	Kuhlmann-Anderson I. Q.	Stanford-Binet I. Q.
1	Bright	117	121
2		116	
3		109	
4		105	
5		104	
6	Dull	100	103
7		99	
8	Bright	96	98
9		95	
10		92	
11		90	
12	Dull	82	80

Table IV indicates that the teacher's estimates were in complete agreement with the Kuhlmann-Anderson I. Qs. in

only one case. However, the teacher did tend to estimate the "bright" students from students scoring in the lower I. Qs. The results of the "Revised Stanford-Binet Intelligence Scales" were in close agreement with the "Kuhlmann-Anderson Intelligence Tests" results.

TABLE IV

RELATIONSHIP BETWEEN THE FOURTH GRADERS' INTELLIGENCE QUOTIENTS AND THE TEACHER'S ESTIMATES

Numerical Ranking	Teacher's Estimates	Kuhlmann-Anderson I. Q.	Stanford-Binet I. Q.
1		113	
2	Bright	112	115
3		110	
4	Bright	109	110
5		105	
6		104	
7		96	
8		90	
9	Dull	87	83
10		83	
11	Dull	68	75

Table V finds the teacher's estimates of both "bright" students and the I. Q. of both tests in agreement. The "dull" students both scored 89 while the lowest I. Q. was measured as only 86. Stanford-Binet and Kuhlmann-Anderson I. Qs. were again very nearly the same.

TABLE V

RELATIONSHIP BETWEEN THE FIFTH GRADERS' INTELLIGENCE QUOTIENTS AND THE TEACHER'S ESTIMATES

Numerical Ranking	Teacher's Estimates	Kuhlmann-Anderson I. Q.	Stanford-Binet I. Q.
1	Bright	117	120
2	Bright	105	109
3		103	
4		98	
4		98	
5		93	
6		92	
7	Dull	89	87
7	Dull	89	84
8		87	
9		86	

Table VI has an I. Q. range of only 21 points. The teacher did, however, estimate "bright" and "dull" students respectively from the higher and lower I. Q. ranges of the class. The Stanford-Binet and Kuhlmann-Anderson I. Qs. have less than a one point difference.

TABLE VI

RELATIONSHIP BETWEEN THE SIXTH GRADERS' INTELLIGENCE QUOTIENTS AND THE TEACHER'S ESTIMATES

Numerical Ranking	Teachers' Estimates	Kuhlmann-Anderson I. Q.	Stanford-Binet I. Q.
1	Bright	102	103
2		101	
3	Bright	99	104
4		98	
5		96	
6		85	
6		85	
6	Dull	85	81
7		84	
8		83	
9	Dull	82	80
10		81	

Table VII ranks only five students. All the teacher's estimates were in agreement with the I. Qs. Stanford-Binet I. Qs. were an average $2\frac{1}{4}$ points higher than the Kuhlmann-Anderson I. Qs.

TABLE VII

RELATIONSHIP BETWEEN THE SEVENTH GRADERS' INTELLIGENCE QUOTIENTS AND THE TEACHER'S ESTIMATES

Numerical Ranking	Teacher's Estimates	Kuhlmann-Anderson I. Q.	Stanford-Binet I. Q.
1	Bright	113	119
2	Bright	111	115
3		97	
4	Dull	95	96
5	Dull	91	87

Table VIII indicates the teacher was again correct in all estimates except in the case of one "bright student. The difference was only two points between the highest I. Q. and the I. Q. of the student whom the teacher incorrectly estimated as being one of the two brightest students in the class. The average difference between the Kuhlmann-Anderson and the Stanford-Binet I. Qs. was less than three points.

TABLE VIII

RELATIONSHIP BETWEEN THE EIGHTH GRADERS' INTELLIGENCE QUOTIENTS AND THE TEACHER'S ESTIMATES

Numerical Ranking	Teacher's Estimates	Kuhlmann-Anderson I. Q.	Stanford-Binet I. Q.
1		110	
2	Bright	109	111
3	Bright	108	113
4		100	
5		90	
5		90	
6		87	
7	Dull	78	79
8	Dull	71	74

Summary of Findings. The foregoing eight tables indicated thirteen incorrect estimates by the teachers, and nineteen correct estimates. The tables also showed that the teachers made nearly the same amount of errors in estimating both "bright" and "dull" students. There were six errors in estimating "bright" students and seven errors in estimating "dull" students. It should be pointed out here, that, in many of the teachers' errors there was but slight difference

in I. Qs. between the pupils chosen as "bright" and the ones measured as having the highest I. Qs.

In only two cases of a teacher's error in estimating students was there an apparent significant difference. Table I indicates a "dull" student with a Kuhlmann-Anderson I. Q. of sixty-eight while the estimated "dull" student scored an I. Q. of ninety-two, making a difference of twenty-four points. Table III shows an estimated "bright" pupil with a measured I. Q. of 96 by the"Kuhlmann-Anderson Intelligence Tests" while the same test pointed out an unestimated pupil with an I. Q. of 116.

The average I. Q. of the students estimated by the teachers was 98,06 when measured by the "Revised Stanford-Binet Intelligence Scales," and 96.01 when measured by the "Kuhlmann-Anderson Intelligence Tests." The difference was 2.05.

The findings of the two intelligence tests were nearly the same. The "Revised Stanford-Binet Intelligence Scales," in every case of "bright" pupils measured a slightly higher I. Q. than did the "Kuhlmann-Anderson Intelligence Tests." The difference ranged from one to nine points. In the cases of estimated "dull" pupils the "Revised Stanford-Binet Intelligence Scales" measured eight cases higher and eight lower in I.Q. than did the "Kuhlmann-Anderson Intelligence Tests." The average difference in I. Q. of the "dull" students for the two tests was less than one point.

Basis for Teachers' Estimates

Tables IX and X are a list of traits in the order of frequency used by teachers to base their estimates of "bright" and "dull" students.

The traits were obtained from statements made by the teachers. The teachers wrote a statement giving the basis for their estimates of each "bright" and "dull" student. From these statements the writer compiled two tables listing the frequency of each trait, with the "bright" students possessing certain qualities and "dull" students lacking some of the same qualities.

In Table IX the four most frequent traits used by the teachers to estimate "bright" students are traits displaying power in comprehension, memory, and reasoning. The traits that were the least frequently used by the teachers were traits dealing primarily with personality, character, and general social aspects of the children.

TABLE IX

BASIS FOR TEACHERS' ESTIMATES OF "BRIGHT" STUDENTS

Traits for Estimating "Bright" Students	Frequency by Grades 1 - 4	5 - 8	Total
Applying ideas to new situations	3	8	11
Reading comprehension	1	8	9
Ability to remember	1	7	8
Quickness to comprehend	1	7	8
Background of experience	5	2	7
Interest in work	4	1	5
Ability to work independently	4		4
Initiative ability	4		4
Leadership qualities	3		3
Ability to get along with others	3		3
Speaks intelligently	1		1

In Table X, the four most frequent traits used in estimating "dull" students are those showing a lack of ability in comprehension and memory, and a poor background of experience.

The traits that were the least frequently used by the teachers were traits concerned principally with physical development, personality, character, and general social aspects of the children.

TABLE X

BASIS FOR TEACHERS' ESTIMATES OF "DULL" STUDENTS

Traits Used in Estimating "Dull" Students	Frequency by Grades		
	1 - 4	5 - 8	Total
Short memory span	4	6	10
Inability to follow directions	3	7	10
Lack of comprehension of read material	2	6	8
Lack of experiences	6	2	8
Slowness to grasp new ideas	2	5	7
Short attention span	3	4	7
Lack of initiative	5	2	7
Poor home environment	2	4	6
Lack of self expression	4		4
Unsocial	3		3
Reads very little	2		2
Slow growth	2		2
Lack of interest	1		1
Bluffing through difficult situations	1		1

Summary of Findings. The writer found that the teachers in this study, for the most part, said they were prone to estimate intelligence on such aspects of the children as

comprehension, memory, reasoning, and background of experience.

It was also noted that in the upper grades, five to eight, estimates were more accurate than in the lower grades. This may be due to (1) the upper grade teachers using different bases for their estimates, or (2) older children being easier to estimate.

CHAPTER III

SUMMARY AND CONCLUSIONS

Summary

Tabulations of the teachers' estimates of the two brightest and dullest students for each of eight grades, grades one through eight, were made. The tabulations included the "Kuhlmann-Anderson Intelligence Tests intelligent quotients of all pupils in each grade, and the "Revised Stanford-Binet Intelligence Scales" intelligence quotients of the pupils that the teachers estimated.

Of the thirty-two estimates made by the teachers, two were found to be in significant error. The errors were made in estimates of a "bright" and a "dull" student.

The intelligence quotients of the two tests were nearly the same. In no case was there a difference large enough to warrant any special attention. Such significant evidence points out the value of the two tests.

Tables were also made listing the bases of the teachers' estimates in order of the frequency in which they were used. It was found that the teachers in this study tended to base their estimates more on such aspects of the students' behavior, such as comprehension, memory, reasoning, and their background of experience.

Conclusions

The teachers' estimates were in significant error twice in thirty-two estimates when the teachers were estimating the brightest and dullest students from their respective classes. The number of errors would undoubtedly have increased greatly had they attempted to estimate the intelligence quotients of the pupils. The fact that there were two errors in trying to determine the brightest and dullest students from select groups rather than trying to determine the I. Qs. of the students, points out the need for a standardized test in measuring mentality.

The Stanford-Binet and Kuhlmann-Anderson I. Qs. were highly correlated in this investigation. However, the I. Qs. did not range as widely as would be expected and the writer cannot vouch for their effectiveness in the cases of very bright or very dull students.

The writer found that while teachers most frequently do base their estimates upon traits that are recognized by leading psychologists to be relevant to mental ability, they also included traits that are of questionable value in measuring intelligence.

It was also found that teachers of the upper grades, five to eight, estimated students' mental ability more accurately than teachers of the lower grades, one to four.

The ultimate purpose of this study was realized by finding that the teachers' estimates of mentality are not to be relied upon in all cases, although they seem fairly dependable.

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