ESTIMATES OF ACADEMIC LEVEL OF FUNCTIONING OF STUDENTS BY TEACHERS OF THE EDUCABLE MENTALLY RETARDED

by

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(ABSTRACT)

The purpose of this study was to investigate the degree of accuracy of teachers of educable mentally retarded (EMR) students in making estimates about student performance in reading and mathematics and to examine certain variables which may assist in explaining the variance in accuracy: sex of the student, subject area of the estimate, years teaching experience, and length of student/teacher contact time. A secondary purpose was to examine the categories of information about the student which teachers felt were important in making judgments.

The sample consisted of 28 EMR teachers and 136 (EMR) students (CA=6-13 years) from six school districts in Virginia. The teachers made estimates about whether or not students would complete 10 performance objectives in reading and 10 performance in mathematics. These estimates were then compared to the actual performances of the students as

measured by the Brigance Diagnostic Inventory of Early Development. Teachers also indicated which information sources they utilized in making the estimates and in writing the students' individualized education programs (IEPs). The data were collected during individual interviews conducted by the researcher during the teacher's workday. The data were analyzed by employing a two-way analysis of variance, product moment correlations, and chi square procedures.

It was concluded that EMR teachers are good estimators of student performance regardless of the sex of the student or the subject area of the estimate. Furthermore, teacher accuracy is not related to the number of years teaching experience of the teacher or to the amount of student/teacher contact time experienced before the estimate is made. In addition, the number of information sources used by the teacher in making the estimate does not affect the teacher's ability to estimate student performance. Teachers were able to make accurate estimates based on information obtained through classroom procedures without information from more formalized procedures such as intelligence and achievement tests and psychological reports.

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Chapter 1

INTRODUCTION

Teachers are continuously involved in making decisions concerning the education of their students. Special education teachers are involved in considering special services for certain children, in placing children in special education classes and resource rooms, in formulating goals and objectives for children which may include choice and level of curriculum, and in determining if and when these goals and objectives are met.

Borko, Cone, Russo, and Shavelson (1979) suggest that instructional decision making involves a three-stage model in which decisions are based partially on judgments which the teacher makes about a child's performance or potential for performance. Specifically, judgments or predictions about a child's ability may be influenced by available student information. These judgments are then used to assist in making decisions about the child's education such as instructional strategies and placement.

In summary, the decision-making model in Borko et al. involves obtaining information, making judgments, and deciding on instructional strategies. Although there seems

to be variation in the types and amounts of information which teachers use, the information appears constant across teachers (Borko et al., 1979; Pedulla, Airasian, & Madaus, 1980). One would assume logically that when judgments are accurate, instructional decisions will be most appropriate. The purpose of this study was to examine the degree of accuracy of teachers of educable mentally retarded (EMR) students in making estimates about student performance in reading and mathematics and to examine the extent to which certain information sources available to teachers were used.

Accuracy and Teacher Judgments

Teacher judgments often influence the selection of long term goals and short term objectives for students. Selecting long term goals requires a teacher to make estimates or predictions about a student's performance at a designated time later in the school year. Selecting short term objectives also requires the teacher to make judgments about a student's performance; however, instead of predicting later school achievement, the teacher is estimating the student's current performance levels on tasks designed to contribute to attainment of the long term goals. The teacher must be able to determine the performance level of the student in order to design tasks which the student

will be able to achieve successfully. Although this procedure of selecting goals and objectives may be utilized by all types of teachers, special education teachers may find this process more pertinent because of Public Law 94-142, The Education of All Handicapped Children Act of 1975. That legislation requires that each child receiving special education services have an individualized education program (IEP) consisting, in part, of present levels of performance, annual goals, and short term objectives (Federal Register, August 23, 1977). Teachers and others jointly develop the IEP.

The accuracy of teacher judgments may be a vital issue if one considers the consequences of less than accurate judgments. When teachers inaccurately overate the functioning level of the student, learning tasks may be employed which exceed the student's capabilities leading to failure and frustration. Goals and objectives which are set at a level much lower than the student's abilities may result in the student progressing too slowly. The student may then fail to function within his range of capabilities. Behavioral problems may arise if the student becomes bored and dissatisfied with the learning situation.

Teachers, especially special education teachers, must be able to determine appropriate long term goals and short term objectives for each student based on available information. This selection process seems particularly vital for short term objectives because of the time involved between the initiation of the objective and the expected completion of the task. If short term objectives must constantly be reassessed and readjusted, the student may not have the opportunity to obtain the long term or annual goals which were designed and selected when the IEP was developed.

A number of studies of teacher accuracy have been conducted using regular education teachers. These studies fall into three categories: (a) studies which examined the teacher's ability to select specific groups of students, i.e., gifted students (Feshbach, Adelman, & Fuller, 1974; Gear, 1976; Keogh & Smith, 1970); (b) studies which examined the teacher's ability to predict future achievement of students (Bolig & Fletcher, 1973; Glazzard, Tollefson, Selders, & Barke, 1982; Kapelis, 1975); and (c) studies which examined the teacher's ability to predict current performance of students (Elijah & Legenza, 1980; Farr & Roelke, 1971; Willis, 1973a). Within each category the findings of accuracy have been mixed.

Even though special education teachers must also make judgments about student performance, few studies have been conducted which used special education students and teachers as subjects. Schwarz and Cook (1972) looked at the ability of teachers of educable mentally retarded students to predict improvement in achievement. They found that teachers were not very accurate in predicting the child's improvement over the course of the school year. The study examined the ability of special education teachers to predict later school achievement, but provided little indication of the ability of those teachers to predict current levels of achievement.

Information and Teacher Judgments

Studies which show individual teacher results indicate that while some teachers are reasonably accurate in predicting achievement, others are very poor predictors of achievement (Elijah & Legenza, 1980; Morine-Dershimer, 1978-79b). Both Shavelson and Borko (1979) and Schwarz and Cook (1972) attribute some of the variation in accuracy of teacher predictions to the information which teachers use to formulate their judgments. This information may be insufficient, inaccurate, or inappropriate for the judgments being made. As a result, the teacher may not be able to

form particular judgments about the student or, if the information is not completely accurate, it may not represent a true reflection of the student or his/her background.

Information is used by teachers in making judgments and subsequently in making decisions about students. Because of the amount of information that is available, teachers often receive much more than needed to make an appropriate decision or judgment, some of which may be irrelevant to the task at hand. This is particularly true for special education teachers who may receive even greater amounts of information because of the evaluation procedures required by the rules and regulations implementing P.L. 94-142 (Federal Register, August 23, 1977). It then becomes necessary for administrators and teachers to control this flow of information by either restricting the types of information received or by selecting the most relevant information to the decision at hand (Morine-Dershimer, 1978-79a).

There is a wide range of information available to teachers which is pertinent to the formation of judgments and predictions (Braun, 1976; Mendels & Flanders, 1973; Shavelson & Stern, 1981). Most prevalent among these information sources are standardized test results, previous achievement, intelligence and ability, sex, cumulative

records, and anecdotal notes from other teachers. In addition to this information available to all teachers, special education teachers may also have information from psychological and medical reports related to behavior and health.

Significance of the Study

Research in the area of teacher estimates of student performance and information sources used in formulating judgments has focused on the regular eduation teacher. Two conclusions are apparent: (a) there is a large amount of information available and teachers vary in their selection of this information; and (b) some teachers are less accurate than others in making judgments. Studies involving special education teachers and students are necessary to determine whether they are similar to regular teachers in their accuracy in judging students and in their use of information. It is both necessary and expected that special education teachers be at least as accurate as regular education teachers in judging students. It is expected because special education teachers are trained to individualize education for each student. This may not always be the case for regular education teachers. In addition, special education classes have smaller numbers of

students, hence increasing student/teacher contact. State and federal statutes require that certain information be obtained about special education students and that teachers participate in the determination of accurate placement, long term goals, and short term objectives for these students using this available information.

If it can be determined which teacher characteristics are associated with less accuracy in making judgments, there is a possibility that training programs could be developed to assist teachers with such characteristics in improving their skills at formulating judgments. The aspect of assisting teachers to increase judgmental accuracy has been examined by several researchers (Gear, 1978; Haring & Ridgway, 1967). The results of these studies indicated that appropriate instruction improved significantly the accuracy of teachers in identifying both intellectually gifted children and children with developmental problems.

This aspect of training teachers to increase judgmental accuracy has particular implications for special education. The rules and regulations implementing P.L. 94-142 require that on-going inservice training programs be provided to all personnel engaged in educating handicapped children (Federal Register, August 23, 1977). These inservice training

programs could be designed to provide appropriate instruction to special education teachers which would assist in increasing judgmental accuracy. If it could be determined which information sources correlated with judgmental accuracy, these inservice programs could also be utilized to assist teachers in using the most highly correlated information when making judgments and decisions about their students. Increasing the teachers' ability to make accurate judgments increases the likehood that the decisions concerning the students' education are appropriate to their needs thus increasing the chance of meeting the requirement of P.L. 94-142 that a free, appropriate education be provided to all handicapped children.

Statement of the Problem

Special education teachers are required by state and federal statutes and regulations to assist in making specific decisions about the education of students in their classes. These decisions may require informal judgments of the students' ability to perform by the teacher. The accuracy of these judgments becomes a vital issue when it contributes to the development of the major goals and objectives of a student's education. Although many studies have been conducted which examined the accuracy of teachers

in predicting performance of students, only one study was found which dealt specifically with the ability of special education teachers to predict student performance and the sources of information used in formulating such judgments.

This study proposes to examine both aspects of the judgmental process. The following questions will be investigated:

1. To what extent are special education teachers, specifically teachers of educable mentally retarded (EMR) students, accurate in their estimates of student academic performance in reading and mathematics?

2. Does the accuracy of EMR teachers in estimating student performance vary across different subject areas and sex of the student, i.e., are teachers more accurate in their estimates of mathematics scores than reading scores or more accurate in estimating boys' scores than girls' scores or vice versa?

3. Do various levels of teaching experience and amounts of contact time with the student result in differing levels of accuracy?

4. Are certain categories of information, i.e., standardized achievement test scores, medical information, more highly related to estimation accuracy than others?

Chapter 2

REVIEW OF LITERATURE

This study proposes to examine the accuracy of teacher judgments of student academic performance and the classes of information which teachers use to formulate these judgments. More specifically, it will examine the ability of teachers of educable mentally retarded (EMR) students to make accurate estimates about the reading and mathematics skills of their students. It will also examine the extent to which certain information sources were utilized by the teachers in making these judgments. Because a review of the literature revealed only one study concerning the accuracy of special education teachers' judgments, it is necessary to review the literature concerning the accuracy of regular education teachers in making judgments of students in order to provide an adequate framework.

A general review of the literature revealed that teachers make judgments about many aspects of a student's character including attitude, personality, behavior, and achievement. This study, however, is concerned only with teacher judgments of academic performance. Therefore, only those studies concerned with teacher judgments and

predictions of academic achievement were included in this chapter.

This chapter is divided into three sections. The first section includes studies concerned with the informational cues which teachers use in formulating their judgments. Studies are included which deal with the opinion of teachers as to the usefulness of information cues and the importance of information cues in formulating judgments. Second, studies concerning the accuracy of teacher judgments or predictions are reviewed. Studies are included which examine teacher accuracy of both future and concurrent predictions. Also included are studies examining the relationship of certain variables to the accuracy of teacher predictions. The final section includes a summary of the related literature and the hypotheses of the present study.

Information and Teacher Judgments

Information cues about students appear to play an important role in the formation of teacher judgments about students. Reviews by several researchers (Baker & Crist, 1971; Borko et al., 1979; Braun, 1976; Shavelson & Stern, 1981) indicate that many different sources of information may be used by teachers in formulating judgments about their students. The importance of information cues was further

emphasized by Schwarz and Cook (1972) who, when investigating the ability of teachers of the educable mentally retarded to estimate the future progress of students, postulated that teachers were not very accurate in differentiating the achievement potential of their students because they appeared to use the wrong information in formulating their estimates. Teachers used class membership which was based on chronological age to formulate their estimates. This variable was found to be negatively correlated with the actual achievement of the students.

Baker and Crist (1971), after reviewing and summarizing literature concerning person perception and teacher impressions, made several generalizations and recommendations about teachers and their impressions of students. In one of these generalizations concerning the various sources of information which are available to teachers, they said:

> Teachers meeting pupils for the first time form impressions based on physical appearance and conduct. They may also know something about each pupils' past conduct, achievement, I.Q. scores, or the general character of older siblings or parents (p. 63).

Similar types of information were presented by Shavelson and Stern (1981) who, after reviewing the literature on teacher judgments and decision-making, found

certain sources of information in the majority of studies. They refer to these sources of information as antecedent conditions which impinge on teachers' decisions. These antecedent conditions include the student's general ability and achievement, sex, class participation, self-concept, social competence, independence, classroom behavior, and work habits.

In reviewing models of decision-making involving teacher judgments and estimates about students (Borko et al., 1979; Braun, 1976), information about a student was found to be a vital part of the decision-making process. Braun, in discussing a cycle which follows from "teacher input" to "learner output," discussed several factors or information sources which are involved in the "teacher input" segment of the process. These factors include sex of the child, intelligence test results, cumulative folders, ethnic background, physical appearance, previous achievement, socio-economic status (SES), and the name of the child.

Similar factors were discussed by Borko et al. (1979) who presented a more complex model of decision-making than Braun. They postulated that teacher judgments were partially formed by the information cues about a student

which were available to the teacher. Because such a large and varying amount of information is available, teachers seem to integrate the information into estimates or judgments about the students. These varying types of information include informal observations, anecdotal reports of other teachers, standardized test scores, and school records.

Again, similar types of information were discussed by Mendels and Flanders (1973) who noted that natural input factors might be important determinants of teachers' expectancies or judgments. They listed these factors as communication about students which is received from other teachers, administrators, and parents; cumulative records; previously established behavior records; standardized test information; SES; motivation; and physical characteristics such as sex and attractiveness.

The previous discussion describes various sources of information determined by researchers to be important in the formation of teacher judgments. Most prevalent among these appear to be standardized test results and previous achievement, intelligence or ability of the student, cumulative records, sex of the student, informal observations including class participation and behavior, and reports from other teachers including anecdotal notes.

A few studies looked at these sources of information from the teacher's viewpoint by having them report in some manner what they felt was important in making judgments about students. Goodwin and Sanders (1969) asked college of education students to rank order seven factors or variables on how each was perceived in predicting performance of students. These variables included standardized achievement test information, grade point average, anecdotal records, I.Q. scores, SES, sex, and age. The subjects were asked to rank these variables as either a first grade "teacher" or a sixth grade "teacher." Results indicated that teachers perceived the importance of these variables differently depending on the grade level considered. Sixth grade "teachers" found standardized achievement test information the most useful variable in predicting performance while first grade "teachers" found socio-economic status the most useful. Although the two groups were different in their rankings, overall it appeared that teachers tended to rely heavily on test information such as standardized achievement and intelligence tests to make predictions about students. SES was the other factor which both groups ranked high in usefulness.

Dusek and O'Connell (1973) asked teachers what they found the most useful when making rankings of year-end performance in language and arithmetic skills. It appeared that these second and fourth grade teachers depended on test information to make their predictions. The teachers listed previous grades, readiness tests, and written and oral classroom performance as the factors considered when making the rankings.

Accuracy of Teacher Judgments

Studies which examined the ability of teachers to predict student achievement have yielded various results depending on the type of judgment or prediction asked of the teacher and the amount of time which elapsed between the teachers' predictions and actual achievement measures. Two major types of prediction studies were identified based on this time factor. Future prediction studies involve predictions made by the teachers of the future achievement of students such as year-end performance. These predictions are usually correlated with standardized achievement test scores obtained at the end of the school year. Concurrent prediction studies involve estimates which the teacher makes about the present performance levels of students. These estimates are usually correlated with some type of test

score obtained about the same time as the teacher's estimate. In both these types of studies, teachers have been asked to make predictions in a variety of subject areas: reading readiness, mathematics achievement, reading achievement, and overall general achievement.

Although this study is concerned with concurrent predictions of educable mentally retarded students on a criterion-referenced test in both reading and mathematics, studies involving both concurrent and future predictions are reviewed. In addition, studies are included which examine variables under consideration in the present study: sex of the student, teaching experience, amount of exposure time to the student, and the subject matter or achievement area of the prediction task, specifically reading and mathematics skills.

Both the future and concurrent prediction studies varied in several aspects. First, there was a wide difference in the amount of time which elasped between the teachers' predictions and the measures of actual achievement. For example, while some researchers looked at the relationship between teacher predictions of student achievement and actual measures of academic achievement obtained over several years, others looked at the ability of

teachers at the beginning of the school year to predict the year end performance of their students.

Second, the studies varied as to the type of prediction task asked of the teacher. Some researchers asked teachers to rank order the students in their class in areas such as reading readiness or performance on more specific skills such as vocabulary identification, while other researchers asked teachers to estimate score ranges for each student in such subject areas.

Third, the studies varied as to the subject area utilized in the predictions. Some researchers asked teachers to make judgments about reading skills while others asked for judgments of mathematics skills.

Finally, the findings of the studies varied. Correlations between the predictions and the achievement measures ranged from approximately .20 to slightly higher than .90.

Future Predictions

Several long range studies investigated the ability of teachers to predict achievement over the course of several years. Similar findings were obtained by Ebbesen (1968) and Keogh and Smith (1970) who looked at the ability of kindergarten teachers to predict achievement in the primary

years. Although these two studies differed in the prediction task asked of the teachers, actual achievement in both was measured by standardized achievement tests administered at the end of the school year. Ebbesen asked the teachers to rank students on expected academic achievement. These rankings correlated .67 with first grade achievement, .61 with second grade achievement, and .52 with third grade achievement. Keogh and Smith asked teachers to rate students as to their level of reading readiness. Teachers' ratings correlated .61 with second grade achievement, .53 with third grade achievement, .58 with fourth grade achievement, and .61 with fifth grade achievement. Results of the Ebbesen study indicate that predicting later school achievement becomes a more difficult task as the gap widens between the teachers' predictions and the measures of actual achievement. Although the Keogh and Smith study support this concept up to the third grade, correlations with later school achievement (fourth and fifth grade) do not differ greatly from correlations obtained with earlier achievement measures (first and second grade).

Similar correlations were obtained in several studies concerned with the teacher's ability to predict the next year's achievement of the student. Predictions were made at

different points during the first year and correlated with achievement measures obtained during the second year.

Bolig and Fletcher (1973) examined the ability of kindergarten teachers to predict first grade achievement. Teachers rated students on the six specific skills measured by the Metropolitan Readiness Test (MRT), a standardized readiness test used often in the kindergarten and first grade years. Teacher ratings were then correlated with the results of the Stanford Achievement Test (SAT) which was administered in the spring of the first grade year. An average correlation of .61 was obtained.

Glazzard et al. (1982) also looked at the ability of kindergarten teachers to predict first grade achievement; however, the predictions were obtained at the end of the kindergarten year instead of the beginning as in the Bolig and Fletcher study. Similar correlations were obtained. Three school districts which were similar in size, socio-economic level, and performance level of the student population were analyzed separately. Teachers were asked to rate students on a five point scale for each of six reading achievement areas and two reading readiness areas. The total reading score of the Stanford Achievement Test (SAT) was used as the measure of actual achievement. The

correlation between achievement and the teachers' ratings for group I was .53, for group II was .67, and for group III .57. Stevenson, Parker, Wilkinson, Hegion, and Fish (1976) also found a correlation of .53 when they investigated the ability of second grade teachers to predict third grade achievement.

The ability of sixth grade teachers to predict the mathematical performance of students entering the seventh grade was examined by Cappadona and Kerzner-Lipsky (1979). Actual achievement was determined by non-standardized tests designed by the junior high mathematics teachers and administered six months after the predictions were made. An average correlation of .69 was found which is slightly higher than correlations reported in similar studies. The difference may be explained by the use of a criterion measure designed by teachers instead of the usual standardized achievement tests.

Varying findings were found in studies which examined the ability of teachers at the beginning of the school year to make accurate predictions about the year-end performance of their students. Merrill (1968) asked first grade teachers to make informal estimates of their students' reading readiness levels by having them rank the students

two weeks after school started. Actual achievement was measured by the Gates-MacGinitie Reading Test administered at the end of the school year. An average correlation of .54 was obtained between scores on the Lee-Clark Reading Readiness Test and first-grade reading achievement. An average correlation of .56 was obtained between the teachers' rankings and scores on the Gates. The author thought that the similarity in these correlations indicated that teachers appeared as good as readiness tests in judging the readiness levels of their students.

Slightly lower correlations were obtained by Kapelis (1975) who looked at the teacher's ability to predict reading achievement. Teachers were asked to indicate the reading level they expected selected students in their class to attain by the end of the school year. A five-point scale was used for the ratings. Correlations between the teachers' judgments and the Word Knowledge, Word Discrimination, and Reading subtests of the Metropolitan Achievement Test (MAT) were .46, .49, and .48, respectively. The differences in the correlations obtained in the Kapelis and Merrill studies may be the result of the differing levels of difficulty of the two prediction tasks. Predicting specific reading levels expected of individual

students may be a more difficult task than rank ordering students according to reading readiness levels.

Several researchers collected teacher estimates throughout the school year and compared them with end-of-year performance. Teachers were usually asked to make judgments during the first two weeks of school, several months or weeks later after test scores had been made available to the teachers, and at the end of the year. Morine-Dershimer (1979) asked teachers to make multiple judgments about reading achievement. First, third, and fifth grade teachers were asked to rank their students in September and November. These data were compared to the scores on the MAT administered in April of the same school year. Correlations were obtained between the teachers' rankings of reading success and the quartile placements on the national test norms of the reading and mathematics sections of the MAT. Teacher rankings obtained during September correlated, on the average, .60 with MAT scores. The second set of rankings obtained in November showed somewhat higher correlations with an average of .67.

Somewhat higher correlations were obtained by Evertson, Brophy, and Good (1972) who asked first grade teachers to rank their students on expected achievement. The rankings

were taken at three points during the year: September, November, and March. These rankings were correlated with the students' scores on the MAT which was administered during the fall of the next school year. The first set of rankings correlated with the students' scores .74 on the average. The second set of rankings correlated .77 while the third set correlated .78. A comparison of the correlations obtained from the March rankings and those from the September rankings suggest that teachers were not much more accurate in March than they were in September.

In both studies correlations obtained with the second set of rankings were higher than correlations obtained with the first set of rankings. This may be the result of several factors. The teachers had an opportunity to review test results before the second rankings were made. They also had an opportunity to observe the student over a two month period.

Concurrent Predictions

Studies involving concurrent predictions of achievement varied on the measure of achievement used in investigating the accuracy of the teachers and the type of prediction task asked of the teachers such as judgments about reading readiness levels or estimations of performance levels of

students on specific skills related to reading or mathematics. Some of the studies compared teachers' predictions of reading readiness with scores obtained on the Metropolitan Readiness Test (MRT) while others compared the teachers' predictions of reading readiness with informal tests designed to measure the skills associated with reading readiness. Some examined the ability of teachers to rate students on three skills related to readiness and compared the ratings to standardized tests designed to measure the specific skills. Findings from these studies varied as to the ability of teachers to accurately predict achievement. Correlations obtained by comparing the teachers' estimates or predictions to actual student achievement ranged from .48 to .92.

Studies (Elijah & Legenza, 1981; Willis, 1973b) which compared the teachers' predictions with scores on the MRT yielded correlations ranging from .60 to .79. Both studies asked first grade teachers to rank students; however, Willis asked teachers to rank students according to their expected achievement, while Elijah and Legenza asked teachers to rank students on reading readiness levels.

Willis asked teachers to predict academic achievement at three points during the first semester of the school

year. The three sets of rankings were obtained three days after school started, several weeks later after reading readiness test data were made available to the teachers, and near the end of the semester. Each set of rankings was correlated with scores on the MRT which was administered at the beginning of the school year. The average correlation obtained from the first set of rankings was .60. Average correlations obtained from the second and third sets of rankings were .79 and .72, respectively. Willis used two methods of obtaining the rankings. One group of teachers ranked the students by means of a questionnaire while the other group of teachers ranked the students during interviews. The correlations for the two groups were basically the same. Willis postulated that the higher correlations obtained with the second set of rankings was due to reading readiness test data made available to the teachers after the first set of rankings was obtained.

Elijah and Legenza obtained an average correlation of .78 between the teachers' rankings of reading readiness and scores on the MRT which was administered one week after the rankings were made. This correlation is higher than the initial correlation found in the Willis study. The disparity in the two could be due to the differences in the

prediction task. Willis asked only that teachers rank students on expected achievement then compared the rankings with the scores on the reading readiness test. Elijah and Legenza compared rankings of reading readiness with a test of reading readiness.

Somewhat lower correlations were obtained by Koppman and LaPray (1969) who asked teachers to rate students on a five-point scale of reading readiness. The first grade teachers were given specific instructions for each of the five levels of readiness. Three groups of teachers were selected, two of which received training for a 48-day period in either letter matching or word matching, and one which served as the control group. After the experimental instruction, informal tests of letter copying, letter knowledge, and word matching were administered. Correlations were calculated between the teachers' ratings and scores on the informal tests designed to evaluate the three areas. The two experimental groups averaged correlations of .68 and .61 while the control group averaged a correlation of .23. Since the tests appeared to be specifically coordinated with the experimental training, it seems understandable that the correlations for the experimental groups were higher than the control group.

Farr and Roelke (1971) found differing results within their study. They asked teachers to rate their students on three skills: word analysis, vocabulary, and comprehension. Instead of using general achievement tests as the measure of achievement, they used three different standardized tests to assess each skill. The rating scale for each skill was designed as closely as possible to the standardized measures used to assess the actual skill. The average correlation between the teachers' ratings of word analysis and the scores obtained on the McCollough Word Analysis Test was .48. The average correlation between the teachers' ratings of comprehension and scores on the California Reading Test was .59. A correlation of .92 was found between the teachers' ratings of vocabulary skills and scores on the Gates-MacGinitie Reading Test.

Stevenson et al. (1976), as part of a long range study, asked third grade teachers to predict the effectiveness of students in reading and mathematics. The ratings were made in the spring on a five-point scale. The ratings were compared with scores obtained from the Wide Range Achievement Test (WRAT) also administered in the spring. The correlation obtained between the teachers' ratings of reading skills and WRAT scores was .69 while the average

correlation obtained between the teachers' ratings of mathematics and the WRAT was .55 indicating that teachers involved in this study may be better predictors of reading skills than mathematics skills.

Accuracy and Special Education

In reviewing the literature concerning teacher accuracy of student performance, only one study was found which used special education teachers and students as subjects. Schwarz and Cook (1972) asked 18 teachers of mentally retarded students to indicate their expectancy that each student would show improvement during the coming year in academics, social behavior, and language. Only data concerning academics were reported. Instructions in determining the academic expectancy (AE) of each student were given during inservice sessions prior to the rating. Actual achievement and gain in achievement were determined by the administration of the Wide Range Achievement Test (WRAT) given at three points during the semester. Correlations between the AE and the actual gain in achievement in reading, spelling, and arithmetic were .13, .09, and .04, respectively. Correlations were also obtained between the AE and the scores of the initial administration of the WRAT. These were .23 with reading, .21 with

spelling, and .16 with arithmetic. Correlations between AE and scores on the WRAT administered at the end of the semester were .31 with reading, .30 with spelling, and .22 with arithmetic. Correlations were consistently low indicating the possibility that the teachers involved in this study were not very accurate in their judgments of the student's achievement and that student performance was unstable.

Variables Influencing Accuracy

Many variables have been examined which may influence the accuracy of teacher judgments of student performance. Some of these include sex of the student, number of years teaching experience of the teacher, amount of time that the teacher is exposed to the student before making a judgment, and the subject matter or achievement area of the judgment such as reading or mathematics.

One important variable considered in several studies was the accuracy of teachers in predicting the performance of male and female students. Most examined whether the teachers were more accurate for one sex than for the other. The studies compared both the mean ratings made by the teachers for each sex and the correlations obtained between the teachers' judgments and the measure of actual achievement.

That teachers favor girls when making ratings about their academic achievement was shown by several researchers (Bolig & Fletcher, 1973; Keogh & Smith, 1970; Stevenson et al., 1976). A five-point scale was used by the teachers in all three studies. Keogh and Smith found a significant difference in the mean ratings for girls (4.11) and boys (3.24) made by kindergarten teachers who were asked to rate students on levels of reading readiness. Stevenson et al. also found statistically significant differences in the mean ratings for girls and boys made by second and third grade teachers. The second grade teachers, in making predictions about the future success of students, showed mean ratings of 3.8 for girls and 3.0 for boys. The third grade teachers who made concurrent predictions about student achievement in reading and mathematics, showed mean ratings of 3.6 for girls and 3.2 for boys. Bolig and Fletcher also found higher mean ratings for girls (4.20) than for boys (3.97) by teachers who made predictions about the future achievement of students. These differences while not statistically significant indicate a consistency which is difficult to ignore. The lack of statistical significance in each study may be due to the relatively low power of the statistical tests due to small sample sizes.

Studies which compared the accuracy of teacher predictions for boys with those for girls showed mixed results. These studies compared the correlations obtained between the teachers' predictions and measures of actual achievement for boys and girls. Both Stevenson et al. (1976) and Willis (1973a) found teachers to be more accurate in predicting achievement for boys than for girls, while Koppman and LaPray (1969) found higher correlations for teachers' predictions of girls' achievement. Bolig and Fletcher (1973) also found higher correlations for girls' achievement, but the difference was not statistically significant. Keogh and Smith (1970) examined the ability of teachers to accurately predict the achievement of boys and girls in later school years. The results of this study varied according to the sex of the student and the subject area of the prediction. They found higher correlations for predictions of girls' achievement in reading for the second and third grades and for boys' achievement in reading for the fourth and fifth grades. More accurate predictions of boys' achievement in mathematics were found for the third, fourth, and fifth grades.

The findings concerning sex of the student suggest that teachers are more accurate in predicting the achievement of

girls enrolled in the lower grades, but become less accurate as the grade level increases. On the other hand, teachers are less accurate in predicting the achievement of boys enrolled in the lower grades, but become more accurate as the grade level increases.

Another variable which may be a possible influence on accuracy of teacher predictions is subject matter or achievement area involved in the prediction task. Studies (Keogh & Smith, 1970; Stevenson et al., 1976) investigated the ability of teachers to accurately predict the achievement of students in mathematics and reading. Stevenson et al. found that third grade teachers were more accurate in their predictions of reading skills than in their predictions of mathematics skills. Predictions of boys' achievement in reading by the second grade teachers were more accurate than the predictions of boys' achievement in mathematics, while there was no difference in the ability of teachers to predict the achievement of girls in reading and mathematics.

Keogh and Smith found mixed results when they looked at the ability of kindergarten teachers to predict the mathematics and reading skills of students as they progressed to the second, third, fourth, and fifth grade.

Teachers were more accurate in their predictions of mathematics than in reading for boys. They were also more accurate in their predictions of girls' reading skills than mathematics skills for the third and fifth grade; however, there was no difference in the teachers' ability to accurately predict the reading or mathematics achievement of fourth grade girls.

The findings concerning the subject matter or achievement area are inconclusive. No consistent pattern emerged from summarizing the literature concerning this variable.

Studies (Kapelis, 1975; Merrill, 1968) which looked at the relationship between the number of years teaching experience of the teachers and the accuracy of the teachers' predictions showed no difference between the teachers with little or no experience and the teachers with several years experience. Merrill compared the correlations obtained between the teachers' predictions of reading readiness and actual achievement for four groups of teachers: 0 to 2 years teaching experience; 3 to 5 years teaching experience; 6 to 8 years teaching experience; and, 9 or more years teaching experience. The correlations were .57, .61, .57, and .55, respectively. The differences were not found to be

statistically significant. Kapelis compared the judgments of the two most experienced teachers (each with more than four years teaching experience) with the judgments of two beginning teachers. The comparison failed to show that experienced teachers were more accurate in making judgments.

The amount of time or experience that the teacher has with the student before judgments are made may operate as a factor in the accuracy of the judgments. Results from studies which examined this factor indicate inconclusive results. Several studies (Evertson et al., 1972; Morine-Dershimer, 1978-79b; Willis, 1973a) examined this factor by having the teachers make multiple judgments about the same students over the course of the school year. These judgments were then compared to standardized achievement test scores to determine the accuracy of the teachers. The teachers were usually asked to make judgments a few weeks after school started, several weeks later after test results were made available to the teachers, and either near the end of the school year or near the end of the semester.

That teachers are more accurate in their predictions of student performance after the students have been in class several months was found by Morine-Dershimer who asked teachers to make predictions about the future reading

achievement of their students. Correlations were calculated between those predictions made in September and November and scores on the Metropolitan Achievement Test (MAT) administered in April of the same school year. The average correlation with the September rankings was .60, while the average correlation with the November rankings was .67. Overall, the November predictions were more accurate than the September predictions for every teacher except one. It was hypothesized that the increase in accuracy was a result of increased amount of information about the student obtained from readiness test data which the teacher received after the initial set of rankings had been made; however, the teachers reported that although they had received the scores, they did not have an opportunity to review them before making the predictions. The author then postulated that the increase in accuracy was due to the increased teacher-pupil interaction over a two-month period and of the information obtained through the observations of the students.

Different results were found by Willis (1973a) and Evertson et al. (1972). Willis asked first grade teachers to predict academic achievement at three points during the year. These rankings were correlated with scores on the

Metropolitan Readiness Test which was administered at the beginning of the school year. Higher correlations were found for the second set of predictions which, Willis thought, was due to the availability of test score data after the initial set of rankings was made. This was supported by the fact that the third set of rankings was not significantly different from the second set indicating in this study that the increased amount of time with the student does not provide the teacher with more information to make more accurate judgments.

Similar results were found by Evertson et al. who asked teachers to make predictions about the expected achievement of the students. These predictions were correlated with scores on the MAT administered during the fall of the following year. Similar correlations were found for all three sets of rankings (.74, .77, .78) indicating that teachers did not increase in the accuracy of their predictions because of exposure to the student. The authors felt that the lack of increase in correlations was due to the very high correlation obtained from the initial set of rankings which were made in September, a few weeks after school began.

Summary

As indicated from the previous discussion, there is some inconsistency in research which investigated the accuracy of teachers in making judgments about the academic performance of students. Overall, the results indicate that teachers, on the average, are not very good estimators of student performance. Correlations ranged from the .23 to .92; however, the majority of correlations ranged from .52 to .69. Findings with respect to future or concurrent predictions seem to be similar.

There are varying results in studies which examined the variables under consideration in the present study. There was no difference in the accuracy of teachers with differing levels of teaching experience; however, only a few studies examined this variable in relation to teacher predictions. There appears to be some difference in the accuracy of teachers in relation to the sex the student. Although the results are inconclusive, the results indicate that teachers may be slightly better predictors of girls' achievement than boys' achievement for the lower grades, but become better predictors of boys' achievement as grade level increases. The subject matter or achievement area of the prediction appears to play some factor in the accuracy of teachers and

appears to interact with the sex of the subject. Findings with respect to the amount of student/teacher contact time are also inconclusive. The results of the studies indicate that increased time with the student up to a point may increase the accuracy of teacher predictions.

In summarizing the literature concerning the information sources which are available to teachers, the following were consistently indicated by the researchers as part of the judgment process for teachers: standardized test scores, I.Q. scores, psychological reports, social history information, informal observations of the students, and reports from previous teachers. Standardized test information was reported by the teachers as useful in formulating judgments.

Hypotheses

Based on the review of related research, the following null hypotheses were formulated for the purposes of this study:

1. Primary EMR teachers will be equally accurate in estimating their students' reading and mathematics performances.

2. Primary EMR teachers will be equally accurate in estimating performances for their male and female students.

3. When estimating both reading and mathematics performances of students, primary EMR teachers will be equally accurate for males and females.

4. There will be no relationship between the number of years teaching experience of the teacher and the accuracy of the teacher in estimating student performance.

5. The correlation between the number of months the teacher has had the student in class and the accuracy of the teacher in estimating student performance will be zero.

In addition to the five hypotheses identified above, relationships between the accuracy of the teacher in estimating student performance and several other variables were described. These variables include the types and levels of teacher certification, the types and amounts of specific reading and mathematics courses taken by the teachers, and the number of information sources used by the teacher in formulating their estimates. Also examined was the extent to which certain information sources were utilized by the teacher when making estimates, writing individualized education programs (IEPs), and developing current goals and objectives.

Chapter 3

METHODOLOGY

This chapter describes the subjects of the study, the sampling procedures, the instruments used in the study, the conditions of data collection, and the procedures used in analyzing the data.

Subjects

Six local education agencies (LEAs) in Virginia participated in this study. Each was selected to participate because it met the following criteria: (a) a willingness to participate in the study, (b) separate classes for elementary and secondary level educable mentally retarded (EMR) students, and (c) use of another criterion-referenced test besides the Brigance Diagnostic Inventory of Early Development (Brigance, 1978) as a standard assessment tool in the EMR classes. The six LEAs selected for the study represented a varied geographic composition with both major cities and small rural communities included.

The actual subjects of this study were 28 teachers of educable mentally retarded (EMR) students and 68 female and 68 male EMR students in primary level, self-contained classes within the six LEAs. All primary EMR teachers

employed by these school districts participated unless he or she had too few students enrolled in the class or was not given permission to participate. The distribution of teachers and students participating in the study by school division is summarized in Table 1.

The self-contained primary level EMR classes consisted of six to 14 students ranging in age from 6 to 13 years. In order to select the participating students, students enrolled in each class were first categorized by sex. Three boys and three girls were then randomly selected from each classroom. The selected students participated only if parental permission was obtained. Because of the difficulty in obtaining parental permission, only four students (two females; two males) participated in 16 of the 28 classes. The remaining 12 classes each had six students particpating. The 136 students ranged in age from 6 to 13 years with a mean age of 9 years 8 months. The distribution of these students by age and sex is summarized in Table 2.

Instrumentation

Three instruments were utilized in the data collection for this study. Two questionnaires, a student form and a teacher form, were developed by the the researcher for purposes of this study. In order to determine if the

Table 1

Distribution of Students and Teachers
by School Division

School Division	Number of Teachers	Number of Students
A	10	48
B	2	12
C	9	40
D	3	14
E	1	6
F	3	16

Table 2

Distribution of Students by Age and Sex

	Age in Years							
	6yrs	7yrs	8yrs	9yrs	10yrs	11yrs	12yrs	13yrs
Male	3	10	12	9	8	15	9	2
Female	3	11	8	5	8	11	21	1
Total	6	21	20	14	16	26	30	3

questionnaires were understood by the subjects, both questionnaires were reviewed before the initiation of the study by professionals in the field of special education. Teachers and special education graduate students critiqued the forms for understanding and clarity. Based upon recommendations of the reviewers, only minor changes concerning the information sources were made prior to the actual data collection. The third instrument, the Brigance Diagnostic Inventory of Early Development (Brigance, 1978), is a widely used, commercially published criterion-referenced test designed to determine the developmental or performance level of students in areas such as reading and mathematics.

The teacher questionnaire was used to obtain personal data about each of the teachers. This form was completed by the teacher with data which pertained to certification levels, endorsement areas, teaching experience in both regular and special education, and course work in reading and mathematics at both the undergraduate and graduate levels were collected by utilizing A copy of this form is included in Appendix A.

The student questionnaire was used to determine the student's age and the number of months the student had been

enrolled in the teacher's class. Estimates of student performance for ten reading and ten mathematics objectives were made by the teacher for each of the four or six students selected from his or her classroom. Data concerning the information sources used by the teacher were also collected for each student. The four evaluation components required in Virginia as part of special education placement procedures were used as the basis of these information sources. These four evaluation components include educational, social, medical, and psychological information. Teachers indicated which information sources were utilized in making the reading and mathematics estimates and in preparing the student's individualized education program (IEP). The teachers also indicated how valuable they felt the information sources would be in writing current goals and objectives for each student. A copy of this form is included in Appendix A.

The third instrument used in the study was the Brigance Diagnostic Inventory of Early Development (Brigance, 1978), a criterion-referenced test developed to be used both as an assessment instrument and as a tool for developing IEPs. It consists of 11 subsets relating to motor skills, self-help skills, speech and language skills, general knowledge,

reading, and mathematics. It is designed to permit selection of certain skill sequences in order to meet a variety of needs and purposes. Developmental age levels accompany each skill sequence indicating when the task is typically mastered. The developmental ages were determined by the author after examining many sources which list normative data concerning these skills. The Brigance is easy to administer and does not require specialized training. Only selected skill sequences from the reading and mathematics subsections were utilized in this study. These skill sequences were used to determine the actual performance of the students on the ten reading and ten mathematics objectives for comparison with the teacher's estimates. Permission to use the test for this study was obtained from the publisher, Curriculum Associates, Inc.

Data Collection Procedures

After approval from each LEA was received, preliminary meetings were held with the principals of the participating schools for the purpose of further explaining the study and scheduling the interview/testing sessions with the teachers. At that time a brief meeting was held with the teacher to explain his or her part in the study and to distribute parental permission forms for the previously selected

students. Copies of preliminary correspondence with the school districts and principals are included in Appendix B. Also included is a sample of the parental permission form.

Actual interviews with the teachers for the purpose of completing the data collection forms were conducted by the researcher in the teacher's classroom during the school day. All interviews took place between April 28 and June 1, 1983. Interviews were approximately one-half to one hour in length depending on the varying interest levels of the teachers.

During the first few minutes of the interview, the teacher's part in the study was again briefly explained. The teacher questionnaire was completed first to obtain data on the teacher that would apply across all students. Each item was explained by the researcher before being completed by the teacher in an attempt to clarify all items on the questionnaire.

A student questionnaire was completed by the teacher for each student participating in the study from his or her classroom. The 20 performance objectives used in the estimation task were individually explained by the researcher using a copy of the Brigance. Before making each estimate, the teacher was shown exactly what was expected of the student to complete the objective.

While the interviews were being conducted, at least two test administrators were evaluating the students individually using the Brigance. The testing took place either in an empty, available classroom or in the school library. The locations were all quiet and conducive to testing. The length of the individual testing sessions varied from 15 to 45 minutes depending on the ability level and the attention span of the student.

College level students from three state universities served as the test administrators. Each of these testers was currently enrolled in either a special education class or an educational diagnostics class. All had had direct experience with mentally retarded children. Before the testing and interviews took place, the testers were trained by the researcher. Training consisted of examining each of the 20 test objectives, criteria for completing each task, and acceptable responses. The acceptable responses and criteria for completing each task were also included on the scoring form to miminize the chance of questions arising during the testing sequence. The researcher and testers met after testing sessions each day to review the students' responses and to discuss any discrepancies occurring during the sessions. The researcher was able to observe each tester during the testing situation.

Analysis of Data

The statistical computations for this study were carried out by utilizing the Statistical Analysis System (SAS) computer program (Helwig & Council, 1979). The Two-way Analysis of Variance (ANOVA) procedure was employed to determine if differences existed in the teacher's accuracy of estimation and the sex of the student and the subject area estimated. A Pearson Product Moment Correlation was utilized to determine the relationship between the teacher's accuracy and the length of time the student had been enrolled in the teacher's class. It was the intention of the researcher to use correlations to analyze the relationship between the teacher's accuracy and other variables examined in the study; however, because of the nature of the teachers' responses (the distributions of scores and responses were skewed), the relationships of the data did not fit the assumptions of the correlation coefficient. Chi Square procedures were utilized to determine if there was a relationship between the teacher's accuracy and teaching experience and between the teacher's accuracy and the number of information sources reported as utilized by the teacher when making the estimates. Data concerning the information sources utilized in developing

individual education programs (IEPs) and in writing current goals and objectives were reported in frequencies. Data concerning the value of information sources as reported by the teachers were reported in means.

Chi square procedures were utilized to determine if there was a relationship between the teacher's accuracy and the following variables: the number of endorsement areas of certification held by the teacher and the number of mathematics and reading courses taken by the teacher. Results of these procedures are located in Appendix C.

Chapter 4

FINDINGS OF THE STUDY

This chapter presents the statistical analysis of the findings of this study. The information is presented in three sections. Section one presents information concerning accuracy of the teachers' estimates. This is examined from three viewpoints: (a) the individual teacher's ability to estimate student performance across all students estimated, (b) the teacher's ability to estimate performance for individual students, (c) teacher accuracy based on the 20 performance objectives. Section two examines each hypothesis. Section three presents the data concerned with the categories of information utilized by the teacher when making estimates and similar judgments about the student. All data utilized in the analysis of this study were obtained from the three instruments described in chapter three.

Accuracy and Teacher Estimates

In order to determine the teacher's accuracy in estimating student performance for purposes of this study, teachers were asked to judge whether or not selected students would complete ten performance objectives in each

of two subjects: reading and mathematics. The students were evaluated on the same skills and comparisons were made between the teacher's estimate and the student's response. An estimate was considered accurate, i.e., a hit, if the teacher's response was consistent with the actual performance of the individual student on the corresponding skill as measured by the Brigance Inventory of Early Development (Brigance, 1978). In other words, an estimate was considered a hit if the teacher predicted a "yes" and the individual student completed the objective or a "no" and the student failed to complete the objective.

Individual teacher accuracy was determined by summing the number of hits achieved by that teacher across all students estimated by that teacher for each subject area. This provided the number of correct estimates for each of the 28 teachers reported in Table 3.

As indicated in Table 3, teachers in the present study obtained hits for at least 73% of their estimates for the reading objectives and 68% of their estimates for the mathematics objectives. This was determined by comparing the number of correct estimates (hits) for each teacher in each subject area with the maximum number of possible hits for that teacher. The maximum number of possible hits varied according to the number of students estimated.

Table 3

Total and Average Number of Correct Estimates by Subject and Total for Each Teacher

Teacher	No. of Students	Correct Estimates Reading	Correct Estimates Math	Correct Estimates Total	No. of Estimates Made	Average Correct Reading	Average Correct Math	Average Correct Total
1	6	48	49	97	120	8.00	8.17	16.17
2	4	32	28	60	80	8.00	7.00	15.00
3	4	31	34	65	80	7.75	8.50	16.25
4	4	31	35	66	80	7.75	8.75	16.50
5	6	45	42	87	120	7.50	7.00	14.50
6	4	38	35	73	80	9.50	8.75	18.25
7	6	49	49	98	120	8.17	8.17	16.33
8	6	47	45	92	120	7.83	7.50	15.33
9	6	55	46	101	120	9.17	7.67	16.83
10	4	32	29	61	80	8.00	7.25	15.25
11	4	34	34	68	80	8.50	8.50	17.00
12	4	30	28	58	80	7.50	7.00	14.50
13	4	38	39	77	80	9.50	9.75	19.25
14	4	33	27	60	80	8.25	6.75	15.00
15	4	35	35	70	80	8.75	8.75	17.50
16	6	53	53	106	120	8.83	8.83	17.67

Table 3 (continued)

Teacher	No. of Students	Correct Estimates Reading	Correct Estimates Math	Correct Estimates Total	No. of Estimates Made	Average Correct Reading	Average Correct Math	Average Correct Total
17	6	52	52	104	120	8.67	8.67	17.33
18	6	51	56	107	120	8.50	9.33	17.83
19	4	35	38	73	80	8.75	9.50	18.25
20	4	40	35	75	80	10.00	8.75	18.75
21	6	50	49	99	120	8.33	8.17	16.50
22	6	44	48	92	120	7.33	8.00	15.33
23	6	49	48	97	120	8.17	8.00	16.17
24	4	36	35	71	80	9.00	8.75	17.75
25	4	35	36	71	80	8.75	9.00	17.75
26	4	32	33	65	80	8.00	8.25	16.25
27	4	36	30	66	80	9.00	7.50	16.50
28	6	48	52	100	120	8.00	8.67	16.67
Total	136					8.38	8.24	16.61

As indicated by the data presented in Table 3, teachers' ability to estimate reading objectives ranged from achieving hits on 100% or all of their estimates (Teacher 20) to achieving hits on only 73% of their estimates (Teacher 22). An accuracy level of at least 80% was obtained by three-fourths or 21 of the teachers. In other words, 21 of the teachers were accurate on at least 80% of their estimates for the reading objectives. Five of the teachers achieved hits on at least 90% of their estimates for the reading objectives.

As shown in Table 3, the teacher's ability to accurately estimate mathematics objectives ranged from 68% (Teacher 14) to 98% (Teacher 13). In this case, no teacher was able to make correct estimates for all of the mathematics objectives for all of his or her students. Three-fourths or 21 of the teachers were accurate on at least 77% of their estimates for the mathematics objectives. Four of the teachers were able to make accurate estimates with at least 90% accuracy.

By looking at the combined scores or the sum of the reading and mathematics estimates of the teachers (correct estimates total) in Table 3, it was found that teachers were able to make estimates with at least 73% accuracy. In other

words, teachers were accurate on at least 73% of the estimates made. Accuracy levels ranged from 73% (Teachers 5 and 12) to 96% (Teacher 13) with the majority achieving accuracy levels over 80%.

Teacher accuracy was also looked at on the basis of individual teacher/student questionnaires or the teacher's ability to estimate performance for individual students. In this case, a sum of correct estimates or hits was determined by summing the number of hits made by the respective teacher for that student on the 20 performance objectives for each subject area. This provided an accuracy score for each of the 136 student questionnaires completed by the teachers providing 136 teacher responses.

Table 4 summarizes these accuracy scores for each subject area into the categories used for analysis in this study. Accuracy scores ranged per subject area from four to ten correct estimates or hits.

As shown in Table 4A, 104 or 77% of the teacher responses for the reading objectives indicated accuracy scores of eight or above or, in other words, an accuracy score of 8 was obtained for 104 of the students. Only one teacher response resulted in a score of four, while ten responses resulted in a score of either five or six. As can

Table 4

Part A: Accuracy Score by Number of Teacher Responses for Reading Objectives

	Accuracy Score			
	7 or less	8	9	10
Number of Teacher Responses	32	36	36	32
Percentage of Responses in Each Category	23.53	26.47	26.47	23.52

Part B: Accuracy Score by Number of Teacher Responses for Mathematics Objectives

	Accuracy Score			
	7 or less	8	9	10
Number of Teacher Responses	37	37	36	26
Percentage of Responses in Each Category	27.21	27.21	26.47	19.12

be seen in Table 4A, scores of nine or ten were achieved by the teachers for half of the students.

As shown in Table 4B, 99 or 73% of the teacher responses for the mathematics objectives indicated accuracy scores of eight or above. Again only one teacher response produced an accuracy score of four, while 13 teacher responses resulted in scores of five or six. As can be seen in Table 4B, accuracy scores of nine or ten were achieved for 46% of the students.

Accuracy scores for the total objectives (mathematics and reading combined) ranged from nine to 20 correct estimates. Table 5 summarizes the total accuracy scores into the categories used for analysis in this study. As shown in Table 5, accuracy scores of 15 or more were obtained from 113 or 83% of the teacher responses or, in other words, for 113 of the students teachers were able to correctly estimate at least 15 of the objectives. Accuracy scores of 14 or less were obtained from only 23 or 17% of the teacher responses. An accuracy score of less than 14 was obtained from only six percent or 8 of the teacher responses. Of this six percent, only one score of nine and one score of 11 were obtained from the responses. Only six teacher responses resulted in scores of 12 or 13. On the

Table 5

Accuracy Score by Number of Teacher Responses

	Accuracy Score		
	14 or less	15-18	19-20
Number of Teacher Responses	23	85	28
Percentage of Responses in each category	16.91	62.50	20.59

other end of the scale, a score of 20 was obtained on nine percent or 12 of the responses, while a score of 19 was obtained on 11% or 16 of the responses. As can be seen by Table 5, accuracy scores of 19 or 20 were achieved for 20% of the students.

Accuracy of teachers participating in the present study can also be examined by looking at the percentages of correct estimates or hits obtained for each of the 20 performance objectives. A high percentage of hits was obtained for almost all of the 20 performance objectives. Table 6 shows the number of hits obtained for each of the objectives. As shown in Table 6, for nine of the ten reading objectives, at least 79% of the estimates were accurate. For only one reading objective (number 7) was the number of accurate estimates less than 70% of the total number of estimates made for that objective. Only 67% of the estimates were accurate when teachers were asked to predict if students could determine if two words were alike or different based on the initial consonant sound. Accurate estimates of at least 85% were achieved for half of the reading objectives.

As shown in Table 6, for eight of the ten reading objectives, at least 79% of the estimates were accurate.

Table 6

Number of Correct Estimates for Each Objective

Objective	Number of Estimates	Number of Correct Estimates
	Reading Objectives	
1	136	132
2	136	107
3	136	112
4	136	111
5	136	116
6	136	108
7	136	91
8	136	122
9	136	125
10	136	115
	Mathematics Objectives	
1	136	133
2	136	116
3	136	113
4	136	118
5	136	98
6	136	107
7	136	110
8	136	99
9	136	111
10	136	115

For only 2 of the objectives were the number of correct estimates less than 75% of the total number of estimates made for the objective. Only 72% of the estimates were accurate when the objective was to subtract numbers with minuends of 10 or less. Only 73% of the estimates were accurate when the objective was to indicate ordinal positioning of five objects.

Hypotheses

Sex of the Student and Subject Area of the Estimates

H1 Primary EMR teachers will be equally accurate in estimating performances for their male and female students.

H2 Primary EMR teachers will be equally accurate in estimating their students' reading and mathematics performances.

H3 When estimating both reading and mathematics performances of students, primary EMR teachers will be equally accurate for males and females.

An average of correct estimates or mean score was computed for each of the 28 teachers. This was obtained by summing the number of correct estimates across all students estimated by that teacher and dividing by the number of students. Mean scores ranged from 14.50 to 19.25 with the aggregate mean being 16.61 correct estimates. Separate mean scores were computed for estimates made of the reading and mathematics objectives and for estimates made for the male and female students.

These mean scores were utilized in a 2 X 2 factorial design comparing the scores in terms of sex of the student and the subject area of the estimate. Table 7 is a representation of this design showing aggregate means for each variable. As shown in Table 7, means of 16.56 and 16.66 were obtained for the estimates of the male and female students, respectively. Means of 8.24 and 8.38 were obtained for estimates of the mathematics and reading objectives.

A two-way analysis of variance was used to analyze these data. The significance level for testing the hypotheses was set a priori at $p < .05$. The analysis of variance (as shown in Table 8) indicated there was no significant difference between the teachers' accuracy scores for the reading objectives and the teachers' accuracy scores for the mathematics objectives ($F = .10$, $df = 2$, $p > .05$). Therefore, the null hypothesis regarding the differences between the mathematics and reading estimates was not rejected.

Neither was there a significant difference between the teachers' accuracy scores for boys' performances and those for girls' performances ($F = .74$, $df = 2$, $p > .05$). The null hypothesis regarding the difference between girls' performances and boys' performances was not rejected.

Table 7

Overall Mean Accuracy Scores used in ANOVA of Sex of Student by Subject Area

Sex of Student		Subject Area of Estimate: Math	Reading	Overall Totals
Males	Mean	8.31	8.25	16.56
	S.D.	1.44	1.43	2.38
Females	Mean	8.16	8.50	16.66
	S.D	1.22	1.24	1.89
Subject Area Totals	Mean	8.24	8.38	16.61
	S.D.	1.33	1.34	2.14

Table 8

Summary of ANOVA of Accuracy Score
by Subject Area and Sex of Student

	df	ANOVA SS	ANOVA MS	F	p
Sex of Student	1	.1801	.1801	.10	.75
Subject Area	1	1.3272	1.3272	.74	.39
Interaction (sex x subject)	1	2.68	2.68	1.50	.22
Error	268	477.4853	1.7817		
Total	271	481.6728			

The null hypothesis regarding the interaction between the sex of the student and the subject area of the estimate was not rejected. Although the means presented in Table 7 indicate the possibility that teachers estimate more accurately for girls in reading and for boys in mathematics, the difference was not statistically significant (F =1.50, df =3, p > .05).

Teaching Experience

H4 There will be no relationship between the number of years teaching experience of the teacher and the accuracy of the teacher in estimating student performance.

The number of years teaching experience the teacher had taught in special education as reported by the teacher ranged from less than one year to 20 years. In order for hypothesis four to be analyzed, the teachers' responses for each student were tabulated and grouped into three categories based upon the number years experience in special education. These categories and responses are shown in Table 9. As can be seen in Table 9A, over 50% of the teachers reported at least five years teaching experience in special education. Table 9B summarizes the data from the 136 teacher responses into the categories of teaching experience utilized for the analysis of this section of the study.

Table 9

Part A: Number of Years Teaching Experience in Special Education by Teacher

	Experience in Years		
	4 yrs or less	5-10 yrs	11 yrs or more
Number of Teachers	13	9	6

Part B: Number of Years Teaching Experience in Special Education by Number of Teacher Responses

	Experience in Years		
	4 yrs or less	5-10 yrs	11 yrs or more
Number of Teacher Responses	60	46	30

Because the teacher responses indicating years experience tended to be grouped toward less experience and the number of correct estimates tended to be grouped toward a high level of accuracy, the relationship between the two variables did not fit the assumptions of the correlation coefficient. Given a larger sample of teachers and more variation in accuracy the Pearson r would be the statistic of choice.

Hypothesis four was analyzed using the chi square statistic with categories of teacher experience and the number of correct estimates as variables. The analysis was performed separately for the total number of estimates, the reading estimates, and the mathematics estimates. Results of these analyses are shown in Table 10, Table 11, and Table 12. As shown, there was no significant relationship between the number of years teaching experience in special education and the accuracy of the teacher in estimating student performance in any subject area. Hypothesis four was not rejected.

Student/Teacher Contact Time

H5 The correlation between the number of months the teacher has had the student in class and the accuracy of the teacher in estimating student performance will be zero.

Table 10

Chi Square of Number Years Teaching Experience by Number of Correct Total Estimates

Number of Correct Estimates	Number Years Experience		
	4 yrs or less	5-10 yrs	11 yrs or more
14 or less	10	9	4
15-18	37	32	16
19 or 20	13	5	10

$\chi^2=5.709$ $\underline{df}=4$ $\underline{p}=.2219$

Table 11

Chi Square of Number of Years Teaching Experience by Number of Correct Reading Estimates

Number of Correct Reading Estimates	Number Years Experience		
	4 yrs or less	5-10 yrs	11 yrs or more
7 or less	16	11	5
8	18	13	5
9	13	15	8
10	13	7	12

$\chi^2=8.358$ df=6 p=.2130

Table 12

Chi Square of Number of Years Teaching Experience by Number of Correct Math Estimates

Number of Correct Math Estimates	Number Years Experience		
	4 yrs or less	5-10 yrs	11 yrs or more
7 or less	14	16	7
8	16	14	7
9	22	7	7
10	8	9	9

$\chi^2=9.397$ df=6 p=.1525

The teachers were asked to indicate how many months each student had been enrolled in his or her class. The length of time for the 136 students ranged from one to 60 months with an average of 11 months. Table 13 summarizes these data.

Pearson product moment correlations were computed to determine if there was a relationship between the teachers' accuracy in estimating student performance and the number of months the student had been enrolled in the class. Correlations were calculated separately for the total estimates, the reading estimates, and the mathematics estimates. As shown in Table 14, the correlations obtained between the number of months and the teachers' accuracy scores for the total estimates and the reading estimates were significant at the .05 level of significance. The correlation between the number of months and the mathematics estimates was not significant. Hypothesis five was rejected in part. Although the correlations were significantly different from zero, they are still so weak that little relationship is indicated between the ability of teachers to accurately estimate performance and the length of student/teacher contact time.

Table 13

Number of Months the Student had been Enrolled in the Teacher's Class

Number of Months	Number of Students
0-6 Months	19
7-10 Months	76
12-19 Months	32
20 Months or More	9

Table 14

Pearson Product Moment Correlation
Between Accuracy Score and Student/Teacher
Contact Time

Subject Area	r	probability
Reading	.17194	.0453
Mathematics	.14470	.0928
Total	.18501	.0311

Information and Teacher Accuracy

From the student questionnaire completed for each student participating in the study, data were obtained concerning the information sources that were available to the teacher about each student. A list of information items was developed for this study and presented in checklist form. The information items listed were part of four separate categories of information required as part of the eligibility procedures for placement into special education programs in Virginia. The information items and categories are presented in Table 15.

Using this checklist of information items, the teachers were instructed to check which information sources were: (a) considered when making the mathematics and reading estimates, and (b) utilized when writing the student's IEP. Teachers also judged the importance of the information sources in relationship to the other sources in developing goals and objectives for the student.

Immediately after making the mathematics and reading estimates, each teacher was asked to indicate which information sources he or she considered while making the estimates. Table 16 presents the frequency of occurrence of each of the information sources for this task. As shown in

Table 15

Checklist of Information
Items and Categories

Medical Information	___
Social Information	
Comments from previous teachers	___
Social history	___
Informal classroom observation	___
Educational Information	
Achievement test results	___
Previous classroom performance	___
Informal test results	___
Psychological Information	
I.Q. Score	___
Psycholgoical report	___

Table 16

Frequencies and Percentages for Information Items Utilized by the Teacher When Making Estimates

Item	Number of Students	Percentage
Medical Information	22	16.18
Comments from Previous Teachers	31	22.79
Social History	45	33.09
Informal Classroom Observation	125	91.91
Achievement Test Results	60	44.12
Previous Classroom Performance	116	85.29
Informal Test Results	104	76.47
I.Q. Scores	17	12.50
Psychological Reports	24	17.65

Table 16, certain sources were utilized more frequently by the teachers. "Informal classroom observation" was utilized by the teachers when making estimates for 125 or 92% of the students. "Previous classroom performance" and "informal test results" were utilized for 116 (85%) and 104 (77%) of the students, respectively. "I.Q. score" appeared to be the least utilized information source.

In order to determine if there was a relationship between the number of information items utilized by the teacher and the accuracy of estimation, data from this task were grouped into two categories. Category one consisted of responses by teachers who chose only two or three of the most frequently selected sources. All teachers chose at least one of these three sources, i.e., "informal classroom observation," "previous classroom performance," and "informal test results." Category two consisted of responses by teachers who, in addition to choosing two or three of the most frequently selected items, chose additional items indicating that they utilized additional information when making their estimates. Forty-five or 35% of the teacher responses were in category one while 84 or 65% of the teacher responses were in category two.

The chi square statistic was applied to these data. The results are shown in Table 17. As can be seen, there was no significant relationship between the number of information sources utilized by the teacher and the teachers' ability to accurately estimate student performance.

Separate analyses were calculated for the reading and mathematics estimates. The results of these analyses are shown in Table 18 and Table 19, respectively. As shown in these tables, no significant relationships were found between either variable and the number of information sources utilized by the teacher when making the estimates.

Using the same information checklist presented in Table 15, teachers were asked to check which information items they utilized when writing the student's IEP. The information from this task was tabulated and is presented in Table 20. The results obtained from this task were similar to the results obtained from the previous task. Although the order of frequency varied, the three most frequently selected items in this task were the same as those selected in the previous task. As can be seen in Table 20, the most frequently utilized item was "informal classroom observation" which was selected by the teachers for 132 or

Table 17

Chi Square of the Number of Information Sources by the Number of Correct Teacher Estimates

Number of Correct Estimates	Number of Information Sources	
	Only 2 or 3	Additional
14 or less	5	16
15-18	32	50
19 or 20	8	18

χ^2=1.946 df=2 p=.3779

Table 18

Chi Square of the Number of Information Sources by the Number of Correct Reading Estimates

Number of Correct Reading Estimates	Number of Information Sources	
	Only 2 or 3	Additional
7 or less	9	20
8	8	27
9	18	16
10	10	84

$\chi^2=7.393$ df=3 p=.0604

Table 19

Chi Square of Number of Information Sources
by the Number of Correct Mathematics Estimates

Number of Correct Math Estimates	Number of Information Sources	
	Only 2 or 3	Additional
7 or less	10	25
8	14	21
9	16	18
10	5	20

$\chi^2=5.674$ df=3 p=.1286

Table 20

Frequencies and Percentages for Information Items Utilized by the Teacher When Writing IEPs

Item	Number of Students	Percentage
Medical Information	39	28.68
Comments from Previous Teachers	53	38.97
Social History	71	52.26
Informal Classroom Observation	132	97.06
Achievement Test Results	99	72.79
Previous Classroom Performance	115	84.56
Informal Test Results	118	86.77
I.Q. Scores	27	19.85
Psychological Reports	51	37.50

97% of the student IEPs. The category of "informal test results" was utilized for 118 or 87% of the student IEPs and "previous classroom performance" was utilized for 115 or 85% of the student IEPs.

The third judgment task concerned with the information items involved having the teachers place a value on the information sources they would use if they were to develop goals and objectives for the student. It was emphasized that a value between zero and 100 be placed only beside those items that would be utilized and that the resulting total equal 100. Table 21 reflects the list of information sources and the frequency of occurrence. Results similar to those found in the two previous tasks were found. The three most frequently selected information items were again "informal classroom observation," "previous classroom performance," and "informal test results."

Using the values indicated by the teachers, mean values were calculated for each of the information sources. Table 22 presents these means and standard deviations ranked in order of value. As can be seen, the three items most highly valued by the teachers were also those items most frequently utilized for all judgment tasks.

Table 21

Frequencies and Percentages for Information Items Indicated by Teachers as Important for Writing Goals and Objectives

Item	Number of Students	Percentage
Medical Information	40	29
Comments from Previous Teachers	45	33
Social History	35	52
Informal Classroom Observation	130	94
Achievement Test Results	88	65
Previous Classroom Performance	112	82
Informal Test Results	108	79
I.Q. Score	19	14

Table 22

Information Items Indicated by the Teacher as Important for Writing Goals and Objectives by Means

Item	Mean	S.D.
Informal Classroom Observation	26.40	14.51
Previous Classroom Performance	21.25	17.54
Informal Test Results	20.85	17.09
Achievement Test Results	11.95	11.71
Comments from Previous Teachers	6.54	15.35
Social History	6.21	7.54
Medical Information	5.63	12.34
I.Q. Scores	1.21	3.25

As shown in Table 22, teachers, as a group, placed the highest value on "informal classoom observation." Values indicated for this source of information ranged from 0-80. Over three-fourths (78%) of the teacher responses reported values between 20 and 50, while values above 50 were indicated on only 3% (4) of the responses. For only six students did teachers indicate that information from informal classroom observation would be of no value.

The second most valued information source was "previous classroom performance" which had a range of values from 0-75. Values for this source of information were more wide spread than the previously mentioned source. Forty-two percent of the teacher responses reported values of 10 or below with 17% (24) indicating no value. Over half (52%) of the teacher responses reported values between 20 and 50. Values higher than 50 were reported on only 5% (7) of the responses.

The information source which teachers valued third in importance was "informal test results" which had a range of values from 0-60. Forty-one percent of the responses reported values of 10 or below with 21% indicating no value. Half of the responses indicated values between 20 and 40 while only 3% (4) reported values above 50.

"Achievement test results" which was the source of information ranked fourth in importance had a range of values from 0-50. Over half (58%) of the responses reported values of 10 or less. No value was reported on 35% of the teacher responses indicating that "achievement test results" as a source of information was not considered valuable in developing goals and objectives for over one third of the students participating in the study. The remaining teacher responses (42%) reported values which ranged from 15-50.

"Comments from previous teachers" was the information source which ranked fifth in value for this task. This source of information had a range of values from 0-70. Sixty-seven percent (91) of the teacher responses did not report a value for this source of information indicating that for over half of the students comments from previous teachers were not considered valuable in developing goals and objectives. Twenty-nine of the responses reported values between 5 and 30, while 4% (6) responses reported values of 70.

Values for "Social history" only ranged from 0-30. Values between 15 and 30 were reported on 14% of the teacher responses, while values of 10 or less were reported on 86% on the teacher responses. "Social history" was not felt to

be of value for 48% of the students as reported on the teacher responses.

"Medical information" had the widest spread in values ranging from 0-80 with most of the responses grouped at the lower end of the range. This source of information was not valued as important for almost three-fourths (71%) of the students as indicated by the teacher responses. Most of the remaining responses (25%) indicated values of 30 or less. Only 4% (6) teacher responses indicated values over 30.

The information source valued least by the teachers as useful in developing goals and objectives for students was "I.Q. score." This source of information which had the smallest range of values (0-15) was selected for only 19 of the students. Eighty-six percent (117) of the responses indicated that I.Q. score was not a valuable source of information for developing goals and objectives for the student participating in the present study. Of the remaining responses, 5% (7) reported a value of 5, 7% (10) reported a value of 10, and 1.5% (2) reported a value of 15.

Chapter 5

SUMMARY, DISCUSSION, AND RECOMMENDATIONS

Summary

State and federal statutes require special education teachers to assist in making decisions about the education of students in their class. Specifically, teachers must assist in developing mandated individualized education programs (IEPs) which include annual goals and short term objectives for students enrolled in special education programs. Borko et al. (1979) emphasized the importance of teacher judgments and information about the student in the process of decision-making. This decision-making model implies that teachers receive information which they process and use to make judgments about a student's ability. These judgments are then used to make decisions about the student's education. Although many studies have been conducted which investigated the ability of regular education teachers to make accurate judgments about the performance of students, few researchers have investigated the ability of special education teachers to make judgments about student performance or the sources of information used in formulating these judgments.

The purpose of this study was to investigate the degree of accuracy of teachers of EMR students in making estimates about student performance in reading and mathematics and to examine certain variables which may assist in explaining the variance in accuracy. These variables included sex of the student, subject area of the estimate, teaching experience, and length of student/teacher contact time. A secondary purpose was to examine the categories of information about the student which teachers felt were important in making judgments about students.

Twenty-eight EMR teachers and 136 EMR students from six school districts in Virginia comprised the sample for this study. Three instruments were utilized in collecting the data pertaining to the hypotheses. Teachers were asked to make judgments about whether or not students would complete performance objectives in reading and mathematics. The students were evaluated on the objectives and their responses were compared to the teachers' estimates. Teachers were asked to indicate which information items they utilized when making the estimates and when writing the student's IEP. They were also asked to make judgments about the value of information in relation to the other information items that would be important in writing goals and objectives.

A two-way analysis of variance procedure was used to determine if differences existed in the teachers' accuracy and the sex of the student and the subject area of the estimate. Chi square procedures were carried out between the teacher's accuracy and the following variables: teaching experience, endorsement area of certification, the number of reading and mathematics courses taken by the teacher, and the number and type of information sources used by the teacher when making estimates. Pearson correlations were utilized to determine if there was a relationship between the teacher's accuracy and the length of contact time between the student and the teacher. Frequencies and means were utilized to explain the data concerning the categories of information used in the judgment tasks.

Discussion of the Findings

The findings of this study are discussed pertaining to the four questions formulated as part of the statement of the problem.

1. To what extent are special education teachers, specifically teachers of educable mentally retarded (EMR) students, accurate in their estimates of student academic performance?

The findings of the present study indicated that EMR teachers are good estimators of student performance on specific skill objectives. Although there was variation in the ability of the teachers in the present study to make accurate predictions of student performance, 75% of these teachers were able to accurately predict the student's outcome on at least 77% of their 20 estimates when the results of the reading and mathematics predictions were examined collectively. Half of the teachers were able to accurately predict the outcome on 83% or more of their estimates. Teachers ranged in accuracy from correctly predicting the outcome for 73% of their estimates to correctly predicting the outcome for 96% of their estimates.

Although the number of correct estimates per student ranged from nine to 20 objectives, accurate estimates of 15 or more out of a possible 20 were achieved for 83% of the students. In other words, teachers were able to accurately predict the student's performance on 15 or more of the objectives in reading and mathematics for the majority of the students. For only 17% of the students were accurate predictions made on less than 15 of the objectives and for no student were more than 11 of the 20 estimates incorrect.

The finding that teachers vary in their ability to accurately predict performance was consistent with the findings of Elijah and Legenza (1980) and Morine-Dershimer (1978-79b) who found that while some teachers are good predictors of student achievement, others are very poor predictors of achievement. The present study, however, found that although teachers vary in their ability to predict achievement, teachers, as a group, are accurate estimators of student performance.

The finding of this study that teachers are accurate estimators is inconsistent with findings of previous studies which analyzed the ability of teachers to make accurate judgments about the current performance of their students (Elijah & Legenza, 1980; Farr & Roelke, 1971; Koppman & LaPray, 1969; Stevenson et al., 1976; Willis, 1973a). Results from these studies indicated that teachers, on the average, were not very accurate estimators of student performance.

Several explanations might be offered regarding the discrepancy between the results of the present study and the results of the previous studies. First, teachers in the present study were special education teachers who had participated in writing and evaluating specific skill

sequences for their students on an individual basis. This was not the case with teachers involved in the previous studies. Second, for some students, the test used in the present study to evaluate student performance was at a much lower level than the students' performance ability which resulted in their completing successfully all or almost all of the objectives. The process of estimating student performance was an easier task for their teachers. Third, teachers were asked to make their estimates at the end of the year when the majority of special education teachers are in the process of reevaluating their students, rewriting their individual student plans, and deciding on future placement. Fourth, the type of task asked of the teacher may have played a role in the increased overall accuracy. The teachers were asked to make a yes/no judgment about whether the student would complete a specific skill objective. Specific criteria for completing the objectives were provided for the teacher. In previous studies teachers were usually asked to estimate a score range on a standardized test.

2. Does the accuracy of EMR teachers in estimating student performance vary across different subject areas and sex of the student?

The results of this study indicate that there is no difference beyond that expected by chance in the ability of EMR teachers to accurately estimate the performance of their male and female students. This finding is not consistent with findings of previous studies which looked at teacher accuracy and sex of the student. Both Stevenson et al. (1976) and Willis (1973a) found that teachers were more accurate in their estimates of boys' performances than girls' performances; however, Koppman and LaPray (1969) found that teachers were more accurate in estimating the performance of their female students. Bolig and Fletcher (1973) also reported the teacher to be more accurate in estimating girls' performances; however, differences they reported were not statistically significant.

The results of the present study also indicate that teachers are virtually equally accurate in predicting mathematics and reading performances of their students. In other words, there was no difference in the ability of teachers to predict mathematics skills and the ability of teachers to predict reading skills. This finding concurs partially with the findings of Stevenson et al. (1976) and Keogh and Smith (1970) who found that for certain grade levels there was no difference in the ability of teachers to

accurately estimate girls' performances in reading and mathematics. However, both studies found the estimates for boys' performances to be significantly more accurate for the mathematics skills than for the reading skills. Although results from the present study indicate that the tendency toward interaction is present, i.e., teachers estimate girls' reading performances more accurately and boys' mathematics performances more accurately, these variations were not statistically significant. Teachers were equally accurate no matter what subject area was estimated or regardless of the sex of the student. The high level of accuracy overall, as reported in regard to question 1, may have suppressed such differences.

3. Do various levels of teaching experience and amounts of contact time with the student result in differing levels of accuracy?

Previous researchers (Kapelis, 1975; Merrill, 1968) found that the number of years teaching experience of the teacher did not affect the teachers' ability to accurately estimate student performance. The findings of the present study concur with the findings of Merrill and Kapelis. No differences were found between the accuracy levels of teachers with little experience and those of teachers with

several years experience. Apparently, EMR teachers with little or no experience in teaching special education are as accurate in estimating student performance in reading and mathematics as teachers with more experience.

For the teachers of the present study, the amount of time the student had been enrolled in the class did not affect the teacher's ability to estimate the student's performance. Teachers were able to make accurate estimates even after having the student in class only a few months. This finding is consistent with the findings of Evertson et al. (1972) and Willis (1973a) who found that the accuracy of teacher judgments did not increase after the student had been enrolled in teacher's class three or four months. On the other hand, Morine-Dershimer (1979) found that a two-month time period was enough time for the teacher to know the student well enough to make accurate judgments.

4. Are certain categories of information, i.e., standardized achievement test scores, medical information, more highly correlated to estimation accuracy than others?

Although it is possible to draw some conclusions from the data concerning the categories of information in this study, the nature of the teachers' responses did not allow

the data to be analyzed in a manner to directly answer the preceding question. What the data did show was that EMR teachers who used only a few sources of information were as accurate as teachers who used additional sources of information. More specifically, the majority of teachers indicated that they depended primarily on three sources of information when making reading and mathematics estimates: "informal classroom observation," "previous classroom performance," and "informal test results." Teachers who indicated that they based their estimates on at least two of these items were as accurate as teachers who used at least two of these but also indicated that they utilized additional information such as achievement test results, I.Q. scores, and psychological reports. Apparently, teachers are able to make accurate estimates based on information obtained through classroom procedures without more formalized procedures such as intelligence and achievement tests and psychological reports.

Another conclusion drawn from the data is that teachers find certain information sources more valuable than others when developing goals and objectives for students. As a group, teachers valued information sources which were based more on their own informal evaluations of student

achievement and behavior than formalized test procedures such as achievement tests. This finding is not consistent with findings obtained in previous studies. Both Goodwin and Sanders (1969) and Dusek and O'Connell (1973) found that teachers depended heavily on test information to make predictions of student performance. Teachers in the present study, as opposed to teachers in the previous studies, had monitored an individualized education program (IEP) for most of their students since the beginning of the school year. Monitoring an IEP necessitates that a teacher be aware of the progress that a student is making without always using formal test procedures.

Summary of Conclusions

Although findings of the present study indicate that there is variability in the accuracy of teachers when predicting student performance, the teachers participating in the study, when considered as a group, are good estimators of student academic performance. Furthermore, the teachers are accurate regardless of the sex of the student or the subject area of the estimate. Teachers with little or no experience in teaching special education are as accurate in estimating student performance of reading and mathematics as teachers with more experience. In addition,

the teachers' ability to estimate accurately was not related to the amount of student/teacher contact time experienced before the estimate is made.

Teachers participating in the present study made accurate estimates based on information obtained through classroom procedures without more formalized procedures such as intelligence and achievement tests and psychological reports. It is this informal type of information that they find more valuable and useful. In addition, the number of information sources utilized by the teacher when making estimates does not affect the teacher's ability to estimate the student's performance.

Implications of the Study

The premise that teachers use information about students to formulate judgments of student performance was stated in Chapter 1. These judgments are then utilized in making decisions concerning the educational programs of their students (Borko et al., 1979). A logical assumption to this premise is that if the judgments are accurate then the decisions will be appropriate. Considering the mandated requirements of P.L. 94-142, i.e., to provide an appropriate education for all handicapped children, an investigation into the ability of special education teachers to make

accurate judgments seems an important step to gain insight into the special education decision-making process. Special education teachers are required by both state and federal statutes to assist in making specific decisions about the education of their students. The accuracy of these judgments becomes a vital issue when these judgments are used in the development of goals and objectives for the student. If special education teachers, using information that is provided, make accurate judgments, then there is a greater chance that decisions concerning the student's education will work towards meeting the needs of the student.

The results of the present investigation provide evidence that special education teachers are accurate in their judgments of student performance levels. Consequently, it is logical to assume that input from the teacher is of vital importance to the development of the individualized education program (IEP) which includes goals and objectives for the student. This has implications for the principal who often serves as a member of this committee. Teachers should be encouraged to provide more input during this process.

The results of this study also have implications for special education supervisors and directors. Since the implementation of P.L. 94-142, local education agencies (LEAs) have had the responsibility of providing on-going inservice programs to their special education staff. The development of this task is usually the responsibility of the special education supervisor or director depending on the size of the LEA. Since the results of this study indicate that special education teachers make accurate judgments, the possibility exists that teachers are at least adequately trained. Hence, no additional training in this area is necessary. In other words, inservice programs may be directed at topics other than assisting the teachers in becoming good or at least better estimators of student performance.

If different results had been obtained from the procedures of this study, implications for special education administrators would be modified. First, if the results indicated that teachers were not good estimators, inservice programs could focus on training to increase accuracy levels of the teachers. Research has shown that teachers can be trained to increase their ability to make judgments about specific groups of students, i.e., gifted students or

students with developmental problems (Gear, 1978; Haring & Ridgeway, 1967). Second, if a wider range of accuracy levels among the teachers had been obtained, it may have been possible to determine which information sources correlated with teacher accuracy. Teachers could be provided with and encouraged to use the most highly correlated information when making judgments and decisions about their students.

The results of this study also have implications for regular education in general. Because previous research (see Chapter 2) indicated that the regular education teacher, on the average, is not typically a good estimator of student performance, several observations can be made. First, special education teachers are usually responsible for smaller numbers of students which may offer them the opportunity to become better acquainted with their individual students' progress. On the other hand, the regular education teacher in most instances may be responsible for twice the number of students. Second, the special education teacher, for the most part, has been trained to individualize the education of each student enrolled in the class. Emphasis was often placed on writing goals and objectives for students. This training may have

occurred during inservice sessions conducted within the respective LEA, or during teacher training at the college or university level.

The results of this study also have implications for future research. This study made contributions to the field of teacher accuracy by both confirming previous findings and by increasing the knowledge concerning the special education teacher. The results confirmed previous results which found that both teaching experience and the amount of exposure time to the student did not significantly affect the ability of the teacher to make accurate judgments of student performance. Very few studies have been conducted using special education teachers and students. This study may serve as a foundation for future studies.

Recommendations

This study addressed questions related to the degree of accuracy of EMR teachers in making estimates about student performance in reading and mathematics and questions concerning certain variables which might assist in explaining accuracy. While findings indicated that teachers are accurate estimators of student performance, it may prove enlightening to explore this issue in similar studies with alterations in the following areas: (a) Data should be

collected at different times during the school year. Because the data in the present study were collected near the end of the school year, there was a strong possibility that teachers participating in the study were in the process of reevaluating and reeassessing the students' programs. During this process the teachers may have both formally and informally tested the students allowing them to focus on the areas of the estimation task. Having the teachers make predictions earlier in the year might produce different results. Multiple estimates obtained at several points during the year might also assist in explaining this issue by examining the consistency of the teacher's accuracy in making the estimates. (b) This study should be replicated using evaluation instruments which are appropriate to the student's age and ability. When the evaluation instrument is either too simple or too difficult for the students, the estimation task becomes much easier for the teacher. In the present study, many of the students were able to complete most of the skills with ease indicating that the Brigance may not have been appropriate for many of the students participating in the study. If the Brigance is used for similar studies, care should be given in selecting classes which contain students who fall within the appropriate age range of the test.

Although the findings of this study answer some of the questions concerning the information sources used by teacher for estimation tasks, further investigations are necessary to better understand this step of the decision-making process. More specifically, are some categories of information more highly related to estimation accuracy than others? In other words, do teachers who are more accurate in estimating the performance of students use certain types of information to formulate their judgments and are these types of information different for teachers who are less accurate? Because of the limited range of variability in accuracy of the teachers participating in the present study, this question was not addressed. Replications of the study with different teachers or different estimation tasks as previously discussed, may assist in investigating this question.

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Appendix A

Data Collection Forms

QUESTIONNAIRE - TEACHER

Name_____

Teaching Experience:

Total number of years teaching experience (prior to present school year)....._____

Total number of years teaching experience in special education (prior to the present school year)....._____

Certification:

Level of teacher certification currently held in Virginia (check only the level for your special education position)

Provisional....._____

Collegiate....._____

Collegiate Professional....._____

Post Graduate Professional....._____

Other,_____....._____

Areas of endorsement (check all that apply)

___Mentally Retarded
___Hearing Disorders
___Emotionally Disturbed
___Learning Disabilities
___Preschool Handicapped
___Visually Impaired
___Speech Disorders
___Severely & Profoundly Retarded
___Common Core (NK-12)
___Elementary Education (NK-3)
___Elementary Education (4-7)
___Reading
___Mathematics
___Other,_____

Course Work:

Approximate number of credit hours and courses taken with reading as a primary focus (courses concerned primarily with reading or reading techniques). Please indicate whether the courses were taken under a semester or a quarter system.

	No. of Credit Hours		No. of courses	
	Semester	Quarter	Semester	Quarter
Undergraduate	_____	_____	_____	_____
Post graduate	_____	_____	_____	_____

Post graduate includes any courses taken beyond the bachelor's degree.

Approximate number of credit hours and courses taken with reading as a secondary focus (reading was included as a part of the course).

	No. of Credit Hours		No. of courses	
	Semester	Quarter	Semester	Quarter
Undergraduate	_____	_____	_____	_____
Post graduate	_____	_____	_____	_____

Indicate on a scale from one (low) to ten (high) how confident you feel that the information you reported is accurate (Circle your response).

1 2 3 4 5 6 7 8 9 10

Approximate number of credit hours and courses taken with math as a primary focus (courses concerned primarily with math or math techniques).

	No. of Credit Hours		No. of courses	
	Semester	Quarter	Semester	Quarter
Undergraduate	_____	_____	_____	_____
Post graduate	_____	_____	_____	_____

Approximate number of credit hours and courses taken with math as a secondary focus (math was included as part of the courses).

	No. of Credit Hours		No. of courses	
	Semester	Quarter	Semester	Quarter
Undergraduate	_____	_____	_____	_____
Post graduate	_____	_____	_____	_____

Indicate on a scale from one (low) to ten (high) how confident you feel That this information is accurate (Circle your response).

1 2 3 4 5 6 7 8 9 10

QUESTIONNAIRE - STUDENT

Name_____

Age_____Sex_____

Please indicate in months the length of time you have taught this student including any months prior to this school year. _____Months

Below are 20 objectives which pertain to reading and mathematics skills for educable mentally retarded children. Please indicate by checking the appropriate column whether or not you feel this student could successfully complete each of these objectives at the present time.

READING	YES	NO
1. When shown one set of upper case manuscript letters in alphabetical order and one set in random order, this student will match the letters by pointing to the letters which match, or by drawing connecting lines between the matching letters when asked to do so.	____	____
2. When shown a copy of lower case manuscript letters listed in random order, this student will identify the letters by correctly naming each letter when asked to do so.	____	____
3. When requested to do so by the examiner, this student will correctly name the five vowels.	____	____
4. When presented with a list of 9 color words (red, blue, yellow, green, orange, purple, black, brown, white), this student will read all of them correctly.	____	____
5. When presented with a list of the number words from one to ten, this student will read all of them correctly.	____	____
6. When shown a consonant letter and four pictures, two of which begin with the initial consonant letter presented and two which do not, this student will indicate correctly which two pictures have the same initial consonant sounds as the consonant presented for each of six letters (s, d, n, f, c, p).	____	____

	YES	NO
7. When the examiner pronounces a pair of one syllable words which are alike or different according to the initial consonant, this student will auditorily discriminate by indicating if the words sound alike or different for m, b, r, f, l, and t.	____	____
8. When given a text-referenced preprimer reading passage, this student will read the passage orally without experiencing difficulty in pronouncing more than one word in 33 (97% accuracy).	____	____
9. When given a text-referenced primer reading passage of 67 words, this student will read the passage orally without experiencing difficulty in pronouncing more than two words (97% accuracy).	____	____
10. When given a text-referenced first grade reading passage of 67 words, this student will read the passage orally without difficulty in pronouncing more than two words (97% accuracy).	____	____
MATH		
1. When requested to do so, this student will correctly count by rote to 10.	____	____
2. When requested to do so, this student will correctly count by rote to 30.	____	____
3. When presented with numerals in random order of value of 40 or less, this student will read them one at a time with 100 percent accuracy.	____	____
4. When given numerals of 10 or less in random order and asked to do so, this student will respond by showing the correct quantity of objects to match each numeral.	____	____
5. When given five objects or a picture of five objects in a row and requested to do so, this student will correctly point to the objects according to their ordinal position.	____	____
6. When presented with pencil and a copy of the numbers from 1 to 12 listed in random order, and when requested to do so, this student will write the numbers immediately preceding and following each of the numbers.	____	____

	YES	NO
7. When ten addition combination facts with sums of 10 or less are presented visually and orally one at a time, this student will respond orally with the sum for each pair within 5 seconds and with 90% accuracy for the ten combinations.	____	____
8. When ten subtraction facts with minuends of 10 or less are presented visually and orally one at a time, this student will respond verbally with the answer for each problem within 5 seconds and with 90% accuracy for the ten combinations.	____	____
9. When presented with pictures of, or genuine, U.S. coins and a dollar bill and asked to do so, this student will give the name of each within five seconds.	____	____
10. When presented with pictures of, or genuine, U.S. coins and a dollar bill and asked to do so, this student will give the value of each within five seconds.	____	____

In making your estimates about the above objectives for this student, which of the following sources of information did you consider? (Check all that apply)

Medical Information.....___

Social Information
- Comments from previous teachers___
- Social history.....___
- Informal classroom observation ___

Educational Information
- Achievement test results.....___
- Previous classroom performance ___
- Informal test results.....___

Psychological Information
- I. Q. score.....___
- Psychological report.....___

In writing this student's Individualized Education Program (IEP) which sources of information did you use: (Check all that apply)

Medical Information.....____

Social Information
Comments from previous teachers....____

Social history.....____

Informal classroom observation.....____

Educational Information
Achievement test results.....____

Previous classroom performance.....____

Informal test results.....____

Psychological Information
I.Q. score.....____

Psychological report.....____

Using a scale of 0 to 100 (0 is low) indicate the relative contribution of each information source to developing goals and objectives for this student. (That is, if you had to spend $100.00 for information, how would you spend it?)

Medical Information _____

Comments from previous teachers _____

Social history _____

Informal classroom observation _____

Achievement test results _____

Previous classroom performance _____

Informal test results _____

I. Q. score _____

Appendix B

Correspondence

Dear Superintendent:

As a doctoral student in special education administration at Virginia Tech, I am in the process of collecting data for my dissertation study entitled, "Primary EMR Teachers' Estimates of Student Performance." I am interested in the possibility of using your school division as part of this study. The study will involve teachers of educable mentally retarded students at the primary and elementary levels within the school systems throughout the Commonwealth. I understand that you have three teachers who fall within this category.

Basically, I am interested in investigating the ability of special education teachers to accurately estimate the reading and mathematics performance of their students and the relationship between the teacher's accuracy and the information sources which may be used by the teacher when making decisions concerning the education of students, i.e., individualized education programs (IEPs).

The teachers will be involved in the following activities: (1) filling out a data sheet concerning their teaching experience, certification level, etc., and (2) making estimates about the performance of six students on 20 mathematics and reading skills. Six students (three boys; three girls) will be randomly selected from each classroom. While the teachers are involved in making estimates, three trained examiners will evaluate each of the students on the 20 performance skills. These skills are a part of the Brigance Diagnostic Inventory of Early Development which will be used to evaluate the students. Parental permission will be obtained before the students are evaluated. Although it may be necessary to use the names of students during the actual data collection, no student will be identified by name in the reports. Drafts of the data collection forms are included with this letter.

Since the students will be evaluated while the teachers are making their estimates and filling out the data forms, the total time for each classroom involvement should be less than one hour. The three test examiners will be evaluating students simultaneously so that the six students in the classroom will be evaluated as quickly as possible. The estimated total teacher work time per teacher is between 40 and 60 minutes, while the estimated total student work

time per student is between 30 and 40 minutes. It may be necessary to use a room separate from the classroom for either testing the students or for having the teacher complete the data forms.

Upon completion of the study, a report will be submitted to the appropriate persons within your school division. This report will include the results of the study and recommendations relating to staff development and training, particularly in relation to student programming and individualized education programs.

If any additional information is needed please contact me at the address below. I will be glad to come to the school board office at any time to discuss this study. Thank you for your cooperation and your assistance.

Sincerely,

Marsha Christy

College of Education
Virginia Tech
Blacksburg, VA 24061

Dear Parents:

I am a doctoral student in special education at Virginia Tech. The Department of Research and Planning in your child's school has approved my request to conduct research in the school system. The principal of your school has also agreed to work with me.

As part of my research, I would like to administer part of the Brigance Diagnostic Inventory of Early Development to your child. This short test of reading and math skills would take about 20 minutes for your child. I am requesting that you give permission for your child to be tested sometime in the near future. Please complete the bottom of this sheet and return it to your child's teacher.

If you have further questions about this request, please contact me or call the principal of your school.

Sincerely,

Marsha Christy

College of Education
Virginia Tech
Blacksburg, VA 24061

or

Blacksburg,
VA 24060

Check one:

_____I give permission

_____I do not give permission

for my child_____to participate in testing for the research of Mrs. Marsha Christy as described above.

Signed_____
parent or guardian

Appendix C

Additional Data Analyses

Table 23

Chi Square of the Number of Mathematics Courses at the Graduate Level by the Number of Correct Mathematics Estimates

Number of Correct Math Estimates	Number of Math Courses	
	0	1 or more
7 or less	27	10
8	25	12
9	26	10
10	16	10

χ^2=1.162 df=3 p=.7622

Table 24

Chi Square of the Number of Mathematics Courses at the Undergraduate Level by the Number of Correct Mathematics Estimates

Number of Correct Math Estimates	Number of Math Courses	
	0-2	3 or more
7 or less	26	11
8	25	12
9	23	13
10	14	12

$\chi^2=1.987$ $\underline{df}=3$ $\underline{p}=.5750$

Table 25

Chi Square of the Number of Endorsements held by the Teacher by the Number of Correct Estimates

Number of Correct Estimates	Number of Endorsements	
	1	more than 1
14 or less	12	11
15-18	37	48
19-20	5	23

$\chi^2=7.596$ df=2 p=.0224

Table 26

Chi Square of the Number of Endorsements held by the Teacher by the Number of Correct Mathematics Estimates

Number of Correct Math Estimates	Number of Endorsements	
	1	More than 1
7 or less	22	15
8	16	21
9	13	23
10	3	23

χ^2=15.035 df=3 p=.0018

Table 27

Chi Square of the Number of Endorsements held by the Teacher by the Number of Correct Reading Estimates

Number of Correct Reading Estimates	Number of Endorsements	
	1	More than 1
7 or less	16	16
8	16	20
9	13	23
10	9	23

$\chi^2=3.741$ df=3 p=.2908

Table 28

Chi Square of the Number of Reading Courses at the Undergraduate Level by the Number of Correct Reading Estimates

Number of Correct Reading Estimates	Number of Reading Courses		
	0	1 or 2	3 or More
7 or less	1	21	10
8	4	26	6
9	7	20	9
10	10	15	7

χ^2=12.365 df=6 p=.05

Table 29

Chi Square of the Number of Reading Courses at the Graduate Level by the Number of Correct Reading Estimates

Number of Correct Reading Estimates	Number of Reading Courses		
	0	1 or 2	3 or More
7 or less	22	8	2
8	24	6	6
9	23	5	8
10	19	1	12

$\chi^2=13.538$ $df=6$ $p=.0353$

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