

The Age Placement of Academic Skills in Curriculum for the EMR

Abstract: The purpose of this study was to investigate the importance and age placement of certain operationally defined skill objectives relative to instructional programs for the educable mentally retarded and to compare the behavior of pupils in special classes with that of a representative sample. The basic skill areas included vocabulary, reading, language usage, punctuation, capitalization, spelling, arithmetic problem solving, arithmetic concepts, and work-study skills. Each skill was illustrated and operationally defined by a test item designed to specify the behavior required of the pupil and the difficulty of the skill. In all, 204 samples of behavior were studied. The importance of emphasizing academic skills in instructional programs for the EMR was assessed through the use of a specially designed inventory of skills. The inventory was submitted to 2 groups of judges for evaluation. The illustrative items were also organized into experimental tests and administered to 1,405 EMR children between the ages of 9 and 18 and to a representative sample of 2,187 pupils in grades 3 through 8.

STATEMENTS of objectives for the education of educable mentally retarded pupils are frequently unnecessarily vague. They are typically couched in phraseology which fails to describe the desired changes in behavior or to suggest levels of acceptable performance.

Descriptive statements may be useful in providing a general philosophy for the overall program, but they are of little use to the teacher or the author of instructional materials who must constantly make decisions relative to desired changes in behavior. Teachers attempting to plan learning experiences in accordance with stated objectives must

resort to a personalized interpretation of global objectives. In taking such liberties they risk committing undue emphasis to the teaching of information, concepts, or skills which are inappropriate to the needs of the EMR. Inherent in the broadness of typical educational objectives is a lack of direction for the planning of sequential programs, assessment of pupil performance, and the development of instructional materials.

Educational objectives are relative and not absolute. Thus, one cannot generalize a prescribed level of performance for all individuals, nor can one infer that a unified curriculum is sufficient for all children. However, it is essential that if the scope and sequence of desirable learning experiences for the mentally retarded are to be meaningfully interpreted by teachers, administrators, and researchers, the educational objectives need to be more explicit.

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Behavioral objectives are generally classified into three domains: cognitive, psychomotor, and affective (Bloom, 1956). There is general consensus among special educators that behavior in all three is important. Objectives for the education of the EMR differ from those for children within the normal range of intellectual development mainly in the emphasis given to psychomotor and affective objectives and the selectivity employed in the selection of curriculum content. For example, some programs place a relatively greater emphasis on psychomotor and affective objectives and tend to either deemphasize or to postpone giving attention to objectives in the cognitive domain. This often results in less attention being given to the teaching of basic skills.

A well designed behavioral objective should specify the task to be accomplished, a criterion level for successful performance, and the conditions under which the task is to be performed (Mager, 1962). A review of current curriculum guides developed for the educable mentally retarded indicates a lack of specificity. For the most part, they represent global statements. The lack of well delineated objectives may well contribute to the limited evidence of sequentially developed curriculums for the EMR.

Problem

This study involved an investigation of two major problems pertaining to curriculum development for the educable mentally retarded. The first was (a) to ascertain through expert judgment the importance for instructional programs for the EMR of selected operationally defined cognitive skills in the areas of vocabulary, reading, language usage, punctuation, spelling, arithmetic concepts, arithmetic problem solving, and work-study, and (b) to determine the chronological age level at which experts believe instruction in such skills should be initiated. The second problem was to empirically establish levels of educational development for the skills involved and to identify the level at which the educable mentally retarded are currently learning them.

The omission of the psychomotor and af-

fective domains was not to suggest that their emphasis should be minimized. The investigator fully concurs with the general view of special educators that an appropriate curriculum for the mentally retarded involves more than instruction in academic skills. Objectives related to attitudes and values constitute a legitimate and major emphasis. However, to the degree that academic skills are an essential component to the curriculum, more information was needed concerning which particular skills should be included in instructional programs for the educable mentally retarded and at what level they should be taught.

Method

The importance of academic skills to the curriculum was determined through the use of a specially designed survey instrument. Specific skills in the areas of vocabulary, reading, spelling, capitalization, language usage, punctuation, arithmetic concepts, arithmetic problem solving, and work-study skills were identified through a review of curriculum publications related to the education of the educable mentally retarded. A total of 213 selected skills were then organized into an inventory and submitted to four groups of judges who rated them on a 5 point scale ranging from no importance to very important.

There were two basic parts to the inventory. The first part was an introduction which dealt with an explanation of the study and a description of the population of pupils enrolled in special classes for the educable mentally retarded. The second part contained a listing of specific skills and criteria for appraising the importance of each skill and for estimating the level appropriate for initial instruction in the respective skills. Each skill was operationally defined through the use of an illustrative test item. The test items were selected primarily from items developed by the Iowa Testing Program for inclusion in an achievement battery for disadvantaged students. The 213 illustrative items appeared in the inventory as on Figure 1.

The judges were instructed to use the difficulty level of the illustrative test item as

FIGURE 1. Illustrative item.

Category: Arithmetic—Measurement

Skill or Concept: Reading thermometers

What temperature does this thermometer show?

(1) 38°

(2) 39°

(3) 41°

(4) 42°

| | | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|-----------------------|------------------------|---|----|----|----|----|----|----|----|----|----|
| not impor- tant | very impor- tant | | | | | | | | | | |

a frame of reference in estimating the age level at which instruction should be initiated. The judge groups included 20 special class teachers each at the primary, intermediate, and advanced levels, plus a group of 5 curriculum experts. The teacher judges were selected from a population of 179 Iowa special class teachers meeting the training, experience, and certification requirements, and the curriculum experts represented the states of Iowa, California, New York, Colorado, and Nevada.

In order to establish levels of educational development for each skill and to assess the performance of educable mentally retarded pupils, the illustrative test items were organized into experimental tests and administered to samples of EMR pupils and to representative normal pupils. The experimental tests were designed to investigate the difficulty of the illustrative test items. All 204 test items were administered to each subject

TABLE 1

Illustrative Item

| Subtest | Number of illustrative items |
|----------------------------|------------------------------|
| Vocabulary | 30 |
| Reading comprehension | 14 |
| Spelling | 30 |
| Capitalization | 14 |
| Punctuation | 13 |
| Usage | 8 |
| Arithmetic concepts | 30 |
| Arithmetic problem solving | 25 |
| Map reading | 20 |
| Reading graphs and tables | 20 |

in the educable mentally retarded and representative samples. (Nine items were eliminated because skills they measured were covered by other items or because of printing errors on the original inventory.) Although the focus was on the performance of the individual items, it was necessary to organize the items into several subtests for purposes of test administration. Test booklets and manuals were printed to resemble standardized achievement tests. The items were grouped into subtests (Table 1).

The educable mentally retarded subjects marked their responses on the test booklets; however, the representative sample used machine scorable answer sheets. No time limits were imposed on either group.

The educable mentally retarded sample included 1,405 pupils between the ages of 9 and 18 from three large Iowa school districts (see Table 2). The representative sample was com-

TABLE 2

Summary of Descriptive Data on Educable Mentally Retarded Sample by School District

| Age Group | District A | | | District B | | | District C | | | Total Sample | | |
|-----------|------------|-----------------|-------|------------|-----------------|-------|------------|-----------------|-------|--------------|-----------------|------|
| | N | \overline{IQ} | SD | N | \overline{IQ} | SD | N | \overline{IQ} | SD | N | \overline{IQ} | SD |
| 9 | 40 | 67.97 | 6.89 | 63 | 67.95 | 10.66 | 25 | 68.60 | 8.14 | 128 | 68.08 | 9.16 |
| 10 | 35 | 67.09 | 6.82 | 55 | 69.38 | 6.55 | 44 | 71.98 | 5.27 | 134 | 69.63 | 6.51 |
| 11 | 45 | 68.16 | 6.50 | 85 | 70.31 | 6.50 | 43 | 68.51 | 6.47 | 173 | 69.30 | 6.57 |
| 12 | 40 | 71.35 | 6.89 | 79 | 69.19 | 6.90 | 43 | 68.86 | 6.25 | 162 | 69.64 | 7.80 |
| 13 | 36 | 67.42 | 9.23 | 68 | 69.48 | 7.79 | 40 | 68.10 | 7.72 | 144 | 68.58 | 8.21 |
| 14 | 35 | 66.49 | 9.78 | 82 | 69.43 | 6.55 | 24 | 68.13 | 16.00 | 141 | 68.48 | 9.69 |
| 15 | 43 | 66.07 | 11.49 | 85 | 68.73 | 7.90 | 30 | 68.63 | 7.92 | 158 | 67.49 | 9.10 |
| 16 | 28 | 69.68 | 8.47 | 70 | 68.40 | 11.18 | 35 | 68.69 | 6.88 | 133 | 68.74 | 9.67 |
| 17 | 24 | 72.71 | 8.85 | 58 | 67.34 | 8.11 | 31 | 72.48 | 8.53 | 113 | 69.89 | 8.79 |
| 18 | 22 | 66.37 | 8.78 | 70 | 69.30 | 8.47 | 27 | 71.11 | 5.59 | 114 | 68.88 | 7.60 |

prised of 2,187 pupils enrolled in grades three through eight in 10 Iowa school districts.

Results

The results consisted of (a) an analysis of ratings of importance of skills to the curriculum and judgments relative to age placement by experts in curriculum for the mentally retarded and by special class teachers of educable mentally retarded at three age levels; (b) a comparison of performance of pupils enrolled in classes for the educable mentally retarded by age, sex, and IQ group; (c) comparisons of performance of mentally retarded pupils with that of representative samples of Iowa pupils of the same age; and (d) comparisons of performance data with judgments regarding importance and age placement. Space limitations prohibit the presentation of data relative to the specific skills investigated as they were reported in the original study. Consequently, the results will be reported in terms of (a) the implications relative to teaching academic skills in educational programs for the educable mentally retarded and (b) a sample of how the performance of each item was analyzed.

Tables 3 and 4 illustrate the types of data which were reported on each of the 204 skills investigated. Table 3 presents data for each of the judge groups regarding (a) perceived importance of the skill to the curriculum, (b) the median age placement at which the judges felt instruction in the skill should be initiated, and (c) the raw data in terms of responses by judge groups relative to age placement. The results were reported separately for each judge group along with a composite of the responses from the teacher judges. Table 4 reports the percentage of subjects making correct responses to the illustrative item at each age level. For purposes of comparison, the data were reported according to sex, IQ grouping, and the overall educable mentally retarded sample. The column labeled "60 percent age" indicates the age level at which 60 percent of the sample got the item correct. This is a rather arbitrary index of the age at which the behavior might be called "typical." In free response mental tests, items are frequently

placed on an age scale at the age at which 50 percent pass the item. The 60 percent age represents the median of the frequency distribution of item difficulty indexes which is frequently used in multiple choice achievement test construction. The 60 percent age was obtained through interpolation.

The importance of specific cognitive skills for instructional programs for the EMR was a major concern of this investigation. The fact that the mean ratings of importance by the expert and combined teacher judges was above three on a 5 point scale for 172 of the 204 skills suggests that the broad spectrum of academic skills as defined by the illustrative test items in this study are important to the curriculum for the educable mentally retarded.

The specific skills rated highest in importance by both the expert and combined teacher judges were in the realm of high utility skills. They were skills of a functional nature which are frequently used in daily life. Among the most important were arithmetic problem solving related to money, measurement, and time. Language arts skills, such as the use of a period at the end of a complete sentence, proper use of a question mark, and capitalization of the first word in a sentence, were among the skills rated as important. Most of the reading comprehension and vocabulary items received ratings higher than four. The work-study items ranked high were also of a practical nature. The latter included specific skills which related to the use of a road map and to obtaining basic information from a calendar.

Of the 204 items, 24 were rated below three on a 5 point scale by either the expert or combined teacher judges. Such a rating would imply that the skills could be eliminated and not weaken the program. In general, those skills considered of lesser importance were more abstract and involved reasoning on the part of the subject. For example, skills related to fractions, decimals, and computing averages were rated very low. Work-study items requiring the subjects to see relationships or to draw inferences from tables were among those considered of least importance. The language arts skills rated low

involved skills rarely used in personal correspondence, e.g., quotation marks and capitalizing names of religious groups.

The judges also demonstrated considerable agreement in terms of specifying the chronological age at which instruction in the respective skills should be initiated. On most items the educable mentally retarded sample attained 60 percent success at an age which was within 2 years of the median age placement estimated by the judges. However, the educable mentally retarded failed to achieve the criterion of 60 percent correct within the 9 to 18 age range on 55 of the 204 illustrative items. The three areas presenting the greatest difficulty were arithmetic concepts, reading graphs and tables, and map reading.

It should be noted that the items on which the educable mentally retarded failed to

achieve 60 percent success were rated by the judges as being least important to the curriculum. The age placement on these skills was estimated by the judges to be approximately at the 15 year level. (Age placement refers to the chronological age level recommended by the judges for initiating instruction on the selected skills.)

It is significant to note that although the judges ranked a major portion of the skills as being important and were in agreement on their age placement, the performance of the educable mentally retarded was much below the representative sample on the respective skills. Using 60 percent correct as a criterion, the educable mentally retarded sample performed within 5 years of the representative sample on only 42 of 204 illustrative test items. The judges placed most of the skills

TABLE 3
Sample of Method Used to Report Item Performance Data with Importance and Age Placement of Basic Skills in the Curriculum as Determined by Teachers and Judges

Capitalization: Item No. 7

Skill or Concept: Capitalize the name of the month

7. (1) Pat and I have a job. In
(2) June we are going to pick
(3) cherries in an orchard.

| Judge Group | Importance | | Age placement | | Percent of judges ranking each age level | | | | | | | | | | | | |
|----------------|------------|----|---------------|-------------|------------------------------------------|----|----|----|----|----|----|----|----|----|--|--|--|
| | Mean | SD | Median | $Q_3-Q_1^*$ | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | | | |
| Experts | 4.0 | .6 | 11.3 | 1.0 | | | 60 | 40 | | | | | | | | | |
| Primary | 3.9 | .5 | 10.0 | 2.0 | 30 | 40 | 10 | 15 | 5 | | | | | | | | |
| Intermediate | 4.0 | .4 | 10.3 | 1.7 | 25 | 30 | 30 | 15 | | | | | | | | | |
| Advanced | 4.1 | .4 | 10.8 | 1.4 | 5 | 35 | 35 | 10 | 10 | 5 | | | | | | | |
| Total teachers | 4.0 | .4 | 10.4 | 1.7 | 20 | 35 | 25 | 13 | 5 | 2 | | | | | | | |

* Q_3-Q_1 indicates the degree of agreement of the middle range of 50 percent of judges responding.

TABLE 4
Item Performance Indexes Relative to Age of EMR and Representative Normal Pupils on Item 7

| CA levels | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 60 percentage |
|-----------------------|----|----|----|----|----|----|----|----|----|----|----|---------------|
| EMR boys | | 22 | 44 | 57 | 50 | 52 | 53 | 62 | 68 | 71 | 76 | |
| EMR girls | | 27 | 33 | 47 | 65 | 65 | 62 | 79 | 83 | 80 | 98 | |
| 60-65 IQ group | | 24 | 39 | 58 | 42 | 61 | 46 | 62 | 77 | 58 | 79 | |
| 66-80 IQ group | | 24 | 44 | 50 | 60 | 57 | 63 | 70 | 76 | 83 | 83 | |
| EMR sample | | 24 | 42 | 52 | 56 | 58 | 57 | 68 | 75 | 76 | 84 | 14.3 |
| Representative sample | 88 | 90 | 97 | 96 | 99 | 99 | 98 | 99 | | | | 8.0 |

in the 11 to 14 age category and the educable mentally retarded sample attained success on most items within the 12 to 15 age range, whereas the representative sample demonstrated 80 percent success at age 8 on most items. This finding becomes particularly significant when it is considered that the developmental lag occurred on those skills which the curriculum experts and specially trained teachers concluded were important to the curriculum.

In terms of sex differences within the educable mentally retarded sample, the girls consistently performed better than the boys except in the area of work-study skills. The girls performed better on only 4 of the 20 map reading items and on 5 of the 20 items pertaining to reading graphs and tables. The latter two areas were also the skills presenting the most difficulty to the educable mentally retarded sample. Neither sex achieved 60 percent success at any age level on 11 of the map reading items and 7 of the graphs and tables items.

The educable mentally retarded sample was subdivided according to two IQ groups in an attempt to identify differences based on ability. The low IQ group was comprised of pupils with measured intelligence quotients between 50 and 65. The high IQ group had IQ's ranging between 66 and 80. The latter IQ group achieved the criterion of 60 percent success 2 years in advance of the low IQ group on most skills. The typical state requirement for grouping educable mentally retarded children into special classes sets limits between 50 and 79. The findings of this study suggest that serious consideration should be given to structuring classes with smaller ranges in IQ. For example, the child scoring in the low 50's performs closer to the high functioning trainable child than to educable children with IQ's in the 70's.

Discussion

The lateness of the age placements recommended by the judges for initiating instruction in academic skills reflects a philosophy typical of the literature on curriculum for the mentally retarded. In general, this philosophy suggests that the EMR should be taught aca-

demically much later than the "normal" child in the regular class. While one cannot necessarily disagree with the basic premise of this philosophy, the results of this study imply that the developmental lag observed between the performance of the EMR and the representative sample was too great to be explained solely by intellectual limitations. The late age level recommended by the judges for initiating instruction in the selected academic skills may be the determining factor which influenced the wide difference in performance between the EMR and the representative samples. These findings raise the question of whether or not the educable mentally retarded could be taught the selected academic skills at an age younger than the age placement recommended by the judges. The fact that 80 percent of the 8 year olds in the representative sample were able to learn a skill would suggest that the retarded child could be taught the same skill at the approximate age of 10 or 11. This finding encourages speculation in the area of expectancy. The expectations held by teachers might well contribute to the late performance of the educable retarded in academic skills.

It may be that the rigid requirement of sequentially teaching specific skills in regular education, often deplored by special educators as inappropriate for the educable mentally retarded, is the missing ingredient in the special class curriculum. This is not to suggest that the curriculum should be patterned after the regular class; rather the implication might be that those skills considered important to the education of the educable mentally retarded should be more systematically taught in a sequential manner and possibly introduced at an earlier level. Since children progress through several levels of special classes, reliance on teacher judgment as to what should be taught and when it should be taught for a particular class does not contribute to the continuity of the child's education.

The importance placed on the majority of representative skills considered by the judges suggests that the teaching of certain academic skills is an important element of the curriculum for the educable mentally retarded. This

does not negate the significance of teaching social skills or vocational training; however, it brings into focus the need for a more systematic approach to teaching academic skills.

The results pertaining to the importance and age placement of academic skills help to clarify the findings of several efficacy studies conducted in recent years which showed that the EMR in regular classes did better academically than their counterparts in special classes. Considering that the retarded in special classes were probably introduced to academic skills much later than the retarded in regular classes, it is not surprising that those in regular classes did better on the standardized tests which were used as criterion instruments. Because the academic skills considered important to curriculum for the educable mentally retarded are more circumscribed and in view of the lateness at which they are introduced, the need exists for standardized achievement tests geared to curriculum objectives for the educable mentally retarded.

The grouping of educable mentally retarded children into special classes according to chronological age and IQ has long been a practice supported by legislation and/or governmental regulations. In general, the IQ guidelines have encompassed a range from 50 to 80. When possible, the age spread has been kept small. The results of this study indicate that on the skills and illustrative items considered, pupils with IQ's between 66 and 80 are about 2 years advanced in learning academic skills than the children with IQ's between 50 and 65. This finding supports the need for experimentation in the grouping of retarded children for purposes of instruction.

Conclusion

The high interjudge agreement between teachers and curriculum experts suggests that there is considerable agreement on the importance of specific cognitive skills to instructional programs for the EMR. The lateness at which the judge groups recommended the teaching of the 204 academic skills studied in this investigation is compatible

with the popular position that the educable mentally retarded are not capable of learning skills at the same time or rate as their "normal" peers. However, the developmental lag of 5 years observed in this study between the retarded and representative samples on 162 of the skills implies that the differences in performance may be greater than should be expected in terms of intellectual limitations. There is sufficient evidence to suggest that further study should be given to the teaching at an earlier level of the academic skills identified as important to instructional programs for the educable mentally retarded. The position reflected in the literature that skills should be taught late and the resultant poor performance of the retarded may in part be due to the failure to sort out the skills most relevant and systematically teach them. Failure to focus on the most relevant skills and concepts tends to allow these essential ingredients to become confounded within a larger universe of skills and concepts, many of which are inappropriate.

The absence of well defined instructional objectives and a relevant circumscribed sequential curriculum for the educable mentally retarded has resulted in educational programs which are basically unique to the skills of the teacher. The special class teacher must make decisions on what and when to teach. Further study needs to be given to the selection and age placement of academic skills in curriculum for the educable mentally retarded as well as the influence of the curriculum decisions made by teachers.

References

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