ANALYSIS OF ENGLISH AND MATHEMATICS SKILLS OF SECONDARY EMR STUDENTS

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by
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The current American Association on Mental Deficiency (AAMD) definition of mental retardation (Grossman, 1973) states:

Mental retardation refers to significantly sub-average general intellectual functioning existing concurrently with deficits in adaptive behavior and manifested during the developmental period. (p. 5)

In operational terms, this means an individual's measured intelligence must be at least two standard deviations below the mean (68/70 I.Q.), he must have been identified prior to the age of 18 and he must have been determined to be "unable to meet the standards of personal independence and social responsibility expected of his age and cultural group" (Brolin, 1975, p. 6).

It is unfortunate that this definition of mental retardation is not fully accepted by the public. The mentally retarded, according to Brolin, are one of the least understood minority groups in our country, and there are a variety of misconceptions and negative opinions regarding both mental retardation as a condition and characteristics of retarded individuals.

Research in the field has only perpetuated misconceptions by its lack of specific descriptions, particularly in reference to the mildly retarded. Brolin described this group which is often labeled "Educable Mentally Retarded" (EMR) as follows:

The mildly retarded range in IQ from 55 to 69 and comprise about 89% of the retarded population. Although many are retarded because of minimal brain damage and other medical reasons (where the damage is not severe), many others demonstrate no medical pathology and are classified as cultural-familial. These individuals do not have as many physical problems as a group and therefore are not ... as distinguishably retarded as the other three groups of retardates. They are generally able to develop fairly adequate social and communication skills and a fourth to sixth grade academic level if they receive good educational services. (p. 8)

As a guide for providing educational services for EMR students, Baumeister (cited in Brolin, 1975) listed the following learning characteristics:
1. The learning deficiencies of EMR persons are task specific or related to only certain aspects of the learning situation.

2. Under certain conditions their learning and retention are quite adequate and comparable to normals.

3. Rote memory is often difficult to achieve.

4. Meaningfulness of the material to be learned is important.

5. Learning is facilitated if they are required to name the stimulus before responding.

6. When verbal learning material is familiar and concrete, the retarded do as well as normals.

7. Overlearning materials apparently benefits the retention.

8. Discrimination learning tasks are difficult compared to normal persons.

9. Previous experience in discrimination learning situations is an important factor related to rate of learning.

10. Prolonged failure experience affects ability to solve problems formerly possible.

11. They have a "generalized expectancy to fail" which is associated with an unnecessarily low initial level of performance.

12. Motor learning is most appropriate, and with proper training methods the EMR individual can learn many complex and intricate motor skills. (p. 15)

In similar fashion, Denny (cited in Brolin, 1975) described the learning of EMR's as follows:

1. As long as rote learning materials are non-verbal and familiar, there is insufficient evidence of a learning deficit with the EMR.

2. Direction following is a frequent problem requiring instructions to be repeated frequently for learning to occur.

3. There may be an initial deficit on motor learning tasks, but with practice they improve more rapidly than normals and sometimes catch up with them.

4. As the difficulty of the task increases, the importance of intelligence increases and despite faster improvement, they are unable to make up the difference. (p. 15)
Research has provided a theoretical background and general guidelines for teachers to use in establishing an EMR curriculum. However, most specific guidance has been provided for teachers of elementary-aged EMR students. Little direction is available for teachers of secondary EMR's in terms of what basic academic skills they can expect students to have when they enter high school. As a possible guide for beginning teachers, this paper will examine academic skills of a particular secondary EMR class.

Setting

Students whose academic skills will be described were enrolled during the 1975-76 school year in a high school EMR program located in a lower socio-economic area of East Gary, Indiana. The program is operated in accordance with Indiana Department of Public Instruction rules and regulations. Rule S-1, Revised (DPI, 1973) provides the following definition statement:

"Given an individual intelligence test such as the Stanford-Binet Intelligence Test, the educable mentally retarded person will usually earn a quotient within the 60-75 range" (p. 25). Placement in the program was initiated by teacher referral and followed by testing and staffing. Written parental consent is required for both testing and placement.

Although exact parental income data were not available, 13 of the 29 students in the program were eligible for the school's free lunch program during the 1975-76 academic year. Students ranged in chronological age from 13-6 to 20-2 years, with the mean at 16-5 years. IQ's ranged from 54 to 80 (mean 69), and mental ages ranged from 7.5 to 15 years (mean 11.2 years).

Subjects

A sample of seven students (5 male, 2 female) was selected for this study. These students were assigned to the program during one class period
which facilitated data collection. Table 1 presents test data appearing in each student's permanent record.

Table 1
Test Data Listed in Subjects' Permanent Records

<table>
<thead>
<tr>
<th>Student</th>
<th>Date Tested (CA at testing)</th>
<th>Instruments &amp; Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>James</td>
<td>12-5-75 (15-9)</td>
<td>WISC-R Verbal-55, Performance-65, Full Scale-56</td>
</tr>
<tr>
<td>Joan</td>
<td>5-14-75 (14-4)</td>
<td>WISC-R Verbal-55, Performance-65, Full Scale-56</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WRAT Sight Voc. (3.5), Arith. (3.4)</td>
</tr>
<tr>
<td>Joe</td>
<td>5-23-74 (16-6)</td>
<td>WAIS Verbal-69, Performance-82, Full Scale-73</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WRAT Sight Voc. (2.8), Arith. (3.9)</td>
</tr>
<tr>
<td>John</td>
<td>3-25-75 (17-4)</td>
<td>WAIS Verbal-60, Performance-82, Full Scale-69</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WRAT Sight Voc. (5.4)</td>
</tr>
<tr>
<td>Luis</td>
<td>5-2-73 (17-1)</td>
<td>WAIS Verbal-63, Performance-82, Full Scale-69</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WRAT Sight Voc. (2.0), Arith. (3.4)</td>
</tr>
<tr>
<td>Luther</td>
<td>3-26-74 (15-8)</td>
<td>WISC-R Verbal-55, Performance-87, Full Scale-67</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WRAT Sight Voc. (2.0), Arith. (4.4)</td>
</tr>
<tr>
<td>Toni</td>
<td>3-3-76 (14-8)</td>
<td>WISC-R Verbal-55, Performance-63, Full Scale-55</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PIAT Math (2.6), Reading Rec. (3.4), Reading Comp (2.9), Spelling (5.6)</td>
</tr>
</tbody>
</table>

Students' records include references to a variety of social data. Three students come from broken homes, two are described as "hated by their father," one has been in trouble with the police, one was allegedly raped by her father, one boy's parents have lower IQ's than he, and one is an unwed father.
On the basis of these data, it was concluded that this sample of seven students is representative of the range of academic skills and other factors likely to be encountered in the "typical" high school EMR classroom.

Achievement Data

Data for this paper were collected over an eight week period. Due to students' familiarity with and lack of enthusiasm for standardized tests, it was decided that this method of gathering data was inappropriate. Use of one classroom as a sample allowed for collection of data in an unobtrusive manner.

Thus, routine seatwork assignments as well as oral samples of students' work were compiled from all class periods in which any one of the seven students in the sample was enrolled (history, math, English, health, and science). By virtue of this method of collection, consistency from one student to another is not always possible, and comparisons are difficult.

English

This area encompasses many skills needed for success in other academic areas. This is the reason for its analysis, broken down into three areas: oral reading skills, reading comprehension, and spontaneous written language.

Oral Reading Skills: Samples of the students' oral reading skills were tape recorded during several reading lessons, and later transcribed. In analyzing these tapes, several common problems became obvious. Little heed was paid to word endings (i.e., looked for looking, he for he's, light for lights). Phonics and word attack skills, if used at all, were usually limited to the first letter of the word (i.e., was for with, blue for bubbled, group for guy), and at those times when no attempt was made, the student paused and waited for assistance from either the teacher or another student. Although
sight vocabulary tended to be relatively good, mistakes were often made on pre-primer or primer level words (i.e., were for had, of for to, was for went). Repetition of words was also a common error. Only one of the students corrected his own errors, and at the other end of the spectrum, two students continued reading, even if, due to their errors, the selection made no sense. Another student had a tendency to insert words (make them up with for make time with) as well as disregarding vowels (draw for drew, give for gave).


"Not quite," Ricardo said bitterly. "Connie Hidalgo doesn't waste her time helping people. This party was for one person, and one person only. Connie Hidalgo! Just a neat trick to get Tim Smith over here."

Consuela cried, "I told you! I told you that night I wanted to show him!"

"Show him what?" Ricardo stormed. "Show him how mean Connie can be to a fine old lady? I should have known! You didn't even want us to play 'Mananitas' at your own grandmother's party!" Ricardo shook his head and went on. "And now you show Tim that good guys like Paco and Miguel fill Connie with shame. So what if their English isn't all it should be? You know other things are important, don' you?"

Ricardo had said don' instead of don't.

"Not don' you - don't you!" Consuela almost spit out the t on don't. Then she was sorry. She tried to explain. "It hurts Paco and Miguel. It hurts you if you don't speak right! If I wasn't so mad, I wouldn't tell you again. But you'll never get out of here if -"

"Well," Ricardo put in. "If I wasn't so mad, I wouldn't tell you this. Even if I get a job at Disneyland, I'm going to college. I don't care if it takes me fifty years. But I'm not going to do it by turning my back on my family. Or my friends - however they talk!"

This excerpt was read as follows. The asterisks indicate pauses made by the student, usually where words were given to him, either by the teacher or another student.

"Not quite," Ricardo said * bitterly. "Connie Hidalgo doesn't * waste her time helping people. This party was for one person and one person only. Consuela Ricar-Hidalgo. Just a neat * neat * trick to get Tim Smith over here."
Consuela crawl cried, "I thought I took * I told you I told you that that * night I wanted to show him."

"Show him * what?" * Ricardo * stormed. "Show show me now * show me how now * show him how now * show him how mean Consuela can be to a friend older * fine * old lady. I should have known! You didn't even want us to play * 'Mananitas' at your own grandmother party."

Consuela I mean Ricardo stood shook his hand and went on and * head Sonsuela (skipped line) "And now you should * now you show Tim that good guys like Raco and Juani * Miguel fill Consuela * Connie with * shame. So that is * what if that * their English isn't all it * should be. You know other things are important, don't you?"

Ricardo had said don't * don instead of don't. "Now don * not don you, don't you!" Con-Consuela almost * split * spit out the * the t on don't. Then she was sorry. She tried to explain to harker * hurt Raco and * Raco and Midge * Miguel. It hurt you if you didn't speak right. If I wasn't so mad I wouldn't tell you again, but you'll never get out of * here if you'll * "Well," Ricardo * put in, "If I wasn't so mad I would tell you * this never * even if I got a job at Disneyland, I'm going to * college. I'll do I didn't * I don't care if it takes me * fifty years, but I'm going * but I'm not going to do it my * by trying * turning my back on my friends * family on my friends now * however they talk."

Reading Comprehension: Measured by various types of questions, comprehension is vital in many academic areas in order to progress. Two types of questions were analyzed for the purpose of this paper: yes/no questions and wh questions. Questions in the sample were constructed by the teacher, and in all cases, students were allowed to refer to the text for assistance. Although this is not an advisable procedure for evaluation, in this case it aides in dramatizing the problems these students have.

For the yes/no questions, given over four chapters, accuracy ranged from 100% to 30%, with a mean of 65.5%. Of these 40 questions (10 per chapter), approximately half of them had answers directly stated in the text (i.e., "Was the old house all lit up?" The text states: "The old house is all lit up."). The other half of the questions require some degree of inference on the part of the pupils (i.e., "Did people say the Pool was
always ice cold?" The text states: "People said that the Pool never froze." Of the 19 total direct questions, 10 were answered correctly by all students. On the remaining nine questions, a range of one to six students had incorrect responses. Only 1/3 (7 out of 21) of the questions whose answers were indirectly stated received correct responses from all students. There was a range of from one to six students with incorrect responses on the remaining 14 questions.

Wh questions (that is, questions beginning with who, what, where, etc.) require the student to answer in a phrase, or something other than choosing between given responses. These questions also included answers directly or indirectly stated in the text. Accuracy range for the wh questions was from 100% to 0% with a mean of 74.3%. Of the 40 questions, 22 had answers which were directly stated, and 15 were answered correctly by all students. The remaining seven had incorrect responses from a range of one to three students. In the group of 15 questions with indirectly stated answers, eight were answered correctly by all students, and in the remaining 10, there was a range of one to seven students with incorrect answers.

Responses for these questions varied from incomprehensible (i.e., "What did the Piper's head look like?" "the I did the") to misreading the question ("What did Ma Lovey say to prove Michael's parents loved him?" "She took him in her arms.") to simply incorrect ("Who did Michael have a fight with?" "Lennie.").

Spontaneous written language: Samples for this area were taken from all assignments which required a written response from the students (such as creative writing, and workbook exercises). Samples were available for only four of the seven students. They were assisted with spelling, if and only if,
they requested it. However, this was the only form of assistance they received. This section has been divided into four areas: spelling, grammar, punctuation, and capitalization.

All four of the students exhibited spelling problems, especially with homonyms (i.e., threw for through, their for there), word endings (i.e., comming for coming, legs for leggs), as well as non-phonetic words (i.e., juce for juice).

In terms of grammar errors, two of the students exhibited problems in verb tenses (i.e., come for came), person (i.e., don't for doesn't), and use of negatives (i.e., no for any). One of these two has problems so severe that statements were unintelligible. The other two students did not demonstrate any problems here.

Periods were the only punctuation mark used universally, while apostrophes, quotation marks, and commas were seldom used, and not always appropriately.

In only one of the four cases was there a problem with capitalization, and it involved using capital letters either inappropriately or not using them when necessary.

Following are samples of two students' writing. This assignment asked students to write an ending to the story Upward Toward Hope by Chuck Munar, a story about two young teenagers who had a motorcycle accident in the desert and are now both hurt badly.

I. Eddie was dran so must to could hold his head up. He want to the mountain and fell of the motorcycle and dead. His girlfriend want to the house and was cry so mush so she could stop cry. I sleep so mush and he could see know one. He want to the hospital in the ambulance.

II. suddenly more and more Vultures came suddenly I noticed that they were not after me so I slowly crawled down the hill back threw the bushes and finally I saw eddy under a rock with his leg pinned under it I Knew if I didn't find water in a little while that I would be done
for so I started to look for some I didn't find water but I found a small cactus I used my hard sole of my shoe and began pounding on it finally it split open I saw some Juce coming from it.

Summary: Difficulties encountered by these students in English skills demonstrate probable cause for a great many other academic problems that they have. Types of errors made in oral reading most assuredly contribute to comprehension problems, as the errors usually changed the meaning of the statement. Without more extensive use of phonics and word attack skills, very little progress in their reading ability can be expected. Inability to use context clues, and, therefore, continuing with the passage in spite of the illogical nature it may begin to demonstrate, also impairs further growth.

In reviewing the analysis of students' comprehension skills, it appears that students have greater difficulty on inference-type yes/no questions than factual-direct yes/no questions. However, the fact that these questions allow the student a 50-50 chance of being correct must be kept in mind. Since only 17 out of 40, not quite 50% of the questions were answered correctly, it is difficult to conclude that the students comprehended what was read, in spite of the opportunity to refer back to the text.

Wh questions, however, produce a more marked difference between questions with directly stated and indirectly stated answers. Almost 75% of the questions with directly stated answers received accurate responses, while not quite 50% of those questions with indirectly stated answers were correctly responded to. One may infer with some degree of confidence that comprehension is desperately in need of attention, especially the realm of inference, in response to either type of questions.
Areas discussed in conjunction with spontaneous written language indicated problems one might expect to find, having observed the students' oral reading problems. The spelling problems concerning word endings is predictable, as the students tended to ignore these in oral reading. Not examining the entire word contributes in some degree to many of the grammar errors, as the students have presumably not noticed the differences between the words. The inappropriate usage of both punctuation and capitalization would tend to indicate that the students have been oblivious to them also. Another factor to be considered is that many of these students speak non-standard English, which not only complicates their written communication, but also their ability to comprehend reading material and questions.

Mathematics

Basic mathematic skills are essential to everyday living - one must know how to make elementary business transactions. Due to its importance, it was selected for analysis. The fact that the math class was divided into groups complicated consistency between students to a greater degree than was evident in the English section. However, patterns which indicate problem areas are evident. This segment has been divided into the two basic areas of mathematics: 1) addition and subtraction, and 2) multiplication and division.

Addition and Subtraction: In examination of the addition exercises done by the students, the most outstanding problem was that of carelessness. Two students, however, demonstrated the probability of inadequate knowledge of their addition facts. (See Example 1.) Carrying did not appear to present a problem, nor did the size of the number involved (up to three five digit numbers were completed accurately with carrying).

Example 1:

\[
\begin{array}{c}
65900 \\
3782 \\
68682 \\
137752 \\
\end{array}
\]
other. Since the secondary level basically reviews skills previously introduced, the students feel that they have already acquired them, although this paper illustrates that they have not. One can easily perceive the type of motivation problem the teacher is confronting. A combination of creativity and practicality can be utilized to raise the motivational level, by discovering new and exciting ways to apply these skills in realistic situations, so that the students may begin to grasp the value of possessing them.

This paper has also illustrated the extreme and unpredictable variance in students' abilities from one subject area to another. Thus the beginning teacher faces the puzzle of at least a minimum of group activities (keeping the development of social skills in mind) which students of such varying skill levels can enjoy and profit from, as well as individualizing instruction effectively in terms of the students as well as him/herself.

Summary

This paper has examined basic English and mathematic skills of seven high school EMR students, taken from a large group of 29, from a low socio-economic area of East Gary, Indiana. Data were informally collected from routine assignments, and analyses of the skills also incorporated suggestions for combatting some of the deficiencies. English skills were broken down into three main areas: oral reading skills, reading comprehension, and spontaneous written language; and mathematics was broken down into two: addition and subtraction, and multiplication and division. Each area was examined separately.

References


Subtraction, however, proved to be a more difficult computation. Three of the four students whose work was analyzed indicated definite problems in borrowing, especially subtraction from zero. (See Example 2.) One of the students exhibited an inability to determine the appropriate times to borrow (see Example 3) and two indicated a lack of knowledge of subtraction facts (see Example 4).

Example 2: \[ \begin{array}{c}
1840 \\
- 978 \\
772
\end{array} \]

Example 3: \[ \begin{array}{c}
2370 \\
- 1095 \\
1275
\end{array} \]

Example 4: \[ \begin{array}{c}
3720 \\
- 1566 \\
2154
\end{array} \]

Multiplication and Division: Multiplication problems yielded more variance in ability than any of the other areas being discussed. Only one of the five students could do three digit x two digit problems involving addition and carrying without difficulty. Two students appeared to understand the procedure for this type of problem, but because they did not know all their multiplication facts, they had great difficulty with them. This problem was shared with the other students. (See Example 5.) Another problem of two students was an apparent inability to recall numbers carried (See Example 6). Multiplication by zero was definitely not fully understood by one student (see Example 7). Multiplication of any number times two digits was beyond the level of two students, at that time (see Example 8).

Example 5: \[ \begin{array}{c}
122 \\
\times 42 \\
244 \\
288 \\
3134
\end{array} \]

Example 6: \[ \begin{array}{c}
15 \\
\times 86 \\
490 \\
1290 \\
3134
\end{array} \]

Example 7: \[ \begin{array}{c}
305 \\
\times 65 \\
1950 \\
3525
\end{array} \]

Example 8: \[ \begin{array}{c}
4567 \\
\times 29 \\
40603
\end{array} \]

Division problems were contributed by four of the students. Two of them appeared to know their division facts well, and could do long division and short division with remainders. However, the other two seemed to be lacking
in both areas. (See Examples 9 and 10)

Example 9: \[ \begin{array}{c}
3 \ 8 \\
23 \end{array} \) \[ \begin{array}{c}
209 \end{array} \]
Example 10: \[ \begin{array}{c}
27 \end{array} \) \[ \begin{array}{c}
284 \end{array} \]

**Summary:** The importance of addition and subtraction hardly requires discussion. In seatwork assignments as these were, the students completed addition exercises adequately, although carelessness was an occasional problem. Subtraction was another matter. More time needs to be spent on the concept of place value and borrowing for the students to develop proficiency. Multiplication, in all cases but one, was grasped at the very basic level, and will require more effort for a fuller understanding at the complex level of multiplying by two digits. All of the students could benefit from more extensive drill on multiplication facts. Although speed was not assessed, it is recalled that this area was also deficient. In spite of the fact that insufficient evidence was accumulated to make a definitive statement on division skills, more time should be spent on drill and the concepts of remainders and long division. This would greatly benefit the students in increased speed and accompanying accuracy, as well as lend to the understanding of those students still vague on the procedures.

Transfer of these skills to more practical situations (story problems) was not determined. This opens up an entirely new group abilities, which, by definition, will encompass the English skills already discussed as well as the mathematic skills. The value of pairing these sets of skills for practical application cannot be emphasized enough.

**Discussion**

Numerous considerations must be made by the beginning teacher. Motivation is indescribably important, perhaps more so at this level than any