

The Diacritical Marking System and a Preliminary Comparison with the Initial Teaching Alphabet

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The purpose of this paper is to present the Diacritical Marking System (DMS) as a method of temporarily regularizing the phoneme-grapheme relationship for beginning readers, and to give some preliminary results of a study¹ comparing the DMS with unmarked books and with the Initial Teaching Alphabet (ITA) in 21 New Jersey first grades during the school year 1964-65.

Background and Rationale

From the phonetic standpoint, the basic difficulty with English is that in speaking we use about 44 phonemes, while in writing it we have only 26 letters available. By definition, an alphabet is a set of graphic symbols which stand for speech sounds or phonemes. Hence, we cannot possibly have a good correspondence. To make matters worse, there are a number of spelling inconsistencies. Scholars have long been aware of this problem, and attempts to do something about it probably go back as far as the history of English. To cite but two examples: John Hodges had a system of diacritical marks for beginning readers in 1644, and Benjamin Franklin proposed a new and augmented alphabet in 1768.

The current flurry of activity is probably directly traceable to the well publicized and well financed efforts of Sir James Pitman during the past few years. Pitman developed the ITA and, with the help of his political office (Member of Parliament), his own publishing firm, and the Ford Foundation, the ITA has spread very rapidly. John

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Downing, who heads the largely Ford-financed Reading Research Unit at the University of London, has estimated that approximately 1,000 schools in the United Kingdom used the ITA, at least in part, during the school year 1965–66. United States figures are difficult to obtain, but it is probably safe to say that there are at least several hundred schools using ITA, apart from specific formal research studies. There are minor uses of ITA throughout a good bit of the English-speaking world from Africa to Australia.

It is incumbent upon educational researchers to take a good hard look at any system which radically changes the type of materials used in beginning reading instruction, if for no other reason than that the financial implications are so large. In the United States alone, approximately 4,000,000 children enter first grade every year. To switch from traditional books to ITA, for example, costs the school system about \$12 per child for the first year. Thus, we are talking about a possible U.S. expenditure of about \$50 million, not to mention the cost to the rest of the English-speaking world. We might hope that Congressmen, Members of Parliament, and even taxpayers might feel a little more kindly towards educational research when they see the magnitude of decisions school officials must make.

But the most important considerations are not financial. After all, what is \$50 million compared to the cost of sending a rocket to the moon, or even compared to the annual cost of igniting small shreds of tobacco leaves? The real problem is: Will some system of improving the phoneme-grapheme relationship increase the efficiency of a child or adult learning to read, and will there be a lack of undesirable residual or side effects? The second problem is: If an improved phoneme-grapheme correspondence is beneficial, which method of achieving it is best? It is in light of these problems that the DMS was developed and the subsequent research study conducted.

It is not the purpose of this paper to describe the ITA, but briefly stated, it regularizes the phoneme-grapheme correspondence by augmenting the alphabet, that is, by adding 16 new characters and by changing the spelling rules so that some words do not use any new characters but do use a different spelling than traditional English. The DMS as a system attempts to achieve the same goal of increased efficiency for beginning readers, without the possibly undesirable perceptual problems of altered word form and spelling problems of

altered spelling which must be rectified later. Though, of course, the diacritical marks do change the word form a little, still the basic, traditional word form is very apparent and spelling is unchanged.

The Diacritical Marking System

The following set of rules represents a compromise between a system accurate enough to satisfy a phonetician and what is practical to teach a first-grade child. Hence, they are slightly less complete than most dictionary systems, but generally they are in harmony with the work of Bloomfield and the Thorndike-Barnhart dictionaries. The author has recently done some work on the frequencies of various phonic sounds and their spelling (Fry 1964). DMS uses this frequency information and tends to give simpler or no marks to the more frequently used graphemes. The basic DMS rules follow.

1. *Regular consonants and short vowels are not marked.* This is in line with the fact that these are the most frequent uses of these letters.

2. *Long vowels have a bar over mark.* For example: gō, mē. This is in line with many dictionary diacritical systems.

3. *Silent letters are slashed out.* For example: mā~~d~~, māid. This is extremely useful in explaining the sounding out of words to children. It explains nicely why “made” and “maid” make the same sound while differing visual forms acknowledge the semantic differences. The DMS also helps to keep the teacher from teaching partially misleading phonics rules like “The E at the end of a word is silent and it makes the preceding vowel long” (note: “come”), or the more misleading, “When two vowels are together the first is long and the second is silent” (note: “boil”).

4. *The unaccented vowel (schwa) has a comma over it.* For example: āgō, ēnough, ōther. Note that the A, E, and O at the beginning of each of these example words make the same sound. There is no good phonics rule to tell the child when he should make a schwa sound for a vowel, yet the schwa has a surprisingly high frequency.

5. *The broad O sound is indicated by a circumflex.* For example: ôff, âutō. This sound is most often made by an A before U, W, or L (auto, awful, all), but it has practically no cues as to when it is made by an O.

6. *The second sounds of consonants have a bar under.* For example:

is, gem, city. There are only three consonants that have two sounds (apart from digraphs), and the second in terms of frequency is indicated by the bar under the letter.

7. Consonant digraphs have a bar under both letters. For example: shut, that, chat, when, sing. Note that the six consonant digraphs are not blends. They make a unique phoneme, not a blend of two phonemes. Blends (BL, CR, SM, etc.) are not marked. Unfortunately, one consonant digraph, TH, has both a voiced and voiceless form or, in other words, makes two different phonemes, so the less frequent or voiceless has a double bar under it. For example: thing.

8. *Diphthongs have a bar under both letters.* For example: boy, boil, out, owl. There are only two of these unique vowel sounds, each with two spellings.

9. *One dot U vowels have a dot over.* For example: put, look. This is not a short U sound as in “up.” It is sometimes called the Short Double O.

10. *The two dot vowels have two dots over.* For example: rüle, moon, neu. This is *not* the long U sound as in “use.” It is sometimes called the Long Double O.

11. *The letter R is sometimes a vowel.* There is a rule in English which states every syllable (and hence every word) must contain a vowel. By calling R a vowel, we can nicely handle the fact that after the preceding phoneme words that have an ER, IR or UR all have the same sound. For example: her, sir, fur. Note that the R in these words sounds the same as the beginning sound in “red.” While dictionaries would call the E, I, and U before an R a schwa, slashing them out seems to make a lot of sense to first graders and the author.

12. *The letter A before an R has two sounds.* The first unique sound we handle by a bar under both letters. For example: far. The second sound of AR we slightly inaccurately call a long A before R. For example: vary.

It is perhaps worth noting here that O before R is the broad O. For example: for.

13. *The Y rule.* By far the commonest use of the letter Y is when it makes the long E sound at the end of a polysyllable word; hence this use is unmarked. For example: funny. Many dictionaries would call this use of Y the short I sound, but a few agree with the author that it is a long E. In any event, it is the commonest use of Y and it doesn't

matter which sound the teacher chooses to call it. The second commonest use of Y is the long Ī sound at the end of the monosyllabic word or in the middle of a word. It is marked with a bar over. For example: mȳ, cȳcl̄.

Finally, the least common use of Y is as a consonant which is usually at the beginning of a word, and this is marked with a bar under. For example: yes.

14. *D, L, and N suffixes have no vowel.* This is simply an extension of the rule established for E, U, and I before R. The schwa vowel is slashed out in D, L, and N suffixes. For example: ābl̄e, happ̄en, liv̄ed, penc̄il. The L sound in “able” and “pencil” sounds just like the L in “love” and seems to follow immediately the preceding consonant.

15. *The QU digraph has a bar under both letters.* The consonant Q has no sound (phoneme) of its own and furthermore nearly always appears with a U. The QU together make a KW sound. It is marked with a bar under both letters. For example: qūēn. The other worthless consonant, X (no phoneme), is unmarked because it does not involve any other letters and always makes the KS sound. For example: box.

16. *Double consonants are unmarked.* The problem here is that sometimes the second consonant is useless and could be slashed out, for example, “class,” and sometimes the second consonant contributes to the syllabification, for example, “lesson.” Rather than having teachers worrying about this or trying to explain it, we say don’t mark double letters; if superfluous they don’t affect the sound much anyway.

17. *Four sight words are unmarked: the, a, to, of.* There are two reasons for this. The first is that these structure words have such high frequency that they are readily learned as sight words and not marking them saves a lot of marks. The second point has more linguistic significance in that in normal speech we say “th̄ mat” not “thē mat,” or “ā cat” not “ā̄ cat.” Anybody who says “I went tō thē stōre” instead of “I went t̄ th̄ stōre” is probably talking to his English teacher. In brief, three of these little words can be pronounced two ways, and probably the least academically acceptable pronunciations, so some teachers erroneously think, are the most common. We avoided the problem by not marking them. The fourth word, “of,” doesn’t follow any kind of regular phoneme-grapheme correspondence, yet it has a high frequency.

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“Lòøk, Bill,” sáid Lindá.

“Hēè còmèg Ricky.

Hē is âll reády fôr schööl.

Lòøk up and sēè funny Ricky.”

Figure 1. Two examples from a primer printed with DSM.
DSM © 1964 by Edward Fry.

18. *Exceptions are marked with a plus sign over the letter.* For example: $\overset{+}{o}n\overset{+}{c}e$, $\overset{+}{a}ny$. The above 17 rules take care of over 99% of the phoneme-grapheme correspondence used in English writing. There is no point in proliferating rules to take care of such infrequent cases as the fact that O sometimes makes a W sound as in “once,” or that A sometimes has a short E as in “any.” We found that we had to use the plus sign very infrequently in marking first grade reading material.

It is probably of passing interest that the bar mark, above or below, tended to be generic; that is, it stands for a class of things such as long vowels, consonant digraphs, diphthongs, second sounds of consonants, or when turned at an angle, silent letters, while the other marks tended to stand for phonemes. For example, the circumflex stands for the broad O sound regardless of letter, and likewise for the comma-over, one dot and two dot marks.

Even though this system might seem a trifle complicated for those unfamiliar with the phonetic structure of English, all of the first grade teachers in our research study were able to master it after only a few hours of study. It is perhaps an indictment of teacher training in America that it took a few hours to master. The prevalence and use of the schwa, and the differences between one dot U and short U were something that apparently had never dawned on some teachers of reading. The author regularly teaches these DMS rules to teachers in a graduate reading course, and the high frequency of their errors while using it on an examination is due more to their unawareness of the sounds (phonemes) used in English than to the complexity of the DMS rules. If nothing else, this system is excellent for teacher training. Simply assign the teachers to mark up a few pages of a text—it will open both their eyes and yours.

Research Design

This study was one of the 27 coordinated first grade reading investigations conducted during the school year 1964–65. Each investigator chose his own two or more conditions, but all had the same training time (140 days), 20 or more classrooms, and the same beginning and final tests. Each investigator was individually responsible to the U. S. Office of Education and operated under a separate contract, but all investigators agreed also to submit the results of their pre- and post-tests and

other conditions on similar punch cards to a master coordinating center at the University of Minnesota for re-analysis and cross-study comparisons.

The results reported here are simply the first pass at the data, namely, the differences between means of the three methods groups of a few of the most important tests. Much more analysis will be done in the near future, answering such questions as: Is one method better for boys? or for duller students? etc.

The DMS group consisted of seven randomly selected first grade classrooms that were taught beginning reading instruction by use of Diacritically Marked Materials. The regular Allyn and Bacon first grade reading books and workbooks were marked and reproduced by photo offset (Fig. 1). All of the teachers' written work for the children—on the blackboard, on charts, or on ditto material—also had Diacritical Markings. The teachers were instructed to use the regular Allyn and Bacon teachers' manuals as far as possible and, in addition, were given instructions for teaching one phoneme-grapheme correspondence per preprimer lesson, using a small chart with Diacritical Marks.

The TO group used traditional orthography or, in other words, the regular Allyn and Bacon first grade reading books and workbooks. This group may have had a slight advantage in that the books were better bound and had color illustrations (as opposed to the DMS group which, for economical reasons, had to be in black and white), and the teacher was more familiar with this writing system. On the other hand, this group might not have received as much boost from any "hawthorne effect" if any existed, although the Allyn and Bacon series was a "new" series in each of the schools in the research project.

The ITA group used Initial Teaching Alphabet special beginning reading series, written by Albert Mazurkiewicz and Harold Tanyzer, and published for the United States by Pitman Publishing Company's New York branch. Besides being printed in the special ITA alphabet, these materials tended to have more of a phonic and language experience approach (emphasis on children's writing) than the Allyn and Bacon series.

Research Results

Table I shows the mean raw scores of each classroom on the Paragraph Meaning Subtest of the Stanford Achievement Test, Form W, Primary I

TABLE I: *Mean Raw Scores of Each Classroom, Stanford Paragraph Meaning, May 1965:*

	<i>DMS</i>	<i>TO</i>	<i>ITA</i>
	14.14	21.73	10.84
	19.61	19.40	22.00
	15.55	18.07	21.82
	20.75	17.06	15.82
	21.68	21.22	15.63
	16.87	23.03	19.95
	<u>11.89</u>	<u>23.38</u>	<u>17.53</u>
Mean :	17.25	20.55	17.65
Grade Score :	1.7	1.8	1.7

Analysis of variance: not significant.

Battery (Harcourt, Brace and World, 1964). When the group means are converted to grade placement, the DMS group scored 1.7, the TO group scored 1.8 and the ITA group scored 1.7. Normal achievement for this time of year, early May, according to the test manual is 1.8. An analysis of variance across the mean raw scores was not significant. It is interesting to note that the range in raw scores for the 21 classrooms was from 10.84 to 23.38, while the difference between group raw score means was only 17.25, 20.55, and 17.65.

Table II shows the mean IQ scores for each classroom. The Pintner Cunningham Primary Test was given in September just before instruction began. It is interesting to note that the group with a slightly higher mean IQ (TO) also has slightly higher reading achievement, as might be normally expected. An analysis of variance also showed no significant differences on the other Stanford subtests of word reading, vocabulary, and spelling.

It is worth noting that the Stanford test used was the regular test,

TABLE II: *Mean IQ Scores of Each Classroom, Pintner-Cunningham Primary Test, September, 1964 (1964 Norms)*

	<i>DMS</i>	<i>TO</i>	<i>ITA</i>
	92.76	103.57	94.00
	100.28	97.00	95.63
	93.95	98.40	98.17
	98.84	98.26	92.47
	98.61	101.00	100.72
	91.18	100.51	91.45
	<u>93.05</u>	<u>95.53</u>	<u>97.33</u>
Mean :	95.52	99.11	95.68

that is, it was printed in TO. Only about half of the DMS children and a little less than half of the ITA children had formally “transferred” to TO materials. The last few stories of the final first grade book in the DMS materials were for transfer, that is, the marks were gradually faded, first appearing only on new words and finally on no words. ITA had similar transfer materials, except that it is more gradual and they have a different system of numbering their books so that the transfer occurs after the child has read more books. Though the ITA publishers do not like to use traditional grade levels, they believe that completion of their ITA materials is something like the equivalent of upper third grade reading ability (our tests didn’t particularly show this), and might occur any time from the latter part of the first grade to the latter part of the second grade for normal children, depending on the teacher, children’s ability, and other factors. Actually, informal observation leads us to believe that transfer is somewhat of a sham problem for both DMS and ITA, as a majority of children, before any type of formal transfer, were reading TO supplementary books for recreation. The supplementary reading books tended to be of first grade difficulty levels. Dr. Mazurkiewicz, who was a consultant for our study, recommended the use of the TO reading achievement test, rather than speeding up or giving artificially early transfer instruction.

An additional grant has been given to us by the U.S. Office of Education to retest these children in December and May of their second year, when formal transfer will be completed for all but the most retarded children. This grant also provides for further development of DMS materials; special primers are being written which provide some control over the introduction of phoneme-grapheme correspondence.

The exception to the TO achievement test was spelling. When TO standards were applied to correcting the spelling, the ITA group was significantly inferior. When a word was scored as correct if it was correctly spelled in either ITA or TO, then there was no significant difference between any of the three groups.

Conclusions and Comments

In general, that is, if group means are considered, it doesn’t make much difference which method is used to teach beginning reading. DMS, TO, and ITA can all teach children to read; not one of them is significantly superior or significantly inferior.

The differences between classes is much greater than the differences between methods groups. Possibly, we should be looking for something besides alphabet as being vital to the efficient acquisition of reading skills. We have a suspicion that that something is teacher ability. This is supported by a glance at, but not yet an analysis of, teacher rating. Furthermore, "good teaching" by this meaning is not just an ability to perform in front of the class, but rather the ability to get the children to work on their own. In terms of first grade instruction, what this means in practical terms is that most any teacher can perform pretty well in front of the whole class or a reading group, in other words, she can conduct a satisfactory lesson, but the "good" teacher had the two-thirds of her class who were not at her reading group also working well at their seats.

In addition to the not too surprising fact that good teachers get good results is also the not too surprising fact that in general (for large groups) IQ is a pretty good predictor of reading achievement. The two slightly below average IQ groups got slightly below average reading achievement, and the average IQ group got average reading achievement. These statements are interesting, not because any well-educated teacher or educational psychologist does not know them, but because some adherents to some reading methods make loose claims that their particular method is so superior that it can transcend differences in IQ or teacher ability.

Let us remember that this is an ongoing study. We must still analyze more tests and analyze the scores tests for subgroups to answer such questions as, "Do any of the methods favor boys, or low IQ's, or lower socio-economic groups?" Tests at the middle and end of the next academic year will show if any differences or lack thereof will persist through the second year of instruction. We will also see if improved DMS materials, readers specially developed for DMS rather than re-treading a basic series, will prove superior to the three methods already tried out. Several of the other 27 first grade studies also compared TO with ITA (though no others also used DMS), and their results will be interesting.

If this study can be characterized as unique, it was because of the particular care that was taken to control the "hawthorne effect" (enhancement due only to novelty and advantages due to volunteers' enthusiasm). Neither teachers nor children had any choice of the method used; classrooms with teachers and children already enrolled

were assigned method by pulling slips of paper out of a hat. The DMS was partly chosen as a "new" method to compare with another "new" method, the ITA, both of which had a strong phoneme-grapheme regularity. Even the TO groups had a "new" series. Authors from all three methods talked to the teachers of their respective methods groups; training time and supervisor visits were kept equal. If this study is controversial, it is apt to be because the results were also equal.

Finally, it is an interesting research sidelight that not one parent asked to have his child withdrawn from any of the experimental methods and not one first grade teacher got pregnant and had to drop out during the year.

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