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ABSTRACT

This study, conducted at a community college in mid-Missouri, compared the reading ability of students with the readability of the textbooks (aside from technical books) used in their classes. There were a total of 17 textbook/class comparisons. The reading level of students was determined by the Nelson-Denny Reading Test, revised edition, and readability of texts was determined by the Dale-Chall Readability formula. It was found that 52 per cent of students studied had reading abilities below the grade-level placement of the textbooks used in their classes. The mean reading ability grade level for freshmen was 12.6 while the mean readability grade level of texts was 13. It is recommended that: (1) community college faculties review their means of textbook selection, utilizing a readability formula and/or analysis; (2) where a range of reading ability exists, two or three texts at different readability levels should be used; (3) other classroom aids should be used to augment and clarify text materials; and (4) reading and study skills programs should be instituted. (CA)

A COMPARISON OF THE READABILITY OF COMMUNITY COLLEGE TEXTBOOKS WITH THE READING ABILITY OF THE STUDENTS WHO USE THEM

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The literature on community colleges abounds with descriptive information concerning the nature of its students. Collins (1966) provides an illustrative example:

> Anyone who has read the many studies on the nature of the clientele reported by Medsker (1960), McConnell (1962), Thorton (1960), Wrenn (1962) or has looked closely at the San Jose case study made by Clark (1960) already has a picture in his mind of the junior college student. Speaking in generalities, this junior college student comes from the lower middle class and, as one might expect, he bears the marks of this culturally, in level of educational background, in past academic achievement, and in mental potential. He may, of course, be sitting next to another student who would in every way fit in at the most selective of universities, and behind him may be sitting a student whose only chance of academic survival rests on an intensive remedial reading course offered by the junior college.

More recent descriptions of community college students are offered by Schenz (1964), Cooley and Becker (1966), Hoyt (1966), Gleazer (1968), and Roueche (1968).

While much has been written about the general nature of the community college student, what do we know about his reading ability? A characterization by Cowan, Hawkins and McPherson (1964) is most succinct:

> Each September junior colleges fling open their

> famous open doors and in swarm a horde of students, eager, perhaps, to begin a college education, but distinctly uneager, most of the time, to fulfill the English requirement. At least half of them have napped their way through their high school English classes. Any kind of sectioning test reveals that this bottom one-half has reading abilities from the twelth to the third grade; most tests don't register any lower. Last fall one of our students scored so much below zero that he appeared to represent some sort of prenatal level.
>
> Mechanics and usage tests show that most of them punctuate by the catch-as-catch-can method, and they can't. And the last time we gave a standardized college spelling test, two years ago, all the students scored so low that the testing department came up with a lump instead of a curve.

Similar, but perhaps not such dramatic, testimonials are reported by a number of writers, including; Newman (1966), Martin (1967), and Taschow (1969). When we consider the reading habits and interests of community college students (Foody, 1970), we often find them to be comparable to their reading abilities.

It has long been recognized that written materials, chiefly textbooks, have been a primary medium for imparting knowledge in our educational institutions, and a number of writers have pointed out the importance of considering "readability" in textbook selection (Cowan, et al, 1964; Martin, 1967; Williams and Black, 1968). However, very little has been published to show that these institutions, and community colleges in particular, have followed these suggestions.

Due to the rapid development of public community colleges during the last decade, it appears that the methods of textbook

selection are quite often the most expedient ones. For example, it is not uncommon for university instructors to migrate to the community college and take their favorite, elevated textbooks with them.

Scott and Yelon (1969) inform us that textbook writing has long been viewed as an academic art form, with subject matter expertise and the patience to deal with a publisher as the most apparent precursors to success. It seems that explicit criteria for judging a good textbook have been generally neglected. All too frequently the needs and abilities of the clientele are overlooked when textbooks are written. Since first draft manuscripts are often circulated among a writer's colleagues as a "try-out session", it is not uncommon for the finished product to be geared primarily for the approval of the writer's peers and only incidently for the instruction of students.

Articles comparing the readability of textbooks with the reading ability of the students using them have been concentrated at the elementary and secondary levels, basically, with a few being found at the four-year college level. The bulk of these studies focus in the area of mathematics and science. In a study comparing the readability of high school textbooks with the reading ability of science students, Belden and Lee (1962) found that none of the chemistry textbooks had a readability score that would make it useful to even half of the

students in the survey. The results relative to physics textbooks, however revealed that most of them could be used to good advantage. In another study by Belden and Lee (1961), this time focusing on five biology textbooks, only one textbook in the study had a readability score that made it useful to over half of the students in the study. Major and Collette (1961), in a national study of college general biology textbooks, concluded that the most frequently used and preferred textbooks in this catagory are written beyond the reading comprehension level of college freshmen students.

In an unpublished study conducted at a rural public comprehensive community college in New Jersey, Creamer (1968) found that the average student at the institution was reading at approximately the eighth grade level, while the textbooks utilized at that institution were written, on an average, between grade levels fourteen and sixteen. Are other community colleges experiencing the same disparities?

Purpose of the Study

The purpose of this study was to compare the readability of community college textbooks with the reading ability of the students who use them.

Method

The study was conducted at a public community college in

mid-Missouri. This is a comprehensive institution, in a rural setting, with an enrollment of approximately 750 full-time equivalent students.

The reading level of the students in the study was determined by the Nelson-Denny Reading Test, revised edition (Nelson and Denny, 1960), which is routinely administered each semester, in English composition classes, to all newly enrolled full-time students. Test results were available on 279 students, or 80 percent of the freshman class.

The Dale-Chall Readability Formula (1948) was used to gauge the readability of the textbooks selected for the study. This formula is a two-factor formula based on (1) a factor of vocabulary load (relative number of words outside the Dale list of 3000 familiar words), and (2) a factor of sentence structure (average sentence length).

A primary objective of the study was to utilize a method of comparison that would ensure meaningfulness and practicality of results. Therefore, the most basic mode of comparison was employed--that of a given textbook with the class in which it was used. In addition to the textbook versus class comparison, a table was constructed to illustrate how each of the textbooks "measured up" with the total freshman class.

A total of seventeen textbook/class combinations were selected for comparison in the study. One text was used by

two different classes, while two classes employed the use of two textbooks each.

Initially, forty-two textbook/class combinations were considered for possible inclusion in the study, but this number was reduced to the present figure by the elimination of technical textbooks and classes with an insufficient number of students with Nelson-Denny scores.

A class was considered for inclusion if it contained a minimum of ten students with Nelson-Denny scores. Multiple sections of classes were used to reflect the true range of reading abilities. Technical Science included only eight Nelson-Denny students but was used because of its uniqueness.

The Dale-Chall Readability Formula is applicable only for continuous textual material; therefore, textbooks that were replete with formulas, graphs or charts had to be eliminated from the study (i.e., math, accounting, chemistry, physics, foreign languages, circuit theory, drafting, etc.). It is recommended that in applying this formula to a book, a 100-word sample be taken approximately every tenth page. The formula is then applied to each sample to yield a raw score, the average of which is converted to a corrected grade level (see Appendix).

Following a procedure employed by Brownrigg (1962) the writer converted the Correction Table above into single grade levels (see Appendix).

In the present study selected samples always included at

least 100 words. If a sentence ended near the recommended 100 words, but with less than 100 words, an additional sentence was analyzed. It was felt that a larger sample would give a better indication of the readability of the material.

Only continuous textual material of a descriptive nature was analyzed. The paragraph heading or paragraphs which relied basically on diagrams or formulas for their understaning were not analyzed because the Dale-Chall Formula instructions do not include directions for analyzing mathematical formulas and it was felt that paragraph headings would not give a true picture of difficult words and sentence length. When a page did not contain textual material the sample was taken from the adjacent page.

Results

It is important to keep in mind that because of the basis on which the Dale-Chall Formula was derived, a student must answer only 50 percent of the questions asked about the material to have this material rated on a certain grade level (Dale and Chall, 1948).

The rationale used in the following comparisons is that students at or above the grade-level placement of a textbook should be able to comprehend the material, while those below the grade-level placement of the textbook would experience difficulty in comprehending the material.

In Table 1 the seventeen textbook/class comparisons are illustrated graphically.

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Table 1 about here

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Table 2 was prepared as an easy reference for readers interested in the actual titles of the textbooks and classes being compared. A complete bibliographical listing of the textbooks used in the study is found in the Appendix.

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Table 2 about here

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The key findings in Table 1 were summarized in Table 3 for reference purposes.

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Table 3 about here

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In fourteen of the seventeen textbook/class comparisons at least 33 percent of the students had reading abilities below the grade-level placement of the text, while in eleven comparisons at least 50 percent of the students were below the text, and in seven comparisons at least 75 percent of the students were below the text.

In Comparisons (1) and (2), 100 percent of the students were below the textbooks, while only 3 percent of the students in Comparison (17) were below the text.

In Comparison (12), where one textbook was used by two different classes (one occupational/vocational, the other transfer), the first (occ./voc.) had 50 percent of its students below the text, while the second (transfer) had only 17 percent of its students below the text.

Comparisons (4) and (5), and Comparisons (7) and (8) represent the two cases where two texts were used in one class. In Comparisons (4) and (5), both textbooks were at the same grade level (grade level fourteen) which resulted in both texts being above the reading abilities of 85 percent of the students. However, in Comparisons (7) and (8) the texts were separated by two grade levels. This separation placed 50 percent of the students above text (8), but below text (7).

Perhaps the most significant finding of the study was that 52 percent of the students in all of the classes had a reading ability below the textbooks used in the respective classes, as seen in Table 3. This figure was derived by dividing the total number of students in the 16 separate classes surveyed, by the total number of students below the textbooks used in these classes (see footnotes in Table 3).

Table 4 compares the readability of the textbooks with the reading ability of the freshman class (generalized from the 80 percent on whom Nelson-Denny scores were available).

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Table 4 about here

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The right-hand column of Table 4 reveals the percentage of the freshman class with reading abilities below the grade-level placement of the various textbooks. The textbook readability range is from grade level 10 to grade level 16.

Textbook (16) had a sixteenth grade readability which placed it above 99 percent of the freshman class, while textbook (17) was the easiest to comprehend, having a tenth grade readability, which placed it above only 16 percent of the freshman class. Considering the other texts, it is observed that five of the textbooks (2,3,4,5,7) were above 79 percent of the students; three of the textbooks (11,12,13) were above 61 percent of the students; five textbooks (6,8,9,14,15) were above 45 percent of the students; and two textbooks (10,16) were above 32 percent of the freshman class

The mean reading ability for the freshman class was calculated to be grade level 12.6, while the mean readability of the seventeen textbooks was calculated to be grade level 13. Since all technical textbooks were eliminated from the study, it is impossible to generalize to "freshman textbooks" as a whole. (The inclusion of technical textbooks would, no doubt, increase the "average" readability of the textbooks used by this community college since such texts generally yield higher

readability scores.)

Discussion and Recommendations

The purpose of this study was to compare the readability of textbooks used by a comprehensive community college with the reading abilities of the students who use them. The results clearly indicate that disparities exist between the two. Eleven of the seventeen textbooks analyzed were above the reading ability of at least 50 percent of the students in the classes where the texts were used, and seven of the textbooks were above the reading abilities of at least 75 percent of the students in the corresponding classes. In all, 52 percent of the students in all of the classes had reading abilities below the grade-level placement of the textbooks.

These results appear even more startling when it is considered that the average reading ability of the students was computed to be grade level 12.6, which is probably higher than for most community colleges. With this in mind, it is wondered what other community colleges would find if they were to conduct similar studies.

On the basis of these results a number of principle recommendations seem appropriate. One concerns the process of textbook selection. It is recommended that community college faculties review their means of textbook selection, placing the readability of textbooks, and other classroom

materials, high on the list of criteria. Readability formulae are relatively simple to apply and the results would prove to be worth the effort. For years researchers have been skeptical of using readability formulae at higher levels of learning because of the lack of validity data and analytical procedures. In a recent study utilizing multiple regression equations, Bormuth (1966) concluded that a single readability formula can be used at almost any level of reading ability and recommends that readability analysis be applied to materials at higher levels of education.

Where a wide range of reading abilities exist it is recommended that two or three texts written at different levels of difficulty be employed, perhaps with one as a major text and the other(s) as reserve material.

Moreover, with the availability of various educational media today, perhaps the need no longer exists to rely on textbooks as the sole means for imparting knowledge. It is recommended that wherever possible such classroom aids as films, filmstrips, microfilms, tapes, reviewer-recorders, etc., be used to augment and clarify textual material.

Another primary area of consideration is that of reading programs. Milligan and Crawford (1968) point out that while nearly all four-year colleges have established reading and study skills programs, very few community colleges have insti-

tuted such programs. Any community college today that maintains an "open door" admission policy and claims to be comprehensive, can ill-afford to be without an effective reading and study skills program. It is recommended that community colleges without such programs seriously consider establishing them.

TABLE 1

Comparison of the Readability of Textbooks with the Reading Ability of the Students Who Use Them On A Class by Class Basis

Nelson-Denny Grade Equivalent	TEXTBOOK/CLASS COMPARISONS																	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)		(13)	(14)	(15)	(16)	(17)
16.0 - Above*				1	1		1	1			2		1				1	2
15.0 - 15.9*			3				1	1			5			8	3	2	3	7
14.0 - 14.9*	1		5	3	3		1	1	6		8	3	2	13	6	6	2	13
13.5 - 13.9	4	5	5	3	3	3	1	1		3	6	1	3	7	4	3	2	12
13.0 - 13.4	1	3	7	3	3	3	3	3	2	2	8		2	1		3	1	11
12.5 - 12.9		2	5	3	3		1	1	2		6	1	2	5	4	6		13
12.0 - 12.4	1	1	7	1	1	2			1	3	1			4	1	3		7
11.5 - 11.9		5	6	2	2	3			2	2	5			3	3	3		6
11.0 - 11.4			4	3	3	3			3	3	3	1	1	2	2	1		4
10.5 - 10.9	2	6	6	2	2	3	2	2	1	3	6	1		1		3		10
10.0 - 10.4		1	11	2	2	5			3	4	5	1		5	1	1		4
9.5 - 9.9	1		2	2	2	1			1	1				2	1	2		1
9.0 - 9.4	1		7			6				3	2		1	2	1		1	
8.5 - 8.9			6	1	1	1			2	1				1	2	1		
8.0 - 8.4			4	1	1	4				2	2			1				
7.5 - 7.9			1			1			1	1				1				1
7.0 - 7.4			1						1		1					1		1
Below 7.0																		
Number of Students	11	23	80	27	27	35	10	10	25	28	60	8	12	56	28	35	10	92
No. of Stu. Below Text	11	23	72	23	23	27	7	2	14	15	31	4	2	27	10	12	1	3
% Below Text	100%	100%	90%	85%	85%	77%	70%	20%	56%	54%	52%	50%	17%	48%	36%	34%	10%	3%

Key: Textbook Placement - ▬

*Extrapolated

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TABLE 2

List by Title of the Textbooks and Corresponding Classes Analyzed in the Study

No.	Textbooks	Classes
1	Essentials of Modern Biology	General Biology I
2	Health for Effective Living	Personal Hygiene
3	Introduction to Business	Intro. to Business
4	Sociology	General Sociology
5	Perspectives on the Social Order	General Sociology
6	Salesmanship	Salesmanship
7	Government and Politics in the U.S.	National Government
8	The American Presidency	National Government
9	Art Fundamentals: Theory and Practice	Art Appreciation
10	Marketing and Distribution	Principles of Marketing
11	The Democratic Experience	U.S. History Before 1865
		Technical Science
12	The Physical Universe	Intro. to Physical Science
13	Introduction to Psychology	General Psychology
14	Modern Biological Principles	Intro. to Biological Science
15	Principles and Types of Speech	Public Speaking
16	Introduction to Geography	World Geography
17	Detail and Pattern	English Composition I

Note.--Order in which the Textbooks and Classes appear in Table 1

TABLE 3

Summarization of Table 1

Textbook/Class Comparisons	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	Total[a]
Number of Students	11	23	80	27	27	35	10	10	25	28	60	8	12	56	28	35	10	92	538[b]
No. of Stu. Below Text	11	23	72	23	23	27	7	2	14	15	31	4	2	27	10	12	1	3	282[b]
% Below Text	100%	100%	90%	85%	85%	77%	70%	20%	56%	54%	52%	50%	17%	48%	36%	34%	10%	3%	52%[c]

[a]Corrected

[b]Comparisons (5) and (8) were deleted so as not to add a class of students twice. The textbooks in these comparisons were secondary texts and were omitted in favor of the primary texts--(4) and (7). The result was sixteen distinct textbook/class comparisons.

[c]Percentage of students in all the classes that have a reading ability below the grade-level placement of the textbooks.

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TABLE 4

A Comparison of the Readability of the Textbooks with the Reading Ability of the Freshman Class[a]

Grade-Level Placement	Frequency	Cumulative Percent	Textbook Placement	% of Students Below Text
16.0- Above	3	100	1	99
15.0- 15.9	19	99		
14.0- 14.9	36	92	2,3,4,5,7	79
13.5- 13.9	29	79		
13.0- 13.4	22	69	11,12,13	61
12.5- 12.9	26	61		
12.0- 12.4	18	50	6,8,9,14,15	45
11.5- 11.9	21	45		
11.0- 11.4	14	37	10,16	32
10.5- 10.9	20	32		
10.0- 10.4	24	25	17	16
9.5- 9.9	8	16		
9.0- 9.4	12	13		
8.5- 8.9	8	9		
8.0- 8.4	10	6		
7.5- 7.9	2	2		
7.0- 7.4	1	1		
Below 7.0	3	1		
	N=276		N=17	
	$\bar{X}$= 12.6 (grade level)		$\bar{X}$=13 (grade level)	

[a]Generalized from 80 percent on whom Nelson-Denny scores were available

APPENDIX

Dale-Chall Correction Table

Formula Raw Score	Corrected Grade Levels
4.9 and below	4th grade and below
5.0 to 5.9	5th - 6th grade
6.0 to 6.9	7th - 8th grade
7.0 to 7.9	9th - 10th grade
8.0 to 8.9	11th - 12th grade
9.0 to 9.9	13th - 15th grade (college)
10.0 and above	16+ - (college graduate)

In order to allow for a more direct comparison of the data, the writer set up the following table.

Conversion Table

Formula Raw Score	Corrected Grade Levels
7.00 - 7.49	9th grade
7.50 - 7.99	10th grade
8.00 - 8.49	11th grade
8.50 - 8.99	12th grade
9.00 - 9.33	13th grade (college)
9.34 - 9.66	14th grade (college)
9.67 - 9.99	15th grade (college)
10.00 - above	16+ (college graduate)

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