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ABSTRACT

A model for augmenting the impact of the community college reading instructor within the institution is presented in this paper. Reported are the actual findings and the criteria used in: (1) the assessment of the reading levels of students enrolled in three courses at the College of DuPage in Glen Ellyn, Illinois; (2) the evaluation of the readability of the texts used in the courses; and (3) determination of how the instructors used and augmented the texts. Six sections of students enrolled in three vocational courses taught by seven instructors served as the study population. The reading comprehension levels of the students were determined by the Gates-MacGinitie Reading Test, Comprehension Subtest. The readability of each textbook used was determined by applying a computerized version of the Dale-Chall Formula. A 219-item survey was used to evaluate the knowledge and attitudes of the instructors with respect to reading and text use. Analysis of student scores, text readability levels, and instructor surveys prompted the instructional personnel involved to modify their course offerings to better fit their students' needs. Due to the benefits gained by faculty and students from the study, the program has been adopted for general use at the College of DuPage. (TO)

A Replication in Vocational Reading: The Project and the Criteria Used to Determine the Feasibility of Replication[1]

by Mary J. Van De Warker[2]

Introduction

Reading consultants in community colleges can find themselves in peculiar situations. If their instruction is confined to the classroom or learning lab, they are likely to find themselves instructing classes of students with "problems" in reading. In other words, the students come for assistance after the damage has been done. It would seem to be a greater service to students to alert instructors in the content areas to the actual communication/reading demands placed on students in the areas and to alert

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students to the communication/reading demands placed on them in these areas. The reading consultant is then confronted with the whole question of what kinds and levels of communication are being used in the courses at the college. Several problems become immediately evident. An obvious one is to determine the level at which the students are communicating/reading. Another obvious problem is to determine the level and methods of the instructors' communication. The reading instructor can be of greatest value to students by becoming part, in some way, of the communication occurring between the content area instructor and the student. This is not an easy thing to do. In searching for ways to be of service to students and instructors both, it appeared to the author that a program having the following components would, in some cases, provide entrence:

1. Assessment of the reading levels of the students enrolled in a given course at the college.
2. Evaluation of the readability of the texts used in the course.
3. Determination of how the instructors used and augmented the texts.

The Vocational Reading Power Project (VRPP) described by Butz et al. (3) and Butz (2) has focused on these three basic activities at the vocational high school level. In the project reported here, then, the reading consultant's objective coincided with those of the VRPP.

This paper differs from previous reports because it includes not only the results of the project, but also the criteria used to determine whether replication was possible and the outcomes of the replication in terms of these criteria.

It is hoped that both the actual findings of the project and the criteria used, will provide a model for augmenting the impact of the community college reading instructor within the institution.

Replication procedure.

Overview. The following major components of the VRPP were replicated:

1. The reading comprehension levels of community college students enrolled in three courses at the College of DuPage were determined by the Gates-MacGinitie Reading Test, Survey F, Comprehension Subtest (5).

2. The reading difficulty levels ("readabilities") of three textbooks and one study guide used by these students were assessed by applying a computerized version developed by Butz and Joos (1, 6, 7) of the Dale-Chall readability formula (4).

3. The readability levels of the texts were compared with the reading comprehension levels of students using the texts.

4. A 219-item survey was used to evaluate the knowledge and attitudes of seven instructors teaching the three courses with respect to reading and text use.

Subjects. Six different groups of students participated in the study. There were fifteen, thirty-two, and thirty-two students, respectively enrolled in three sections of Air Conditioning; seventy-three and thirty-nine students in two sections of Data Processing; and eighteen students enrolled in one section of Radiologic Technology. The total number of students was 208. All of these courses were at the freshman level.

Instructors. Each of the seven instructors participating in the study had had considerable experience both in his occupational area and in teaching. The instructor in the radiologic technology course is the coordinator of the radiologic technology program. A team of three instructors, including the coordinator of the program, taught the data processing course. Two members conducted the evening session and all three worked together in the day session. Each of the sections of air-conditioning was taught by a different

instructor. The day session was taught by the (full-time) coordinator of the program, and the evening and Saturday sections were each taught by a part-time instructor.

Texts. The text used in all three sections of the air conditioning course was the Trane Air Conditioning Manual. The text used in both sections of data processing was Bohl, M. Information Processing, Chicago: Science Research Associates, 1971, and its accompanying Study Guide to Information Processing. The section of radiologic technology used Selman, J. The Fundamentals of X-ray and Radium Physics.

Method - student testing. Student testing was conducted during the Winter Quarter, 1972. All 208 students were administered the Gates-MacGinitie Reading Test, Survey F, Comprehension Subtest (Form 1M). The reading consultant administered all tests.

Method - readability analyses. Dale-Chall readability analyses were completed on each of the four text materials. The sampling strategy was random sequential, with the "topic" being the sampling unit. (A "topic" was defined as a conceptually and structurally complete sub-unit of a chapter; operationally, topics were sequences of narrative text, identified by a boldface-type heading, within a chapter.) Every 14th topic from the Trane Air Conditioning Manual; every 15th topic from the Selman book; every 9th topic from the Bohl text; and every 6th topic from the Bohl study guide.

The samples were edited to conform with the instructions of Dale and Chall, and were keypunched onto standard IBM data cards. The readability analyses were performed on Oakland Schools' IBM 360-50 computer, using the Joos-Butz Readability Program.

Method - instructor survey. Each of the seven instructors completed the VRPP Survey, and returned it to the reading consultant.

Results - readability analyses. The results of the readability analyses on the text materials are shown in Table 1. It may be seen that the topics in all of the books showed a wide range in reading difficulty, and that there were considerable differences between the "average" readability values between books. The mean readability of the Trane Air Conditioning Manual was significantly lower than the other three books ($p<.05$) and the Bohl study guide was significantly higher ($p<.05$). It is interesting that the readability of the Bohl study guide is higher than that of the Bohl text; this probably reflects the greater difficulty of the study guide's "condensed" description of the content. It should be noted that these were books selected for use in freshman-level courses; the present analyses indicates that a very high level of reading skill would be required to use the materials selected for the data processing and radiologic technology courses.

Results - reading tests. The results of the reading test, as shown in Table 2, indicate that the reading comprehension of the students was, in general, quite high. Students in the radiologic technology course obtained the highest reading comprehension mean score (15th grade equivalent); the data processing sections had an average equivalent to the 14th grade level; and the average comprehension grade equivalent in the air conditioning sections was 13th grade (two sections) and 12th grade (one section). It is noteworthy that the mean scores were very consistent between sections of the same course; this is particularly interesting in the case of the three air conditioning sections, which were quite different with respect to age ranges and academic backgrounds.

It must be mentioned that within each section there was a considerable range of reading test scores; in every section there were some students who scored at or below 8th grade level, as well as students who scored at the level of the average college graduate.

Results - comparison of reading test data and text readability data. Table 2 shows the comparison between the readability of the texts and the reading comprehension levels of the students.

Three comparative measures were calculated.

a. The mean Dale-Chall value of each test was compared with the mean Gates-MacGinitie score of the students (both values expressed in grade equivalents). Table 2 shows that the mean reading comprehension level of the radiologic technology students was at least one grade level higher than the mean reading difficulty level of the text they were using, and that the mean reading test score of the two air conditioning sections was at least one grade level higher than the mean reading difficulty level of the Trane manual. There were no other significant differences between the text means and the student means in the other three sections.

b. Table 2 also shows the percentage of students in each section with reading comprehension scores at least one grade level below the mean reading difficulty level of the text. (Since the mean readability value for each book was expressed as a confidence interval, the percentages were also presented in the form of bands.) It may be seen that in each class there was a considerable number of students with reading comprehension scores below the mean of their text.

c. Table 2 also estimates for each section the percent of topics in the text which are at or below the level of the average reading comprehension grade equivalent for students in that section. A table of confidence intervals was used to obtain these percentages. Perhaps the most appropriate interpretation of these very conservative statistics is that in the air conditioning sections most (at least 2/3) of the topics in the text would be at or below the reading comprehension levels of the "average" students; in the other courses

there would probably be a greater percentage of topics above the reading comprehension levels of the average student in each section.

Results - instructor survey. An analysis of the seven instructors' responses on the VRPP survey indicated that

a. Six of the instructors responded that the text was an "important and necessary" part of their course. One instructor felt that the text was "somewhat important"; the other possible response category, which no instructor indicated, was "not important."

b. All of the instructors rely heavily on the textbooks in their courses; all responded that the text was a) the primary reference for occupational theory in their courses, b) the primary reference for outside assignments, and c) the sequence of the course followed the sequence of the text.

c. Most of the instructors expected their students to read the text "independently," i.e.,without help.

d. There were considerable differences among the instructors as to the relative value (usefulness) of various components of their texts (glossary, illustrations, explanation of theory, review questions, etc.)

d. All the instructors used the review questions in the text as a measure of their students' comprehension of the text.

e. Virtually all of the instructors had used and/or developed various kinds of materials to supplement the text.

f. All the instructors felt that it was very important for their students to "visualize from a written description" and to "apply textbook principles to practical application." Five of the seven instructors surveyed felt it was very important for their students to "recognize what is implied as well as what is stated."

g. Finally, in response to the question: "If you were selecting students for your course, how important would you consider the following?"

all the instructors rated "schematic interpretation" as "very important" and six of the seven rated "reading ability" and "self-discipline" as "very important" (the highest evaluation offered).

Criteria used to determine the feasibility of replication.

At the start of the replication eight criteria were established for determining whether such a project was possible. These criteria were selected because each involves a decision maker or a group of decision makers who could "veto" the replication. They were:

I. With reference to the faculty involved in the project

   A. To determine whether any of the faculty felt that the information generated was worth the commitment they would have to make

   B. To see if there were any behavioral changes on the part of the faculty participating

II. With reference to the faculty not directly involved with the project

   A. To determine interest

   B. To determine other uses of the program

III. With reference to the students involved

   A. To see if they felt the project worthy of their cooperation

   B. To see if just taking the test lead to an awareness of their reading strengths and weaknesses

   C. To see if they acted upon such awareness

IV. With reference to the Computer Services Department at College of DuPage

   A. To determine whether readability analyses were feasible with current equipment and personnel

   B. To determine whether the department understood the project and its implications

V. With reference to the administration at College of DuPage

   A. To determine its level of psychological support

   B. To determine whether it was willing to make a financial/time commitment to the project

VI. With reference to the Oakland Schools VRPP personnel

A. To determine if they were interested in having a pilot/replication study done at College of DuPage

B. To determine if they followed through with the necessary support

VII. With reference to the Director of the Developmental Learning Lab at the College of DuPage

A. To determine whether readability analyses were included in the responsibility of the reading consultant

B. To determine whether a portion of the consultant's time would be committed to such a pilot study

VIII. With reference to the reading consultant at the College of DuPage

A. To determine whether she had mastered or could master the skills necessary to do the project

B. To determine whether the size of the project was too large for and individual to manage

Outcomes - with reference to the faculty involved in the pilot project. Nine instructors were approached to determine whether they wanted to participate in the project. One used no text in his course and one said he had too few students to make the replication valid. The other seven became the content instructor participants in the project.

Several of the content instructors followed through with the information provided: one is examining the level of his language in his lectures; one rewrote a portion of the text and saw how it could be made more readable; one is determining whether such a study could be made at another college with which he is affiliated; and another asked the reading consultant to evaluate all the textbooks in his vocational program. This instructor is also using the information in an article he is writing for a professional journal.

Outcomes - with reference to faculty not directly involved in the project.

Two English instructors asked the reading consultant to administer the Gates-MacGinitie test to classes which seemed to be having difficulty

reading assignments in English. The two classes were tested and a week later the reading consultant and English instructors interpreted some of the apparent findings to the classes. The students then took the computer printouts of their wrong answers and a copy of the test and decided why they made the errors they had made. The most common findings of the students were: a lack of general vocabulary information coupled with an inability to use context clues; a lack of general information; and a syndrome they identified as "psychological cop-out." They found that if they predetermined that they did not know anything about the subject, they did not even seriously try to answer the test item. For example, one series of items was concerned with chemistry. The students, in some cases knowing they knew little about chemistry, did not try and did poorly. In going over the items, terminology from cooking was used in place of the chemical terms and the students found that they could easily supply the answers. Other non-project involved instructors are considering using the computer program to evaluate materials they are writing, to evaluate students' writing, and to determine "hands on" literacy demands for students in vocational-technical areas. The accounting instructors, after narrowing their selection of possible texts to two, asked the publishers for the readability levels of the books. One text was 15th grade level; the other was 12th. The instructors selected the text with the 12th grade readability.

Outcomes - with reference to the students. In general, it is felt that the students were most cooperative. After their participation in the project was explained, they worked with the instructional team to provide valid test results. The students in the vocational-technical areas were sporatic in their response to the test results, themselves, but there were some requests for interpretation of the results. Many of the students scored much higher than

they thought they would and some students who scored low are coming to the reading lab to develop their reading skills.

Outcomes - with reference to the Computer Services Department at the College of DuPage. The computer services personnel not only understood the instructional implications of the program, but also suggested some further uses of the program, e.g. the possibility of using the readability analysis to study the students' writing; the possibility of offering readability analyses to feeder high schools in the district for use by their textbook adoption committees, thus broadening the community services of the college. It was determined that readability analyses could be done at the college using existent equipment if re-programming were done. Since the computer at the college is in great usage, the Computer Priorities Committee has been created to establish programming priorities. This leads to the next criterion for evaluation.

Outcomes - with reference to the administration. The reading consultant was first introduced to the work being done at Oakland Schools at the National Reading Conference in early December, 1972. In mid-December the Vice-President, Program, at College of DuPage wrote to the Superintendent of Oakland Schools requesting that the head of computer services and the reading consultant visit during Christmas vacation. During the interim the Vice President, Program; the Dean of Faculty: the Associate Dean, Vocational and Technical Programs; and the Head of the Computer Services Department had not only been psychologically supportive, but also had provided the funds necessary for both a feasibility study and replication. The administrative support was also evident when the project was presented to the Computer Priorities Committee. At the time the reading consultant presented the project for a priority, the committee had requests before it for 54 weeks of programming time. Only 48 weeks of time were available.

The computer conversion would require another 6 weeks of time, thus raising the requested time to 60 weeks. The committee is large, composed of 12 administrators representing various segments of the college population. Immediately after presentation of the program request, the committee made several supportive comments and unanimously voted the reprogramming priority one. This directed computer services to begin programming immediately. This vote subsequently served as a further dissemination of availability of the service and has influenced the choice of textbooks by faculty already.

Outcomes - with reference to the Oakland Schools' VRPP personnel. The Oakland School and DuPage teams quickly decided that a replication was feasible and began work January 2. The Oakland Schools' team provided considerable support and encouragement at each step of the replication. They consistantly provided information and services not available at the college.

Outcomes - with reference to the Director of the Developmental Learning Lab at the College of DuPage. The director determines the scope of the responsibility of the reading consultant.

Immediately after the NRC meeting, the reading consultant described the work being done at Oakland Schools to her. She provided unconditional support for the reading consultant. Because she had established the lab with maximum flexibility, time was available for consultations with participating faculty and staff with no dimunition in services to students. Without her understanding of the significance and implications of the replication, it would have been impossible.

Outcomes - with reference to the reading consultant. It was determined that the reading consultant, a graduate of a traditional reading program, with several years experience in community college work, had proficiency in the basic skills necessary for the replication. For the more sophistocated

aspects of the project, she relied heavily on the specialists in the other areas. Needless to say, she learned a lot. The final determination of whether a continuing operation of this type is too large for effective operation depends on faculty usage of the program.

Summary of outcomes

1. A greater professional rapport was developed between the faculty, administration, and students and the reading consultant. It is felt that the data generated by the replication concerning languaging in the college will be of benefit, both directly and indirectly, to the students.

2. The mean raw score for all the students taking the test, including the two English classes (n = 251) was 36.44 (upper 13th grade level). Eighty-three per cent of the students were in vocational-technical courses.

3. The program was adopted for general use, but only as the result of the cooperative efforts of all of the persons involved.

TABLE 1

Summary of Readability Analyses: Listing of Comparisons Between Student Reading Ability and Textbook Readability for Courses Offered at the College of DuPage During the Winter Quarter of 1972

NO.	TEXTBOOK	Sampling Information		Readability (Grade Equivalent)	
		Number of Topics Sampled	Number of Words Sampled	Range of Sample Topics (Low to High)	Estimated Mean (95% Confidence Interval)
1.	Bohl Information Processing	20	6299	10 to 16+	12 - 15
2.	Bohl Study Guide to Information Processing	17	1809	11 to 16+	15 - 16+
3.	Selman The Fundamentals of X-Ray and Radium Physics	26	6795	9 to 16+	12 - 14
4.	Trane Air Conditioning Manual	27	10,810	7 to 16+	10 - 12

TABLE 2

Summary of Readability Analyses: Listing of Comparisons Between Student Reading Ability and Textbook Readability for Courses Offered at the College of DuPage During the Winter Quarter of 1972

NO.	COURSE	n	TEXTBOOK	TEXTBOOK READABILITY Mean Dale-Chall Readability Grade Equivalent	STUDENT READING ABILITY Mean Gates-MacGinitie Comprehension Grade Equiv.	Percent of student comprehension scores below mean textbook readability	Percent of textbook topics which the average student may be expected to "comprehend".	
							not less than	not more than
1.	Air Conditioning and Refrigeration 102 (a.m.)	15	Trane Air Conditioning Manual	10 - 12	13	7% - 27%	66%	95%
2.	Air Conditioning and Refrigeration 102 (p.m.)	32	Trane Air Conditioning Manual	10 - 12	12	16% - 47%	63%	93%
3.	Air Conditioning and Refrigeration 102 (Sat.)	32	Trane Air Conditioning Manual	10 - 12	13	16% - 41%	66%	95%
4.	Data Processing 100 (a.m.)	73	Bohl, M. Information Processing	12 - 15	14	25% - 46%	41%	86%
5.	Data Processing 100 (a.m.)	73	Bohl, M. Study Guide to Information Processing	15 - 16+	14	45% - 70%	12%	57%
6.	Data Processing 100 (p.m.)	39	Bohl, M. Information Processing	12 - 15	14	26% - 41%	41%	86%
7.	Data Processing 100 (p.m.)	39	Bohl, M. Study Guide to Information Processing	15 - 16+	14	41% - 67%	12%	57%
8.	Radiologic Technology 102	18	Selman, J. The Fundamentals of X-ray and Radium Physics	12 - 14	15	22% - 28%	61%	92%

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