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ABSTRACT

A machine-oriented reading course was compared to a textbook-oriented reading course to see which course more effectively improved reading rate and reading comprehension in disadvantaged college freshmen. Subjects were 340 college freshmen in reading classes at Texas Southern University who were divided into two matched treatment groups. The experimental group used a variety of machines, including tachistoscopes, controlled readers, filmstrip projectors, and tape recorders. The textbook groups used the Reading Improvement Program by Edwards and Silvaroli and Toward Better Reading Skills by Cosper and Griffin. The Nelson-Denny Reading Test, Forms A and B measured initial and final rate, vocabulary, and comprehension. After one semester, the group taught by machines did not differ significantly from the group taught by books. Individual gains were most noticeable among students with consistent class attendance. Tables and references are included. (AL)

# DEPARTMENT OF READING AND STUDY SKILLS AT TEXAS SOUTHERN UNIVERSITY: A LONGITUDINAL STUDY TO DETERMINE AN EFFECTIVE METHOD OF TEACHING READING TO COLLEGE STUDENTS WHOSE BACKGROUNDS ARE PARTIALLY OR WHOLLY DISADVANTAGED



A STUDY

BY

JEWELEANE WILMA WHITTAKER

DECEMBER 1971

# Department of Reading and Study Skills at Texas Southern University: A Longitudinal Study to Determine an Effective Method of Teaching Reading to College Students Whose Backgrounds are Partially or Wholly Disadvantaged*

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# Department of Reading and Study Skills at Texas Southern University: A Longitudinal Study to Determine an Effective Method of Teaching Reading to College Students Whose Backgrounds are Partially or Wholly Disadvantaged*

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## Introduction

Proficient reading and study skills are important variables in the prediction of success and failure of students at the college level. A growing awareness of the reading deficiencies of freshmen students at Texas Southern

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University is evidenced by reading achievement test scores. In an effort to meet the needs of students enrolled in Effective Reading courses, members of the Reading and Study Skills Center are constantly in search of a more effective instructional method. Like other reading and Study Skills Centers, ours at Texas Southern conducts research. A case in point is this longitudinal study made to determine an effective method for teaching reading to college students of partially or wholly disadvantaged backgrounds in the area of culture and economics.

Do such students learn best in a textbook-oriented classroom or a machine-oriented one? The research was an attempt to resolve this question.

Objective

In order to determine the relative effectiveness of a textbook-oriented and a machine-oriented approach in teaching college students whose reading achievement, as indicated by pre-test scores was below the level of required competency* for success in college courses, an answer was sought to the following question:

> To what extent is the machine-oriented approach more effective than the textbook-oriented approach?

The general objective was to determine as precisely as possible whether the textbook-oriented or machine-oriented approach is the most effective instructional procedure for freshmen students at Texas Southern University.

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*a reading grade score of at least 12.5.

## Related Literature

Proficiency in reading and study skills is considered to be an important variable in predicting the academic success or failure of students at the college level. Blake (1) found that over 90 per cent of colleges in the United States offer study skills courses, and 10 per cent require such a course of all freshmen. Entwisle (5) evaluated 22 study-skills courses using academic success as the criterion measure to determine whether the study skills courses were effective. Among Entwisle's conclusions were: 1) study skills courses are usually followered by academic improvement, and 2) any gains noted were not necessarily related to course content. A comparative study made by Ray and Martin (8) revealed that substantial gains were made by both low and high performance groups.

In a study made by Weigel and Weigel (15) on the relationship of knowledge and usage study skills to academic performance it was suggested that the skills be taught due to the fact that many students do not possess effective study skills and attitudes.

Some differences of opinion seem to exist concerning the use of machines for accelerating reading speed. Some studies have shown significant results.

Bish (2) found that a nine-week, machine-centered program, meeting 40 minutes a day produced significant improvement in reading rate. Dramer (4) reports favorable results of a study in which projection readers were used. However, supplementary books that paralleled the content in regular classes were also used and the students were of above average in intelligence. In a study designed to improve study skills, Ritter (9) reports that GPA's increased significantly at .01 level of confidence. The subjects were instructed through tapes, lectures and workbooks. Wood (18) also reports favorable

results with the tape recorder in teaching adults to read.

Whitehill and Rubin (16) designed a study to improve reading rate and comprehension in which automatic reinforcing clocks were used. Favorable results were reported from the study. This particular study was comprised of three groups: extraverts, introverts and normal. The experimental group used automatic reinforcing clocks while the traditional group alternated between the use of SRA Reading Accelerators and Timed Reading on stop watches. The instrumental method produced greater proportional WPM gains than did the traditional methodology. An earlier study by Whitehill and Jipson (17) reports that extraverts do significantly better in the instrumental program than do introverts or normal groups.

Marani and Maxwell (7) report a significant difference using the "t" test between p and post-test scores as measured by the Nelson-Denny Reading Test with medical laboratory assistants. In this study the T-scope, Controlled Readers and EDL's Listen and Read Tapes were used to improve reading rate and listening comprehension.

Thompson (14) compared a machine-centered program with a book-centered program and found that the latter was significantly better in increasing reading speed with no significant difference in comprehension.

Sechriest (11) gives the following advantages in the use of the rate controller:

1. It discourages regressions.
2. It does not allow time for vocalization.
3. It is a motivating device - producing competition with one's self.
4. It helps improve concentration.
5. The psychological effect is to push the student to read faster.

In agreement with Sechriest, Smith (13) says that "probably the chief value of instruments is two fold: they motivate attempts to read faster, and show a person how fast he really can read when he is forced." However, Karlin (6) found, in his review of research in the use of machines, that "in eleven of the twelve investigations which measured natural reading against machine reading, the groups that received training in the former either equaled or surpassed the machine groups in rate of reading."

Bryant et al (3) conducted a study to determine the effectiveness of taped reading instruction in improving reading rate and comprehension. They report a significant difference, in favor of taped instructions, between taped and silent instructions in reading. There were significant gains in both reading rate and comprehension.

Savage (10) observed that limited use has been made of mechanical devices such as tachistoscopes, controlled readers and other accelerators in reading clinics and high school in an effort to improve reading rate. However, their use is still limited. In the meantime, he admits that with appropriate programed materials, teaching machines can be used to developed the basic skills of structural analysis, context clues and dictionary and study skills.

In a prediction of the use of technology in reading improvement, Smith (12) hypothesized that good results can be obtained with mechanical devices in recognizing whole words, phonic elements, affixes, syllabication and comprehension. However, she questions the effectiveness of mechanical devices in teaching interpretation and critical reading.

## Method

### Subjects

The population for the study consisted of 163 male and 169 female beginning freshman students. The students were arbitrarily divided into two treatment groups: (1) textbook-oriented; (2) machine-oriented. Students in the control group were instructed through a textbook-oriented approach while the experimental group was taught by a machine-oriented approach. The mean initial reading grade scores were 8.9 and 9.1 for the textbook-oriented and machine-oriented groups respectively.

### Materials

Tachistoscopes, including Tach-X and Flash-X, were used as eye-span trainers. Educational Developmental Laboratories' Controlled Readers were used as control instruments for directional attack. Perceptoscopic instruments included DuKane Flip-Tape Sound Filmstrip Projector and 16mm Films Listening Laboratory. AVR Rateometer, SRA Accelerator, Pacers, and EDL Skimmers were used to improve reading rate. The aforementioned instruments were used exclusively with the machine-oriented groups.

The textbook-oriented groups used Reading Improvement Program by John L. Edwards and Nicholas J. Silvaroli and Toward Better Reading Skills by R. Cosper and E. G. Griffin concurrently. No mechanical devices were used with these groups.

The Nelson-Denny Reading Test Forms A and B were used to measure the initial and final rate, vocabulary, and comprehension of all subjects respectively.

Procedure

The criterion measures of reading achievement which were used to ascertain reading growth, if any, were test scores (grade equivalents) on the Nelson-Denny Reading Test. The scores were obtained before treatment as a part of admission requirements. According to Nelson-Denny Composite Grade Equivalent Scores, students who scores between 9.1 and 12.9 enrolled in Reading 114 while those who scored -7.0 to 9.0 enrolled in Reading 112.

Two classes each of 112 and 114 were included in the study for three consecutive semesters exclusive of summer terms. One class each of 112 and 114 were placed in a textbook-oriented and machine-oriented group each semester. Each class met for one hour, twice per week on alternate days for eighteen weeks per semester. Two weeks prior to the end of each semester all students were administered the Nelson-Denny Reading Test Form B to ascertain growth in rate, vocabulary and comprehension, if any.

## Discussion

The instructional program aimed at increasing the capacity of the eye to gain more from the printed page was one in which the time was spent in working with such equipment as the tachistoscope and flashmeter. Controlled instruments such as controlled readers, rateometers, accelerators, pacers and skimmers were used to improve directional attack. Students who used the aforementioned instruments were limited to the machine-oriented instructional approach.

The textbook-oriented instructional approach aimed at improving comprehension concentrated on strengthening such skills as grasping main ideas, noting authors' purpose, critical evaluation of arguments, and vocabulary

study. The techniques consisted of students reading material of increasing difficulty with an attempt on the part of the student to increase the speed of comprehension and, through discussion, have students analyze the ideas and structure of the selection read. No mechanical devices were used.

The study was limited to four classes of Reading for Freshmen each semester during the duration of the investigation. No effort was made to limit the enrollees by sex. A distribution by sex of enrollees who participated in the study is shown in Table I.

Table I

DISTRIBUTION OF SUBJECTS BY SEX

| Semester | Male | % | Female | % | Semester Total |
|---|---|---|---|---|---|
| Spring 1969 | 58 | 48.3 | 62 | 51.7 | 120 |
| Fall 1969 | 42 | 48.9 | 44 | 51.1 | 86 |
| Spring 1970 | 63 | 50.0 | 63 | 50.0 | 126 |
| Total | 163 | 49.1 | 169 | 50.9 | 312 |

The population was fairly well distributed according to sex

Pre-Test Scores in Reading

An inspection of Table II will reveal that the control or textbook groups scored slightly higher in total reading than the experimental or machine groups at the beginning of each semester. The differences in group means in favor of the control groups for the three semesters were 0.2, 0.1 and 0.9 respectively.

Table II

MEAN PRE-TEST GRADE SCORES IN TOTAL READING

FOR EXPERIMENTAL AND CONTROL GROUPS

| Groups | Semester | N | Total Reading | Difference |
|---|---|---|---|---|
| Machine | Spring 1969 | 55 | 8.9 | |
| Textbook | Spring 1969 | 65 | 9.1 | 0.2 |
| Machine | Fall 1969 | 44 | 9.8 | |
| Textbook | Fall 1969 | 42 | 9.9 | 0.1 |
| Machine | Spring 1970 | 53 | 9.3 | |
| Textbook | Spring 1970 | 53 | 10.2 | 0.9 |

An analysis of variance was used to determine whether there were any significant differences in grade equivalent of the experimental and control groups. The t value indicated that there was nc significant difference each semester between the groups at the beginning of the treatment. Therefore, the groups were well matched on the attribute of grade equivalent scores.

Table III shows the mean grade scores for individual groups at the beginning of each semester during the duration of the study.

Table III

NELSON-DENNY MEAN COMPOSITE READING GRADE SCORES FOR TEXTBOOK AND MACHINE GROUPS

| Group | Semester | N | Mean Grade Scores Pre-Test |
|---|---|---|---|
| Machine (Group 1) | Spring 1969 | 30 | 8.7 |
| Machine (Group 2) | Spring 1969 | 25 | 9.0 |
| Textbook (Group 3) | Spring 1969 | 37 | 9.3 |
| Textbook (Group 4) | Spring 1969 | 28 | 8.9 |
| Machine (Group 1) | Fall 1969 | 22 | 9.4 |
| Machine (Group 2) | Fall 1969 | 22 | 10.1 |
| Textbook (Group 3) | Fall 1969 | 22 | 9.5 |
| Textbook (Group 4) | Fall 1969 | 20 | 10.2 |
| Machine (Group 1) | Spring 1970 | 31 | 8.9 |
| Machine (Group 2) | Spring 1970 | 22 | 9.7 |
| Textbook (Group 3) | Spring 1970 | 31 | 10.0 |
| Textbook (Group 4) | Spring 1970 | 22 | 10.4 |

F test was also computed and tested at the .05 level of confidence to test the assumption of homogeneity of variance in total reading achievement for the machine and textbook groups at the beginning of the treatment each semester. An inspection of the F value disclosed no significant variation between the reading achievement of the experimental and control groups before the experiment began. It can be concluded that the groups were equally varied.

Further effort to test homogeneity of the groups was made by comparing IQ scores made on the Otis Quick Scoring Mental Ability Test-Gamma Form (IQ scores were obtained prior to registration as part of admission requirements). Table IV shows the distribution of mean IQ scores for each group per semester.

Table IV

MEAN OTIS IQ SCORES FOR MACHINE AND TEXTBOOK GROUPS

| Group | Semester | N | Mean |
|---|---|---|---|
| Machine (Group 1) | Spring 1969 | 30 | 99.5 |
| Machine (Group 2) | Spring 1969 | 25 | 97.2 |
| Textbook (Group 3) | Spring 1969 | 37 | 97.0 |
| Textbook (Group 4) | Spring 1969 | 28 | 96.4 |
| Machine (Group 1) | Fall 1969 | 22 | 94.0 |
| Machine (Group 2) | Fall 1969 | 22 | 95.1 |
| Textbook (Group 3) | Fall 1969 | 22 | 97.2 |
| Textbook (Group 4) | Fall 1969 | 20 | 97.0 |
| Machine (Group 1) | Spring 1970 | 31 | 96.5 |
| Machine (Group 2) | Spring 1970 | 22 | 96.2 |
| Textbook (Group 3) | Spring 1970 | 31 | 97.6 |
| Textbook (Group 4) | Spring 1970 | 22 | 97.4 |

Intelligence seemed not to have been an intervening factor in regards to progress made in reading ability. The Table above indicates that the research population was well matched in intelligence as well as in reading achievement The lowest variation in mean IQ score, 1.1, appeared in the 1970 spring semester while the greatest variation, 3.1, appeared between the groups in the 1969 spring semester.

Post-Test Scores in Reading

Data on the composite grade equivalent scores for the Nelson-Denny Reading Test Form A is presented in Table V (a). A distribution of reading levels by percentage for the total population is indicated.

Table V (a)

DISTRIBUTION OF THE READING LEVELS OF STUDENTS WHO WERE ENROLLED IN READING FOR FRESHMEN - MACHINE ORIENTED APPROACH (Nelson-Denny Form B)

| Reading Grade Level | | | N | Percent |
|---|---|---|---|---|
| 14.0 | - | 14.0+ | 3 | 1.9 |
| 13.0 | - | 13.9 | 12 | 7.8 |
| 12.0 | - | 12.9 | 11 | 7.1 |
| 11.0 | - | 11.9 | 10 | 6.5 |
| 10.0 | - | 10.9 | 23 | 14.8 |
| 9.0 | - | 9.9 | 35 | 22.6 |
| 8.0 | - | 8.9 | 26 | 16.7 |
| 7.0 | - | 7.9 | 33 | 21.3 |
| Below | | -7.0 | 2 | 1.3 |
| Total | | | 155 | 100.0 |

The greatest percentage of the machine-oriented group came to 22.6% with a grade equivalence between 9.0 and 9.9 while the lowest percentage appeared between grade equivalence of 14.0 and 14.0+ with 1.3%.

Table V (b) presents the distribution of grade equivalence scores for the textbook-oriented approach groups.

Table V (b)

DISTRIBUTION OF THE READING LEVELS OF STUDENTS WHO WERE ENROLLED IN READING FOR FRESHMEN - TEXTBOOK ORIENTED APPROACH (Nelson-Denny Form B)

| Reading Grade Level | | | N | Percent |
|---|---|---|---|---|
| 14.0 | - | 14.0+ | 7 | 4.5 |
| 13.0 | - | 13.9 | 7 | 4.5 |
| 12.0 | - | 12.9 | 13 | 8.3 |
| 11.0 | - | 11.9 | 15 | 9.6 |
| 10.0 | - | 10.9 | 20 | 12.7 |
| 9.0 | - | 9.9 | 40 | 25.4 |
| 8.0 | - | 8.9 | 26 | 16.6 |
| 7.0 | - | 7.9 | 28 | 17.8 |
| Below | | -7.0 | 1 | .6 |
| Total | | | 157 | 100.0 |

The greatest percentage of the population appeared in the second machine -oriented group, 25.4%, with a mean grade equivalence score between the interval of 9.0 and 9.9 while the lowest per cent for the group fell to .6 with a grade equivalence of -7.0 and below.

Table V (c) shows the distribution of reading levels for the total population at the end of the investigation. The experimental and control groups are combined.

Table V (c)

DISTRIBUTION OF READING LEVELS OF STUDENTS WHO WERE ENROLLED IN READING FOR FRESHMEN - MACHINE AND TEXTBOOK ORIENTED APPROACHES

(Nelson-Denny Form B)

| Reading Grade Level | | | N | Percent |
|---|---|---|---|---|
| 14.0 | - | 14.0+ | 10 | 3.3 |
| 13.0 | - | 13.9 | 19 | 6.1 |
| 12.0 | - | 12.9 | 24 | 7.7 |
| 11.0 | - | 11.9 | 25 | 8.1 |
| 10.0 | - | 10.9 | 43 | 13.5 |
| 9.0 | - | 9.9 | 75 | 24.1 |
| 8.0 | - | 8.9 | 52 | 16.7 |
| 7.0 | - | 7.9 | 61 | 19.6 |
| Below | - | -7.0 | 3 | .9 |
| Total | | | 312 | 100.00 |

The greatest and smallest gains occurred in the machine groups. The greatest gain being 3.4 with the first machine group in 1969 Spring Semester while the smallest gain, .2, appeared in the 1970 Spring Semester second machine group. Table VI shows the mean raw score gains for each group included in the study.

Table VI

NELSON-DENNY MEAN COMPOSITE READING GRADE SCORES FOR TEXTBOOK AND MACHINE GROUPS (Post-Test)

| Group | Semester | N | Mean Total Grade Score | | Gain |
|---|---|---|---|---|---|
| | | | Pre-test | Post-test | |
| Machine (Group 1) | Spring 1969 | 30 | 8.7 | 9.2 | .5 |
| Machine (Group 2) | Spring 1969 | 25 | 9.0 | 9.1 | .1 |
| Textbook (Group 3) | Spring 1969 | 37 | 9.3 | 9.5 | .2 |
| Textbook (Group 4) | Spring 1969 | 28 | 8.9 | 9.1 | .2 |
| Machine (Group 1) | Fall 1969 | 22 | 9.4 | 9.9 | .5 |
| Machine (Group 2) | Fall 1969 | 22 | 10.1 | 10.2 | .1 |
| Textbook (Group 3) | Fall 1969 | 22 | 9.5 | 9.6 | .1 |
| Textbook (Group 4) | Fall 1969 | 20 | 10.2 | 10.3 | .1 |
| Machine (Group 1) | Spring 1970 | 31 | 8.9 | 9.3 | .4 |
| Machine (Group 2) | Spring 1970 | 22 | 9.7 | 9.5 | -.2 |
| Textbook (Group 3) | Spring 1970 | 31 | 10.0 | 10.0 | .0 |
| Textbook (Group 4) | Spring 1970 | 22 | 10.4 | 10.6 | .2 |

Even though group gains were slight, individual gains were much more encouraging. However, a small percentage of the population obtained overall reading grade equivalent scores indicative of college success.

[redacted]

## Conclusion

The results of the experimental program described in this study indicate that the machine-oriented approach has a slight advantage over the textbook-oriented approach in increasing reading rate and comprehension. However, with the application of the t test at the .05 level of confidence, no significant difference was found. Individual gains in reading rate and comprehension were most noticeable among students who were consistent in their attendance. Regression in reading achievement was more prevalent among students who were taught by the textbook approach and attended sporadically.

Based on the results presented in the study, the following conclusions may be drawn:

1. Students do better when they are consistent in class attendance
2. Students of disadvantaged backgrounds need extended teaching of reading and study skills
3. More research is needed to determine the effectiveness of reading instruction by a machine-oriented approach.

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