DOCUMENT RESUME

ED 359 498 CS 011 353

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TITLE Improved Reading Comprehension: A Key to University Retention?
PUB DATE Mar 93
NOTE 17p.; Paper presented at the Annual Midwest Regional Reading and Study Skills Conference (6th, Kansas City, MO, March 1-2, 1993).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *College Freshmen; Computer Assisted Instruction; Higher Education; Instructional Effectiveness; Program Effectiveness; *Reading Comprehension; Reading Improvement; Reading Research; *Remedial Reading; *School Holding Power
IDENTIFIERS *Indiana Wesleyan University

ABSTRACT

A study investigated the growth in reading comprehension of students successfully completing a college developmental reading course, and the retention of students taking (and not taking) the reading course. Subjects, 197 first-time freshmen who entered Indiana Wesleyan University during 1989-90 and the 1990-91 school years, were divided into a treatment group of 88 students who were required to enroll in a developmental reading course (using computer-assisted instruction) based on their entrance scores on the Nelson-Denny Reading Test, and 109 students whose scores were slightly higher and who were not required to enroll in the course. Of 39 surveys sent to students who completed the course and were still on campus during the spring semester 1993, 38% were returned. Results indicated that: (1) the average growth in reading comprehension for students who completed the course in 1989-90 was 4 years and almost 3 years for students in 1990-91; (2) retention rates for students who completed the course in 1989-90 was 59%, while retention rates for students who did not take the course was 35%; (3) retention rates for students who completed the course in 1990-91 was 65%, while retention rates for students who did not take the course was 36%; and (4) the overwhelming majority of the students who completed the survey said the reading course gave adequate preparation for reading assignments in other courses. Findings suggest that reading comprehension of underprepared freshman can be increased, computer-assisted instruction is effective, and such instruction can aid in university retention. (Four tables of data and the survey instrument are included; a list of 5 computer software packages is attached.) (RS)

# IMPROVED READING COMPREHENSION: A KEY TO UNIVERSITY RETENTION?

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In recent years, our nation has been made aware of the poor reading skills of many high school graduates. The 1983 federally mandated study, "A Nation at Risk," reported that about 13% of the nation's 17-year-olds could be considered functionally illiterate and nearly 40% of them could not draw inferences from written material. Almost ten years later in April, 1992, USA TODAY reported that 20% of the 1992 working population could not read and understand at the fifth-grade level.

The entrance scores for first-time freshmen at Indiana Wesleyan University during the past few years seem to reflect these findings. The in-coming class of 1989-90 was no exception. Of the 300 new students, 150 tested at or below 10.7 on the Nelson Denny Reading Test and were enrolled in developmental reading classes.

We as reading instructors know that the ability to read is basic to success in college. We also know that what we are doing in college developmental reading classes is making a difference. Unfortunately, however, our colleagues many times do not realize how important our role is in the overall picture. Having effective on-going evaluation procedures in place and reporting

the findings to the rest of the university faculty and administrators give credibility and validity to our programs.

The rationale for this study was based on three different areas of research: evaluation of learning center programs, computer-aided instruction in reading comprehension, and university retention. No one study was found that addressed all three areas; however, a brief overview of each field, keeping in mind its relationship to reading research and instruction gave the foundation for the present study.

## EVALUATION OF LEARNING CENTER PROGRAMS/CLASSROOM RESEARCH

Dr. Maxwell (1993), in her latest book Evaluating Academic Skills Programs, gives the following basic guidelines which should be followed in evaluating a program: 1) Before starting, decide on questions to be answered. 2) Conduct effective data collection. 3) Use multiple measures and multiple criteria. 4) Include qualitative information as well as quantitative evidence.

Simpson and Nist (1992) also suggest that a comprehensive model of assessment should include a variety of formal and informal instruments that sort, diagnose and evaluate. The authors list seven characteristics of an exemplary assessment program and state that the ongoing diagnosis and evaluation should be directly related to instruction. Testing is done to provide information which is used to improve instruction and inform students.

Neilson (1990) states that the authority of the reading

researcher who works far away from the classroom in an intellectual haven is being threated by teachers who feel that research should be conducted and reported by teachers themselves. Teacher research is making a difference and has the potential to bring professional research home. She says, "Teachers who undertake their own research are not afraid to grow."(p.249)

## COMPUTER-AIDED-INSTRUCTION IN READING COMPREHENSION RESEARCH

Quantitative research studies on computer-aided-instruction (CAI) as related to reading comprehension are virtually non-existant. No studies directly assessing CAI were found. However, Rickelman and Henk (1989), in their column on reading technology, reported many of the the ways computers and other forms of technology such as interactive videos and CDs could and would be used in the reading classroom. They asserted that reading would be the major vehicle through which technology could be used in the future. The authors concluded that, "If the anticipated multiple uses of technology are eventually realized, there is a clear message to teachers that technological literacy is essential." (p. 78)

In a more recent column called "Techtalk", Caverly and Broderick (1993) gave a review of the latest uses of the computer as a tutee. They reported that the use of multimedia and hypermedia software allows instructors to teach their developmental students using technology more in tune with their "MTV literacy."

In Maxwell's review of recent research in reading and study

skills presented at the Institute for Learning Assistance Directors and Professionals in January, 1993, she included an article by Stahl, Simpson, and Hayes (1992) which listed the ten best ideas for teaching developmental reading. Computer-assisted-instruction was conspicuously absent from the list. Perhaps, in a rather broad sense, CAI embodies several of the ten ideas on this list.

1. Adapt a cognitive-based philosophy.
2. Use a course model that stresses transfer of skills to "real" college courses.
3. Use reliable, process-oriented assessment procedures.
4. Broaden the students conceptual background knowledge.
5. Reconceptualize vocabulary development.
6. Use learning strategies that have been research validated.
7. Systematically train students to employ strategies through self-control training.
8. Promote strategy control and regulation by teaching students to plan, monitor, and evaluate their own learning.
9. Teach high utility strategies to maximize acceptance and reduce negative attitudes.
10. Incorporate writing into the curriculum. (Stahl, Simpson, & Hayes, 1992)

Although based on observation and experience rather than empirical research, computer-aided-instruction seems to support many of the above ideas. Examples could be given to demonstrate

its effectiveness in broadening the students' conceptual background knowledge (#4), in reconceptualizing vocabulary development (#5), in training students to employ strategies through self-control development (#7),, and perhaps most significantly - in promoting strategy control and regulation by teaching students to plan, monitor, and evaluate their own learning (#8). From the beginning, the computer seems to put the student in control of his own learning.

## UNIVERSITY RETENTION RESEARCH

Ainley, Forman, and Sherret conducted a study at the high school level to find out what factors influenced high school students to stay in school after reaching the age level mandated by the compulsory education system. They concluded that the students' intentions to stay in school were influenced not only by their background, but by two other variables: their achievement level and their perception of the quality of school life.

Perhaps these findings should not be generalized to the university level, but they may give us further insight into our role in the solution to the problem of university retention. We as reading instructors know that achievement levels and reading levels are definitely interrelated. Because we are actively involved in the university support system, we also know that the students' perception of the quality of school life has much to do with their self-concept, which can improve as they experience academic success.

No published studies were found which directly linked university retention with academic support programs; however, Holland and Matthews, in their presentation at the North Central Reading Association Conference, October, 1992, told how their developmental reading courses and supplemental instruction program fit into a comprehensive retention plan recently implemented at Wayne State University.

Dr. Vincent Tinto, in his keynote address at the 1989 MCLCA conference in Chicago, suggested that successful retention is no more than nor less than successful education (Cassaza, 1990). However, successful education cannot take place if the students lack the necessary skills to cope with the reading demands of college courses. That is where we as reading instructors can make a difference.

## DESCRIPTION OF THE LEARNING CENTER READING COURSES

Indiana Wesleyan University is a four-year, church-related, liberal arts college located in Marion, half-way between Indianapolis and Fort Wayne. It has a student body of over 1500 on the main campus and almost 1900 in its innovative program for adult professionals in Indianapolis and throughout the state of Indiana.

The Learning Center serves the students on the main campus, the majority of whom are traditional 18-22 year olds. A small (but growing) percentage of the population consists of minorities, ESL students, and older, non-traditional students who have returned to the classroom to pursue a liberal arts degree.

The Learning Center at Indiana Wesleyan University offers courses in developmental reading for students who have been identified through assessment during orientation as reading below college level. Students are screened on the basis of their Nelson-Denny Reading Test scores. Those who are at or below 10.7 are required to enroll in developmental reading classes.

The primary method of instruction in these courses is the computer. During the first week of classes, the reading instructors determine the students' levels in reading comprehension, vocabulary, skimming/scanning, and speed of reading. The students then are assigned appropriate computer lessons for remediation. Several software programs designed to review and/or re-teach basic reading strategies are installed on the hard drives of the Learning Center's 20 IBM ps2 computers. The names of the programs and the addresses of the companies where they can be purchased are in the appendix.

Exit levels for the reading course are ≥12.0 on the Nelson-Denny in all four diagnosed areas - comprehension, vocabulary, skimming/scanning, and speed. Students must re-enroll in the course in subsequent semesters until the required levels are reached.

## PURPOSES OF THIS STUDY

The purposes of this study were to answer the following questions: 1) What was the average growth in reading comprehension as measured by pre and post Nelson-Denny scores of the students who successfully completed the developmental reading

courses during the school years 1989-90 and 1990-91? 2) What percent of the students required to take reading courses in the 1989-90 and 1990-91 school years were still enrolled at Indiana Wesleyan University spring of 1992? 3) What percent of the incoming students in 1989-90 and 1990-91 who had similar (slightly higher) entrance scores but were not required to take reading courses were still enrolled at IWU in the spring of 1992? 4) Did successful completion of Learning Center reading courses have a statistically significant effect on university retention of this population?

## METHOD

The subjects for this study were 197 first-time freshmen who entered Indiana Wesleyan University during the 1989-90 and the 1990-91 school years. The treatment group consisted of 88 of these students who were required to enroll in reading courses based on their entrance scores (<10.7) on the Nelson-Denny Reading Test. The control group consisted of 109 students whose entrance scores were slightly higher (between 10.7 and 13.0), so they were not placed in the reading classes.

## RESULTS

A comparison of the pre and post Nelson-Denny comprehension scores for students who successfully completed the reading courses in 1989-90 revealed that students gained from 1.2 to 9.6 grade levels (as measured by this instrument) and the average growth was about 4 years. Similar comparisons were made for

1990-91. Students gained from .6 to 8.2 grade levels in comprehension while the average growth was almost 3.0 years. (See Table 1.)

TABLE 1

GROWTH IN READING COMPREHENSION
AS MEASURED BY PRE AND POST NELSON-DENNY

| YEAR | NO. | MEAN | STANDARD DEVIATION | STANDARD ERROR |
|---|---|---|---|---|
| 1989-90 | 39 | 4.2077 | 2.871 | .460 |
| 1990-91 | 49 | 2.9551 | 2.546 | .364 |

THE AVERAGE GROWTH IN READING COMPREHENSION OF THE 1989-90 GROUP WAS A LITTLE OVER FOUR YEARS, AND THE AVERAGE GROWTH OF THE 1990-91 GROUP WAS ALMOST THREE YEARS.

Additional data were gathered from school years 1989-90 and 1990-91 as well as from the enrollment rosters from the Spring Semester, 1992, to determine the retention rates of both the treatment and the control groups. The rate of retention for 1989-90 reading students still enrolled in the spring of 1992 was 59% while the control group retention rate was 35%. A comparison of the rates of the 1990-91 population and the 1990-91 control group revealed a 65% to 36% ratio. (See Table 2.)

TABLE 2

RETENTION RATES (SPRING, 1992) OF STUDENTS WHO SUCCESSFULLY COMPLETED READING COURSES AND THOSE WHO DID NOT

| YEAR | GROUPS | NO. | LEFT | RETAINED | RATE % |
|---|---|---|---|---|---|
| 1989-90 | 1. Reading | 39 | 16 | 23 | 59% |
| 1989-90 | 2. No Reading | 48 | 31 | 17 | 35% |
| 1990-91 | 1. Reading | 49 | 17 | 32 | 65% |
| 1990-91 | 2. No Reading | 61 | 39 | 22 | 36% |

The statistical analysis showed a significant difference between the retention rates of the two groups at the .002 level of significance. The results showed that the developmental reading courses were a significant determinant in the improved rate of retention. (See Table 3.)

TABLE 3

COMPARISON OF RETENTION RATES BETWEEN GROUPS

ANALYSIS OF VARIANCE

| YEAR | | DF | SUM OF SQUARES | MEAN SQUARE | F | SIG F |
|---|---|---|---|---|---|---|
| 1989-90 | REGRESSION | 1 | 1.19413 | 1.19413 | 4.97188 | .0284 |
| | RESIDUAL | 85 | 20.41506 | .24018 | | |
| 1990-91 | REGRESSION | 1 | 2.32329 | 2.32329 | 9.96979 | .0021 |
| | RESIDUAL | 100 | 25.16761 | .23303 | | |

p=<.05

SUCCESSFUL COMPLETION OF THE LEARNING CENTER READING COURSE IS A VERY SIGNIFICANT DETERMINANT OF RETENTION AT <.03 LEVEL (1989-90) AND <.002 LEVEL (1990-91).

FINDINGS

These findings indicate that underprepared freshmen who successfully complete developmental reading courses which use the computer as the primary method of instruction may notably increase their comprehension levels as measured by the Nelson-Denny Reading Test and are more likely to still be enrolled in school one and two years later than their counterparts with slightly higher entrance levels.

QUALITATIVE EVALUATION - SURVEY OF FORMER READING STUDENTS

A survey was sent out to students who successfully completed the reading courses in 1989-90 and 1990-91 and who were still on campus during Spring Semester, 1993. Thirty-nine questionnaires were sent out enclosing a pre-addressed return envelope. Thirty eight percent of them were completed and returned. The following is a copy of the survey:

READING COURSE SURVEY

Please react to the following statements to determine the effectiveness of this course in preparing students for reading assignments in other courses. Circle the number that best reflects your feelings:

| | STRONGLY AGREE 5 | AGREE 4 | UNDECIDED 3 | DISAGREE 2 | STRONGLY DISAGREE 1 |
|---|---|---|---|---|---|
| 1. The Reading Improvement course has helped me in my reading assignments for other classes..... | 5 | 4 | 3 | 2 | 1 |
| 2. The comprehension programs on the computer were helpful to me in my better understanding of text materials..... | 5 | 4 | 3 | 2 | 1 |
| 3. The vocabulary building programs on the computer were beneficial in giving me backgroud knowledge necessary to meet college reading demands..... | 5 | 4 | 3 | 2 | 1 |
| 4. Skimming and scanning instruction has been helpful in completing reading assignments in other courses..... | 5 | 4 | 3 | 2 | 1 |
| 5. Study skills exercises such as how to prepare for exams, scheduling study time, and analyzing textbook structure were valuable components of the class..... | 5 | 4 | 3 | 2 | 1 |

6. Please list your <u>suggestions</u> for improving the Reading Improvement course to make it more relevant to students' reading needs.

RESULTS

Ninety three percent of the respondents agreed or strongly agreed that this course adequately prepared them for college reading assignments. In answer to the second question concerning the comprehension software programs, 47% of the respondents felt that they were helpful in understanding text materials while 53% were undecided. Fifty-three percent said that the vocabulary programs on the computer were helpful. Eighty-seven percent said that the skimming/scanning instruction was helpful. In answer to the last question, 47% of the students said that the study skills exercises were valuable, 33% were undecided, and 20% did not feel they were helpful. One student could not remember this part of the course. It is important to look at the disagree/strongly disagree boxes for number two because a large percent of the students marked undecided and no one disagreed or strongly disagreed.

TABLE 4
READING COURSE SURVEY
REPORT

| | STRONGLY AGREE AND AGREE | UNDECIDED | DISAGREE/ STRONGLY DISAGREE |
|---|---|---|---|
| 1. Reading course helped in other classes . . . | 93% | 7% | 0% |
| 2. Comprehension programs helpful . . . . . | 47% | 53% | 0% |
| 3. Vocabulary programs beneficial . . . . . | 60% | 27% | 13% |
| 4. Skimming/scanning instruction helpful . . | 87% | 7% | 6% |
| 5. Study skills exercises valuable . . . . . | 47% | 33% | 20% |

To sum up the survey results, the overwhelming majority of the students who responded to the questionnaire said that the reading course gave adequate preparation for reading assignments in other college courses and that the instruction in skimming and scanning was valuable (#1 & 4). About half of the respondents felt that the comprehension and vocabulary lessons on the computer and the suggestions for improving their study skills were valuable components of the course. Moreover, a large percentage of the respondents were undecided in these three areas, and very few disagreed.

STUDENTS' COMMENTS

The following comments may give insight into some of the students' reactions which were not included in the survey questions:

STUDENTS' COMMENTS

"I NEEDED MORE SPEED READING CLASSES."

" I WANTED MORE EXTENSIVE READING COMPREHENSION (MORE LENGTHY READING MATERIAL)."

". . . I WAS ABLE TO DO VERY WELL IN THE CLASS BUT I STILL HAVE SOME PROBLEMS RELATED TO MY READING READING ABILITIES THAT THE CLASS DID NOT ADDRESS. . "

"VERY HELPFUL CLASS. I'M A SENIOR NOW AND I CAN SAY THAT THIS CLASS HAS HELPED ME IMPROVE THROUGHOUT MY FOUR YEARS HERE. IT HELPED ME TO READ FASTER."

"I FEEL THAT THE COURSE HELPED ME TO 'FOCUS' ON MY READING, BUT COMPREHENSION, VOCABULARY, AND STUDY SKILLS CAME BY CONTINUOUS PRACTICE."

## LIMITATIONS OF THE STUDY

Random sampling was not possible because students were required to enroll in the classes. Isolating and controlling certain variables such as instruction in study skills, basic writing, and vocabulary building was not possible. The results of this study can only be generalized to similar populations.

## CONCLUSIONS AND RECOMMENDATIONS

Based on the review of literature and the findings (both quantitative and qualitative), the following conclusions can be drawn: 1) Underprepared freshmen, including non-traditional students, can significantly increase their reading comprehension by successfully completing a reading course such as the one described in this study. 2) Computer-aided-instruction, using commercially developed reading software programs, proved to be effective in meeting the needs of developmental readers enrolled in college reading classes. 3) Because students who increased their reading comprehension levels were more likely to be enrolled (one and two years later) than their counterparts, developmental reading instructors play an important role in the university retention of this population.

Follow-up studies should be conducted with this population to determine retention rates three and four years later and to report how many of these students actually graduate. Further research should be done, isolating other variables, to examine the effectiveness of computer-aided-instruction in the light of recent reading research concepts such as whole language, metacognition, and the reading/writing connection.

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Twenty percent of U.S. workers functionally illiterate. USA TODAY. April, 1992. 120(2563), p.13.

## Computer Software

Reading Efficiency (Grade equivalent levels 6-14).
Comprehension and Vocabulary.
Weaver Instructional Systems
6161 28th S. E.
Grand Rapids, MI 49506

Skills Bank II Reading - Reading Comprehension, Word Knowledge.
Softwriters Development Co.
825D Hammonds Ferry Road
Linthicaum, Maryland 21093-1301

New England Readers Levels F, G, H. Comprehension.
Queue
562 Boston Avenue
Bridgeport, CT 06610

Speed Reader II
Davidson and Associates, Inc
3135 Kashiwa Street
Torrance, CA 90505

Speed Reading
Bureau of Business Practice
Division of Prentice-Hall, Inc.
Waterford, CT 06386