2000

An Analysis of Remedial Reading Preparation for Beginning Information Systems Students at Eastern Shore Community College

Cynthia Hodges
Old Dominion University

AN ANALYSIS OF REMEDIAL READING
PREPARATION FOR BEGINNING
INFORMATION SYSTEMS STUDENTS
AT EASTERN SHORE COMMUNITY COLLEGE

A Research Paper
Presented to the Graduate Faculty of
the Department of Occupational and Technical Studies
at Old Dominion University

In Partial Fulfillment
Of the Requirements for the
Master of Science in Occupational and Technical Studies

By
Cynthia Hodges

April 2000

APPROVAL PAGE

This research paper was prepared by Cynthia Hodges under the direction of Dr. John M. Ritz in OTED 636, Problems in Occupational and Technical Studies. It was submitted to the Graduate Program Director as partial fulfillment of the requirements for the Degree of Master of Science in Occupational and Technical Studies.

APPROVAL
BY:_____DATE:__4 - 17 - 00__
          Dr. John M. Ritz
          Advisor and Graduate
          Program Director

TABLE OF CONTENTS

TABLE OF TABLES

CHAPTER I
INTRODUCTION

When a student undertakes the study of computer information systems, one of the fundamental tasks he/she must face is comprehension of the texts and other documentary materials inherent to the field. The literature accompanying information systems courses is usually interspersed with technical jargon that can be daunting, particularly for the beginner. The student may feel as if he/she is learning a foreign language.

The technical reading required of beginning information systems students can be quite a challenge, even for the best readers. When a history of reading comprehension problems is added to the equation, successful completion of the introductory computer course is even more difficult.

For the student entering college with documented reading deficiencies, developmental courses can help bridge the gap to effective comprehension of college texts. But while remediation often helps improve overall reading skills, does it help with the technical material required by the field of Information Systems Technology (IST)? If not, how can remedial preparation be improved for the beginning IST student? It is the intent of this study to answer those fundamental questions.

Statement of the Problem

The problem of this study was to evaluate the success of the Reading Improvement course at Eastern Shore Community College (ESCC) in preparing developmental reading students for the technical reading required to complete the Fundamentals of Computer Information Systems course. The performance of beginning

IST students placed into developmental reading upon admission to the college was compared to that of students who did not need the remedial course. Semester grades earned by former IST students and reading comprehension skills exhibited by current IST students provided the data necessary to examine the problem.

Research Goals

The hypotheses under investigation during the course of this study were as follows:

H_0: Students who complete the developmental reading course (ENG 04, Reading Improvement) at ESCC earn grades in the introductory computer course (IST 114, Fundamentals of Computer Information Systems) comparable to those students who did not need remediation.

H_0: The developmental reading course prepares the remedial reading students to comprehend the technical material required to complete the introductory computer course at a level comparable to those students who did not need remediation.

Background and Significance

As the sole full-time IST faculty member at ESCC, the researcher is responsible for teaching all of the computer courses from introductory through advanced. This circumstance often precipitates close personal tracking of the skills exhibited by individual students throughout the duration of their enrollments. The quantity of students needing developmental skills preparation, coupled with frequent observations of the in-

class performance of beginning computer students, led the researcher to pose the questions examined in this research study. Test grades and student questions appear to indicate that former remedial reading students may have a harder time grasping the technical material.

Although the effectiveness of the developmental reading, writing, and math courses have been evaluated in periodic program reviews, the assessment has been based on student performance in all subsequent courses, not specifically with respect to the beginning IST course, where significant amounts of technical material must be comprehended. The written materials accompanying the general academic courses are not especially technical in content, so are not directly comparable to those used in information systems to assess reading comprehension levels.

Limitations

Throughout this research study, certain limitations must be acknowledged as possibly affecting the outcome. They are:

- The supplemental and support materials used by different teachers in the same course varied.

- Reading comprehension placement and exit test scores of the remedial reading students entering IST 114 varied.

- Some of the students enrolled in IST 114 took it voluntarily; others signed up because the course was required for their curriculum, therefore student attitudes toward IST 114 varied.

- The computer experience level of those students enrolled in IST 114 varied.

- The teaching methods and effectiveness of the instructors varied for the same course.

Basic Assumptions

The researcher made the following assumptions about the problem:

- Results of the reading comprehension placement and exit tests were valid and reliable.

- Measurement of the comprehension of technical material was consistent with the measurement of comprehension of the general material measured in the placement test.

- Effectiveness of the remedial reading course and the beginning information systems course was the same regardless of the term in which it was measured.

- All faculty teaching the IST 114 used the same textbook to accompany the course.

Procedures

Sections of the Fundamentals of Computer Information Systems course taught within the past four years were selected at random from different semesters in which the course was offered. For each student in each section selected, data was collected from the Virginia Community College System's (VCCS) Student Information System (SIS) in order to determine whether he/she took the Reading Improvement course and to obtain his/her Fundamentals of Computer Information Systems final grade.

Enrollment in the course is strictly limited to a maximum of twenty students per section, and in the fall and spring semesters, the sections are typically full. Not all students remained enrolled for the entire semester; however, an initial estimate of the number of students to be studied was one hundred twelve, assuming at least sixteen of the twenty remained in each section. Additional randomly selected sections were added as necessary to bring the total number of subjects to at least one hundred, so that an accurate

sample population would be used. Ten sections were eventually selected in this fashion. The resulting sample population headcount was one hundred seventy students.

The data collected was tabulated and analyzed in order to address the question of whether or not the students who were required to take remedial reading performed as well as the students who were not. The semester grades of the former remedial reading students were compared to that of the non-remedial students for the Fundamentals of Computer Information Systems course.

In addition, students enrolled in three of the four spring 2000 semester sections of the Fundamentals of Computer Information Systems course were given a passage of technical text relevant to the course, which they read, and about which they answered questions to determine how well they comprehended the passage. A full time English faculty member reviewed the text and the sample questions to determine whether they appropriately reflected a valid measurement of comprehension. This faculty member also ranked the difficulty level of the passage selected in order to determine if it was comparable to that of the general reading required in the college placement test.

Definition of Terms

Throughout this document, the following terms will be used with respect to Eastern Shore Community College and this research project.

ESCC: Eastern Shore Community College

IST: Information Systems Technology

Reading Improvement: a course of study in remedial reading to
         improve the comprehension skills of students who tested
         below the expected college level rate of performance

SIS: Student Information System; an electronic repository of student academic records

VCCS: Virginia Community College System

Overview of Chapters

Any knowledge the IST faculty member can bring to the classroom in order to help the beginning computer student succeed is priceless. But that knowledge must be based on solid facts--not just teacher speculation. This research project has the potential to identify and address remedial reading preparation deficiencies that may affect the student's comprehension of technical material.

In the chapters that follow, this research study will attempt to demonstrate, based upon the performance of past students, how well the Reading Improvement course at ESCC is preparing IST students. Should performance prove to be less than satisfactory, improvements to the preparation of technical material comprehension would be suggested.

Chapter II, Review of the Literature, will discuss some of the important relevant reading research that has been done in the past and is currently being undertaken. Chapter III, Methods and Procedures, will discuss the data selection, collection, and tabulation processes used in the study. The statistical analyses of the data will be presented in Findings, Chapter IV. Finally, Chapter V, Summary, Conclusions and Recommendations, will present the researcher's summary of what, if anything, should be done to improve remedial reading preparation for IST students.

CHAPTER II
REVIEW OF THE LITERATURE

The issue explored in this research project is how well the remedial reading course at ESCC prepares students for the technical reading required to successfully complete the introductory information systems course. Many studies have been performed to analyze the success of remedial reading programs. However, this project seeks to specifically target the success of technical reading remediation.

Importance of Technical Reading Skills

In the short term, sound technical reading skills provide an important means by which the beginning information systems student can pass the introductory computer course with an acceptable grade. In the long term, sound technical reading skills are important to the student's later career performance. Today more than ever before, many jobs rely on the employee's ability to read and understand technical material.

In a 1995 interview with *Educational Leadership*, Willard Daggett, Director for the International Center for Leadership in Education, predicted that the U.S. would continue a trend toward fewer and fewer unskilled job openings and more jobs requiring a high degree of technical skills. Being able to perform those jobs successfully means being able to interpret the technical materials accompanying those jobs.

According to Daggett, other countries already include a technical reading component as part of their educational curricula. In Germany, for example, students spend up to 25% of their K-12 education on the development of technical reading skills. Assessment includes not only reading and interpreting literature, but also the ability to

read and comprehend very technical materials, such as a technical instruction manual (1995).

The Reading Improvement course at ESCC, like many other remedial reading programs, does not focus specifically on technical reading skills. Course materials typically include literature, general magazine articles, and newspaper articles. Whether or not the course develops technical reading abilities in successful program completers, therefore, remains to be discovered during the research project.

Important Reading Theory and Research

Before undertaking analysis of the success of any remedial reading course, it is necessary to review some of the important reading theories and research undertaken in the past. Reviewing the work done by other researchers can provide valuable insight into the measurement techniques that will be most useful in providing valid and reliable feedback for this study.

Laberge and Samuels (1974) proposed a theory of reading based upon information processing, modeled after the way in which computers process data. According to their theory, as more of the task of reading becomes automatic, the more attention can be focused on absorption or understanding of the material, rather than on the basic skills required to understand simple constructs, such as letters or words.

Later studies were undertaken to support the information processing theory of reading. Samuels, LaBerge, and Bremer (1978) performed research using word recognition, using words of varying lengths. Patberg, Dewitz, and Samuels (1981) further supported the theory with a study that contrasted recognition of isolated words versus two

word combinations. Findings of these studies were consistent and supportive of the original information processing theory, suggesting that the more automatic reading becomes, the greater the reader's comprehension level will be.

Chall (1983) proposes a six-stage model of reading development based upon the conclusion that reading is not a holistic process, but a combination of basic skills mastered over time. During stages 0 through 3, children progress from the point where printed materials hold little or no meaning to them to the point of beginning to acquire meaning from text. Chall's stages 4 and 5 continue this progression to the point where readers can integrate differing points of view.

Chall's theory tends to agree with the information processing theory in the respect that the more fluent the reader becomes in utilizing the basic skills of word and character recognition, the better he/she becomes at reading. The research performed by Chall, LaBerge, Samuels, and others supports the concept of reading as a holistic activity (Potter & Wamre, 1990).

Measuring the Success of Remedial Reading Programs

Several methods have been used in the past to evaluate the success of remedial reading programs. A pretest/post-test approach, using a standardized measure of reading comprehension has proven to be an effective method of measuring reading skills improvement (Taraban, 1997). As an alternative approach, the same standardized measures can be used to compare the performance of those students taking remedial courses to those who have not (Caverly, 1996).

Barksdale-Ladd and Rose (1997) have taken the assessment process one step further. They suggest that not only are quantitative measures needed for the successful evaluation of remedial reading students, but also qualitative methods of measurement. In a study performed by the two, nine students participated in five one-hour interviews, during which they were asked questions regarding: reading and metacognition, study, notetaking, motivation and attitudes, and family literacy history.

The results, though difficult to tabulate and analyze, revealed a wealth of information not easily obtained by strict use of quantitative measures. In some cases, the results of the qualitative analysis contradicted the results of the quantitative testing. The benefit for the students participating in the study was that they received personalized, comprehensive reading skills assessments based upon the results of the interview sessions (Barksdale-Ladd & Rose, 1997). The major drawback to this type of assessment is the time and effort required for its administration and the difficulty getting the necessary commitment from program volunteers.

Some researchers advocate an approach that allows cross-validation of different assessment methods. Potter and Wamre (1990) suggest that the basic research of model building (such as the models of Chall, Samuels, and LaBerge) should be combined with the applied research found in curriculum-based measurement (CBM) to gain a more comprehensive perspective. The authors contend that CBM is useful in testing the reading models; the models, in turn, can reveal new hypotheses that advance the uses of CBM.

Trends in Reading Assessment

Standard measurements of reading assessment are being challenged. There is an ongoing debate over whether they measure reading processes, or only the product of reading. New items are being developed for tests that measure metacognition, a term for the reader's awareness of reading thought processes. The idea is that once readers are aware of these processes, they can control them (Powell, 1989).

Portfolio assessment techniques are also being used, some utilizing performance-based and authentic assessment. Even widely used assessment measures are turning toward authentic and performance-based assessments. Among the changes implemented are: students respond to open-ended questions; use of longer passages originally intended for enjoyment; and reading text for a variety of purposes, such as enjoyment or understanding ("Changes in reading assessment," 1997).

Summary

Many theories of reading comprehension exist, accompanied by many models of assessment for reading success. This research study will rely heavily on the use of standardized testing instruments administered upon the student's admission to the college. The same test is administered both before and after the remedial reading course is recommended, and the results are easily obtained for analysis. It was difficult to find an instrument that targeted the technical reading aspect of this study, however. The assessment procedures common to remedial reading programs do not tend to be technically oriented, so this part of the assessment process relied on researcher-designed instrumentation. Chapter III will discuss this instrument in detail.

CHAPTER III
METHODS AND PROCEDURES

During the course of this experimental study, data was collected to determine how well prepared former remedial reading students were to comprehend the technical material presented in ESCC's introductory computer course. This chapter will describe the population, instrument design and use, methods of data collection, and statistical analyses performed on those data. Careful treatment of each yielded conclusions about the research hypotheses posed in Chapter I.

Population

The population under study was randomly selected and representative of the general population attending ESCC. The VCCS requires all degree-seeking students to complete a computer literacy component during their course of study, and in the majority of cases, that is fulfilled by completing the Fundamentals of Computer Information Systems course. In addition, many students who are not seeking degrees enroll in the course in order to upgrade or obtain basic computer skills. Therefore, the sample population contained students who had not declared a major in addition to curricular students.

During the period of time extending from fall of 1996 through spring of 1999, twenty-four total sections of the introductory information systems course were offered during the fall and spring semesters. From those, ten sections were randomly selected in order to obtain the data required for comparison of semester grades.

Each semester of the designated three-year span was represented in the population at least once. In order to keep the population as typical as possible, summer semester sections were not used in the study. The typical ESCC student does not attend during the summer session.

Another factor that was considered during random selection of the sample population was the faculty member teaching a particular section. Four different faculty members, one full time and three adjuncts, were represented in the random sample. Random selection of sections was repeated until that combination was achieved.

One hundred seventy students were selected for this part of the study. Each of the ten sections contained a mix of both former remedial and non-remedial reading students. Sections of the course offered during the three-year period were randomly selected as necessary in order to achieve a minimum of fifty former remedial reading and non-remedial students in the sample population. The final population was composed of fifty-five (55) former remedial reading and one hundred fifteen (115) non-remedial students.

If deemed necessary by placement test scores, students were required to complete the remedial reading course before enrolling in the introductory computer course. This remedial reading placement status was recorded in the SIS computer program for each student.

Students enrolled in the spring 2000 semester sections of Fundamentals of Computer Information Systems provided the sample population for the technical reading comprehension test described in the next section.

Research Variables

In order to perform the research needed to complete this study, several research variables were considered. Investigation of the first hypothesis, which concerned the grade comparison of former remedial reading students to non-remedial students in the Fundamentals of Computer Information Systems course, required two variables: the remedial reading or non-remedial status (reading ability) and outcome of the class (semester grade). The second hypothesis, comparison of the technical reading comprehension skills between former remedial reading and non-remedial students, also required consideration of two research variables: remedial reading or non-remedial status (reading ability) and outcome of the reading comprehension test (mean scores).

Instrument Design and Use

One researcher-designed instrument was used in this study in order to obtain additional insight into the technical reading skills of the students. A short passage of technical text was selected. One page of single-spaced text addressing the topic of computer networking, a subject about which most entering students know little to nothing, was used. No diagrams or pictures accompanied the text. The passage was followed by five multiple-choice questions designed to determine whether or not the reader understood the content.

In order to determine the validity of the instrument, an English faculty member reviewed the text and questions and suggested revisions. The test was revised as necessary before administration. The English faculty member also rated the difficulty level of the text selected, which was comparable to the college's placement test.

The test was administered to beginning computer students during the spring semester of 2000. In addition to the section taught by the researcher, the sections taught by an adjunct faculty member were also used. None of the students were exposed to any of the concepts presented in the text prior to reading the passage. Social Security numbers of the participants were used to retrieve the former remedial or non-remedial status from the SIS computer system. The performance of both groups was compared.

Methods of Data Collection

Several of the data needed to complete this research study were available from the VCCS's SIS system. For each student in the study, the system reflected whether or not he/she was placed into remedial reading. In order to compare student performance in the introductory computer course, the letter grade received upon completion of the class was also retrieved.

To analyze the performance of beginning IST students on the researcher-designed instrument, remedial reading status was retrieved from the SIS system. Scores earned on the researcher-designed instrument provided the additional data required to compare the technical reading comprehension levels for the spring 2000 semester's students.

Statistical Analysis

Two sets of data were analyzed for former remedial reading and non-remedial students: scores earned in the Fundamentals of Computer Information Systems course and scores earned on the researcher-designed reading comprehension test. Careful analysis of each revealed the answers to the questions posed by this research study.

The first research hypothesis, contrasting the performance of former remedial reading and non-remedial students in the introductory computer course, was addressed by using the semester grades retrieved from the SIS system. A chi-square analysis of the frequency of A's, B's, C's, D's, and F's was used to determine whether or not there was a significant difference in performance between the two sets of students. Student withdrawal grades (W's) were ignored.

Scores recorded for the researcher-designed instrument were as follows: five questions yielded a possible score in the range 0 through 5, determined by the number of questions the student answered correctly. A t-test was used to compare the mean scores achieved by former remedial reading and non-remedial students. The result was used to address the second research hypothesis--the determination of whether or not the former remedial reading students were prepared for the comprehension of the technical reading required in the introductory information systems course.

Summary

Throughout this chapter, the population under study, instrument design and use, methods of data collection, and statistical analyses that were used to complete this research project have been described. The methods and procedures were carefully selected in order to achieve results that were reliable and indicative of the effectiveness of the remedial reading course in preparing beginning computer students to comprehend technical material. Chapter IV will reveal the statistical results of the study.

CHAPTER IV
FINDINGS

Previous chapters have described the problem investigated, data collection procedures, relevant research, and statistical analysis required to complete this experimental research study. The researcher followed all of the procedures previously set forth in order to determine how well prepared former remedial reading students were to understand the written technical materials accompanying ESCC's introductory computer course, IST 114, and to complete the course successfully. Findings of the research activities will be presented in this chapter.

Analysis of Course Performance

Evaluation of the first hypothesis, regarding the performance of former remedial reading students versus non-remedial students in the introductory computer course, required analysis of the semester grades of both categories of students. Using the random selection techniques described in Chapter III, ten sections of the Fundamentals of Computer Information Systems course yielded a total sample population of one hundred and seventy (170) students. As stated in Chapter III, four different instructors were included in the random selection, and each semester of the three-year time span was represented at least once. The compiled population data is shown in Table 1, on the following page.

Table 1
Frequency of Grades by Reading Status

Developmental Reading Status	Fundamentals of CIS Semester Grade					
	A	B	C	D	F	Totals
Remedial	4	14	20	9	8	55
Non-remedial	46	36	18	6	9	115
Totals	50	50	38	15	17	170

Fifty-five (55) of the students in the random population were former remedial reading students, and one hundred fifteen (115) were non-remedial readers, as shown in Table 1 above. The table contains the summary of student headcount by grade earned and remedial reading or non-remedial status. Computation performed on the data presented in Table 1 resulted in a chi-square value of 28.04.

Table 2
Percentages of Populations by Reading Status

Developmental Reading Status	Fundamentals of CIS Semester Grade					
	A	B	C	D	F	Totals
Remedial	7.3%	25.4%	36.4%	16.4%	14.5%	100%
Non-remedial	40.0%	31.3%	15.7%	5.2%	7.8%	100%

As shown in Table 2 above, approximately one-third of the population was composed of former remedial readers. Also from Table 2, it can be seen that 69.1% of the former remedial reading population earned semester grades of C or better in the Fundamentals of Computer Information Systems course, as compared to 87.0% of the non-remedial student population. It should also be noted that remedial students earned more C's (36.4%) than B's (25.4%) and more B's than A's (7.3%), while non-remedial students earned more A's (40.0%) than B's (31.3%), and more B's than C's (15.7%). In

addition, 14.5% of the remedial reading population failed the course; of the non-remedial population, 7.8% failed.

Analysis of Technical Reading Skills

Investigation of the second hypothesis put forth by this research study, determining whether the former remedial reading students were able to comprehend technical written materials as well as the non-remedial readers, required the administration of a technical reading comprehension test. During spring semester 2000, the test was administered to three of the four sections of the Fundamentals of Computer Information Systems course. The results are shown below.

Table 3

Reading Comprehension Test Scores	
Remedial	Non-remedial
3	4
2	5
3	5
0	5
4	4
5	5
2	5
4	4
5	5
4	4
4	4
	4
	4
	4
	5
	4
	1
	5
	2
	3
	5

Table 3 (continued)

Reading Comprehension Test Scores	
Remedial	Non-remedial
	4
	4
	5
	5
	4
Mean scores	
3.2727	4.1923

Table 3, above, contains the summary of all of the student scores for the technical reading comprehension test. Thirty-seven (37) students took the test; eleven (11) were former remedial reading students, and twenty-six (26) were not. Almost one-third (29.7%) of the sample population were former remedial reading students.

As shown in Table 3, the mean reading comprehension score of the former remedial reading students was 3.2727 out of a possible 5 points, and the mean score for non-remedial students was 4.1923. Computations based upon the two means yielded a t-ratio of 2.2248. The mean score of the non-remedial students was 18.4% better than that of the former remedial reading students.

Summary

This chapter has presented the results of the data gathering and statistical analysis activities required to evaluate the effectiveness of ESCC's Reading Improvement course in preparing students to comprehend the technical materials required in order to complete the Fundamentals of Computer Information Systems course successfully. Chapter V will offer the researcher's conclusions and recommendations based upon those findings.

CHAPTER V
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Technical reading skills are important for every student attempting the study of information systems. The researcher has collected and analyzed data from past and present beginning information systems students in order to explore how former remedial reading students are performing in comparison to the non-remedial readers. It is the purpose of this chapter to form judgments based on the findings of the statistical analysis and make recommendations based upon those findings.

Summary

Based upon personal observation of the performance of former remedial reading students in the Fundamentals of Computer Information Systems course at ESCC, the researcher suspected that those students were not comprehending technical materials as well as the non-remedial readers. It was the purpose of this research study to either confirm or dispel that suspicion by comparing the course performance and technical reading skills of the two sets of students.

Two hypotheses were initially established for research. They were that:

H_0: Students who complete the developmental reading course (ENG 04, Reading Improvement) at ESCC earn grades in the introductory computer course (IST 114, Fundamentals of Computer Information Systems) comparable to those students who did not need remediation.

and that

H_0: The developmental reading course prepares the remedial reading students to comprehend the technical material required to complete the introductory computer course at a level comparable to those students who did not need remediation.

Once the hypotheses were established, the researcher collected the final grades of a randomly selected sample of former remedial and non-remedial readers enrolled in past sections of the beginning computer course. In addition, the researcher administered a technical reading comprehension test to information systems students currently enrolled in the same beginning computer course. The course grades and reading scores earned were grouped into former remedial reading and non-remedial status. A chi-square analysis was used to compare course grades; a t-test was used for reading test scores.

Conclusions

The first hypothesis investigated in this research study, which states that

H_0:   Students who complete the developmental reading course (ENG 04, Reading Improvement) at ESCC earn grades in the introductory computer course (IST 114, Fundamentals of Computer Information Systems) comparable to those students who did not need remediation

must be rejected. The result of the grade analysis for this study was a computed chi-square value of 28.04. When evaluated at the 0.01 level of 11.670, that figure revealed that the grade differences between the former remedial reading and non-remedial students in the Fundamentals of Computer Information Systems course was indeed significant. Students completing the developmental reading course at ESCC do not earn grades in the introductory computer course comparable to those students who did not need remediation.

Evaluation of the second hypothesis investigated by this research study, specifically that

H_0:   The developmental reading course prepares the remedial reading students to comprehend the technical material required to complete the introductory

computer course at a level comparable to those students who did not need remediation

also resulted in rejection of the hypothesis. The t-test result revealed a significant level of

difference between the technical reading abilities of the former remedial reading and non-

remedial students. The t-ratio of 2.2248 was significant when evaluated at the 0.05 level

of 1.645. The result showed that the developmental reading course at ESCC does not

prepare the remedial reading students to comprehend the technical material required to

complete the introductory computer course at a level comparable to those students who

did not need remediation.

Recommendations

Based upon the findings presented in this research study, the researcher concludes

that the remedial reading course (ENG 04, Reading Improvement) is not fully providing

ESCC Fundamentals of Computer Information Systems students with the technical

reading skills necessary to complete the course successfully. Several measures may prove

effective in improving the technical reading comprehension abilities of these students.

First, the researcher recommends that supplementary technical materials be added

to the Reading Improvement course in addition to the general reading material that is

currently used to teach reading comprehension. The IST Department, as well as other

occupational/technical departments, can provide these supplementary materials upon

request.

Second, the researcher recommends that supplemental reading materials be

offered to the Fundamentals of Computer Information Systems students as part of an

optional reading list accompanying the course syllabus. For each major topic covered,

there should be a variety of additional texts or articles offered to the students so that they may practice their technical reading skills and gain the perspective of several different writers and writing styles. The faculty member teaching each section would be provided with this list so that he/she could provide those recommended supplemental materials to his/her classes.

Third, the researcher recommends that the Fundamentals of Computer Information Systems course be added to the list of courses routinely offered for peer tutoring sessions. Currently, there are college-sponsored peer tutoring services for basic math, composition, and chemistry classes, among others. Since the Fundamentals of Computer Information Systems course is taken by the majority of ESCC graduates, it should be added to ensure that all students get the extra help they need.

Finally, the researcher recommends that a follow-up study be conducted during the fall semester of 2003. If the recommended actions are taken, performing the same data gathering and analysis as that undertaken in this research study should reveal an improvement in former remedial reading student performance in the introductory computer course. The semesters for which data should be gathered are fall and spring of 2000 through 2003, if the recommended measures are implemented beginning fall semester of 2000. If not, the period of the follow-up study should be the three-year time span following implementation of the recommended procedures.

This research study has shown that the technical reading ability and performance of former remedial reading students in the Fundamentals of Information Systems course does not match that of the non-remedial students. Eastern Shore Community College owes these students its best effort in order to improve their educational endeavors.

BIBLIOGRAPHY

Association for Supervision and Curriculum Development. (1995, May). On preparing students for the world of work: A conversation with Willard Daggett. Educational Leadership. 52, 46.

Barksdale-Ladd, M. & Rose, M. (1997). Qualitative assessment in developmental reading. Journal of College Reading and Learning. 28, 34.

Caverly, D. (1996). Effects of a whole language college reading program. Paper presented at the College Reading and Learning Association annual conference, Albuquerque, New Mexico.

Chall, J.S. (1983). Stages of reading development. New York: McGraw-Hill.

Houghton Mifflin Company (1997). Changes in reading assessment. [online]. Available: http://www.eduplace.com/rdg/res/literacy/assess1.html.

LaBerge D. & Samuels, S. (1974). Toward a theory of automatic information processing in reading. Cognitive Psychology, 6, 323.

Patberg, J., Dewitz, P., & Samuels, S. (1981). The effect of the size of the perceptual unit used in word recognition. Journal of Reading Behavior. 13, 33-38.

Potter, M. & Wamre, H. (1990). Curriculum-based measurement and developmental reading models: opportunities for cross-validation. Exceptional Children. 57, 16.

Powell, J. (1989). How well do tests measure real reading? ERIC Clearinghouse on Reading and Communication Digest #41. [online]. Available:http://www.indiana.edu/~eric_rec/ieo/digests/d41.html.

Samuels, S., LaBerge, D. and Bremer, C. (1978). Units of word recognition: Evidence for developmental changes. Journal of Verbal Learning and Verbal Behavior. 17, 715-720.

Taraban, R. (1997). Using statewide data to assess the effectiveness of developmental reading programs. Journal of College Reading and Learning. 27, 119.

APPENDIX

Appendix A: Technical Reading Comprehension Test

Reading Improvement Research Study

The purpose of this study is to determine whether or not the Reading Improvement course at ESCC prepares the student to comprehend the technical material used in our computer classes.

Read the following passage carefully. When finished, answer each of the questions that follow. Your identity, as well as your performance on the test, will remain confidential.

Many thanks for your cooperation.

> *Cindy Hodges*
> *Asst. Prof. of Info. Sys. Tech., ESCC*

Social Security Number _____

Computer Network Architecture

The physical layout of a computer network is often referred to either as the network topology or network architecture. Besides serving as a design tool for the network engineer, the topology of a network determines its behavior and performance once the network is up and running. For this reason, network architecture should be evaluated thoroughly and selected carefully.

Three of the major network topologies in use are the star, the ring, and the bus configurations. Each type of architecture not only has a unique physical layout; it also determines how the network software handles each of the stations, or nodes, attached to the network.

In a star configuration, all nodes are directly connected to the main, or host, computer. As a result, star networks can transmit data at very high speeds. In addition, since each client is connected directly to the host, the failure of a single client does not affect the other computers attached to the network. Despite these characteristics, however, the star topology tends to be very inefficient for most applications.

Ring networks have a configuration exactly like the name implies. The network clients are arranged in a circle, and data are passed from one computer to the next until a loop is made. There is no central host in such a configuration. Since the topology depends on an unbroken circle, the loss of a single computer on the network will cause failure for the entire loop. Ring networks are commonly used in local area network applications.

In a bus topology, there is a single main line to which all of the clients are attached. A bus may be thought of as a ring configuration that has been cut through the middle and stretched out to form a line. If a single computer fails, none of the others are affected. Like the ring configuration, there is no central

host computer controlling the network. The bus architecture is also used commonly in local area networking applications.

None of the three architectures described is most appropriate for every application. The network engineer must carefully weigh the physical and performance characteristics inherent in each type before selecting the topology most suited to a particular situation.

Circle the letter of the best answer based upon your understanding of the passage.

1. A synonymous phrase for *network topology* is

   A. network performance.
   B. network host.
   C. network client.
   D. network architecture.

2. Despite its speed, the _____ network is not commonly used.

   A. star
   B. ring
   C. bus
   D. host

3. The type of network that will fail if a single computer attached to it fails is the

   A. star
   B. ring
   C. bus
   D. client

4. The network topology made by attaching client computers to a single main line is the

   A. star
   B. ring
   C. bus
   D. host

5. Which of the following was mentioned by the passage as being directly affected by the selection of a particular topology?

   A. performance
   B. cost of materials
   C. installation cost
   D. none of the above