1996

Computer-Assisted Instruction in a College Setting: Survey of Student Demographic and Motivational Characteristics

Maureen A. Culleeney
Loyola University Chicago

Follow this and additional works at: https://ecommons.luc.edu/luc_diss

Part of the Education Commons

Recommended Citation
https://ecommons.luc.edu/luc_diss/3609

This Dissertation is brought to you for free and open access by the Theses and Dissertations at Loyola eCommons. It has been accepted for inclusion in Dissertations by an authorized administrator of Loyola eCommons. For more information, please contact ecommons@luc.edu.

This work is licensed under a Creative Commons Attribution-Noncommercial-No Derivative Works 3.0 License.
Copyright © 1996 Maureen A. Culleeney
LOYOLA UNIVERSITY CHICAGO

COMPUTER-ASSISTED INSTRUCTION IN A COLLEGE SETTING: SURVEY OF STUDENT DEMOGRAPHIC AND MOTIVATIONAL CHARACTERISTICS

A DISSERTATION SUBMITTED TO THE FACULTY OF THE GRADUATE SCHOOL IN CANDIDACY FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF CURRICULUM, INSTRUCTION, AND EDUCATIONAL PSYCHOLOGY

BY MAUREEN CULLEENEOY

CHICAGO, ILLINOIS

MAY 1996
Copyright by Maureen Culleeney, 1996
All rights reserved.
ACKNOWLEDGEMENTS

I would like to acknowledge the contributions made by various persons in bringing this research project to completion. First and foremost, I am grateful to committee members Dr. Todd Hoover, Dr. Jack Kavanagh, and Dr. Ronald Morgan who offered invaluable support, guidance, and advice. Committee chair Dr. Todd Hoover’s encouragement, enthusiasm, and countless hours of assistance were instrumental in helping me throughout the entire research process.

Next, I appreciate the assistance of Tammy Jones and Sharon Marquez of Loyola University’s Division of Information Technologies. They were extremely helpful and patient in answering questions during my struggles with the mainframe computer.

Without the permission, cooperation and help from the Lewis University CAPS staff and faculty, this project could not have been accomplished. I am grateful for all their efforts.

Finally, my parents Robert and Marlene Culleeney continually kept my spirits up in countless ways throughout this project and during my many years of graduate study. My parents along with my sister Kathleen Culleeney kept me on the straight and narrow and were always there when I needed them. They have my deepest gratitude for their influence and inspiration.
# TABLE OF CONTENTS

**ACKNOWLEDGEMENTS** ........................................................................................................... ii

**LIST OF TABLES**.................................................................................................................. vii

**LIST OF ILLUSTRATIONS** ..................................................................................................... viii

Chapter

1. **INTRODUCTION** .................................................................................................................. 1
   
   Statement of the Problem
   
   Purpose of the Study
   
   Research Questions
   
   Definition of Terms
   
   Significance of the Study
   
   Limitations of the Study

2. **REVIEW OF THE LITERATURE** ......................................................................................... 7
   
   Academic Achievement and CAI
   
   Measuring Academic Motivation
   
   Locus of Control and CAI
   
   Faculty Perceptions of CAI
   
   The Motivation Analysis Test

3. **METHOD** .......................................................................................................................... 28
   
   Introduction
   
   Research Design


<table>
<thead>
<tr>
<th>Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population and Sample</td>
</tr>
<tr>
<td>Procedures</td>
</tr>
<tr>
<td>Instrumentation</td>
</tr>
<tr>
<td>Instrument Reliability and Validity</td>
</tr>
<tr>
<td>Data Analysis</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. RESULTS AND DISCUSSION</th>
<th>42</th>
</tr>
</thead>
<tbody>
<tr>
<td>Descriptive Analysis of the Sample</td>
<td></td>
</tr>
<tr>
<td>Descriptive Analysis of the Nowicki-Strickland Scale</td>
<td></td>
</tr>
<tr>
<td>Descriptive Analysis of the Motivation Analysis Test</td>
<td></td>
</tr>
<tr>
<td>Descriptive Analysis of the Student Evaluation Instrument of Computer-Assisted Instruction</td>
<td></td>
</tr>
<tr>
<td>Correlation Analysis</td>
<td></td>
</tr>
<tr>
<td>Regression Results</td>
<td></td>
</tr>
<tr>
<td>Path Analysis</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5. CONCLUSIONS AND RECOMMENDATIONS</th>
<th>75</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summary of Important Findings</td>
<td></td>
</tr>
<tr>
<td>Integration with Past Literature</td>
<td></td>
</tr>
<tr>
<td>Recommendations</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Appendix</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. STUDENT EVALUATION INSTRUMENT OF COMPUTER-ASSISTED INSTRUCTION</td>
</tr>
<tr>
<td>B. INTERCORRELATIONS AMONG INDEPENDENT VARIABLES</td>
</tr>
</tbody>
</table>
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Student Demographic Variables</td>
<td>43</td>
</tr>
<tr>
<td>2. Descriptive Statistics of Subject Age</td>
<td>44</td>
</tr>
<tr>
<td>3. Descriptive Statistics of Academic Variables</td>
<td>45</td>
</tr>
<tr>
<td>4. Descriptive Statistics of Nowicki-Strickland Scale Scores</td>
<td>46</td>
</tr>
<tr>
<td>5. Descriptive Statistics of Motivation Analysis Test</td>
<td></td>
</tr>
<tr>
<td>Integrated Subscores and Summary Scores</td>
<td>47</td>
</tr>
<tr>
<td>6. Descriptive Statistics of Motivation Analysis Test</td>
<td></td>
</tr>
<tr>
<td>Integrated Subscores and Summary Scores by Gender</td>
<td>48</td>
</tr>
<tr>
<td>7. Descriptive Statistics of the Student Evaluation Instrument of</td>
<td></td>
</tr>
<tr>
<td>Computer-Assisted Instruction</td>
<td>55</td>
</tr>
<tr>
<td>8. Multiple Regression Equation for Locus of Control</td>
<td>65</td>
</tr>
<tr>
<td>9. Multiple Regression Equation for Total Personal Interest</td>
<td>67</td>
</tr>
<tr>
<td>10. Multiple Regression Equation for Overall Evaluation of Computer-</td>
<td></td>
</tr>
<tr>
<td>Assisted Instruction</td>
<td>68</td>
</tr>
<tr>
<td>11. Multiple Regression Equation for Feeling More Positive About</td>
<td></td>
</tr>
<tr>
<td>School in General</td>
<td>69</td>
</tr>
<tr>
<td>12. Correlation Coefficients for Observations of Variables Used in</td>
<td></td>
</tr>
<tr>
<td>Path Analysis</td>
<td>71</td>
</tr>
<tr>
<td>13. Path Coefficients</td>
<td>71</td>
</tr>
</tbody>
</table>
# LIST OF ILLUSTRATIONS

<table>
<thead>
<tr>
<th>Figure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. CAI Frame of Reference Model</td>
<td>72</td>
</tr>
</tbody>
</table>
CHAPTER ONE
INTRODUCTION

Advances in computer technology continue to accelerate at an astonishing rate, and it is anticipated that computer use will continue to become even more pervasive in all sectors of society. The continued growth of computer technology in the business sector is supported by claims of remarkable productivity and labor cost savings. Along with a plethora of software applications which enhance business productivity, a dizzying array of multimedia computer programs exist for the home computer user. Recent dramatic growth of the World Wide Web now also affords computer users the opportunity to have access to information from around the world.

As the computer technology revolution continues to advance, educators seem compelled to integrate computers into the curriculum. Unless students become computer literate, the general notion seems to be that they will be at a serious disadvantage in the years to come. Indeed, there seems to be little, if any doubt that computer skills will be required of most new entrants to the workforce. However, educational institutions are faced with the challenge of determining whether the new technologies are effective in terms of meeting instructional goals, enhancing academic achievement outcomes, and optimizing educational expenditures.
Statement of the Problem

The question arises whether computer technology, particularly computer-assisted instruction, enhances the quality of instruction and intrinsically motivates students. In other words, the debate remains with respect to "whether the investment in computer-based education yields appropriate benefits" (Flynn, 1989, p. 6).

Anderson, Shire, Wilson, and Fielding (1986, p. 22) point out that, "motivational factors may often exert as great an influence on achievement as do cognitive factors." A recent review of educational psychology literature revealed numerous studies designed to focus on the academic achievement consequences of computer-assisted instruction (CAI). However, few research studies have been designed to focus upon CAI and its relationship to student motivation in college settings. Given the dearth of evidence related to motivation, additional research appears to be needed to determine if CAI enhances students' motivation for learning.

Purpose of the Study

The overall purpose of the study was to:

1. systematically document students' attitudes regarding school motivational outcomes of using computer-assisted instruction
2. confirm a relationship between the locus of control characteristics of students preferring computer-assisted instruction compared to those students not preferring computer-assisted instruction
Research Questions

The following research questions were addressed:

1. What are the characteristics of those learners who are satisfied with the CAI experience?
2. Does computer-assisted instruction have significantly different motivational benefits for those students whose interest is not already captured by traditional classroom methods?
3. Does the use of computer-assisted instruction have an effect on developing positive attitudes toward school in general?
4. What is the relationship between a student's locus of control and overall rating of the CAI experience?

Definition of Terms

Computer-assisted instruction (CAI): Computer-based education may take the form of drill and practice, tutorials, simulations, computer games, expert systems, and testing. Computer-assisted instruction in this study was limited to the use of a computer as a tutorial which presents factual or theoretical knowledge in a particular subject area, concurrently asks the student questions to test comprehension, reviews and provides remediation if required, presents an overall test at the end of a module, and maintains a permanent copy of the student's score.

Motivation: For purposes of this study, motivation was be defined as, "a person's interests, drives, and the strengths of his sentiment and value
systems" as measured by the Motivation Analysis Test (Cattell, 1964, p. 2).

**Locus of control:** Based upon J.B. Rotter's (1966, p.1) research, locus of control was defined as, "the degree to which the individual perceives that reward follows from, or is contingent upon, his own behavior or attributes versus the degree to which he feels the reward is controlled by forces outside of himself and may occur independently of his own actions." The locus of control construct addresses generalized expectancies and is grounded in the broader theoretical base of social learning theory (Rotter, 1990).

**Subjects:** Subjects were academically-at-risk undergraduate students at Lewis University registered for daytime courses requiring completion of homework exercises in the computer-assisted instruction lab.

Independent variables in this study were:

1. Age
2. Gender
3. Race/ethnicity
4. Undergraduate field of study
5. Number of hours spent using CAPS computer lab
6. Achievement as measured by CAI course grade
7. Cumulative college gradepoint average

Dependent variables in this study were:

1. Scores on the Student Evaluation Instrument for CAI
2. Scores on the Nowicki-Strickland scale (Locus of control instrument)
3. Scores on the Motivation Analysis Test (MAT)

**Significance of the Study**

Numerous studies have attempted to measure achievement outcomes related to computer-assisted instruction to determine the effectiveness and benefits of the technology. Overall, research results indicate a positive although moderate effect of computer-assisted instruction. An area noted by various investigators is that additional research is needed that goes beyond the measurement of only achievement measures and instead evaluates motivational aspects of computer-assisted instruction.

This study was designed in an effort to contribute to the growing body of knowledge about computer-assisted instruction by systematically exploring motivational characteristics of academically at-risk students in higher education who may benefit from the technology. The potential significance of the study is that it focused on the relationship between computer-assisted instruction and the motivational benefits perceived by students who have not fared well academically in traditional instructional settings. It is expected that findings from this study will provide additional information to guide decisions regarding integration of computer-assisted instruction into remediation courses in higher education settings.
Limitations of the Study

This study is limited to undergraduate first year students who have been identified as being academically at-risk. The subjects were registered in courses requiring completion of reading comprehension homework exercises in a computer-assisted instruction lab. Another limitation of the study is the degree of validity and reliability of the instruments used to collect the data.
CHAPTER TWO

REVIEW OF THE LITERATURE

Most of the literature focuses upon CAI in primary and secondary level school settings. Surprisingly, only a few studies exist which were designed to focus upon CAI at the college level. In 1980, a meta-analysis of CAI at the college level yielded 59 studies (Kulik, Kulik, & Cohen, 1980). Six years later, only 101 studies were identified as meeting criteria for inclusion in Kulik & Kulik's meta-analytic review (Kulik & Kulik, 1986).

For the most part, what is reported in the literature is related to student learning outcomes regarding examination performance, achievement scores, instructional time, and retention at follow up. Other CAI topics identified in the literature include software design and learning styles. However, a dearth of research exists about college students' attitudinal outcomes regarding CAI.

The literature review will focus upon the following topics germane to the research study: academic achievement and CAI, measuring academic motivation, locus of control and CAI, faculty perceptions of CAI, and the Motivation Analysis Test.

**Academic Achievement and CAI**

Traditionally, academic achievement has been defined as
students' performance on curriculum specific tests. Depending on the instructional setting, a student may be required to attend classroom lectures, participate in small group discussion, complete assigned readings from textbooks or articles, gather information from outside resources such as a library, and complete homework assignments. During the course of the instructional experience, tests are administered with the intent of measuring the student's success in learning the new information. Cognitive psychologists refer to this process of learning as "sensing, encoding, storing, and retrieving information much as a computer does" (Rothstein, 1990, p. 116).

Thus, academic achievement as measured by test scores provide a measure of the student's performance in encoding, storing, and retrieving this new information which is specific to the curriculum topics covered during the instructional experience.

One of the newer instructional methodologies to emerge in recent years has been computer-assisted instruction. Computer-assisted instruction, also known as computer-based education, is the use of computers to assist students in the learning process of encoding, storing, and retrieving information. Information is presented on a computer screen, practice sessions are provided, and the student's understanding of the material is assessed through a series of questions. The student proceeds through the computer-assisted instruction at his own pace, and frequent feedback is
provided as the student progresses through the instructional session.

Since the 1980's, researchers have attempted to determine whether the learning process and subsequent academic achievement outcomes can be enhanced by the use of computer-assisted instruction. The most comprehensive analysis of computer-assisted instruction and academic achievement outcomes has been reported by Kulik and Kulik (1986, 1988). The meta-analysis of 101 studies of computer-based education in college settings published in 1986 (Kulik & Kulik, 1986, p. 85) categorized measurements of outcomes into:

1. Learning outcomes
2. Attitudes toward instructional quality and course content
3. Attitudes toward computers
4. Instructional time

Kulik & Kulik's 1988 (Kulik & Kulik, 1988) meta-analysis of 254 studies reported that 81% of the studies showed higher examination scores when CAI was coupled with conventional classroom instruction. However, in only 94 of the 254 studies were the differences statistically significant. In general, studies report that CAI contributes a positive, though moderate, short term effect to student learning. Thus, CAI has been found to have only a slightly superior advantage to traditional classroom instruction. Along with modest gains in academic achievement, CAI also appears to have a favorable effect on student ratings of quality of instruction.
Flynn (1989) in his exploratory evaluation study of CAI reports that measurable outcomes are smaller on studies conducted at the college level than in elementary education. He points to the Hawthorne effect as a possible explanation for this fact because students are initially exposed to computers at the elementary school level. Actually, the Hawthorne effect as an explanation doesn’t really apply here. The Hawthorne Effect refers to the tendency of people who are singled out for special attention to perform as anticipated merely because of expectations created by the situation.

A quasi-experimental design study at Indiana University’s Learning Skills Center evaluated whether students who made voluntary use of CAI to review for psychology and sociology tests performed better than students who chose not to use CAI (Hartig, 1984). An analysis of covariance based on the variables of CAI use versus non-use, SAT scores, placement level, and sociology and psychology test scores. Results were that CAI had a significantly overall positive effect on students’ psychology and sociology test scores. Although motivation was not a variable identified in this study, it was pointed out that the more motivated students received higher than expected scores. The question which comes to mind is whether CAI had some motivational impact or whether it can simply be assumed that the higher level students of this at-risk population were more intrinsically motivated.
A doctoral dissertation addressed the effects of learner characteristics of 142 college freshmen and their learning and drill and practice utilization (Rattanapian, 1992). Students were afforded the opportunity, on a voluntary basis, to use a computerized drill and practice program. Only one factor, SAT score which is also a measure of academic achievement, predicted how students used the program. Learner characteristics had no bearing on the following variables: decision to use the program, achievement, attitude toward the program, or program use.

A meta-analysis integrating results of primary research studies on learner control in computer-based environments revealed that providing learner control to students decreased achievement by .04 standard deviations (Parsons, 1992). This extremely small effect suggests that achievement under learner control is the same as achievement under other forms of control. College students were most frequently used as the subject pool in the studies which were analyzed. The author does point out the need to examine moderator variables such as quality of the courseware and topic of instruction.

A moderator variable was examined in one doctoral dissertation that focused upon the effects of learner and program control feedback and field orientation in CAI (Chyou, 1988). The findings from this experimental design study of 92 undergraduate students indicated that field dependent students (as measured by the Group Embedded Figures Test) scored higher
in the learner controlled feedback condition while there was no significant difference in either treatment for field independent students.

**Measuring Academic Motivation**

In its most general term, academic motivation is defined as, "a prerequisite to learning; the influence of needs and preferences on behavior" (Rothstein, 1990, p. 136). A host of theoretical frameworks regarding human motivation exist which range from behavioral to humanistic to cognitive theories. In educational settings, academic motivation continues to be of paramount importance to educators as they search for instructional methodologies which optimally influence students' motivation to learn and ultimately improve academic achievement outcomes. In essence, motivation which is an important component of the learning process, has implications for research of individual differences and academic motivation as they relate to one of the newer instructional methodologies, computer-assisted instruction.

One provocative journal article explored theoretical controversies and policy debates concerning academic, motivational, and social outcomes of CAI. The authors identify three major themes in their discussion (Lepper & Chabay, 1985, p. 217-218): 1) motivation exerts a great influence on children's learning; 2) instructional programs may benefit from individualization on motivational as well as on cognitive grounds; 3) different forms of instruction and uses of the computer will be appropriate
for different tasks, for different learners, and for learners at different stages in the learning process. They elegantly make a claim that educators and administrators are making computer use decisions for which insufficient research evidence exists.

Very few studies exist which specifically address student motivational outcomes and CAI in college settings. Reports of student motivation outcomes at the high school level include behavioral measures of greater class attendance, more completed assignments, and increased numbers of students coming to use computer technology before and after class. (O'Connor, 1983). This particular study, a quasi-experimental design, involved students in math and science classes at six high schools during a two year period.

Researchers Perez and White analyzed motivational qualities of computer software as reported by 38 sixth graders (Perez & White, 1985). The study's purpose was to identify differences between the motivational and educational aspects of computer use versus traditional classroom activity. Results revealed that the greatest percentage of motivational attributes were characteristics of the technology (i.e., animation, making decisions and seeing results) while motivational attributes for classroom activities were related to the particular subject matter (i.e., multiplication). No theoretical base for the motivation construct was discussed.

A recent study of 48 third graders in an elementary school setting
attempted to examine the social and motivational contexts of CAI environments. The hypotheses were that CAI environments differentially influence 'effectance’ motivation and sense of competence (Nastasi & Clements, 1994). The experimental design involved measurement of self-reported perceived competence of two groups, one using Logo programming and one using CAI. A school-wide standardized test was also administered to measure pretreatment achievement levels. The results of the study partially confirmed the hypothesis. Tests confirmed posttreatment differences in effectance motivation but did not confirm perceived sense of competence.

Motivation in one doctoral dissertation study of 69 fourth grade children was defined as the number of multiplication problems attempted (Hessemer Stegemann, 1986). Achievement was measured by the number of problems completed correctly. Students were randomly assigned to a CAI multiplication drill and practice session, a CAI multiplication drill and practice session resulting in a reward, or an equivalent paper and pencil session. Results indicated that students using CAI or CAI with a reward were more motivated than students using pencil and paper. However, there were no significant achievement effects.

Another doctoral student designed an experimental study involving children and microcomputer use to assess the influence of feedback on learning and motivation (Mohamedali, 1988). The findings of this research
revealed that delayed feedback produced inferior learning as compared to either no feedback or immediate feedback. Interestingly, the no feedback group required less time to complete tasks. The researcher's work was grounded in cognitive development theory in terms of Piaget.

One researcher's study of 38 community college students enrolled in an English as second language (ESL) course points out that CAI could prove to be a powerful motivational aid in the teaching of ESL (Eichel, 1989). The purpose of Eichel's experimental design study was to determine whether CAI would "make a difference in the acquisition of English" as measured by test scores (Eichel, 1989, p.4). Although CAI in this study produced no significant effects in the learning of the English language, Eichel did report an increase retention of students in the ESL program and points out that future research is needed to measure student reaction.

Another study (Land & Haney, 1989, p.7) in a community college setting posed the following research questions, yet failed to report their findings regarding motivation: "Is motivation and enthusiasm for learning increased for junior college psychology classes who are involved in CAI? Do students who are involved in classrooms with CAI develop more positive self-concepts and attitudes toward the course and the professor? How do achievement levels in a psychology class compare for students involved with CAI and those using a traditional method?" Curiously, only the academic achievement results were reported.
New York University researcher Gallo points out that an expectancy model of motivation could be used to predict how individuals will respond to computer technology (Gallo, 1986). The expectancy model of motivation involves a mathematical function with the following variables: expectancy, instrumentality, and valence. Although the definitions of the variables were not provided, the expectancy model involves the relationship between a person's belief that working hard will result in a desired level of task performance being achieved (i.e., expectancy), a person's belief that successful performance will be followed by rewards (i.e., instrumentality), and the value a person assigns to the possible rewards (i.e., valence). The model postulates that expectancy has an overall effect on the degree to which valence and instrumentality interact to influence motivation.

Researcher Gallo conducted a survey research study of 146 university students to measure attitudinal reactions to computer technology and to measure the expectancy's model predictor components. Findings supported the hypothesis that an expectancy model of motivation may explain an individual's tendency to approach or avoid new computer learning situations.

Seymour et al (1987) focused upon CAI's positive motivational aspects from a viewpoint of retention, feedback, and degree of learner control. Along with the pedagogical technique of cooperative learning, CAI enhances student motivation because "it places students in control at the keyboard, success is quantified, and competence leads to confidence" (Caprio, 1993,
Locus of Control and CAI

The construct 'locus of control' is attributed to Julian B. Rotter (1966) and refers to "the degree to which persons expect that a reinforcement or an outcome of their behavior is contingent on their own behavior or personal characteristics versus the degree to which persons expect that the reinforcement or outcome is a function of chance, luck, or fate, is under the control of powerful others, or is simply unpredictable" (Rotter, 1989, p. 489).

Locus of control is an important variable within educational research because it allows one to examine individual differences among learners regarding whether a learner attributes academic achievement to himself or to chance. Researching academic motivation along with locus of control can provide a fuller picture of how computer-assisted instruction and these variables interact.

Although a plethora of locus of control educational research studies exist, few studies were found which examined CAI's relationship to locus of control. In Nicholson's doctoral dissertation (1988), the relationship between motivational orientation and aspects of using computers to teach writing were explored in a quasi-experimental design study. Two hundred and ten undergraduate students completed survey instruments at the beginning and end of the course; the survey measured motivational
orientation toward writing, attitude toward writing, attitude toward technology, and experience in using computers and writing.

Major findings of Nicholson's study were: 1) intrinsic vs. extrinsic motivational orientation regarding writing assignments can be measured with adequate internal consistency and factorial validity; 2) intrinsic motivational orientation is positively related to attitude toward writing; 3) choice regarding use of computers was found to be an important motivational variable.

The best articulated argument regarding CAI and intrinsic motivation was found in a European professional journal article authored by Lens (1994). He clearly points out that the issue is not whether CAI positively influences motivation but rather, identifying how and when CAI influences student motivation. Additionally, Lens points out that intrinsic motivation leading to deep level learning has more lasting cognitive and motivational effects. Lens provides his views of implications for CAI and how it can stimulate intrinsic motivation: allowing for highly individualized learning activities, controlling feedback, and inducing correct kind of causal attributions. Lens continues by strongly advocating that much more research is needed to focus upon how CAI interacts with individual characteristics of learners (i.e., gender, age, achievement motivation, test anxiety, computer anxiety, pre-exposure to computers).

Of the few empirical studies located in the literature, one study
examined behavior of 24 college-age subjects selecting problem difficulty levels using a computer problem solving program (Newby & Alter, 1989). The purpose of this research was to examine conditions under which a subject selects intrinsic versus extrinsic rewards for a given task. In this study, the computer was used as a recording device and not as an instructional aid.

One doctoral dissertation was designed to examine the effects of student ability, locus of control, and type of instructional control on motivation and performance (Klein, 1988). The experimental design involved 75 seventh grade students who either used CAI with learner control over the instructional strategy or CAI with program control over the instructional strategy. Students completed a survey measuring their confidence and satisfaction with the program and also took a test measuring their knowledge of the CAI topics presented. The aptitude variables in the study were locus of control and student ability. Statistically significant results showed that both ability and locus of control were related to performance while no relationship was found between performance and type of instructional control.

Although locus of control was not stated as a variable in his study, researcher Peter (1988) did seem to examine variables related to the locus of control construct. Peter (1988) explored the effects of source (i.e., computer vs. human tutor) and student attribution (effort vs. luck) on
persistence and expectancy of success. The experimental design consisted of 105 high school students in four treatment conditions. The groups were told by a human tutor or computer tutor that they had failed because they had not tried hard enough or that they were unlucky. The control group were not given reasons why they failed. Findings revealed that no persistence differences existed due to the source treatment (computer or human tutor). However, there were significant differences due to attribution. Of the four treatments, low effort attribution suggested by a human was the least effective approach in motivating students. Thus, this study leads one to conclude that it is not advisable for a teacher to tell a student that he failed because he did not try hard enough.

Faculty Perceptions of CAI

Faculty attitudes may indirectly have some impact on students' perceptions and motivation regarding CAI. One survey research study of 91 college writing teachers queried faculty about their computer use, advantages and disadvantages of computers, and future directions (Stine, 1985). Interestingly, the research revealed that computer phobia was not a problem for students but rather was a problem for faculty. The author points out that because of faulty wording of some of the survey questions, some results could not be tabulated.

Advantages of CAI as identified by the respondents were summarized into five categories. The author (Stine, 1985, p. 5) reported the five major
categories of advantages as: "1. ease of revision; 2. opportunity for patient, individualized feedback; 3. frees teachers from working with surface details; 4. helps students to see the whole writing process differently; and 5. motivates students to be enthusiastic writers." Unfortunately, no further description was provided regarding these identified advantages.

Recommendations resulting from the Learning Skills Center/B.E.S.T. study at Indiana University (Hartig, 1984) include the need for teachers themselves to become adept at writing their own CAI programs. Otherwise, according to the author, faculty are faced with using mediocre, commercially available CAI software. Noteworthy is that this study was done in 1984, and since that time more educational software which incorporates appropriate instructional design principles has become available. Thus, faculty now have a greater number of programs from which to choose.

One study was crafted to explore the relationship between teachers' knowledge of microcomputers and their apprehension toward using this technology in schools (Esin, 1988). Questionnaires were sent to four hundred randomly selected teachers resulting in a response rate of 63%. Data were analyzed with six statistical procedures - correlational, t-test, one way ANOVA, multiple comparison, crosstabulation, and frequency. Results indicated that there were no relationships due to gender or educational levels with regard to microcomputer apprehension. However, age and number of years of teaching experience were accompanied by an increase in
computer apprehension.

Trollop (1987) believes that university reward structures are partially at fault for faculty members' lack of interest in instructional computing. Software development for CAI is extremely time consuming and has not been considered a research pursuit by universities. Thus, promotion and tenure have not been linked to CAI software development. Additionally, faculty who are involved in CAI development often find their efforts are discounted by their peers and frequently abandon their development efforts. Trollop presents several suggestions for educational institutions to change the existing structure so that the role of CAI could become more highly regarded.

The Motivation Analysis Test

The term "motivation" has been subject to numerous interpretations throughout the history of motivation research. Researcher Weiner has presented an overview of the changing direction of motivation research in education from the 1940's through the 1990's (Weiner, 1990). At the forefront of motivation research in the 1940's and 1950's were need and activity levels, neural structures, incentives, and defense mechanisms. During the 1960's, drive and learning, drive and frustration, activation of drives and motives, and reward were the focus of many studies.

The 1980's saw the emergence of attribution theory, achievement motivation, curiosity, and self-esteem as topics of motivation studies.
Weiner points out that motivation topics in 1990 focused on cognitions of causal attributions, self-efficacy, and learned helplessness. Individual differences of need for achievement, locus of control, and attributional style also became center stage in much of the research.

One psychologist who has devoted over thirty years to the study of personality and learning was Raymond Cattell. Among his contributions through extensive research in the Personality and Group Behavior Research Laboratory at the University of Illinois, Urbana was the development of the Motivation Analysis Test.

The Motivation Analysis Test (MAT) was developed to measure an individual's interests, drives, and the strength of his sentiment and value systems. It concentrates on ten psychologically meaningful unitary motivation systems (Cattell, 1984). Each system is characterized as an erg or a sentiment. An erg is defined as a drive directed toward a particular goal while a sentiment is defined as an acquired aggregate of attitudes developed by learning and social experience (Cattell, 1964). Thus, Cattell espouses a view that both sociogenic and biogenic factors influence human motivation. The five ergs are mating, assertiveness, fear, narcism, and pugnacity. The five sentiments are superego, career, sweetheart/spouse, self-sentiment, and home/parental.

College settings for educational research using the MAT includes studying motivational patterns of adult evening college students (Dooley &
White, 1968); educational motivation of three groups of mature women in a metropolitan area (Mears, 1972); and characteristics and motivations of students who withdraw without failing (Rump & Greet, 1975).

The MAT was used in a study by Dooley and White (1968) to investigate the relationship of motivation to college grade point average of 70 adult evening college students. Eighty-five percent of the sample was married and consisted primarily of male subjects. An analysis of variance applied to the data showed the mating integrated subscore to be statistically significant. Pugnacity was the highest mean score of the group. In this study, the researchers concluded that the mating drive measured by MAT was the only motive that maintained significant influence above other motivational variables.

Mears (1972) used the MAT in a study of educational motivation of 150 mature women. The purpose of the study was to determine why some women decide to continue their formal education while other women do not. For the most part, correlations between the mean MAT subscores of the groups of women studied were not statistically significant. Only home/parental and narcissism/comfort were significant at the .01 level. For the group of women college students, narcissism/comfort was the highest mean score (M = 7.32 SD = 2.31) while pugnacity was the lowest mean score (M = 2.96 SD = 1.89).

MAT subscores were among the motivational measures used in a study
of characteristics of 28 first year students at an Australian university who withdraw during the first half of the semester (Rump & Greet, 1985). The investigators report that many of the subjects' MAT scores differed significantly from the mean standardized norm score of 5.5. Low mean scores were career (M = 2.7), superego (M = 3.4), assertiveness (M = 3.5), pugnacity (M = 3.9), parental/home (M = 3.9). The highest mean score was mating (M = 7.0). No data regarding standard deviations was reported. It was concluded that new withdrawing students have low motivation in a number of areas relevant to academic pursuits.

Researcher Child (1984) points out that past research has shown the importance of self-sentiment, superego, and pugnacity for high achievement. However, he believes that the MAT needs more educational sentiments incorporated into the instrument to provide finer grain detail for educational research purposes. Child's point is well taken. First, the terminology of the instrument's measurement (i.e., ergs and sentiments) is possibly foreign to most educators. Secondly, measures of the various ergs and sentiments refer to general motivational aspects of one's life and do not pinpoint motivational aspects specific to the complexity of the learning process.

This section reviewed various studies related to computer-assisted instruction and academic achievement, academic motivation, locus of control, and faculty perceptions. Whereas there seems to be little doubt in
the literature about the positive, although moderate relationship between CAI and academic achievement outcomes (Hartig, 1984; Kulik & Kulik, 1988; Parsons, 1992), very few studies exist regarding CAI and motivation. For the most part, studies focusing upon CAI and motivation have been limited to primary grade settings or high school settings. Of the studies in college settings (Gallo, 1986; Seymour et al, 1987; Eichel, 1989; Land & Haney, 1989; Caprio, 1993), only Gallo’s research (1986) seemed grounded in a true theoretical framework of motivation (i.e., expectancy model of motivation). The present study attempts to provide another theoretical framework of motivation based on biogenic and sociogenic factors articulated by Cattell (1964).

Another area lacking in definitive studies is research of locus of control and its relationship to computer-assisted instruction. Very few researchers have addressed the topic (Klein, 1988; Peter, 1988), and only two of the studies were based in college settings (Nicholson, 1988; Newby & Alter, 1989). The present study expands the exploration of locus of control in a college setting and points to the fact that this variable can be a predictor of students’ attitudes toward computer-assisted instruction.

Sample sizes ranged from 24 subjects in Newby and Alter’s study (1989) to 210 subjects in Nicholson’s study (1988). In many of the studies, research sample sizes were relatively small which affect the generalizability of the findings. Other relatively small sample sizes were 38 (Perez & White,
The use of small samples may account for the fact that few statistically significant findings were reported. Also noteworthy is that none of the studies cited focused exclusively on academically at-risk college age students.

Given what is reported above, it appears as though only a limited amount of research has been reported related to the relationship between CAI and academic motivation or locus of control. Thus, the present study was designed to provide a knowledge base related to documenting a possible relationship between computer-assisted instruction and college students' demographic as well as motivational characteristics.
CHAPTER THREE

METHOD

Lewis University is in Romeoville, Illinois which is located 35 miles from Chicago. Total enrollment in the College of Business, College of Nursing, and College of Arts and Science is approximately 4400 undergraduate and graduate students. Lewis University offers more than 50 majors in the humanities, social sciences, and natural sciences as well as in aviation, business, computer science, communications, education, fine arts, and nursing. Graduate programs are available in business administration, counseling psychology, criminal/social justice, education, and nursing.

In the spring of 1995, Lewis University's Center for Academic and Personal Success (CAPS) purchased from Skills Bank™ Corporation a product titled 'Skills Bank3' CAI software for use in the CAPS computer lab. The Skills Bank3 software is a comprehensive resource for diagnosing and remediating college students' basic skills. The software offers instruction in the following general categories: reading, language, mathematics, writing, and study skills.

Each general section diagnoses and prescribes the appropriate lessons. The individual lessons focus on mastery of concepts followed by a brief tutorial and exercises. Both a pretest and posttest component are part
of each exercise.

In the Fall of 1995, first year students in five sections of reading comprehension courses were required to complete 28 specific Skills Bank3 homework exercises as part of their course requirements. One full-time faculty member taught three sections of the course while an adjunct faculty member taught the other two sections.

**Research Design**

A survey research design methodology was used to investigate the characteristics and attitudes of the identified sample. This methodology was selected because the desired data regarding computer-assisted instruction was not already available in a usable form from other sources. Although an experimental research design would have yielded comparative group data regarding treatment effects, this type of design was ruled out due to lack of a control group. Additionally, since the overall purpose of the study was to describe relationships between variables rather than explain the causes and effects of CAI treatments, survey research methodology was considered to be the design of choice.

Among the characteristics of survey research are that it allows replicability and standardization. That is to say that studies using this type of design can be replicated by other researchers, and information can be gathered by using uniform questions for all members of the sample group. In addition, it is quantitative in nature which allows the researcher to assign
"numerical values to nonnumerical characteristics of human behavior" (Backstrom & Hursh-Cesar, 1981, p. 4). For example, subjects can be asked to identify their degree of agreement or disagreement with an attitudinal statement and respond by selecting a number from a 5 point scale. In the study to be described in this chapter, several 'nonnumerical characteristics of human behavior' such as motivational variables as well as attitudes toward CAI were measured which lent themselves well to survey methodology.

In addition to the advantage of quantifying nonnumerical characteristics, survey research can be theory-based meaning that "its operations are guided by relevant principles of human behavior and by mathematical laws of probability" (Backstrom & Hursh-Cesar, 1981, p. 4). Thus by using a probability sample and statistical procedures, a researcher can generalize from the sample to a larger population.

Another distinct advantage of survey research methodology is that data can be collected in a relatively quick and timely manner. Because of the limited timeframe (i.e., sixteen week semester) in which the sample needed to complete assigned computer-assisted instruction exercises, data collection needed to be completed with dispatch.

Among survey research disadvantages are procedures which govern the appropriate sample size. Generally, it is advisable to have at least ten subjects per variable under study. If the sample size is too small, statistical
power is reduced and the generalizability of the findings is limited.

Another limitation of survey research methodology is the possibility of nonresponse to survey question. Also, the issue of self-reported responses by subjects provides the opportunity for untruthful answers to sensitive questions.

Statistical procedures which can be performed on data collected through survey research include descriptive analysis, correlational analysis, multiple regression, discriminant function analysis, factor analysis, path analysis, and linear structural relations which is also known as LISREL.

Because of the small sample size in this study, it was anticipated that the statistical power of tests would be reduced. To compensate for this reduction in power, the level of significance was set at .01. A power analysis table (Hinkle & Oliver, 1985, p. 278) was used to estimate the number of subjects required for the study. For a two-tailed .01 level of significance with statistical power of .85 to determine a medium effect (d=.70), the appropriate sample size was 30. An effect size measures how much a difference the independent variable makes in relation to the dependent variable. In this case, 'd' is defined as "the effect size in terms of standard deviation units" (Hinkle, Wiersma, Jurs, 1988, p. 316).

To compensate for nonresponse to survey questions, the nonresponding subject’s data for that instrument was coded and recorded as missing. For the Motivation Analysis Test, nonresponses were recorded for
Population and Sample

The population was comprised of 71 Lewis University students who had been identified as being academically at-risk based on their Nelson Denny scores and/or ACT (American College Test) scores. First year freshmen as well as newly entering transfer students comprised the group.

At the beginning of the semester, the size of the population was 71 students ranging in age from 18 years to 36 years old. Each student was enrolled in one of the five sections of the three credit hour reading comprehension courses. Students also were registered for other courses through their respective colleges.

Although completion of the research instruments was part of the normal course requirements, 24 of the 71 individuals enrolled in the course elected not to provide information for inclusion in the study. Thus, the actual sample size for the study was 47 students.

Missing Data

Some instances of missing data occurred. Two subjects withdrew from school prior to the end of the semester and were consequently dropped from the study. This resulted in the sample size being reduced to 45 subjects. Several subjects (N = 6) did not complete the second side of the Motivation Analysis Test answer sheet. Thus, data from the Motivation Analysis Test was available for only 39 subjects.
For the independent variables of high school grade point average and ACT scores, data were unavailable for transfer students from community colleges or for international students. High school grade point average along with class rank could only be reported for 32 subjects, and ACT score could only be reported for 29 subjects. Thus, these three academic-related variables were later dropped from consideration in the study in order to maintain the integrity of the sample size.

Procedures

A letter of request and proposal for the study was submitted to the CAPS Director. Approval was secured from the CAPS director and appropriate university staff. A meeting was held with the director of the reading program, and she along with the other faculty member teaching the reading comprehension courses agreed to administer the instruments during class time.

Instructors assigned 28 CAI homework exercises which were to be completed in the CAPS lab outside of class time during the course of the semester. A score of 70% or greater on each assigned exercise was required for successful completion of the course. Subjects could re-do the exercises as many times as they wished to achieve the 70% score.

The format of the computer-assisted instruction homework exercises consisted of a menu from which subjects would select the desired exercise. After selecting the desired exercise, a one page screen providing a brief
explanation of the topic and several examples were presented. For example, if a subject selected "Words with Multiple Meanings," a brief explanation of this topic was presented followed by examples of several words having multiple meanings. On the next screen, a question was posed to the subject requesting that he select the correct meaning of the word based upon its use in the sentence listed. After making a response, the bottom of the screen provided a message indicating whether the answer was correct or incorrect. If the subject’s response was incorrect, explanation regarding the correct choice was provided.

For each homework exercise, approximately ten questions were posed to the subject. After completing the ten screens of ten questions, the computer provided a summary of the number of questions attempted for this exercise, the number of questions answered correctly, the percentage score for this exercise, and the amount of time spent completing the exercise. The subject had the option of reviewing questions he answered incorrectly or moving to another exercise topic. At any time while working within the program, subjects could exit the CAI program, and their progress up to that point was automatically saved on the computer hard disk drive.

Instrumentation

Three of the instruments for the study (i.e., Nowicki-Strickland Scale, Motivation Analysis Test, Student Evaluation of Computer-Assisted Instruction) were paper and pencil tests administered on different dates
toward the end of the semester. Students were informed that the tests would not be graded nor count toward their final course grade. To maintain anonymity, they were instructed not to put their names on the test but rather only write on the test their date of birth in the month-day-year format. Date of birth and course number were used to cross reference each subject’s scores. Interestingly, only two subjects had the same day and year of birth. This same birthdate identifier for the two subjects did not pose a problem because the course number on the answer sheet became the secondary identifier for cross referencing purposes.

The first instrument administered was the Nowicki-Strickland Scale which consisted of 27 questions. Responses were made by placing a mark next to the yes or no answer. The second instrument administered was the 208 item Motivation Analysis Test consisting of four subtests. The third instrument was the Student Evaluation of Computer-Assisted Instruction consisting of 20 attitudinal statements regarding computer-assisted instruction. Responses were made by circling one of the nine point Likert scale responses ranging from strongly disagree to strongly agree.

At the end of the semester, the coordinator of the CAPS computer lab generated reports for the study listing the total amount of time each subject spent in the CAPS lab completing all 28 CAI homework exercises.

**Instrument Reliability and Validity**

Three instruments were used in this study: the Nowicki-Strickland
The Nowicki-Strickland Scale is an instrument designed to measure locus of control. It was constructed on the basis of Rotter's definition of the internal-external control of reinforcement dimension (Rotter, 1966). The items describe reinforcement situations across interpersonal and motivational areas such as affiliation, achievement, and dependency.

The Educational Testing Service (ETS) provided a comprehensive abstract of research findings which suggest that "an internal score on the Nowicki-Strickland scales is significantly related to academic competence, to social maturity and appears to be a correlate of independent, striving, self-motivated behavior" (Educational Testing Service, 1971, p. 11). The construct validity of the Nowicki-Strickland Scale to other measures of locus of control as reported by ETS include that the relationship between the Rotter I-E scale and Nowicki-Strickland adult scales was significant in two studies of college students. For the Adult Nowicki-Strickland Scale, internal consistency coefficients ranged from .74 to .86 and a stability coefficient of .83 was reported. Unfortunately, no information regarding the specific method used in calculating the consistency nor stability coefficients were provided.

According to Nowicki (1971, p. 34), estimates of internal consistency via the split-half method corrected by the Spearman-Brown are \( r = .81 \) for
grade 12. Test-retest reliabilities sampled six weeks apart are .71 for 10th graders. A revised version of the Nowicki-Strickland Scale (Nowicki, 1971) for adults was used in this study. As researcher Nowicki has suggested, the word "kids" in the original version was changed to "people" and 13 items about parents were deleted. Thus, the total number of items in the instrument was reduced from forty to twenty-seven.

The Motivation Analysis Test (MAT) is a pencil and paper 208 item objective test of motivation. It is the work of psychologist Raymond B. Cattell and is based upon Cattell's dynamic calculus model of motivation. It is an objective method for measuring motivational patterns and the relative strengths of a person's interests, drives, sentiments, and values. The MAT is the outcome of more than 15 years of basic research examining over seventy different possible motivation strength indicators (Cattell, 1964).

The MAT concentrates on ten psychologically meaningful unitary motivation systems which were determined by factor analytical research. According to Cattell (1964, p. 2), "an erg is a source of drive toward a particular goal. A sentiment is an acquired aggregate of attitudes built up by learning and social experience. Like an erg, a sentiment is a source of motivation and interest."

The ten dynamic structures reportedly measured by the MAT are:

<table>
<thead>
<tr>
<th><strong>Ergs (drives)</strong></th>
<th><strong>Sentiments</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mating</td>
<td>1. Sentiment to Self</td>
</tr>
<tr>
<td>2. Assertiveness (achievement)</td>
<td>a. social reputation</td>
</tr>
<tr>
<td>3. Fear (escape)</td>
<td>b. control &amp; understanding</td>
</tr>
</tbody>
</table>
According to the data presented in the Motivational Analysis Test (MAT) handbook and assessment manual published by the Institute for Personality and Ability Testing in Champaign, IL, validity as measured by the correlation between factor estimates ranges from .52 (narcism) to .76 (self-sentiment). Validity was defined as "the correlation of the scale produced with the least-squares factor score estimate obtained in the construction study on the erg or sentiment concerned" (Cattell, 1964, p. 5). Reliability as measured by alpha coefficients based on a sample of 227 adults ranged from .33 for assertiveness to .71 for self-sentiment. The dependability coefficients for each of the ten dynamic factors measured by MAT range from .51 (pugnacity) to .78 (self-sentiment). Dependability coefficients, according to Cattell (1964, p.5), are based upon short term retest.

An evaluation instrument for computer-based instruction was developed by John Flynn of the School of Social Work at Western Michigan University as an evaluation questionnaire. In the findings and recommendation section of his report, he provides a list of questions for the developer or instructor evaluating CAI and a potential list of items for a questionnaire for student users. He states, "They are not intended to be used in toto but rather as a cafeteria from which to choose when evaluating
computer-based education" (Flynn, 1989, p. 28). In the present study, a substantial modification of the original 50 item questionnaire was completed and resulted in a 20 item Likert scale instrument called the Student Evaluation Instrument of Computer-Assisted Instruction (see Appendix A). Flynn's original 50 item questionnaire addressed a host of topics which were not pertinent to the present study. Deleted topics included questions related to subject content, hours of lab convenience, adequacy of staff support, comfortability of the setting, and design elements of the software.

In the present study, the Cronbach's alpha test was run to determine reliability of the 20 item instrument. The resulting Cronbach's alpha coefficient for the modified instrument was .91 for the twenty items.

**Data Analysis**

The following steps were undertaken during the data analysis phase:

1. A list of subject birthdates were first recorded on a spreadsheet.
2. Dates of birth were matched with subject demographic and academic-related data from the Lewis University computer system. These independent variables were then recorded on the spreadsheet. The data was re-checked for accuracy.
3. The three instruments were scored and re-checked for scoring accuracy.
4. Scores from the instruments were then recorded on the spreadsheet.
5. Using SPSS on Loyola University's mainframe computer, data from the spreadsheet were then entered as a SPSS data file.
6. All data recorded into SPSS was verified by checking it against the spreadsheet.

Seven independent demographic and academic-related variables were recorded. The Nowicki-Strickland scale (locus of control instrument) yielded one score per subject, the Motivation Analysis Test (MAT) yielded ten integrated subscores and two summary scores per subject, and the Student Evaluation Instrument for CAI yielded 20 scores per subject.

Descriptive statistics were used to analyze the data sets. Correlational statistics to determine relationships among the variables along with multiple regression and path analysis were also performed. Two-tailed tests of significance were set at the .01 alpha level.

In summary, this section addressed the topics of research design, population and sample, procedures, instrumentation, instrument validity and reliability, and data analysis. A survey research design was selected for the population under study which consisted of identified academically at-risk first year college students enrolled in reading comprehension courses. The completion of computer-assisted instruction homework exercises was part of the course requirement for the identified population.

Details regarding procedures of the study were described, and information regarding the specific instruments (i.e., Motivation Analysis Test, Nowicki-Strickland Scale, and Student Evaluation of Computer-Assisted Instruction) were provided. Measures of reliability and validity for
each of the instruments used in this study were also discussed. Finally, the
data analysis process which included data collection procedures, data
coding, and statistical analysis were spelled out.
CHAPTER 4
RESULTS AND DISCUSSION

Descriptive Analysis of the Sample

The purpose of this section is to present a descriptive analysis of the demographic and motivational characteristics of the sample. Descriptive statistics for the sample demographic variables of gender, race/ethnicity and college are presented in Table 1.

There was a total of 47 subjects comprised of 11 (23%) males and 36 (77%) females. The racial/ethnic composition consisted of nineteen (40%) Caucasians, sixteen (34%) Blacks, seven (15%) Asians, and five (11%) Latinos.

Twenty-five (53%) subjects were registered in the College of Arts and Sciences, thirteen (27.7%) in the College of Nursing, and seven (14.9%) in the College of Business. The largest percentage of subjects, 54%, were classified as undecided in their choice of major field of study. Declared fields of study included general nursing (17%), liberal arts (6.4%), business administration (6.4%), accountancy (4.3%), aviation flight maintenance (4.3%), computer science (2.1%), criminal/social justice (2.1%), marketing (2.1%), premed (2.1%), theatre (2.1%), and TV and Radio (2.1%).
Table 1. Student Demographic Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>11</td>
<td>23%</td>
</tr>
<tr>
<td>Females</td>
<td>36</td>
<td>77%</td>
</tr>
<tr>
<td>Total N</td>
<td>47</td>
<td></td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>19</td>
<td>40%</td>
</tr>
<tr>
<td>Black</td>
<td>16</td>
<td>34%</td>
</tr>
<tr>
<td>Asian</td>
<td>7</td>
<td>15%</td>
</tr>
<tr>
<td>Latino</td>
<td>5</td>
<td>11%</td>
</tr>
<tr>
<td>Total N</td>
<td>47</td>
<td></td>
</tr>
<tr>
<td>College</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arts &amp; Sciences</td>
<td>26</td>
<td>55%</td>
</tr>
<tr>
<td>Nursing</td>
<td>14</td>
<td>30%</td>
</tr>
<tr>
<td>Business</td>
<td>7</td>
<td>15%</td>
</tr>
<tr>
<td>Total N</td>
<td>47</td>
<td></td>
</tr>
</tbody>
</table>

Descriptive statistics regarding subjects’ age are presented in Table 2. Ages ranged from 18 to 36 years old with a mean age of 21. The largest age group was comprised of eighteen year olds (44.7%). Male subjects were slightly younger than female subjects. The mean age of the eleven male subjects was 19 years old while the mean age of the 36 female subjects was 21 years old.
Table 2. Descriptive Statistics of Subject Age

<table>
<thead>
<tr>
<th>Variable AGE</th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>11</td>
<td>19</td>
<td>1.58</td>
</tr>
<tr>
<td>Females</td>
<td>36</td>
<td>21</td>
<td>5.53</td>
</tr>
<tr>
<td>Both (Males and Females)</td>
<td>47</td>
<td>21</td>
<td>4.99</td>
</tr>
</tbody>
</table>

Table 3 presents descriptive statistics of the academic related variables of CAI course final grade (CGPA), college cumulative gradepoint average (OGPA), and number of hours spent in the computer lab (TIME). For purposes of this study, the reading comprehension course is referred to as the CAI course.

Total time spent in the computer-assisted lab to complete all 28 lessons during the semester ranged from one half hour to 11.7 hours with a mean number of hours of 5.25. Therefore, on the average, it took approximately 11 minutes to complete each computer-assisted instruction homework exercise.

The mean final grade for the CAI course was 2.91 on a four point scale. The mean college cumulative gradepoint was 2.58 on a four point scale.
Table 3. Descriptive Statistics of Academic Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAI Course Grade</td>
<td>45</td>
<td>2.91</td>
<td>1.29</td>
</tr>
<tr>
<td>Cumulative GPA</td>
<td>45</td>
<td>2.58</td>
<td>.82</td>
</tr>
<tr>
<td>Number of Hours Spent in Computer Lab</td>
<td>45</td>
<td>5.25</td>
<td>2.57</td>
</tr>
</tbody>
</table>

Note:
Two subjects who received a grade of incomplete are not reflected in the mean CAI course grade nor in the mean cumulative GPA.

Descriptive Analysis of the Nowicki-Strickland Scale

Mean scores and standard deviations on the Nowicki-Strickland Scale are presented in Table 4. In this study, data were available for 45 of the 47 subjects. Two of the subjects were not in class when the instrument was administered. Nowicki-Strickland Scale scores ranged from three to 18 (M = 8.556, SD = 3.145).

On the average, subjects were in the mid range of the scale indicating that they had neither a strong internal nor external locus of control as measured by the Nowicki-Strickland Scale. Males had a lower mean score (M = 7.27 SD = 2.27) meaning that they had a higher internal locus of control as compared to females (M = 8.97 SD = 3.19).

The Nowicki-Strickland Scale is an unpublished test for which norm data was not available. However, comparison data of mean scores from several populations (ETS, 1971) is also listed in Table 4. As indicated by
the comparison data, the Nowicki-Strickland Scale scores for subjects in the present study is nearly the same as those scores of Ohio State Psychology students ($M = 8.29$). Information regarding standard deviations was not reported for the comparison populations.

Table 4. Descriptive Statistics of Nowicki-Strickland Scale Scores

<table>
<thead>
<tr>
<th>Scores by Gender</th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>11</td>
<td>7.27</td>
<td>2.76</td>
</tr>
<tr>
<td>Females</td>
<td>34</td>
<td>8.97</td>
<td>3.19</td>
</tr>
<tr>
<td>Both (Males and Females)</td>
<td>45</td>
<td>8.56</td>
<td>3.14</td>
</tr>
</tbody>
</table>

Comparison Data

<table>
<thead>
<tr>
<th>Comparison Data</th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>National High School Sample</td>
<td>1000</td>
<td>8.50</td>
<td>n/a</td>
</tr>
<tr>
<td>Ohio State Psychology Students</td>
<td>1180</td>
<td>8.29</td>
<td>n/a</td>
</tr>
<tr>
<td>Peace Corps Trainees</td>
<td>155</td>
<td>5.94</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Note: Standard deviations not reported for comparison populations.

Descriptive Analysis of the Motivation Analysis Test

Data are presented in the form of mean scores and standard deviations of the ten integrated subscores and two summary scores. The integrated subscores are presented in the order in which they are listed on the Motivation Analysis scoring sheet.

In Table 5, mean subscores and summary scores are reported for the 39 subjects completing the instrument. Data is missing for six subjects because they did not complete the entire instrument or were absent from
According to norm data provided by the Institute for Personality and Ability Testing for the Motivation Analysis Test, the range of scores is 1 through 10 with a mean of 5.5, and a standard deviation of 2.

Table 5. Descriptive Statistics of Motivation Analysis Test Integrated Subscores and Summary Scores

<table>
<thead>
<tr>
<th>Scores for Entire Group (n=39)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated Summary Scores</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT1 General Information Intelligence</td>
<td>4.66</td>
<td>1.30</td>
</tr>
<tr>
<td>MAT2 Total Personal Interest</td>
<td>3.80</td>
<td>1.97</td>
</tr>
<tr>
<td>Subscores</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT3 Career</td>
<td>4.03</td>
<td>2.54</td>
</tr>
<tr>
<td>MAT4 Home/Parental</td>
<td>3.94</td>
<td>2.47</td>
</tr>
<tr>
<td>MAT5 Fear</td>
<td>4.26</td>
<td>2.37</td>
</tr>
<tr>
<td>MAT6 Narcism/Comfort</td>
<td>4.11</td>
<td>2.01</td>
</tr>
<tr>
<td>MAT7 Superego</td>
<td>3.66</td>
<td>1.92</td>
</tr>
<tr>
<td>MAT8 Self Sentiment</td>
<td>2.80</td>
<td>2.19</td>
</tr>
<tr>
<td>MAT9 Mating</td>
<td>4.69</td>
<td>2.47</td>
</tr>
<tr>
<td>MAT10 Pugnacity</td>
<td>5.00</td>
<td>2.60</td>
</tr>
<tr>
<td>MAT11 Assertiveness</td>
<td>4.23</td>
<td>2.73</td>
</tr>
<tr>
<td>MAT12 Sweetheart/Spouse</td>
<td>4.74</td>
<td>3.00</td>
</tr>
</tbody>
</table>

Table 6 presents subscores and summary scores by gender. Noteworthy is that highest mean score for males scores was MAT10 (M = 7.29) which is a measure of the pugnacity sentiment while the highest mean score for females was MAT12 (M = 4.86) which is a measure of sweetheart/spouse sentiment.
Table 6. Descriptive Statistics of Motivation Analysis Test Integrated Subscores and Summary Scores by Gender

<table>
<thead>
<tr>
<th>Scores by Gender</th>
<th>Males (n=11)</th>
<th>Females (n=28)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Summary Scores</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT1 General Information Intelligence</td>
<td>4.71</td>
<td>1.25</td>
</tr>
<tr>
<td>MAT2 Total Personal Interest</td>
<td>3.71</td>
<td>1.89</td>
</tr>
<tr>
<td>Subscores</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT3 Career</td>
<td>4.86</td>
<td>3.02</td>
</tr>
<tr>
<td>MAT4 Home/Parental</td>
<td>4.00</td>
<td>2.83</td>
</tr>
<tr>
<td>MAT5 Fear</td>
<td>3.43</td>
<td>2.15</td>
</tr>
<tr>
<td>MAT6 Narcism/Comfort</td>
<td>4.57</td>
<td>1.51</td>
</tr>
<tr>
<td>MAT7 Superego</td>
<td>2.71</td>
<td>2.36</td>
</tr>
<tr>
<td>MAT8 Self Sentiment</td>
<td>2.57</td>
<td>1.72</td>
</tr>
<tr>
<td>MAT9 Mating</td>
<td>4.57</td>
<td>3.51</td>
</tr>
<tr>
<td>MAT10 Pugnacity</td>
<td>7.29</td>
<td>1.25</td>
</tr>
<tr>
<td>MAT11 Assertiveness</td>
<td>2.71</td>
<td>2.63</td>
</tr>
<tr>
<td>MAT12 Sweetheart/Spouse</td>
<td>4.29</td>
<td>3.09</td>
</tr>
</tbody>
</table>

The career subscore (MAT3) indicates the amount of development of interests in a career. In this study, career subscores ranged from one to nine (MD = 4.03 SD = 2.54). The mean score is within the normal range for this subscore.

The home-parental subscore indicates the strength of attitudes attaching to the parental home. The scale provides clues to general home relationships, progress in emancipation, dependency, and autonomy. Home-parental subscores ranged from one to nine (M = 3.94 SD = 2.47).
According to interpretive data from the Institute for Personality and Ability Testing, the somewhat low mean score may be interpreted as subjects' conscious movement toward independence from the parental home. This is not surprising because of the age demographics of the sample and the fact that many of the subjects are living away from home for the first time. As a college student, subjects are exposed to new ideas some of which may be in direct conflict with their parents' beliefs.

The fear subscore indicates the need for safety and realistic precautions. In this study, scores ranged from one to eight (M = 4.26 SD = 2.37). The mean score is within the normal range for this subscore.

The narcissism-comfort subscore indicates the level of drive to self-indulgent satisfactions and putting importance on the self. Narcissism-comfort subscores ranged from one to ten (M = 4.11 SD = 2.01). The mean score is within the normal range for this subscore.

The superego subscore indicates the strength of development of conscience. Superego subscores ranged from one to seven (M = 3.66 SD = 1.92). A low score indicates that the subject is undergoing conflict, and it may be interpreted that he is rejecting some religious beliefs to which he was exposed during childhood. In this study, the mean score may be indicative of the change the subjects may be experiencing during the transition from adolescence to young adulthood.

The self-sentiment subscore indicates the subject's investment of
motivation in himself and his social reputation. In this study, subscores ranged from one to ten ($M = 2.80$ $SD = 2.19$). The mean score was more than one standard deviation below the norm. According to interpretive data from the Institute for Personality and Ability Testing, a low score may indicate that a subject is an underachiever. The low mean score is not surprising in light of the fact that the sample consists of academically at-risk students.

The mating subscore indicates the strength of the normal mating drive. Mating subscores ranged from one to ten ($M = 4.69$ $SD = 2.47$). The mean score is within the normal range for this subscore.

The pugnacity subscore is a measure of competitiveness. Pugnacity subscores ranged from one to ten ($M = 5.0$ $SD = 2.6$). The mean score is within the normal range for this subscore.

The assertiveness subscore indicates the search for those immediate goals which society associates with success. In this study, subscores ranged from one to ten ($M = 4.23$ $SD = 2.73$). The mean score is within the normal range for this subscore.

The sweetheart-spouse subscore measures the subjects' affectional needs in relation to a person of the opposite sex. Subscores ranged from one to ten ($M = 4.74$ $SD = 3.00$). The mean score is within the normal range for this subscore.

The general information-intelligence summary score is a measure of
overall mental ability. In this study, scores ranged from three to eight 
(M = 4.66 SD = 1.30). The mean score indicates that the subjects in this 
study are within the range of average general information-intelligence.

The total personal interest summary score is a measure of the amount 
of total motivation and life interest. Total personal interest scores ranged 
from one to nine (M = 3.80 SD = 1.97). The subjects’ mean score is almost 
one standard deviation below the mean score found in a normally distributed 
population. The mean score indicates that subjects in this study have a 
slighter lower than average motivation level as measured by the Total 
Personal Interest score of the Motivation Analysis Test.

Descriptive Analysis of the Student Evaluation Instrument of 
Computer-Assisted Instruction

Internal consistency reliability estimates were determined by using the 
Cronbach’s alpha test. The Cronbach alpha value for the twenty items was 
.91.

Mean scores, and standard deviations for the 45 subjects completing 
the instrument are presented in Table 7. No comparative data for this 
instrument was available from other studies. In the present study, scores 
ranged from one (strongly disagree) to nine (strongly agree). Subjects 
indicated their response to each statement of the instrument by circling their 
degree of disagreement, uncertainty, or agreement. The nine point scale 
was as follows:
Mean scores indicating a response of "disagree" were reported for only two (10%) of the twenty items. They are:

CAI5  The computer technology decreased my learning time. (M = 3.42 SD = 1.95)

CAI13 My experience with the computer was too impersonal. (M = 4.44 SD = 1.80)

Mean scores indicating a response of "uncertain" were reported for nine (45%) of the twenty items. This relatively high percentage of "uncertain" responses may be due to the fact that the subjects, on the average, spent only 5.25 hours in the computer lab during the entire semester. This limited amount of time on task may not have afforded enough time for subjects to develop a more definitive opinion regarding some aspects of the computer-assisted instruction experience.

The statements resulting in a mean response of "uncertain" are:

CAI2  I was more motivated toward this course as a result of being able to use the computer. (M = 5.58 SD = 2.21)

CAI4  Use of the computer technology in this class made the class more interesting to me. (M = 5.53 SD = 1.75)

CAI6  The computer technology exercises held my interest. (M = 5.49 SD = 1.86)
CAI11 I felt motivated to use the computer technology. (M = 5.67 SD = 1.81)

CAI12 I enjoyed using the computer technology within this class this semester. (M = 5.56 SD = 1.67)

CAI16 The computer technology exercises helped my performance in this course. (M = 5.84 SD = 1.91)

CAI18 The computer exercises helped me understand the material from class lectures or discussion. (M = 5.67 SD = 1.58)

CAI19 I would like to use the computer technology exercises in other courses if it were available. (M = 5.77 SD = 2.17)

CAI20 I feel more positive about school in general as a result of using the computer technology. (M = 5.67 SD = 1.84)

Mean scores indicating a response of "agree" were reported for nine (45%) of the twenty items. They are:

CAI1 I believe that doing the computer technology exercises helped me to better understand the information in this course. (M = 6.51 SD = 1.47)

CAI3 The computer technology used in this class was easy to use. (M = 7.70 SD = 1.46)

CAI7 The computer technology provided me with knowledge which I can use in other courses. (M = 6.49 SD = 1.65)

CAI8 Feedback from the computer after each response added to my
understanding of the topic. (M = 6.79 SD = 1.26)

CAI9 I feel positive about using computer technology exercises for teaching and learning. (M = 6.70 SD = 1.57)

CAI10 It was helpful to have computer technology exercises as a course requirement. (M = 6.14 SD = 1.87)

CAI14 I liked the fact that computer technology exercises were an individualized alternative to learning. (M = 6.51 SD = 1.32)

CAI15 My knowledge of the course materials was increased by the computer technology exercises. (M = 6.16 SD = 1.57)

CAI17 The amount of time required to do the computer exercises was appropriate. (M = 6.14 SD = 1.32)

The statement which elicited the strongest agree response (mean = 7.70 SD = 1.46) was, "CAI was easy to use" (CAI3).

Only two items, CAI5, "the computer technology decreased my learning time" and CAI13, "My experience with the computer was too impersonal" were the only two items which elicited mean scores indicating a disagree response. Consequently, these two items were eliminated when calculating an overall index of evaluation of computer-assisted instruction (CAI) to reflect more accurately the degree to which a given subject responds positively (i.e., favorably) to the overall computer-assisted experience.

The overall index of evaluation of computer-assisted instruction which was named variable "CAI" was then calculated by summing all the mean CAI
item scores except items CAI5 and CAI13 and then dividing by 18. Removing these two items (i.e., CAI5 and CAI13) resulted in an Cronbach's Alpha score of .89 for the remaining 18 items. In contrast, Cronbach's alpha for all 20 items was .91.

Table 7. Descriptive Statistics of the Student Evaluation Instrument of Computer-Assisted Instruction

<table>
<thead>
<tr>
<th>Item and Score</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAI11 Helped Understand Course Info</td>
<td>6.51</td>
<td>1.47</td>
</tr>
<tr>
<td>CAI12 Motivated Toward Course Due to Computer</td>
<td>5.58</td>
<td>2.21</td>
</tr>
<tr>
<td>CAI13 CAI Easy to Use</td>
<td>7.70</td>
<td>1.46</td>
</tr>
<tr>
<td>CAI14 Made Class Interesting</td>
<td>5.53</td>
<td>1.75</td>
</tr>
<tr>
<td>CAI15 Decreased My Learning Time</td>
<td>3.42</td>
<td>1.95</td>
</tr>
<tr>
<td>CAI16 Held My Interest</td>
<td>5.49</td>
<td>1.86</td>
</tr>
<tr>
<td>CAI17 Provided Knowledge for Use in Other Courses</td>
<td>6.49</td>
<td>1.65</td>
</tr>
<tr>
<td>CAI18 Feedback Added Understanding of Topic</td>
<td>6.79</td>
<td>1.26</td>
</tr>
<tr>
<td>CAI19 Feel Positive about CAI for Teaching/Learning</td>
<td>6.70</td>
<td>1.57</td>
</tr>
<tr>
<td>CAI20 Helpful to Have as Course Requirement</td>
<td>6.14</td>
<td>1.87</td>
</tr>
<tr>
<td>CAI21 Felt Motivated to Use Computer Technology</td>
<td>5.67</td>
<td>1.81</td>
</tr>
<tr>
<td>CAI22 Enjoyed Using Computer</td>
<td>5.56</td>
<td>1.67</td>
</tr>
<tr>
<td>CAI23 Experience with Computer Too Impersonal</td>
<td>4.44</td>
<td>1.80</td>
</tr>
<tr>
<td>CAI24 Liked It Was Individualized Alternative</td>
<td>6.51</td>
<td>1.32</td>
</tr>
<tr>
<td>CAI25 Course Materials Knowledge Increased</td>
<td>6.16</td>
<td>1.57</td>
</tr>
<tr>
<td>CAI26 CAI Helped My Performance in Course</td>
<td>5.84</td>
<td>1.91</td>
</tr>
<tr>
<td>CAI27 Amount of Time Required Appropriate</td>
<td>6.14</td>
<td>1.79</td>
</tr>
<tr>
<td>CAI28 Helped Understand Class Lecture/Discussion</td>
<td>5.67</td>
<td>1.58</td>
</tr>
<tr>
<td>CAI29 Would Like to Use CAI in Other Courses</td>
<td>5.77</td>
<td>2.17</td>
</tr>
<tr>
<td>CAI30 Feel More Positive About School in General</td>
<td>5.67</td>
<td>1.84</td>
</tr>
<tr>
<td>CAI31 CAI Overall Evaluation</td>
<td>6.09</td>
<td>1.20</td>
</tr>
</tbody>
</table>

Note: n = 45; Variable CAI is the index of overall evaluation of computer-assisted instruction.
Correlation Analysis

Correlational statistics were used to describe the strength of relationship between two variables. Appendix C presents correlation coefficients between the dependent variable of Nowicki-Strickland Scale scores and the independent variables of age (AGE), CAI course grade (CGPA), cumulative college grade point average (OGPA), and time spent in the computer lab (TIME).

In order to determine the degree of correlation between the variables, the Pearson product-moment correlation was used. A negligible relationship exists if the correlation coefficient is less than .20. A low but definite relationship exists if the correlation coefficient is between .20 and .40. Correlation coefficients between .40 and .70 are considered moderate to substantial relationships while .70 to .90 is a strong relationship (Backstrom & Hursh-Cesar 1981, p.367).

The importance of correlation actually lies in squaring the "r" value (i.e., $r^2$) which is called the coefficient of determination. The $r^2$ value is then interpreted as "the amount of variation between two variables which is accounted for (explained by) their relationship" (Backstrom & Hursh-Cesar 1981, p.367). For example, if a statistically significant correlation coefficient of .50 exists between one variable and another variable, the $r^2$ value is .25. Thus, 25% of the variability in variable one can be accounted for by variable two.
There were no significant correlations between the independent variable of age and the Nowicki-Strickland Scale scores. However, correlation coefficients were significant at the .01 level for:

<table>
<thead>
<tr>
<th>Variables (n=45)</th>
<th>Correlation Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAI Course Grade</td>
<td></td>
</tr>
<tr>
<td>College Cumulative GPA</td>
<td>.8278</td>
</tr>
<tr>
<td>Time Spent in CAI Lab</td>
<td>.4084</td>
</tr>
<tr>
<td>College Cumulative GPA</td>
<td></td>
</tr>
<tr>
<td>Time Spent in CAI Lab</td>
<td>.5418</td>
</tr>
</tbody>
</table>

All of the variables cited were either moderately or highly correlated. A high positive correlation (.8278) existed between CAI Course Grade and cumulative College GPA.

One of the reasons for the high correlation (.8278) between CAI course grade and cumulative college grade point average is due to the fact that the subjects are first semester students. Therefore, their CAI grade accounts for a substantially large percentage of the cumulative college grade point average which at this point is based only on four or five courses.

Following is a discussion of correlation coefficients between the dependent variables of Motivation Analysis Test scores and the independent variables of age and time spent in the computer lab. Appendix C provides the correlation matrix for the independent variables and Motivation Analysis Test Scores.

In this study, there were no significant relationships at the .01 level between subject independent variables and Motivation Analysis Test
integrated subscores and summary scores.

However, correlation coefficients were significant at the .05 level for several independent variables and Motivation Analysis Test subscores which included:

<table>
<thead>
<tr>
<th>Variables (n=39)</th>
<th>Correlation Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT6 (Narcism/Comfort)</td>
<td>MAT10 (Pugnacity)</td>
</tr>
<tr>
<td>Age</td>
<td>Age</td>
</tr>
<tr>
<td>-.3615</td>
<td>-.3598</td>
</tr>
<tr>
<td>MAT11 (Assertiveness)</td>
<td>CAI Course Grade</td>
</tr>
<tr>
<td>-.3725</td>
<td></td>
</tr>
</tbody>
</table>

Three of the relative strengths of the correlations were low. The low negative correlation of age with narcism/comfort (-.3615) and age with pugnacity (-.3598) seems to indicate that the younger the subject, the more likely he is concerned with comfort and the more competitive he is.

Correlation coefficients between Motivation Analysis Test integrated subscores and summary scores were also calculated. Integrated subscores are MAT3 through MAT10 while the summary scores are MAT1 and MAT2. In this study, significant relationships at the .01 level include:

<table>
<thead>
<tr>
<th>Variables (n=39)</th>
<th>Correlation Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT1 (General Information Intelligence)</td>
<td>MAT12 (Sweetheart/Spouse)</td>
</tr>
<tr>
<td>MAT8 (Self-Sentiment)</td>
<td></td>
</tr>
<tr>
<td>MAT4 (Home/Parental)</td>
<td>MAT5 (Fear)</td>
</tr>
<tr>
<td>.6073</td>
<td>.4686</td>
</tr>
</tbody>
</table>
59

MAT7 (Superego)  
MAT9 (Self-Sentiment)  -.4626

In this study, three of the correlations indicate a moderate positive relationship between the variables. Two pairs of variables resulted in a moderate negative relationship. Subjects with high MAT1 scores also will have high affectional needs as indicated by the MAT12 score. Additionally, subjects with high MAT1 scores probably have high aspirations for themselves as indicated by the MAT8 correlation.

Correlation between MAT4 and MAT5 (-.4495) seems to indicate that the stronger the subject's attachment to his parental home, the less general fear the subject has. Correlation between MAT7 and MAT9 (-.4626) seems to indicate that the higher one's interest in organized religion, the less likely one is to openly discuss sexual interests.

Significant relationships at the .05 level include:

<table>
<thead>
<tr>
<th>Variables (n = 39)</th>
<th>Correlation Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT2 (Total Personal Interest)</td>
<td></td>
</tr>
<tr>
<td>MAT6 (Narcism/Comfort)</td>
<td>.3404</td>
</tr>
<tr>
<td>MAT9 (Mating)</td>
<td>.4284</td>
</tr>
<tr>
<td>MAT3 (Career)</td>
<td></td>
</tr>
<tr>
<td>MAT7 (Superego)</td>
<td>.3514</td>
</tr>
</tbody>
</table>

Two of the correlations at the .05 level were low, and only one correlation was moderate. In this study, the moderate correlation of MAT2 and MAT9 may be interpreted that persons with a higher overall motivation score (MAT2) also score higher on the mating dimension.
The following is a presentation of correlation coefficients between Student Evaluation Instrument of Computer-Assisted Instruction scores and student demographic variables.

In this study, the only significant relationship at the .01 level was:

<table>
<thead>
<tr>
<th>Variables (n=45)</th>
<th>Correlation Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAB (Easy to Use)</td>
<td></td>
</tr>
<tr>
<td>Time Spent in the Computer Lab</td>
<td>0.4015</td>
</tr>
</tbody>
</table>

The moderate positive correlation between CAB and TIME indicates that the more time spent in the computer lab, the more likely the subject rated CAI technology as easy to use.

Significant relationships at the .05 level include:

<table>
<thead>
<tr>
<th>Variables (n=45)</th>
<th>Correlation Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAI5 (Decreased My Learning Time)</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-0.3378</td>
</tr>
<tr>
<td>CAI9 (Feel Positive About CAI for Teaching/Learning)</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.3213</td>
</tr>
<tr>
<td>CAI18 (Helped Understand Lecture/Discussion)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>-0.3453</td>
</tr>
<tr>
<td>CAI19 (Would Like to Use CAI in Other Courses)</td>
<td></td>
</tr>
<tr>
<td>Locus</td>
<td>0.3258</td>
</tr>
</tbody>
</table>

All correlations indicated only a low relationship between the variables. The negative correlation between CAI5 and age indicates that younger subjects were more likely to disagree with the statement that CAI decreased their learning time. The positive correlation between CAI9 and age indicates that the older the subject, the more likely the subject agreed
with the statement that he felt positive about CAI for teaching and learning. The negative correlation between CAI18 seems to indicate that the longer the time spent in the computer lab, the more likely a subject was to disagree with the statement that CAI exercises helped to understand the class lecture/discussion.

The low positive correlation between CAI19 and Locus of Control score indicates that the higher one's locus of control score (i.e., higher external locus of control), the more likely one agreed with the statement that he would like to use CAI in other courses.

Correlation coefficients between Motivation Analysis Test integrated subscores and summary scores were also calculated (see Appendix D). Summary scores are MAT1 and MAT2 while integrated subscores are MAT3 through MAT10.

In this study, significant relationships at the .01 level include:

<table>
<thead>
<tr>
<th>Variables (n = 39)</th>
<th>Correlation Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT1 (General Information Intelligence)</td>
<td></td>
</tr>
<tr>
<td>MAT2 (Total Personal Interest)</td>
<td>.8662</td>
</tr>
<tr>
<td>MAT8 (Self-Sentiment)</td>
<td>.4686</td>
</tr>
<tr>
<td>MAT11 (Assertiveness)</td>
<td>.4431</td>
</tr>
<tr>
<td>MAT12 (Sweetheart/Spouse)</td>
<td>.6073</td>
</tr>
<tr>
<td>MAT1 (Total Personal Interest)</td>
<td></td>
</tr>
<tr>
<td>MAT11 (Assertiveness)</td>
<td>.5555</td>
</tr>
<tr>
<td>MAT12 (Sweetheart/Spouse)</td>
<td>.6083</td>
</tr>
<tr>
<td>MAT4 (Home/Parental)</td>
<td></td>
</tr>
<tr>
<td>MAT5 (Fear)</td>
<td>-.4495</td>
</tr>
</tbody>
</table>
For MAT1, all correlations were moderately or highly positive. The MAT1 and MAT2 correlation indicates a strong relationship between both variables. The remaining moderate strength relationships indicate that scores on MAT1 are related to a subject’s investment of motivation in himself (MAT8), mastery and achievement (MAT11), and affectional needs (MAT12).

Significant relationships at the .05 level include:

<table>
<thead>
<tr>
<th>Variables (n = 39)</th>
<th>Correlation Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT1 (General Information Intelligence)</td>
<td></td>
</tr>
<tr>
<td>MAT3 (Career)</td>
<td>.3495</td>
</tr>
<tr>
<td>MAT2 (Total Personal Interest)</td>
<td></td>
</tr>
<tr>
<td>MAT3 (Career)</td>
<td>.3959</td>
</tr>
<tr>
<td>MAT6 (Narcism/Comfort)</td>
<td>.3404</td>
</tr>
<tr>
<td>MAT9 (Mating)</td>
<td>.4284</td>
</tr>
<tr>
<td>MAT10 (Pugnacity)</td>
<td>.3449</td>
</tr>
<tr>
<td>MAT3 (Career)</td>
<td></td>
</tr>
<tr>
<td>MAT7 (Superego)</td>
<td>.3514</td>
</tr>
</tbody>
</table>

Of the six correlations, five were positive low correlations and one was a positive moderate correlation. MAT3 (Career) correlated with MAT1 (General Information Intelligence), MAT2 (Total Personal Interest), and MAT7 (Superego). The only moderate correlation was between MAT2 (Total Personal Interest) and MAT9 (Mating).
Appendix E presents correlation coefficients between Motivation Analysis Test scores and Student Evaluation Instrument of Computer-Assisted Instruction scores.

Significant relationships at the .01 level include:

<table>
<thead>
<tr>
<th>Variables (n=39)</th>
<th>Correlation Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT4 (Home/Parental)</td>
<td>CAI20 (Feel More Positive About School in General)</td>
</tr>
<tr>
<td>MAT5 (Fear)</td>
<td>CAI1 (Helped Understand Course Info)</td>
</tr>
<tr>
<td></td>
<td>CAI4 (Made Class Interesting)</td>
</tr>
<tr>
<td></td>
<td>CAI7 (Provided Knowledge for Use in Other Courses)</td>
</tr>
<tr>
<td></td>
<td>CAI20 (Feel More Positive About School in General)</td>
</tr>
<tr>
<td></td>
<td>CAI (CAI Overall Evaluation)</td>
</tr>
</tbody>
</table>

Five of the relationships between variables were moderate negative correlations while one of the relationships was a low positive correlation.

The positive correlation between MAT4 and CAI20 seems to indicate that subjects with stronger attachments to parental home are more likely to agree with the statement that they feel more positive about school in general as a result of using computer-assisted instruction.

A subject with a low MAT5 (Fear) score is more likely to agree with the statements that CAI helped him understand course information, made the class interesting, provided knowledge for use in other courses, or makes the person feel more positive about school in general. Additionally, a subject with a low MAT5 score is more likely to rate favorably the overall CAI experience. Conversely, higher MAT5 scores are associated with
disagreements of these statements.

Significant relationships at the .05 level include:

<table>
<thead>
<tr>
<th>Variables</th>
<th>Correlation Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT4 (Home/Parental)</td>
<td></td>
</tr>
<tr>
<td>CAI1 (Helped Understand Course Info)</td>
<td>.3678</td>
</tr>
<tr>
<td>MAT5 (Fear)</td>
<td></td>
</tr>
<tr>
<td>CAI6 (Held My Interest)</td>
<td>-.3946</td>
</tr>
<tr>
<td>MAT6 (Narcism/Comfort)</td>
<td></td>
</tr>
<tr>
<td>CAI5 (Decreased My Learning Time)</td>
<td>.3517</td>
</tr>
</tbody>
</table>

Two of the relationships between variables were low positive correlations while one of the relationships was a low negative correlation. The positive correlation between MAT4 and CAI1 (.3678) seems to indicate that subjects having a stronger home/parental attachment are more likely to agree with the statement that CAI helped them understand the course information. The positive correlation between MAT6 and CAI5 seems to indicate that subjects putting importance on the self are more likely to agree with the statement that CAI decreased their learning time.

The negative correlation between MAT5 and CAI6 (-.3946) seems to indicate that subjects scoring low on the fear dimension are more likely to agree with the statement that CAI held their interest.

Regression Results

A discussion of the regression models for each of the dependent variables will be presented. The stepwise method was used which instructs the computer to start at the beginning of the variable list and then eliminate
variables that have no influence in predicting the regression equation. The independent variables entered into the regression were: gender, race, age, time in computer lab, CAI course grade, semester cumulative gradepoint average, Nowicki-Strickland Scale scores, Motivation Analysis integrated subscores, Motivation Analysis Summary scores, and Student Evaluation Instrument for CAI scores.

For the multiple regression equations, beta weights rather than b weights are used. Beta weights are the regression weights in a multiple regression equation in which all of the variables in the equation are in standard score form.

Table 8 is the model generated to explain the variance in a subject's locus of control as measured by the Nowicki-Strickland Scale. The significant predictors of the subject's locus of control were CAI20 (score on item 20 of the Student Evaluation Instrument of CAI) and the Cumulative College Gradepoint Average (CGPA). In this study, these predictor variables could account for 65% of the variation in locus of control as measured by the Nowicki-Strickland Scale.

Table 8. Multiple Regression Equation for Locus of Control

<table>
<thead>
<tr>
<th>Outcome Variable</th>
<th>R</th>
<th>R²</th>
<th>Beta</th>
<th>T</th>
<th>Sig T</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAI20</td>
<td>.703</td>
<td>4.607</td>
<td>.0003</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OGPA</td>
<td>.359</td>
<td>2.35</td>
<td>.0329</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In this study, the multiple regression equation for locus of control as measured by the Nowicki-Strickland Scale is:

\[ Z_v = (0.703)CAI20 + (0.359)OGPA. \]

An illustrative example of using the equation follows: A subject with a CAI20 score of seven which means he positively rated the statement that he feels more positive about school in general and also has a cumulative college grade point average (OGPA) of 3.5 would be predicted to have a standardized Nowicki-Strickland score of six.

Table 9 is the model generated to explain the variance in a subject's MAT2 (Total Personal Interest) score. In this study, the significant predictors of the subject's MAT2 score were the MAT1 (General Information-Intelligence) score and MAT12 (Sweetheart/Spouse). The predictor variables could account for 89% of the variation in Total Personal Interest as measured by the Motivation Analysis Test.
Table 9. Multiple Regression Equation for MAT2 Total Personal Interest

<table>
<thead>
<tr>
<th>Outcome Variable</th>
<th>R</th>
<th>R²</th>
<th>Beta</th>
<th>T</th>
<th>Sig T</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT1</td>
<td>.94</td>
<td>.89</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT12</td>
<td>.233</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note:
MAT1 = General Information-Intelligence Summary Score
MAT12 = Sweetheart/Spouse Integrated Subscore

In this study, the multiple regression equation for MAT2 (Total Personal Interest) as measured by the Motivation Analysis Test is:

\[ Z_y = (1.052)\text{MAT1} + (.233) \text{MAT12} \]

An illustrative example of using the equation follows: A subject with a MAT1 score of five and also having a MAT12 score of five would be predicted to have a MAT2 score of 6.42.

Table 10 is the model generated to explain the variance in a subject's overall evaluation of the computer-assisted instruction as measured by the Student Evaluation Instrument of Computer-Assisted Instruction. In this study, the significant predictors of the subject's Overall Evaluation of the Computer-Assisted Instruction were CAI12, CAI2, CAI9, and MAT7. These predictor variables could account for 89% of the variation in Overall Evaluation of the Computer-Assisted Instruction.
Table 10. Multiple Regression Equation for Overall Evaluation of Computer-Assisted Instruction

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Variable</th>
<th>R</th>
<th>R²</th>
<th>Beta</th>
<th>T</th>
<th>Sig T</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAI12</td>
<td>.95</td>
<td>.89</td>
<td>.83</td>
<td>8.373</td>
<td>.0000</td>
<td></td>
</tr>
<tr>
<td>CAI2</td>
<td>.58</td>
<td></td>
<td>5.844</td>
<td>.0001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAI9</td>
<td>.53</td>
<td></td>
<td>4.824</td>
<td>.0003</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT7</td>
<td>-.37</td>
<td></td>
<td>3.744</td>
<td>.0025</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: CAI12 = Enjoyed Using Computer, CAI2 = Motivated Toward Course Due to Computer, CAI9 = Feel Positive About CAI for Teaching/Learning, MAT7 = Superego.

In this study, the multiple regression equation for Overall Evaluation of Computer-Assisted Instruction is:

$$Z_v = (.83)\text{CAI12} + (.58)\text{CAI2} + (.532)\text{CAI9} + (-.374)\text{MAT7}$$

Table 11 is the model generated to explain the variance in a subject's evaluation of CAI20 on the Student Evaluation Instrument of Computer-Assisted Instruction which is the statement, "I feel more positive about school in general as a result of using the computer technology." In this study, the significant predictors of the subject's evaluation of CAI20 were locus of control score as measured by the Nowicki-Strickland scale and CAI6 which is the statement on the Student Evaluation Instrument of Computer-Assisted Instruction, "The computer technology exercises held my interest." The variables could account for 69% of the variation in the subject's response to statement CAI20.
Table 11. Multiple Regression Equation for Feeling More Positive About School in General

<table>
<thead>
<tr>
<th>Outcome Variable</th>
<th>R</th>
<th>R²</th>
<th>Beta</th>
<th>T</th>
<th>Sig T</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCUS</td>
<td>.69</td>
<td>.69</td>
<td>.6962</td>
<td>4.89</td>
<td>.0002</td>
</tr>
<tr>
<td>CAI6</td>
<td>.39</td>
<td>.39</td>
<td>.3938</td>
<td>2.767</td>
<td>.0144</td>
</tr>
</tbody>
</table>

Note:
LOCUS = Nowicki-Strickland Scale Score
CAI6 = Computer Technology Exercises Held My Interest

In this study, the multiple regression equation for Feeling More Positive About School in General as a Result of CAI is:

\[ Z_v = (.6962)\text{LOCUS} + (.338)\text{CAI6} \]

Path Analysis

Path analysis is essentially an extension of multiple regression analysis to show which independent variables and which combinations of these variables best explain causal relationships to a dependent variable. In addition, path analysis can show both the direct and indirect effects of independent variables on the dependent variable. The relationship between pairs of variables is expressed by a path coefficient which is a standardized regression coefficient indicating the direct effect of one variable on another variable.

The input to the model selected for path analysis are those variables which are thought to be the major factors contributing in a causal manner
to the dependent variable under investigation. In this study, locus of control as measured by the Nowicki-Strickland Scale, information intelligence (MAT1) as measured by the Motivation Analysis Test, total personal interest (MAT2) as measured by the Motivation Analysis Test, and CAI20 (Agreement of Feeling More Positive about School in General as Result of CAI) as measured by the Student Evaluation Instrument of Computer-Assisted Instruction were thought to be relevant to the causal process regarding one's overall evaluation of CAI. A review of the correlation matrices and multiple regression equations provided rationale to include the MAT1, MAT2, LOCUS, CAI20 variables in the model. Table 12 presents the results of a correlation analysis for the identified variables.

The next step was to compute the path coefficients. After regressing the variables to compute the appropriate path coefficients between all variables, the results were compared against the proposed model to confirm or disconfirm it. Results of the path analysis suggest that MAT1 and MAT2 are exogenous variables while LOCUS, CAI20, and CAI are endogenous variables. In other words, one's information intelligence (MAT1) and total personal interest (MAT2) are variables whose variability is assumed to be determined by causes outside the model. For the endogenous variables, the model indicates that one's locus of control (LOCUS) is a cause of one's feeling positive about school in general (CAI20) as a result of computer-assisted instruction. In turn, CAI20 is a causal link to one's overall
evaluation of computer-assisted instruction (CAI).

Table 12. Correlation Coefficients for Observations of Variables Used in Path Analysis

<table>
<thead>
<tr>
<th></th>
<th>MAT1</th>
<th>MAT2</th>
<th>LOCUS</th>
<th>CAI</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT1</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT2</td>
<td>.8662**</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOCUS</td>
<td>-.2511</td>
<td>-.2945</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>CAI</td>
<td>-.1403</td>
<td>-.0827</td>
<td>.1250</td>
<td>-</td>
</tr>
<tr>
<td>CAI20</td>
<td>-.1219</td>
<td>-.0740</td>
<td>.3263*</td>
<td>.5783**</td>
</tr>
</tbody>
</table>

Note: *p < .05, **p < .01

Path coefficients are presented in Table 13 and the model is presented in Figure 1.

Table 13. Path Coefficients

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCUS to CAI20</td>
<td>.40</td>
</tr>
<tr>
<td>CAI20 to CAI</td>
<td>.52</td>
</tr>
<tr>
<td>LOCUS to CAI</td>
<td>.33</td>
</tr>
</tbody>
</table>

Using the path coefficients, a path diagram was generated which shows the model's causal relationship among the variables. The path diagram shows the path coefficients which are standardized regression coefficients indicating the direct effect of one variable on another variable in the path analysis (Borg & Gall, 1989, p. 618). The results indicate that the locus of control variable (LOCUS) as measured by the Nowicki-Strickland Scale has
some direct effect on variable CAI (i.e., overall evaluation of computer-assisted instruction). However, most of its effect is indirect due to the fact that part of the effect of LOCUS is due to its effect on CAI20 (i.e., feeling more positive about school in general as a result of computer-assisted instruction).

![Diagram of CAI frame of reference model]

The direct effect of LOCUS on CAI is .33 which is the path coefficient. The indirect effect was calculated by subtracting the path coefficient (.33) from the correlation coefficient (.175). Thus, the indirect effect of LOCUS on CAI is -.205 which means that its direct effect is not as strong as its indirect effect. The direct effect of the other variable, CAI20, on CAI is .52 while the indirect effect of CAI20 on CAI is .05. This means that CAI20's direct effect on CAI is stronger than its indirect effect which is due to LOCUS.

The path analysis results do not seem to fully support the original theory that LOCUS, MAT1, MAT2, and CAI20 are all relevant to the causal
process regarding one’s overall evaluation of CAI. Rather, the indirect
effect of LOCUS together with the direct effect of CAI20 are most
important in the causal relationship among the variables.

A major goal of educational research is to increase our understanding
of how and why a process looks and works as it does. To assist in visualizing
how locus of control and a subject’s attitude regarding feeling more positive
about school in general as a result of computer-assisted instruction relate
to one’s overall evaluation of the computer-assisted instruction experience,
a model presented in Figure 1 was developed. The model depicts a heuristic
device that may be useful in examining individual characteristics, in this case
locus of control, and how they relate to attitudinal components of computer-
assisted instruction.

As the model suggests, locus of control has a direct effect on one’s
attitude regarding feeling positive about school in general as a result of
computer-assisted instruction. In turn, this attitude has a direct causal
relationship to one’s attitude in evaluating the overall computer-assisted
instruction experience. The model assists in addressing the question of
which learner traits (i.e., individual characteristics) have a causal
relationship to attitudinal components of computer-assisted instruction. The
value of the model is that it can aid educators in understanding how the
individual characteristic of locus of control influences the computer-assisted
instruction experience. The empirical validity of the model could be tested
In further research studies with different populations who are using computer-assisted instruction.

In summary, this section provided descriptive analysis of the sample independent variables and also the dependent measures which were scores on the Nowicki-Stickland Scale, the Motivation Analysis Test, and the Student Evaluation Instrument of Computer-Assisted Instruction. An overview of correlational analysis, multiple regression, and path analysis introduced the statistical findings specific to each of these topics. Statistically significant findings were presented and discussed in relation to the independent and dependent variables under study.
CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

This section will summarize findings, provide possible explanations for the findings, integrate the findings with past research, and provide recommendations for future research. The section is organized around the four research questions addressed in Chapter One.

Research Question #1: What are the characteristics of those learners who are satisfied with the CAI experience?

Variable CAI regarding Student Evaluation Instrument of Computer-Assisted Instruction provides information to address this question. This variable is an overall index calculated by summing all the mean CAI items except item CAI5 and CAI13 and then dividing by 18. A review of the descriptive analysis of the data reveals the mean score indicates a positive satisfaction with the overall CAI experience (M = 6.09 SD = 1.20).

There were no discernible differences between male and female subjects in their CAI score. A chi-square analysis by gender revealed no statistically significant differences for CAI mean scores. A chi-square analysis by ethnicity also revealed no statistically significant differences.

There were no statistically significant correlations between variable CAI and any of the subject demographic variables. However, a moderate
negative correlation existed between a motivational variable and CAI. The moderate negative correlation between MAT5 (Fear) and CAI (Overall Evaluation of Computer-Assisted Instruction) indicates that subjects with lower Fear scores as measured by the Motivation Analysis Test are more likely to have an overall higher CAI score.

Noteworthy is that the Fear motivational variable also had a negative moderate correlation with four other computer-assisted instruction variables which included agreement with statements that CAI helped the subject understand course information, made the class more interesting, provided knowledge for use in other courses, and elicited more positive feelings about school in general.

The findings specific to the Fear variable were unexpected and cannot be corroborated with other research because no studies specific to this variable and its relationship to CAI exist. Computer phobia may be a differential variable which was not taken into account in this study and may account for the findings regarding the fear variable.

However, another explanation for this provocative finding is that the subject's home environment probably has been instrumental in influencing one's realistic precautions for safety. Subjects coming from a turbulent home and/or community environment may have higher fear scores resulting in anxiety which may interfere with academic-related activities. In contrast, those subjects who have lower fear scores may come from more secure
environments, experience less anxiety and fear in general, and feel more positive in general about new experiences such as computer-assisted instruction.

There was no statistically significant correlation between variable CAI and locus of control as measured by the Nowicki-Strickland Scale score.

A multiple regression equation was generated which explains subjects' variance in evaluation of CAI. In this study, the four significant predictors of the subject's Overall Evaluation of the Computer-Assisted Instruction were agreement with statements that the subject enjoyed using the computer, felt motivated toward the course as a result of using computer technology, felt positive about CAI for teaching and learning), and Superego score as measured by the Motivation Analysis Test. These predictor variables could account for 89% of the variation in Overall Evaluation of the Computer-Assisted Instruction. The regression findings are not surprising because CAI did not correlate with demographic variables but rather correlated with motivational variables. To summarize, subjects who were satisfied overall with the CAI experience cannot be characterized simply by demographic variables.

Rather than demographic data, motivational characteristics as measured by the Motivation Analysis Test and responses of agreement to statements of the Student Evaluation Instrument of Computer-Assisted Instruction provide more definitive information regarding subject
characteristics. In this study, identified characteristics are scoring lower on the fear subscore of the MAT and providing agreement responses to the statement of enjoyed using computer as well as the statement of feeling motivated toward the course as a result of using computers.

Research Question #2: Does computer-assisted instruction have significantly different motivational benefits for those students whose interest is not already captured by traditional classroom methods?

Because the sample was comprised of academically-at-risk students, one may assume that the subjects' interest in school probably has not been captured by traditional classroom methods. Responses to items of the Student Evaluation Instrument of Computer-Assisted Instruction provide some indication that computer-assisted instruction does have some, although moderate, benefits as measured by agree/strongly agree responses. Forty-five percent of questions on the Student Evaluation Instrument of Computer-Assisted Instruction resulted in a mean score indicating a response of agree/strongly agree. The instrument items in which subjects were in agreement indicated that they believed CAI helped them to better understand the information in the course, the computer technology was easy to use, and it provided knowledge which can be used in other courses.

The remaining statements resulting in mean scores indicating agreement included subjects feeling positive about using computer technology exercises for teaching and learning, liking the fact that computer
technology exercises were an individualized alternative to learning, and believing that knowledge of the course materials was increased by the computer technology exercises.

Correlational analysis indicated that only a very few dimensions of computer-assisted instruction had statistically significant relationships with subject variables. Noteworthy is that the strengths of the statistically significant relationships were all low, and two of the correlations were negative.

Younger subjects were more likely to disagree with the statement that CAI decreased their learning time, and the amount of time spent in the computer lab correlated negatively with subject agreement regarding the statement that CAI helped them to understand the class lecture/discussion. Thus, the negative correlations may indicate that some aspects of CAI has demotivating characteristics: learning time is increased and doesn’t necessarily enhance one’s understanding of the classroom lecture later.

On the other hand, older subjects are more likely to agree with the statement that they felt positive about CAI for teaching and learning. Because of the low correlations, only very limited interpretation is in order.

To adequately address research question #2, an experimental design study with a larger subject pool could provide more definitive answers regarding motivational benefits derived. In this study, no control group existed and thus there is no basis of comparison.
To summarize, there were some benefits as measured by agreement responses to items of the Student Evaluation Instrument of Computer-Assisted Instruction yet it cannot be determined whether the nature of the benefits was actually motivational.

Research Question #3: Does the use of computer-assisted instruction have an effect on developing positive attitudes toward school in general?

The intent of item CAI20 of the Student Evaluation Instrument of Computer-Assisted Instruction was to directly address this question. A review of the descriptive analysis of the data reveals the mean score indicates a response of "uncertain" to the statement, "I feel more positive about school in general as a result of using the computer technology." An analysis of the frequency distribution of responses indicates that 38% of subjects provided a response of "uncertain" to CAI20. However, 33.3% of subjects agreed with the statement of feeling more positive about school in general as a result of CAI. Only 4.8% strongly agreed with the statement. Thus, 38.1% of the subjects indicated that they agreed or strongly agreed that they feel more positive about school in general as a result of using computer-assisted instruction while 38% were uncertain. Responses of strongly disagree or disagree were received by 23.8% of subjects.

There were no discernible differences between male and female subjects in their responses to CAI20 (Males M = 5.36, SD = 1.80, Females M = 5.77 SD = 1.87). A chi-square analysis by gender revealed no
statistically significant differences for CAI20. A chi-square analysis by ethnicity also revealed no statistically significant differences.

A multiple regression equation was generated which explains subjects' variance in evaluation of CAI20. For the multiple regression analysis, there were only two statistically significant predictors: locus of control score as measured by the Nowicki-Strickland scale and response to CAI6, "The computer technology exercises held my interest." These two variables accounted for 69% of the variation in the subjects' responses to CAI20. The findings predict that the higher one's locus of control and stronger one's agreement that CAI held his interest, the more likely the possibility that the subject will feel more positive about school in general as a result of using CAI. This finding has ramifications for designing research studies to examine any long term effects that CAI may have on enhancing at-risk students' feelings about school throughout their college experience. The transfer of positive feelings from the CAI experience to academic studies in general definitely seems to hold promise for future research.

Locus of control score in this study is a predictor variable in determining which subjects are likely to agree that computer-assisted instruction has an effect of developing positive attitudes toward school in general. A subject with a higher locus of control score which means someone with a more external orientation will probably experience more positive attitudes toward school following the CAI. Computer-assisted
instruction provides consistent external feedback about performance which may account for the higher rating of CAI by subjects with an external locus of control.

To summarize, only 38.1% of subjects agreed that computer-assisted instruction has an effect of developing positive attitudes toward school in general.

Research Question #4: What is the relationship between a student’s locus of control and overall rating of the CAI experience?

Variable CAI provides the measure of overall rating of the CAI experience. Analysis of correlational statistics presents data to address the question. There was no statistically significant correlation between locus of control variable as measured by the Nowicki-Strickland Scale score and CAI variable which measures overall evaluation of the computer-assisted instruction experience.

A review of the multiple regression equation to predict CAI also reveals that locus of control was not a significant predictor of subjects’ overall rating of the computer-assisted instruction experience. Additionally, a review of the multiple regression equation to predict locus of control reveals that CAI was not a significant predictor variable.

Thus, no relationship exists between a subject’s locus of control as measured by the Nowicki-Strickland Scale score and overall rating of the CAI experience as measured by the Student Evaluation Instrument of
Computer-Assisted Instruction.

This finding is surprising in light of the fact that locus of control was a predictor variable for subjects who feel more positive about school in general as a result of using CAI. In this study, the lack of relationship between locus of control and overall evaluation of CAI may be partially due to the procedure for calculating the overall CAI evaluation score. A more precise measurement of overall CAI evaluation may have provided different results. Path analysis also provided a plausible explanation. There is a causal link between locus of control and CAI; in turn, CAI has a causal relationship with one's overall evaluation of the computer-assisted instruction experience (i.e., variable CAI). Thus, locus of control has an indirect effect rather than a direct effect on CAI.

An additional interpretation is that even though subjects feel more positive about school in general after the CAI experience, the overall CAI experience was not satisfying. In other words, the outcome was effective but the process itself left something to be desired.

Summary of Important Findings

1. Demographic and academic-related variables are not related to overall evaluation of computer-assisted instruction.

2. Enjoying use of the computer, feeling motivated toward the course as a result of computer use, feeling positive about CAI for teaching and learning, and superego subscores are predictor characteristics of
learners who were satisfied with the computer-assisted instruction experience.

3. Motivational benefits of computer-assisted instruction are enhanced understanding of course information and course materials, acquisition of knowledge which can be used in other courses, having an individualized alternative to learning, and ease of use of the technology.

4. Only 38% of subjects feel more positive about school in general as a result of using computer-assisted instruction.

5. Presence of a higher external locus of control score and agreement that CAI holds one's interest are predictors of feeling more positive about school in general as a result of using computer-assisted instruction.

Overall, the findings seem to support research from other studies focusing on CAI and academic achievement in that identified benefits of CAI are negligible to modest at best. The results of this study do not provide strong support for the assumption that computer technology has motivational benefits for academically-at-risk college students. Correlations between independent variables and dependent measures of CAI were generally low, and examination of overall satisfaction with CAI indicates that only a minority of the sample was satisfied with the CAI experience.

This study has some important limitations that affect its
generalizability of the findings. First, data from the study was based upon a small sample size. The sample size also consisted of academically-at-risk subjects who are not representative of college students across all academic ability levels. Moreover, males were under represented in the study.

Another limitation is that instruments were administered near the very end of the semester at a time when students may not be feeling positive about school in general because of pending final examinations.

Limitations regarding the instruments also must be taken into consideration. Although the Motivation Analysis Test provided an assessment of motivation, it appears to have limited predictive value as a measure of educational motivation.

Integration with Past Literature

This study tends to confirm Lens (1994) theory that positive effects of CAI on student’s motivation to learn largely depends on the degree to which learning is individualized. Nearly one half of the subjects agreed or strongly agreed that they liked the fact that CAI was an individualized alternative to learning.

Natasi and Clements (1994) compared academic achievement results of undergraduate psychology students taught through the use of traditional methods and taught through the use of CAI. Independent variables of race, age, and gender were investigated along with teaching method. Only the relationship between age and achievement was found to be statistically
significant. Age was also the only demographic variable in the present study which was found to be statistically significant in the overall evaluation of the CAI experience.

In another study of primary grade students, Natasi and Clements (1994) postulate that certain CAI environments may engender an enhanced sense of self-direction and mastery. This study tends to support that claim at least for subjects with an external locus of control. Subjects with an external locus of control are more likely to agree that CAI held their interests and also elicited more positive feelings about school in general. It may that a heightened sense of self-direction and mastery as a result of CAI contributed to their positive feelings about school overall.

A study of college students by Gallo (1986) hypothesized that an expectancy model of motivation may explain an individual’s tendency to approach or avoid computer learning situations. In the present study, fear as measured by the Motivation Analysis Test correlated negatively with several items of the Student Evaluation Instrument of Computer-Assisted Instruction and was one of the statistically significant predictors of the multiple regression equation for overall satisfaction with the CAI experience.

Although tendency to approach or avoid computers was not measured, the fear score may be a measurement of subjects’ tendencies regarding the CAI experience. Thus, this study tends to confirm Gallo’s claim that
technology designed to benefit individuals may be rejected by them unless they realize the actual outcomes which can be derived from the technology. Subjects with higher fear scores did not agree that CAI was helpful, interesting, provided knowledge for other courses, or contributed to positive feelings about school in general.

Another study defined motivation as the amount of time fourth-grade subjects participated in CAI exercises and measured the number of math problems completed correctly (Stegemann, 1986). This study corroborates the relationship between time and academic achievement. CAI course grade was moderately positively correlated with the amount of hours spent in the computer lab working on CAI exercises.

Researchers Kulik and Kulik (1986) meta-analyzed 101 studies that evaluated the effectiveness of CAI and reported that in all studies results showed that CAI contributed positively, though moderately, to academic achievement. This study offered evidence to confirm this statement. CAI course grade and the amount of hours spent in the CAI lab also correlated positively, though moderately. Additionally, the present study findings tend to support Kulik and Kulik's findings that computer-assisted instruction has small but positive effects on attitudes toward instruction.

In the literature, there are only few studies in college settings in which the Motivation Analysis Test was used to measure motivation. No studies were found which used the Motivation Analysis Test in conjunction with
evaluating computer-assisted instruction. Thus, no comparisons can be made with respect to the present study.

One study, however, provided comparison descriptive data of college students who completed the Motivation Analysis Test. Rump and Greet (1975) studied characteristics of 28 first year students at an Australian university who withdrew from the university during the first half of the semester. Descriptive statistics of only one Motivation Analysis Test subscore in the Rump and Greet study are similar to ones in the present study. Although there may be academic similarity in characteristics of academically at-risk subjects in this study and subjects who withdrew in the Australian study, this study does not confirm the findings of Rump and Greet.

The findings in this study tend to provide some evidence in support of Cattell's research (1973) which linked the importance of self-sentiment, superego, and pugnacity to high academic achievement. Data from the current study of at-risk subjects who in the past have not demonstrated high achievement shows lower than average mean scores for self-sentiment and superego.

Another study based upon Motivation Analysis Test scores from a sample of 70 adult college students enrolled in evening classes found pugnacity was the highest mean score (Dooley, 1968). Although not reported in the study, it seems that males comprised the largest percentage
of evening students during that era. In the present study, gender differences existed between males and females with pugnacity also being the highest mean score among males. However, the present study did not confirm the statistical significance of the mating score which was found in Dooley's study.

This study tended to refute the findings of one study focusing upon educational motivation of three groups of adult women (Mears, 1972). In Mear's study, all Motivation Analysis Test mean scores were higher except for pugnacity. The difference in the sample's age rather than the changing role of women since Mear's study may account for the differences.

The effects of seventh grade students' ability, locus of control, and instructional control on motivation and performance were investigated in one study (Klein, 1988). The present study does support Klein's regression analysis findings that the independent variables were not related to satisfaction with the computer experience. However, the present study does provide some data supporting locus of control as a predictor of feeling more positive about school in general.

**Recommendations**

The results reported here extend previous findings about the potential motivational aspects of computer-assisted instruction in higher education settings. However, the sample included in this study was restricted on demographic and academic-related characteristics. The findings are limited
to identified academically at-risk college age subjects. The applicability of the findings contained in this study need to be investigated with other populations within higher education.

Results suggest a need to include better measures of motivational processes in future research examining the relationship between CAI and motivation. The fear variable as measured by the Motivation Analysis Test in relation to CAI seems to need further clarification. Perhaps introducing students to CAI during their first semester in an unfamiliar environment when they are faced with a host of new experiences is ill advised.

With regard to the potential demotivating aspects of CAI, the findings suggest that the time requirements for CAI assignments be examined more carefully. Curiously, the results seem to indicate that the longer one spends in the computer lab, the lower the overall rating of CAI. If educators incorporate CAI assignments into course requirements in lieu of traditional homework, determination of appropriate time demands should be explored.

Studies of the voluntary option of CAI use for homework assignments or as extra credit assignments is one possible area where motivational characteristics may become more apparent. Another area of research which seems warranted is the interaction of cooperative learning coupled with CAI and its motivational benefits.

Some implications result from the Student Evaluation Instrument of Computer-Assisted Instruction. First, it should be modified further to
ascertain subjects' prior use of computers. This may assist in clarifying whether the fear scores in this study were indicative of computer phobia. Secondly, additional studies are required to provide more information regarding its test-retest reliability and convergent validity with other measure.

Additional questions which need yet to be addressed in the literature are which subject domains best lend themselves to CAI, which college age populations respond favorably to CAI, and how are the motivational benefits best measured.

Finally, additional research designs, most notably experimental designs, are warranted. Such designs may more clearly identify and clarify the motivational issues of computer-assisted instruction. Without well-documented research, the question remains whether computer technology yields appropriate educational and motivational benefits.
APPENDIX A

The information that you provide by responding to the following questions will be used to evaluate the use of computer technology exercises in this course.

Do not put your name on this questionnaire.

Directions: For each of the following, please circle a number along the line that most accurately reflects your opinion in response to each of the statements.

Your date of birth (use month–day–year format): ________________________________

1. I believe that doing the computer technology exercises helped me to better understand the information in this course.

   |   1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
   | Strongly Disagree | Disagree | Uncertain | Agree | Strongly Agree

2. I was more motivated toward this class as a result of being able to use the computer technology.

   |   1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
   | Strongly Disagree | Disagree | Uncertain | Agree | Strongly Agree

3. The computer technology used in this class was easy to use.

   |   1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
   | Strongly Disagree | Disagree | Uncertain | Agree | Strongly Agree

4. Use of the computer technology in this class made the class more interesting to me.

   |   1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
   | Strongly Disagree | Disagree | Uncertain | Agree | Strongly Agree

5. The computer technology decreased my learning time.

   |   1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
   | Strongly Disagree | Disagree | Uncertain | Agree | Strongly Agree

6. The computer technology exercises held my interest.

   |   1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
   | Strongly Disagree | Disagree | Uncertain | Agree | Strongly Agree
7. The computer technology exercises provided me with knowledge which I can use in other courses.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>Disagree</td>
<td>Uncertain</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8. Feedback from the computer after each response added to my understanding of the topic.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>Disagree</td>
<td>Uncertain</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9. I feel positive about using computer technology exercises for teaching and learning.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>Disagree</td>
<td>Uncertain</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10. It was helpful to have computer technology exercises as a course requirement.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>Disagree</td>
<td>Uncertain</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

11. I felt motivated to use the computer technology.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>Disagree</td>
<td>Uncertain</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

12. I enjoyed using the computer technology within this class this semester.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>Disagree</td>
<td>Uncertain</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

13. My experience with the computer technology was too impersonal.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>Disagree</td>
<td>Uncertain</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

14. I liked the fact that the computer technology exercises were an individualized alternative to learning.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>Disagree</td>
<td>Uncertain</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
15. My knowledge of the course materials was increased by the computer technology exercises.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Strongly</td>
<td></td>
<td>Strongly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disagree</td>
<td></td>
<td>Agree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

16. The computer technology exercises helped my performance in this course.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Strongly</td>
<td></td>
<td>Strongly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disagree</td>
<td></td>
<td>Agree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

17. The amount of time required to do the computer exercises was appropriate.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Strongly</td>
<td></td>
<td>Strongly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disagree</td>
<td></td>
<td>Agree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

18. The computer exercises helped me understand the material from class lectures or discussion.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Strongly</td>
<td></td>
<td>Strongly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disagree</td>
<td></td>
<td>Agree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

19. I would like to use computer technology exercises in other courses if it were available.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Strongly</td>
<td></td>
<td>Strongly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disagree</td>
<td></td>
<td>Agree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

20. I feel more positive about school in general as a result of using the computer technology.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Strongly</td>
<td></td>
<td>Strongly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disagree</td>
<td></td>
<td>Agree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX B

INTERCORRELATIONS AMONG INDEPENDENT VARIABLES

<table>
<thead>
<tr>
<th>Variables</th>
<th>AGE</th>
<th>HS</th>
<th>RANK</th>
<th>ACT</th>
<th>CGPA</th>
<th>OGPA</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HS</td>
<td>-.1477</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RANK</td>
<td>.2351</td>
<td>-.7669**</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACT</td>
<td>-.4619*</td>
<td>.5483**</td>
<td>-.3710</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CGPA</td>
<td>-.0613</td>
<td>.4997**</td>
<td>-.3789</td>
<td>.3489</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OGPA</td>
<td>-.0366</td>
<td>.5651**</td>
<td>-.4404*</td>
<td>.3492</td>
<td>.8278**</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>TIME</td>
<td>.0323</td>
<td>.3668*</td>
<td>-.4283</td>
<td>.0656</td>
<td>.4084**</td>
<td>.5418**</td>
<td>---</td>
</tr>
</tbody>
</table>

Note: AGE = Subject Age; HS = High School Gradepoint Average; RANK = % Below in Class Rank; ACT = American College Test Score; CGPA = CAI Course Grade; OGPA = College Cumulative Gradepoint Average; TIME = Number of Hourse Spent Using Computer—Assisted Instruction Lab

* p < .05  ** p < .01
APPENDIX C

CORRELATIONS BETWEEN INDEPENDENT VARIABLES AND DEPENDENT MEASURES

<table>
<thead>
<tr>
<th>Variables</th>
<th>LOCUS</th>
<th>MAT1</th>
<th>MAT4</th>
<th>MAT5</th>
<th>MAT6</th>
<th>MAT7</th>
<th>MAT8</th>
<th>MAT9</th>
<th>MAT10</th>
<th>MAT11</th>
<th>MAT12</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE</td>
<td>0.0301</td>
<td>-0.0303</td>
<td>0.2374</td>
<td>0.1143</td>
<td>-0.3615*</td>
<td>0.0738</td>
<td>0.2394</td>
<td>-0.2677</td>
<td>-0.3598*</td>
<td>-0.2662</td>
<td>0.3006</td>
</tr>
<tr>
<td>HS</td>
<td>0.0327</td>
<td>-0.2272</td>
<td>-0.4622*</td>
<td>0.3554</td>
<td>0.0893</td>
<td>-0.2891</td>
<td>-0.0920</td>
<td>-0.0006</td>
<td>-0.0425</td>
<td>0.0183</td>
<td>-0.2217</td>
</tr>
<tr>
<td>RANK</td>
<td>-0.0923</td>
<td>0.2739</td>
<td>0.3080</td>
<td>-0.1630</td>
<td>0.0939</td>
<td>0.1987</td>
<td>0.0835</td>
<td>0.0962</td>
<td>-0.0793</td>
<td>0.0766</td>
<td>0.2603</td>
</tr>
<tr>
<td>ACT</td>
<td>-0.1785</td>
<td>0.3517</td>
<td>0.2912</td>
<td>0.1977</td>
<td>0.3831</td>
<td>-0.3798</td>
<td>-0.1784</td>
<td>0.3417</td>
<td>0.4504*</td>
<td>0.1714</td>
<td>0.2729</td>
</tr>
<tr>
<td>CGPA</td>
<td>-0.0691</td>
<td>0.2068</td>
<td>-0.219</td>
<td>-0.0286</td>
<td>0.3073</td>
<td>-0.2952</td>
<td>0.1449</td>
<td>0.2232</td>
<td>-0.0423</td>
<td>0.3725*</td>
<td>0.1263</td>
</tr>
<tr>
<td>OGPA</td>
<td>0.1591</td>
<td>0.1221</td>
<td>0.0427</td>
<td>0.0301</td>
<td>0.1081</td>
<td>-0.2055</td>
<td>0.0976</td>
<td>0.1791</td>
<td>-0.1740</td>
<td>0.2517</td>
<td>0.1743</td>
</tr>
<tr>
<td>TIME</td>
<td>0.1760</td>
<td>-0.0398</td>
<td>0.0875</td>
<td>0.0701</td>
<td>-0.1775</td>
<td>0.1367</td>
<td>0.1606</td>
<td>-0.1176</td>
<td>-0.2210</td>
<td>-0.0937</td>
<td>-0.1636</td>
</tr>
</tbody>
</table>

Note: AGE = Subject Age; HS = High School Gradepoint Average; RANK = % Below in Class Rank; ACT = American College Test Score; CGPA = CAI Course Grade; OGPA = College Cumulative Gradepoint Average; TIME = Number of Hours Spent Using Computer-Assisted Instruction Lab; MAT1 = General Information Intelligence; MAT2 = Total Personal Interest; MAT3 = Career; MAT4 = Home/Parental; MAT5 = Fear; MAT6 = Narcism/Comfort; MAT7 = Superego; MAT8 = Self-Sentiment; MAT9 = Mating; MAT10 = Pugnacity; MAT11 = Assertiveness; MAT12 = Sweetheart/Spouse

* p < .05  ** p < .01
### CORRELATIONS BETWEEN INDEPENDENT VARIABLES AND DEPENDENT MEASURES

<table>
<thead>
<tr>
<th>Variables</th>
<th>CAI1</th>
<th>CAI2</th>
<th>CAI3</th>
<th>CAI4</th>
<th>CAI5</th>
<th>CAI6</th>
<th>CAI7</th>
<th>CAI8</th>
<th>CAI9</th>
<th>CAI10</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE</td>
<td>.0771</td>
<td>.1035</td>
<td>.0379</td>
<td>.1821</td>
<td>-.3378*</td>
<td>.2062</td>
<td>-.0460</td>
<td>.1620</td>
<td>.3213*</td>
<td>.0144</td>
</tr>
<tr>
<td>HS</td>
<td>-.2981</td>
<td>.1231</td>
<td>.0921</td>
<td>-.0488</td>
<td>-.0722</td>
<td>-.0592</td>
<td>-.0417</td>
<td>.0813</td>
<td>.0539</td>
<td>-.1239</td>
</tr>
<tr>
<td>RANK</td>
<td>.2723</td>
<td>-.2266</td>
<td>-.2734</td>
<td>.1091</td>
<td>-.0214</td>
<td>.0348</td>
<td>.0332</td>
<td>.0054</td>
<td>-.1069</td>
<td>.0925</td>
</tr>
<tr>
<td>ACT</td>
<td>-.3273</td>
<td>-.2544</td>
<td>.0452</td>
<td>-.0293</td>
<td>-.0746</td>
<td>.2400</td>
<td>.0543</td>
<td>.0506</td>
<td>-.0163</td>
<td>-.0720</td>
</tr>
<tr>
<td>CGPA</td>
<td>-.0853</td>
<td>.2677</td>
<td>.4344**</td>
<td>-.0128</td>
<td>.0779</td>
<td>.0728</td>
<td>.1671</td>
<td>.1315</td>
<td>.4640**</td>
<td>.1376</td>
</tr>
<tr>
<td>OGPA</td>
<td>-.1380</td>
<td>.2424</td>
<td>.3373*</td>
<td>-.0271</td>
<td>.0435</td>
<td>-.0092</td>
<td>.1573</td>
<td>.1261</td>
<td>.3377*</td>
<td>.0882</td>
</tr>
<tr>
<td>TIME</td>
<td>-.2311</td>
<td>.2718</td>
<td>.4015**</td>
<td>-.1244</td>
<td>.1431</td>
<td>-.1305</td>
<td>-.0285</td>
<td>-.0832</td>
<td>.0665</td>
<td>-.0408</td>
</tr>
</tbody>
</table>

Note: AGE = Subject Age; HS = High School Gradepoint Average; RANK = % Below in Class Rank; ACT = American College Test Score; CGPA = CAI Course Grade; OGPA = College Cumulative Gradepoint Average; TIME = Number of Hours Spent Using Computer-Assisted Instruction Lab; CAI1 = Helped Understand Course Info; CAI2 = Motivated Toward Course Due to Computer; CAI3 = CAI Easy to Use; CAI4 = Made Class Interesting; CAI5 = Decreased My Learning Time; CAI6 = Held My Interest; CAI7 = Provided Knowledge for Use in Other Courses; CAI8 = Feedback Added to Understanding of Topic; CAI9 = Feel Positive About CAI for Teaching/Learning; CAI10 = Helpful to Have as Course Requirement

* p < .05  ** p < .01
### CORRELATIONS BETWEEN INDEPENDENT VARIABLES AND DEPENDENT MEASURES

<table>
<thead>
<tr>
<th>Variables</th>
<th>CAI11</th>
<th>CAI12</th>
<th>CAI13</th>
<th>CAI14</th>
<th>CAI15</th>
<th>CAI16</th>
<th>CAI17</th>
<th>CAI18</th>
<th>CAI19</th>
<th>CAI20</th>
<th>CAI</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE</td>
<td>.1145</td>
<td>.2314</td>
<td>.0554</td>
<td>.0618</td>
<td>.1784</td>
<td>.0987</td>
<td>.0924</td>
<td>.2183</td>
<td>.1866</td>
<td>.2665</td>
<td>.2099</td>
</tr>
<tr>
<td>HS</td>
<td>.0902</td>
<td>.0241</td>
<td>-.4983*</td>
<td>-.0366</td>
<td>-.0408</td>
<td>-.1906</td>
<td>.1203</td>
<td>-.2737</td>
<td>.1037</td>
<td>.1633</td>
<td>-.0027</td>
</tr>
<tr>
<td>RANK</td>
<td>-.1211</td>
<td>.0731</td>
<td>.3161</td>
<td>.0437</td>
<td>.1357</td>
<td>.2437</td>
<td>-.2331</td>
<td>.3985</td>
<td>.0138</td>
<td>-.3277</td>
<td>-.0102</td>
</tr>
<tr>
<td>ACT</td>
<td>-.2216</td>
<td>-.2378</td>
<td>-.0530</td>
<td>-.0977</td>
<td>-.0710</td>
<td>-.1698</td>
<td>.1144</td>
<td>-.1244</td>
<td>.0680</td>
<td>-.1795</td>
<td>-.1377</td>
</tr>
<tr>
<td>CGPA</td>
<td>.1646</td>
<td>.1675</td>
<td>-.1179</td>
<td>.2527</td>
<td>.1403</td>
<td>-.0256</td>
<td>.0344</td>
<td>-.0990</td>
<td>.1844</td>
<td>.1069</td>
<td>.1916</td>
</tr>
<tr>
<td>OGPA</td>
<td>.2659</td>
<td>.1941</td>
<td>-.1317</td>
<td>.1644</td>
<td>.1802</td>
<td>-.0777</td>
<td>-.0203</td>
<td>-.1432</td>
<td>.2749</td>
<td>.2026</td>
<td>.1624</td>
</tr>
<tr>
<td>TIME</td>
<td>.1445</td>
<td>.0420</td>
<td>-.2773</td>
<td>-.1034</td>
<td>-.1441</td>
<td>-.2410</td>
<td>-.2253</td>
<td>-.3453*</td>
<td>.0660</td>
<td>-.0273</td>
<td>-.0747</td>
</tr>
</tbody>
</table>

Note: AGE = Subject Age; HS = High School Gradepoint Average; RANK = % Below in Class Rank; ACT = American College Test Score; CGPA = CAI Course Grade; OGPA = College Cumulative Gradepoint Average; TIME = Number of Hours Spent Using Computer-Assisted Instruction Lab; CAI11 = Felt Motivated to Use Computer; CAI12 = Enjoyed Using Computer; CAI13 = Experience with Computers Too Impersonal; CAI14 = Liked It Was Individualized Alternative; CAI15 = Course Materials Knowledge Increased; CAI16 = Helped My Performance in Course; CAI17 = Amt of Required Time Appropriate; CAI18 = Helped Understand Class Lecture/Discussion; CAI19 = Would Like to Use CAI in Other Courses; CAI20 = Feel More Positive About School in General; CAI = CAI Overall Evaluation

* p < .05  ** p < .01
APPENDIX D

CORRELATIONS BETWEEN MOTIVATION ANALYSIS TEST INTEGRATED SUBSCORES AND SUMMARY SCORES

<table>
<thead>
<tr>
<th>Variables</th>
<th>MAT1</th>
<th>MAT2</th>
<th>MAT3</th>
<th>MAT4</th>
<th>MAT5</th>
<th>MAT6</th>
<th>MAT7</th>
<th>MAT8</th>
<th>MAT9</th>
<th>MAT10</th>
<th>MAT11</th>
<th>MAT12</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Summary Scores are MAT1 and MAT2; MAT1 = General Information Intelligence; MAT2 = Total Personal Interest; Integrated Subscores MAT3 = Career; MAT4 = Home/Parental; MAT5 = Fear; MAT6 = Narcism/Comfort; MAT7 = Superego; MAT8 = Self-Sentiment; MAT9 = Mating; MAT10 = Pugnacity; MAT11 = Assertiveness; MAT12 = Sweetheart/Spouse

* p < .05  ** p < .01
### Appendix E

**Correlations Between Motivation Analysis Test Scores and Student Evaluation of Computer-Assisted Instruction Scores**

<table>
<thead>
<tr>
<th>Variables</th>
<th>CAI1</th>
<th>CAI2</th>
<th>CAI3</th>
<th>CAI4</th>
<th>CAI5</th>
<th>CAI6</th>
<th>CAI7</th>
<th>CAI8</th>
<th>CAI9</th>
<th>CAI10</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT1</td>
<td>-.1566</td>
<td>-.2699</td>
<td>-.0087</td>
<td>-.1924</td>
<td>-.1816</td>
<td>-.0049</td>
<td>-.0891</td>
<td>.2065</td>
<td>-.0515</td>
<td>-.0479</td>
</tr>
<tr>
<td>MAT2</td>
<td>-.0186</td>
<td>-.2411</td>
<td>.0921</td>
<td>-.0239</td>
<td>-.0998</td>
<td>-.0676</td>
<td>.0749</td>
<td>.3024</td>
<td>-.0290</td>
<td>.0901</td>
</tr>
<tr>
<td>MAT3</td>
<td>.0789</td>
<td>-.3175</td>
<td>.0355</td>
<td>-.1329</td>
<td>.1014</td>
<td>.0012</td>
<td>-.0629</td>
<td>.1172</td>
<td>-.3461*</td>
<td>-.0727</td>
</tr>
<tr>
<td>MAT4</td>
<td>.3678*</td>
<td>.1151</td>
<td>.2360</td>
<td>.3081</td>
<td>.0248</td>
<td>.1549</td>
<td>.2677</td>
<td>.0999</td>
<td>.1592</td>
<td>.3484*</td>
</tr>
<tr>
<td>MAT5</td>
<td>-.5105**</td>
<td>-.1084</td>
<td>-.3014</td>
<td>-.5092**</td>
<td>-.1365</td>
<td>-.3946*</td>
<td>-.4562**</td>
<td>-.1207</td>
<td>-.2410</td>
<td>-.5392**</td>
</tr>
<tr>
<td>MAT6</td>
<td>.0021</td>
<td>-.1419</td>
<td>-.0895</td>
<td>.0281</td>
<td>.3517*</td>
<td>-.0238</td>
<td>.2630</td>
<td>.0530</td>
<td>.0975</td>
<td>-.0959</td>
</tr>
<tr>
<td>MAT7</td>
<td>.0539</td>
<td>-.0333</td>
<td>.0106</td>
<td>-.0113</td>
<td>.1316</td>
<td>.1167</td>
<td>-.0947</td>
<td>.0008</td>
<td>-.2190</td>
<td>.1502</td>
</tr>
<tr>
<td>MAT8</td>
<td>.0830</td>
<td>-.0145</td>
<td>-.0684</td>
<td>.1269</td>
<td>-.2401</td>
<td>.2247</td>
<td>-.0964</td>
<td>.1115</td>
<td>.0665</td>
<td>.0547</td>
</tr>
<tr>
<td>MAT9</td>
<td>.0495</td>
<td>.0941</td>
<td>-.0297</td>
<td>.1192</td>
<td>-.2622</td>
<td>-.0540</td>
<td>.1445</td>
<td>.2865</td>
<td>.3363</td>
<td>.2774</td>
</tr>
<tr>
<td>MAT10</td>
<td>-.1528</td>
<td>-.0691</td>
<td>-.0454</td>
<td>-.1392</td>
<td>.1513</td>
<td>-.1771</td>
<td>.1964</td>
<td>-.0665</td>
<td>-.0346</td>
<td>-.0061</td>
</tr>
<tr>
<td>MAT11</td>
<td>.0341</td>
<td>.0192</td>
<td>.1028</td>
<td>.0984</td>
<td>.0016</td>
<td>.0566</td>
<td>-.0241</td>
<td>.1379</td>
<td>.0544</td>
<td>.1819</td>
</tr>
<tr>
<td>MAT12</td>
<td>.0788</td>
<td>.2174</td>
<td>.0726</td>
<td>-.3132</td>
<td>.0328</td>
<td>.0454</td>
<td>.1934</td>
<td>.2591</td>
<td>.0804</td>
<td>.0053</td>
</tr>
</tbody>
</table>

Note: MAT1 = General Information Intelligence; MAT2 = Total Personal Interest; MAT3 = Career; MAT4 = Home/Parental; MAT5 = Fear; MAT6 = Narcism/Comfort; MAT7 = Superego; MAT8 = Self-Sentiment; MAT9 = Mating; MAT10 = Pugnacity; MAT11 = Assertiveness; MAT12 = Sweetheart/Spouse; CAI1 = Helped Understand Course Info; CAI2 = Motivated Toward Course Due to Computer; CAI3 = CAI Easy to Use; CAI4 = Made Class Interesting; CAI5 = Decreased My Learning Time; CAI6 = Held My Interest; CAI7 = Provided Knowledge for Use in Other Courses; CAI8 = Feedback Added to Understanding of Topic; CAI9 = Feel Positive About CAI for Teaching/Learning; CAI10 = Helpful to Have as Course Requirement

* p < .05  ** p < .01
CORRELATIONS BETWEEN MOTIVATION ANALYSIS TEST SCORES AND STUDENT EVALUATION OF COMPUTER-ASSISTED INSTRUCTION SCORES

<table>
<thead>
<tr>
<th>Variables</th>
<th>CAI11</th>
<th>CAI12</th>
<th>CAI13</th>
<th>CAI14</th>
<th>CAI15</th>
<th>CAI16</th>
<th>CAI17</th>
<th>CAI18</th>
<th>CAI19</th>
<th>CAI20</th>
<th>CAI</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT1</td>
<td>-.2855</td>
<td>-.3017</td>
<td>-.0599</td>
<td>-.1868</td>
<td>.1316</td>
<td>.0035</td>
<td>-.2232</td>
<td>-.1709</td>
<td>-.0327</td>
<td>-.1266</td>
<td>-.1717</td>
</tr>
<tr>
<td>MAT2</td>
<td>-.1875</td>
<td>-.2117</td>
<td>.0035</td>
<td>-.1263</td>
<td>.2808</td>
<td>.0637</td>
<td>-.0262</td>
<td>-.0019</td>
<td>-.0204</td>
<td>-.0535</td>
<td>-.0392</td>
</tr>
<tr>
<td>MAT3</td>
<td>-.0047</td>
<td>-.1932</td>
<td>-.0716</td>
<td>-.4460</td>
<td>-.1173</td>
<td>.0438</td>
<td>-.1575</td>
<td>-.1220</td>
<td>.2396</td>
<td>-.1331</td>
<td>-.1986</td>
</tr>
<tr>
<td>MAT4</td>
<td>.2355</td>
<td>.2742</td>
<td>.1449</td>
<td>.1711</td>
<td>.1199</td>
<td>.0886</td>
<td>-.0856</td>
<td>.1407</td>
<td>.1208</td>
<td>.4498**</td>
<td>.2916</td>
</tr>
<tr>
<td>MAT5</td>
<td>-.4733</td>
<td>-.4688</td>
<td>-.0071</td>
<td>-.4021</td>
<td>-.1981</td>
<td>-.3985</td>
<td>.0610</td>
<td>-.3188</td>
<td>-.2083</td>
<td>-.5198**</td>
<td>-.5049**</td>
</tr>
<tr>
<td>MAT6</td>
<td>-.2892</td>
<td>-.1957</td>
<td>-.0222</td>
<td>.0356</td>
<td>.0449</td>
<td>.0578</td>
<td>-.1376</td>
<td>.0467</td>
<td>.0817</td>
<td>-.1621</td>
<td>-.0585</td>
</tr>
<tr>
<td>MAT7</td>
<td>.1912</td>
<td>.1686</td>
<td>.1351</td>
<td>-.1522</td>
<td>-.0731</td>
<td>.0329</td>
<td>-.1578</td>
<td>-.0275</td>
<td>.0284</td>
<td>.0938</td>
<td>-.0127</td>
</tr>
<tr>
<td>MAT8</td>
<td>-.1564</td>
<td>-.0214</td>
<td>-.0204</td>
<td>.0945</td>
<td>.2260</td>
<td>.1554</td>
<td>-.0418</td>
<td>.1137</td>
<td>.1680</td>
<td>.1277</td>
<td>.1220</td>
</tr>
<tr>
<td>MAT9</td>
<td>.0934</td>
<td>.2007</td>
<td>.0136</td>
<td>.2671</td>
<td>.3385</td>
<td>.0218</td>
<td>.1661</td>
<td>.1318</td>
<td>.2145</td>
<td>.1609</td>
<td>.2477</td>
</tr>
<tr>
<td>MAT10</td>
<td>-.1536</td>
<td>-.2800</td>
<td>.0880</td>
<td>.0092</td>
<td>.0551</td>
<td>-.0121</td>
<td>.0459</td>
<td>-.0519</td>
<td>-.1868</td>
<td>-.1518</td>
<td>-.1261</td>
</tr>
<tr>
<td>MAT11</td>
<td>-.0059</td>
<td>.0571</td>
<td>.0107</td>
<td>.1934</td>
<td>.2836</td>
<td>.1409</td>
<td>.2557</td>
<td>.1897</td>
<td>.0106</td>
<td>.1189</td>
<td>.1314</td>
</tr>
<tr>
<td>MAT12</td>
<td>.2469</td>
<td>-.0631</td>
<td>.3246</td>
<td>-.0693</td>
<td>.1509</td>
<td>.3067</td>
<td>.0216</td>
<td>.1729</td>
<td>.0737</td>
<td>-.0795</td>
<td>-.0101</td>
</tr>
</tbody>
</table>

Note: MAT1 = General Information Intelligence; MAT2 = Total Personal Interest; MAT3 = Career; MAT4 = Home/Parental; MAT5 = Fear; MAT6 = Narcism/Comfort; MAT7 = Superego; MAT8 = Self-Sentiment; MAT9 = Mating; MAT10 = Pugnacity; MAT11 = Assertiveness; MAT12 = Sweetheart/Spouse; CAI1 = Felt Motivated to Use Computer; CAI12 = Enjoyed Using Computer; CAI13 = Experience with Computers Too Impersonal; CAI14 = Liked It Was Individualized Alternative; CAI15 = Course Materials Knowledge Increased; CAI16 = Helped My Performance in Course; CAI17 = Amount of Time Required Appropriate; CAI18 = Helped Understand Class Lecture/Discussion; CAI19 = Would Like to Use CAI in Other Courses; CAI20 = Feel More Positive About School in General

* p < .05 ** p < .01
REFERENCES


ETS Test Collection. Nowicki-Strickland Locus of Control Scale, Educational Testing Service, Princeton, NJ.


Maureen A. Culleeney is a full-time faculty member in the College of Business at Lewis University in Romeoville teaching business administration courses. She earned her B.S.W degree in social work and Ed.M. degree in human resource training and development from the University of Illinois, Urbana, and her M.B.A. degree from DePaul University, Chicago.

She has authored two computer software books published by Prentice-Hall, Inc. and co-authored another computer book which is also published by Prentice-Hall.
The dissertation submitted by Maureen Culleeney has been read and approved by the following committee:

Todd J. Hoover, Ph.D., Director
Associate Professor, Curriculum, Instruction, and Educational Psychology
Loyola University Chicago

Jack Kavanagh, Ph.D.
Professor, Counseling Psychology
Loyola University Chicago

Ronald M. Morgan, Ph.D.
Associate Professor, Curriculum, Instruction, and Educational Psychology
Loyola University Chicago

The final copies have been examined by the director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the dissertation is now given final approval by the committee with reference to content and form.

The dissertation is, therefore, accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

April 3, 1996
Date
Todd Hoover
Director's Signature