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THE EFFECTS OF COMPUTER REVIEW ASSISTANCE MODULES (CRAM) ON STUDENT ACHIEVEMENT IN UNITED STATES HISTORY

The University of Nebraska - Lincoln   PH.D.   1985

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THE EFFECTS OF COMPUTER REVIEW ASSISTANCE MODULES

(CRAM) ON STUDENT ACHIEVEMENT

IN UNITED STATES HISTORY

by

Mark W. Feldhausen

A DISSERTATION

Presented to the Faculty of

The Graduate College in the University of Nebraska

In Partial Fulfillment of Requirements

For the Degree Doctor of Philosophy

Major: Interdepartmental Area of

Administration, Curriculum, and Instruction

Under the Supervision of

Professors Clarice Ramsey and Lee Witters

Lincoln, Nebraska

December, 1985

TITLE

The Effects of Computer Review Assistance Modules

(CRAM) on Student Achievement in United States History

BY

Mark W. Feldhausen

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THE EFFECTS OF COMPUTER REVIEW ASSISTANCE MODULES

(CRAM) ON STUDENT ACHIEVEMENT

IN UNITED STATES HISTORY

Mark W. Feldhausen, Ph.D.

University of Nebraska, 1985

Advisers: Clarice Ramsey and Lee Witters

This study investigated the effectiveness of Computer Review Assitance Modules (CRAM) on student achievement in United States history in secondary schools. Computer Review Assistance Modules are examples of adjunct computer assisted instruction (CAI) programs written for use on microcomputers. The researcher designed the modules with a pascal based authoring system--Apple SuperPilot to provide students with an additional, supplemental method of study for unit exams.

The review of the literature included an analysis of the current status of microcomputers in education with special emphasis upon their use in social studies education. The work of behaviorist and cognitive psychologists in reference to CAI was examined. Finally, a review of the effectiveness of CAI through the use of box-score analyses and meta-analyses was conducted.

The purpose of the study was to determine the effectiveness of CRAM. Ten intact classrooms of secondary

United States history students were randomly assigned to control and treatment groups. The treatment group (N=103) used CRAM in preparation for the final unit exam. The control group (N=113) used a traditional study guide to prepare. An evaluation survey was administered to the treatment group after the posttest. Available achievement composite scores were used to establish three achievement levels used as blocking variables in the analysis of variance.

The results of the experiment indicate that there was no statistically significant difference, at any achievement level, in unit test performance between those that used CRAM and those that did not. Attitudinal information indicated that the majority of students enjoyed the use of CRAM and believed it helped them prepare for the unit exam. The low and high achievement levels were more positive toward CRAM than was the medium achievement level. The study concluded with recommendations that further study of CAI such as CRAM and its use in social studies, the motivational impact of CAI, the CRAM paradigm, and the types of questions used in CRAM be pursued.

ACKNOWLEDGMENTS

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CHAPTER I

INTRODUCTION

Initially regarded as a toy or passing fad, the computer, specifically the microcomputer, is rapidly becoming a permanent part of American public education. In 1981 only 18.2% of all public schools possessed microcomputers. Yet, in just three years that percentage had increased to 68.4% (Chion-Kenney, 1984).

With the proliferation of microcomputers in the schools a growing need exists to address the question of their utilization. The microcomputer is regarded as an object of instruction, illustrated by computer literacy and programming; as the manager of instruction, exemplified by record-keeping and test scoring; and as the medium of instruction, demonstrated by simulations, problem solving, and computer-assisted instruction (West, 1983). The third catagory is of paramount importance to classroom teachers interested in computers. The National Education Association reported in its 1983 study, _A Teacher Survey NEA Report: Computers In The Classroom_, that the dominant concern of teachers as users of computers was instructional application.

The computer is not a new educational tool. Beginning in the 1960's, first in industry and then rapidly moving into higher education, the possibilities of

computer-assisted instruction (CAI) were quickly realized (Suppes & Macken, 1978). Stanford University and the University of Illinois were among the leading institutions engaged in CAI research. University researchers examined various models of computer-assisted instruction, experimented with hardware, developed programs, and evaluated the effectiveness of CAI as both a substitute for and supplement to traditional instructional methodologies.

Visonhaler and Bass (1972), in reviewing ten major studies of computer-assisted instruction, reported that when comparing CAI to traditional instruction no significant differences in achievement were obtained. However, when CAI drill and practice, as a supplement to instruction, was examined, there appeared to be strong evidence for the effectiveness of CAI. Three years later a review of the research commissioned by the Association for Supervision and Curriculum Development revealed a myriad of contradicting results from CAI studies (Edwards, Norton, Taylor, Weiss, & Dusseldorp, 1975). These researchers found CAI to be most effective as a supplement to traditional instruction. They found no significant difference when CAI was substituted for traditional instruction. Few studies reveal the effectiveness of CAI as it relates to the ability level of students.

By 1977 CAI, as a viable instructional methodology,

had met with mixed success. Practical limitations existed for computer-assisted instruction. Equipment was cumbersome and expensive. Time-sharing systems connected to large centrally located mainframe computers via telephone lines proved to be troublesome and unreliable (Hofmeister, 1984). However, in 1977, just as educators were about to abandon CAI, a revolution in computer technology occurred. The advent of the microprocessor had resulted in the microcomputer--a small, inexpensive, desk-top computer. With the microcomputer the question of CAI's efficacy was resurrected.

The need for further research into the effectiveness of computer-assisted instruction via microcomputer is evident (Gleason, 1981), especially in subject areas other than mathematics and language arts (Billings, 1983). One discipline, social studies, has received virtually no attention at all. Inherent in the absence of CAI studies in social studies may be the reluctance of social studies teachers to use computers. A National Science Foundation report (1977) indicated that only 3% of those social studies teachers surveyed used computers (Klassen & Rawitsch, 1982). This percentage has increased in six years to only 5.3% (NEA, 1983). With so few social studies teachers using computers, the question of their effectiveness as an instructional tool within the discipline remains conjecture.

CONTEXT OF PROBLEM

The purpose of this study was to investigate the
effectiveness of teacher-authored Computer Review
Assistance Modules (CRAM) on student achievement in United
States history. The researcher found, however, that the
issues surrounding this study dealt with more than the
increased frequency of computers in the public schools
with little or no usage by social studies teachers and
mixed reviews of CAI effectiveness. Therefore, in order
to fully understand the need for such an investigation,
several other major areas of concern were examined.

The first area of concern was the structure of
computer-assisted instruction and its history. CAI ·   ·
consists of adjunct and primary types of material
(Chambers & Sprecher, 1983) divided into drill and
practice, tutorials, simulations, and problem solving
(Hofmeister, 1984; Manion, 1985). CAI in American public
schools began in 1959 (Baker, 1978) and expanded during
the next two decades through major research projects such
as Plato and TICCIT--Time Shared, Interactive, Computer
Controlled, Information Television (Alderman, Appel, &
Murphy, 1978; Hofmeister, 1984). Computer usage grew,
because of reduced costs and greater availability, with
the advent of the microcomputer (Gleason, 1981).

The second area of concern was the computer and the social studies. The negative attitudes toward and lack of use of computers by social studies teachers (Klassen & Rawitsch, 1982; Roberts, 1982) is contrary to the rapid growth of the technology in education (Chion-Kenney, 1984). Computers have played a minor role in the social studies (Martorella & Kohn, 1970) but can and should play a larger role as a tool of social studies educators (Cohen, 1982; Diem, 1980; Rooze, 1983; Saltinski, 1981).

The third concern was that of computer-assisted instruction and the social studies. Recently, the social studies has undergone a review of its purposes and its scope and sequence (NCSS, 1984). Furthermore, in a summary of Project SPAN (Social Studies Priorities, Practices, and Needs), a National Science Foundation research report on the social studies (Morrissett, 1983), the authors have suggested that the social studies has several major problems. These problems included the need for a greater emphasis on knowledge and skills and an increased variety of teaching methods. Solutions to these problems has included the use of computers and CAI (Cohen, 1982; Rooze, 1983; Saltinski, 1981, Senn, 1983).

A fourth concern was the theoretical foundations upon which CAI is based. CAI, in its structure and purpose, is an extension of Programmed Instruction (Hofmeister, 1984; O'Day, 1970). Its psychological foundation lies in the

work of B. F. Skinner (1968) with regard to the reinforcement and repetition of responses to specific stimuli. The information processing models of cognitive psychology (Gagne, 1982; Gagne, Wagner, Rojas, 1981; Moates & Schumacher, 1980) are also a foundation of drill and practice and tutorial CAI. Computer-assisted instruction utilizes the principles of the behaviorist and cognitive schools of psychology (Chambers & Sprecher, 1983).

Finally, the instructional effectiveness of CAI was a concern. Computer technology, hardware and software, changes with great rapidity. Generalizations and conclusions, resulting from studies which utilized various types of CAI among several academic disciplines at differing educational levels, must be viewed with caution (Glass, McGaw, & Smith, 1981; Pogrow, 1983). For these reasons two major types of reviews were consulted: the box-score method and meta-analysis. Whether box-score analyses (Edward, Norton, Taylo., Weiss, & Dusseldorp, 1975; Jamison, Suppes, & Wells, 1974; Thomas, 1979; Visonhaler & Bass, 1972) or meta-analyses (Burns & Bozeman, 1981; Hartley, 1977; Kulik, Bangert, & Wiliams, 1983; Kulik, Kulik, & Bangert-Downs, 1984; Kulik, Kulik, & Cohen, 1980) were employed, supplemental computer-assisted instruction was more effective than traditional instruction alone.

Conclusions about the effectiveness of CAI at varying levels of student aptitude were limited in the studies. The authors of one report asserted that CAI was effective especially for disadvantaged elementary students and special education (Jamison, Suppes, & Wells, 1974). Other researchers reported that CAI was most effective for low ability students (Edwards, Norton, Taylor, Weiss, & Dusseldorp, 1975), while others concluded that performance increases were about equal for high, medium, and low aptitude students (Kulik, Kulik, & Cohen, 1980).

Virtually all of these studies were in science, mathematics, and language arts. The need for research into the effectiveness of CAI in areas such as social studies remains (Billings, 1983; Gleason, 1981; Rooze, 1983).

Consequently, certain assumptions and areas of concern are apparent. Microcomputers are becoming an integral part of public education. As such, further research into their effective use, especially in the area of CAI, is necessary. This research should occur in academic disciplines such as social studies. In addition, the effectiveness of CAI, authored by classroom teachers to fulfill specific objectives and educational requirements in social studies, rather than the use of commercially developed software, is of interest (Cohen, 1983; Diem, 1980). And finally, the research into CAI

should also be related to the student's individual
achievement level (Cohen, 1983; Atkinson, 1984).

PURPOSE OF THE STUDY

The purpose of this study was to determine the
effectiveness, at varying levels of student achievement,
of teacher written Computer Review Assistance Modules
(CRAM) upon student achievement in United States history.
A second purpose was to secure information from those
subjects who used CRAM regarding their attitude toward the
structure of this computer-assisted instruction material,
their help derived from the reinforcers used, and their
view of CRAM as a supplemental study method for unit test
preparation.

RESEARCH QUESTIONS

Specific questions to be statistically analyzed in
this study were:

1. Are there significant differences in achievement
on the unit test between subjects who utilized teacher
written Computer Review Assistance Modules (CRAM) in test
preparation in United States history and those who did
not?

2. Are there significant differences in achievement

on the unit test, at varying student achievement levels,
between subjects who utilized teacher written Computer
Review Assistance Modules (CRAM) in test preparation in
United States history and those who did not?

3. What are the subject's affective responses to the
use of Computer Review Assistance Modules (CRAM) for unit
test preparation?

DEFINITIONS OF TERMS

For the purpose of this study, the following terms
are defined:

Achievement. The mastery of certain skills,
acquisition of information, or extent to which something
is learned, measured in a quantitative manner, which
usually results from planned instruction or training.

Computer. A machine that can be programmed to
process information. This term includes mainframe,
minicomputer, and microcomputer.

Computer-Assisted Instruction (CAI). The application
of computers in education includes drill and practice,
tutorial, and simulation exercises. Applied here, the
term is synonymous with computer based education (CBE),
computer managed instruction (CMI), computer-assisted
learning (CAL), and instructional application of computers

(IAC).

Computer Review Assistance Modules (CRAM).
Researcher written CAI, using a pascal based authoring
system--Apple SuperPilot, for the microcomputer, in which
the student interacts with a simulated multiple choice
exam for the purpose of content review and mastery
practice.

Hardware. It is the computer equipment, the machine
itself.

Microcomputer. The smallest of computers usually
having from 48K to 128K of memory, consisting of keyboard,
monitor, disk drive, and memory processor. In this study
it is synonymous to computer.

Public Schools. Those schools which are open to all
students and supported by public monies.

Secondary Students. Those individuals enrolled in
grades 10, 11, and 12.

Software. It includes computer programs and data,
both application and instructional programs.

ASSUMPTIONS

For the purpose of this study the following
assumptions were made:

1. All individuals who use CRAM follow set
procedures in a diligent manner.

2. The levels of reliability and validity of the instruments used to measure achievement are adequate.

3. The subjects that receive the CRAM treatment are representative of the population being studied.

4. The subjects who use CRAM answered the follow-up questionnaire honestly.

5. Instruction and content are delivered to all classes, control and treatment, involved in the study in accordance with the prescribed curriculum syllabus and time-line no matter which of the United States history team members (teachers) were involved.

LIMITATIONS OF THE STUDY

1. The population in this study is limited to secondary school students in a suburban Nebraska school district enrolled in United States history during the 1984-1985 academic year. No attempt was made to control for the socio-economic background of the subjects.

2. Subjects are assigned to either control or treatment as a part of an already constituted classroom. Students and the study, therefore, may be subject to class effect (Blair, Higgins, Topping, & Mortimer, 1983).

3. The novelty of using a computer for United States history and test preparation may result in a Hawthorne effect for some subjects (Borg & Gall, 1979).

4. The utilization of classes as the experimental unit contributes to the probability of a Type I error (Blair, Higgins, Topping, & Mortimer, 1983).

IMPORTANCE OF THE STUDY

Computer Review Assistance Modules (CRAM) are an extension of CAI drill and practice software used to supplement traditional instuctional methods. They provide the student with an additional interactive mode of study and content review for test preparation. Researchers need to continue studying to 1) examine its effectiveness, and 2) find additional paradigms of delivery. Furthermore, in CAI research several disciplines, including social studies, have been neglected. Finally, it is important to ascertain the effectiveness of CRAM CAI as it pertains to differing levels of student achievement. In this way optimal utilization can be realized.

Pragmatically, CRAM's importance lies in other areas. CRAM is teacher written and continuously modifiable. More importantly, unlike commercial software, it meets the specific needs and objectives of a unique course within a school district. It is reasonably inexpensive to produce and it can be applied to any number of different content areas.

DESIGN OF THE STUDY

Setting

The setting for the study was Ralston High School, a suburban school district of Omaha, Nebraska.

Population

The population for the study was those secondary students enrolled in United States history during the 1984-1985 academic year.

Instrumentation

The composite score of the school district authorized and approved Science Research Associates (SRA) Achievement Series, Form 2, Level H, was used to measure subject achievement level. The reliability of the SRA composite score is .97 (1978). The final unit test or posttest, developed and approved by the school's United States history team, was used as the dependent variable to measure achievement of content. The study guide, used by the control group, was written to parallel CRAM content. CRAM, the treatment, was written by this investigator, a teacher of United States history. It was approved for its validity by the team, based upon established objectives and previous unit exams, before implementation. The survey, approved by the United States history teaching

team, was administered to the treatment group to secure
their attitudes toward the structure and use of CRAM.

Procedures

The writing of Computer Review Assistance Modules
(CRAM) for United States history began in the winter of
1982 under the direction and approval of the office of
curriculum of the school district. One year later the
first module was used by students. In so doing,
programming and content problems were discovered and
remedied. Feedback from students and United States
history teachers was secured also. Since that time the
district administration has made a strong commitment to
microcomputers in terms of time, personnel, finances,
hardware, and software. Consequently, district officials
desire to ascertain the efficacy of CRAM. With the
approval and support of the school district's curriculum
office and high school administration, a study of CRAM was
undertaken.

The study involved eleven United States history
classes with approximately 250 secondary students. Five
classes were randomly assigned to the control group and
five to the treatment group. Treatment consisted of the
use of CRAM in preparation for the taking of the final
unit test. Simultaneously, the control group was given a
study guide which parallels the CRAM material. This

procedure caused no disruption to normal classroom
routine. All instructional methods and materials, with
the exception of treatment, remained as prescribed by the
district's United States history curriculum guidelines.

ORGANIZATION OF THE STUDY

The study is organized into five chapters. Chapter
One provides an introduction to the study. It contains a
summary of the background and issues surrounding CAI, the
purpose of the study, the research questions, definitions,
limitations, assumptions, importance of the study, design,
and the procedures for carrying the study out.

In Chapter Two the literature regarding computer-
assisted instruction--its modes of delivery and history,
computers and the social studies, CAI and the social
studies, CAI and learning theory, and the instructional
effectiveness of CAI is reviewed for findings which are
relevant to the study of Computer Review Assistance
Modules (CRAM) and student achievement at various ability
levels. Findings are summarized and issues to be
addressed by the study are stated.

A description of the procedures used in the study are
contained in Chapter Three. Demographic information about
the subjects, a description of the CRAM utilized, and
information about the instruments used in the study are

included.

In Chapter Four, the method of analysis of the data is presented. The data are examined with respect to the two research questions posed and the survey information from the experimental group summarized.

A summary of the study and the findings of the study are presented in Chapter Five. Instructional implications of CAI and CRAM are suggested. Issues and questions raised by the study are posed and recommendations for further research made.

The review of literature was conducted to ascertain
the status of computer-assisted instruction (CAI) as an
effective pedagogical technique within the social studies
content area. Chapter II is divided into five parts:
computer-assisted instruction--modes of delivery and
history, computers and the social studies, CAI and the
social studies, CAI and learning theory, and the
instructional effectiveness of CAI.

CAI--MODES OF DELIVERY AND HISTORY

The utilization of the computer, especially the
microcomputer, is a relatively recent development in
American education. Described by some educators as
innovative and revolutionary, and by others as faddish and
foolish, it would appear that this technology will not
soon disappear (Gleason, 1981). The computer has been
presented to educators as a tutor, a tool, and a tutee
(Taylor, 1980). It has been perceived as the object of
instruction, manager of instruction, and medium of
instruction (West, 1983). Nevertheless, despite the
descriptions, the acclaim, and the detractors, the focal
point of computers in education is computer-assisted

instruction.

Computer-assisted instruction is defined as "the use of the computer to provide course content instruction" (Chambers and Sprecher, 1983, p. 3). The term is also viewed as synonymous with Computer Based Instruction (CBI) and Computer-assisted Learning (CAL). CAI incorporates a number of different delivery modes. Among the earliest modes of CAI were the drill and practice program and the tutorial program.

Drill and practice programs are usually supplementary programs designed to assist the student with review, reinforcement, and with the mastery of basic skills and knowledge (Hofmeister, 1984; Manion, 1985). Tutorial programs, although usually viewed as a substitute for teacher-directed instruction, may in fact be used in a supplementary fashion. In this way independent instruction, which emphasizes knowledge acquisition, student evaluation, and feedback, is provided (Hofmeister, 1984; Manion, 1985). Tutorials also engage the student in a dialogue-type learning activity in which the computer provides help and direction to the student (Chambers and Sprecher, 1983). A third mode of CAI delivery is the simulation. In a simulation the student plays a role and interacts with the computer to emulate real life conditions (Hofmeister, 1984). Recently CAI has been defined to include problem-solving programs and word-

processing (Manion, 1985).

CAI is divided into two major types--adjunct and primary. Adjunct CAI refers to those programs which are used to supplement or enrich the learning situation. Primary CAI materials stand alone, require little or no teacher assistance, and usually require a longer time period for implementation (Chambers and Sprecher, 1983). Drill and practice, tutorial, and simulation programs are essentially adjunct CAI.

Computer-assisted instruction was first introduced in a public school setting by the IBM Watson Research Center in New York state in 1959 (Baker, 1978). Within the next five years CAI research projects were established at the University of Illinois--the Plato Project, and at Stanford University's Institute for Mathematical Studies in the Social Sciences (IMSSS). The Plato System and IMSSS provided supplementary and basic instruction in mathematical logic, reading, chemistry and precalculus (Suppes and Macken, 1978). These projects were characterized by large CRT's (cathode ray tubes), teletypes, headsets, and rear projection type 16mm film projectors, connected by telephone lines to large mainframe computers. These projects resulted in the production of CAI hardware and software that was to become suitable for the classroom environment (Hofmeister, 1984).

During the 1970's CAI development continued as the

Plato project was expanded and the Mitre Corporation began

work with TICCIT--Time Shared, Interactive, Computer

Controlled, Information Television (Alderman, Appel, &

Murphy, 1978). This was a multi-media approach to CAI.

Modifications and advancements in hardware and software

made CAI more affordable and available and minicomputers

replaced the large mainframe computers of the previous

decade.

In 1977 the microcomputer was introduced. Since that

time CAI has been adapted for use by this new technology.

The microcomputer of the 1980's is smaller, less

expensive, and less threatening to educators that the

larger time-sharing systems (Gleason, 1981). The Plato

system has been adapted for microcomputer use and

authoring systems, such as those based on the Pilot

language developed at the University of California Medical

Center, allows educators to create their own CAI programs

(Hazen, 1982; Hofmeister, 1984).

COMPUTERS AND THE SOCIAL STUDIES

Among American educators, the social studies teacher

appears to be among the last to use the educational

technology of the 1980's (Roberts, 1982). As early as

1977, a National Science Foundation study indicated that

74% of surveyed social studies teachers, grades nine

through twelve, believed that computers were not needed as
a means of instruction. The negative attitude towards
computers was even more severe among social studies
teachers at the primary, intermediate, and junior high
grade levels, where 84%, 74%, and 78% respectively
believed that computers were not necessary in social
studies education. Furthermore, only 3% of those
secondary social studies teachers reporting had ever used
a computer as an instructional tool (Klassen & Rawitsch,
1982). Six years later the National Education Association
(1983) reported that 5.3% of those teachers reporting used
computers for social studies. This was a negligible
increase.

Such a response toward computer usage may have been
understandable as late as 1981 when only 18.2% of all
public schools possessed microcomputers. However, by the
fall of 1984 68.4% of all public schools had acquired at
least one microcomputer. This accelerated acquisition of
computers within the public schools was reflected across
grade levels as 62.4% of all elementary, 80.5% of all
junior high and 86.1% of all senior high schools possessed
microcomputers (Chion-Kenney, 1984). The practical
implications of computer acquisition became visible when
the number of computers per building was revealed. There
was an average of 5.8 computers in every public school.
Senior high schools had the highest average with 10.6

machines per building (Chion-Kenney, 1984). The influx of computers into the mainstream of American public education was evident.

Despite the disparity between the rapid growth in the acquisition of computers by public schools and the seemingly slow-paced acceptance of this educational tool in the social studies, computers were being used by social studies educators. Reporting in 1970, Martorella and Kohn noted that appropriate software for social studies was scant when compared to other content areas. Their survey of available computer programs for social studies instruction was divided into three sections. They found only four programs available at the elementary level, twelve at the secondary, and eight at the college/university level. The twenty-four programs were either simulations or data base retrieval systems for topical research within a particular sub-discipline of the social studies/social sciences. Martorella and Kohn (1970) warned social studies educators about the practical limitations of the existing hardware and software requirements. The early limitations have been echoed by others (Hofmeister, 1984).

From this point on, the use of computers in social studies education took a back seat to what was happenning in other disciplines, especially mathematics and language arts (Roberts, 1982). During the decade and a half since

the Martorella and Kohn study, little had changed. Those few social studies teachers who used computers did so for the purpose of simulations and an occassional drill and practice program (Roberts, 1982; Rooze, 1983). The use of computers in social studies was still considered to be a relatively new innovation. Suggestions were constantly being made which echoed the prior uses of computer simulations and drill and practice, while others advocate the use of computers to teach statistics and data analysis in the social studies (Saltinski, 1981). Even the National Council for the Social Studies (NCSS), representing approximately 10% of all secondary social studies teachers (Levin, 1984), had just begun to take a position regarding computers (Cohen, 1983). In 1981, Diem, writing for the NCSS, stated the problem succinctly when he suggested that social studies teachers acquire basic computer skills and the ability to author lessons for the computer. In concluding his analysis of computers and the social studies Diem (1981) stated, "We have a tool that can be an aid to our teaching--if we learn to use it" (p. 6).

CAI AND THE SOCIAL STUDIES

In summarizing the 1982 National Council for the Social Studies (NCSS) convention, Cohen (1983) reported a

growing interest and concern for the use of computers and appropriate software among social studies educators. Major questions and assertions, reported at the convention, were the concerns about quality software and the belief that with authoring languages, good social studies teachers would soon be able to develop software themselves. Of further concern was the question of how software would be integrated into the social studies curriculum. Since that time the questions of computer usage, software types and selection, and integration into the social studies curriculum have been addressed by the NCSS and social studies educators in the field.

It has been noted that social studies educators are among the last to make use of this new technology (Roberts, 1982; NEA, 1983). This tendency among social studies teachers was reiterated in the Association for Supervision and Curriculum Development (ASCD) publication Social Studies in the 1980's: A Report of Project SPAN (Fancett & Hawke, 1983). It was reported that computers ranked next to last among instructional techniques used by social studies teachers; only contract learning was used less frequently.

In Project SPAN (Social Studies Priorities, Practices, and Needs), the editors concluded that the social studies would encounter six major problems in the 1980's that would necessitate solutions if the discipline

was to survive. Among them was the need to promote greater student learning; learning which focuses on the knowledge, skills, and attitudes believed to be important for the social studies. A second problem was a lack of variety in teaching methods, evaluation practices, and limited kinds of learning experiences (SPAN Consultants & Staff, 1983).

The role of computers and computer-assisted instruction material has been offered as a solution to the problems cited in the SPAN report. Senn (1983) asserted that the educational practices and goals of the social studies would be improved by using computers and its accompanying software. Computers could promote more effective learning via individualized instruction and immediate and objective feedback, thus providing greater motivation to the students. Senn also believed that the computer would be more fun and provide a variety of learning methods for the student through drill and practice, tutorials, simulations, and other programs.

When the NCSS revised its scope and sequence for the social studies in a report released in November, 1983 (NCSS, 1984), it focused upon the need for knowledge and the development of specific skills. Knowledge was defined as the base ". . . which provides facts, concepts, and generalizations that help students understand human affairs and the base condition. Knowledge provides a

basis for values and beliefs, and it is the vehicle for
the development of skills" (p. 251).

Among those necessary skills outlined by the NCSS was
the ability to operate a computer using prepared
instructional or reference programs. The acquisition of
requisite knowledge and the students self-directed
interaction with the computer were at the heart of
computer-assisted instruction (Manion, 1985).

The NCSS report on a scope and sequence for the
social studies reflected a long standing debate among
social studies educators as to whether the knowledge
approach or the skills approach should be emphasized.
These two views of social studies instruction require that
the role of the computer and computer-assisted instruction
be examined within these differing perspectives.

At the 1983 NCSS convention in San Francisco, Rooze
addressed this problem in a paper on integrating computer
software into social studies instruction. He believed
that using computers as an instructional technique, within
the knowledge approach to social studies, would result in
several advantages. Drill and practice programs would
allow the student to learn social studies content and
skills, receive immediate knowledge of results, and
supplement regular instruction. Tutorials could be used
for initial instruction on concepts and skills. The
interactive nature of computers might also make social

studies more appealing to students and productive.

From the skills perspective of social studies education, Rooze echoed Saltinski's (1981) belief that the computer could be used in data retrieval and analysis. In this way social science skills, especially statistics, often ignored by social studies teachers, would be confronted.

CAI AND LEARNING THEORY

The theoretical premises and practical concerns regarding the utilization of this new technology are inherent in the concerns about computers in social studies education. Adjunct computer-assisted instruction is the most prevalent form of computer usage in the social studies today (Roberts, 1982; Rooze, 1983). Drill and practice programs and tutorials, as examples of CAI, can be traced to the work in programmed instruction (PI) which occurred in the 1960's (Hofmeister, 1984). PI material, written for texts and teaching machines, specified objectives and required empirical testing. It allowed the learner to be self-paced, respond overtly, and receive immediate feedback. O'Day (1971), in analyzing PI principles and effectiveness, concluded that computer-assisted instruction was the logical extension of programmed instruction. CAI would, O'Day believed,

enhance student motivation and allow students to select the pace and sequencing of their own learning.

The work of psychologist B. F. Skinner influenced PI and CAI. Skinner first studied the behavior of animals and then studied human behavior. He found that by providing suitable stimuli, the subject would respond and, because of reinforcement, that response would be repeated regularly when the appropriate stimuli was present (Skinner, 1968). Skinner's work emphasized the need to reinforce responses in a positive fashion in order to facilitate learning. He also noted the need for practice or repetition. The repetition and positive feedback are necessary for learning to take place.

Skinner's views are applicable to drill and practice CAI (Chambers & Sprecher, 1983). Basic to drill and practice CAI is the repetition of material for the purpose of mastery. Second, the use of reinforcement, both positive and negative, is beneficial to learning, such as the increase or decrease in scored points. In this way the learner becomes more proficient.

Skinner's concepts are applicable to tutorial programs also. The tutorial requires the student to interact with the computer by providing a response to each question or set of information. It permits the student to proceed at his or her own pace. It also provides adequate reinforcement of efficient work (Chambers & Sprecher,

1983).

However, the theoretical basis of CAI is not found in the work of Skinner alone. Cognitive psychology has been utilized in the creation of CAI drill and practice and tutorial modules. Based upon the information processing models (Moates & Schumacher, 1980), CAI would be concerned with 1) the effect of stimuli upon the receptors of the learner; 2) information storage in short-term (working) memory; 3) storage of information in long term memory; 4) the encoding and decoding of information; and 5) the retrieval of stored information. Viewed as a part of cognitive learning theory, CAI drill and practice speeds the learning process, making the learning of low level skills more efficient and automatic. Drill and practice reinforce the indexing characteristics of basic knowledge and skills, making them more easily retrieved and placed in short-term (working) memory (Gagne, 1982).

CAI tutorials are influenced by cognitive learning theory as well. Expressed in terms of cognitive theory, the internal learning processes can be compared with the external instructional events of computer-assisted instruction (Gagne, Wagner, & Rojas, 1981). The internal learning processes include alertness, expectancy, retrieval to short-term memory, selective perception, semantic encoding, retrieval and responding, reinforcement, cueing retrieval, and generalizing. These

internal learning processes are equivalent to the following external instructional events: gaining attention, informing the learner of lesson objectives, stimulating recall of prior learning, presenting stimuli, guided learning, eliciting performance, providing information feedback, assessing performance, and enhancing retention and learning transfer. The external instructional events, contained within the CAI, would be that with which the learner would interact. Accordingly, the internal processes would occur (Chambers & Sprecher, 1983).

The efforts to systematize and formalize learning, that began with programmed instruction, is continued by CAI. Furthermore, the influence of behaviorist and cognitive learning theories is apparent in computer-assisted instruction.

THE INSTRUCTIONAL EFFECTIVENESS OF CAI

The review of the literature revealed a substantial number of studies in which computer-assisted instruction was compared to more traditional methods of instruction. The majority of these studies pertained to the fields of science, mathematics, and language arts. Attempts at generalizing the effectiveness of CAI, based upon such studies, however, was difficult for several reasons. The

studies varied in the degree to which CAI was used as a
supplement to or substitute for traditional instruction.
Studies differed with regard to design--some utilized
control groups; others did not. The type of adjunct CAI
investigated included drill and practice, tutorials, and
simulations. A wide range of settings was covered by the
studies, including elementary, secondary, and college.
The hardware and software packages utilized within studies
also varied. For these reasons, replication of studies
and the duplication of results was virtually non-existent.

Recently, several researchers have noted that these
problems and the ever-changing technology have made it
difficult to generalize about the effectiveness of
computer-assisted instruction (Glass, McGaw, & Smith,
1981; Pogrow, 1983). In order to make sense of these
diverse studies, two methods of analysis have been
employed by reviewers of CAI research. The first is the
box-score method; the second is meta-analysis. The box-
score method generalized its findings by reporting the
proportion of studies found to be favorable to CAI versus
those that were unfavorable. The box-score method usually
included a narrative of comments about the studies. In
contrast, meta-analysis takes a more quantitative approach
with the statistical analysis of the summary findings of
many empirical studies. By employing appropriate
statistical methods, a synthesis of the findings can be

achieved for the purpose of generalization about a specific research question (Glass, McGaw, & Smith, 1981).

The earliest attempt at a box-score review of CAI was performed by Visonhaler and Bass (1972). They reported the results from ten independent studies of elementary students using drill and practice CAI in the content areas of mathematics and language arts. Visonhaler and Bass concluded that there was strong evidence for the effectiveness of CAI over traditional instruction. The elementary students who used CAI drill and practice showed performance gains of one to eight months on standardized achievement tests.

Jamison, Suppes, and Wells (1974) also concluded that CAI, as a supplement to regular instruction at the elementary level, was effective in improving achievement scores. At the secondary and college levels, these box-score reviewers concluded that CAI was as effective as traditional instruction and it provided substantial savings of student time spent at the learning task.

Similar conclusions were reported by Edwards, Norton, Taylor, Weiss, and Dusseldorp (1975) in their review of CAI for the Association for Supervision and Curriculum Development (ASCD). They reported that CAI, as a supplement to regular instruction, proved to be more effective than traditional instruction alone. As a substitute CAI was viewed to be equal to traditional

instruction. In either case, all studies reported that it took students less time to learn.

A final box-score review was published by Thomas (1979) regarding studies omitted by Edwards, Norton, Taylor, Weiss, and Dusseldorp (1975) or conducted after the ASCD summary report. This review dealt specifically with computer-assisted instructional material at the secondary level. Thomas (1979) concluded that although a few studies were found in which CAI was not effective, the overwhelming number of studies supported CAI as a viable instructional alternative. The review showed that CAI also resulted in reduced time spent to attain mastery learning and CAI improved attitudes toward learning.

One of the problems with the box-score method of review was that no answer was provided concerning the degree to which CAI improves learning. The meta-analysis attempted to solve this problem. The first meta-analysis of computer-assisted instruction was conducted by Hartley (1977), who focused on mathematics in elementary and secondary schools. She reported that the average effect of CAI was to raise student achievement scores by .41 standard deviations. This is the same as raising one's performance level from the 50th percentile to the 66th percentile. Hartley also noted that elementary students fared better than secondary students, and that CAI was more effective than programmed instruction but not as

effective as peer tutoring.

Burns and Bozeman (1981) also used meta-analysis to integrate findings in CAI mathematics instruction in elementary and secondary schools. These reviewers reported an effect size of .45 for tutorial CAI and .34 for drill and practice.

At the collegiate level, Kulik, Kulik, and Cohen (1980) used meta-analysis to examine the effectiveness of computer based teaching. They found computer-assisted instruction raised examination scores about three points or about one-quarter standard deviation. Thus, the student in a CAI class scored at the 60th percentile on an examination over course content while a student in a class utilizing traditional instruction scored at the 50th percentile. Finally, Kulik, Kulik, and Cohen concluded that CAI took only about two-thirds the amount of time that traditional instruction took.

Kulik, Bangert, and Williams (1983) integrated 51 studies of CAI at grades six through twelve to determine the effectiveness of computer based teaching on secondary students. Their analysis showed that CAI raised student scores on examinations approximately .32 standard deviations. This is a performance increase from the 50th to the 63rd percentile. In addition, CAI methods resulted in positive attitudes toward the content being taught and a substantially reduced amount of time needed for student

learning.

Finally, Kulik, Kulik, and Bangert-Downs (1984)
reported the use of meta-analysis on 29 studies of CAI in
the elementary schools. They reported achievement score
increases of .48 standard deviations, or increases from
the 50th percentile to the 68th percentile.

Computer-assisted instruction, as presented by both
box-score and meta-analysis reviewers, was a consistently
more effective instructional methodology, as evaluated by
examination scores, and took less time for the student to
learn in contrast to traditional pedagogical methods.
Furthermore, several reviews asserted a positive attitude
toward the subjects learned as a result of CAI.

Only three reviews dealt with the issue of student
aptitude and CAI effectiveness. Jamison, Suppes, and
Wells (1974) reported that the performance of special
education and disadvantaged students improved from the use
of CAI material. Edwards, Norton, Taylor, Weiss, and
Dusseldorp (1975) proposed that CAI was more effective for
low ability students. Kulik, Kulik, and Cohen (1980)
asserted that the benefits from CAI were about equal
across apptitude levels.

An additional concern was the content areas within
which CAI research was conducted. Whether the studies
were independently conducted or a part of larger research
projects, such as those put forth by the Plato project and

TICCIT, drill and practice and tutorial CAI was dominated
by mathematics, science, and language arts. Only two
studies dealing with the social studies content area were
found. One examined student attitude toward computer
literacy using a high school American history class as the
medium for delivery (Berg, 1979). The other analyzed the
motivating factors for student usage of collegiate
macroeconomic CAI lessons (Schenk & Odorzynski, 1979).
Neither study addressed the question of the effectiveness
of CAI material or the possible variance of achievement
based upon differing student ability levels.

CONCLUSIONS DRAWN FROM THE REVIEW OF LITERATURE

The utilization of computers and computer-assisted
instruction in social studies education is just beginning.
Social studies teachers have thus far registered negative
attitudes toward this technology. Surveys have shown that
despite the rapid growth of computers, especially
microcomputers in American public education, few social
studies teachers are taking advantage of this tool to
advance the teaching of basic knowledge essential for
higher level thought processes and the development of
social studies skills and concepts. This can be done
through the use of adjunct CAI material exemplified by
drill and practice, tutorials, simulations, problem

solving, and data analysis (statistics) programs.

CAI is an extension of programmed instruction and incorporates behavioral and cognitive learning theory. Among the principles that CAI utilizes are repetition, reinforcement, guided practice, and semantic encoding and decoding reinforcing indexing characteristics of information. Furthermore, the interactive nature of CAI allows the student to be an active participant in the learning activity.

The study of the instructional effectiveness of computer-assisted instruction has occurred almost exclusively in science, mathematics, and language arts. The differing types of CAI used combined with the various types of hardware and software packages and paradigms of CAI have necessitated that conclusions regarding CAI's effectiveness utilize box-score and, more recently, meta-analysis. Researchers have concluded from these methods of review that CAI, as a supplement for regular instruction, is effective. CAI as a substitute to traditional instruction has proved to be effective also. CAI is believed to reduce the amount of time needed to learn a particular task and to cause improved student attitutes toward school and individual subjects. Few studies have examined the effectiveness of CAI when compared to student achievement levels.

This study was designed to study the effectiveness of

computer-assisted instruction (Computer Review Assistance
Modules--CRAM) in United States history at various levels
of student achievement. Information was gathered from
those students who used CRAM regarding the structure of
this CAI, their attitudes toward using CAI, and their
feelings toward using CAI in social studies.

CHAPTER III

METHODOLOGY

The purpose of this study was to determine the
effectiveness of teacher written Computer Review
Assistance Modules (CRAM) upon student achievement in
United States history. This effectiveness was to be
examined at three levels of student achievement. A
secondary purpose was to secure information from
those subjects who utilized CRAM regarding their
attitudes toward computer-assisted instruction (CAI)
material, the help/encouragement provided by
reinforcers, and their view of CRAM as a supplemental
study method for unit test preparation in United
States history.

Specific questions to be statistically analyzed
were:

1. Are there significant differences in
achievement on the unit test between subjects who
utilized teacher written Computer Review Assistance
Modules (CRAM) in test preparation in United States
history and those who did not?

2. Are there significant differences in
achievement on the unit test, at varying student
achievement levels, between subjects who utilized
teacher written Computer Review Assistance Modules

(CRAM) in test preparation in United States history
and those who did not?

3. What are the subject's affective responses
to the use of Computer Review Assistance Modules
(CRAM) for unit test preparation?

SOURCES OF DATA

The study was conducted with all secondary
students enrolled in United States history at a
suburban high school during the 1984-1985 academic
year. The investigator was a member of the United
States history team which consisted of four teachers.
The high school had an enrollment of approximately
1100 students, grades 9-12. It is the only high
school in a suburban school district of metropolitan
Omaha, Nebraska. The district is dominated by middle
class families with a growing number of middle
management and professional families. It is
predominantly white with less than 2% of the students
coming from non-white ethnic backgrounds. A major
emphasis at the high school is student preparation
for college and continued vocational training. An
estimated 65% of the students continue their
education after graduation.

All students are required to take United States

history in order to graduate from high school.
During the 1984-1985 school year, there were 13
sections of United States history including two
sections designed for low-reading students. Except
for the sections for low-reading students, no
particular plan was used in assigning students to
sections of United States history. Eleven sections
of United States history were chosen for use in this
study, excluding the low-reading sections. The
eleven sections were taught by the four members of
the United States history team utilizing an
established curriculum, standard materials, jointly
held activities, and a uniform time-table of
instruction. The study was conducted during the
second and third weeks of October, 1984.

INSTRUMENTS/DATA SOURCES USED IN THE STUDY

Five instruments and sources of data were used
in the study. They included CRAM, the study guide,
SRA composite scores, the unit exam, and the CRAM
Evaluation survey.

CRAM

Computer Review Assistance Modules (CRAM) are
adjunct computer-assisted instruction which are

teacher-authored to meet specific content objectives, CRAM incorporates features of both drill and practice and tutorial CAI. The purpose of CRAM is to provide the learner with an alternative method of study in preparation for the final unit exam. CRAM tests the student's knowledge, provides immediate feedback, instructs the student via feedback on where to find additional information if mastery has not been achieved. CRAM utilizes multiple-choice questions which are at the knowledge, comprehension, and application levels of Bloom's taxonomy. CRAM was written using the Apple SuperPilot authoring system. The CRAM used in the study, as the treatment, was examined by the United States history team to insure that it covered the stated unit objectives, terms, and concepts that were to be mastered by the student (Appendix A).

STUDY GUIDE

The study guide (Appendix B) was prepared for use by the control group. Representative of a traditional means of review for unit test preparation, the content of the study guide matched, item for item, the questions contained in the Computer Review Assistance Module (CRAM). The structure of the study guide was simply a listing of

terms and concepts.

SRA

The Science Research Associates Achievement
Series was used by the school district to evaluate
student achievement and district educational growth.
Form 2, Level H was used in the spring of 1984. The
investigation was conducted in the fall of 1984. The
composite score was used as a blocking variable in
the analysis of variance. The reliability of the SRA
composite score is .97 (1978).

UNIT EXAM

The final unit exam, used as the dependent
variable, was developed for the Constitution Unit by
the United States history team over several years
(Appendix C). The test consisted of fifty multiple
choice questions worth two points each. The structure
of the questions used in the final unit exam and the
structure of CRAM questions is similar. The
investigator utilized this test to replicate normal
classroom conditions and teacher made tests. The
United States history team reviewed the test with the
investigator to establish content validity.
According to Kerlinger (1973), content validity is
essentially "judgment" (p. 458) and a panel of

experts such as teachers may establish such validity.

SURVEY

Entitled the Computer Review Assistance Modules
(CRAM) Evaluation (Appendix D), this survey was
administered to the treatment group the day after the
posttest was taken. The purpose of the survey was to
secure attitudinal information from the subjects who
had utilized CRAM regarding its structure and their
perception of CAI, and to determine whether future
use of CRAM was desirable or warranted. The
questions were arrived at through discussions held
between the investigator and the United States
history teaching team and a professor of educational
psychology. The survey was divided into three parts.
Part I consisted of three questions, the purpose of
which was to act as a cross check for sign-up sheets
in the computer lab to assist in the verification of
CRAM usage as required by the investigator. Part II
consisted of eleven statements. Ten of the
statements required the subjects to respond to a five
point scale. The last question of Part II asked for
a yes/no response. Part III of the survey consisted
of three open-ended questions and appeared on the
back of the survey form.

PROCEDURES FOR COLLECTING DATA

Students in ten intact United States history classes were the subjects of this study. Scores from the Science Research Associates Achievement Test Series, given the preceeding April, were available for each student from school records.

During the course of the study five classes were required to use the Computer Review Assistance Modules (CRAM) at least twice in the week and a half before the final unit exam. The other five classes were given a study guide which paralleled the CRAM content. The schedule and content and structure of CRAM were approved by the United States history team which closely coordinated regular instruction prior to the use of CRAM.

STRUCTURE OF CRAM

The structure of Computer Review Assistance Modules (CRAM) is similar to those paradigms used by adjunct computer-assisted instruction such as drill and practice and tutorials. CRAM was created by the investigator using a microcomputor authoring system for the Apple II+/IIe called Apple SuperPilot. Based upon the Pascal computer language, the authoring system allows a teacher to create lessons while

learning a minimum number, approximately twelve, of commands. The system requires an Apple II+/IIe microcomputer, 64K of memory, and two disk drives to create lessons. One disk drive and 64K of memory is required to run student diskettes. The authoring system was chosen because its structure was easy to learn and students were unable to break into programs such as those written in BASIC.

CRAM is a series of randomly selected multiple choice questions. The student chooses the number of questions to be reviewed from a file of forty questions. The questions are constructed to parallel the objectives of the unit and the term sheet given at the beginning of each unit. The unit under study, during the investigation, dealt with the Constitutional Period, 1781-1789.

The student is given two chances to answer the question correctly. If the question is answered incorrectly on the first attempt, the student is given a clue, or the location of the information in the text, notes, or terms. If the question is missed on the second attempt, the student is given the correct answer and encouraged to study the appropriate material. If the question is answered correctly on either the first or second attempt, the student receives a positive reinforcer and allowed to

continue. At the end of the review the student is given a total score on those questions answered on the first and second attempts. A final message reminds the student to study for the final unit exam and encourages them to try CRAM again.

PROCEDURES

The writing of Computer Review Assistance Modules (CRAM) for United States history began in the winter of 1982. One year later the first module was used by students. At that time programming and content problems were discovered and remedied. Feedback from students was secured through the use of a survey and discussions were held with the United States history team to acquire additional information regarding CRAM. The administration, which had supported the project from its inception, then authorized that a study be undertaken to determine the efficacy of CRAM.

Random selection procedures were used to assign ten of the eleven United States history classes to either treatment or control group. Random assignment of individual students to control or treatment groups was not possible without disrupting intact classes assigned via computer during the previous summer.

Student assignment to classes, however, was done
randomly with only two conditions to be satisfied:
1) the need to balance the number of students within
classes, and 2) the need to avoid scheduling
conflicts.

Ten days prior to the final unit exam each class
within the experimental group used CRAM for a forty
minute period. The students were instructed to
choose twenty questions the first time through the
program and an odd number the second time. This
guaranteed exposure to a maximum number of review
questions. Students were then required to use CRAM
at least once more before the unit exam. In each use
of CRAM, students used the microcomputer by
themselves. This was monitored by the investigator,
team members and two computer lab supervisors.
Simultaneously, members of the control group were
given a specially devised review sheet which
paralleled the content of CRAM (see Appendix B). The
purpose of the review sheet for the control group was
to utilize class time in as similar as possible a
manner to those using CRAM and to establish a basis
of comparison between CRAM and traditional methods of
review and test preparation. Following the posttest,
the final unit exam, a survey was conducted of those
students who had used CRAM to obtain affective

information regarding CRAM structure, usage, and
perceived effectiveness as an alternative and
supplemental study method.

DATA ANALYSIS

The data in this study were analyzed using an
analysis of variance to determine if statistically
significant differences between the control group and
treatment group existed at the _alpha_ level of .05. A
frequency distribution of the students composite SRA
achievement test scores was conducted to establish
three, approximately equal in number, achievement
levels in both the treatment and control groups.
These achievement groups--low, medium and high--were
used as blocking variables to determine possible
statistically significant differences between the two
groups at various achievement levels. The three
achievement levels incorporated the following ranges
of SRA composite achievement scores (national norms
percentiles): Low equaled 1 through 75, Medium
equaled 76 through 90, and High equaled 91 through
99.

The total enrollment of the ten classes was 251.
Of this number 128 were in the control group and 123
in the treatment group. During the data analysis

participants were eliminated from the study who 1)
were not present on the day of the final unit exam
but would have taken it later, 2) missed the initial
utilization of CRAM and/or the required second use of
CRAM, 3) did not receive a control group study guide,
and 4) had no SRA achievement test composite score
available. This left 113 students in the control
group and 103 in the treatment group. The total "N"
of the study was 216. The resultant
disproportionality between the total number of
subjects in the control group (n = 113) and the
number of subjects in the treatment group (n = 103)
posed no threat to the robustness of the analysis of
variance test being used. In order to compensate for
the disproportionality and provide the necessary
descriptive statistics, the SPSS-X MANOVA procedure
was employed (SPSS Inc., 1983).

An SPSS-X crosstabulation analysis was then run
for the survey data reported by the experimental
group. The crosstabulation reported the survey data
of the experimental group by collapsing the
information according to the SRA composite scores--
blocking variables which had been previously
established for use in the analysis of variance.

SUMMARY

The procedures described in Chapter III were
used to investigate whether or not there was a
significant difference in final unit exam scores
between those students who used CRAM and those
students who used a traditional method of review.
The investigation also examined possible differences
at varying student achievement levels. Surveys,
completed by those who used CRAM, provided
information about CRAM's structure and student
perception of CAI. The population included all
secondary students enrolled in United States history.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

The purpose of this study was to determine the
effectiveness, at varying levels of student achievement,
of teacher written Computer Review Assistance Modules
(CRAM) upon student achievement in United States history.
A second purpose was to secure information from those
subjects who used CRAM regarding their attitude toward the
structure of this computer assisted instruction material,
the help provided by the reinforcers used, and their view
of CRAM as a supplemental study method for unit test
preparation. Therefore, the study was divided into three
specific research questions:

1. Are there significant differences in achievement
on the unit test between subjects who utilized teacher
written Computer Review Assistance Modules (CRAM) in test
preparation in United States history and those who did
not?

2. Are there significant differences in achievement
on the unit test, at varying levels of student
achievement, between subjects who utilized Computer Review
Assistance Modules (CRAM) in test preparation in United
States history and those who did not?

3. What are the subject's affective responses to the
use of Computer Review Assistance Modules (CRAM) for unit

test preparation.

In this chapter the methods by which the data were
analyzed is described. The results of the statistical
tests of the research questions are then reported and
analyzed.

METHOD OF ANALYSIS

The data was analyzed through the use of analysis of
variance (ANOVA). The purpose of ANOVA is to determine,
through the establishment of an F-ratio, whether there
exists a treatment effect. The treatment effect is caused
by any observed or measureable differences between the
independent variable or experimental treatment and the
dependent variable or response variable of the control
group (Keppel, 1982).

The F-ratio contrasts the differences among treatment
means and the differences among subjects treated alike.
The differences among treatment means are referred to as
between group differences and the treatment within a
treatment group is called within-group differences. The
between group differences are the result of the combined
effects of experimental treatment and experimental error
while the within-group differences represent experimental
error alone.

Thus the F-ratio is also a contrast among between

group differences and within-groups differences. These
differences or deviations may be transformed into more
useful quantities called variances. The statistical
analysis of between groups and within-groups variances is
called analysis of variance. Mathematically, this
relationship is represented by:

$$SS(T) = SS(A) + SS(S/A)$$

where, SS(T) is the sum of the squared deviations from the
mean,

SS(A) is the between-groups deviation, and

SS(S/A) is the within-groups deviation.

The SPSS-X MANOVA procedure, treatment x blocking
variables, was utilized for the purpose of data analysis
regarding research question #1 and #2. This was done to
secure sequential ANOVA data accessible only through the
MANOVA procedure as well as weighted cell means which
account for the disproportionality of achievement level
groupings--blocking variables, as discussed in Chapter
III.

The third research question required the use of the
SPSS-X crosstabulation procedure. This procedure
tabulated the survey information provided by the treatment
group. It gave not only the distributions of survey
responses for the entire treatment group but also
distributions based upon the SRA, blocking variable,
groupings. Thus the data may be analyzed collectively and

by achievement level.

ANALYSIS OF DATA RELATED TO RESEARCH QUESTIONS

In the following sections, the statistics relating to each of the research questions are presented.

Research Question #1

The first step in the analysis of data was the determination of whether or not there was a statistically significant difference between those subjects who used the Computer Review Assistance Modules (CRAM) and those who did not ($p < .05$).

Table 1

MANOVA Summary Table

Source	SS	df	MS	F	Prob.
A (SRA)	13507.65930	2	6753.82965	49.26253	$p < .001$
B (Grp.)	143.96944	1	143.96944	1.05012	$p > .05$
A x B	271.20122	2	135.60061	.98907	$p > .05$
S / AB	28790.73317	210	137.09873		

With degrees of freedom of 1, 210, the F-ratio would have to be 3.84 to be statistically significant. As presented

in Table 1 the F-ratio was 1.05012. This indicated that there was not a statistically significant difference between the treatment and control groups. It suggests that the use of CRAM did not result in a treatment effect.

Research Question #2

Although Table 1 indicated that there existed no statistically significant differences between those subjects who used CRAM and those who did not, research

Table 2

Cell Means

SRA	Groups 1 (Control)	SD	N	2 (CRAM)	SD	N
1 (Low)	56.82353	12.33981	34	57.57895	10.73673	38
2 (Medium	68.68293	11.29256	41	68.16000	13.64942	25
3 (High)	73.78947	11.35938	38	78.52500	11.49579	40
Group	66.83186		113	68.28155		103

Total N = 216

Grand Mean = 67.52315

question #2 asks for more specific information. This
research question requires that the data be analyzed not
only by group but also according to three achievement
levels--low, medium, and high. This breakdown of posttest
results is contained in Table 2.

Table 2, Cell Means, indicates that at the low and
high achievement levels the treatment group scored higher
than the control group. More specifically, the mean score
of those using CRAM versus those who did not was 57.57895
and 56.82353 at the low achievement level, and 78.52500
versus 73.78947 at the high achievement level. In the
medium achievement level found the treatment group scored
68.16000 while the control group scored 68.68293.
Collectively, the treatment group's mean score was
68.28155 and the control group's mean score was 66.83186.
These results suggest that those subjects who utilized
CRAM scored quantitatively higher on the unit exam
(posttest) than those who did not.

Having found, via the cell means scores, that there
is a quantitative difference at the three achievement
levels between the control and treatment groups, the
question of whether this was a statistically significant
difference arises.

Table 1 reveals that a significant F-ratio was not
found regarding the interaction of the treatment (CRAM)
and the SRA achievement levels. Furthermore, a

significant F-ratio was not found between the treatment and control groups at the various levels of achievement. Finally, a significant F-ratio was found for the SRA achievement levels. This, however, was to be expected and was not part of research question #2.

Research Question #3

For research question #3 subjects responsed to a series of questions and statements regarding their use of the Computer Review Assistance Modules (CRAM) for unit test preparation in United States history. As described in Chapter III, the CRAM Evaluation survey was divided into three parts. The data summaries and analyses which follow are based upon Part II, statements 4 through 14, and Part III, question 15 through 17, of the survey. The data are broken down according to the three SRA achievement levels, blocking variables, as well as cummulative responses. Because of the quantity of data each question will be presented independently. There were 103 respondents in the treatment group.

The first statement to which treatment subjects responded was: I had trouble finding a free computer. As indicated in Table 3-A a total of 68.0% of the subjects strongly disagreed and 14.6% disagreed with this statement--a total of 82.6%. The highest disagreement rate occurred within the high achievement group where

Table 3-A

CRAM Evaluation Survey

Statement #4

Statement: I had trouble finding a free computer.

SRA levels:	1 (Low)		2 (Medium)		3 (High)		Total	
Responses	#	%	#	%	#	%	#	%
1 (Strg Agr)	1	2.6	0	0.0	1	2.5	2	1.9
2	1	2.6	2	8.0	3	7.5	6	5.8
3	5	13.2	4	16.0	1	2.5	10	9.7
4	10	26.3	1	4.0	4	10.0	15	14.6
5 (Strg Dis)	21	55.3	18	72.0	31	77.5	70	68.0

87.5% disagreed/ strongly disagreed with the statement.
In the low achievement group 81.6% disagreed/stongly
disagreed while in the medium achievement group 76.0%
indicated that they disagreed or strongly disagreed with
the statement.

The second survey statement was: The immediate
feedback was helpful in locating my weaknesses. Table 3-B
presents the responses to this statement. The statement
centers on the positive reinforcers, encouragement, and
directions used in the CRAM. Subjects in the high

achievement level reported 70.0% of their number

agreed/strongly agreed with this statement. In the low

achievement group 39.5% strongly agreed and 23.7% agreed,

a total of 63.2%. The medium achievement group reported

53.0% agreed/strongly agreed with the statement. Only

9.7% of the 103 total subjects either disagreed or

strongly disagreed with the statement. However, 25.2% of

the respondents assumed a neutral position on the

statement.

Table 3-B

CRAM Evaluation Survey

Statement #5

Statement: The immediate feedback was helpful in locating
my weaknesses.

SRA levels:	1 (Low)		2 (Medium)		3 (High)		Total	
Responses	#	%	#	%	#	%	#	%
1 (Strg Agr)	15	39.5	10	40.0	15	37.5	40	38.8
2	9	23.7	5	13.0	13	32.5	27	26.2
3	7	18.4	8	32.0	11	27.5	26	25.2
4	3	7.9	0	0.0	1	2.5	4	3.9
5 (Strg Dis)	4	10.5	2	8.0	0	0.0	5	5.8

Table 3-C deals with the statement: I enjoyed working with the computer program. None of the 103 respondents strongly disagreed with the statement while 87.4% of all subjects either agreed or strongly agreed with the statement. 55.3% of the low achievement group strongly agreed and 36.8% agreed with the statement for a 92.1% total. The medium achievement level posited 28.0% who agreed with the statement and 56.0% who strongly agreed, an 84.0% total.

Table 3-C

CRAM Evaluation Survey

Statement #6

Statement: I enjoyed working with the computer program.

SRA levels:	1 (Low)		2 (Medium)		3 (High)		Total	
Responses	#	%	#	%	#	%	#	%
1 (Strg Agr)	21	55.3	14	56.0	16	40.0	51	49.5
2	14	36.8	7	28.0	18	45.0	39	37.9
3	3	7.9	1	4.0	3	7.5	7	6.8
4	0	0.0	3	12.0	3	7.5	6	5.8
5 (Strg Dis)	0	0.0	0	0.0	0	0.0	0	0.0

Statement #7 of the CRAM Evaluation survey, reported

in Table 3-D, was: Working with the computer seemed cold
and impersonal. Cumulatively, 29.1% of the subjects
disagreed with this statement and 50.5% strongly
disagreed, a total of 79.6%. Of the three achievement
groups, the low achievement group reported 26.3%
disagreeing with the statement and 55.3% strongly
disagreeing. While 81.6% of the low achievement group
disagreed to some degree with the statement no respondent
in that group either agreed or strongly agreed. At the

Table 3-D

CRAM Evaluation Survey

Statement #7

Statement: Working with the computer seemed cold and
impersonal.

SRA levels:	1 (Low)		2 (Medium)		3 (High)		Total	
Responses	#	%	#	%	#	%	#	%
1 (Strg Agr)	0	0.0	0	0.0	0	0.0	0	0.0
2	0	0.0	1	4.0	4	10.0	5	4.9
3	7	18.5	4	16.0	5	12.5	16	15.5
4	10	26.3	7	28.0	13	32.5	30	29.1
5 (Strg Dis)	21	55.3	13	52.0	18	45.0	52	50.5

medium achievement level, 80.0% of the group

disagreed/strongly disagreed with the statement. In the

high achievement group 77.5% disagreed or strongly

disagreed with the statement. Only 4.9% of the 103

subjects agreed with the statement and no respondent

strongly agreed.

Table 3-E reports on statement #8: I feel the

computer program helped me review for the final unit exam.

Table 3-E

CRAM Evaluation Survey

Statement #8

Statement: I feel the computer program helped me review

for the final unit exam.

SRA levels:	1 (Low)		2 (Medium)		3 (High)		Total	
Responses	#	%	#	%	#	%	#	%
1 (Strg Agr)	13	34.2	13	52.0	19	47.5	45	43.7
2	12	31.6	7	28.0	16	40.0	35	34.0
3	12	31.6	4	16.0	4	6.0	20	19.4
4	0	0.0	1	4.0	0	0.0	1	1.0
5 (Strg Dis)	1	2.6	0	0.0	1	2.5	2	1.9

Of the 103 respondents 2.9% either disagreed or strongly

disagreed with the statement, 19.4% assumed a neutral

position, and 77.7% agreed/strongly agreed with it. The

high achievement group reported 40.0% agreed and 47.5%

strongly agreed, 87.5% of the total subgroup. The medium

level reported 80.0% of the group in agreement with the

statement, 28.0% agreed and 52.0% strongly agreed. Of the

low achievement, 65.8% group either agreed or strongly

agreed with the statement. However, 31.6%

of the low level group assumed a neutral position

regarding the survey statement.

Table 3-F

CRAM Evaluation Survey

Statement #9

Statement: I enjoyed reviewing for the exam in this
            manner.

SRA levels:	1 (Low)		2 (Medium)		3 (High)		Total	
Responses	#	%	#	%	#	%	#	%
1 (Strg Agr)	14	36.8	16	64.0	23	57.5	53	51.5
2	16	42.1	8	32.0	9	22.5	33	32.0
3	5	13.2	1	4.0	5	12.5	11	10.7
4	1	2.6	0	0.0	3	7.5	4	3.9
5 (Strg Dis)	1	2.6	0	0.0	0	0.0	1	1.0

Statement #9, I enjoyed reviewing for the exam in
this manner, is summarized in Table 3-F. 83.5% of the
subjects who used CRAM either agreed or strongly agreed
with this statement. Of the three achievement groups,
78.9% of the low level, 80.0% of the high level, and 96.0%
of the medium level, agreed or strongly agreed with the
statement.

Table 3-G. statement #10, I would use the computer

Table 3-G

CRAM Evaluation Survey

Statement #10

Statement: I would use the computer review if given the
chance in the future to prepare for a U.S.
History unit exam.

SRA levels:	1 (Low)		2 (Medium)		3 (High)		Total	
Responses	#	%	#	%	#	%	#	%
1 (Strg Agr)	22	57.9	15	60.0	26	65.0	63	61.2
2	9	23.7	8	32.0	9	22.5	26	25.2
3	5	13.2	2	8.0	4	10.0	11	10.7
4	1	2.6	0	0.0	1	2.5	2	1.9
5 (Strg Dis)	1	2.6	0	0.0	0	0.0	1	1.0

review if given the chance in the future to prepare for a U. S. History unit exam, found 86.4% of the experimental group agreeing or strongly agreeing with the statement. Of the total, 2.9% indicated that they disagreed/strongly disagreed with the statement and 10.7% assumed a neutral position toward the statement. Within the three groups, 92.0% of the medium level, 91.6% of the low level, and 87.5% of the high level agreed/strongly agreed with the statement.

Table 3-H

CRAM Evaluation Survey

Statement #11

Statement: I learned something new by using the computer review.

SRA levels:	1 (Low)		2 (Medium)		3 (High)		Total	
Responses	#	%	#	%	#	%	#	%
1 (Strg Agr)	10	26.3	11	44.0	13	32.5	34	33.0
2	18	47.4	7	28.0	16	40.0	41	39.8
3	8	21.1	5	20.0	7	17.5	20	19.4
4	1	2.6	1	4.0	3	7.5	5	4.9
5 (Strg Dis)	1	2.6	1	4.0	1	2.5	3	2.9

Statement #11, reported in Table 3-H, was: I learned something new by using the computer. Cummulatively, 72.8% of the respondents either agreed or strongly agreed, 39.8% and 33.0% respectively, with the statement. In the medium achievement group, 28.0% agreed and 44.0% strongly agreed, 72.0% of the subgroup. In the high achievement group, 40.0% agreed and 32.5% strongly agreed, 72.5% of the group. And in the low achievement group, 73.7% of the total group, respectively 47.4% and 26.3% agreed and strongly agreed, with the statement. Of the entire experimental group, 19.4% reported a neutral response and 7.8% either disagreed or strongly disagreed with the statement.

Using the computer review program encouraged me to study for the final unit exam, was statement #12 summarized by Table 3-I. Of the medium achievement group, 68.0% agreed/ strongly agreed with the statement, while 24.0% took a neutral position, and no one disagreed/strongly disagreed. In the low achievement group, 52.6% either agreed or strongly agreed, 23.7% and 28.9% respectively, with the statement, 26.3% responded neutrally, and 21.0% either disagreed or strongly disagreed with the statement. In the high achievement group, 40.0% agreed/strongly agreed, 35.0% were neutral, and 22.5% disagreed/strongly disagreed. Finally, when all

Table 3-I

CRAM Evaluation Survey

Statement #12

Statement: Using the computer review program encouraged me to study for the final unit exam.								

SRA levels:	1 (Low)		2 (Medium)		3 (High)		Total	
Responses	#	%	#	%	#	%	#	%
1 (Strg Agr)	11	28.9	8	32.0	7	17.5	26	25.2
2	9	23.7	9	36.0	9	22.5	27	26.2
3	10	26.3	6	24.0	14	35.0	30	29.1
4	7	18.4	0	0.0	7	17.5	14	13.6
5. (Strg Dis)	1	2.6	0	0.0	2	5.0	3	2.9

three groups are examined together 51.4% agreed or strongly agreed, 16.5% disagreed or strongly disagreed, and 29.1% were neutral.

Statement #13, Table 3-J, How would you rate your overall experience with the computer review program, calls for the subject to judge the experience on a scale ranging from very positive to very negative. Of the 103 respondents, 2.9% rated it as negative or very negative, 17.5% were neutral, and 77.6% rated the experience as

Table 3-J

CRAM Evaluation Survey

Statement #13

Statement: How would you rate your overall experience
with the computer review program.

SRA levels:	1 (Low)		2 (Medium)		3 (High)		Total	
Responses	#	%	#	%	#	%	#	%
1 (Very Pos)	9	23.7	11	44.0	13	32.5	33	32.0
2	17	44.7	11	44.0	19	47.5	47	45.6
3	10	26.3	2	8.0	6	15.0	18	17.5
4	0	0.0	0	0.0	2	5.0	2	1.9
5 (Very Neg)	1	2.6	0	0.0	0	0.0	1	1.0

---

positive or very positive. The medium achievement group

rated the experience as 44.0% positive and 44.0% very

positive. The high achievement group posited 47.5%

positive and 32.5% very positive. The low group reported

44.7% positive and 23.7% very positive. It also reported

a 26.3% neutral rating.

Table 3-K, statement #14 asks subjects, Would you

recommend this program to a friend reviewing for U.S.

History exams in the future? They were asked to respond

Yes, Probably Yes, or No. While 54.4% of the experimental

Table 3-K

CRAM Evaluation Survey

Statement #14

_____

Question: Would you recommend this program to a friend

reviewing for U.S. History exams in the future.

- -

SRA levels:	1 (Low)		2 (Medium)		3 (High)		Total	
Responses	#	%	#	%	#	%	#	%
1 (Yes)	18	47.4	16	64.0	22	55.0	56	54.4
2 (Prob Yes)	19	50.0	9	36.0	18	45.0	46	44.7
3 (No)	1	2.6	0	0.0	0	0.0	1	1.0

_____

group responded Yes, 44.7% answered Probably Yes, and 1.0%

responded with a No. Of those responding Yes, the high

achievement level reported 55.0%, the medium level 64.0%,

and the low level 47.4%.

The third part of the CRAM Evaluation survey asked

the subjects to respond to three open-ended questions.

These questions were:

15. What did you like best about the computer

program?

16. What did you like least about the computer

program?

      17. What other suggestions, comments, questions, or information could you, would you make about the computer program? (These can be positive or negative!!)

The following is a summary of the comments made by the 103 survey respondents who made up the treatment group.

The responses to question #15 were varied, ranging from one word responses to elaborate sentences. Among the responses (number in parentheses) to this question of what they like best were:

    a. It was fun (8)

    b. Made it easy to study (5)

    c. Tested your knowledge (3)

    d. Gave you immediate results (3)

    e. Questions imitated a test (6)

    f. Helped me study (10)

    g. Like to work with computers (3)

    h. Corrective feedback indicated strengths and weaknesses (11)

    i. Helped me remember questions and answers (2)

    j. Encouraged me to study (5)

    k. Learned from it (3)

    l. know what to study (4)

    m. Gave a second chance to answer (5)

    n. Asked questions student could not have

thought of while studying (6)

(Note: 9.7% of the subjects gave no response.)

Question #16 asked the subjects what they liked least about the CRAM program. Seventy-four of the subjects, 71.8%, stated that the computer program took too much time between questions as they appeared on the monitor. Other items included:

a. Questions hard to understand (2)

b. Not enough questions (2)

c. Repetition of questions when used several times (3)

d. Need class time for it (3)

e. Not enough time between questions after wrong answer given on second try (3)

Question #17 asked for additional comments or suggestions about CRAM. Forty-four of the subjects, 42.7%, made no additional comments. Those that were made included:

a. Have a greater variety of questions (11)

b. Took too much time between questions (10)

c. It was fun (2)

d. Made study easier (3)

e. Should be used in future (8)

A summary of the subject's affective responses to the use of CRAM may be achieved by examining the aggregate attitudes of each of the three achievement levels. A

higher percentage of the low achievement level enjoyed working with the computer and claimed to have learned more new material from CRAM than either the medium or high achievement levels. A smaller proportion of the low achivement level felt that CRAM helped them review for the unit exam, would use CRAM again, or would recommend its use to their friends than either the medium or high achievement levels.

The medium achievement level responded more positively than the low and high achivement level in the areas of enjoying a review using CRAM, claiming they would use it again, and recommending its use to their friends for future study. They were least enthusiastic of the three achievement levels in regarding the feedback as helpful, learning something new from CRAM, or enjoying the use of the computer.

A greater percentage of the high achievement level found CRAM's feedback helpful, and believed CRAM helped them review for the unit exam better than either of the other two achievement levels. A lower percentage of the high achievement level felt more encouraged to study for the unit exam after using CRAM than either of the other two achievement levels.

CHAPTER V

CONCLUSIONS

This chapter is composed of four sections. In the first part, the context, problem, research questions, and procedures of the study are summarized. The findings of the study are summarized in the second section. The instructional implications of the findings are suggested in the third. In the fourth section, issues and questions raised by the study are examined.

SUMMARY OF THE STUDY

Computer Review Assistance Modules (CRAM) are examples of adjunct computer-assisted instruction (CAI) material. The purpose of CRAM is to provide the student with an additional, supplemental means by which content mastery may be attained and successful completion of the unit exam may be achieved. CRAM provides the student with a non-traditional method of reviewing, immediate feedback, positive reinforcement, and a system to further enhance the cognitive encoding of information for later retrieval.

Research into the effectiveness of adjunct computer-assisted instruction material has concentrated in the fields of science, mathematics, and language arts; little has been done in the social studies. Furthermore, social

studies teachers are just beginning to make use of computers and computer-assisted instructional materials. CAI research has also concentrated on material which utilized large mainframe systems, sponsored by academic and commercial enterprises. CRAM, utilizing an easy to learn authoring language for microcomputers, is teacher written.

This research began as an attempt to determine the effectiveness of CRAM on unit test achievement. As the literature was reviewed and the study designed, it became apparent that the effectiveness of CRAM at varying student achievement levels was of interest. Student attitudes and reactions to CRAM were viewed as important, especially in the context of the social studies and the concerns expressed by professional social studies educators.

The Problem

This study was designed to determine the effectiveness, at varying levels of student achievement, of teacher written Computer Review Assistance Modules (CRAM) upon student achievement in United States history. Information was secured from those subjects who used CRAM regarding their attitudes toward the structure of this computer-assisted instruction material, the help provided by the reinforcers used, and their view of CRAM as a supplemental study method for unit test preparation.

Research Questions

There were three specific questions to be statistically analyzed in this study. They were:

1. Are there significant differences in achievement on the unit test between subjects who utilized teacher written Computer Review Assistance Modules (CRAM) in test preparation in United States history and those who did not?

2. Are there significant differences in achievement on the unit test, at varying student achievement levels, between students who utilized teacher written Computer Review Assistance Modules (CRAM) in test preparation in United States history and those who did not?

3. What are the subject's affective responses to the use of Computer Review Assistance Modules (CRAM) for unit test preparation?

Procedures

The study involved eleven United States history classes with approximately 250 secondary students. Five classes were randomly assigned to the control group and five to the treatment group.

Composite scores of the Science Research Associates (SRA) Achievement series were used to establish three

levels of achievement. These three groups--low, medium, and high--were used as blocking variables in determining CRAM effectiveness. Treatment consisted of the use of Computer Review Assistance Modules (CRAM) in preparation for the final unit exam. The final unit exam, or posttest, was used as the dependent variable to measure achievement of United States history content.

Simultaneously, the control group was given a study guide which paralleled the CRAM material. This procedure caused no disruption to normal classroom routine. All instructional methods and materials, with the exception of treatment, remained as prescribed by the school district's United States history curriculum and the United States history teaching team. After the posttest was given, the CRAM Evaluation survey was administered to the treatment group.

Analysis of variance was used to determine statistically significant differences between control and treatment groups. SPSS-X crosstabulation procedures were used on the survey material. The "N" of the study was 216.

SUMMARY OF FINDINGS

An analysis of the data resulted in the findings related to the research question posed in Chapter I.

1. The utilization of CRAM resulted in no statistically significant difference between the mean scores of those subjects who used CRAM and those that did not leading to the inference that no treatment effect occurred.

2. At the low, medium, and high achievement levels there was no statistically significant difference between the mean scores. The inference is that a treatment effect had not occurred at any of the three achievement levels.

3. According to the CRAM Evaluation survey of those subjects who utilized the program:

   a. 82.6% had no problem finding a computer on which to use CRAM.

   b. 65.0% felt that the immediate feedback was helpful in locating their weaknesses.

   c. 87.4% enjoyed working with the computer program.

   d. 79.6% did not find working with the computer cold and impersonal.

   e. 77.7% believed that the computer program helped them review for the final unit exam.

   f. 83.5% enjoyed reviewing for the exam in this manner.

   g. 86.4% would use the computer review if

given the chance in the future to

prepare for a United States history unit

exam.

h. 72.8% believed they learned something

new by using the computer review.

i. 51.4% felt that using the computer

review program encouraged them to study

for the final exam.

j. 77.6% rated the overall experience with

the computer review program a positive

one.

k. 54.4% would recommend the use of this

program to a friend reviewing for United

States history exams in the future.

l. a large majority indicated, from free

responses, that they wished to eliminate

the waiting periods between questions

which had been programmed into CRAM.

INSTRUCTIONAL IMPLICATIONS

Implications for instruction, which are suggested by

this study, fall into two catagories of importance--

statistical and practical. The statistical analysis

suggests, in this instance, that no difference exists

between the performance of those that use CRAM in final

unit test preparation and those who used a more
traditional study guide. CRAM usage apparently did not
result in any detectable effect upon posttest performance.
Such was also the case when the subjects were divided into
low, medium, and high achievement levels and CRAM usage
was compared to the traditional review method.

Despite a lack of statistically detectable treatment
effect by CRAM, certain practical implications for social
studies education might be suggested. A close examination
of mean score student performance on the posttest in
combination with student survey responses suggests that
CRAM material may have a place in the classroom. The mean
score of all students who used CRAM was slightly higher
than the mean score of all those students who did not use
CRAM.

Of further pratical interest is the student response
to the Computer Review Assistance Modules. Students,
generally, enjoyed working with the computer and reviewing
for the exam in this manner. They also believed CRAM
helped them in their review by posing simulated test
questions which they themselves could not or would not
have considered on their own. Interestingly, the low
achievement group reported a 31.6% neutral position toward
CRAM as a help in review.

Few students, only 4.9%, found the computer to be
cold and impersonal, and many found the immediate feedback

beneficial. Although 65.0% found the immediate feedback
to be helpful, 25.9% took a neutral position to it, and
9.7% disagreed/strongly disagreed. It would appear that a
substantial number of students may not have used the cues,
hints, and suggestions for study built into CRAM to the
fullest possible degree.

Students found that CRAM was not only a review but
also instructional. Although CRAM covered only the basic
knowledge and concepts that had been covered in regular
instruction, for any number of reasons a significant
number of students regarded parts of CRAM as initial
instruction. As such, CRAM provided some subjects with
the advantage of repeated instruction.

From the viewpoint of social studies instruction CRAM
might be used as a means to vary instructional techniques
and increase student interest in the subject. The use of
CRAM also provided additional motivation for students to
study--providing them with direction or parameters while
revealing to them their strengths and weaknesses. From an
instructional perspective CRAM might be viewed as a tutor
or quide when the teacher is not available to the student.
Since CRAM was not viewed as impersonal the student may
find CRAM less judgmental than their instructor, the
display of weak content mastery less embarassing, and the
use of CRAM more conducive to their own learning style.
Some students may in fact prefer to use CRAM rather than

work with the teacher.

CRAM is relatively inexpensive to produce with regard to both time and money expended. It is easily modifiable, and once the paradigm has been learned by the teacher, it may be applied to many curricular situations. The paradigm used by CRAM may, however, necessitate modification based upon student feedback. A specified amount of time was programmed to pass between presented questions. The purpose of this waiting period was to allow students time to take notes or consult class notes or the textbook. Based upon the survey, it would appear that the waiting period was either not necessary, not profitably used, or simply not desirable. Another implication may be that the students need more teacher direction on the reason the time is present within the program, and the ways CRAM might be effectively utilized by the student.

RECOMMENDATIONS, ISSUES, AND QUESTIONS

A number of possible recommendations, issues, and questions have arisen during the course of this study. Although, they are only indirectly related to this specific study and no definite answers may be provided, their examination at this time may lead to investigation in the future.

The first issue deals with the performance on the posttest by the subjects in the three ability groups who used CRAM. The results are contrary to the box-score and meta-analysis reviewers who found that the benefits of CAI were significant and applicable across aptitude levels. However, since little research has been done in the social studies regarding the effectiveness of CAI, the results of this study should be viewed as initial. The study should be replicated to ascertain whether the effects of CRAM are unique to this sample or are consistently of no statistical significance.

A second and more important issue centers upon the impact of CRAM as a motivational device for student study and improved performance. Collectively, 51.4% asserted that the use of CRAM encouraged them to study more. The question arises as to whether the encouragement the subjects assert was provided by the use of CRAM resulted in a quantitative improvement in performance or a qualitative improvement. As determined, the quantitative differences appear to be negligible. However, there is the possibility that CRAM provided its users with a feeling of self-confidence or self-assurance resulting from having experienced a simulated testing situation and perhaps spending more time in test preparation than normal. Did those who used CRAM spend more time or less than they normally would have in final unit test

preparation?

An issue that arises from a reading of the free
responses to the open-ended questions on the CRAM
Evaluation survey focuses upon the student's need for more
compatible and even more enjoyable learning situations.
The students regarded CRAM as enjoyable and many wrote
that they would use it again in United States history.
Several suggested that this method of review and study be
applied to other curricular areas. Consequently, how does
adjunct CAI, such as CRAM, fit into the different modes of
learning that each student possesses? CAI requires a
student to interact, through the keyboard, and to read
from the monitor utilizing both visual and kinesthetic
modes of learning. This may be of benefit in contrast to
their being a passive and sometimes non-attentive learner
as sometimes happens in the classroom. With this in mind,
and since the microcomputer and authoring language upon
which CRAM is based can utilize graphics, sound--including
voice, and computer activated laser disc material, would
these additions to the CRAM paradigm help or hinder
student usage and performance?

The paradigm around which CRAM was programmed was a
traditional multiple choice, response, second chance,
corrective feedback model that began in programmed
instruction and has been borrowed for use in computer-
assisted instruction. Two questions arise based upon

student response and performance. What kind of reinforcer should be used and to what degree should CRAM provide remedial instruction? With only slight modification CRAM could be adapted to provide remedial instruction rather than only the correct answer and the location of the information. If this were done, would performance levels be enhanced? Both reinforcers and the possibility for remedial instruction will improve when computer technology, hardware and software, incorporates CAI which utilizes artificial intelligence, thereby allowing for greater student individualization by the the computer.

CRAM incorporated questions which would be catagorized in the first three levels of Bloom's Taxonomy--knowledge, comprehension, and application. A number of students in the free-response section of the survey called for a greater diversity of questions and increasing the degree of difficulty of the questions. It is not known if what the students were calling for would be questions which cover the three upper catagories of Bloom's Taxonomy. If the questions in CRAM were to be diversified, would the effect upon student performance improve or not? A further consideration would be, can the existing limitations of computer software and hardware accommodate such levels of questioning which might well require the student to respond freely rather than choose from listed choices?

Finally, one thing this study attempted to maintain was the reality of educational settings while recognizing practical limitations of time, logistics regarding available machinery, and personnel constraints. It was felt that this was necessary for the use of CRAM and other adjunct CAI material will not take place in the vacuum of a laboratory or in a special academic/learning environment. Therefore, one must wonder about the performance of CRAM users under a different set of circumstances and in a more controlled environment. Such a variable as the time lag between the initial teaching of a fact or concept, the use of CRAM, and the posttest, if narrowed, may posit different results. Nevertheless, CRAM, in this instance, was tested in a real-life educational setting, wherein it would be used.

Thus, the value of CRAM in the social studies becomes an issue. As described in Chapter II, social studies teachers have avoided using computers and, to date, little formal study of their use and effectiveness has been undertaken in social studies. This study is but a beginning.

Closely related to the issue of the question types contained in CRAM is the debate regarding the type of CAI to be used in social studies education. Drill and practice, tutorials, simulations, and CRAM might contribute to the knowledge approach in social studies

education. CAI which concentrates on skills development,
such as problem-solving, is also necessary. Research into
the effective use of computers within both approaches in
social studies education must be pursued if optimum use of
computers is to ever be achieved.

More importantly, however, social studies educators
must recognize and understand the impact of computer
technology on contemporary society. Such steps are being
taken in futuristic studies, but social studies teachers
must come to grips with the fact that computers are not
only the object of instruction; but they can also be the
means of, as well as an aid to, instruction. It is just
that the question remains concerning what place and role
that might be and whether social studies teachers will
accept a leadership position in the use of computers.

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Appendix A

Print of lesson HELLO


```
t:*************************************
t:*                                   *
*:*                                   *
t:*            U.S. HISTORY           *
t:*                                   *
t:*                                   *
t:* COMPUTER REVIEW ASSISTANCE MODULE *
t:*                                   *
t:*                                   *
t:*             CREATED BY            *
t:*                                   *
t:*                                   *
t:*        MARK W. FELDHAUSEN         *
t:*                                   *
t:*                                   *
t:*                                   *
th:*  Press Space Bar To Continue...  *
t:*************************************
as:
g:es
i:C1
```


Print of lesson C1


```
*Intro
t:            U.S. CONSTITUTION
t:
t:
t:This review quiz is designed to help
t:you study for the test on the
t:Constitution Unit in U.S. History.
t:
t:Written by Mark W. Feldhausen
t:Ralston High School, Ralston, NE
t:July, 1983
t:
t:Choose the best answer possible.
t:Type only the letter of your choice
t:before you press "return".  No other
t:information is needed.
t:
t:
t:Good Luck!
t:
t:
t:
th:    Press Space Bar To Continue
as:
w:2
g:es
j:numquest
*numquest
t:This practice review contains a file
```

```
t:of 40 questions.  You may do between
t:5 and 20 questions at a time. The
t:program selects questions randomly,

t:therefore, it is suggested that you go

t:through this review at least twice so
t:that you may experience the majority
t:of the questions.  Remember this pro-
t:gram keeps score for you and selects
t:questions so that no question is
t:repeated during any single run through
t:this review.  Because of these condi-
t:tions you may have to be patient while
t:the computer finds a question you have
t:not yet seen. Have fun!!!!!

t:
t:
t:How many questions do you wish to
:try?
t:
a:#q
m:5!6!7!8!9!10!11!12!13!14!15!16!17!18!
:19!20
t:
tn:The number must be between
:5 and 20. Try again, please!
ty:Thank you!
w:2
g:es
jn:numquest

c:t=-1
c:s=-1
c:s2=0
c:n=0
c:x1=0
c:x2=0
c:x3=0
c:x4=0
c:x5=0
c:x6=0
c:x7=0
c:x8=0
c:x9=0
c:y0=0
c:y1=0
c:y2=0
c:y3=0
c:y4=0
c:y5=0
c:y6=0
c:y7=0
c:y8=0
c:y9=0
c:z0=0
c:z1=0
c:z2=0
c:z3=0
c:z4=0
c:z5=0
c:z6=0
c:z7=0
c:z8=0
c:z9=0
```

```
c:w0=0
c:w1=0
c:w2=0
c:w3=0
c:w4=0
c:w5=0
c:w6=0
c:w7=0
c:w8=0
c:w9=0
c:b0=0
*score
c:s=s+1
j:questions
*score2
c:s2=s2+1
j:qustions
*questions
c:t=t+1
j:options
*options
c:n=n+1
l(n>q):C3,end
j:random
*random
c:x=(RND(41))
j(x=1):1
j(x=2):2
j(x=3):3
j(x=4):4
j(x=5):5
j(x=6):6
j(x=7):7
j(x=8):8
j(x=9):9
j(x=10):10
j(x=11):11
j(x=12):12
j(x=13):13
j(x=14):14
j(x=15):15
l(x=16):C2,16
l(x=17):C2,17
l(x=18):C2,18
l(x=19):C2,19
l(x=20):C2,20
l(x=21):C2,21
l(x=22):C2,22
l(x=23):C2,23
l(x=24):C2,24
l(x=25):C2,25
l(x=26):C2,26
l(x=27):C2,27
l(x=28):C2,28
l(x=29):C2,29
l(x=30):C2,30
l(x=31):C3,31
l(x=32):C3,32
l(x=33):C3,33
l(x=34):C3,34
l(x=35):C3,35
l(x=36):C3,36
l(x=37):C3,37
l(x=38):C3,38
l(x=39):C3,39
l(x=40):C3,40
```

```
*1
r:Question #1
c:x1=x1+1
j(x1>1):random
j(x1+1):q1
*q1
t:A government in which the political
t:rulers and church elders (clergy) are
t:one and the same would be known
t:as a(n) ?
t:
t:A. Oligarchy
t:B. Tyranny
t:C. Federalism
t:D. Theocracy
t:
t:
pr:us
a:
m:D
t:
ty:Well done!
tn1:Let's try again: you know this one.
tn2:Study those terms. The answer is D
w:3
g:es
jy1:score
jy2:score2
jn1:q1
jn2:questions
g:es
*2
r:Question #2
c:x2=x2+1
j(x2>1):random
j(x2=1):q2
*q2
t:The idea of three branches of
t:government each checking the others
t:power was the idea of ?
t:
t:A. Rousseau
t:B. Montesquieu
t:C. Locke
t:D. Jefferson
t:
t:
pr:us
a:
m:B
t:
ty:Excellent!
tn1:Think again!
tn2:Sorry, the answer is B
w:3
g:es
jy1:score
jy2:score2
jn1:q2
jn2:questions


g:es
```

```
*3
r:Question #3
c:x3=x3+1
j(x3>1):random
j(x3=1):q3
*q3
t:A loosely knit cooperative between
t:the states in which the state viewed
t:itself as superior to the cooperative
t:body is a(n) ?
t:
t:A. Federal System
t:B. Democracy
t:C. Republic
t:D. Confederation
t:
t:
pr:us
a:  .
m:D
t:
ty:Magnificent!
tn1:Better study those types of
tn1:governments. Lrt's try again.
tn2:Study!!! The answer is D
w:3
g:es
jy1:score
jy2:score2
jn1:q3
jn2:questions

g:es
*4
r:Question #4
c:x4=x4+1
j(x4>1):random
j(x4=1):q4
*q4
t:Which of the following concepts was
:not a part of the newly written and
t:implemented state constitutions
:immediately after the Revolutionary
t:War?
t:
t:A. a written document
t:B. separation of powers
t:C. abolition of slavery
t:D. separation of church and state
t:E. None of the Above
t:
t:
pr:us
a:
m:C
t:
ty:Great job!
tn1:Think again. please.
tn2:Sorry! The answer is C
w:3
g:es
jy1:score
jy2:score2
jn1:q4
jn2:questions
g:es
```

```
+5
r:Question #5
c:x5=x5+1
j(x5>1):random
j(x5=1):q5
+q5
t:A republican form of government may
:be defined as one in which the
:citizens
t:
t:A. all have the right to vc.e and
t:   make laws
t:B. may elect representatives who vote
t:   and make laws for them
t:C. select a small ruling body.
t:   usually from the wealthy to rule
t:D. None of the Above
t:
pr:us
a:
m:B
t:
ty:Well thought out!
tn1:Now really! Try again.
tn2:You really need to study. The
tn2:answer is B
w:3
g:es
jy1:score
jy2:score2
jn1:q5
jn2:questions
g:es
+6
r:Question #6
c:x6=x6+1
j(x6>1):random
j(x6=1):q6
+q6
t:If you believed in a strong central
t:government you would have been known
:as a(n) ?
t:
t:A. Sovereignist
t:B. Federalist
t:C. Anti-Federalist
t:D. Loyalist
t:
t:
pr:us
a:
m:B
t:
ty:Superb!
tn1:Please try again.
tn2:Sorry! The answer is B
w:3
g:es
jy1:score
jy2:score2
jn1:q6
jn2:questions
g:es
+7
r:Question #7
c:x7=x7+1
```

```
j(x7>1):random
j(x7=1):q7
*q7
t:The decision by the states under the
:Articles of Confederation that rivers
:be recognized as boundaries occurred
:at the ?
t:
t:A. Mt. Vernon Conference
t:B. Annapolis Conf rence
t:C. Constitutiona Convention
t:D. New York Conf erence
t:
t:
pr:us
a:
m:A
t:
ty:Super!
tn1:Think again. It's important that
tn1:you know the differences between
tn1:these conferences!
tn2:Sorry! Study some more! The
tn2:answer is A
w:3
g:es
jy1:score
jy2:score2
jn1:q7
jn2:questions
g:es
*8
r:Question #8
c:x8=x8+1
j(x8>1):random
j(x8=1):q8
*q8
t:Which of the following was not a part
t:of the Land Ordinance of 1785?
t:
t:A. land would be surveyed into
t:   townships
t:B. land would be allocated for public
t:   and government use
t:C. specific provisions for governing
t:   the area was included
t:D. Section 16 was set aside for
t:   public education
t:
t:
pr:us
a:
m:C
t:
ty:Nicely done!
tn1:Don't confuse this with the
tn1:Northwest Ordinance. Try again.
tn2:Sorry. The answer is C
w:3
g:es
jy1:score
jy2:score2
jn1:q8
jn2:questions
g:es
*9
```

```
r:Question #9
c::x9=x9+1
j(x9>1):random
j(x9=1):q9
*q9
t:According to the Treaty of Paris
:(1783)
t:
t:A. American territory stretched from
t:   the Atlantic to tne Mississippi
t:   River, and from the Great Lakes
t:   to F.orida
t:B. the colonies became free and
t:   independent
t:C. the colonists received the right
t:   to fish off Newfoundland
t:D. All of the Above
t:E. A & B Above
t:
t:
pr:us
a:
m:D
t:
ty:Excellent!
tn1:Sorry, try again.
tn2:Better study the Treaty. The answer
tn2:is D
w:3
g:es
jy1:score
jy2:score2
jn1:q9
jn2:questions
g:es
*10
r:Question #10
c:y0=y0+1
j(y0>1):random
j(y0=1):q10
*q10
t:According to the Land Ordinance of
t:1785 a section of land
t:
t:A. was 1 mile square
t:B. consisted of 640 acres
t:C. was called a township
t:D. All of the Above
t:E. A & B Above
t:
t:
pr:us
a:
m:E
t:
ty:Fantastic!
tn1:Reread the questiuon carefully.
tn2:The answer is E
w:3
g:es
jy1:score
jy2:score2
jn1:q10
jn2:questions
g:es
*11
```

```
r:Question #11
c:y1=y1+1
j(y1>1):random
j(y1=1):q11
*q11
t:According to the Nothwest Ordinance
t:of 1787 a constitution could be
:written and Congress petitioned for
t:statehood when the population of a
:territory had reached how many free
: nhabitants?
  :
t:A. 5,000
t:B. 30,000
t:C. 50,000
t:D. 60,000
t:E. 100,000
t:
t:
pr:us
a:
m:D
t:
ty:Stupendous!
tn1:Think again!
tn2:Better study. The answer is D
w:3
g:es
jy1:score
jy2:score2
jn1:q11
jn2:questions
g:es
*12
r:Question # 12
c:y2=y2+1
j(y2>1):random
j(y2=1):q12
*q12
t:Which of the following states was not
:created out of the Old Northwest
:Territory?
t:
t:A. Wisconsin
t:B. Minnesota
t:C. Ohio
t:D. Indiana
t:E. Michigan
t:F. None of the Above
t:
t:
pr:us
a:
m:B
t:
ty:Awesome!
tn1:Better study the geography of the
tn1:time period. Try again.
tn2:You really need to study! The
tn2:answer is B
w:3
g:es
jy1:score
jy2:score2
jn1:q12
jn2:questions
```

```
g:es
+13
r:Question #13
c:y3=y3+1
j(y3>1):random
j(y3=1):q13
*q13
t:In the Constitution, powers held only
:by the states are called?
t:
t:A. Delegated Powers
t:B. Reserved Powers
t:C. Concurrent Powers
t:D. Enumerated Powers
t:
t:
pr:us
a:
m:B
t:
ty:Good job!
tn1:Think again!
tn2:Sorry. The answer is B
w:3
g:es
jy1:score
jy2:score2
jn1:q13
jn2:questions
g:es
+14
r:question #14
c:y4=y4+1
j(y4>1):random
j(y4=1):q14
*q14
t:The right to coin money and declare
:war are examples of ?
t:
t:A. Delegated Powers
t:B. Reserved Powers
t:C. Concurrent Powers
t:D. Shared Powers
t:
t:
pr:us
a:
m:A
t:
ty:Well thought out!
tn1:Think about it before you answer!
tn2:Think harder next time! The
tn2:answer is A
w:3
g:es
jy1:score
jy2:score2:
jn1:q14
jn2:questions
g:es
+15
r:Question # 15
c:y5=y5+1
j(y5>1):random
j(y5=1):q15
*q15
```

```
t:The Virginia Plan called for
t:
t:A. representation by population
t:B. a strong President
t:C. seven supreme court justices
t:D. equal representation
t:
t:
pr:us
a:
m:A
t:
ty:Excellent!
tn1:Think large! Try again
tn2:You didn't think large enough.
tn2:The answer is A
w:3
g:es
jy1:score
jy2:score2
jn1:q15
jn2:questions
g:es
```

Print of lesson C2

```
*16
r:Question #16
c:y6=v6+1
l(v6>1):C1.random
j(v6=1):q16
*q16
t:The New Jersey Plan called for?
t:
t:A. representation by population
t:B. a weak president
t:C. no judicial branch
t:D. equal representation
t:
t:
pr:us
a:
m:D
t:
ty:Magnificent!
tn1:Think small. Try agasin.
tn2:Sorry! The answer is D
w:3
g:es
ly1:C1.score
lv2:C1.score2
jn1:q16
ln2:C1.questions
g:es
```

```
r:Question #17
c:y7=y7+1
l(y7>1):C1.random
j(y7=1):q17
*q17
t:The supreme court, as outlined in the
t:Constitution, has how many judges?
t:
t:A. 3
t:B. 5
t:C. 7
t:D. 9
t:E. 11
t:F. 13
t:
t:
pr:us
a:
m:D
t:
ty:Nicely done!
tn1:You can do better. Try again.
tn2:Sorry! The answer is D
w:3
g:es
ly1:C1.score
ly2:C1.score2
jn1:q17
ln2:C1.questions
g:es
*18
r:Question #18
c:y8=y8+1
l(y8>1):C1.random
j(y8=1):q18
*q18
t:To enforce the laws of the country is
:the duty of which branch of
:government?
t:
t:A. Legislative
t:B. Executive
t:C. Judicial
t:D. All of the Above
t:
t:
pr:us
a:
m:B
t:
ty:Super!
tn1:Think again.
tn2:Better study the function of each
tn2:branch of government. The answer
tn2:is B
w:3
g:es
ly1:C1.score
ly2:C1.score2
jn1:q18
ln2:C1.questions
g:es
*19
r:Question #19
c:y9=y9+1
l(y9>1):C1.random
```

```
j(y9=1):q19
*q19
t:To be elected President of the U.S.
t:one must have reached the age of ?
t:
t:A. 25
t:B. 30
t:C. 35
t:D. 40
t:E. 45
t:
t:
pr:us
a:
m:C
t:
ty:Superb!
tn1:Think President! Try again.
tn2:Sorry! The answer is C
w:3
g:es
ly1:C1.score
ly2:C1.score2
jn1:q19
ln2:C1.questions
g:es
*20
r:Question #20
c:z0=z0+1
l(z0>1):C1.random
j(z0=1):q20
*q20
t:The length of a term of office for a
t:senator is ?
t:
t:A. 2 years
t:B. 4 years
t:C. 6 years
t:D. None of the Above
t:
t:
pr:us
a:
m:C
t:
ty:Brilliant!
tn1:How many? Try again.
tn2:You need to study. The answer is C
w:3
g:es
ly1:C1.score
ly2:C1.score2
jn1:q20
ln2:C1.questions
g:es
*21
r:Question #21
c:z1=z1+1
l(z1>1):C1.random
j(z1=1):q21
*q21
t:Which of the following is not a
:method of imposing the checks and
:balances on the President?
t:
t:A. impeachment
```

```
t:B. the veto
t:C. the override
t:D. None of the Above
t:
t:
pr:us
a:
m:B
t:
ty:Perfect!
tn1:Which is not used against the
tn1:President? Try again!
tn2:Better study! The answer is B
w:3
g:es
ly1:C1.score
ly2:C1.score2
jn1:q21
ln2:C1.questions
g:es
*22
r:Question #22
c::z2=z2+1
l(z2>1):C1.random
j(z2=1):q22
*q22
t:Which of the following best describes
:the weaknesses of the Congress under
:the Articles of Confederation?
t:
t:A. no power to make laws
t:B. no power to enforce laws
t:C. no power to control interstate
t:   trade
t:D. All of the Above
t:E. B & C Above
t:
t:
pr:us
a:
m:E
t:
ty:Well thought out!
tn1:Let's try this one again!
tn2:Better study the Articles a little
tn2:more closely. The answer is E
w:3
g:es
ly1:C1.score
ly2:C1.score2
jn1:q22
ln2:C1.questions
g:es
*23
r:Question #23
c::z3=z3+1
l(z3>1):C1.random
j(z3=1):q23
*q23
t:The counting of five slaves to be
:equal to three free whites was a
:compromise related to which of the
:following issues?
t:
t:A. trade and voting
t:B. trade and taxation
```

```
t:C. taxes only
t:D. taxation and voting
t:E. voting only
t:
t:     `
pr:us
a:
m:D
t:
ty:Superb! This one was tricky.
tn1:Think again this one is trcky.
tn2:Better look at the differences
tn2:between the 3/5's compromise and
tn2:the.commerce compromise. The
tn2:answer is D
w:3
g:es
ly1:C1,score
ly2:C1,score2
jn1:q23
ln2:C1,questions
g:es
*24
r:Question #24
c::z4=z4+1
l(z4>1):C1,random
j(z4=1):q24
*q24
t:The Constitutional Convention met in
:Philidelphia in what year?
t:
t:A. 1781
t:B. 1783
t:C. 1787
t:D. 1789
t:E. 1791
t:
t:
pr:us
a:
m:C
t:
ty:Good job!
tn1:Please try again.
tn2:Sorry. The answer is C
w:3
g:es
ly1:C1,score
ly2:C1,score2
jn1:q24
ln2:C1,questions
g:es
*25
r:Question #25
c::z5=z5+1
l(z5>1):C1,random
j(z5=1):q25
*25
t:Which of the following means to
:accept or approve?
t:
t:A. veto
t:B. ratify
t:C. override
t:D. judicial review
+.
```

```
t:
pr:us
a:
m:B
t:
ty:Perfect!
tn1:Let's try again!
tn2:You need to study the term sheet!
tn2:The answer is B
w:3
g:es
ly1:C1.score
ly2:C1.score2
jn1:q25
ln2:C1.questions
g:es
+26
r:Question #26
c:z6=z6+1
l(z6>1):C1.random
j(z6=1):q26
*q26
t:To make an act illegal after it has
:been committed is to pass what kind of
:law?
t:
t:A. Bill of Attainder
t:B. Ex Post Facto
t:C. Writ of Habeus Corpus
t:D. Nolo Contendere
t:
t:
pr:us
a:
m:B
t:
ty:Fantastic!
tn1:Think "after"! Try again.
tn2:The answer is B
w:3
g:es
ly1:C1.score
ly2:C1.score2
jn1:q26
ln2:C1.questions
g:es
*27
r:Question #27
c:z7=z7+1
l(z7>1):C1.random
j(z7=1):q27
*q27
t:To be elected a member of the House
:of Representatives you must be:
t:
t:A. 25 yrs. old & 7 yrs. a citizen
t:B. 30 yrs. old & 9 yrs. a citizen
t:C. 35, native born, & 14 yrs. a
t:   citizen
+:D. 35 yrs. old & 7 yrs a citizen
t:
t:
pr:us
a:
m:A
-:
```

```
ty:Fine job!
tn1:Think again!
tn2:Study those qualifications for
tn2:elected officials. The answer is A
w:3
g:es
ly1:C1,score
ly2:C1,score2
jn1:q27
ln2:C1,questions
g:es
*28
r:Question #28
c::8=:8+1
l(:8>1):C1.random
j(:8=1):q28
*q28
t:The Suprem Court's right to examine a
:law and pass on its constitutionality
:is known as?
t:
t:A. the Supreme Right of the Judicial
t:    Branch
t:B. Judical Review
t:C. the question of constitutionality
t:D. the decision of the bench
t:
t:
pr:us
a:
m:B
t:
ty:Superb!
tn1:C'mon, you know this! Try again.
tn2:Study!!!!! The answer is B.
w:3
g:es
ly1:C1,score
ly2:C1,score2
jn1:q28
ln2:C1.questions
g:es
*29
r:Question #29
c::9=:9+1
l(:9>1):C1.random
j(:9=1):q29
*q29
t:The first ten amendments to the
:Constitution are known as the?
t:
t:A. Civil Liberties
t:B. Bill of Rights
t:C. Rights and Responsibilities
t:D. the Protection of Fundamental
t:    Liberties
t:
t:
pr:us
a:
m:B
t:
ty:Magnificent!
tn1:You know this one, try again.
tn2:Did you read the questiuon?
tn3:The answer is B
```

```
w:3
g:es
ly1:C1,score
ly2:C1,score2
jn1:q29
ln2:C1,questions
g:es
*30
r:Question #30
c:w0=w0+1
l(w0>1):C1.random
j(w0=1):q30
+q30
t:Which of the following provided
:assistance to the founding fathers in
:writing the Constitution?
t:
t:A. The Magna Carta
t:B. the Right of Petititon
t:C. the Mayflower Compact
t:D. the Declaration of Independence
t:E. All of the Above
t:F. C & D Above
t:
t:
pr:us
a:
m:E
t:
tv:Well thought out!
tn1:Let's try again.
tn2:Sorry. The answer is E
w:3
g:es
ly1:C1.score
ly2:C1.score2
jn1:q30
ln2:C1,questions
g:es
```

```
Print of lesson C3
```

```
*31
r:Question #31
c:w1=w1+1
l(w1>1):C1.random
j(w1=1):q31
+q31
t:In Congress, under the Articles of
:Confederation, each state was entitled
:to how many votes?
t:
t:A. it depended on their population
t:B. it depended on their geographic
t:   size
t:C. one vote each
t:D. between 2 & 5
t:
t:
pr:us
a:
```

```
m:C
t:
ty:Excellent
tn1:Remember the differences between
tn1:the A of C and the Constitution.
tn1:Try again.
tn2:Better Study! The answer is C
w:3
g:es
ly1:C1,score
ly2:C1,score2
jn1:q31
ln2:C1,questions
g:es
*32
r:Question #32
c:w2=w2+1
l(w2>1):C1,random
j(w2=1):q32
*q32
t:Of all 13 states, which was not
:present at the Constituional
:Convention?
t:
t:A. Rhode Island
t:B. Georgia
t:C. Maine
t:D. New Hampshire
t:
t:
pr:us
a:
m:A
t:
ty:Good job!
tn1:Try again.
tn2:Sorry! The answer is A
w:3
g:es
ly1:C1,score
ly2:C1,score2
jn1:q32
ln2:C1,questions
g:es
*33
r:Question #33
c:w3=w3+1
l(w3>1):C1,random
j(w3=1):q33
*q33
t:As a result of the commerce
:compromise:
t:
t:A. there would be tariffs on imports
t:   but not exports
t:B. Congress would regulate foreign
t:   trade
t:C. slave importation would continue
t:   until 1808
t:D. All of the Above
t:E. A & C Above
t:
t:
pr:us
a:
m:D
```

```
t:
ty:Marvelous!
tn1:Please try again!
tn2:Better study in more detail! The
tn2:answer is D
w:3
g:es
ly1:C1.score
ly2:C1.score2
jn1:q33
ln2:C1.questions
g:es
*34
r:Question #34
c:w4=w4+1
l(w4>1):C1.random
j(w43=1):q34
*q34
t:According to the Constitution and
:the system known as the electoral
:college:
t:
t:A. the people vote directly for the
t:   President
t:B. the people vote for
t:   representatives who in turn vote
t:   for the President
t:C. only educated males could vote
t:   for the President
t:D. None of the Above
t:
t:
pr:us
a:
m:B
t:
ty:Perfect!
tn1:Let's try again.
tn2:Not quite! The answer is B
w:3
g:es
ly1:C1.score
ly2:C1.score2
jn1:q34
ln2:C1.questions
g:es
*35
r:Question #35
c:w5=w5+1
l(w5>1):C1.random
j(w5=1):q35
*q35
t:Although held in secret, our
:knowledge of what happened at the
:Constitutional Convention was a reult
:of the writings/notes kept by?
t:
t:A. James Madison
t:B. George Washington
t:C. Benjamin Franklin
t:D. Alexander Hamilton
t:
t:
pr:us
a:
m:A
```

```
t:
ty:Good Memory!
tn1:Sorry. Try again.
tn2:The answer is A
w:3
g:es
ly1:C1,score
ly2:C1,score2
jn1:q35
ln2:C1,questions
g:es
*36
r:Question #36
c:w6=w6+1
l(w6>1):C1,random
j(w6=1):q36
*q36
t:The right to raise money, tax and
:borrow are examples of ?
t:
t:A. Delegated Powers
t:B. Reserved Powers
t:C. Concurrent Powers
t:D. None of the Above
t:
t:
pr:us
a:
m:C
t:
ty:Well done!
tn1:Think again!
tn2:Better study. The answer is C
w:3
g:es
ly1:C1,score
ly2:C1,score2
jn1:q36
ln2:C1,questions
g:es
*37
r:Question #37
c:w7=w7+1
l(w7>1):C1,random
j(w7=1):q37
*q37
t:The right to make "necessary and
:proper" laws to allow the constitution
:to grow and be flexible is known as
:the?
t:
t:A. Amendment Process
t:B. Elastic Clause
t:C. Adaptability Clause
t:D. Growth Law
t:
t:
pr:us
a:
m:B
t:
ty:Super!
tn1:Think again.
tn2:Sorry. The answer is B
w:3
g:es
```

```
1y1:C1,score
1y2:C1,score2
jn1:q37
1n2:C1,questions
g:es
*38
r:Question #38
c:w8=w8+1
l(w8>1):C1,random
j(w8=1 :q38
+q38
t:A bill of law which calls for the
:appropriation of money must originate
:(begin) in the?
t:
t:A. House of Representatives
t:B. Senate
t:C. Executive Branch
t:D. there are no specific requirements
t:
t:
pr:us
a:
m:A
t:
ty:Superb!
tn1:Not quite. Try again.
tn2:Sorry. The answer is A
w:3
g:es  .
1v1:C1,score
1y2:C1,score2
jn1:q38
1n2:C1,questions
g:es
*39
r:Question #39
c:w9=w9+1
l(w9>1):C1,random
j(w9=1):q39
+q39
t:The Constitution was ratified in ?
t:A. 1787
t:B. 1789
t:C. 1790
t:D. 1791
t:
t:
pr:us
a:
m:B
t:
ty:You really know your dates!
tn1:Let's try again.
tn2:Better study those dates. The
tn2:answer is B
w:3
g:es
1y1:C1,score
1y2:C1,score2
jn1:q39
1n2:C1,questions
g:es
*40
r:Question #40
c:h0=h0+1
```

```
l(b0>1):C1.random
j(b0=1):q40
*q40
t:To amend the constitution of the U.S.
t:2/3's of both houses of Congress
t:shall propose amendments or
t:2/3's of the state legislatures
t:shall call for a constitutional
t:convention for proposing amendments.
t:The proposed amendment is ratified
t:only if ?
t:
t:A. the amendment waits 7 years
t:B. 3/4's of the state legislatures
t:   approve it
t:C. 3/4's of the state conventions
t:   approve it
t:D. All of the Above
t:E. B & C Above
t:
t:
pr:us
a:
m:E
t:
ty:Absolutely correct!
tn1:Think a little harder!
tn2:Better study the amendment process.
tn2:The answer is E
w:3
g:es
ly1:C1,score
ly2:C1,score2
jn1:q40
ln2:C1,questions
g:es
*end
t:The results of your practice review
t:quiz are as follows:
t:
t:        #s   CORRECT FIRST TRY
t:        #s2   CORRECT SECOND TRY
t:
t:        #t   QUESTIONS ATTEMPTED
t:
w:10
g:es
j:final
*final
t:
t:
t:
t:
t:
t:
t:
t:
t:        HOPE YOU ENJOYED THIS
t:          PRACTICE REVIEW
t:
t:
t:        REMEMBER TO STUDY FOR
t:        THE UPCOMING UNIT EXAM
t:
t:
t:
```

```
t:
t:
t:
th:      Press Space Bar To End.....
as:
j:fine
*fine
e:end
g:es
```

Appendix B

STUDY GUIDE FOR THE CONSTITUTION UNIT
U.S. HISTORY

1. Forms of Government
2. Philosophers and Government
3. Impact of State Constitutions and Past Documents
4. Treaty of Paris, 1783
5. Land Ordinace of 1785 and Land Survey
6. Nortwest Ordinace of 1787 and Territorial
   Government
7. Reserved, Delegated, and Concurrent Powers
   (Definition and Examples)
8. Virginia Plan
9. New Jersey Plan
10. Convention Compromises (Great, Commerce, 3/5's,
    Electoral)
11. Duties of Executive, Legislative, & Judicial
    Branches
12. Elastic Clause
13. Amendment Process
14. Supreme Court
15. Qualifications and Terms of Office for Pres.,
    Rep., Senator
16. Checks & Balances (Definition and Examples)
17. Articles of Confederation--Strengths and
    Weaknesses
18. Bill of Rights
19. Dates: 1787,1789
20. Prohibitions: Ex Post Facto, Bills of Attainder
21. Constitutional Convention (People & Conditions)

Appendix C

CONSTITUTION
Unit Exam

NAME_____
HOUR_____

MULTIPLE CHOICE

___ 1. The compromise that provided the entire population
of slaves not be counted for representation and
for taxation purposes.
A. Three-Fifth Compromise
B. Commerce Compromise
C. Great Compromise
D. None of the above

___ 2. The provision in the Constitution that provides that
the state governments keep certain powers that the
federal government has no control over.
A. Northwest Ordinance
B. Concurrent Powers
C. Reserved Powers
D. Delegated Powers
E. Separation of Power

___ 3. The document that contains the beliefs that all men
have freedom of speech and religion.
A. Articles of Confederation
B. Toleration Act of 1703
C. Declaration of Independence
D. Bill of Rights

___ 4. The document which provided for the governing of our
western lands.
A. Northwest Ordinance
B. Land Ordinance of 1785
C. Great Compromise
D. Articles of Confederation

___ 5. The compromise that provided for a bicameral govern-
ment, with equal votes in the Senate and votes in
the House of Representatives based on population.
A. Three-Fifths Compromise
B. Petition of Rights
C. Virginia Compromise
D. Great Compromise

___ 6. The federal government should be divided into three
branches so that all the power of government is not
concentrated in one branch giving rise to tyranny.
A. Separation of Powers
B. Checks and Balances
C. Elastic Clause
D. Ex Post Facto

___ 7. The process provided for in the Constitution which
enables each branch of government to control the
other two branches, in the event the other branch
is doing something wrong.
A. Checks and Balances
B. Separation of Power
C. Delegated Powers
D. Judicial Review

___ 8. Under the Constitution, both the federal and state
governments share certain powers such as taxation.
A. Delegated Powers
B. Concurrent Powers
C. Reserved Powers
D. Separation of Power

___ 9. A loosely organized group of states working inde-
pendently of each other with the individual states
having more power than the national government.
A. Sovreignity
B. Oligarchy
C. Confederation
D. Republic

___ 10. The English philosopher who wrote about the natural
rights of man (life, liberty, and property).
A. Rousseau
B. Locke
C. Montesquieu
D. Hobbs

___ 11. Under the Constitution, powers that only the federal
government can exercise.
A. Delegated
B. Limited
C. Reserved
D. Separation of Powers
E. Concurrent

___ 12. The French philosopher who stated that there should
be a definite distinction or separation between the
branches of government.
A. Locke
B. Montesquieu
C. Rousseau
D. Lafayette

____ 13. The French philosopher who stated that the purpose
of government is to serve the people rather than the
people serving the government.
A. Locke
B. Rousseau
C. Montesquieu
D. Voltaire
E. D'Albert

____ 14. Under the Constitution Congress was given the power
to make all laws necessary for carrying out the
specific powers given to them.
A. Ex Post Facto
B. Writ of Habeas Corpus
C. Elastic Clause
D. Bill of Attainder

____ 15. The compromise in the Constitution which provided
for tariffs on imported goods and one on exported
goods.
A. Commerce
B. Interstate Trade of 1780
C. Three-Fifths
D. Great
E. Products

____ 16. Conflicts of economic interests between northerners
and southerners were resolved by
A. the commerce compromises
B. the three-fifths compromise
C. the great compromise
D. both A and B
E. all of the above

____ 17. Weaknesses of the government under the Articles of
Confederation included
A. lack of executive
B. limit of one vote to each state delegation
C. lack of central national court
D. all of these

____ 18. Appointment to the United States Supreme Court is
made by the President, and must be approved by
A. House of Representatives
B. U.S. Senate
C. United States Supreme Court
D. state legislatures

____ 19. The Supreme Court is made up of
A. 10 justices and 2 chief justices
B. 6 justices and 3 chief justices
C. 8 justices and 1 chief justice
D. none of these

___ 20. A senator in congress serves
   A. 2 year term
   B. 4 year term
   C. 6 year term
   D. for life

___ 21. Which one of these is incorrectly paired?
   A. Senate: power to ratify treaties
   B. President: power over military
   C. Congress: power to declare war
   D. Supreme Court: power to control trade between countries

___ 22. Which of these was not one of the original sourthern states?
   A. Georgia
   B. Maryland
   C. Mississippi
   D. South Carolina

___ 23. The House of Representatives has the power to
   A. pass bills after the Senate approves them
   B. pass bills that require money (taxes) to fund them before the Senate
   C. run for the office every 2 years if they want to be reelected
   D. all of these are correct
   E. none of these are correct

___ 24. Which came last in time?
   A. Convention in Annapolis
   B. Second Continental Congress
   C. Convention in Philadelphia
   D. Delaware ratifying constitution

___ 25. All of these were a part of the Land Ordinance Act except
   A. Quebec Act
   B. section for schools
   C. townships for organization
   D. selling of land by government

___ 26. Problems on the early frontier included all of these except which one?
   A. expensive land
   B. Indian attacks
   C. British forts
   D. equal political power

___ 27. The Articles of Confederation could not enforce
treaties because
A. taxes were different in the states
B. British forts were still in control of the west
C. any one of the 13 states could ignore the treaty
D. there was no control of the seas

___ 28. Which of these men was at the Constitutional Con-
vention?
A. Alexander Hamilton
B. John Adams
C. Patrick Henry
D. Thomas Jefferson
E. Gerald Ford

___ 29. The Convention in Philadelphia was held in secret
because
A. the British had spys in Philadelphia
B. Daniel Shays would rebel with the farmers
C. George Washington wanted to be President by
unanimous consent
D. the common people might argue and revolt

___ 30. Which of these does not concern the beginning of the
legislative branch of government?
A. Great Compromise
B. Commerce Compromise
C. Virginia Plan
D. Connecticut Compromise

___ 31. Which of these dealt with the issue of slavery?
A. 3/5 Compromise
B. Great Compromise
C. Commerce Compromise
D. anser A and B
E. answer A and C
F. all are correct

___ 32. Under the Articles of Confederation, the central
government consisted of a congress in which each
state had
A. votes proportionate to its size
B. votes proportionate to its population
C. one vote
D. seven votes

___ 33. The government under the Articles accomplished all
of the following __except__
A. successful conclusion of the Revolutionary War
B. provision for an orderly system of government
    for the territories
C. conclusion of a commercial (trading) treaty with
    Great Britain
D. cession (surrender to the central government of
    claims made by serval states to western lands)

___ 34. Although the Confederation could coin its own money,
it
A. could not obtain the gold and silver
B. refused to do so
C. circulated money from other nations
D. forced that states to coin money

___ 35. During the Constitutional Convention this man kept
unofficial records which today give us a good com-
plete picture of what took place during the writing
of the Constitution.
A. Alexander Hamilton
B. George Washington
C. George Mason
D. James Madison

___ 36. The constitutional Convention met in Philadelphia
in the year
A. 1781
B. 1783
C. 1787
D. 1789

___ 37. What is the smallest number of members of Congress
that a state regardless of population may have?
A. five
B. three
C. two
D. four

___ 38. The power of the Supreme Court to decide the
constitutionality of a law or treaty is known as
the power of
A. equity
B. judicial review
D. appellate jurisdiction
D. impeachment

___ 39. The President is elected by
A. direct vote of the people
B. a majority of the Electoral College
C. a majority of both houses of Congress
D. majorities in the stat legislatures

____ 40. An amendment to the Constitution needs to be
ratified by
A. the President and Congress
B. a majority of the Supreme Court justices
C. a majority of voters
D. legislaturs or conventions in three-fourths
of the states

____ 41. Which illustrates the fact that the United States
has a federal system of government
A. Congress passes laws, but the President en-
forces them
B. the President appoints cabinet members, but
the Senate must approve them
C. the Supreme Court has the power to declare
laws of Congress unconstitutional
D. the national government regulates interstate
commerce, but the state governments regulate
commerce within the states

____ 42. At the Philadelphia Convention, on which issue was
there the most agreement?
A. method of electing the President
B. increased power for the central government
C. importation of slaves
D. representation in a new Congress

____ 43. The Articles of Confederation provided for all of
these except
A. name of the country
B. formation of a league of states
C. voting power according to population
D. common defense against attacks

____ 44. Which of the following was not created out of the
Northwest Territory?
A. Indiana
B. Michigan
C. Ohio
D. Minnesota

____ 45. A law which is passed after the "action" is
committed can only be enforced in the future not
the past. This refers to
A. Habeas Corpus
B. Ex Post Facto
C. Bill of Attainder
D. Judicial Review
E. all of these

___ 46. Control of education, transportation, marriage and
divorce laws comes under the Constitution and are
examples of
A. Concurrent Powers
B. Reserved Powers
C. Delegated Powers
D. None of the above

___ 47. The process by which the House of Representatives
files charges and the Senate acts as trial jury
is called
A. veto
B. over-ride
C. impeachment
D. treason

___ 48. Which of the following was not a power granted to
the central government by the Constitution?
A. to regulate interstate commerce
B. to levy a tariff on imports
C. to regulate the slave trade after 1808
D. to levy a tax on exports

___ 49. This provision in the Constitution requires a per-
son to be charged with a crime within a reasonable
amount of time
A. trial by jury
B. Writ of Habeas Corpus
C. Bill of Attainder
D. Ex Post Facto

___ 50. Having reached the age of 35 years and fourteen
years a citizen of the United States are the
qualifications for
A. Senators
B. President
C. Supreme Court
D. Representatives

Appendix D

COMPUTER REVIEW ASSISTANCE MODULES (CRAM) EVALUATION
U.S. History

Unit Name _____
Teacher _____ Period _____
Student Name _____

Please answer all of the questions below in terms of your
experience with the computer program.

1. How many times did you use the computer review? _____
    (This includes class and the one required time.)
2. How many total questions did you go through each time you used
    the review? 1st _____ 2nd _____ 3rd _____ 4th_____
    Other _____
3. Approximately how many answers did you get correct on
    each run through the review? 1st _____ 2nd _____
    3rd _____ 4th _____ Other _____

Mark the different aspects of your experience with the computer
program by circling one of the areas on each scale that most
nearly describes your reaction to the question.

		Strongly Agree			Strongly Disagree	
4.	I had trouble finding a free computer.	1	2	3	4	5
5.	The immediate feedback was helpful in locating my weaknesses.	1	2	3	4	5
6.	I enjoyed working with the computer program.	1	2	3	4	5
7.	Working with the computer seemed cold and impersonal.	1	2	3	4	5
8.	I feel the computer program helped me review for the final unit exam.	1	2	3	4	5
9.	I enjoyed reviewing for the exam in this manner.	1	2	3	4	5
10.	I would use the computer review if given the chance in the future to prepare for a U.S. History unit exam.	1	2	3	4	5
11.	I learned something new by using the computer review.	1	2	3	4	5
12.	Using the computer review program encouraged me to study for the final unit exam.	1	2	3	4	5
13.	How would you rate your overall experience with the computer review program.	Very Positive 1	2	3	Very Negative 4	5

14. Would you recommend this program to a friend reviewing
    for U.S. History exams in the future?
    Definitely Yes _____ Probably Yes _____ No_____

15. What did you like best about the computer program?

16. What did you like least about the computer program?

17. What other suggestions, comments, questions or
    information could you, would you make about the computer
    program? (These can be positive or Negative!!)

Thank you!