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AUTHOR Klassen, Daniel L.
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ABSTRACT

Computers are beginning to be used more frequently as instructional tools in secondary school social studies. This is especially true of "new social studies" programs; i.e., programs which subordinate mere mastery of factual content to the recognition of and ability to deal with the social imperatives of the future. Computer-assisted instruction (CAI) in such programs is educationally justified because the computer provides great information storage and retrieval capacities. In addition, CAI is economically feasible for secondary school social studies because of the large enrollments in those programs. Examples of simulations which have been used include MARKET, ELECT, and USPOP; these introduce the student, respectively, to dynamic marketing, political and demographic analyses. (PB)

COMPUTER SIMULATION IN THE SOCIAL SCIENCES/SOCIAL STUDIES*

Daniel L. Klassen

State University of New York (Stony Brook)

INTRODUCTION

Since the early 1960's computers have been used as teaching devices and instructional tools. Numerous computer-assisted instructional programs as well as instructionally oriented information storage, retrieval, and analysis systems have been developed and marketed. Most of these applications, however, have been aimed at college students or, if developed for use in elementary and secondary schools, they tend to be related to subject areas such as mathematics, spelling or foreign language study. As a result, social studies education at the secondary school level has not felt the impact of the computer as an instructional tool.

Recently, however, with the growth of the "new social studies"[1] and greater access to computing facilities in the schools, social studies teachers are beginning to utilize the capabilities of the computer as a tool to be applied in the instructional process. This paper briefly examines the use of computers as instructional tools in the social sciences/social studies.[2]

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1 The term "new social studies" refers to a reorientation of social studies education. Traditional social studies, for example, had always emphasized the mastery of facts. The new social studies says that a curriculum must be built that recognizes the social imperatives of the future and that provides learners with the abilities to meet them. For a complete discussion of the new social studies see Clinton E. Boutwell, Getting it All Together: The New Social Studies (San Rafael, California: Leswing Press, 1972).

2 For a more complete and detailed discussion of this topic see Daniel L. Klassen and Douglas James, "Computers as Instructional Tools for the Social Sciences," Journal of Educational Technology Systems, Vol 1, No. 2, Fall, 1972, pp. 116-118.
and
Daniel L. Klassen and Donald C. Holznagel, "Computers and the Social Studies/Social Sciences." Social Education, (forthcoming).

DR. DANIEL L. KLASSEN holds a Ph.D. in political science from the University of Iowa. He is a classroom teacher as well as researcher. Dr. Klassen is currently working with the Huntington Two Computer Project developing social studies materials at the State University of New York at Stony Brook.

JUSTIFYING USING COMPUTERS IN SOCIAL EDUCATION

Justification for using the computer as an instructional tool in the social sciences/social studies can be advanced on two fronts. The first is related to education as a teaching-learning system; the second is related to economic factors.

Educational Justification

It is not surprising, given the thrust of many of the approaches, strategies and methodologies implicit in the "new social studies" that the computer is beginning to be utilized as an instructional tool. The characteristic of computers that makes them especially attractive as tools in the social sciences/social studies is their flexibility. This flexibility allows the computer to serve as a "laboratory"; a laboratory in which a variety of environments, processes and behaviors can be recreated and studied. Viewing the computer as a laboratory useful in the instructional process has opened the door to two basic types of application: simulation and information processing.

Simulation: Simulation is not a new instructional strategy in the social sciences/social studies. Many teachers have used simulations to convey to students an understanding of the complexities, interrelationships, and dynamics of social phenomena. Computer simulation offers new possibilities in this area. They can be used to help students develop analytical approaches, to organize concepts, to think intuitively, to use models, and to test for limiting conditions. The real advantage for the social studies student lies in the ability to use complex models of reality. Real world processes and events can be "brought into" the classroom. This is a very real educational advantage.

Information Storage and Retrieval: The well-documented explosion of knowledge occurring in nearly all disciplines makes it impossible to continue to expect students to learn everything that is important in a subject-matter area. New instructional approaches are thus being developed which stress the student's ability to handle, store, process, and analyze data/information. Already the "inquiry or discovery" approach is widely accepted in the social sciences/social studies. The inquiry approach requires the teacher to move from the role of dispensing the data and facts to helping the student find and analyze the data for himself. He encourages the student to do his own thinking and to arrive at his own conclusions. He guides the student in using the tools and developing the skills necessary for the investigation at hand. It is not difficult to visualize the role the computer can play in this type of instructional strategy. Computer can store large amounts of data. They can compute summary reports about the data. They can calculate statistics that help the student interpret and understand the data.

Both uses of the computer as an instructional tool; simulation and information processing, are highly attractive to social science/social studies educators and can be supported in the light of sound learning theories.

Economic Justification

The use of the computer as an instructional tool in the social sciences/social studies must be justified in economic terms as well as in educational

terms. One of the basic factors related to the cost-effectiveness of any new technology is the number of students that benefit from the application of the technology. Here the use of the computer as a tool in the social studies stands on firm ground. A very large percentage of all students in any given school are involved in the social science/social studies program. Since the social studies includes economics, political science, psychology, sociology, geography and history large numbers of students are involved. Many social studies courses are required. While many of the hard science courses have lost students the social studies subjects, on the whole, have gained. This fact provides an important economic justification for the purchase and use of a computer in the school setting. It also justifies the training of the social studies teachers in the use of the computer as an instructional tool.

EXAMPLES

In order to illustrate the use of the computer as an instructional tool in the social studies several examples are presented below.[3]

MARKET

MARKET allows two people or two groups to play the roles of two companies who are competing for the market for a particular product; for example, racing bicycles. At the start of the simulation, the computer informs the players of the fixed and the variable production costs involved in marketing the product and the number of items that will be sold, with no advertising, at a specific price. The computer then assigns to each company initial values for inventory (stock on hand), cash on hand, and total assets.

Each player is allowed to make marketing decisions quarterly and can specify the production level, the advertising budget and the unit price of the product for his company. After these decisions have been made for a given quarter, the computer reports the results of these decisions by way of a marketing summary. Throughout the simulation, events occur that influence the marketing strategies made by the companies.

ELECT

ELECT allows students to simulate a local, state, or national election process. The computer model in the ELECT simulation functions as the electorate. Information is stored regarding voter attitudes toward the image of the candidates with respect to personality, ability and experience, attitudes related to the party affiliation of the candidates, and attitudes regarding their issue position on foreign and economic policy. The model can be defined to simulate a variety of electoral choice situations. Students acting as campaign voters in such a way that on election day they will vote for their candidate. Throughout the simulated campaign, the computer gives the students information regarding their candidate's current standing via poll results. In addition, voter turnout and media distortion affect the success of each candidate's strategy and thus the outcome of the election.

Another application of the computer as social studies laboratory can be demonstrated by using the ELECT model with fixed data concerning

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[3] All of the examples presented have been developed by the Huntington Two Project. This project is funded by the National Science Foundation's Division of Pre-Collegiate Education. All of the programs include a program tape, a Student Guide, a Teacher Guide, and a Resource Guide. Program sets may be purchased from Digital Equipment Corporation, Maynard, Massachusetts.

historical elections stored in the computer. Such a strategy enables the student to examine the actual historical election, and to then test hypothesis about how different campaign decisions might have affected the actual election. He can thus experiment with or "replay" the election as many times and ways as he wishes.

Initially the student reads a Political Scene Sheet (see fig. 1). The information, very briefly, gives a sketch of the historical setting. The student may also wish to consult additional historical sources. The student then goes to the computer, calls a particular election and enters his decision; i.e., how much emphasis the candidates place on their image, their party affiliation and the issues. The computer computes the results of the student's decision and compares it with the actual historical outcome. The student then reads a Campaign Comment Sheet (see fig. 2) which helps explain the results of the historical election.

FIG. 1

ELECT 1

THE POLITICAL SCENE SHEET

ELECTION CODE NO. 2

ELECTION	1840
CANDIDATE A:	MARTIN VAN BUREN, DEMOCRAT
CANDIDATE B:	WILLIAM HENRY HARRISON, WHIG

Martin Van Buren had just been inaugurated in 1837 when a major depression hit the country. Its causes were complex, but certainly the policies of the Jackson administration contributed to it. Jackson was safely out of the White House, however, and Van Buren suffered the brunt of the intense criticism.

His opponents flocked into the Whig party. This numerical strength, however, presented the Whigs with a fundamental problem. How could all these groups (who agreed only in their opposition to Van Buren and their hatred of Jackson) agree on a platform and a presidential candidate? They solved the platform problem by not issuing one. The selection of the candidate was more difficult. Henry Clay was clearly the most outstanding Whig, but he had, in his long political career, made many enemies -- too many to unite the party. The Whigs finally selected sixty-eight-year-old William Henry Harrison, whose most important qualification appeared to be his victory over the Indians at the battle of Tippecanoe twenty-eight years earlier.

Van Buren held that the American economy was not the responsibility of the Federal Government. The Democrats were not to be held responsible for the depression. The people did have, he said, a right to expect that the President would manage government finances in a sound manner. To this end, Van Buren asked Congress to establish a system of sub-treasuries in different sections of the country. Government money would be kept there rather than deposited in private banks. Despite Henry Clay's warning that it would be dangerously deflationary, Congress passed the bill in 1840.

HOW WOULD YOU ALLOCATE YOUR POLITICAL RESOURCES FOR YOUR CANDIDATE IN THIS ELECTION?

FIG. 2

ELECT 1

CAMPAIGN COMMENT SHEET

Election of 1840

	CANDIDATE	PARTY	POPULAR VOTE	ELECTORAL VOTE
A.	Martin Van Buren	Democrat	1,130,033	60
B.	William Henry Harrison	Whig	1,275,612	234

The Whigs conducted a wildly exuberant, but largely irrelevant campaign. The appeal was totally to the emotions of the voters. Harrison was presented as a military hero and as a simple backwoodsman. Neither was true. Nothing was said of his position on the issues of the day, other than to blame the depression on Van Buren. In response the Democrats attacked Harrison's party background; but to no avail -- the "log-cabin and hard-cider" candidate won.

Strategies

CANDIDATE A 30--50--20

CANDIDATE B 60--10--30

(See ELECT 1 - SAMPLE OUTPUT)

USPOP

USPOP is a human population simulation. It allows students to examine population dynamics and thus learn many key demographic concepts involving population growth and decline. Students may experiment with future population trends. They may examine the concept of zero population growth, examine fertility's role in population growth, examine the effect of varying the time of birth of the first child, examine the effects on the population growth rate of reducing infant mortality and so on.

The USPOP model makes use of over 100 variables in making its projections. By making use of 1970 census data, the student need supply only a few of the over 75 required values. Given the complexity of human population growth, understanding its dynamics is facilitated by using the computer as a laboratory.

(See USPOP - SAMPLE OUTPUT)

SUMMARY

These few examples illustrate that the computer can be a valuable tool in the social education process. It provides a laboratory in which a replica of a real world system can be examined.

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ELECT 1 - SAMPLE OUTPUT

HISTORICAL ELECTIONS - 19th CENTURY

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DO YOU WANT INSTRUCTIONS (1=YES, 0=NO)  ?1
    YOUR GOAL WILL BE TO CHOOSE THE OPTIMUM STRATEGY
FOR CANDIDATES IN AN HISTORICAL ELECTION.

    EACH CANDIDATE'S STRATEGY CONSISTS OF 3 NUMBERS

    THE FIRST REPRESENTS THE AMOUNT OF EMPHASIS TO BE
PLACED ON THE CANDIDATES IMAGE.

    THE SECOND REPRESENTS THE AMOUNT OF EMPHASIS TO BE PLACED ON
PARTY AFFILIATION.

    THE THIRD REPRESENTS THE AMOUNT OF EMPHASIS TO PLACED ON
THE CAMPAIGN ISSUES.

    EACH OF THESE NUMBERS IS BETWEEN 10 and 80, WITH
A HIGHER NUMBER REPRESENTING MORE EMPHASIS

    THE TOTAL OF EACH STRATEGY MUST EQUAL 100 !

    THE COMPUTER WILL FIRST ASK - 'ELECTION CODE NO.?'
CHOOSE THE CODE NO.  FROM THE FOLLOWING LIST:

         ELECTION                 CODE NO.
           1828                      1
           1840                      2
           1844                      3
           1868                      4
           1876                      5
           1884                      6
           1896                      7

ELECTION CODE NO.  ?2

                              ELECTION OF 1840

         CANDIDATE A              CANDIDATE B
         VANBUREN                 HARRISON
         DEMOCRAT                 WHIG

CANDIDATE A - STRATEGY (3NUMBERS, 10 =  = 1 = 80, TOTAL=100) ? 40,30,30
CANDIDATE B, - STRATEGY (3 NUMBERS, 10 = = 1 = 80, TOTAL=100) ? 60,10,10
THE TOTAL OF EACH STRATEGY MUST EQUAL 100 !
STRATEGY (3 NUMBERS, 10 = 1 = 80, TOTAL=100) ? 60,10,30
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THE RESULT OF YOUR STRATEGY IS:

        VAN BUREN                  HARRISON
      44.75 PERCENT             55.25 PERCENT

THE VOTE FOR THE TWO MAJOR CANDIDATES
IN THE ACTUAL ELECTION:

        VAN BUREN                  HARRISON
        47 PERCENT                 53 PERCENT

ANOTHER RUN (1=YES, 0=NO) ?0
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This example illustrates that the computer can be used as an "historical laboratory."

USPOP - SAMPLE OUTPUT

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YEAR AT START OF PROJECTION ? 1970

1970 FERTILITY (1=YES, 0=NO) ?1
WILL FERTILITY (1) STAY AT 2.45 OR (2) CHANGE TO
NEW STABLE FERTILITY OR (3) VARY FROM YEAR TO YEAR ?2
WHAT FERTILITY WILL BE STABLE ?2.0
HOW MANY DECADES UNTIL FERTILITY REACHES 2 ?3

1970 BIRTH DISTRIBUTION (1=YES, 0=NO) ?1
1970 SEX RATIO (1=YES, 0=NO) ?1
1970 MORTALITY (1=YES, 0=NO) ?1
1970 POPULATION (1=YES, 0+NO) ?1

     REPORT:1)SHORT 2)LONG 3)GRAPH 4)CHANGE 5)END ?1

YEAR 1970    POP. 202.212  MILLION     FERTILITY 2.45

     REPORT: ?1

YEAR 1975    POP. 210.003  MILLION     FERTILITY 2.375

     REPORT: ?3

YEAR 2000    POP. 248.088  MILLION     FERTILITY 2.
                    PCT. TOTAL POP.
             0.....5.....10.....15.....20
0-4          .              *
5-9          .               *
10-14        .                *
15-19        .                *
20-24        .               *
25-29        .           *
30-34        .           *
35-39        .              *
40-44        .              *
45-49        .             *
50-54        .         *
55-59        .       *
60-64        .     *
65-69        .   *
70-74        .  *
75-79        . *
80-84        . *
85           .*
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