CALIFORNIA COMMUNITY COLLEGES
AND
PERALTA
COMMUNITY COLLEGE DISTRICT

#88-0010
Interactive Videodisc Tutorials in Physical Geography and Ecology

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**PROJECT TITLE**

Interactive Videodisc Tutorials in Physical Geography and Ecology

**FUNDING CATEGORY & AWARD**

Grant = $20,000

**ELIGIBLE PROGRAM**

A --- Nontraditional Instruction

**PROJECT CATEGORY**

Developmental Model

**PROJECT PRODUCT**

Video Disc CD

**PROJECT TOPIC #1**

Curriculum Develop

**PROJECT TOPIC #2**

Computer Technology

**ACADEMIC SUBJECT**

Geography

**PROJECT DIRECTOR**

Rita Haberlin, Instructor

**PROJECT SUPERVISOR**

Ken Giles, Assistant Dean

**PROPOSAL DESCRIPTION**

The major objective of this project is to develop six interactive videodisc tutorials for urban students who have difficulty understanding and visualizing physical phenomena in the fields of geography and ecology. The project will utilize $36,000 worth of microcomputer and videodisc equipment already donated to the college. This is an extension of a previous grant from the fund that developed computerized learning modules in meteorology using graphics and animation.
Interactive Videodisc Tutorials in Physical Geometry and Ecology

The major objective of this FII (Fund for Instructional Improvement) project is to develop six interactive videodisc tutorials for urban students who have difficulty understanding and visualizing physical phenomena. Staff-development workshops for Peralta District faculty are also included in this proposal.

Self-paced interactive tutorials that show real-life images such as volcanic eruptions and hurricanes will be an important improvement on computer-assisted instruction for underprepared science students. The tutorials will also help students with English as a second language, hearing impaired students who have difficulty learning from traditional lectures and working adults who want to study independently.

Although this proposal will initially benefit students in physical geography and ecology, the methods and techniques used in this project can be adapted to any subject that uses visual images to clarify concepts. For this reason, staff-development workshops are included in this project to introduce faculty to the interactive videodisc and to encourage them to develop demonstration projects in their own subject areas.

This FII project will use $36,500 worth of microcomputer and videodisc equipment donated to the College of Alameda by Sony Corporation and by IBM Corporation. Despite the instructional potential of the interactive videodisc, most of the courseware currently available for this equipment has been limited to business and technical training. Very little commercial interactive videodisc courseware has been developed in academic areas.

The $22,981 requested for this FII project will be used in the development of the interactive videodisc tutorials in physical geography and ecology using the combined skills of an instructor-programmer. The funds will also be used for staff-development workshops.

This project is an extension of an earlier FII project that developed computerized learning modules in meteorology using graphics and animation. The instructor-programmer team that developed the meteorology courseware will develop the interactive videodisc tutorials.

The tutorials will make full use of the color graphics and animation capabilities of the computer and the video images of the Optical Data Corporation’s Earth Science and Biology videodiscs. The tutorials will enhance the offerings in an existing course at the College of Alameda entitled...
Computer-Assisted Instruction in Physical Geography, 48A and provide supplemental materials for geology biology, and meteorology for aviation students. The new materials will include a student data collection system to monitor student progress.

The tutorials developed for this project will be made available at cost of duplication to local educational media centers, museums and community colleges. The experience gained in developing these interactive videodisc tutorials will be shared with other educators in workshops and professional conferences.
Interactive Videodisc Tutorials in Physical Geometry and Ecology

1. Specific Educational Program Being Addressed

EDUCATIONAL PROGRAM OR SERVICE ADDRESSED

The College of Alameda in the Peralta Community College District proposes to develop and coordinate a project that meets all five criteria of the California Community College Fund for Instructional Improvement described in Article 7, Section 84381, Creation of Fund Programs.

1a Non-traditional forms content and methods of instruction
   This project uses an innovative technology and a nontraditional form of instruction. The six interactive videodisc tutorials will combine the graphics and animation capabilities of a microcomputer with split-second access to visual material from a videodisc.

1b Programs for improving teaching abilities of faculty
   Staff-development workshops are an integral part of this project. The skills and experience gained while carrying out this project can be readily adapted to other subject areas and shared with fellow instructors. The student data collection system incorporated into the tutorials and the student activity log will help faculty analyze student responses, run times, and weak areas.

1c Programs addressing special learning needs of educationally disadvantaged students
   The interactive videodisc tutorials will provide remedial activities for the below average student. An alternative learning method for the hearing impaired as well as enrichment for the gifted student. The tutorial format allows students to work independently and at their own pace.

1d Educational services for new clientele including older working adults
   The self-paced tutorial format is appealing to older working adults who prefer to study in the computer learning center on their own time schedule.

1e Efforts to improve traditional instructional
These tutorials will be an important improvement on traditional instruction for students in physical geography and ecology. The combination of a computer and a videodisc allow for a style of learning that demands analytical reasoning of visual data rather than rote learning.

GOALS:

This FII project has two major goals. The first goal is to develop six interactive videodisc tutorials in physical geography and ecology using the Sony View System for the IBM-PC with attached videodisc player. Each tutorial will consist of four or five interactive sequences followed by quizzes that review the subject matter. This material will be programmed onto computer diskettes. The software on the computer diskette will control the graphics and animation sequences and the videodisc player. The videodisc will contain video clips and still frames that will be incorporated into the tutorials. The second goal of this project is to provide workshops in the use of the videodisc technology for faculty in the Peralta Community College District.

TECHNOLOGY RATIONALE

The use of a videodisc activated by a microcomputer allows instant access to a complete library of still frames and video clips. Videodiscs on earth science and biology are commercially available, making it possible to call up any one of thousands of pictures of weather phenomena, satellite sequences, volcanic eruptions, floods, landslides, and ecosystems. We can now combine the interactivity of the computer with the visual reality of a movie or slide. The student can use the touch-sensitive screen on the Sony View System to point to various features. With headphones, the students can hear the sound of a tornado as it passes over.

The six interactive videodisc tutorials will use currently available generic videodiscs. This reduces the cost of the project since the production of an original videodisc is extremely expensive. The use of generic videodiscs also increases the transferability of this project.

WORKSHOPS

The purpose of the workshops will be (1) to provide instructors with an overview of the power and potential of the interactive videodisc system; (2) to demonstrate the use of the physical geography and ecology tutorials developed for this project; (3) to demonstrate the use and value of student data collection and (4) to encourage and assist other faculty to develop videodisc courseware in their own subject areas. Existing generic videodiscs in art history, biology, and astronomy are promising areas for these demonstration projects.

Two kinds of workshops will be offered to meet these goals. The first workshop will provide a general overview and reach the widest group of faculty. Out of this group, there will be some faculty who have the time, energy, and interest to develop demonstration projects in their own subject area. This self-selected group will participate in several hands-on workshops where they will receive direct help from the instructor-programmer team. Materials provided for these workshops will include sample programs in Sony Basic/1 and IBM Basic for those instructors.
with a knowledge of Basic programming and simplified instructions for using the Sony software, “Genesis Interactive Authoring Environment.”

This FII project represents an enhancement and continuation of an earlier Fund for Instructional Improvement project. The project “Microcomputer Courseware in Meteorology Using Color Graphics and Animation” was carried out during 1983-84 at the College of Alameda. This courseware, and eight tutorials developed by the instructor-programmer team for IBM Corporation form the nucleus of an innovative lab in computer-assisted instruction for physical geography. The use of the videodisc in this new proposal will make it possible to expand the tutorial offerings for this lab with two additional topics in meteorology and four additional topics in physical geography. This project builds upon the combined experience of the team that developed the meteorology courseware.

PERSONNEL

Rita Haberlin, instructor in physical geography at the College of Alameda, will be the project director. She will spend 34% of her contract time designing the interactive dialog, selecting the video and graphic sequences, testing the materials, preparing documentation for the tutorials and workshops, planning and leading the workshops, assisting faculty with demonstration projects, and coordinating with cooperating colleges. Pat Kulda, the programmer and graphics artist, will be contracted for 680 hours to develop the animation and graphics sequences, program the text, program the videodisc sequences, install the student data collection system, write a utility program to print out student activity logs, assist with the workshops and demonstration projects, and provide technical support and documentation. Instructors in physical geography and ecology in the other Peralta Colleges will have an advisory role.

EQUIPMENT

The five Sony View Systems (donated by Sony Corporation), one IBM-PC supplied by IBM Corporation, a Pioneer compatible videodisc player, generic videodiscs, and a graphics tablet and software available at the College of Alameda will be used to develop the interactive videodisc tutorials. To enable students to use the tutorials on all five Sony View Systems, it is necessary to purchase additional videodiscs. Students will use these tutorials in the Computer Learning Center at the College of Alameda. The equipment and tutorials will also be used for demonstration at the staff-development workshops. Workshop facilities and materials will be provided by the College of Alameda.

BASIC AGENDA

The staff-development workshops proposed in this project meet the Board of Governors Agenda Objective B - Educational Excellence initiative 2 Faculty and Staff Renewal. Some of the faculty who attend these workshops will have the opportunity to develop their own interactive videodisc instructional material. When teachers develop new forms of educational materials, they frequently question their traditional modes of teaching and rewrite their goals.
and objectives. This process can be stimulating to teachers who find that teaching the same subject matter has become stale.
2. Specific Problems Being Addressed

SPECIFIC PROBLEMS
The following problems will be addressed by this project

1. Very little courseware has been developed for schools using the tremendous potential of the interactive videodisc as an instructional tool. Interactive videodisc systems are used imaginatively in business, military, technical, and corporate training, but little money is being invested in academic courseware.

2. Computer study guides and tutorials have been developed at the College of Alameda to provide tutorial help in introductory physical geography classes. Many of the students in this inner city college have real difficulty visualizing natural phenomena and understanding scientific concepts. Many students have English as a second language, most have a low reading level. Faced with the vocabulary of physical geography, many students feel that they are learning another foreign language. These students learn best when they work with self-paced interactive tutorials and laboratory materials that reinforce scientific concepts.

The computer materials that have already been developed at the College of Alameda have been successful in helping students of all ages and abilities. Student response has been very positive, and test scores have improved by at least one letter grade when students have had the benefit of interactive courseware. The experience gained by the instructor-programmer team while working on interactive courseware for the previous Fund for Instructional Improvement project has provided good preparation for the type of project proposed here. The College of Alameda team has experimented with the videodisc using short sequences from the Optical Data Corporation's "Earth Science" videodisc. The students found that the combination of computer graphics and animation with the reality of a film clip or still frame from the videodisc was an exciting improvement upon the computer-only tutorial. The real-lite images from the videodisc allow a student to understand the scale of physical phenomena. For instance, the eruption of Mount St Helens is best understood when a student sees how magma rises toward the surface in a computer graphics sequence and then sees the actual eruption from a sequence of still frames on the videodisc. In addition, students show by their responses to questions that they have misunderstood the instructional material segments can be repeated taking advantage of the split-second access time of a computer-controlled videodisc player.

3. The shortage of courseware using the videodisc needs to be addressed. This is done best by sharing with other instructors the potential of this medium and encouraging them by example. Workshops can be inspiring, but most instructors need more than one exposure to start developing their own materials. In this project, we intend to work on a
one-to-one basis with instructors. We will help them to develop demonstration programs in their own field.

Desired Outcomes

The desired outcomes of this Fund for Instructional Improvement project include the following:

1. Students of all ages and abilities each quarter will have a more realistic understanding of weather forecasts, satellite images, storms, volcanic eruptions, and other physical phenomena as they progress through the six Interactive videodisc tutorials. They will learn to observe and think more critically about physical processes.

2. A minimum of 30 instructors will be exposed to the potential of interactive videodisc instruction in staff-development workshops. Some of these instructors will be inspired to develop their own material using the videodisc technology.

3. During the hands-on workshop some instructors will create demonstration programs in different subject areas. Instructors with no programming experience will use the Genesis Interactive Authoring Environment to develop their own materials.

4. Once a programming model has been built for each tutorial in physical geography, further tutorials can be developed more rapidly after the project has concluded.

The tangible outcomes of the project include:

1. Six interactive videodisc tutorials on 3 5 computer diskettes for the Sony View System and six 5 25 computer diskettes for the IBM-PC. The computer diskettes will contain selected physical geography and ecology topics.

2. Printed materials for the workshops including lists of videodiscs currently available for the videodisc player sample program listings in Sony Basic/1 and IBM Basic, sample student activity logs, and simplified instructions for the Genesis Interactive Authoring Environment.

3. Two demonstration programs developed by faculty during the workshops.

Current practice

This FII project builds upon the success of the physical geography computer-assisted instruction lab at the College of Alameda. In the lab, students use computer study guides and tutorials as a supplement to their course in physical geography. We have found that students make the best use of interactive courseware if they use it on a regular basis as an accepted part of their instruction. The current emphasis in computer-assisted courseware is upon critical thinking and analysis rather than simple drill and practice. The proposed interactive videodisc
tutorials will make full use of thought questions and analysis of visual images. Just as a textbook combines line drawings with photographs, these tutorials will make the best use of computer graphics and videodisc images to help students understand scientific concepts and to visualize physical phenomena. Students will distinguish between fact and opinion, primary and secondary sources, provable statements, and unprovable statements.
3. Population To Be Served

POPULATION SERVED

This FII interactive videodisc courseware project will serve three different groups:

Group 1  The tutorials will initially benefit physical geography ecology and meteorology for aviation students at the College of Alameda. It will also be made available to the ten community colleges in the nation participating in "Project Leader" (See Appendix A.) and to community colleges throughout California. Approximately 300 students a year enroll in physical geography and aviation classes at the College of Alameda alone. They include students seeking physical science requirements for transfer to four-year colleges; students seeking Private Pilot and Flight Instructor Certificates; and educationally underprepared students attempting their first science class.

Group 2  The workshops will serve instructors in all disciplines in the Peralta Community College District who are interested in the potential of the videodisc. A minimum of 30 faculty are expected to attend these workshops. Students will benefit from the demonstration programs developed in these workshops.

Group 3  The tutorials in the IBM-PC/Pioneer or Sony View System formats will serve teachers and visitors to Contra Costa and Alameda County Instructional Media Centers, the Lawrence Hall of Science, and the Exploratorium. These programs will be made available to these Institutions as demonstrations of the instructional potential of the videodisc.

The districts served by the community colleges participating in this project are urban areas with large minority populations. Many of the students are Chinese, Japanese, Vietnamese, Filipino, and Hispanic with English as a second language. For these students, the use of computer graphics enhanced with film clips and still frames is especially helpful in understanding scientific concepts.
4. Objectives

OBJECTIVES
The objectives to be achieved by this project are

1. To develop six interactive videodisc tutorials in physical geography and ecology. This self-paced, interactive courseware will combine computer-generated graphics and animation with still frames and film clips from a videodisc. The instructional material will be presented using a question and answer format. Some questions will involve analysis of a diagram or visual image, some will require speculation and reasoning, and others will review material already presented. Where students do not appear to have mastered the material, the tutorial will branch to repeat the section. Data will be collected as the student works through the tutorial. This data will include the actual answers typed by the students, the number of right and wrong answers, and the time spent on each section. In addition, written documentation will accompany the tutorials so that other instructors using the tutorials can use the student data collection system.

   Cost: $18,679
   Dates: July 1988 - April 1989

2. To present at least two ½-day staff development workshops to share the experience gained in the development of interactive videodisc tutorials and to help identify and encourage instructors that want to develop their own instructional material using a videodisc. Resource materials will be prepared for the workshops.

   Cost: $1,776
   Dates: March 1989 - June 1989

3. To produce two demonstration programs working with instructors who are interested in developing material in their own subject area.

   Cost: $2,526
   Dates: April 1989 - June 1989
5. Workplan Narrative

ACTIVITIES

The Project Director and Instructional Designer will be Rita Haberlin. She has taught physical geography for twenty-seven years and has been developing computer-assisted instruction for the past eight years. She is currently Project Manager for “Project Leader” (See Appendix A) utilizing the Sony View System at the College of Alameda. She is co-author of the IBM Earth Science Series.

Pat Kulda is the Programmer and Graphics Artist. She has been working with computers for the past seventeen years and has been writing computer courseware for the past eight years. She is co-author of the IBM Earth Science Series.

This project team has previously developed courseware for the Peralta Community Colleges, the National Science Foundation, the Fund for Instructional Improvement, and IBM Corporation.

The interactive videodisc tutorials will be tested in the computer learning center at the College of Alameda using the Sony View System and the IBM-PC/Pioneer system. Workshops will be held at the College of Alameda during the Winter and Spring Quarters of 1989.

The following timetable indicates the sequence in which project activities will be carried out.

Activity Schedule 1988

July-Aug The Instructional Designer prepares the objectives for each tutorial and develops the instructional sequences.

August The Instructional Designer reviews the Earth Science and Biology Videodiscs and chooses the sections most appropriate to meet the objectives of each tutorial.

The Instructional Designer selects the animation and graphics required for each instructional sequence.

The Programmer/Graphics Artist critiques the choice of video and computer graphics.

September The Project Director invites the Director of the Computer Learning Centers and interested faculty to join an evaluation team to review the tutorials and documentation as it is developed.

Sept-Feb The Instructional Designer writes the text and develops the questions and reinforcement responses.
The Programmer reviews and critiques the text as it is written. The material is also evaluated by members of the evaluation team.

**Sept-April**
The Programmer/Graphics Artist programs the text and video sequences and designs the graphics and animation. A graphics tablet is used to create the computer graphics.

**December**
The Project Director submits a half-year report to the Fund for Instructional Improvement.

**Jan-June**
The Instructional Designer tests the programs with physical geography classes at the College of Alameda. Students are required to take pre-test and post-tests. These tests, along with computer-collected student data, are used to evaluate the effectiveness of instruction. Students evaluate the courseware by completing questionnaires.

The evaluation team reviews the material and makes suggestions to improve them.

The Instructional Designer rewrites the text and redesigns the graphics in response to the student comments, test results, student data, and observation.

**Mar-June**
The Programmer rewrites the program in response to feedback from students and the evaluation team.

**Jan-March**
The Instructional Designer prepares the resource materials for the workshop. The Project Director makes arrangements for the workshop to be held at the College of Alameda. Advance notice is given to Peralta District faculty.

**March**
The Project Director and Programmer hold the workshop at the College of Alameda. Questionnaires are used to evaluate this first workshop and to prepare for the hands-on workshop.

**April**
The Project Director consults with faculty in advance of April's hands-on workshop to determine the most efficient way to use the available equipment and the instructors' time.

**April-June**
The Project Director and Programmer work with faculty in the hands-on workshop. They help faculty prepare their own programs using an authoring or programming language and a videodisc in their own subject area.
June  Questionnaires are used to evaluate these workshops and to evaluate the demonstration programs developed in the workshops.

The Project Director prepares a final report and submits it to the Peralta Community College District and the California Community College Fund for Instructional Improvement.

July  The Project Director and Programmer review all the courseware developed in this project in preparation for its use in local museums and educational media centers.

1989-90  The Project Director submits papers on the results of this project to educational computer conferences.
6. Expected Outcomes

EXPECTED IMPACT AND TRANSFERABILITY

Interactive videodisc tutorials will enrich the curriculum for students in physical geography, ecology, and meteorology for aviation at the College of Alameda. The workshops and demonstration programs will stimulate interest in this powerful new medium among other Peralta Community College District faculty. The instructors will observe that self-paced interactive tutorials using color graphics and videodisc images clarify the student's understanding of concepts and processes. The experience gained in developing the tutorials will be shared with other instructors at workshops and conferences.

These tutorials will become a regular part of the courseware available to students enrolled in physical geography and students enrolled in computer-assisted instruction in Physical Geography 48A. The data collection techniques used within the tutorials will provide valuable feedback on student progress.

The new tutorials developed for this project will expand the limited library of educational materials that are currently available for the videodisc in traditional academic subject areas. The transferability of this project is enhanced by making the tutorials available for both the Sony View system and the IBM-PC/Pioneer configuration. The tutorials and documentation will be provided at cost of reproduction to colleges, local science museums and educational media centers. In this way a much wider audience will be exposed to the instructional potential of the interactive videodisc. Since the tutorials will be user-friendly, students will be able to run the programs without assistance in a library or learning resource center.

The tutorial topics will appeal to the layman as well as students in geography, biology, geology, meteorology, aviation and physical science classes. Television audiences often have difficulty understanding the jargon of weather forecasts and the satellite images and maps that accompany them. Two of these tutorials, Understanding the Weather Map and "Violent Storms", address this problem using the satellite images from the videodisc. The programs will be designed to accompany a variety of textbooks and to meet the needs of many instructors. This will ensure that they will have a wide impact.

Once this project is completed, the skills and experience gained by those who have participated in the project and in the workshops will be used to develop further videodisc programs. Our experience with computer-assisted instruction has shown that when the courseware is interesting, the students demand for more keeps the instructor working on a project long after a grant has concluded.
7. Evaluation Plan

EVALUATION PLAN

Evaluation will take place at each stage of the project using an evaluation team, student testing and questionnaires. The evaluation team will consist of educators from the Peralta Community College District.

The tutorials will be evaluated by observing students as they use the modules by evaluating the computer-collected student data, and by giving the students pretest and post-tests on the material. The students will also be asked to complete questionnaires. The evaluation team will be asked to review the tutorials and make suggestions. Changes will be made to the modules in response to this feedback.

The workshops will be evaluated using questionnaires. The questionnaires from the first general workshop to be held in March will be helpful in preparing for the hands-on workshop in the spring quarter.

A mid-year and final report will be submitted to the Peralta Community College District and to the California Community College Fund for Instructional Improvement. These reports will include a summary of progress made in meeting program objectives, results of evaluations and other information relating to the project.

The materials developed in this project will become part of a library of interactive videodisc courseware available for student and faculty use in the California Community Colleges in "Project Together." Throughout the nation (See Appendix A.) The materials will be incorporated into the physical geography courses at the College of Alameda. This project will have successfully met its goals if instructors in several different disciplines are inspired to develop their own courseware.
8. Dissemination Plan

Information for Dissemination

The interactive videodisc tutorials will be given to the State of California and made available to community colleges educational media centers *Project Leader colleges and local museums at cost of duplication. The tutorials and the experience gained in developing the tutorials will be shared with other educators at professional conferences These conferences include Computer Using Educators International Interactive Communications Society National Educational Computing Conference, and the League for Innovation in Community Colleges
9. Budget Narrative

NO “BUDGET NARRATIVE ACCOMPANIES THIS DOCUMENT.”