DOCUMENT RESUME

ED 301 159 IR 013 499

| | |
|---|---|
| AUTHOR | Cordes, Albert E. |
| TITLE | The Development and Evaluation of an Interactive Video Lesson for Use in a General College Physics Course. |
| PUB DATE | 88 |
| NOTE | 31p.; Ed.D. Practicum, Nova University. |
| PUB TYPE | Dissertations/Theses - Practicum Papers (043) -- Tests/Evaluation Instruments (160) |
| EDRS PRICE | MF01/PC02 Plus Postage. |
| DESCRIPTORS | *College Science; *Computer Assisted Instruction; Computer Simulation; *Instructional Improvement; Instructional Material Evaluation; *Interactive Video; *Physics; Questionnaires; *Science Instruction; Student Attitudes; Teacher Attitudes; Two Year Colleges; Videodisks |

ABSTRACT

This report describes the development, use, and evaluation of an interactive video lesson for a community college level algebraic-based general physics class that could be used to demonstrate Newton's laws and the conservation of momentum. The lesson consisted of five mini-lessons including an introduction, a presentation of Newton's laws, a review of the impulse momentum equation, the conservation of momentum, and elastic and inelastic collisions. Students used the lesson and completed evaluation questionnaires. The lesson was also presented to faculty, who completed evaluation questionnaires. Students found the visual images of the video lesson helped to explain the physics principles, and also found that it was helpful to be able to control the pace and review segments of the lesson. They also found the lesson to be enjoyable. Faculty agreed that laser video technology could be used in their courses, but were concerned about the availability of videodisks for a variety of subject areas. Copies of both the student and faculty survey instruments are attached. (14 references) (Author/EW)

# The Development and Evaluation of an Interactive Video Lesson for Use in a General College Physics Course

by

Albert E. Cordes

Cohort 4



A Practicum II Report Presented to the Ed.D. Program in Computer Education in Partial Fulfillment of the Requirements for the Degree of Doctor of Education

NOVA UNIVERSITY

1988

TABLE OF CONTENTS


Page

PRACTICUM APPROVAL . . . . . . . . . . . . . . . . . . . . . . . ii

TABLE OF CONTENTS. . . . . . . . . . . . . . . . . . . . . . . . iii

ABSTRACT . . . . . . . . . . . . . . . . . . . . . . . . . . . . iv

Chapter

I INTRODUCTION. . . . . . . . . . . . . . . . . . . . . . . 1

Description of Community, including
Socio-Economic and Geographic Factors . . . . . . 1
Writer's Role and Responsibilities. . . . . . . . . 2

II STUDY OF THE PROBLEM. . . . . . . . . . . . . . . . . . 4

Problem Statement . . . . . . . . . . . . . . . . . . 4
Evidence of the Problem . . . . . . . . . . . . . . . 5
Analysis of the Causes. . . . . . . . . . . . . . . . 5
Relationship of the Problem to the
Literature. . . . . . . . . . . . . . . . . . . . . 6

III ANTICIPATED OUTCOMES AND EVALUATION
INSTRUMENTS. . . . . . . . . . . . . . . . . . . . . . 11

Goals and Objectives . . . . . . . . . . . . . . . . 11
Measurement of Objectives. . . . . . . . . . . . . . 12

IV SOLUTION STRATEGY. . . . . . . . . . . . . . . . . . . 13

Discussion and Evaluation of Possible
Solutions. . . . . . . . . . . . . . . . . . . . . 13
Description and Justification for
Solution Selected. . . . . . . . . . . . . . . . . 15
Report of Action Taken . . . . . . . . . . . . . . . 16

V RESULTS, IMPLICATIONS, AND RECOMMENDATIONS . . . 20

Results . . . . . . . . . . . . . . . . . . . . . . . 20
Implications . . . . . . . . . . . . . . . . . . . . 21
Recommendations. . . . . . . . . . . . . . . . . . . 23
Dissemination. . . . . . . . . . . . . . . . . . . . 23

REFERENCE . . . . . . . . . . . . . . . . . . . . . . . . . . 24

Appendices. . . . . . . . . . . . . . . . . . . . . . . . . . 26

A STUDENT AND FACULTY QUESTIONNAIRE. . . . . . . . . . 26

# ABSTRACT

The Development and Evaluation of an Interactive Video Lesson for Use in a General College Physics Course. Cordes, Albert E. 1988: Practicum Project, Nova University. Ed.D. Program in Computer Education.

Descriptors: College Science/Computer Assisted Instruction/Computer Simulation/Instructional Improvement/Interactive Video/Physics/Science Instruction/Videodisc Recordings.

The objectives of this project was to produce an interactive video lesson for a college level algebraic based general physics class that could be used to demonstrate Newton's laws and the conservation of momentum. The lesson was to be designed so it could be used independently by students, be student controlled and provide some amount of individualized instruction. Another objective of this practicum was to inform our faculty of the instructional uses of laser video technology.

A laser disc player was interfaced to an IMB compatible microcomputer and the Vidkit authoring system was used to design the lesson. Zollman and Fuller's "Physics and Automobile Collisions" was the source of the video material. The lesson consisted of five minilessons including an introduction, a presentation of Newton's laws, a review of the impulse momentum equation, the conservation of momentum and elastic and inelastic collisions. A presentation was made to the faculty at the writer's college demonstrating the educational uses of interactive video. Evaluation questionnaires were used to judge the effectiveness of the lesson itself and the presentation made to the faculty.

The results of the questionnaires suggested that most students felt the visual method of presentation helped them better understand physics principles. They also agreed that the ability to control the pace of the lesson and the ability to review segments of the lesson was helpful. Results of the faculty questionnaire showed that most faculty understood how laser disk technology could be used in their classroom, and how it could improve their teaching effectiveness. As a result of this project, it is recommended that interactive video be more widely used to supplement traditional instruction for general physics classes.

# Chapter 1

# INTRODUCTION

## Description of Community, Including Socio-Economic and Geographic Factors

The institution where the problem under study exists is a small community college in northeastern New York State. This community has a population of about 25,000 and is the largest city in the county. The college serves the residents of the city, smaller outlying communities, and the rural areas as well. The county's main industries are agriculture, tourism, paper manufacturing and pharmaceutical manufacturing. Unemployment is higher than the statewide average, and the socio-economic level probably is slightly below the national average. Two other factors that affect enrollment and curriculum at this college is the existence of a U.S. Air Force base nearby and a four year college that is also a unit of the state university system located in the same city.

The college's curricula are heavily oriented toward business and liberal arts, but the present administration is interested in expanding into some technical fields. Electrical engineering technology is one currently receiving serious consideration.

## Writer's Role and Responsibility

This writer was hired two years ago as a member of the Math/Science division owing to a background in teaching physics and experience using computers. Then, adjunct faculty taught physics at the air base with no laboratory component. Since then, funds for a new physics lab that was constructed on campus, have been obtained. This project was supported partially because of the college's interest in diversifying into more technical areas. Starting in September of 1987, physics will be taught with a lab component during the day on campus as well as during the evening for air base personnel. Although most of the physics students will probably still be from the air base, there is interest in attracting other daytime students to maintain enrollment in these daytime classes. The college has traditionally had few students majoring in Mathematics/Science and those that do may not choose to take physics. Also, like many community colleges, numerous students are seen with deficiencies in mathematics that would prevent them from taking physics. It was the author's goal, then, to present a physics course that would be attractive to a student population that was not strongly oriented toward science and to be able to convey the principles of physics to these students without compromising the subject matter.

The author is greatly interested in using computer simulations and interactive video to help achieve this end.

## Chapter 2

## STUDY OF THE PROBLEM

### Problem Statement

Last year, this writer served as a member of a Learning Resources Committee at the college where the writer is employed. The committee chair informed the group that a budget of $5000 was available to purchase equipment to improve learning on the campus, and requested proposals from anyone on the committee. This author proposed that the college purchase an interactive video system. This proposal was eventually approved, and a laser videodisc player, computer interface and authoring system were purchased. The college faculty is small, and although a few faculty members have expressed interest in using the equipment, no other faculty member has taken any initiative to explore how they might use the system. Since the initial proposal was sponsored by this writer, it was felt that he should get the equipment operational and build a well designed lesson to demonstrate its possibilities to other faculty. The other aspect of the problem was to use videodisc technology to create simulations to illustrate concepts in physics. Kirkpatrick and Kirkpatrick (1985) have described videodiscs containing many scenes that depict automobile collisions. He states "computer programs can be written to create a large variety of lessons using these materials...." It was the intention of this practicum to create an interactive videodisc lesson, using the videodisc to which Kirkpatrick refers, to illustrate the principle of the conservation of momentum as it is represented by automobile collisions. Arrangements were also made to show the outcome of this practicum to the faculty during a monthly faculty forum seminar.

## Evidence of the Problem

A goal of this practicum was to improve instruction in a physics course taught by the author at a community college using interactive video. At present, the Learning Resource Center's inventory list of this college contains no visual media, excluding computer software, for teaching physics. Further, the Learning Resource Center contained only one videodisc player. It was not being used by any faculty member. At the conclusion of this practicum, the videodisc player was interfaced with an IBM compatible computer and was located in the Learning Resource Center for use by any faculty member.

## Causative Analysis

Since the use of interactive video is a new instructional technique, it is understandable that it was not being used at this college. As previously mentioned, this is a small college with a limited budget. It is still struggling to provide adequate computer facilities for its students. Physics instruction itself is also new at this college. Only since the fall of 1986 has physics been offered during the day on campus; and the fall of 1987 was the first time it was offered with a laboratory component. As a result, there is a lack of many types of instructional media that would aid in the teaching of physics. Efforts in the past two years to improve this situation have included the acquisition of computer software. It was felt that including interactive video media would be a great asset to physics instruction at the college.

## Review of the Literature

In reviewing the literature on the use of interactive video in an educational setting, it was found that researchers have approached the issue from several points of view. Sherwood (1986) has attempted to use videodiscs to show that learning must always occur in context with experiences that students are familiar with. Since teachers cannot possibly know what experiences or environments each student has encountered, video segments can provide this common ground. Sherwood devised a series of experiments where a group of students viewed segments of movies such as "Raiders of the Lost Ark," and then received lessons in subjects such as science and geography that related to portions of the film. Sherwood showed that students who viewed the video segments were better able to understand the meaning of unfamiliar terms and interrelate various topics that otherwise seemed unrelated. They also recalled more science content and, to some extent, were better able to use science concepts to solve problems than did students who did not view the film segments.

Bunderson et al. (1983) studied the performance of biology students who received interactive video instruction compared with a group who received instruction in the traditional manner. He found that the students who received the interactive video instruction performed significantly better on a post test and a retention test than did the traditional students. Bunderson discussed several reasons why he thought that the performance of the interactive-video students was superior; some of these are described below:

a) The ability of interactive video to integrate visual images in classrooms. He feels that in the traditional class, most knowledge is transmitted verbally and visual images are rarely present.

b) The ability of interactive video to hold student attention longer because of its novelty, ability to interplay styles of presentation, and because of the power of the visual imagery.

c) The ability of interactive video to trigger a greater range of preexisting concepts through visual imagery.

d) The ability of interactive video to provide models of skilled performances for teaching procedures.

e) The ability to provide experiences for the students that they would not normally encounter otherwise. For example, Bunderson discussed an interactive videodisc that could present disease symptoms visually to medical students and allow them to question and eventually diagnose the disease.

Davis and Gross (1985) explored interactive video instruction for simulating laboratory experiments. They argued that with the cost of laboratory equipment, facilities and staffing so high, interactive video may be a possible alternative to traditional "wet" labs. They compared students who received interactive video simulations with students who performed experiments in "wet" labs in the traditional way. He reported the following results. Students who experienced the interactive video simulations completed the lab in less time, appeared less confused about the procedures of the lab, had fewer distractions and were exposed to a wider variety of experimental conditions than was possible in the traditional labs. They pointed out several advantages of the interactive video system including its ability to provide immediate feedback, allowing students to be active in their learning, and the ability to provide review segments for students needing it. Surveys among faculty members suggested that instructors from small colleges were more inclined to use interactive video as a substitute for conventional labs than were their colleagues in larger research universities. Both groups agreed that these simulations were appropriate where danger to the student or excessive costs would prohibit students from performing an experiment directly.

Russel et al. (1985) used interactive videodiscs to prepare chemistry students for their laboratory sessions. They found that the group using the interactive video instruction did significantly better on prelab quizzes and in experimental accuracy than the control group who received instruction in the traditional manner. Russel also reported that student reaction was unanimously in favor of the interactive video approach.

Some authors wrote about the impact that interactive video will have on education. For example Price and March (1983) feel that the educational system, as we know it, is headed for disaster. They cite teacher shortages, increased demand for higher salaries by faculty and staff, and the inability of the taxpayer to bear the financial burden as reasons for their prediction. They feel that education needs to shift towards a less expensive teaching technology and they see interactive video as playing a major role here. Thorkildsen and Freedmen (1984) feel that research attempting to test whether interactive video is superior to traditional instruction is not particularly appropriate. They argue that, given faculty shortages, it can supplement instruction to increase learning for a greater number of students. They feel that the capability of the videodisc to continually monitor and assess a student as a teacher would is a major advantage.

In summary, the literature seems to be positive about the use of interactive video as an effective method of instruction and provides some evidence to show that it indeed may be superior to traditional methods for many applications.

## Chapter 3

## ANTICIPATED OUTCOMES AND EVALUATION INSTRUMENTS

### Goal and Objectives

It was hoped that two main objectives would be achieved as a result of this practicum. One was to demonstrate the use and usefulness of all levels of video disk instruction to the faculty at the writer's college during a special presentation. It was also hoped that some faculty would see some application for their own teaching and use video disk instruction in their classes. Secondly, the writer hoped to design a lesson using interactive video for physics students, with the intention of building into this lesson some characteristics that are unique to the interactive video media and difficult or impossible to achieve using traditional teaching techniques. These characteristics were as follows:

a) To provide visual stimuli to demonstrate the conservation of momentum using the simulation of events with which students are familiar, from everyday life, such as automobile collisions.

b) To provide students with a medium they could control and with which they could interact individually.

c) To provide students with a medium that could, through branching, provide some degree of individualized instruction.

d) To provide students with instruction that could be reviewed independently, as often as desired, at a pace that was comfortable for the student.

## Measurement of Objectives

The extent to which these objectives were achieved was measured with short questionnaires that were completed by the faculty after the presentation, and by the students after they experienced the interactive video lesson. Copies of the questionnaires are included in appendix A. Since an objective in this practicum was to provide students with a visual medium they could control and interact with, a student questionnaire appeared to be a potentially effective method to measure that objective. The students can certainly be good judges of whether the lesson contained those characteristics. The writer plans to use this technique to supplement, not completely replace, more traditional instruction. Therefore, it was felt that a controlled comparison between interactive instruction and traditional methods was inappropriate. For the part of the practicum that dealt with making the faculty aware of laser video technology, a short questionnaire appeared to offer a quick and effective way to receive that input. Once again, they are the ones to ask whether they are now more aware of this technology and its potential benefits in instruction.

Chapter 4

# SOLUTION STRATEGIES

## Discussion and Evaluation of Possible Solutions

In selecting methods to teach topics such as the conservation of momentum in physics, several methods come to mind. Lecture is the most widely used, and has been shown to be efficient and effective for some circumstances (McKeachie 1986). Gagne and Briggs (1979) describe Dale's cone of experience as a listing of twelve categories ranging from verbal symbols, category 12, to direct purposeful experiences, category 1. They suggest that the low end of the cone is characterized by time consuming but effective methods of learning. They also refer to this low end as the "slow but sure" method as opposed to the "fast but risky" high end of the cone. The lecture method, with its high verbal emphasis, would be on the high end of the cone.

Another possible method that is widely used in physics instruction is the demonstration. The demonstration is lower on the cone of experience than is the lecture. It does have the disadvantage that it requires time to set up and perform. Measurements are often necessary and are usually performed by the instructor, and student interaction is minimal. For this writer, demonstrations are difficult because lecture sessions are held off campus, and equipment has to be transported from the lab. Another disadvantage of demonstrations is that they are not usually performed independently, so the student must derive all learning from the one observation.

One possible solution to the drawbacks of the demonstration is the computer simulation. Murphy (June 1981) states that computer simulation can "take the place of the laboratory or field situation where students are invited to carry out experiments which would otherwise be impossible or at least difficult due to expense, danger or ethics." Murphy points out elsewhere (May 1981) that computer simulations eliminate problems often encountered with "hands on" activities such as student error, difficulties in handling live materials or limitations of small populations. He also states that simulations "allow students to alter parameters systematically while observing and interpreting outcomes."

Lipson and Fisher (1985) describe educational simulations as "a natural outgrowth of the intrinsic nature of the computer medium," but they also comment on the limitations of some computer simulations because of the current poor quality of computer graphics. Because of memory constraints, computer graphics are not near the quality students are used to seeing in photographic pictures, television and films.

## Description and Justification for Solution Selected

In light of what was discussed in the previous section, interactive video simulations appear to be a good solution. Simulations are included in category eleven of the twelve categories in Dale's cone of experience and there is evidence that there are not the large time investments that Gagne referred to. Hollen (1971) and Jones (1972) applied computer simulations to a high school chemistry course and found traditional instruction to take twice as long as the computer simulations.

Davis (1985) compared interactive video lab simulations with traditional wet labs. She found, in wet labs, that performance of the experiment tends to overshadow other phases of preparation and analysis. She states that the videodisc simulation integrates all phases of the laboratory experience and requires that the student be active in preparation and design of the experiment.

There is no doubt that the quality of the images produced by interactive video is superior to computer graphics. Kirkpatrick and Kirkpatrick (1985) point out many other advantages of this technology including the ability to store 54,000 images on one disk, the ability to access any image or group of images within seconds, and the presence of stereo sound in addition to high-quality visual images.

## Report of Action Taken

At the outset of this practicum, the video disk player, video monitor, interface cable and authoring software was stored, unused and untried in this writer's office. The writer's first task was to interface it with an IBM-compatible microcomputer. It was soon found that an incorrect interface cable had been received. After contacting the vendor, the correct cable arrived within a few weeks. Meanwhile, familiarity was obtained with "Vidkit," the authoring system that the college purchased. Vidkit was found to be easy to learn, although somewhat limited and awkward to use. Also, some problems were encountered with the software. Once again, the vendors were contacted. They explained that there were some "bugs" in the software, and that a new updated version was forthcoming. The vendor's representative promised to send this new version, but it has not been received as yet. The problem encountered was as follows. After a screen of text was written the software allowed the addition of an action. The action was typically allowing the user to view a movie sequence. Since it was desired that students be able to read the screen of text before viewing the video, it was decided that the student would be allowed to control the start of the video by pressing the spacebar. When the lesson was played, however, the software would display the text and immediately begin the video. This problem was circumvented by introducing a "dummy screen" which simply displayed the message to "please watch the video." It was found that this worked well since the user could read a screen of text, press the spacebar to move to the next screen, and then view the video.

The final lesson consisted of five minilessons that contained an introduction, a review of Newton's laws, impulse and momentum, the conservation of momentum and elastic and inelastic collisions. The videodisc used was "Physics and Automobile Collisions" by Fuller and Zollman. Each minilesson contained screens of text that branched to selected video segments chosen to illustrate the point made in the text. Each minilesson also contained a question that tested the student on the material covered, and a remediation screen along with supporting video segments for incorrect responses. This video disk contained audio as well as video so the student was able to hear a narrative explanation while viewing the video.

The following provides a brief summary of the lesson content. First, the lesson was driven by a main menu that allowed the student to choose any of the minilessons in any order. At the completion of any minilesson, the student was returned to this main menu. The introduction briefly explained how the lesson worked and gave a brief video introduction about how physics principles could be demonstrated using automobile collisions. The segment on Newton's laws explained each law individually, and provided dramatic illustrations of each law using car collisions and showing how mannequins, acting as passengers in the cars, obeyed these laws. The impulse/momentum minilesson introduced the equation F x t = m x v. Video segments were shown that illustrated how an increase in impact time could decrease an applied force resulting in the same momentum change. These segments used air bags and compressible bumpers to make that point. The conservation of momentum minilesson emphasized that momentum is a vector quantity, and that vector addition must be applied in momentum conservation. Video segments were then shown of cars colliding at right angles to each other. Overhead views in slow motion showed that the resulting momentum of these cars can indeed be predicted by vector addition. The last minilesson on elastic and inelastic collisions made use of video sequences of model cars with different bumpers on an air track. It was shown that a steel spring bumper restored its shape when a deforming force was removed, whereas a lead bumper did not. Rebound velocity of a car with a steel spring bumper was then compared with that of a car with a lead bumper. The loss of energy owing to the work of deformation was then discussed. Real automobile collisions against a wall reinforced this concept more dramatically.

Students were assigned responsibility to play the lesson some time during their laboratory period. Students worked alone or in pairs, and filled out the evaluation form when they completed the lesson.

The second phase of this practicum was to attempt to familiarize the faculty with laser video technology. This author's presentation consisted first of some technical information about the laser disk and player. Level 1 use was then demonstrated by playing selected segments and frames from a video disk using only the remote controller. The interactive level 3 use was demonstrated by showing the lesson created for this practicum. Participants filled out short evaluation questionnaires after completion of the presentation.

Chapter 5

# RESULTS, IMPLICATIONS, AND RECOMMENDATIONS

## Results

Table 1

Results From Student Questionnaire Expressed in Percents

| Question Number | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| 1 | 17 | 61 | 22 | 0 | 0 |
| 2 | 39 | 44 | 17 | 0 | 0 |
| 3 | 32 | 54 | 14 | 0 | 0 |
| 4 | 23 | 50 | 27 | 0 | 0 |
| 5 | 13 | 30 | 52 | 5 | 0 |
| 6 | 4 | 17 | 57 | 22 | 0 |
| 7 | 22 | 61 | 17 | 0 | 0 |
| 8 | 39 | 52 | 9 | 0 | 0 |

Table 2

Results From Faculty Questionnaire Expressed in Percents

| Question Number | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| 1 | 71 | 29 | 0 | 0 | 0 |
| 2 | 43 | 43 | 14 | 0 | 0 |
| 3 | 14 | 72 | 14 | 0 | 0 |
| 4 | 14 | 58 | 14 | 14 | 0 |

The above tables present the results of both student and faculty questionnaires illustrated in Appendix A. There were 23 respondents to the student questionnaire and 7 to the faculty questionnaire. Percentages for each response are given for each table.

## Implications

The results of the student questionnaire seem to suggest that the writer's objectives were met in this phase of the practicum. A total of 78% of the students agreed that visual images of car crashes helped them better understand physics principles. This is consistent with the point of view held by Sherwood (1986) who felt that video segments of events students are familiar with can provide a context for learning. Another desired objective in this lesson was to provide students with a medium they could control and with which they could interact. The interactive video lesson provided this because students controlled the rate at which the screens were presented. They also had the option of moving backward at any point to review previous screens. Students could also, of course, replay an entire minilesson selected from the main menu. A total of 83% of the students agreed that it was helpful to control the pace of the lesson, and 87% agreed that it was helpful to be able to review certain segments of a lesson. Another objective of this practicum was to provide students with instruction that could be reviewed independently. Only a total of 21% agreed they would actually do this. One reason for the low percentage on this question was that they had already studied Newton's laws and momentum conservation earlier in the semester, and students had already been tested on these topics. Since preparation for exams is often the prime motivation for review and study for many students, this low percentage is understandable. Finally, a total of 83% of the students agreed that the lesson was enjoyable.

The last objective of this practicum was to demonstrate the use of laser video technology to the faculty, and attempt to show applications to their teaching. This writer's presentation took place on the last week of the semester at 8:30 AM. Faculty turnout was predictably light, and some faculty had to leave to attend 9:00 classes. The college president, dean of academic affairs, associate dean for the Math/Science division and the division's coordinator were all present, however. As a result of the questionnaire filled out by faculty, 100% felt they understood how laser video technology could be used in a class. 86% agreed they could see applications to their courses. Many faculty were concerned about availability of video disks in their subject areas. This writer was able to provide one catalog that described video disks for a variety of subject areas. Some faculty also commented on the size of the monitor used to display the images. They felt that a larger monitor would be necessary for showing video segments or images to an entire class. A total of 71% agreed they would use some aspect of videodisk instruction within the next year.

## Recommendations

Since interactive laser video technology seemed to be favorably received by both students and faculty, it is recommended that it be more widely used at this college. This writer already has recommended to the Learning Resource Center committee that a second laser disk player be purchased this year. This item has received first priority on the list of planned purchases. A large 24-inch monitor is also planned for purchase next year by the same committee. It was also recommended that interactive video be more widelv used for individualized instruction for physics students and to supplement traditional instruction. Current plans include the purchase of at least two more laser video discs in the physics area.

## Dissemination

Dissemination was part of the objectives of this practicum. Since faculty turnout was light, however, this writer has been asked to make a second presentation early in the spring semester when faculty are not so pressured by final exams and final grades. A short workshop on the use of the Vidkit authoring system is also planned. As mentioned before, Vidkit is easy to use and requires no programming experience. This would allow faculty to take advantage of some of the special qualities of interactive video instruction.

BIBLIOGRAPHY

Bunderson, C.V. and Others. "Instructional Effectiveness of an Intelligent Videodisc in Biology" ERIC ED 272 165, 1984.

Davis, Barbara Gross. "Nebraska Videodisk Simulations. Executive Summary (and) Science Lab Videodiscs: Evaluation Report. A Report From the Annenberg/CPB Project." ERIC ED 267 989, 1986.

Gagne, Robert; Briggs, Leslie. Principles of Instructional Design. 2nd Edition. Holt, Rinehart and Winston, New York, N.Y.1979.

Hollen, T; Bunderson, C.V. and Dunham, J. "Computer Based Simulations of Laboratory Problems in Quantitive Chemical Analysis." Science Education, Vol 55 n2, p131-136, 1971.

Jones, J.E. "Computer-Simulated Experiments in High School Physics and Chemistry." Dissertation Abstracts International. Vol 33 n8, p4200-A, 1973.

Kirkpatrick, Larry D.; Kirkpatrick, Diane S. "The Physics Teacher and the Video Disk." The Physics Teacher, v23 n7, p13-18, Oct 1985.

Lipson, Joseph; Fisher, Kathleen. "Technologies of the Future" ERIC ED 273 246, 1985.

McKeachie, Wilbert. Teaching Tips. A Guidebook for the Beginning College Teacher. 8 Edition. D.C. Heath and Co. Lexington, Mass. 1986.

Murphy, P. "Computers in Biological Education: Simulation Approaches. Genetics and Evolution. CAL Research Group." ERIC ED 247 887, May, 1981.

Murphy, P and Others. "Evaluation Study on Simulation CAL in the Science Faculty of the Open University. CAL Research Group." ERIC ED 247 890, June, 1981.

Price, Barrie Jo; Marsh, George E. "Interactive Video Instruction and the Dreaded Change in Education." Technological Horizons in Education, v10 n7, p112-117, May 1983.

Russell, Arlene A; Staskun, Mina G; Mitchell, Bernie. "The Use and Evaluation of Videodisks in the Chemistry Laboratory." Journal of Chemical Education, v62 n6, p514-515, June 1985.

Sherwood, Robert D. "The Development of Videodisc Based Environments to Facilitate Science Instruction." ERIC ED 275 503, 1986.

Thornkildsen, Ron; Friedman, Susan. "Videodisks in the Classroom." Technological Horizons in Education, v11 n7, p90-95, April 1984.

## APPENDIX A

## STUDENT AND FACULTY QUESTIONNAIRES

### STUDENT QUESTIONNAIRE

Please indicate your opinion concerning the interactive video lesson you just participated in.

1. I feel the visual images of automobile collisions helped me better understand the conservation of momentum. a) Strongly agree b) Agree c) Neutral d) Disagree e) Strongly Disagree

2. I felt it helpful to be able to control the pace at which the lesson progressed. a) Strongly agree b) Agree c) Neutral d) Disagree e) Strongly Disagree

3. I found it helpful to be able to review certain segments of the lesson. a) Strongly agree b) Agree c) Neutral d) Disagree e) Strongly Disagree

4. I felt the extra explanations the lessons provided to be helpful to me. a) Strongly agree b) Agree c) Neutral d) Disagree e) Strongly Disagree

5. The location of the materials in the Learning Resource Center is a convenient central location for me. a) Strongly agree b) Agree c) Neutral d) Disagree e) Strongly Disagree

6. I intend to go back and review this lesson again on my own time. a) Strongly agree b) Agree c) Neutral d) Disagree e) Strongly Disagree

7. I found the interactive video lesson to be enjoyable. a) Strongly agree b) Agree c) Neutral d) Disagree e) Strongly Disagree

8. I would like to see more of this kind of lesson in the future. a) Strongly agree b) Agree c) Neutral d) Disagree e) Strongly Disagree

## FACULTY QUESTIONNAIRE

Please respond to the questions below based on the information you received during this demonstration.

1. I feel I understand how a videodisc can be used in the classroom, and I understand what interactive video is. a) Strongly agree b) Agree c) Neutral d) Disagree e) Strongly Disagree

2. I can see applications of videodisc instruction to the courses that I teach. a) Strongly agree b) Agree c) Neutral d) Disagree e) Strongly Disagree

3. I feel that the use of videodisc instruction could improve instruction in my classes. a) Strongly agree b) Agree c) Neutral d) Disagree e) Strongly Disagree

4. I will attempt to use some aspect of videodisc instruction in my classes sometime within the next year. a) Strongly agree b) Agree c) Neutral d) Disagree e) Strongly Disagree