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DISTANCE EDUCATION AS A MEDIUM FOR PROMOTING  
THE COLLEGE PREPARATION AND ATTENDANCE OF MINORITY STUDENTS

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#### Abstract

A unique distance education project for promoting the college preparation and attendance of minority high school students is described and evaluated. This project is based on a collaborative effort between an urban university and a high school utilizing CODEC interactive television technology. Suggestions for using distance education in this context are offered.

#### Introduction

A unique distance education project has recently been initiated at California State University, Dominguez Hills to improve the college preparation and attendance of minority students. CSU Dominguez Hills, part of the California State University system, is a mid-sized university in south-central Los Angeles, which predominately serves communities with large Black and Hispanic populations. A major challenge facing this university is how to better serve these populations, which are significantly underrepresented in higher education. The problems of low rates of college attendance and poor preparation for college for certain minority and low-income students are well known and have proven difficult to solve.

In response to these problems, CSU Dominguez Hills has begun a project utilizing interactive television (CODEC) to establish an educational link with students at an inner-city high school. This link is designed to give students exposure to an enriched high school curriculum and college-level instruction, with the goal of improving their education and motivation for college. Traditionally, distance education has served older students primarily studying post-secondary and professional courses. Recently, however, interest has focused on serving younger, less traditional students with special learning needs (Ross, Smith, Morrison, and Erickson 1989). With this in mind, this article will describe the CODEC distance education project for minority high school students, and provide some evaluative information on its implementation and effectiveness during its first year of operation. From this analysis, suggestions for using distance education in this context are offered.

## Project Description

In the spring of 1990, CSU Dominguez Hills was given a grant from Pacific Bell to purchase and install equipment for a CODEC (code/decode) television link with a high school in the Compton Unified School District. Compton School District primarily serves minority students from low income neighborhoods, who traditionally have low rates of college attendance. The high school selected for the link is located approximately 15 miles from the university and has an enrollment of nearly all minority students. CSU Dominguez Hills agreed to support the costs of operating the link and providing instructional services to the school. Compton School District provided funding for equipment and personnel to support delivery at the high school site.

The major goal of the CODEC project was to provide a medium for minority high school students to familiarize themselves with college and to become better prepared for study at this level. This was to be achieved by broadcasting lessons taught by college professors over interactive television to the high school site. These lessons were designed to present college level material in a way high school students would understand and to motivate students for further advanced study. Minority students traditionally have trouble seeing themselves as succeeding in college, but the opportunity to experience higher education might significantly alter this conception. By actually learning from a professor, students could develop increased confidence regarding their abilities to do college work. And by studying advanced subjects they could also improve their academic preparation and chances for admission to college. This is particularly important because so many urban high schools lack the resources to give their students anything but a basic education.

An additional goal of the project was to test the value of electronically delivered educational services via CODEC and to develop the potential for CODEC links with other sites.

CODEC technology was selected for this project because of its ability to provide two-way communication between instructors and students. CODEC utilizes high compression telephone lines for bi-directional transmission of television video and audio signals. It was felt that the ability of instructors and students to simultaneously see and speak to each other had potential to appreciably improve the effectiveness of distance education over more traditional instructional delivery systems, such as one-way Instructional Television Fixed Service (ITFS).

In the fall of 1990, broadcasts over CODEC to the high school began. There were five to six hours of broadcasts a week of instruction in German, advanced algebra, calculus, and Mexican-American Studies. In addition, there were science demonstrations in physics and chemistry, and tutoring programs for help with homework and test-taking skills. These broadcasts were designed to augment regular class instruction at the high school, and to provide students with enriched educational experiences.

A single classroom at the high school served as the receiving site. During the broadcasts, students were brought into the classroom and supervised by either their regular teachers or other adults. Because the classroom was also used for regular classes, CODEC equipment had to be set up and put away prior to each broadcast. Equipment was housed in a portable cabinet and consisted of a large television monitor so that students could see the university instructor, a small camera and two microphones for student communication with the instructor, and a video display table for students to show their written work.

Sixty-two students and four high school instructors from four different classes participated in the project. The majority of the students were female (62%), and the grade breakdown was 30% freshmen, 5% sophomores, 61% juniors, and 5% seniors. Students took part in the project as part of their

regular class work. Typically, they were taught by their teacher three days a week, and by CODEC instructors the other two days. Frequent coordination and planning between the high school and university instructors was required to integrate the distance and regular teaching. It is important to note that the students did not directly earn a grade or credit for their participation in CODEC. To overcome the problem that this might cause in reducing motivation for distance learning, some of the high school instructors factored CODEC participation into their students' regular grades.

CODEC classes were taught by four faculty members from the departments of science, math, social science, and foreign languages of the university. None of the faculty had previous experience teaching over television, but all were enthusiastic about doing so. Their teaching primarily emphasized theoretical and abstract knowledge of a subject. After consulting with the high school instructors, it was decided that the students would benefit most from teaching that presented college-level ideas and higher level thinking. Students in the advanced algebra class, for example, were taught the derivations of formulas and a little about the history of mathematics rather than purely computational skills. Other instruction involved subjects, such as German, which helped to broaden the students' academic preparation for college.

### Project Evaluation

At the end of the spring semester, an evaluation was conducted to determine the quality of the project's implementation and its effect on students. Evaluative measures included questionnaires, interviews, observations, and record reviews.

### Evaluation Outcomes

Student attitudes. To measure attitudes toward CODEC technology and instruction, students were asked to answer a questionnaire. Nearly all of the students responded (93.5%). Responses for seven questions were given on a five-point scale, with 5 indicating the most positive response and 1 the most negative (e.g., 1=Definitely Not; 3=To Some Extent; 5=Definitely Yes). Questions are listed below, with mean ratings for each.

Question	Mean Rating
1. Did you like learning with CODEC?	3.7
2. Were the CODEC lessons interesting?	3.7
3. Were the CODEC lessons easy to understand?	3.6
4. Would you like to take more CODEC lessons?	3.6
5. Did the CODEC lessons make you feel more comfortable about the idea of going to college?	3.3
6. Would you like to receive high school or college credit for learning over CODEC?	4.8
7. How did the CODEC lessons compare to lessons in your regular classes at Dominguez High?	3.0

The questionnaire also requested student responses to three open-ended questions. The questions, response categories and frequencies are given below.

Question and Response	Frequency
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"What did you like best about CODEC lessons?"	
Instructor (e.g., "teacher was helpful")	9
Subject (e.g., "chance to learn something new")	14
College Experience (e.g., "learn what college students learn")	7
Technology (e.g., "talking to someone far away")	21
"What did you like least about CODEC lessons?"	
Instructor (e.g., "spoke too much")	11
Personal (e.g., "didn't like talking to a TV or in front of others")	8
Subject (e.g., "the subject was hard to learn")	10
Technology (e.g., "sometimes CODEC didn't work")	14
"What would you do to make CODEC lessons better?"	
Instructor (e.g., "keep explanations simple and short")	5
Class structure (e.g., "professor could get more students to be active in the class")	14
Subject (e.g., "offer more classes on different subjects")	14
Technology (e.g., "make things work better")	8

Discussion. In general, students had a favorable attitude toward CODEC. They found the technology intriguing, and the lessons interesting and understandable. The lessons were rated as comparable to their regular high school classes. This is a positive finding since students often favor face-to-face instruction over distance learning when the two approaches are directly compared (Davis 1984). The strongest opinion concerned a desire to receive credit for CODEC. Interviews with the high school instructors confirmed this, as they felt that motivation to learn would be improved in some students if they were given a grade and/or unit credit for their efforts.

Interestingly, students were made to feel only moderately more comfortable about attending college as a result of distance learning. From record reviews, nearly all students (93.4%) indicated they would attend college, though only 8.2% had applied, and only 3.3% had been accepted. Since most plan to go to college, they may already feel comfortable with the idea. However, the low rate of applying to college among this group suggests that they have trouble following through on their good intentions. Exposure to college instruction over CODEC may improve their persistence, however, and given that this is a major goal of the project, this will be closely monitored in follow-up evaluations.

Although impressed with the technology, students found technical problems to be bothersome. Many cited instances in which broadcasts were delayed or cancelled because no one at the high school knew how to set up or run the equipment. Other problems included CODEC instructors lecturing too much, or subject matter that was too difficult or theoretical. To improve CODEC, students suggested more student participation during lessons and a greater variety of classes.

Student Achievement. Since CODEC instruction primarily augmented regular class instruction, its direct effect on student achievement was not measurable. However, the high school instructors reported that their students learned much new material that motivated them in their regular subject studies.

Instructor Attitudes. The four high school and four university instructors that took part in the project were interviewed to determine their attitudes and experiences with CODEC. Each group was asked a set of narrative questions. Questions and most frequent responses are given below.

## High School Instructors

"What were the benefits of CODEC for your students?"

Numerous benefits were cited by the high school instructors. All mentioned the opportunity their students had to learn college level material and to interact with college professors ("Students got a real taste for higher education and how it is to learn from a professor."). Some instructors felt that their students developed more confidence about going to college when they experienced successful learning over CODEC ("Students get confident from doing college calculus and feel they can study this in college."). Two instructors stated that the lessons challenged their students to think more deeply and analytically.

"What were the problems with CODEC?"

Technical problems setting up equipment or trouble-shooting were most often cited ("Equipment is moved around or not put away properly, which causes technical problems that are difficult to solve sometimes."). Another problem was coordinating the high school bell and CODEC broadcast schedules ("The CODEC schedule and our bell schedule sometimes conflict, and we end up missing part of a broadcast.") Also mentioned was the reluctance of some students to interact with the distance instructors ("A big problem was that some students felt shy or anxious talking to the professors." "It took a lot of coaxing to get them to answer.").

"What are your suggestions for improving CODEC?"

Suggestions including increasing student motivation by giving them grades or credit for CODEC participation; preparing students for CODEC by familiarizing them with how it works and how to speak to the professor; inservicing the high school instructors so they know something about how to trouble-shoot equipment problems; and having a special room just for CODEC so interruptions by other classes are eliminated.

## CODEC Instructors

"What were the positive aspects of teaching over CODEC?"

All the instructors mentioned that they found teaching over CODEC a rewarding and enjoyable experience ("High school students are enthusiastic learners, and I like the opportunity to get them excited about the idea of going to college."). Another positive aspect mentioned were changes in the students' self-esteem ("Over the course of the semester, I could see students get more confident about their learning and their own abilities." "This is important if they are to be motivated to do college work."). Seeing students develop new interests in science and math was another positive outcome ("Some students really get excited about learning college math; they're motivated to learn all they can about the subject.").

"What problems did you experience teaching over CODEC?"

All instructors mentioned the problem of poor response among some students in their classes ("For many students the TV camera was imposing and they didn't like talking over it."); ("Students are not graded for their participation, and so some were reluctant to work."). Knowing how to teach high school students was also troublesome for several instructors ("I had to make some major changes in my teaching for the high school students, like doing less lecturing and more questioning; you can't teach them like

college students."); ("High school students have some trouble understanding theoretical or abstract concepts." "I found that I had to make things somewhat more concrete for them, but this wasn't always easy."). Being able to see only part of the room at the high school was a problem for one instructor ("The camera could only catch part of the room; I didn't always know who was there."). All instructors mentioned technical problems as occasionally interfering with their teaching.

"What are your suggestions for improving CODEC?"

Instructors suggested training students on how to communicate over television ("Students need to learn how to address the instructor by facing the camera and speaking clearly; many of them don't do this right and you can't understand what they're saying."). To increase motivation, all instructors suggested students be given grades or credit for their participation ("I know that what we teach them is enrichment for their regular class subjects, but they should be graded just like students are in college." "This will help teach them the importance of being prepared for class and attending to the lesson."). Better planning and coordination between themselves and the high school instructors was suggested to improve integration of CODEC and regular class subjects.

Observations of CODEC classes. The author observed several CODEC classes during the fall and spring semesters. At least one class in each of four subjects (i.e., German, Mexican-American Studies, advanced algebra and calculus) was observed to obtain information about the delivery of instruction and the general classroom atmosphere at the receiving site. Across classes, the quality of instructional delivery appeared high. The instructors all spoke clearly with a steady voice, maintained good eye contact with the camera, and appeared comfortable teaching over television. This was impressive given that none of the instructors had extensive experience with the medium. Though their delivery skills were good, the instructors tended to ignore the interactive characteristics of CODEC. Most used lecture as an instructional method, with students responding only occasionally. There was one instructor that increased student participation by asking frequent questions and using group learning methods that promoted high levels of learning interaction. Interestingly, this instructor was also teaching a regular class at another high school (in person) and reported feeling comfortable knowing how to teach this age group.

Student participation also seemed to be somewhat affected by course content and quality of on-site supervision. Participation was lower in classes, such as calculus, where subject matter was predominately theoretical and abstract, and highest in a class like German where much oral language practice was required. Also, classes were more responsive when the high school instructors took an active part in supervising and helping their students. This made it easier for the distance instructors to concentrate on teaching rather than on monitoring classroom behavior. Active classroom supervision was critical in larger classes, which often had thirty or more students. Since there was only a single TV monitor in the room, students in the back rows of these classes tended to be less involved and in need of closer supervision.

### Suggestions

From this evaluation a number of suggestions regarding the use of distance education with high school students are offered.

1. Prior to its implementation, students and supervisors at the receiving site should be given a brief introduction on how an interactive television system works to make them feel more comfortable with this technology. In addition, students should be shown how to communicate

properly over the system, and supervisors should be given some knowledge of trouble-shooting procedures for correcting minor technical problems with equipment.

2. If possible, distance instructors should personally visit students at the receiving site to establish rapport with them and to reduce their anxieties about communicating over television. This is particularly important with younger students who may feel anxious or shy about speaking publicly.

3. Distance instructors should be given training on how to effectively utilize the capabilities of interactive television. This medium comes close to emulating the communication characteristics of the regular classroom, but is less effective if students are merely given lectures. Strategies for getting students to talk back must be actively incorporated into lessons. Much that has been learned about increasing student participation in regular classrooms (e.g., cooperative learning techniques) can be of value here (Slavin 1990b).

4. Student motivation is critical to the success of learning. While CODEC technology is novel and intriguing to students, it is not sufficient in itself to maintain student interest long term. Some form of extrinsic motivation, like a grade or credit for course work, seems necessary to stimulate learning over time.

5. College instructors need to modify their teaching for high school students. Compared to adults, high school students generally need more instructional support and basic skill development, more active and concrete learning, and more frequent feedback (Snow 1986). Meeting these needs is even more critical when distance education is involved because personal access to the instructor is limited.

## Conclusion

Utilizing distance education within the context of a project to educate young minority students about college is a unique endeavor. Over the past year, we have learned much about what makes such a project work and what needs to be improved. It is still too early, of course, to know the precise effect of the project on the college aspirations of students, but we do know that their education has been broadened and enriched from exposure to distance education.

Plans are under way to extend the project to several new districts and high schools in fall, 1991. Like Compton, these districts serve low income, minority students. The goal is to have these districts on a single system so that they can share broadcasts and interact with each other. This will greatly improve the efficiency of the system and hopefully its effect. Another goal is to offer pre-college and college courses for credit in addition to the classes already offered. Students will then be able to get a head start on their college careers and save some tuition in the process.

With CODEC, the potential of distance education to reach out to nontraditional students is beginning to be realized. This medium holds promise to bridge not only geographical distance, but the distance between students themselves and their goals.

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