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Future Trends in Graduate TV Instruction

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The University of Florida has run a major graduate program in Engineering using microwave television for several years now (ref. 1). Initially called GENESYS, our system has presented 350 courses over seven semesters and two quarters. Student enrollment is in the order of 600, all taking graduate courses in engineering. Recently this TV system was given a broader scope and renamed SUNSTAR (State University System for Television And Radio). Professional offerings other than engineering are envisioned and participation by other state universities will be possible. This expansion is to be welcomed and even further expansion to regional or national university systems may be possible in the more distant future. Our GENESYS network has already demonstrated an experimental lecture tie with Huntsville, Alabama.

The promise and problems of advanced media instruction are many. To scale the magnitude of the educational requirements in the coming days, I refer to some of the projections. Engineering Ph.D. production in the United States is increasing at a rate of 12% per annum (ref. 2). The Master Degree output also increases at a rate of 11%, projecting to the conclusion that by 1990 every engineer will hold a Master's Degree (ref. 3). Other new degrees are being more widely used, such as the Engineer degree and the Doctor of Engineering, which may, in time, be more utilized than some present degrees. The problem of employed students obtaining graduate instruction, including the all important graduate degree, will become more severe as the possession of this graduate degree becomes more usual.

The spectrum of advanced media for presenting viable solutions to these demands may be briefly summarized:

Live Presentations:

1. Full Two-Way Television. Two-way television and two-way audio can be utilized for a point-to-point remote teaching system such as one remote classroom in a contractor or government facility connecting with the main university. The instructor and student would see and hear each other. On special occasions the GENESYS network has been used in this manner for oral exams and conferences. The only disadvantage, of course, is the high cost of the two-way television link. Microwave television line costs run approximately eight to ten times single telephone line costs.

2. One-Way Television; Two-Way Audio. This is the system which was created three years ago at the University of Florida by Dean Thomas Martin under the acronym of GENESYS, now renamed SUNSTAR. Four transmitting and receiving stations are linked with three more receiving only stations spread over a 200-mile network in Central Florida. A similar system has now been installed by Dean Martin at the Southern Methodist University. Both these systems use microwave transmission. The same general concept is planned by Stanford and the University of California at Irvine, but using broadcast band television to many receiving classrooms located

at a short distance from the campus. These "Star" or radial type systems have an advantage, as opposed to the network system of GENESYS, in that the entire faculty remains grouped at the main campus; laboratory and library facility provision is then simplified. For multitudinous nearby receiving studios the broadcast band system will be cheaper than the microwave.

3. Blackboard by Wire. This system is currently being considered by many universities, typically, (ref. 4). In this system the professor or his amanuensis scribes on a prepared surface on a desk and his markings are remotely reproduced at the destination classrooms. With two-way audio, this operation is reminiscent of a television system using a television camera over the professor's desk. Of course, the electronic blackboard cannot "see" printed or other prepared material. Nor does it have the capability to recall material presented in the past. Blackboard by wire is, however, comparable with a bashful professor operating a GENESYS-like system on the desk. The advantage of the blackboard by wire is the lower cost of the data transmission, being just an additional leased phone line.

4. Telephone Line. A two-way audio system can be used with prepared notes, or possibly a video tape, previously mailed to the receiving sites. A variation of this system is the mailed video tape with an open audio line and provision for halting the video tape presentation at the receiving classroom when questions arise. This could become cumbersome in the case of multiple classroom reception, but proper professional control could set the pace.

Preprepared Presentations:

It is the feeling of many that engineering instruction has yet to feel the full impact of the initiative of audio visual aids and methods. Films and video tapes could more widely be used, not just to save money, but to permit presentation of outdoor sequences, laboratory material and other course content not generally suitable for classroom creation and presentation.

As an experiment, the University of Florida has for the past quarter video-taped two classes as presented on the SUNSTAR television network. This video tape includes the live talk-back from the existing six receiving classrooms, and subsequent explanation. The presumption was that the questions during recording of the video tape would be representative of the questions of other students. This assumption seems to be borne out in experience and the students at West Palm Beach have generally reacted favorably to this experiment. It is still maintained in the category of experiment because a full television link to West Palm Beach is scheduled to begin operation in the fall. Professorial visits every three weeks during the quarter have provided the personal contact with the eight students in each class at West Palm Beach.

The blackboard by wire system could be used by many of the universities providing education at

remote sites and the suggestion is to combine it with professorial visits every third or fourth week. One of the disadvantages of current commuting professor classes is that the professor is tempted to visit only for the class lecture and to make that lecture a heinous three-hour tour de force. With modern media such as television or the presently discussed blackboard by wire, more frequent instructional periods of more merciful shorter duration are contemplated. The professorial visit every three to four weeks could provide the personal contact and counseling.

For any of these advanced media systems linking remote classrooms and originating universities, adequate reproduction facilities for material and toll-free telephone lines available at all hours to the students are a positive contribution.

It is my experience that the professor-student contact can be equal or greater than the usual in situ situation. To justify this comment, recall that in many universities the student and professor bolt immediately from the room after the lecture. The personality and the number of students per classroom encounter is more important for establishing contact than the technical details of the communication link. These comments and conclusions of course are personal, but seem to be generally shared by many faculty and serious students in the University of Florida GENESYS experience. With regard to experience of other universities, the ever present problem of faculty being motivated to participate in advanced media must be considered. It has been held by some that a faculty should be hired with the condition that they are willing to participate in the advanced media. However, the difficult legal and economic problem of residuals for film or video tape reuse has not yet been resolved.

Looking far into the future, we visualize a time when the professor is basically a resource person available for personal discussion with the student. The student would receive the bulk of his formal instruction from films, video tape or other preprepared material. An excellent, yet inexpensive and portable, random access data retrieval system is a book. The professor will have presented some of his past lectures to the student by means of the recorded advanced media and then will be spared the routine repetition of basic materials. For the advanced and newly developing material, he will of course wish to continually revise, erase and update the tape presentation. This far distant system proposed is not too dissimilar in principle from the Don system of the better universities. The role of the professor then is to monitor, encourage, cajole, stimulate, harangue and inspire the student as he breaks his path of discovery.

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