


TWO-WAY INSTRUCTIONAL TELEVISION A TECHNOLOGICAL ALTERNATIVE FOR THE 1980'S

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Abstract

Declining enrollments and reduced budgets have caused problems in meeting the needs of foreign language students in smaller schools, particularly where school consolidation is not a viable alternative. As budgets are reduced, the curriculum must be modified. The upper level foreign language courses have been most severely effected. This article describes a Two-way Instructional Television (TWIT) system designed to permit a maintenance and even expansion of the science, math, & foreign language curricula. The article is based on interactive microwave technology and foreign language pedagogy used for the past three years by four small schools in Iowa.

KEY WORDS: Foreign Language Interactive Television; Foreign Language Instructional Television; Interactive Educational Microwave Systems; Foreign Language Instructional Technology; Interactive Foreign Language Television.

DECLINING ENROLLMENTS AND WEAKENED CURRICULA

According to Webster, "twit" means "to subject to light ridicule or reproach." However, to the students, faculty, and administrators in the rural communities of Morning Sun, Winfield-Mt. Union, Waco, and Wapello in southeastern Iowa, "TWIT" stands for Two-Way Instructional Television, a unique microwave system that was designed to meet special needs of these small Iowa schools with enrollments of 250-870 students in grades K through 12.

As budgets and enrollments declined, course offerings were reduced in several curricular areas including science, math, and particularly foreign language. Since the State of Iowa requires accredited secondary schools to offer a minimum of 2 years instruction in at least one foreign language, small Iowa schools (and the majority are small) have encountered severe difficulties in maintaining even that minimal requirement. Some schools, such as Morning Sun and Winfield-Mt. Union solved that problem by offering Spanish I and II in alternate years. Upper level foreign language instruction was not even offered due to a lack of qualified students. In addition to foreign language faculties, the math and science teachers were also faced with the problem of small class size which rendered upper level offerings economically unfeasible. Again, the result was the absence of upper level offerings.

Administrators had wrestled with this problem for several years and considered various remedies such as transporting teachers from school to school or offering correspondence courses. However, the distance between schools (6 to 27 miles) made the transporting of teachers from one school to another somewhat impractical; attempts at offering correspondence courses were unsuccessful since the students considered them too impersonal.

THE DEVELOPMENT AND INSTALLATION OF TWO WAY INSTRUCTIONAL TELEVISION

The school administration finally decided to develop and install a two-way (interactive) microwave system between the four schools. This TWIT system had several objectives. A primary objective was to combine small groups of students at each of the schools into one larger class taught by one teacher. Thus, the costs of the course can then be shared among all participating schools. This has turned out to be a vehicle for expanding the course offerings in a cost effective manner. A second object was to enhance the quality of instruction by permitting teachers to teach only in their areas of major expertise. A third objective was to offer to these small schools an alternative to massive, impersonal consolidation programs. The TWIT system provides some of the advantages of a larger school while at the same time permitting each community to retain its own school.

The various communities participated in a federal grant which permitted the purchase of state-of-the-art video equipment which would enable each school to transmit and receive microwave signals from specially equipped classrooms. Thus, each TWIT classroom is equipped with a Panasonic WV-3800 color video camera, two (2) unidirectional microphones, two (2) wall mounted speakers, three (3) modified 21" Panasonic monitor/receivers, and a master console. (See figure A.) The total cost for all four schools, including transmitters, receivers, and microwave antennas was approximately \$250,000.

This system is unique in several aspects. It links only secondary schools (although there is one second grade class involved), and there is no university level involvement. It is also operated by teachers and students right in the classroom and not by technicians in control booths. Unlike earlier interactive ITV systems (Cerf, 1975), a student is not required to press a button or make a telephone call to ask a question. Since the teacher can actually see and hear all the students in all the schools simultaneously, the student needs only to raise his or her hand as in a normal classroom.

ACADEMIC SUCCESS IN A TWIT CLASSROOM AS COMPARED TO A REGULAR CLASSROOM

During the discussions on the systems, both teachers and parents had expressed concern as to the effectiveness of the TWIT classroom when compared to a regular classroom. They questioned whether students in the TWIT classroom would learn as much as students in a normal classroom. Preliminary findings based on a perception study distributed by Max Morrison of the Iowa Department of Public Instruction on teacher comparisons on the effectiveness of televised versus non-televised classes, supported the notion that students do indeed learn just as effectively in televised courses as in non-televised courses. An analysis of 1982-83 classroom tests, along with quarter and semester grades of three Spanish I sections, one of which was a TWIT class, showed no significant differences. Indeed, the TWIT class scores were slightly (though not significantly) higher than the regular classes. However, it must be pointed out that this experiment does not meet all of the pre-requisites of a true experiment as indicated in Lett, 1983.

CLASSROOM TELEVISION MAY ENHANCE INSTRUCTION-BUT • REQUIRES CAREFUL PLANNING

The presence of intimidating electronic equipment in a classroom caused concern among several staff members. Certainly, the equipment arrangement (cameras, monitors, student desks, visuals, etc.) plays a significant role in a successful TWIT class session. Improper camera placement may create the illusion that the teacher is not looking at the students in the receiving schools. Certainly the importance of eye contact becomes significant in a TWIT classroom. By placing the camera trained on the teacher directly in front of the student monitor viewed by the teacher, it appears to the receiving students that the teacher is indeed looking directly at them when the teacher looks directly at the student monitor located directly behind the camera. (See figure "C"). Different activities require different camera arrangements. Indeed, it should be possible to modify the classroom arrangement during the class with little or no loss of instruction time during equipment changes. Having study hall students operate the cameras has proven itself to be very effective in reducing lost instructional time. The operators are informed as to what to expect ahead of time. An experienced camera operator learns to anticipate the teacher's needs and automatically makes the necessary equipment adjustments. However, it has also become necessary for some of the teachers to modify their techniques.

WHILE MANY ACTIVITIES IN A FOREIGN LANGUAGE CLASSROOM WORK WELL IN A TWIT CLASSROOM, SOME ACTIVITIES MUST BE MODIFIED

Those activities successful in a regular FL classroom may, with a certain amount of modification and pre-planning, also be used in a TWIT classroom. The activities described below are but a sampling of activities which have experienced particular success in the TWIT environment.

1. VOCABULARY REINFORCEMENT

A. Directed Role Playing.

Purpose: To use recently learned vocabulary items for use with specific units such as in a taxi, restaurant, market, hotel, etc. Intended level of instruction: intermediate & advanced.

The students work together to prepare a short skit, for example, in a restaurant. The teacher describes (in English or in the target language) on 3 x 5 cards a role for each participant (waiter, customer, cashier, etc.). These directions are specific enough to direct the action, but permit freedom of action within the role, i.e. Customer # 1-order a beverage and two additional items from the menu; later get the waiter's attention and request a condiment, etc.

This activity allows the student to use not only the new vocabulary items, but also practice the newly acquired cultural aspects. For instance, one must always ask the waiter for the check in a Mexican restaurant. It is considered rude for the waiter to bring the check without a request from the customer.

The students are also instructed to prepare a written script for the teacher and the camera operator. The group must also prepare programming directions for camera arrangements for the camera operator. Using the TV camera, the camera operator is able to zoom in on different speakers, actions, or objects. The students demonstrated genuine creativity. The information was written (in the target language, of course) on a roll of paper and then stretched over a flat surface to simulate "real" TV credits. Other groups dedicated quite a bit of their free time to prepare visuals, scripts, sound effects, and even commercial breaks in order to enhance their productions.

The students watching the presentation gather around the TV sets rather than watch the actors in person. Thus everyone, those in the room where the skit is being performed and those in distant TWIT classrooms, views the same picture.

This activity is very effective for promoting rapport among students, particularly where there are representatives in the group from more than one school. However, such a split group is only possible when all students are able to see the skit with minimal equipment changes. Emphasis must always be focused on the language activity and not on the equipment.

Evaluation of the role playing activity varies with what the teacher wishes to emphasize. The instructor may wish to grade on creativity and effectiveness of communication, the number of correctly used vocabulary words taken from the unit under study, the teacher may wish to evaluate fluency and pronunciation or listening comprehension of the audience. Obviously, these skits may also be videotaped for future evaluation.

B. GROUP SCRABBLE

Purpose: To review general vocabulary; to acquire new vocabulary items; to practice the use of a bilingual dictionary.

Intended level of instruction: second semester through advanced level.

This activity can be easily used to provide a break in normal classroom routine. In a normal classroom, it would be difficult to gather twenty to twenty-five students around one scrabble board. Usually, small schools can afford only one game. However, there is no such limitation in a TWIT classroom. Any number of students can be accommodated.

The students are divided into groups of two, three, or four within each school. Each group receives a rack with seven (7) Scrabble letters and as many dictionaries as possible. The camera operator in the originating TWIT classroom draws letters for the groups in the distant classrooms and places these letters on each group's letter rack. Only the group whose letters are being shown may look at the screen. The other groups in the distant classrooms write down their letters. The camera operator then zooms in on the Scrabble Board for the remainder of the game. Each group takes its turn placing words on the board and drawing replacement letters. The camera operator receives oral instructions from each group as to the placement of letters on the Scrabble board and then draws the replacement letters. The operator then informs the appropriate group what their replacement letters are and places them on the group's rack. A two-minute time limit on each turn maintains the pace of the game. Scores are kept on a piece of paper and periodically flashed on the screen for all to see.

This activity is a good attention getter, promotes student rapport, and requires little equipment movement.

II. GRAMMAR PRACTICE ACTIVITIES

A. Cooperative Group Sentences

Purpose: To practice the use of newly learned grammar rules or verb tenses.

Intended level of instruction: Second semester through advanced level.

The students are divided into small groups, with students of varying abilities included in each group. The teacher then gives an English sentence which incorporates new grammar points. Depending upon the sentence complexity, the students are given a time limit in which to write out the sentence in the target language. While no notes or reference materials are allowed, groups members are encouraged to discuss their answers with each other. The students are directed to write their answer on a piece of paper and may take that paper to the board at the called for time. No changes are permitted to the paper once time has been called. Each sentence must be transferred verbatim from the paper to the board for viewing by the other TWIT classes. The teacher awards points for each correct item while no points are allowed for misspelled words. In addition, points are deducted for any words used incorrectly. During the correction process, the teacher points out and discusses any errors. This is also a good opportunity for rewarding good work. After the scoring, each student writes out the correct version of the sentence which may later appear on a test.

For this activity, the originating camera is trained on the teacher while the sentence is being stated, then on the groups while they are working, and finally, on the blackboard when the sentences are being written and corrected. This is easily accomplished if the room is arranged in the all-purpose configuration as depicted in Figure "C". The blackboards in the distant classrooms have, in effect, become an extension of the blackboard in the originating classroom via student monitor "A" on Figure "C".

This activity is very useful as a tool for error analysis. It also provides excellent opportunities for peer teaching. Although there is a certain element of competition involved, it has not become a serious problem. With guidance from the teacher, the groups strive to improve on their previous scores as well as compete with each other.

B. Correcting Written Grammar: exercises, quizzes, & formal tests.

Purpose: To speed up the task of correcting written work.

Intended level of instruction: beginning through advanced level.

Our camera is equipped with a macro (close-up) lens setting, which permits focusing on very small print. Workbooks, quizzes, and test keys may be shown on the screen for all to see. This reduces the time required to write answers on the board and permits a greater degree of individual attention. Certainly, the macro lens setting is not suitable for all activities. There are assignments which are still better when done orally or on the board. However, for routine assignments, the TV method remains overall much more efficient.

III ACTIVITIES FOR ORAL WORK

Before describing the oral activities, it is necessary to describe the sound system. The TWIT sound system is designed to pick up sound from all around the room. While the student microphone is encased in protective foam, the teacher usually wears a microphone clipped to a collar or tie. Both microphones have very long extension cords to allow unrestricted movement.

Oral work in the TWIT is accomplished in much the same fashion as in a normal classroom, with individual, small group, and choral work possible. Because of voice amplification during choral work, it sometimes becomes necessary to listen to the various groups by school (or group, or row, etc.) Although such activities as oral reading, dialogue recitations, and general conversation exercises are much the same as in a regular classroom, it is necessary for the students in the outlying classrooms to speak directly into their microphones whenever the students in the originating classroom are also doing small group oral work.

The conversation activities described below were used in a second grade conversational Spanish class as a pilot project for the Iowa Department of Public Instruction. A teacher in Wapello taught Spanish to twenty-one second graders in Morning Sun via the TWIT system. Though the results of that program would fill another article, it suffices to say that those young children responded extremely well to the instruction and to the equipment by which it was delivered. The following oral activities were used exclusively with the Morning Sun second graders. Others were used at different levels and with equally effective results.

A. Translator

A student is selected to sit in front of the class with his/her back turned to the monitors so that she/he cannot see what is on the screen. The teacher then shows three visuals on the screen for the class to see. These visuals are a number card, an object card, and a location, in that order, from left to right. One student is selected from the class to say a sentence in the target language based on the card cues. For example, if the cards are "3" (number), "apple" (object), and "house" (location), the student says "Hay tres

manzanas en la casa. Then the student with his/her back to the class translates the sentence into English (There are three apples in the house.) The students usually became so excited that they often give the "translator" a round of applause. At this point, the "translator" selects another student as a replacement and new cards are shown on the screen for the next passage. Naturally, the vocabulary had all been taught beforehand. This activity drills the ability to arrange words in proper word order. It is also very entertaining if absurd sentences are used.

B. Conversational Review with E.T., Annie, the Smurfs, and Others.

This activity can be done after the students have learned the vocabulary for clothing, parts of the body, and numbers. It is also necessary to know the present tense of "tener" (to have) and "ser" (to be.) An Annie doll, an E.T. doll, a smurf miniature, a fuzzy monster, and a colorful clown are placed on a music stand. (A music stand was used to display all the visuals because of its flexibility. It can be raised, lowered, or tilted in any direction.) At first, the students see only the back of the music stand as the teacher gives clues and asks questions about who may be on the stand. Once the students' curiosity is sufficiently aroused, they are allowed to see the dolls. The teacher then asks such questions as, "Who has two arms? (Answers include "Annie has two arms," or "E.T. has two arms.") As correct answers are given, the camera zooms in on the character named. All vocabulary items can thus be worked into the questions and responses. Individual students are selected to give responses. This activity is particularly effective with slower students, who can usually figure out what has been asked by listening to the other students' responses. This activity generates quite a bit of enthusiasm and inattentiveness is no problem.

The use of visuals with the TWIT students in general has proven itself to be extremely effective. Having been raised with educational TV, they are accustomed to the group TV experience. For them, television is a natural part of communication. It seems logical to "capitalize on this medium through which our students have become accustomed to receiving and analyzing their information." (Griffin, 1981).

IV CULTURAL AWARENESS ACTIVITIES

Most cultural activities used in a regular class can be duplicated in the TWIT classroom. Some, such as the sampling of different foods, require a great deal of coordination, but they remain possible. Others, such as demonstrations of the construction of different craft items, are superior to activities in a regular classroom because of the camera's ability to "look over your shoulder" and enlarge the craft items being shown.

Concerning cultural awareness, one of the biggest advantages of the TWIT system is that it makes possible the sharing of resource people who are living in or visiting any of the four communities. We have had some outstanding cultural experiences during the past three years. One such experience occurred when we were able to compare the cultures of four South American countries while listening to the interchanges between four exchange students located in three of the TWIT schools. Our students have entered into discussions with these students and with many others over the past three years. During one year, our students have interviewed people from as many as six different countries. Students in small Iowa towns with a population of 500 seldom have that opportunity.

THE FUTURE OF TWO-WAY INSTRUCTIONAL TELEVISION IS LIMITED ONLY BY ONE'S IMAGINATION

(Davis, 1983)

When we began the TWIT experiment over three years ago, we really did not know what to expect. For us, the success of the system as a means of delivering instruction has far surpassed our expectations. We have only begun to explore all of its potential. As more and more people become involved, ideas for expanded use of the equipment occur frequently. There are already plans to feed the Wapello TWIT system into the local cable TV system. Then we will be able to transmit tapes of school activities or live programs to the local cable subscribers. The future possibilities are endless and exciting, but its current use is equally as exciting.

SUMMARY

Currently, TWIT is being used to upgrade foreign language instruction in four rural Iowa schools. Other subject areas successfully taught via the system include advanced science, advanced math, shorthand, and creative writing. Each year, in determining class offerings, administrators consider the needs of the different schools vis-a-vis available teachers. A TWIT classroom is unique. Certainly, not all teachers in the school system wish to share the added responsibilities and pressures. Others are not willing, or able, to modify their classes to television transmission. Still others have expressed fears that the TWIT system will be used by the various school boards to reduce staff. In three years time, that has not occurred. Administrators and school board members have followed their objectives: 1) maintain or expand the curriculum through cost sharing of personnel and materials; 2) upgrade the quality of instruction; and 3) prevent consolidation of small schools. We cannot let the possibility of misuse of this equipment prevent the tremendous advantages it has to offer.

While some members of our profession may view TWIT as only another "temporary" innovation, others see it as their "salvation." When enrollments decline, the number of course offerings must also decline. School boards will not pay a teacher to teach just four students in an upper level course. Thus, we often end up teaching second, third, and fourth year language students in one class period, or eliminate the upper levels altogether. When such situations arise, it becomes impossible to give students the attention they need and deserve. Two-way instructional television provides a technological and cost effective alternative for improving our nation's schools. It deserves careful scrutiny.

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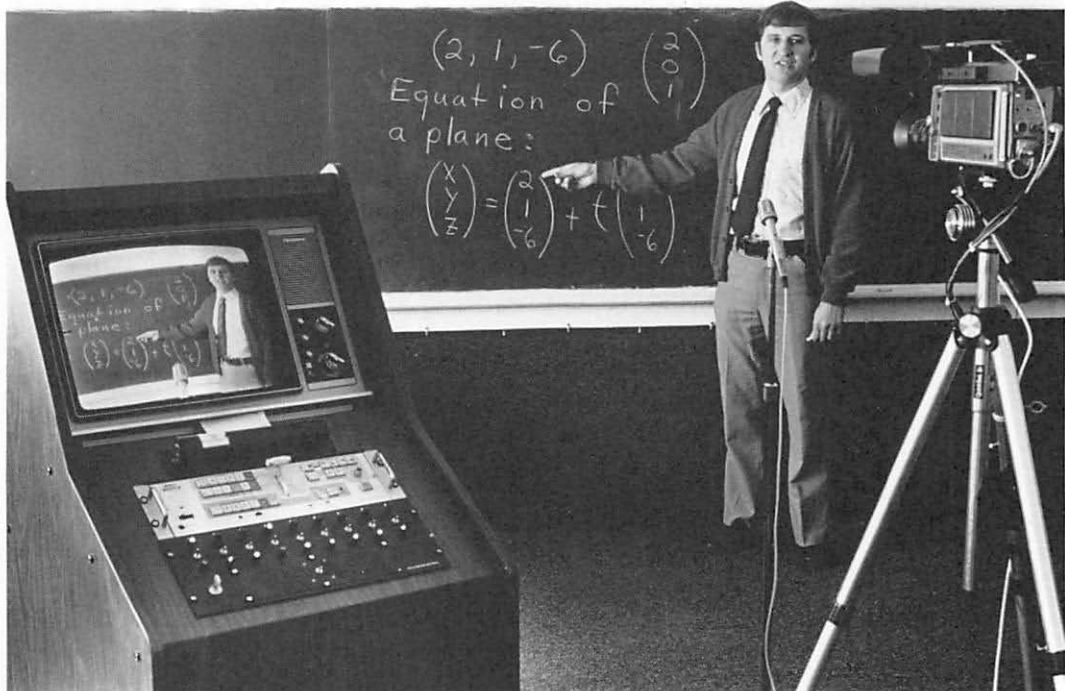


Figure A

LECTURE SET-UP: The control console on the left shows the picture being transmitted to the receiving schools. Also visible on the console are numbered switches. Students quickly adjust the switches for the transmission or receiving of classes. The lever and buttons in the upper center of the console panel control the special screen splits [horizontal, vertical, or corner]. See Photo B, [horizontal split] and Diagram C, [vertical and corner splits]. The camera is mounted on a tripod with casters for maneuverability. The camera also has a 360 degree pan capacity, and approximately 100 degree vertical tilt capability.



Figure B

HORIZONTAL SCREEN SPLIT: The teacher sees students from Winfield-Mt. Union [top third of screen], Morning Sun [middle third], and Wapello [bottom third], simultaneously. This class originated from Waco, which students in the receiving schools see on two monitors in their classrooms. See Diagram D.

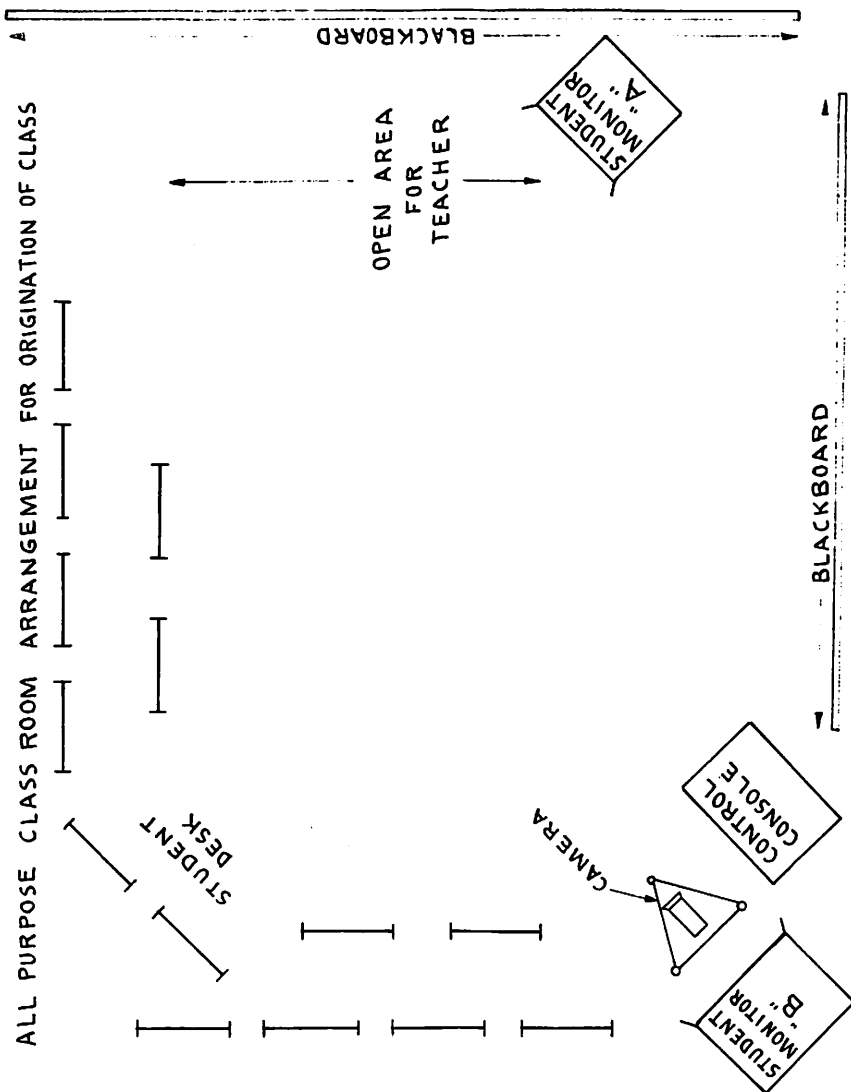


Figure C The camera is placed directly in front of the student monitor "B" displaying the students in the remote classroom. When the teacher looks into the camera, the remote students have direct eye contact with the originating teacher. Student monitor "A" could display the same image as "B" or even display the camera picture being transmitted to the remote location. Innovative use of the switches on the control console permits extensive variations in the video displays.

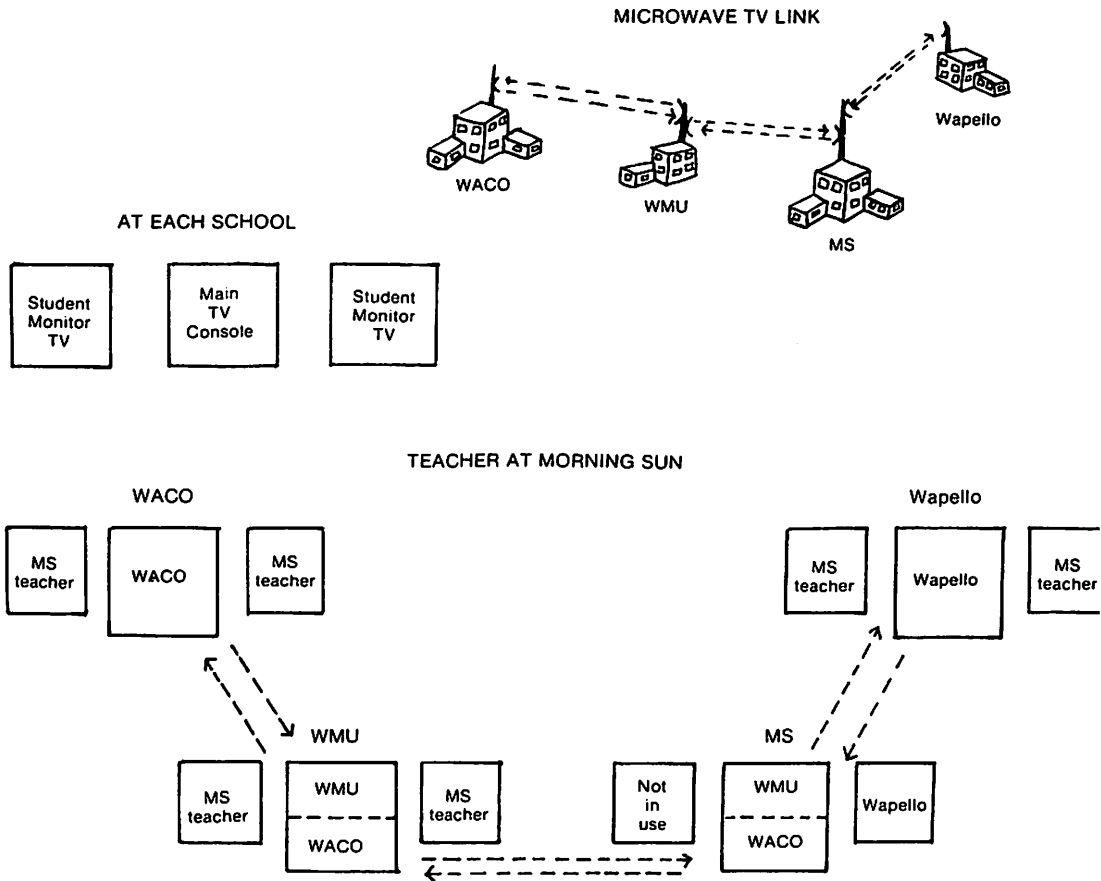
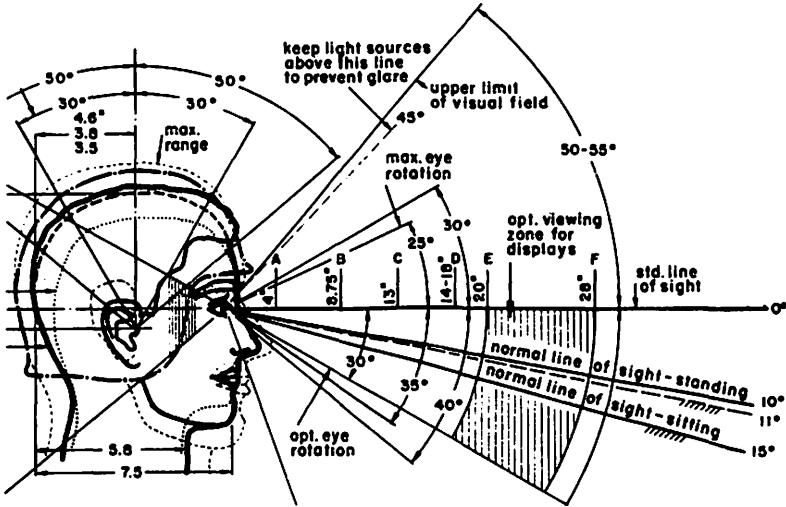


Figure D

This figure outlines the various microwave paths. All schools transmit and receive simultaneously. This system permits total audio and video interaction between all schools at all times...

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