

An Evaluation of Audio-Visual and Self-Learning
Programs For Agricultural Economic Students

By

Edward Powers, Kelso L. Wessel, Donald W. Larson
and Alan Evans*

The Ohio State University, like other colleges and universities, is charged with the task of preparing young men and women for professional, technical and managerial occupations. The research embodied in this paper deals with a survey course in economics taught primarily to freshmen and sophomores. More specifically, Food Fiber and Natural Resource Economics (AEC 100) is taught to students whose interests are mostly in the fields of agriculture or natural resources. For many students, AEC 100 is not only the first course but also the only course in economics. It is imperative that students complete this course with a good understanding of economics.

THE PROBLEM

Approximately 1,200 students take AEC 100 each year. Due to the varied backgrounds of students and the increasingly larger enrollment, outside instructional media have been developed to supplement the lectures and text. Approximately five faculty members teach four or five sections of the course, on a rotating basis, during each of three quarters every year. Section size varies from 50 to over 180 students.

*Edward Powers is a graduate student and Kelso L. Wessel and Donald W. Larson are Associate Professors in the Department of Agricultural Economics and Rural Sociology, The Ohio State University. Alan Evans is Consultant for Instructional Media Development in the Teaching Aids Laboratory, The Ohio State University. The authors are indebted to Howard Phillips and Robert Warmbrod for helpful comments on an earlier draft. The authors assume responsibility for any errors.

Each professor frequently teaches an additional advanced course, thus the amount of personal attention each student receives is limited. If properly used, instructional media should provide valuable additional information for those students not able to fully understand the material as presented in the lectures and/or text. In addition, such instructional media serves as a means of standardizing the course content among professors.

Over the past four or five years, a series of homework problems related to concept applications in economics has been assembled in a workbook which is made available to students. Students have frequently indicated that being able to work problems related to real situations is extremely useful in their understanding of economics. Traditionally, these problems were collected and graded by the professor. However, due to the increasing student enrollment, it became impossible to collect and grade each set of problems. Because of the learning value placed on the problem sets by students, it was decided that solutions to the problems would be placed on video-cassette tapes (also referred to as AVIS-audio video instructional supplements) so students could review them at their own pace and convenience. Also, several parts of the course were adapted for use with computer assisted instruction (CAI) programs. Thus, parts of the course were supplemented by both CAI and AVIS programs whereas some parts were not supplemented by either.

This research was conducted to evaluate the impact of these instructional media, more specifically the AVIS program, on student understanding of the course material. Student understanding was determined by grade and student evaluation of the media. The research also included an

analysis of several other variables which might be related to student grades and evaluation. The results of this research should provide an understanding of student reaction to the video taped material, the extent to which they used the media, their recommendations for improvements, and any impact of the use of AVIS on grades.

OBJECTIVES

The general objective of the research was to evaluate the impact of AVIS on student understanding of the course material presented in AEC 100.

More specifically the objectives were:

- 1) To describe student use of instructional media available to them.
- 2) To determine the impact of the video cassettes on the amount of study time and the degree of substitution between the video cassettes and the other available instructional media.
- 3) To test the impact of the video-cassettes on student grades by comparing users and non users.
- 4) To evaluate the effect of location of the instructional media upon their use.

Historical Perspective

Educators have concluded that new technology can replace, to varying degrees, the traditional textbook-lecture approach to teaching. The future of education rests on a premise that technology can provide "mechanical or electronic advantages" that will permit colleges and universities to teach more students for less cost and, at the same time, improve the quality of education (Molner). The main objective of

technological aids is not to replace the teacher, but to free him from simple, repetitive presentations thus allowing more time for interacting with students (Molner). This was the objective of the AVIS program used in AEC 100 at The Ohio State University.

Though different in format, the Mathematics Department at Ohio State University uses a combination of television and video-cassettes on a larger scale. Their CRIMEL Program (Curriculum Revision and Instruction in Mathematics at the Elementary Level) is more individualized than the format used in AEC 100. For example, the testing and retesting are tied directly to the CRIMEL Program. In addition, the television lectures and video-tapes are essentially duplicates of classroom lectures and encompass most of the course material (Riner and Waits). In contrast, the AEC 100 video-cassettes currently do not include all concepts discussed in class.

In spite of the research favoring new educational tools, relatively few educational institutions have adopted instructional technology to its full potential. The U.S. Office of Education, which has supported considerable research on a variety of media, reports that computer assisted instruction (CAI) is the most significant educational concept adopted during the 1960's (Molner). The report stresses that students progress best when using materials which are tailored to their individual needs, which abolish rigid time standards and allow each to advance at his own pace. The traditional textbook material is often inadequate for transmitting information effectively and additional modes enhance student learning and retention. A multi-media approach assumes that some material can be more effectively presented in specific modes.

The multi-media approach is precisely the type of exposure available to students in AEC 100 with AVIS, CAI, and the more traditional means of lecture, text and homework problems.

New educational technology may allow universities to teach more students for less cost in both time and money but this does not mean that it will replace teachers in the classroom. Some important questions must be dealt with first: 1) Do students actually learn and retain material presented by machine, as the research implies? and 2) Do students like or dislike these new modes? In two audio-visual programs produced for students at Shasta College, Reading, California, the Director of the Audio-Visual Center measured student reactions and test scores. The results were "very positive" and the only complaints were due to equipment failures and waiting for programs already in use (Bertrand).

In 1971, Kingsborough Community College, part of City University of New York, was faced with incoming students needing remedial mathematics. They developed SCIMP (Single Concept Introductory Mathematics Project) which basically put the whole remedial math course and testing on video-cassettes. The results were very impressive. They previously had a 60 percent failure rate, but of the first 28 students enrolled in the SCIMP program, only five failed the course. Student reaction was positive. Halfway through the course students were polled to evaluate SCIMP. The results were: 1) students rated presentation by video-cassettes good to excellent, 2) students felt that they were learning more than they would have learned in a traditional classroom, and 3) the students wanted the program expanded. One of the advantages, pointed out by Dr. Peter Utz, was that the use of a gadget (video-cassette) may

in itself have the advantage of keeping student interest through the "Hawthorne Effect."

At the State University of Utrecht-Netherlands, members of the Department of Educational Research and Development were asked by the Faculty of Law to design a new program for their first and second year economics courses. Faced with larger enrollment and a small staff, the faculty decided that an audio system would get the "students more deeply involved in the subject matter." During their first year (1969) only one-half of the students used the system, the other half attended traditional lectures. With this breakdown of students, they were able to evaluate the audio system against the traditional system. They found that the mean score on the final exam was significantly higher (five percent level) for students using the audio system. The taped lectures gave better examination results in the subject of microeconomics than the usual live lectures. Also study time in the test group was more regular than that found in the control group (Ackers and Oosthoek). One additional point from their research was that the learning-tasks in the audio group were better structured than that of the lecture group.

The task facing educators is clearly definable. Due to many factors (larger enrollments, financial constraints, and other student needs), new methods of teaching students and evaluation of the results are needed. Currently, there is a large array of methods and devices available; however, continued research and evaluation of new methods must become part of an educator's tasks.

PROCEDURE

Until the introduction of AVIS, the instructional media available in AEC 100 consisted of the workbook and the CAI programs. The workbook consisted of 11 major units, each essentially corresponding with a different topic taught in the course. Due to funding limitations, only six of the 11 units were done on video-cassettes.^{1/} The CAI programs cover four of the 11 units, some units are not covered by either technique (See Table 1). The AEC 100 course is taught at: 1) the Agricultural Campus, at either Vivian Hall or the Agricultural Administration Building, and 2) West Campus. The video-cassette facilities are only located in the Learning Resources Center on West Campus, which is approximately a five minute bus ride from the Agricultural Campus and a ten minute bus ride from the Main Campus. The CAI programs can be accessed through remote terminals in several buildings on Main Campus and the Learning Resources Center on West Campus (most students live on or near Main Campus).

The research was conducted with two sections of AEC 100 during Winter Quarter, 1976. During the previous summer, several faculty members of the Department of Agricultural Economics and Rural Sociology produced the six, 30-minute video-cassettes. Each unit discussed the concepts and solutions to a specific set of problems found in the workbook. The student was expected to have read and worked the set of problems in the workbook before viewing the appropriate video-cassette. The video cassettes were to supplement the workbook and CAI material.

^{1/} A grant of approximately \$2,000 was received from the OSU Task Force on Learning Committee by Professors K.L. Wessel, D.W. Larson, W.A. Wayt, and G.C. Himes in the Department of Agricultural Economics and Rural Sociology.

Table 1: Course Content and Availability of Selected Instructional Media for AEC 100

Unit Number and Title	Media Available	
	Video Cassette	CAI
I. Index Numbers	Yes	No
II. Circular Flow of Economic Activity	Yes	No
III. Monetary and Fiscal Policy	Yes	No
IV. Loans and Interest	No ^a	No
V. Stocks and Bonds	No ^a	No
VI. Specialization and Comparative Advantage	No	No
VII. Physical Production Relationships	Yes	Yes
VIII. Costs, Revenue, and Profit	No	Yes
IX. Changing Equilibrium	Yes	Yes
X. Model for Imperfect Competition	No	No
XI. Trading in Futures	Yes	Yes

^{a/} Covered by audio-cassette and 35mm slides but not included as part of the AVIS analysis of this paper.

Two different classes, one taught by Dr. Wessel and the other by Dr. Larson, both from the Department of Agricultural Economics and Rural Sociology were involved in the study. The combined student population of both groups numbered approximately 240. Dr. Wessel's class of 160 students was the experimental group. This group was told that they were to be involved in an evaluation of the instructional media available to them. Therefore, it was necessary to divide the class into two groups, one group having access to the audio-visual cassettes one week and the other group using them the next week. Thus,

each group was to act as an experimental group for one study unit and a control group for another unit. Both groups were encouraged to use the video-cassettes when available to them. They were also told that the workbook and computer assisted programs were at their disposal as they saw fit. Due to the smaller size of Dr. Larson's class, 80 students, this group was not divided. Instead, the use of the instructional media was completely voluntary on their part. This group was to permit an analysis of the extent of video-cassette usage when students were not explicitly told to use them.

The teaching method was to lecture and test in the same manner as was done in the past. A quiz covering the material from a major unit of the course was given approximately once a week. After each quiz, the students completed a questionnaire which indicated what study aids had been used and their evaluation of them (See Appendix A). At the end of the quarter the students were asked to fill out a summary form on the study aid programs and a personal evaluation of the course and instructor (See Appendices B and C).

The data were coded and tabulated on IBM punch cards directly from the source documents. Various statistical techniques such as frequency counts, chi square analyses and analysis of variance were used to describe and evaluate the effects of the instructional media. Also included in the data are direct quotes concerning the students' own evaluation of material and format of the instructional media.

WORKBOOK ANALYSIS

The workbook contains sets of problems with concept applications of all the major topics in the course. By the end of the second week in

the quarter, 206 students (88 percent) had purchased the workbook. Several copies were also located in the Agricultural and West Campus libraries for those students who did not want to purchase the workbook. Thus, student use of the workbook appeared to be very high.

Several questions were asked to determine whether students were working the problems before seeking the answers, either in the libraries or from the video-cassettes. This was done for two reasons: 1) the answers were readily available and 2) the purpose of the problem sets was to give the student the opportunity to work the problems at his own pace. The number of students working the problems before using the cassettes was very high initially, but tapered off quickly as the quarter progressed (Table 2).

Table 2: Percentage of Students who Worked Problem Sets Before Viewing Video-Cassettes

Unit Number and Title	Percent of Students
I Index Numbers	69
II Circular Flow of Economic Activity	64
III Monetary and Fiscal Policy	60
VII Physical Production Relationships	55
IX Changing Equilibrium	39
XI Trading in Futures	39

A majority of the students worked the problems set before going to the answers for the first four units. The large drop shown in the last two units can possibly be explained by the fact that these units were introduced after the second midterm and just before finals; thus some students may have had other coursework pressing at that time.

The important point is that more than one-third of the students did not abandon the workbook but altered the way they used it, even though the stress of finals was upon them.

Having determined how the workbook was used, the next point of interest was how much time students spent working the problems. The amount of time students spent working the problems also tended to decrease over time. The responses varied from fractions of an hour to well over four hours per unit. For the most part, those students who worked less than an hour decreased in numbers as the quarter progressed. The first and second units had 28 percent and 32 percent, respectively, working less than an hour; however, this figure declined to a low of 19 percent for units V and VI.

A majority of the students normally studied from one to three hours per unit. This increased during the quarter from a low of 59 percent for unit I to a high of 68 percent for units V and VI. The noteworthy point is that the number of students who worked the problems before looking at the answers decreased, but the time spent on the problems increased as the quarter progressed. If the students who spent more than four hours working the problems are added with those falling into the one to three-hour range, the percentage of students who worked the problems as intended averaged more than 40 percent of the total class. This is evidence of the importance selected students placed on the workbook.

Since the workbook was intended to be used as a reinforcement of materials already presented in class, it should benefit those who used it. Student response to the degree of difficulty of the problems was

obtained to aid in modification of the problems where they were not furthering student competence. Table 3 presents student responses to the percentage of problems they were able to complete in each unit. For Unit I, (Index Numbers) 92 percent of the students were able to complete more than one half of the problems. This indicates that the problem set for this unit should have dealt with more complex concepts. For example, as presented, this unit does not include problems on weighted indexes. This is a good illustration of a concept presented in lecture but not reinforced in the workbook. The second unit, the circular flow

Table 3: Distribution of Students Completing Various Proportions of the Problems for Each Study Unit

Unit and Title	Percent Distribution of Problems Completed				
	0 to 24 (Percent of Students Responding)	25-49	50-74	75-100	Total
I Index Numbers	4	4	21	71	100
II Circular Flow of Economic Activity	23	14	28	35	100
III Monetary and Fiscal Policy	8	9	29	54	100
VII Physical Production Relationships	14	9	34	43	100
IX Changing Equilibrium	15	9	35	41	100
XI Trading in Futures	13	13	33	41	100

of economic activity, is the most difficult unit since only 63 percent of the students were able to solve over 50 percent of the problems before seeking assistance. Furthermore, 23 percent were not able to complete one-fourth of the problems in this unit. Unit VII, production economics, appears about average in difficulty; however, past experience, based on test information indicates that for most students this is probably the most difficult concept to grasp the first time in the course. Further study of the content of these units would be warranted in order to

enhance student competence in the subject matter covered.

VIDEO-CASSETTE ANALYSIS

AVIS had an important role in the intended study program for the course. The study schedule suggested to students was that they: 1) attend lectures and take notes; 2) work the homework problems as completely as possible, even working with another student if helpful; and 3) view the video-cassettes for answers and additional explanation.

The primary purpose of the video-cassettes was to provide an individualized learning environment to supplement the traditional classroom. At the end of the quarter, students were asked how, in their opinion, the video-cassettes could be improved (See Appendix B). Not all students were completely satisfied with the AVIS program; however, most of the students using the workbooks and video-cassettes reacted very favorably. Some of the responses were:

"The additional lecture time was nice."

"I needed it to explain weighted index numbers."

"Helped to get ideas and definitions straight without rushing."

"The video-cassette explained how the answers could be derived for each question, which was helpful."

"It explained the answers better. I could concentrate better with the video-cassettes and I enjoyed them."

"The video-cassettes were very useful in helping me to answer the problems in the workbook."

"In just using the workbook answer key you find the answers to the problems but not the reasoning behind them. By using the video-cassette someone is explaining the reason behind the correct answer."

For some students, the video-cassettes provided the extra material needed to fully grasp the concepts. AVIS is not for all students; however,

for those who needed the additional material it was a valuable aid. Student response suggests that even more instructional media would have been helpful: 52 percent of the students would have liked even more media available.

Not all students were completely satisfied with the format of the video-cassettes. Some of the negative responses can be explained by the fact that AVIS was designed to be completed after attending the lecture and working the problems. It was obvious that some students went directly to the video-cassettes without any advance preparation. Below are a few specific examples on how students thought the video-cassettes could be improved:

"Make the presentations more interesting."

"Expand the discussion beyond the workbook and add more examples."

"More information and examples would be better."

"Too repetitious."

It would seem that some students who viewed the video-cassettes had already mastered the concepts through the lecture and workbook material. Perhaps more explanation concerning the content of the video-cassettes was needed. The student who feels competent about a particular unit should not feel that he is missing material by not viewing them. It is significant to note that negative replies to the open ended question of how the video-cassettes could be improved were only ten percent of the total replies.

At the end of the quarter, students were asked to rank each video cassette unit on a scale of 1 through 5, with one being the highest rating. Almost half of the students (49 percent) felt that the AVIS

was beneficial and ranked the units as 1 or 2. The range of "rank 1" replies for each unit varied from 37 percent for unit V to 56 percent for unit III.

Total usage of the video-cassettes was higher at the beginning of the quarter, and showed a significant decrease for units IX and XI. The overall mean usage was 30 percent. This was about 50 percent of those eligible to use the video-cassettes, because one class was divided and only one half of the students were supposed to use any one of the video-cassette units.

One factor that may account for usage of the video-cassettes to have dropped late in the quarter is that like the workbook, unit IX followed immediately after the second midterm and unit XI was only two weeks prior to finals. The CAI program which covered the same material as that contained in video-cassette units VII, IX, and XI also declined in a similar manner from about 40 percent on unit VII to 29 percent on unit XI. The student had three alternative instructional media from which to choose (for the last three units), in addition to lectures and text. Many students apparently chose to use the traditional media near the end of the quarter.

The preceding has dealt with those students who actually viewed the video-cassettes. This amounted to approximately 50 percent of the eligible students. Those who chose not to use the program overwhelmingly gave as their reasons location and lack of time. Over 56 percent of those not using AVIS gave lack of time as their primary reason and another 32 percent did not like the location. As already suggested, the number of students who lacked time increased well above the mean for the last three units. This is the point where end of the quarter time

pressures caused a decrease in use of all media. In addition, student responses suggest that a more convenient location would perhaps have increased video-cassette usage.

STUDY HABITS

In the analysis of workbook usage, there was reference to the amount of time students spent working the problems. Over 50 percent had spent between one and three hours per unit working on them. Bearing in mind the high usage obtained on the video-cassettes, compared with the time that students allocated to the text and lecture notes, it seems that many were substituting these instructional media for traditional study habits based on textbook and notes. For example, a large proportion of the students spent less than three hours per week on the textbook and lecture notes for each of the following six units: (I) Index numbers - 45 percent, (II) Circular flow of economic activity - 60 percent, (III) Monetary and fiscal policy - 46 percent, (IV) Loans and interest - 48 percent, (V) Stocks and bonds - 38 percent, and (VI) Specialization and Comparative Advantage - 38 percent. Clearly a high percentage of the students spent very little time on the textbook and lecture notes during some weeks, as compared with the OSU rule of thumb of 10 hours for a five credit-hour course. It should be pointed out that each of these units covered at least one week of the quarter.

For units IX and XI, an increase in the time for the traditional methods of study was found. This concurs with the fact that each of these units had a marked decrease in workbook, video-cassette and CAI usage. It appears that students used these instructional media when time permitted, but as the quarter drew to a close and time pressures increased,

they were not willing to take the added time required for viewing of the cassettes and/or the transportation time required to reach them.

On the whole, total study time for AEC 100 was less than the total time spent on other introductory courses. For example, 60 percent of the students spent four hours or less studying for AEC 100, while 67 percent spent more than four hours on their other most time consuming course.

COURSE AND INSTRUCTOR ANALYSIS

An analysis of the video-cassette program would be incomplete if the course and professors were not analyzed at the same time since they have a direct relationship upon student interest in the material presented. For example, if students do not find the course interesting, their use of the instructional media would reflect their disinterest. It has been shown that students used the instructional media; therefore, it appears that both the course and professors had a positive impact upon student interest.

Realizing that AEC 100 is an introductory course required of all students who plan to major in agriculture, one might expect student interest in the course to be relatively low. However, for the group under analysis, just the opposite was true. Over 80 percent of the students found the course "moderately" to "very" interesting. Of these students, 42 percent stated that they would have taken AEC 100 even if it were not required of them; 20 percent were undecided on this matter. If we compare AEC 100 to other introductory courses, only 38 percent of the students felt it was not as good as others they had taken.

It would be difficult to infer from the above that this course meets the requirements of its students; however, there is evidence to suggest that it goes a long way toward meeting student interests and needs.

Agricultural economics is just one of many disciplines a student must take in college. Just requiring a course cannot assure an interest by students without help from the teacher. After all, it is the teacher who guides the students through the myriad of concepts and application focused in the text. It is his attitude toward the discipline that awakens interest which a text is not capable of doing. His knowledge of the discipline should be broad and his presentations should guide the students. Students should feel comfortable with the teacher and feel that he enjoys his profession along with maintaining a good relationship between him and themselves. The professors involved in this research met these requirements. Eighty-six percent of the students rated the professor's attitude from good to excellent, while 72 percent were satisfied with the faculty-student relationships.

VIDEO-CASSETTE USAGE AND PERFORMANCE ON QUIZZES

Up to this point in the analysis of the video-cassette program, student reactions have been shown to favor continuance of the program. However, evidence concerning the effectiveness of the program is needed. The classes were divided into a treatment and control group solely on whether or not the video-cassette program was used. To compare the results obtained by those who used the video-cassette program with those who did not, an analysis of variance of the quiz grades was used. The null hypothesis was that the means obtained on the quiz grades were equal. No significant differences among the means between groups was

found so the null hypothesis could not be rejected. The conclusion from this is that students who used the video-cassette program did not receive better grades on their quizzes.

In an attempt to relate the effectiveness rating of the program to the final examination grades, the students were divided into three separate groups according to their final exam score: 1) those students who received a score of 60 or less, 2) those who received between 61 and 80, and 3) those between 81 and 100 (Table 4). Effectiveness of the AVIS program was taken from responses on the course evaluation form (See Appendix C). The answers were grouped into three categories according to those students who found the program: 1) very effective, 2) good or 3) poor. Students with good final exam scores (81-100) found the video-cassette programs least effective. Eighty-seven percent of the average students rated the programs either very good or good, and about

Table 4: Relationship of Final Exam Score to Effectiveness Rating of Video-Cassettes

Rating of Effectiveness	Score on Final Exam			Total
	<60	61-80	81-100	
Very good	12	18	2	32
Good	17	37	9	63
Poor	7	8	6	21
Total	36	63	17	116

Total Chi-Square = 6.259 DF = 6 p>.36

80 percent of the below average students rated the AVIS programs good or very good. In all, more than 90 percent of the students responding indicated that the video-cassettes were effective as a media. However, a Chi-Square analysis indicated that the results were not significant.

SUMMARY

During the past 6-7 years the number of students enrolling in AEC 100 at The Ohio State University has more than tripled while the number of full-time faculty equivalents assigned to teach the course remained nearly constant. As teaching loads have increased, the faculty have sought alternative teaching methods which would help maintain a high level of retention of the course material and leave students with a good feeling toward economics.

Computer assisted instruction, homework problem sets and audio-visual cassettes have been prepared to supplement the textbooks and lectures normally used. This research attempts to describe the use of these instructional media and to evaluate their impact upon student grades, course evaluation and evaluation of the instructor. The analysis concentrated on the workbook, video-cassette usage and evaluation.

Other departments at The Ohio State University, and other universities, have successfully used audio-visual, self-study programs to teach all, or part, of their introductory courses. Colleges of Law and Mathematics have especially found this audio-visual technique successful in their introductory level courses which stress basic principles and theory.

Six video-cassettes were prepared during the summer of 1975. When used in conjunction with the workbook they included the material presented in more than one half of AEC 100 (six out of eleven major topics). Two professors teaching two sections of approximately 240 students participated in the experiment during Winter Quarter, 1976. Students in AEC 100 have access to several instructional media including workbooks, AVIS and CAI.

One section of 160 students was randomly divided into two groups and informed that they would be participating in an experiment to evaluate the impact of the video-cassettes on their learning of economics. Each half of the section was permitted to use alternating video-cassette units. Thus each group was to serve as a control group for one unit and an experimental group for the subsequent unit. The other section of about 80 students were not divided, but all were encouraged to use the video-cassettes as they felt necessary.

The course functioned in the normal way except that a quiz was given upon completion of the material covered in each video-cassette unit. Also an evaluation form was completed by all students after the quiz pertaining to the course material, workbook usage and video-cassettes.

At least 88 percent of the students purchased the workbook. Usage of the workbook and the video-cassettes was high during the first few weeks of the course, then tapered off. Approximately 40 percent of the students used the workbook as intended.

When asked how the video-cassettes could be improved only about ten percent of the users indicated that they needed improvement. Student reaction to the workbook-video-cassette combination was very favorable. The negative reaction was from the better students who apparently understood the material quite well before using the video-cassettes. Thus, a thorough explanation on the proper intent of the video cassettes is needed at the beginning of the course.

Of those students who did not use any of the video-cassettes, 56 percent gave lack of time and 32 percent gave location as the reason location was a problem because the video-cassettes were all located in one building separated from the Main Campus by approximately one mile.

Despite this, 52 percent of the students indicated that they would like to have more instructional media available for the course.

It appeared as if the time for usage of the video-cassettes came at the expense of time normally devoted to study of the textbook or lecture notes. Total study time for AEC 100 was significantly less than for the most demanding course the students had.

Despite the fact that 79 percent of the students enrolled in the course because it was required in their curriculum, about 80 percent found the course "moderately" to "very" interesting. In retrospect, 42 percent said they would have taken the course if it were not required. Only 38 percent felt the course was not as good as the rest of others they had taken. Both the professors received good to excellent rating in this course by 86 percent of the students.

AVIS is an important supplement for the students who encounter difficulty understanding the concepts from traditional type lectures. Student reaction to the video-cassettes was very favorable from those who used them for any one unit. Almost one-half the students rated the video-cassettes either good or excellent in terms of usefulness. The lowest ratings were from those students who were high achievers and perhaps did not need the supplemental teaching program.

Usage of the video-cassettes was higher at the beginning of the quarter than at the end. Two main factors may account for the decreased use late in the quarter: (1) time pressures of final exams and (2) the location of the AVIS program.

Little evidence could be found to show that total study time was increased by introducing the AVIS program. Rather, it appears as though

students substituted AVIS for traditional study of the text and lecture notes.

Students who did less well on the final exam tended to rate the effectiveness of the video-cassettes better than those who did well. Thus if one considers that supplemental media should be designed to assist the slower or less well prepared students, the AVIS program of audio-visual cassettes has been successful.

A high percentage of students spend very little time studying outside of class. Total study time for 60 percent of AEC 100 students was no more than four hours per week outside the classroom. This was less than that for some other introductory courses which these same students had taken.

Students who used the video-cassette program did not obtain better grades on quizzes than the non-users. Some factors which may explain part of this failure to perform better are the experimental design and the location of the tapes. The experimental design only permitted analysis of the impact of the program on quiz grades. Analysis of student performance on midterm and final exams would have been desirable but could not be conducted because students were users for one unit and non-users for the next. Thus, all students had the opportunity to use some of the video-cassettes during the quarter. The location of the tapes was also a problem which caused relatively low and declining use throughout the quarter. More convenient access would have increased the number of users. Because of these difficulties, further research on this program seems warranted.

Citations

1

Andrew Molner, "Ten Years of Educational Broadcasting," Educational Broadcasting Review, (June, 1969), Vol. 3.

2

Ibid.

3

John Riner and Bert Waits, "Television and Videocassettes for Math at Ohio State," Videoplay Magazine, (October, 1973), p. 37.

4

Molner, Vol. 3.

5

John Bertrand, "Shasta College: Growing into an Individualized Learning Program," AV Guide The Learning Media Magazine, (April, 1972), Vol. 51, No. 4.

6

Peter Utz, "Is This Any Way to Teach Mathematics," AV Guide The Learning Media Magazine, (June, 1972), Vol. 51, No. 6.

7

G.W. Ackers and J.K. Oosthoek, "The Evaluation of An Audio-Tape Mediated Course - I," British Journal of Educational Technology, (May, 1972), Vol. 3, No. 2.

References

- Ackers, G.W. and J.K. Oosthoek. "The Evaluation of an Audio-Tape Mediated Course - 1," British Journal of Educational Technology, (May, 1972), Vol. 3, No. 2.
- Bertrand, John. "Shasta College: Growing into an Individualized Learning Program," AV Guide The Learning Media Magazine, (June, 1972), Vol. 51, No. 6.
- Molner, Andrew. "Ten Years of Educational Broadcasting," Educational Broadcasting Review, (June, 1969), Vol. 3.
- Riner, John and Bert Waits. "Television and Video-cassettes for Math at Ohio State," Videoplay Magazine, (October, 1973), p. 37.
- Utz, Peter. "Is This Any Way to Teach Mathematics," AV Guide The Learning Media Magazine, (June, 1972), Vol. 51, No. 6.

APPENDIX A

Ag. Ec. 100
VIDEO-CASSETTE STUDY ANALYSIS
Winter Quarter 1976

Name _____ Date _____ Seat _____

Instructor _____ Unit Title _____ Unit No. _____

1. Do you own a workbook?
1) Yes _____
2) No _____
2. Was your group asked to use the video-cassettes for this unit?
1) Yes _____
2) No _____
3. Did you attempt to work the homework problems in the workbook before checking the answer key or the video-cassettes?
1) Yes _____
2) No _____
4. Did you work with someone else taking this course to solve the homework problems?
1) Yes _____
2) No _____
5. Approximately how much time did you devote to working on the homework problems before either checking the answer key or the video-cassettes?
1) Hours _____
2) Minutes _____
6. Approximately what percentage of the homework problems were you able to solve before either checking the answer file or listening to the video-cassette?
_____ %
7. Did you check the answer key in the Ag. Adm. Library?
1) Yes _____
2) No _____
in the Learning Resources Center?
1) Yes _____
2) No _____
8. Approximately how much time did you devote during the past week to reading the textbook or studying your class notes (outside of class)?
1) Hours _____
2) Minutes _____
9. Did you use the CAI for this unit?
1) Yes _____
2) No _____

10. If you used both the CAI and the video-cassette for this unit, which did you prefer?

- 1) CAI _____
- 2) Video-cassette _____

Why?

11. If you used the video-cassette for this unit, how could it be most useful?

12. If you used the video-cassette for this unit, how could it be improved?

13. If your group was asked to use the video-cassettes for this unit but you did not, briefly explain why.

APPENDIX B

Instructor _____ Name _____

Ag. Econ. 100
Video-Cassette Study Analysis
Winter Quarter 1976

1. Which of the following video-cassettes did you use?

<u>Unit Title</u>	<u>Yes</u>	<u>No</u>	<u>Rating*</u>
Index Numbers	___	___	___
Circular Flow of Economic Activity	___	___	___
Monetary & Fiscal Policy	___	___	___
Physical Production Relationship	___	___	___
Changing Equilibrium	___	___	___
Trading in Futures	___	___	___

*Please rate each video-cassette you used on a scale from 1 to 5, where one equals the highest rating.

2. How did you view the tapes?

Straight through without stopping	___
Straight through with some stopping	___
Reversing tape to repeat occasionally	___
Reversing tape to repeat frequently	___

3. Which of the following CAI units did you use?

<u>Unit Title</u>	<u>Yes</u>	<u>No</u>	<u>Rating**</u>
Factor-Factor	___	___	___
Product-Product	___	___	___
Short-run cost analysis	___	___	___
Investment Analysis	___	___	___
Elasticity	___	___	___
Hedging & Futures Market	___	___	___

**Rate 1-5, with one being the highest mark.

4. How many credit hours did you carry this quarter? _____

5. If you worked part-time this quarter, how many hours/week? _____

6. Did you have any classes scheduled on the University College West Campus? Yes ___ No ___

7. Did you fill out a yellow slip each time you checked out a tape? Yes ___ No ___

8. Did you know which tape you were to use at a given time? Yes ___ No ___

9. Which of the following would you rather have available for use with the workbook? Answer Key _____
Video-cassettes _____

Why?

10. Did you experience any waiting period for a video tape? yes ___ no ___

If so, how long did you wait for the video tape? _____ minutes

11. Did you experience any waiting period for a video tape player? yes ___ no ___

If so, how long did you wait for the tape player? _____ minutes

12. Would you have liked more assistance from staff members in using video-cassette equipment? yes ___ no ___

13. Was there any mechanical problem with the equipment you used? yes ___ no ___

If yes, how much difficulty did you have?

very little _____
some problems _____
many problems _____

14. How would you rate the overall effectiveness of the video-cassette study system?

very effective _____
good _____
poor _____
not useful _____

15. Does the video-cassette study system need improvement? yes ___ no ___

16. How are some ways the video-cassette study system could be improved?

17. Other Comments:

APPENDIX C

COURSE EVALUATION

Ag. Ec. 100

ADMINISTRATIVE IDENTIFICATION

Code the following information in Section II on the general coding form, beginning with Column 1.

1. Calendar year

- (2) 1972
- (3) 1973
- (4) 1974
- (5) 1975
- (6) 1976
- (7) 1977
- (8) 1978
- (9) 1979

2. Quarter

- (1) Winter
- (2) Spring
- (3) Summer
- (4) Fall

3. Class Hour

- (1) 9:00 a.m.
- (2) 10:00 a.m.
- (3) 11:00 a.m.
- (4) 2:00 p.m.
- (5) 9:30 a.m.
- (6) 10:30 a.m.
- (7) 11:30 a.m.
- (8) 12:30 p.m.
- (9) Other

4. Instructor

- (1) Hahn
- (2) Wessel
- (3) Himes
- (4) McCormick
- (5) Wayt
- (6) Larson
- (7)
- (8)
- (9)

Code the following information on the General Coding Form beginning with Column 21.

STUDENT BACKGROUND

21. What was your class rank at the beginning of the quarter when taking Ag. Ec. 100?

- (1) Freshman
- (2) Sophomore
- (3) Junior
- (4) Senior
- (5) Other

22. What was your age at your last birthday before the beginning of the quarter when taking Ag. Ec. 100?

- (1) Less than 18
- (2) 18
- (3) 19
- (4) 20
- (5) 21
- (6) 22 or more

23. Please indicate your sex.

- (1) Male
- (2) Female

24. What is your present marital status?

- (1) Married
- (2) Single

25. Indicate the category which most nearly describes your most significant personal experience in agriculture.

- (1) Reared on a farm
- (2) Worked on a farm for pay
- (3) Visited or helped friends or relatives who operate a farm
- (4) None
- (5) Other

26. Ag. Ec. 100 was:

- (1) A required course
- (2) An elective
- (3) Substituting for another social science course

27. If you had any other university level course in economics prior to taking Ag. Ec. 100, please indicate the highest level course you have had. (Check only one answer).
- (1) No other economics course
 - (2) Econ. 100
 - (3) Rural Sociology 105
 - (4) Ag. Ec. 110
 - (5) Econ. 200 or 201
 - (6) Econ. 400 or 402
 - (7) Econ. 520
 - (8) Economic course at another university
 - (9) Other
28. Which of the following most nearly describes your father's primary occupation, or last occupation if retired or deceased?
- (1) Farmer - owner operator, or tenant
 - (2) Self employed - privately owned business or partnership
 - (3) Laborer - factory worker, forman, truck driver, farm laborer, or other manual labor paid on an hourly basis
 - (4) Business executive - manager, company officer, or other company positions in which they receive a salary instead of an hourly wage
 - (5) Specially trained professional - engineer, chemist, certified public accountant, or other occupations which require advanced degrees and/or special qualifications
 - (6) Professional - dentist, medical doctor, lawyer, veterinarian, etc.
 - (7) Public service - teacher, school administrator, public elected official, military service, policeman, fireman, etc.
 - (8) Sales - salesman, fieldman, or related areas which deal with the distribution of a company's products
 - (9) Other
29. If your father's primary occupation is not farming, is he a part-time farmer?
- (1) Yes
 - (2) No
30. If you had declared your major at the beginning of the quarter when taking Ag. Ec. 100, what is it?
- (1) Agricultural Economics
 - (2) Agricultural Education
 - (3) Agronomy
 - (4) Animal Science
 - (5) Natural Resources
 - (6) Veterinary Medicine
 - (7) Other, in College of Agriculture
 - (8) Other, not in College of Agriculture
 - (9) Had not declared major or still in UVC

31. If you had not declared a major at the beginning of the quarter when taking Ag. Ec. 100, what is your intended major?
- (1) Agricultural Economics
 - (2) Agricultural Education
 - (3) Agronomy
 - (4) Animal Science
 - (5) Natural Resources
 - (6) Veterinary Medicine
 - (7) Other, in College of Agriculture
 - (8) Other, not in College of Agriculture
 - (9) Had declared a major
32. Indicate in which one of the following occupations you hope to be employed after graduating from OSU.
- (1) Farming (either self-employed, as a tenant, or as a manager)
 - (2) Parks or forestry
 - (3) Agri-business field representative
 - (4) Agri-business management
 - (5) Veterinary medicine
 - (6) Graduate school
 - (7) Non-agricultural
 - (8) Other
 - (9) Don't know yet
33. How interesting is the subject of economics to you?
- (1) Very interesting
 - (2) Moderately interesting
 - (3) Of little interest

COURSE EVALUATION

34. Knowing what you know now, if Ag. Ec. 100 were strictly an elective course would you take it?
- (1) Yes
 - (2) No
 - (3) Undecided
35. How would you rate Ag. Ec. 100 in comparison with the best other introductory course (i.e. 100 or 200 level) you have taken in the College of Agriculture?
- (1) Superior
 - (2) Better
 - (3) About the same
 - (4) Slightly worse
 - (5) Worse

36. Rate Ag. Ec. 100 with the best introductory course you have had outside of the College of Agriculture.

- (1) Superior
- (2) Better
- (3) About the same
- (4) Slightly worse
- (5) Worse

37. Rate Ag. Ec. 100 with the worst introductory course you have had in the College of Agriculture.

- (1) Superior
- (2) Better
- (3) About the same
- (4) Slightly worse
- (5) Worse

38. Who influenced you to enroll in this course?

- (1) Dean or Counselor
- (2) Advisor
- (3) Roommate
- (4) Other student in same living unit
- (5) Classmate or friend not in same living unit
- (6) Required in your curriculum
- (7) Other

39. What was your cumulative grade point at OSU at the end of the quarter before taking Ag. Ec. 100?

- (1) 3.5 - 4.0
- (2) 2.9 - 3.4
- (3) 2.3 - 2.8
- (4) 1.7 - 2.2
- (5) Less than 1.7
- (6) Not applicable because you were a first quarter freshman
- (7) Not applicable because you were a first quarter transfer student from another college or university

40. What grade do you expect to receive (or did you receive) in Ag. Ec. 100?

- (1) A
- (2) B
- (3) C
- (4) D
- (5) E
- (6) Other (pass/fail, withdrawal, etc.)

41. On the average, how many hours per week did you study outside of class for Ag. Ec. 100?

- (1) 1-2
- (2) 3-4
- (3) 5-6
- (4) 7-8
- (5) 9-10
- (6) 11 or more

42. Approximately how many hours per week have you studied outside of class for your other most time consuming 5-credit course?

- (1) 1-2
- (2) 3-4
- (3) 5-6
- (4) 7-8
- (5) 9-10
- (6) 11 or more

43. How many hours per week have you studied outside of class for your least time consuming 5-credit course?

- (1) 1-2
- (2) 3-4
- (3) 5-6
- (4) 7-8
- (5) 9-10
- (6) 11 or more

PROFESSOR EVALUATION

44. His attitude toward teaching was:

- (1) Excellent
- (2) Good
- (3) Fair
- (4) Poor

45. His faculty-student relationship was:

- (1) Excellent
- (2) Good
- (3) Fair
- (4) Poor

46. His knowledge of the material was:
- (1) Broad and accurate
 - (2) Deficient at times
 - (3) Seriously deficient
47. The "Organization" of the material for this course was generally:
- (1) Clear and carefully given
 - (2) Sometimes vague, indefinite or hastily given
 - (3) Usually vague and poorly given
48. To better understand the material, the use of more teaching aids (i.e., charts, slides, movies, etc.) in the course:
- (1) Would have been very helpful
 - (2) May have helped
 - (3) Would have been of little help
 - (4) Would have been a detraction
 - (5) There was a good balance in the course
49. Would the course have been improved if the instructor had used more examples of the application of economics?
- (1) Yes
 - (2) No
 - (3) Undecided
50. If more time had been allocated for classroom discussion, it would have been:
- (1) Highly valuable
 - (2) Useful
 - (3) Often unprofitable
 - (4) A waste of time except for the student asking a question
 - (5) Discussion in class was about right
51. If all the teachers with whom you have taken courses were divided into three groups, all qualities considered, would you place the professor you had in Ag. Ec. 100 in the:
- (1) Top third
 - (2) Middle third
 - (3) Lower third

GENERAL EVALUATION

Indicate the degree of agreement or disagreement which you have for the following statements:

	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
52. The teaching methods used were appropriate for this level course.	(1)	(2)	(3)	(4)	(5)
53. The course has <u>not</u> improved my ability to analyze situations involving economic decisions.	(1)	(2)	(3)	(4)	(5)
54. Economic principles (i.e. input-output, supply-demand, etc.) are useful in almost every type of business or occupational pursuit.	(1)	(2)	(3)	(4)	(5)
55. A farm background is of major importance in Ag. Ec. 100.	(1)	(2)	(3)	(4)	(5)
56. The level of difficulty of Ag. Ec. 100 is too advanced for an introductory course.	(1)	(2)	(3)	(4)	(5)
57. The work demanded in Ag. Ec. 100 is excessive for a course of five credit hours.	(1)	(2)	(3)	(4)	(5)
58. The homework assigned in this course helped to better understand the application of economics.	(1)	(2)	(3)	(4)	(5)
59. Because of my experience in Ag. Ec. 100, I would like to take another economic-business related course.	(1)	(2)	(3)	(4)	(5)
60. The examinations were a good evaluation of the material covered in Ag. Ec. 100.	(1)	(2)	(3)	(4)	(5)
61. Ag. Ec. 100 makes me feel more comfortable concerning economic decisions which I might have to make in the future.	(1)	(2)	(3)	(4)	(5)

COMPUTER ASSISTED INSTRUCTION

62. Did you use the CAI programs for Ag. Ec. 100 during the quarter?

- (1) Yes
- (2) No

If you used the CAI for Ag. Ec. 100, please indicate your evaluation of its usefulness for each of the following items:

	Very Useful	Somewhat Useful		Useless
63. Study aid	(1)	(2)	(3)	(4) (5)
64. Helpful in understanding the course material.	(1)	(2)	(3)	(4) (5)
65. Practical application of the material.	(1)	(2)	(3)	(4) (5)
66. Interaction with immediate indication whether answers to questions were correct	(1)	(2)	(3)	(4) (5)
67. Good way to review.	(1)	(2)	(3)	(4) (5)
68. Made the course more interesting.	(1)	(2)	(3)	(4) (5)
69. Good experience to use CAI	(1)	(2)	(3)	(4) (5)

(Continued on next page)

If you did not use CAI, proceed to question 76 on next page.

If you used CAI for Ag. Ec. 100, please indicate how it could be improved for each of the following:

	<u>Strongly</u> <u>Agree</u>		<u>Agree</u>		<u>Disagree</u>
70. Have more terminals	(1)	(2)	(3)	(4)	(5)
71. Have more programs for other parts of the course	(1)	(2)	(3)	(4)	(5)
72. Have more programs for the topics presently on CAI	(1)	(2)	(3)	(4)	(5)
73. Have shorter programs	(1)	(2)	(3)	(4)	(5)
74. Divide the programs presently on CAI into shorter segments	(1)	(2)	(3)	(4)	(5)
75. Explain its use better	(1)	(2)	(3)	(4)	(5)

If you did not use CAI, indicate whether you did not use it for the following reasons:

	<u>Yes</u>	<u>No</u>	<u>Don't</u> <u>Know</u>
76. Not enough time	(1)	(2)	(3)
77. Did not feel CAI was important	(1)	(2)	(3)
78. Knew the material well enough without using CAI	(1)	(2)	(3)
79. I wish I would have used CAI	(1)	(2)	(3)