

The Effectiveness of Video-Based Instruction in an Undergraduate Agricultural Business Course

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Abstract

This study compared the effectiveness of video-based instruction to live instruction in an undergraduate agricultural sales course. Three video classes were taught concurrently with a live course at Purdue University in the 1992 spring semester. Location specific course data were compiled at the live and video locations. This data were then analyzed to determine what, if any, differences existed in the effectiveness of the two methods of instruction. Results indicate that student achievement scores were the same regardless of the media used to communicate course content. However, the video instructor's effectiveness was significantly affected by the use of video tapes/television as a method of communicating instruction. A key contributor to video course success was the local instructor.

By 1995, one third of the opportunities for graduates in natural resources, agriculture, and veterinary medicine will be in sales, marketing, or merchandising positions (USDA, 1990). And, Midwestern studies report that nearly 50 percent of all College of Agriculture graduates enter industry in a sales position (Bohl, et al., 1990). Consistent with these findings, a 1989 study of 1,100 agribusiness managers reported that in college curriculum more emphasis was needed in sales skills and marketing (Litzenberg and Schneider, 1989). Another western regional study of 177 agribusiness managers ranked sales and marketing experience as the first and second most important factors for employment in their firms (Klein, 1988). Despite this, few Colleges of Agriculture offer a course in agricultural sales (Hathaway, 1992). These studies suggest an inconsistency between the demand for sales skills voiced by private industry

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and the lack of courses in agricultural sales at Colleges of Agriculture to train qualified sales graduates.

Rising costs and declining real budgets are the norm in higher education. This is particularly the case for agricultural colleges where declining enrollments, an aging student population, and reduced levels of state funding challenge many higher education administrators. A combination of these constraints has administrators looking for innovative alternatives to traditional instructional methods. One alternative being considered is distance education.

Distance Education

Distance education has historically been thought of as independent study or correspondence courses offered to off-campus students. In the 1980's, keen interest in alternative distance education mediums has resulted in an explosion of alternative instructional delivery systems (Olcott, 1992). Developments in new technological mediums such as cable television, audio/video, fiber optics, satellites and micro-computer networking, have revolutionized distance education (Olcott, 1992). Along with the new interest in distance education, concerns about the educational effectiveness of this approach have been raised, including questions about student learning, attitude, and performance in the distance education classroom. Other questions include instructor effectiveness, the quality of different mediums, and the possible trade-offs associated with each method (Cookson, 1989).

To address the shortage of agricultural sales courses, the United States Department of Agriculture funded a Challenge Grant Project entitled "Undergraduate Agri-Selling Course Via AG*SAT". This three year project began at Purdue University in late 1991. Initially, the project called for Dr. W. David Downey's Professional Agri-Selling course to be delivered live, via AG*SAT¹, to two Big Ten Universities. However, at the request of AG*SAT in De-

1. Agricultural Satellite Corporation (AG*SAT) is a national agricultural education telecommunications network service. Formed in 1989 and based in Lincoln, Nebraska, AG*SAT serves thirth-four land grant universities by combining satellite, audio/video, and computer technologies to share academic instruction, cooperative extension, and agricultural research information.

ember of 1991, the project switched from a live satellite delivery to a video-based delivery. This video-based Professional Agri-Selling course was pilot tested in the spring of 1992 at Michigan State University, Iowa State University, and to a separate video location at Purdue University.

The purpose of this study was to compare the effectiveness of video-based instruction to live instruction in an undergraduate agricultural sales course. Location specific course data from 273 students were compiled at the live and video locations. These data were then analyzed to determine what, if any, differences existed in the effectiveness of the live and video courses.

Previous Studies

Determining course effectiveness in either a traditional or distance education environment is a difficult task. The educational effectiveness of television and video-based courses has been researched for decades and continues to be questioned in part due to the broad range of instructional settings and variety of technological formats employed (Chu and Schramm, 1975; Smith, 1983; McKeachie, 1986).

The most influential and extensive research on instructional television was conducted by Whittington (1987). Whittington concludes that televised instruction is neither inferior nor superior to the traditional classroom presentation. He feels the critical factor that influences student achievement is not which medium works best, but rather, what constitutes effective instruction.

A study conducted by Beare (1989) compared the effectiveness of videotape, audiotape, and televised instruction in continuing education. The results of the comparative study indicated that instructional format had no negative effect on student achievement or course evaluation. Other studies completed during the last three decades indicate that performance by students on achievement-type tests is similar regardless of instructor proximity. Clark (1989) and Salomon (1981) contend that comparable performance can be expected from students regardless of the medium. Additional studies support these findings (McCleary and Egan, 1989; Ritchie and Newby, 1989; Smith, 1987; Weingand, 1984).

Course Description

Professional Agri-Selling is offered in the fall and spring semesters and is taken by approximately 400 undergraduates at Purdue University. The course takes a practical approach to the sales process and begins with a section on human behavior, focusing on business transactions and the purchasing decision. The human behavior section is followed by a detailed analysis of the formal sales process: preparation, opening, presentation, closing, and service after the sale. Other key components of the course include two experiential projects (called SWAS and RSS)² that expose students to the "real" sales environment.

Methods

In this study three approaches were used to determine course effectiveness. These approaches were student

achievement (based on exam scores), course evaluations, and video student feedback surveys.

Some 273 subjects from four locations in the spring of 1992 were involved in the project. There was one 'live' course of 185 students at Purdue University, and three video locations with a total of 88 students. Each of these three video locations had a local instructor or facilitator who answered questions, led discussions and exercises, supervised the local SWAS and RSS projects, and administered quizzes and exams.

Student achievement or level of learning was determined at each location based on exam scores and the same exam was given at all locations. Objective questions from the midterm and final exam were used. Objective questions were considered to be true-false, multiple choice, and fill-in-the-blank. Essay questions were not used in the study due to multiple graders and the subjective nature of grading.

Students rated their level of satisfaction with the course by responding to course evaluations. Course evaluations were voluntarily completed by 240 of 273 students at the end of the semester. This sample equates to an 87.9 percent response rate at the four locations. Thirty-three questions on the course evaluations focused on six effectiveness variables: the effectiveness of the instructors (both video and local), course content, course structure, media use, and the classroom. In addition, demographic data about student major (agricultural versus non-agricultural), class, age, and gender were collected for analysis.

Surveys were completed at the three video locations to collect student feedback and suggestions for improving the course. Video students were asked to rate the video-course as it compared to a traditional lecture course. Responses on the course evaluations and surveys were completed both anonymously and with student identification numbers to control for response bias. There was no significant difference in the two responses allowing demographic information, which was correlated to the student identification numbers, to be utilized in the analysis.

Means and standard deviations were calculated for each of the variables in the four classes. Responses from the three video locations were then combined into one video class and compared to the live class. The two Purdue locations were also compared. Simple descriptive statistics, two tailed t-test, chi-square tests, and regression analysis were used to test for differences across the groups.

Student Achievement Results

Student achievement scores for the combined video and live courses are shown in Table 1. These scores are from the objective portions of the midterm and final exam. Compari-

2. *Sashay With A Salesperson (SWAS)* is a project in which students schedule a day in the field with a professional salesperson. Students observe how the sales person works with customers and obtain first hand knowledge of the salesperson's job, attitude, experiences, and how the concepts and techniques studied in the classroom are applied in the field. *Ready Set Sell (RSS)* is conducted at the end of the semester and integrates material from the entire course. Students choose a product or service and make a sales presentation to a professional salesperson who takes the role of a customer and evaluate's the student's presentation.

Table 1. Mean Exam Scores for Live and Video Courses.

EXAM	Mean Live	Mean Video	t-statistic
Midterm Exam Score (50 possible)	40.52	41.06	-.74
Standard Deviation	(5.12)	(5.81)	
Final Exam Score (70 possible)	58.61	58.47	.18
Standard Deviation	(5.55)	(6.13)	

son of the scores indicate that there is no difference in student achievement between the live and video groups. This would support the findings from previous studies conducted by Beare (1989), Clark (1989), Salomon (1981), and Whittington (1987).

There were differences in exam scores by video location. Michigan State students scored significantly lower on the midterm and final exam (-7.6 and -3.50 points respectively). When considering the mean of the three video locations in Table 1, slightly higher scores at Iowa State and the Purdue Video location are offset by the lower scores at Michigan State.

Two regression models were developed to control for location differences in exam scores. Midterm and final exam scores were the dependent variables while the independent variables included dummy variables for Purdue Video (PUVIDEO), Iowa State (ISVIDEO), Michigan State (MSVIDEO), and gender (GENDER).

The regression results presented in Table 2 indicate that some of the differences in the midterm exam scores are explained by location and gender. On the final exam differences, location and gender effects are not important. It is interesting to note that females had a slightly higher (statistically significant) midterm score. However, Michigan State had the highest ratio of females and also scored lower on both exams. It is unclear why the exam scores were lower at Michigan State, but this pattern is reflected throughout the results.

Course Evaluations

Instructor effectiveness scores for the live and combined video instructor are given in Table 3. The video students rated the video instructor (the instructor on the video tapes) significantly lower than the regular live students rated the same instructor. The video instructor's effectiveness was

Table 2. Regression Models with Midterm and Final Exam Scores.

VARIABLE	Midterm		Final	
	Parameter Estimates	t-statistic ^a	Parameter Estimates	t-statistic ^a
INTERCEPT	41.38	71.53*	58.78	87.04*
PUVIDEO	3.16	3.32*	-0.04	-0.03
ISVIDEO	1.47	1.60	1.06	0.97
MSVIDEO	-7.70	-5.44*	-3.55	-2.15*
GENDER	-1.40	-2.06*	-0.28	-0.36
MODEL STATISTICS		Midterm	Final	
R2		.1811	.0265	
ADJ R2		.1667	.0093	
F Value		12.55	1.54	
Prob>F		-7.70	-3.55	

a * Indicates statistically significant at the .05 level.

Table 3. Effectiveness of Video and Local Instructor^a.

INSTRUCTOR EFFECTIVENESS	Mean Live	Mean Video	t-statistic ^b	Chi-sq ^a Statistic
VIDEO INSTRUCTOR				
Made learning easy and interesting	1.40	2.48	-10.78*	83.93*
Held the attention of the class	1.50	2.89	-12.78*	97.31*
Stimulated my interest in the course	1.59	2.68	-9.34*	66.17*
Spoke clearly/explained difficult material	1.38	1.95	-6.21*	34.97*
Motivated me to do my best work	1.68	2.89	-10.46*	75.21*
Overall, is among the best teachers I know	1.58	2.77	-9.73*	68.39*
LOCAL INSTRUCTOR				
Was readily available for consultation	1.86	1.37	4.58*	21.39*
Returned papers quickly to benefit me	1.38	1.63	-2.89*	10.18*
Developed classroom discussion skillfully	1.53	1.55	-.22	3.22
Spoke clearly/explained difficult material	1.38	1.47	-1.05	6.70
Motivated me to do my best work	1.68	1.67	.08	1.40
Overall, is among the best teachers I know	1.58	1.47	1.12	3.30

a Scale: 1=strongly agree, 2=agree, 3=undecided, 4=disagree, and 5=strongly disagree.

b * Indicates difference between live and video statistically significant at the .05 level.

significantly affected by the use of video tapes and television as a method of communicating instruction. This result is not surprising considering the limited interaction between the video instructor and the remote site students when using a one-way method of delivery such as video-based television.

The local instructor (instructor at the remote site that facilitated the video tapes and local activities) received ratings very similar to those received by the video instructor in the live setting (Table 3). It appears that the local instructor plays a critical role in the overall effectiveness of the video-based course. This result supports previous studies conducted by Chute, et al. (1988) and Moore, et al. (1991). In this study, local instructors were given orientation and training on course content in the semester prior to offering

Table 4. Mean Ratings of Course Content and Structure^a.

COURSE CONTENT/STRUCTURE	Mean Live	Mean Video	t-statistic ^b	Chi-sq ^a Statistic
CONTENT				
The content of this course was relevant to my needs	1.48	1.63	-1.49	4.86
This course contributed significantly to my professional growth	1.46	1.68	-2.15*	7.58
The stated goals of this course were consistently pursued	1.39	1.78	-4.31*	20.23*
The amount of material covered was reasonable	1.50	1.69	-2.18*	5.01
Course assignments were interesting and stimulating	1.73	2.19	-3.95*	21.58*
STRUCTURE				
Exams and quizzes accurately reflect what I have learned	1.78	2.09	-2.69*	10.31*
SWAS significantly contributed to the value of this course	1.34	1.47	-1.43	2.29
RSS significantly contributed to the value of this course	1.32	1.35	-.39	3.16
Overall, this course was among the best I have ever taken	1.56	1.81	-2.39*	7.27

a Scale: 1=strongly agree, 2=agree, 3=undecided, 4=disagree, and 5=strongly disagree

b * Indicates difference between live and video statistically significant at the .05 level.

the video-based course. They were provided examples of the two experiential projects and the lecture tapes well in advance of the scheduled class period. This preparation positively affect the local instructor's effectiveness.

Comparing the three video classes reveals Michigan State students were less satisfied with the video instructor than the other two video classes. The local instructor scores are very similar across the three video locations with the exception of one question (returning papers quickly enough to benefit the student). Students at Michigan State rated the video instructor substantially lower than their local instructor.

Course Content and Structure

The live and combined video evaluations of course content and structure are shown in Table 4. The results are similar for the combined video and live courses. Video students rated most areas in content and structure as slightly less effective (Table 4). Course relevance, SWAS, and RSS were considered effective by both the video and live students. Given that the effective management of these two projects in a video-based course was considered a major challenge, such a finding is encouraging.

In general, Iowa State students were slightly more satisfied with course content and structure while Michigan State students were substantially less satisfied than students at the other two locations. Standard deviations are higher at Michigan State on four of the questions indicating larger variation in responses. The situation changes when course structure is considered. Michigan State students were more satisfied with the SWAS and RSS projects than students of any of the other locations. This is surprising in light of previous course effectiveness ratings but support the preference by Michigan State students for a local instructor and local activities.

Media and Classroom

The media and classroom evaluations are presented in Table 5. Again, the video students were less satisfied than their live counterparts. This gap increases slightly with questions about the required notebook and even more so with the respective classrooms.

The tendencies across sites continue on this set of ques-

Table 5. Mean Ratings of Media and Classroom^a.

MEDIA AND CLASSROOM	Mean Live	Mean Video	t-test ^b	Chi-sq ^b Statistic
MEDIA				
Television reception was of good quality	1.73	1.90	-1.53	10.01
Audio reception was of good quality	1.73	1.95	-1.94	14.28
I was generally pleased with the notebook	1.49	2.16	-5.98*	32.12*
I was generally pleased with the text	2.08	2.46	-2.72*	9.02*
CLASSROOM				
The classroom was adequate and comfortable	1.73	2.74	-8.59*	67.64*

^a Scale: 1=strongly agree, 2=agree, 3=undecided, 4=disagree, and 5=strongly disagree

^b * Indicates difference between live and video statistically significant at the .05 level.

tions with Iowa State students more satisfied and Michigan State students the least satisfied of the video locations. Purdue Video students, although slightly less satisfied than Iowa State students in most cases, were less satisfied with the classroom in terms of adequacy and comfort.

Overall Effectiveness

Overall course ratings for the live and combined video classes are presented in Table 6. On general questions, such as willingness to recommend the course to others and enjoyment of the course, video students rated the course slightly less effective. The gap narrowed between the live and video groups when questions referred to a location specific variable such as guest speakers. Video students were undecided about taking a course with a similar video format while live students were supportive of taking another course with a similar format. The preference of video students for a live instructor and locally conducted activities suggest that a video course should be used when the course is desired by students, but would not be offered otherwise. Other applications suggested by these results include continuing to utilize video-tapes to supplement existing courses, utilizing video courses as an interim until course potential can be determined, and utilizing video courses as a method of improving the local instructors skills and comfort level with new material.

Looking at responses across sites, Michigan State students were the least satisfied with the course in all categories except for the question regarding the value of guest speakers. Again, Michigan State students demonstrate a strong preference for location specific activities which includes local guest speakers.

Surveys

Surveys were completed by students at all three video locations to provide a qualitative evaluation of the course. There was one quantitative question included in the survey. This quantitative question asked students to rate the effectiveness of the video-based course as compared to a normal lecture course. This rating was anchored on a seven point scale ranging from (1) Very Ineffective to (7) Very Effective.

Iowa State rated the video-based course the highest with a mean of 5.11 and standard deviation of 1.24. Purdue

TABLE 6. Mean Overall Evaluation of Course^a.

OVERALL EVALUATION	Mean Live	Mean Video	t-test ^b	Chi-sq ^b Statistic
The use of recorded interviews and sales demonstrations significantly contributed to the value of this course	1.74	2.30	-4.34*	24.62
Guest speakers were an asset to this course	1.74	1.71	.21	1.54
I have enjoyed this course	1.49	1.64	-1.67	3.09
I highly recommend this course	1.40	1.67	-2.92*	8.54*
I would enjoy taking other courses with a similar (video) format	1.50	2.69	-9.52*	73.45*

^a Scale: 1=strongly agree, 2=agree, 3=undecided, 4=disagree, and 5=strongly disagree

^b * Indicates difference between live and video statistically significant at the .05 level.

Video followed with a mean of 4.88 and standard deviation of 1.34. Michigan State rated the video-based course the lowest with a mean of 3.46 and standard deviation of 2.10. These survey scores are consistent with similar questions about overall course effectiveness obtained from the student evaluations.

Although survey responses to the six open-ended questions varied according to location, there were messages consistently voiced by the video locations. In general, all locations enjoyed the experiential SWAS and RSS projects and the applicability of the material in the course. They were not pleased with the length of the videos and recommended that the number of videos be reduced and the duration of the videos be shortened. It also was recommended that the video locations have more local discussion, exercises, and role playing at the expense of time dedicated to video instruction.

Purdue Video students individually voiced displeasure in the surveys with the uncomfortably warm temperature of the classroom. This explains the difference on the mean responses to the question about the classrooms adequacy and comfort. Purdue video also emphasized that more time was needed with the local instructor for exercises and in-class examples.

Michigan State students were very pleased with the SWAS and RSS projects. However, they voiced a dislike for the videos and expressed interest in having non-agricultural examples in the video portion of the class. Michigan State students were more critical of video instruction, and expressed a desire for more non-agricultural examples. Combining these two factors with the lower media scores may explain the lower overall course effectiveness scores at Michigan State.

Conclusions

The distance education literature includes a number of studies about the advantages and disadvantages of different distance education methods. Results from this study support earlier findings about video-based and televised instruction by confirming the importance of the local instructor and the quality of media (both audio and visual). Unique to this study was the importance of the two local projects, SWAS and RSS.

Recommendations for other distance education courses using video-based instruction are clear. Make sure the television and audio reception are of good quality at each location to ensure the course is properly received. Administrators of distance education courses, especially one-way methods such as video, should give particular attention to the selection and training of the local instructor, relevance of the material, and length and quality of videos. Finally, making the material presented at a remote site location specific can help the course be more effective and relevant for distance education students.

It appears that Colleges of Natural Resources, Agriculture, and Veterinary Medicine can maximize existing resources by joint activities in distance education. This enables each institution to share its particular strengths and/or

specialty areas. Distance education using video can be an attractive option for colleges and universities attempting to maximize available resources and/or expand course effectiveness in areas where faculty have little expertise. In times of rising costs and declining real education budgets, cooperation through distance education and shared resources is one realistic alternative to fewer offerings of quality courses.

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