

# Student Evaluation Scores for Courses Delivered by Interactive Videoconferencing

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## Abstract

The College of Agricultural and Life Sciences offers several baccalaureate degree programs outside of its main campus in Gainesville using a combination of live and distance delivery. The primary means of distance delivery has been interactive videoconferencing (IVC), where a live class is delivered synchronously to one or more remote sites. Instructors were concerned that scores on student evaluations were lower at remote than live sites, although only anecdotal information was available to support this concern. This study compared student evaluation scores between live and remote sites in a sample of 22 courses offered between summer 2005 and spring 2008. Live section scores were compared to scores from all remote sections combined using a Wilcoxon Signed Rank test on the differences between Likert scale scores (1=poor, 5=excellent) on an 11-question student evaluation. Results showed that live section scores were higher than the remote sections 64-86% of the time, depending on the question, and for 10 of 11 questions the differences were statistically significant ( $P < .05$ ). This included the overall ratings of the instructor and the course, which are used to document teaching performance in faculty evaluations. Differences between scores for live and remote sections ranged from 0.18 to 0.47, depending on the question. The data suggest that students receiving instruction at remote sites via IVC are less satisfied than students at live sites, supporting the concerns of faculty. However, remote site scores were at most 0.15 points below typical college means, and live site scores were above college means, suggesting that IVC courses are rated satisfactorily relative to other courses in the College.

## Introduction

Distance education (DE) is growing at a rate more than 10 times that of traditional higher education (Allen and Seaman, 2009). More than 25% of all students enrolled in higher education have taken at least one course via distance. In 2010, the University of Phoenix, which delivers much of its courses and programs online, became the second largest university system in the United States despite charging double the average tuition of public universities

(Wilson, 2010). Many public universities are responding to the increased demand by increasing DE course and program offerings, but at this time there is no consensus on the technology or approach that provides the best experience for students and faculty. The number of delivery platforms available and associated learning curves can be daunting for faculty tasked with teaching DE courses. Delivery platforms for DE courses are generally divided into synchronous and asynchronous categories, with asynchronous, internet-based platforms being the most common in higher education in the United States (Parsad and Lewis, 2008). Asynchronous delivery has its roots in correspondence courses, where instructors and students interacted via mailed materials. Synchronous delivery originates from the "extended classroom" model adopted in the 1940s where closed-circuit television was used to connect additional rooms to the main lecture hall to provide additional capacity (Bernard et al., 2004). Today, synchronous delivery has evolved largely into interactive videoconferencing (IVC) or live streaming video on the internet. Among the advantages and disadvantages commonly cited, asynchronous delivery allows greater flexibility for students but often less interaction with the instructor, while the opposite is said of synchronous delivery. Asynchronous may be more demanding on the instructor due to high inputs of time and resources for course development and different pedagogical requirements (Seaman, 2009). On the other hand, synchronous delivery methods such as IVC can be relatively transparent to the instructor and therefore preferred by faculty over asynchronous, internet-based platforms (Thornsbury and Griffin, 2002).

The College of Agricultural and Life Sciences (CALS) at the University of Florida has been engaged in a number of degree completion or "2+2" programs outside of its main campus in Gainesville for several years. The programs are housed at Research and Education Centers located in Ft Lauderdale, Ft Pierce, Apopka, Plant City, and Milton, Florida. Eight majors are offered at one or more of these locations by deploying less than 18 teaching FTE off the main campus, thus there is a great need for course sharing among locations. DE delivery began asynchronously by videotaping courses at the originating site and

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sending tapes to students at remote locations. This evolved into synchronous delivery as IVC systems became more affordable and were installed at Research and Education Centers and in Gainesville. While some faculty continue to teach live or have developed asynchronous, internet-based courses, several courses are delivered via IVC each semester.

The use of IVC in CALS has been problematic. Courses are generally taught in the evenings to accommodate the schedules of working students. After normal work hours, technical staff is not available to resolve issues with connectivity and audio and/or video to some sites can be “dropped,” resulting in delays in teaching for all sites, or at worst, the complete loss of a class meeting. Courses meet only once per week to minimize commuting, thus the loss of a single meeting represents a substantial amount of the course. A study by McKenney et al. (2010) supports this observation, as administrative time requirements (i.e., non-teaching activities necessary for course delivery) for IVC were double those of face-to-face or online horticulture courses. IVC systems are fairly consumptive of bandwidth, and faculty at Research and Education Centers have noted reduced speed in email and internet applications during IVC course transmission or reception. Faculty have been disappointed with the resolution of IVC systems and contend that their PowerPoint slides or whiteboard content appears washed out or illegible at remote sites.

Given the problematic nature of IVC, it is not surprising that faculty believe student evaluations of their teaching are negatively affected by IVC delivery. This has been documented previously. Chisolm et al. (2000) found numerically lower evaluation scores from students at remote sites compared to students at the live (originating) site for pharmacy courses delivered by IVC. Few of the differences were statistically lower, however. Alternatively, Clow (1999) reported statistically lower student evaluations from students at remote IVC sites for 75% of questions about the instructor. Lower scores were seen for videoconferencing groups than live groups even for questions such as fairness in grading and clarity of course objectives, which should not have been a function of delivery method. More frequently, however, studies have shown no effect or mixed effects of IVC on student evaluations. Spooner et al. (1999) reviewed 11 studies conducted prior to 1999 and found that six showed no differences in student

evaluations between live and remote IVC sites, three showed IVC worse than live, and two showed IVC better than live instruction.

The objectives of this study were to determine if student evaluation scores differed at live and remote IVC sites in CALS, and if so, determine if the magnitude of the difference was large enough to 1) affect faculty in terms of annual performance evaluations, and 2) warrant a change in DE delivery technology.

## Materials and Methods

**Study sample.** A convenience sample of student evaluations was used for the study. Student evaluation summaries for courses taught using IVC during 2005-2008 were examined for cases where there were sufficient evaluations from live and remote site(s) to allow for statistical analysis. Courses selected were taught primarily via IVC, although in most cases a course web site was used for items such as posting grades, assignment submission, and supplemental course material. The independent variable was location, live or remote, and there were one to four remote sites, depending on the course. A weighted mean evaluation score was calculated for the remote variable since there were different numbers of students at each remote site. Courses that had at least two completed evaluations returned from each of the live and remote sites were included in the analysis. Courses had relatively small numbers of students and therefore usable evaluations; live sites had 2 to 21 respondents and remote sites had 2 to 12 respondents (each) from which to derive means.

Application of these criteria resulted in 22 cases to analyze. Course subjects included Agribusiness Management, Agricultural Finance, Agricultural and Natural Resource Policy, Marketing, Ornamental Horticulture, Soil Science, Plant Physiology, and Pest Management. Ten different instructors across four

**Table 1. Student Evaluation Instrument Questions and Corresponding Ratings, Differences in Ratings between Live and Remote Site Students, P Values and the Percentage of Cases Where Live Site Scores Exceeded Remote Site Scores**

Question	Live mean <sup>z</sup>	Remote mean <sup>z</sup>	Difference (Live-Remote)	P value, Wilcoxon signed rank test on differences	% Live > Remote
1. Description of course objectives and assignments	4.50	4.16	.34	.0070	77
2. Communication of ideas and information	4.52	4.15	.37	.0239	64
3. Expression of expectations for performance in this class	4.56	4.17	.39	.0064	68
4. Availability to assist students in or out of class	4.56	4.09	.47	.0136	77
5. Respect and concern for students	4.69	4.33	.36	.0383	64
6. Stimulation of interest in course	4.52	4.18	.34	.0106	68
7. Facilitation of learning	4.55	4.13	.42	.0047	86
8. Enthusiasm for the subject	4.73	4.50	.23	.0101	64
9. Encouragement of independent, creative, and critical thinking	4.48	4.30	.18	.1450	68
10. Overall rating of instructor	4.59	4.28	.31	.0229	68
11. Overall, I rate this course as:	4.44	4.01	.43	.0130	73

<sup>z</sup> Mean ratings were derived from Likert scale responses with 1=poor, 2=below average, 3=average, 4=above average, and 5=excellent.

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sites were represented in the sample. Fourteen different courses were represented in the sample; one course was included three times and six courses were included twice (separate years).

**Student evaluation instrument.** Identical evaluations were distributed to students in all courses, sites and years. Within a course, separate section numbers allowed the determination of whether the data originated from a live or a remote site. The 11 questions were scored on a 5-point Likert scale with 1=poor, 2=below average, 3=average, 4=above average, and 5=excellent. The questions are presented in Table 1.

**Statistical analysis.** The data were not normally distributed, so a non-parametric Wilcoxon signed rank test was used to analyze the data. The analysis was performed on the difference between the means for live and remote sites within a given course. The null hypothesis was that the difference between evaluation scores for live and remote sites was zero.

## Results

The results showed that scores for 10 of the 11 questions on the course evaluations were statistically lower for remote sites than live sites (Table 1). Only “Encouragement of independent, creative, and critical thinking” was scored equally by live and remote site students. In CALS, mean scores for all questions from student evaluations are included in promotion and tenure dossiers, but means from two questions appear in a summary table and are highlighted: the overall rating of instructor and the overall course rating (Questions 10 and 11, respectively). These are presented alongside departmental and college means for comparative purposes. Both were statistically lower for remote than live sites. Students at remote sites gave numerically lower scores to instructors than live site students 64-86% of the time (Table 1).

Mean evaluation scores were relatively high for live sections, generally above 4.5 on a 5-point scale (Table 1). Differences in mean values between live and remote sites ranged from 0.18 to 0.47. For comparative purposes, the college-wide mean for the “instructor overall rating” (Question 10) was 4.35 for fall semester 2008. Therefore, students in live sections rated instructors 0.24 points above the college mean, whereas remote site students rated instructors 0.07 points below the college mean. The college-wide mean for the “course overall rating” (Question 11) was 4.16 during fall semester 2008. The students in live sections rated the course 0.28 points above the mean, whereas the students in remote sections rated the course 0.15 points below the college mean.

## Discussion

The main objective of this study was to examine the differences in student evaluation scores returned from students at live and remote sites in DE courses

delivered by IVC. The data show that the students at remote sites gave statistically lower evaluation scores to instructors on all but one question in the standard 11-question evaluation instrument, in agreement with anecdotal evidence provided by faculty. This is relatively strong evidence that the IVC technology is associated with lower student evaluations, given the diversity of course topics, the number of instructors, and number of sites involved in the analysis. Further, considering the low enrollment and the fact that the data were obtained over three consecutive years, it is likely that most students that had provided evaluations had been exposed to both live and IVC delivery, and thus had experienced courses both ways when they rendered their evaluations. The results are in agreement with studies by Clow (1999) and Chisholm et al. (2000) who also found lower evaluations rendered by students at remote sites in courses delivered by IVC. However, the study by Spooner et al. (1999) and references cited therein suggest that IVC has no consistent impact on student evaluation of teaching. Our results are therefore among the minority of studies that show a consistent, negative association between IVC and student evaluation scores. We acknowledge that externalities other than delivery technology not measured or accounted for here, affect student evaluations scores and therefore cannot completely attribute the results to IVC (Fleming et al., 2005).

A secondary objective was to evaluate the magnitude of the differences in evaluation scores between live and remote site students and determine if instructors were being disadvantaged by the IVC technology, and if a change in delivery mode were warranted. On average, instructors and courses received scores about 0.3 and 0.4 points lower (respectively) from students at remote sites than those at live sites on a 5.0-point scale. While statistically significant, the practical significance is probably small and may not seriously disadvantage instructors. The mean scores show that the perceived quality of teaching is very good overall (Table 1); even remote site mean scores were above 4.0 on a 5.0-point scale. Thus, it is unlikely that these scores would be viewed as poor quality teaching since they all fell within the “above average” to “excellent” range. Remote site evaluation scores were less than 0.15 points below college mean scores, and this minor difference would probably not affect annual evaluation or promotion and tenure of faculty. It should be noted that the values summarized in faculty evaluation documents are the averages of live and remote site students, not the section-by-section means as presented here. Thus, overall mean scores for courses and instructors would be virtually indistinguishable from college means. We believe that while the scores are not punitive, faculty concern is justified, and it is reasonable to wish to have scores that are truly reflective of their teaching ability. Also, it is clear that students are less satisfied when receiving instruction via IVC

than face-to-face. Thus, for these and other reasons, changes in technology may be warranted. In addition, a new student evaluation instrument that is capable of disentangling the effects of technology from instructor performance should be considered for DE courses, such as the one developed by Roberts et al. (2005).

An online platform for the degree completion programs in CALS is one potential alternative technology. Internet-based technologies generally do not have the same drawbacks as IVC, and do not require travel to IVC sites at specified times. In fact, the University of Central Florida abandoned the use of IVC several years ago after they discovered negative impacts on student satisfaction and superior online platforms to deliver their substantial portfolio of DE programs (Charles D. Dzuiban, personal communication). With respect to student evaluations, Tesone and Ricci (2008) found no significant differences in any of the 16 questions on an evaluation instrument completed by online or face-to-face student groups. A meta-analysis on this topic also showed no overall differences in student satisfaction between DE and face-to-face students (Allen et al., 2002). In another meta-analysis spanning 1985-2002, Bernard et al. (2004) separated studies into synchronous and asynchronous categories to study the effect of delivery mode on student attitudes and achievement (IVC is synchronous whereas most online platforms are asynchronous). Their analysis concluded that student attitudes toward courses were better for asynchronous than synchronous DE. Significantly, they showed that student achievement, measured by exam scores and other assessments, was higher for asynchronous than synchronous delivery. Bernard et al. (2004) also found that methodology and pedagogy had greater effect sizes than delivery platform with respect to student achievement, and suggested that the learner-centered methodology of asynchronous DE may be responsible for greater achievement than the instructor-centered methodology typically used in synchronous DE. A recent report from the U.S. Department of Education (U.S. Dept. of Ed., 2009) also suggests that students taking courses online performed better than students in face-to-face classes, with the same caveat that the methodology, not the technology per se may be the primary reason. Thus, it appears that a change in delivery platform from IVC (synchronous) to online (asynchronous), with associated changes in methodology and pedagogy may not only positively affect student satisfaction, but may enhance student achievement.

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