Western Kentucky University
TopSCHOLAR®

Architectural and Manufacturing Sciences Faculty Publications

Architectural and Manufacturing Sciences

1-2008

The Videoconferencing Classroom: What Do Students Think?

Dr. Anthony Mark Doggett
Western Kentucky University, mark.doggett@wku.edu

Follow this and additional works at: http://digitalcommons.wku.edu/arch_mfg_fac_pub

Part of the Curriculum and Instruction Commons, Digital Communications and Networking Commons, and the Instructional Media Design Commons

Recommended Repository Citation
Doggett, Dr. Anthony Mark. (2008). The Videoconferencing Classroom: What Do Students Think?. *Journal of Industrial Teacher Education*, *44* (4), 29-41.
Available at: http://digitalcommons.wku.edu/arch_mfg_fac_pub/3

This Article is brought to you for free and open access by TopSCHOLAR®. It has been accepted for inclusion in Architectural and Manufacturing Sciences Faculty Publications by an authorized administrator of TopSCHOLAR®. For more information, please contact todd.seguin@wku.edu.

The Videoconferencing Classroom: What Do Students Think?

A. Mark Doggett
Western Kentucky University

Introduction

The advantages of video conferencing in educational institutions are well documented. Scholarly literature has indicated that videoconferencing technology reduces time and costs between remote locations, fill gaps in teaching services, increases training productivity, enables meetings that would not be possible due to prohibitive travel costs, and improves access to learning (Martin, 2005; Rose, Furner, Hall, Montgomery, Katsavras, & Clarke, 2000; Townes-Young & Ewing, 2005; West, 1999). However, there are few studies that analyze the effectiveness of videoconferencing from the student's perspective. Videoconferencing technology is often touted as a method to connect with previously inaccessible student populations, but does it adequately serve the needs of the students? If given a choice, would students select videoconferencing over face-to-face instructional methods?

Purpose of the Study

The information presented in this paper addresses student perceptions regarding videoconferencing as an instructional delivery method, but the study itself came about quite by accident. The Industrial Technology Department of a small university in the Northwest was running short of classroom space for a general education woodworking course for non-majors. This shortage was

A. Mark Doggett is an Assistant Professor and Coordinator of the online Master of Science in Technology Management, Department of Architectural and Manufacturing Sciences at Western Kentucky University, Bowling Green, Kentucky. He can be reached at mark.doggett@wku.edu.

caused by increased student demand. Beginning woodworking is a popular course for students to fulfill one of their lower division university requirements. The course was typically delivered in a large lecture room with students divided into small groups for a separate laboratory experience. Under normal circumstances, an increase in enrollment would mean that extra sections would be created or that students would be combined into a large lecture classroom and divided into smaller laboratory sections. In this case; however, an additional instructor and/or classroom space large enough to accommodate all the students was unavailable. The institution was also experiencing severe budgetary constraints so maximizing available resources was paramount. The solution was to divide the students into two smaller classrooms and connect them using videoconferencing (VC) technology. The instructor taught approximately 40% of the students in a face-to-face classroom that was connected to a remote classroom holding the other 60% of the students. Students did not know that this would be a videoconference course before registering.

The goal of the delivery strategy was to provide a virtual environment as close as possible to face-to-face for the students in the remote classroom. Since the course has a large amount of visual and technical content, the delivery of this information using the VC format was challenging. The instructor had to adjust his teaching style so that students in the remote classroom could clearly see and hear him. The video and audio connection was two-way so students in both classrooms could see and hear each other as well as the instructor via large video screens. The instructor was able to present visual media and other printed material using an electronic switch that would alternate the screen image between the instructor and the visual material.

The department discussed the possibility of having the teleconferenced students switch rooms with the students in the face-to-face room midway through the semester, but this was rejected because of the potential for confusion among students and the additional workload to keep track of them. In addition, the department wanted the test the feasibility of delivering the course using this method in the future.

Instrument

In order to adequately assess VC as a technique for classroom instruction, a student survey was prepared using questions from Free Assessment Summary Tool (FAST), a web-based student evaluation site developed by Ravelli and Patz (2000-2004) and Mount Royal College (http://www.getfast.ca). Instructors using FAST select from a list of over 300 questions already tested for validity and reliability. According to Carini, Hayek, Kuh, & Ouimet (2001) self-reported information is considered valid when:

1. The information requested is known to the respondents;
2. Answering the questions does not threaten, embarrass, or violate the privacy of the respondent or encourage the respondent to respond in socially desirable ways;
3. The questions refer to recent activities;
4. The respondents think the questions merit a serious and thoughtful response; and
5. Questions are phrased clearly and unambiguously.

Given these conditions and the design features of FAST, the survey questions submitted to the students contained a reasonable degree of validity. The questions selected from the FAST database were slightly modified to include the words videoconferencing technology. Questions from the FAST database included questions about student's perceptions of the technology itself and the instructor's use of the technology. Additional FAST questions were asked to distinguish student perceptions about the instructor versus the technology. The students answered a paper version of the survey while in the classroom.

The students responded to the questions shown in Table 1 using a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Students were also asked to respond as to whether they had attended more than 75% of the lectures in this course. Finally, students were asked to rate the course (worst I have ever taken, poor, okay, good, excellent), and indicate which classroom they were assigned (face-to-face or remote). Students could also add other qualitative comments about the course.

Table 1.

List of Survey Questions
• I am comfortable asking questions using the videoconferencing format.
• I would have felt more engaged in a normal class setting.
• The videoconferencing technology is a barrier to my interaction with the instructor
• The purpose of using the videoconferencing technology is clear to me.
• The instructor uses videoconferencing technology appropriately.
• The instructor appears confident in using the videoconferencing technology
• The instructor uses appropriate media with the videoconferencing to enhance learning
• The use of videoconferencing technology in this course encourages me to continue discussions.
• The use of videoconferencing technology in this course encourages me to learn independently.
• The instructor encourages me to ask questions.
• The instructor establishes rapport with participants.
• The instructor is able to facilitate our communication.
• If I knew this was going to be a videoconferencing class, I would not have taken it.
• The instructor is able to use the videoconferencing technology required for this course.
• I would take another course that used this technology.
• I would recommend this course using this technology.

Method

On the first day of instruction, students were randomly assigned to either the face-to-face classroom or the remote classroom. The department administered the initial survey with the students about three weeks after the start of the semester. Rather than have students respond using the web-based format, students took the survey in the classroom to ensure a high response rate.

Prior to the initial survey, the VC system had many start-up problems such as dropped connections, unintelligible audio or fuzzy video. University technical support found that the majority of these problems were due to high communication volumes on the network during this particular time of day. The solution to this problem was to move the remote classroom to another location in the same building as the face-to-face classroom to take advantage of a shared server switch and reduced connection distance. Students took the same survey again at the end of the semester and the remote classroom students answered the questions from the perspective of their new location.

Results

Eighty-six students responded to the survey. One hundred percent of the students who were offered the survey responded. The results were compiled and statistically analyzed for the face-to-face (n = 30) and remote students (n = 56). Responses were also analyzed between the initial (first) and end-of-the semester (second) surveys. Forty-six responses were received on the first survey and 40 responses received on the second survey. Differences in the number of responses were due to absences or students who dropped the course before the fourth week.

The following provides the detailed results of the student survey. Ninety-seven percent of the students stated they attended more than 75% of the lectures. On the favorable side, over 90% of all students agreed that the instructor used the VC technology appropriately and encouraged the students to ask questions. Over 80% of all students agreed that the purpose for using the VC technology was clear to them and that the instructor was able to utilize the required VC technology. Over 80% of all students agreed that the instructor

appeared confident using the technology with the appropriate media to enhance learning and established rapport with the participants. Seventy-four percent of the students agreed that the instructor was able to facilitate communication using the technology. Sixty-four percent of the students agreed that they were comfortable asking questions using the VC format. See Table 2 for a summary of the favorable responses.

Table 2.

Percentage of Students Responding Favorably to Videoconferencing

Statement	Percent agreement
The instructor encourages me to ask questions.	94%
The instructor uses videoconferencing technology appropriately.	93%
The instructor establishes rapport with participants.	88%
The instructor is able to use the videoconferencing technology required for this course.	82%
The purpose of using the videoconferencing technology is clear to me.	80%
The instructor appears confident in using the videoconferencing technology.	80%
The instructor uses appropriate media with the videoconferencing to enhance learning.	80%
The instructor is able to facilitate our communication.	74%
I am comfortable asking questions using the videoconferencing format.	64%

Conversely, 80% of all students agreed they would have been more comfortable in a normal class setting and 57% of students

agreed that the VC technology was a barrier to their interaction with the instructor. Only half of the students agreed that the VC technology encouraged independent learning while 32% responded that they would not have taken the class if they had known it was going to be delivered using a videoconference format. Seventy percent of the students thought that the use of VC technology discouraged classroom discussions. See Table 3 for a summary of the unfavorable responses.

Table 3.

Percentage of Students Responding Unfavorably to Videoconferencing

Statement	Percent agreement
I would have felt more engaged in a normal class setting.	80%
The videoconferencing technology is a barrier to my interaction with the instructor.	57%
The use of videoconferencing technology in this course encourages me to learn independently.	50%
The use of videoconferencing technology in this course encourages me to continue discussions.	30%

Overall, 56% of all students rated the course as good or excellent, but only 33% agreed they would take another course that used VC technology. Only 20% agreed they would recommend this course using the VC technology.

Within Groups

For the face-to-face classroom, there was no significant difference in the responses between the first and second survey. For the remote classroom, there was a significant difference between the first and second survey. The perception that the use of VC

technology encourages students to learn independently eroded significantly (t(-2.585), p = .012, d = .34). Specifically, students in the remote classroom on the second survey were less inclined to agree that VC technology encouraged independent learning. In addition, students in the remote classroom significantly changed their opinion regarding the ability of the instructor to use the VC technology (t(2.756), p = .009, d = .37). Thus, by the end of the semester, these students agreed that the instructor was able to utilize the VC technology for the course. See Table 4.

Table 4.

Within Groups Statistical Analysis

	1st Survey		2nd Survey					
	M	SD	M	SD	*df*	*t*	*p*	*d*
The use of video-conferencing technology in this course encourages me to learn independently.	3.50	1.04	2.73	1.18	54	-2.58	0.012	0.34
The instructor is able to use the video-conferencing technology required for this course.	3.55	0.98	4.08	0.27	53	2.75	0.009	0.37

Between Groups

There was a significant difference in the responses between the face-to-face classroom and the remote classroom. Students in the remote classroom responded significantly different from the face-to-face classroom in both the first and second surveys that they would

have felt more engaged in a normal class setting (1st survey: $t(-2.571)$, $p = .014$, $d = .38$; 2nd survey: $t(-2.618)$, $p = .011$, $d = .35$). Students in the remote classroom responded significantly different than the face-to-face classroom in both surveys that that the VC technology was a barrier to their interaction with the instructor (1st survey: $t(-3.442)$, $p = .001$, $d = .50$; 2nd survey: $t(-3.661)$, $p = .001$, $d = .49$). As indicated by the effect size, this was the most important difference between the two classrooms. In addition, on the second survey only, students in the remote classroom responded significantly different than the face-to-face classroom that they were less comfortable asking questions using the VC format ($t(2.039)$, $p = .046$, $d = .27$) and that the instructor was less likely to encourage questions ($t(2.624)$, $p = .011$, $d = .34$). See Table 5.

Summary

Overall, the student responses pertaining to the instructor's use of the VC technology and his personal teaching skills were positive. Over three quarters of the students understood that the reason for using the VC technology was to satisfy the demand for the course and utilize existing classroom space.

It is interesting that a strong majority of students agreed they were comfortable asking questions using the VC format, but the remote classroom responses were significantly different with regard to their comfort and perceptions of interactions with the instructor at the end of the semester. This is verified by the remote students' responses that indicated that the VC technology was a barrier to their interaction with the instructor. Their normal comfort level with the learning process was disrupted by not having an instructor in the same room. The remote classrooms' perceptions of the technology also affected their perceptions of how to learn using the VC format as indicated by their changing response over time regarding the ability to learn independently. At first, it appears they blamed the

Table 5.

Between Groups Statistical Analysis

1st Survey	Face-to-Face Classroom M	SD	Remote Classroom M	SD	*df*	*t*	*p*	*d*
I would have felt more engaged in a normal class setting.	3.56	1.15	4.37	0.92	44	-2.57	0.014	0.38
The video-conferencing technology is a barrier to my interaction with the instructor.	2.63	1.08	3.73	1.01	44	-3.44	0.001	0.50
2nd Survey								
I would have felt more engaged in a normal class setting.	3.60	1.12	4.35	0.97	54	-2.61	0.011	0.35
The video-conferencing technology is a barrier to my interaction with the instructor.	2.83	1.05	3.85	1.00	54	-3.66	0.001	0.49
I am comfortable asking questions using the video-conferencing format.	3.80	1.09	3.19	1.13	54	2.03	0.046	0.27
The instructor encourages me to ask questions.	4.50	0.50	4.12	0.58	54	2.62	0.011	0.34

instructor for this lack of engagement and then gradually realized that it was their perception of the technology. According to Hogan (1992), the relationships between people and their individual and collective attitudes toward technology is an important part of socio-technical development and must addressed during this type of endeavor.

In spite of the initial technical difficulties and negative perceptions towards the technology, over half of the students thought the course itself was good. Since this course included both a lecture and a lab, their responses may have also included perceptions of the lab experiences. Two-thirds of the students seemed to prefer face-to-face formats and only a small majority would recommend this as a VC course. Yet, all the students registered for the course thinking it would have a face-to-face lecture component. If these students had known in advance regarding the VC format, course ratings might have been higher. Yet, the overall course ratings were higher than expected. Over 15% of the students rated the course as excellent.

To test the impact of VC technology on student performance, the department compared the test scores of the previous semester to the test scores of this videoconference class. No significant difference between test scores was found between the videoconference and face-to-face courses on either mid-term or final exams. Thus, it appears that the video technology did not affect the attainment of the course content, but did have an impact on student perceptions. If given a choice, students prefer face-to-face interaction with an instructor.

Conclusion

In terms of achieving the goal of offering additional seats to students while utilizing available classroom space, the VC technology did what it was supposed to do. However, its success was predicated by the availability of a VC classroom and adequate bandwidth—each of which requires a significant capital investment. For the long term, if videoconferencing of both local and remote classes were held on the same campus, it would probably be cheaper to construct additional classrooms or rent classroom space. Alternatively, for off-campus learning, this technology has good potential.

The following are personal observations and lessons learned from the experience. First, the ability of the instructor to adapt and learn new teaching techniques using this technology is critical to its success. In this case, the instructor's calm personality and good sense of humor helped develop positive student attitudes about the

technology while reducing their frustration with technical difficulties. In addition, the willingness of the instructor to work outside their comfort zone was a valuable contribution. Second, the rapid response from VC technical support staff was valuable in diagnosing and improving the delivery of the course. The support staff made many behind-the-scenes adjustments and good suggestions that were transparent to students during the process. Without support staff interest and technical follow-up, the delivery of the course using a VC format would not have been possible. Third, the patience of the students, their willingness to try something new, adapt their learning style, and maintain a positive attitude was important during the process.

In conclusion, videoconferencing as a format for courses that have large amounts of technical content or visual demonstration is worth pursuing. Videoconferencing is closest to a face-to-face experience for students in remote locations. The primary concern raised by students in this study was the perception that the VC technology was a barrier to their interaction with the instructor. If this concern can be addressed in future applications, the technology has merit. The other limitation of this format is that it requires good network connections, large video displays, and a willingness of the instructors and students to work with it and have patience through technical difficulties. It requires an investment of time and money. Savings are achieved through reduced travel time and costs, improved equity of access, and, as this study also demonstrated, short-term classroom space utilization.

References

Carini, R. M., Hayek, J. C., Kuh, G. D., Ouimet, J. A. (2001). *College Student Responses to Web and Paper Surveys: Does Mode Matter?* Conference paper presented at the AIR Forum, June 3-6, 2001, Long Beach, California.

Hogan, C. (1992). Confessions of a change agent-Introducing videoconferencing at Curtin University of Technology. *Training & Management Development Methods, 6* (5): 507-525.

Martin, M. (2005). Seeing is believing: The role of videoconferencing in distance learning. *British Journal of Educational Technology*, 36 (3): 397-405.

Ravelli, B. & Patz, Z. (2000-2004). FAST-The Free Assessment Summary Tool. Mount Royal College, Canada, Retrieved October 10, 2007 from http://www.getFAST.ca.

Townes-Young, K. L, & Ewing, V. R. (2005). Creating a Global Classroom. *T.H.E. Journal, 33* (4): 43-5.

Rose, D. A. D., Furner, S., Hall, A., Montgomery, K., Katsavras, E., Clarke, P. (2000). Videoconferencing for Speech and Language Therapy in Schools. *BT Technology Journal,* Jan; 18, 2000: 101-105.

West, G.B. (1999). Teaching and technology in higher education: Changes and challenges. *Adult Learning,* Summer 1999, 10 (4): 16-18.