

AN ASSESSMENT OF INTERACTIVE VIDEO TELECONFERENCE SESSIONS
BETWEEN THE UNITED STATES AIR FORCE ACADEMY
AND THE UNITED STATES NAVAL ACADEMY

David T. Lawyer
Department of Economics and Geography
United States Air Force Academy
Colorado Springs, Colorado

Dennis J. Whitford
United States Naval Academy
Annapolis, Maryland

David R. Smith
United States Naval Academy
Annapolis, Maryland

Brian E. Heckman¹
United States Air Force Academy
Colorado Springs, Colorado

1. INTRODUCTION

During the past three spring semesters, 1999-2001, Heckman et al. (2000) designed, planned, and conducted a series of video teleconference (VTC) teaching sessions between the United States Naval Academy (USNA) and the United States Air Force Academy (USAFA). This teaching method was first introduced and explained at the 9th Symposium on Education at Long Beach, California in January of 2000. Due to the success of our VTC sessions in 1999 and 2000, improvements were made to the VTC teaching process at the USNA and USAFA during 2000-2001 by purchasing new equipment, utilizing larger and more efficient rooms, expanding teaching techniques, and increasing our number of VTC sessions.

This paper and the accompanying presentation will illustrate the physical layout and structure of the sessions, discuss student feedback from the USAFA cadets and USNA midshipmen, describe the lessons learned on behalf of the instructors, and most importantly, describe the future implications and challenges of this exciting new technology for the classroom.

2. STRUCTURE OF THE VTC SESSIONS

The VTC sessions were conducted as an enhancement to a USAFA independent study Meteorology 499 (Meteor 499), senior-level Geosciences course entitled *Applications of the Geosciences to Joint Naval and Air Force Operations*. The course focused on the applications of meteorology and oceanography to Air Force and U.S. Navy (USN) operations with a minor block of instruction addressing the support that USN oceanographers and meteorologists provide to carrier groups. The class also focused on marine meteorology with special emphasis on ocean sea and swell forecasting. These topics required expertise in the field of oceanography, so the USAFA elected join a USNA Honors Waves and Tides (SO516) class via VTC. Approximately 25% of the Meteor 499 course was conducted using VTC. The sessions taught by USNA consisted of 2 two-hour problem-solving classes and 5 fifty-minute lecture and discussion classes. Since the Meteor 499 class was

“sitting in” on the USNA oceanography class, CAPT Whitford, the USNA instructor, supplied the USAFA cadets with the same material that was available to the USN midshipmen. This included textbooks, supplemental handouts, homework assignments, and exercises. In addition to the USNA sessions, one 50-minute question and answer session was also conducted with the United States Coast Guard (USCG), and 2 fifty-minute sessions were taught by the USAFA to a USNA senior-level, independent study meteorology course on aviation weather hazards.

Due to the success of our VTC sessions in 1999 and 2000, both the USNA and the USAFA made major improvements to their respective VTC environments. The USNA relocated their VTC equipment to a 30 ft x 40 ft room equipped with a Polycom Viewstation 512 system capable of ISDN and IP connections. Two monitors were placed at the rear of the room with one providing a view of the distant site and one providing a view of what was being transmitted from the USNA site. A Samsung SVP 6000 document camera, laptop computer, overhead projector, projection screen, omni-directional table microphone, Sony DXC 539 broadcast camera, Dukane 8900 LCD projection system, and whiteboards completed the equipment suite. Equipment layout is illustrated at the URL provided with this preprint.

The USAFA purchased a VTEL Galaxy 5500 learning center for approximately \$25K-\$30K. The mobile Galaxy 5500 system, capable of 384 Kbps, included a wireless remote and keyboard, SMARTTrack voice-tracking system, real-time video/audio and live data collaboration. In addition, the Galaxy 5500 handles all audio and video protocols.

The well-equipped USAFA VTC classroom was set-up in a conference style setting. The classroom consisted of table microphones, two large monitors at one end of the room—one for viewing the distant USNA classroom and one for viewing the USAFA classroom—plus white boards, computer and network (Internet) access, video-cassette recorder (VCR), document viewer, and one mobile and two stationary cameras. An instructor workstation, which housed a laptop computer, VCR, and document camera, was conveniently located opposite the monitors near the white boards (access the URL

provided with this preprint for visuals of the layout). The mobile camera provided for close-ups of images from the document camera and offered a means to view the instructor and the materials presented from the computer (Internet, Microsoft Powerpoint presentation, etc.). Instructors who use these various types of multimedia will find a relatively easy transition to VTC.

3. STUDENT AND INSTRUCTOR FEEDBACK

3.1 From the students' perspective. Evaluation data was collected from both the cadets and the midshipmen during the 2001 spring semester. Some student comments included the following:

- (USNA) My experience with VTC is positive, but I don't think it is as efficient as normal class time. It is a great tool to be able to use an expert from anywhere.
- (USNA & USAFA) I didn't think the VTCs were as interactive as they could have been.
- (USAFA) The VTCs with the USNA were very helpful and informative. I felt I was part of CAPT Whitford's class.
- (USAFA) Not much dialogue at all between the cadets and the midshipmen until the last few sessions.
- (USNA) Personally, I did not feel comfortable in the VTC environment at first because I was "on camera," but the discomfort did lessen as I got used to it.
- (USNA) I thought the experience of working with the USAFA was interesting. I thought the USAFA cadets got more out of the learning experience than we did.

Other common comments from the USNA included: "faster pace than normal" and "talked louder than normal." Several students (both USNA and USAFA) mentioned the fact that the white boards were hard to see, especially from the USAFA classroom. Overall, the feedback from the students was positive. USNA students were slightly more negative because they felt they gained nothing from USAFA. In fact, they perceived they lost quality because they had to share the instructor with a distance learning group. The USAFA cadets, on the hand, were mostly just "listening in" and were overwhelmingly positive in their comments. They felt they were receiving information from an expert that they otherwise wouldn't have.

3.2 From the instructors' perspective. CAPT Whitford, who taught the majority of the sessions from the USNA, provided the following valuable feedback on the VTC environment:

- I think VTC teaching would work better with "talking head" type presentations, e.g. a lecturer talking about a non-technical subject. There are less equations and complex spatial and temporal relationships to present and learn. In a technical course, a teacher needs to see the "body language" of the students so as to decide whether to return and repeat a previous and not understood topic, perhaps with a different approach. I'm not saying

technical courses can't be done, I just perceive higher learning success rates for non-technical courses.

- I enjoy using it (VTC), however few USNA faculty have expressed interest. I held an open USNA faculty seminar on the topic and very few people came to view it.
- I find it takes much more work to conduct VTC teaching as opposed to conducting a traditional lecture. For example:
 - ▶ Dates, times, and VTC studio and cameraman reservations must be coordinated well in advance between the sites.
 - ▶ Textbooks and other hard copy materials must be mailed to the distant site in advance.
 - ▶ Difficult to assess student reaction at the distant site using the TV monitor.
 - ▶ Instructor must continually monitor his home site TV monitor to ensure the camera is focused on the correct material.
 - ▶ Instructor needs to coach the cameraman to the next location to view (e.g. whiteboard, projection screen, document camera, or the instructor) so as not to slow the presentation waiting for the cameraman to catch up.
 - ▶ VTC malfunctions, such as loss of audio, are much more challenging to recover from than any typical malfunctions experienced in a standard classroom.
 - ▶ Difficult to observe student's whiteboard work at the distant site.
- Most of my students didn't like it the experience because they felt they received less attention than when I just taught them without the USAFA group.

In contrast to CAPT Whitford, Major Dave Lawyer and Dr. Brian Heckman from the USAFA found it was no more difficult preparing for a VTC lesson than a normal classroom lecture. Some of their comments included:

- Since we already use Powerpoint, animations, graphics, and the Internet in our normal meteorology classes, little additional preparation was required for the VTC aviation weather sessions presented to the USNA.
- Based on earlier feedback from the cadets on the sessions taught by CAPT Whitford, we tried to make the two VTC sessions we taught, more interactive, often times making a special effort to call on the midshipmen (specifically by name) while at the same time making sure we didn't ignore the cadets in our classroom. We found this took more of an effort and felt the content of the class may have suffered.

Dr. Smith, the USNA instructor for the independent study course, made the following observation:

- The students involved in this course were primarily interested in aviation applications of meteorology. They generally enjoyed the VTC experience, particularly the use of graphics of pertinent case studies. All noted the potential

of this interactive technology for teaching and learning

- Prof. Smith appreciated the flexibility of the VTC system as a mechanism to open the classroom to the world. However, the current technology at USNA is somewhat of a problem. With improvements in technology and more practice with the equipment, VTC will offer a tremendous opportunity tool for expanding teaching capability.

4. LESSONS LEARNED

Over the three-year period, we continued building on the previous year's experiences. With more than 30 VTC sessions completed, several common practices or lessons learned have evolved:

- Because of the two-hour time zone difference, it was often difficult to coordinate the USAFA class schedule with the USNA class schedule. We adopted the protocol that those "sitting in" on the class adhered to the schedule of those "teaching" the class. Of all the challenges with conducting the VTC sessions, we feel scheduling was one of the most difficult.
- Small group exercises that the cadets and midshipmen worked on were most effective when both the USNA and USAFA divided into their own groups, then discussed their results with both classes. We attempted, on at least two occasions, to conduct problem-solving exercises consisting of USNA-USAFA students where they "discussed" the problem and solutions using the VTC link; however, in both situations, their conversations were distracting to the other teams at both ends of the link.
- Instructors should carefully consider the learning outcomes desired by using the VTC links for their courses before proceeding further with efforts required.
- All instructors and students agreed that our students gained much from the interactions (although limited) with each other and the content provided during the Honors Waves and Tides course, the USCG session, and the aviation weather VTC sessions.

5. CONCLUSION AND FUTURE CHALLENGES

Over the past three years, we had the unique opportunity to work with the VTC method of teaching for a Meteorology 499 independent study course. From the spring of 1999 through the spring of 2000, the USAFA and USNA conducted 20 VTC sessions, 90% of which the USAFA was on the "receiving" end. However, on

two occasions during the spring of 2001, the USAFA did have the opportunity to experience the "teaching" aspect of VTC to the USNA. Over the course of the three years, several improvements were made to room settings and equipment as well as adapting one's teaching style to the VTC environment. The authors also collected valuable feedback from the cadets and midshipmen during two of the three years in order to improve on the VTC teaching/learning experience. Overall, the cadets and instructors were very impressed with the technology (although it did fail at times!) and what VTC had to offer to the academic environment. However, the biggest complaint/comment from almost everyone was the lack of interaction between the students. The students wanted more interaction...they wanted to know more about each other...they wanted to feel more a part of the group. As is often the case in our own classrooms, it's difficult to make sure all (especially on the far end!) students are involved in the learning process.

VTC teaching is by no means the ultimate answer for our problems encountered in teaching today's students, but based on the authors' experiences, along with feedback from our students, VTC teaching does bring in subject matter experts not normally available. It also offers expanded educational opportunities in line with the ever-expanding field of distance learning.

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6. REFERENCES

- Heckman, B.E., Whitford, D.J. and Lawyer, D.T., 2000: Teaching geoscience courses collaboratively using compressed videoconferencing technology: An experiment conducted between the USAFA and the USNA. Paper presented at the Proceedings of the Ninth Symposium on Education, American Meteorological Society, Long Beach, CA.