

TANDBERG



The New Way of Learning
Education Video Guide

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Distance Learning & Your Classroom

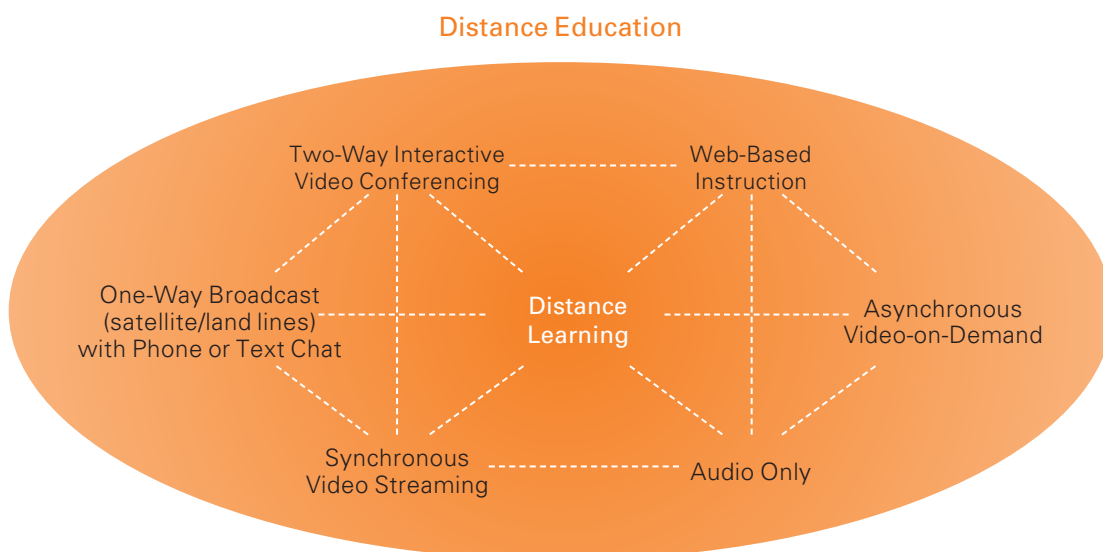
How can schools use developing technology to create a climate of learning that inspires and motivates students while supporting teachers in their challenging roles as educators? How can technology help reshape and transform education to keep up with the expanding and complex world in which our children live?

Interactive distance learning opportunities and the video communication equipment that makes them possible are the keys to growing classroom opportunities for students and teachers alike. Distance education enables students and educators to encounter people, places and situations in ways that traditional classroom staffing and curriculum cannot easily, and in some cases ever, support. Video communication is one solution for addressing the growing concern of equitable education and opportunities for all students, regardless of geographic location and socio-economic circumstances.

This guide defines video communication, common applications and successful models and tools that may be useful in evaluating readiness and developing effective instruction. We believe you will agree that distance education and video communication, in particular, are truly viable answers to providing much-needed quality learning anywhere, at any time, for anyone, at any level.

What Are Distance Education and Video Communication?

Distance learning is what occurs when knowledge is transferred from one person or source to a recipient or learner by one or any combination of the following technologies: Online, web-based instruction, synchronous video and asynchronous video. Depending on the content and learning objectives, it may be possible, or preferable, to use multiple technologies to achieve the desired distance learning outcomes. More and more video communication providers today have incorporated a blended solution, using multiple technologies in order to enhance the learning experience and provide a vehicle for accessing support materials before, during and after a learning event.





This guide addresses video communication, which most closely simulates a traditional face-to-face environment. Participants at all locations are able to see, hear and interact with each other simultaneously. There are a variety of different systems that can be used to accomplish this, depending on the desired learning outcomes. For example, a personal system may be preferred for meetings and administrative purposes, and a mobile solution might be more conducive to group exchanges or classroom locations. It is possible to upgrade systems to be used for instruction delivery with the addition of appropriate peripherals and tools, but in many cases a dedicated-room system would be most appropriate for large groups and instruction delivery. The essential point is that the technology has evolved such that there are numerous applications and uses of video in an educational environment, depending on the goals of each project.

Why Embrace Distance Education?

Distance education is not intended to replace traditional classroom teaching, but instead compliment it in ways that help students better grasp, understand and apply knowledge. Through video communication, learners actually enter the world they are learning about — all through the use of convenient and flexible video communication technology.

Challenges facing school districts and educators are vast and often daunting. State and district budgets are being slashed, which can mean deficiencies in staffing, inability to offer required courses and increased difficulty in obtaining professional development training. This is troubling in light of federal and state government mandated initiatives like No Child Left Behind (NCLB), which hold educators more accountable for learning. Many schools are in rural areas and lack the resources they need to most effectively educate students. Managing and overcoming these obstacles is achievable with the adoption and implementation of distance learning technology.

In addition to these very real issues that educators face daily, another looming reason exists to embrace distance learning. The bipartisan, congressional Web-based Education Committee observed:

“Today’s education is built on an agrarian model that worked in the years when we were a nation of farmers, foresters and fishermen. Schooling changed to take on elements of the industrial revolution (factory-line classes, assembly-line curriculum and teacher-foremen) and that worked for the needs of the Industrial Age. New designs are needed to create the “knowledge workers” who will define the Information Age.”

Today and into the future, we recognize that employers in a global economy are demanding workers who can collaborate using technology to solve real-world problems. Therefore, the answer to achieving educational excellence, combating the day-to-day issues that educators face and introducing students to technology lies in integrated, flexible distance learning opportunities.

What are the Benefits of Interactive Video Communication?

Video communication offers a variety of benefits to those who embrace and utilize it:

Student Benefits

- Establishes a dialogue and exchange of ideas between students, educators and subject-matter experts who have different viewpoints, experiences and strengths
- Extends educational resources into locations where few exist due to location or funding
- Prepares students for a future as global citizens, proficient in emerging technologies
- Addresses multiple learning styles when distance learning is combined with traditional methods of instruction
- Enables homebound or off-campus students to remain included and engaged
- Enables advanced or special needs students to take advantage of learning opportunities that the school alone cannot provide due to a lack of staffing, funding or expertise
- Provides students the opportunity to collaborate with peers from many cultures and communities

Educator Benefits

- Adds a personal relationship element back into teacher/student interaction in distance learning applications
- Combats teacher isolation for educators in remote regions, educators who are the only subject-matter expert in their school or early-career teachers who need mentoring
- Allows for timely, convenient, professional development that does not incur time away from the classroom, personal travel time and additional expenses associated with travel
- Increases interaction with colleagues
- Provides access to resources and information not traditionally available, resulting in more relevant and engaging learning experiences

School District & Higher Education Institution Benefits

- Provides educational equity for schools and campuses that are isolated due to funding or location
- Supports state and federal teacher and student performance requirements
- Provides experiences that schools might not have had access to through traditional field trips
- Enables team teaching and collaboration between institutions
- Can be used for administrative purposes such as planned and ad hoc meetings, which result in reduced travel time and expense and less time away from classroom/building
- Expands curriculum offerings and increases numbers served
- Enables schools, universities and consortiums to share resources and the cost of those resources
- Demonstrates a district's commitment to providing unique and equitable learning experiences
- Supports "Green Plans" and sustainability efforts

Informal Training Institution Benefits (Content Providers)

- Supports and expands outreach mission
- Exposes students and educators to educational programs offered that the schools might not have access to without video communication technologies
- Provides a vehicle to build comprehensive learning experiences that extend beyond an on-site event and that support other offerings
- Offers another way to market on-site events and bring people to the institution
- Provides additional revenue stream
- Increases public awareness and reach internationally

Interactive Distance Learning Applications

In almost every case, interactive distance learning applications can be categorized into four broad categories: course delivery, professional development, curriculum enrichment and collaboration and information sharing. While many schools decide to invest in video communication for a specific need, it doesn't take long for them to identify many additional uses that add more value to the cost/benefit bottom line.

The following section describes these applications in further detail and highlights school districts and consortiums with exemplary programs.

Case Study

The Office of Distance Education at the Arkansas School for Mathematics, Sciences and the Arts

Contact: Chris Robbins, crobbins@asmsa.org

Challenge: With an estimated population of 2,855,390 spread over some 52,068 square miles, Arkansas's population density ranks significantly below the national average. The large number of rural schools that exist as a result presents significant challenges to the state and local education officials charged with ensuring all students have access to a broad, high-quality curriculum, and to the state legislators who are constitutionally mandated to ensure that all Arkansas schools are adequately funded and offer substantially equal academic programs.

Solution: The Office of Distance Education (ODE) at the Arkansas School for Mathematics, Sciences and the Arts (ASMSA) was founded in 1998 to provide rural Arkansas school districts with a means of offering high-quality, affordable educational opportunities to their students. The program served 228 students in its first year of operation, providing courses in Spanish and mathematics.

Results: Today, ODE is a comprehensive K-12 distance education provider offering schools nationwide real-time, compressed, interactive video courses in virtually all disciplines. A not-for-profit part of the University of Arkansas system, the program currently serves more than 3,000 public, charter and private school students in the United States, and in 2008 began delivering coursework internationally to St. George's Church of England Primary School in Birmingham, England. Regionally accredited by the North Central Association Commission on Accreditation and School Improvement (NCA CASI), the Office of Distance Education at the Arkansas School for Mathematics, Sciences and the Arts is also a college board-approved distance learning provider of AP[®] courses. The program employs an exceptional faculty of more than thirty full-time distance educators who have won four awards in the last three years from the United States Distance Learning Association. To assist our partner schools in obtaining the equipment needed to receive compressed, interactive video programming, ODE also operates an active grants office that has worked closely with TANDBERG's National Grants Office to prepare grant applications that have provided schools with some \$6,000,000 in distance education equipment in the last five years.

Course Delivery

Many schools, universities and consortia use video communication to deliver semester-long courses. In some cases, this could be advanced middle school students taking a high school course or high school students taking traditional, advanced placement or dual-credit courses from a partner school, college or university.

In many cases, it is more cost effective to adopt video communication as a solution to providing needed courses where there are few students or scarce resources available than by transporting those students off campus, and in some cases across county lines, or by hiring another teacher. That is not to say that interactive distance learning is a way to replace teachers, rather it is a means to better leverage the teachers already in place. In some cases, distance education better serves students by providing courses and curriculum that currently aren't being offered to them because of few students, limited funds and few highly qualified teachers. Organizations can bring in new course offerings that support specific ability levels, interests and career paths.



Higher Education

Most colleges and universities extend their reach by offering courses through video communications in outlying areas, thus increasing total enrollment. Often, these video courses are delivered in tandem with online materials. Today's higher education students require more than the traditional, residential college education. They want to be able to access course content anywhere, anytime. The flexibility of taking courses away from the main campus via distance learning often makes the difference in whether a student completes a course of study or not. Being able to access video course content on demand and view it from their mobile devices, laptops or phones is another option that is rapidly being demanded by higher education students. When students can access class presentations, lectures and materials anytime, they have the ability to make better use of class and study times.

Content for Secondary-Level Course Delivery

It is perhaps the most challenging to find available secondary-level content for course delivery via interactive distance learning. No known national clearinghouse exists that lists all providers of course content or schools that are currently engaged in this exchange, nor those who are looking for other school partners. This is due in part to the fact that each state has its own graduation requirements, teacher accreditation requirements and academic content standards, and many K–12 schools try to coordinate these efforts on a more regional or state level. Some states that share courses between districts include Wyoming, Oregon, Wisconsin, South Dakota, North Carolina, Alabama and Arkansas. At present, Arkansas is the only state delivering IVC high school courses across state lines. With National Board Certified teachers, this may become a more common practice.

Following are a few suggestions as to how one can go about finding interactive distance learning courses and collaborating partners.

- Contact the State Department of Education to see if there is a state effort to coordinate the sharing of courses via interactive distance learning
- If your state has a regional Education Service Center, see if they are aware of any courses being shared inter/intra district(s) as well as possible higher education partners
- Form a consortium of multiple districts with the understanding that each partner district must contribute at least one distance learning course. Once the consortium is formed, then the work begins to match course demand with course availability
- Encourage teachers to attain National Board Certification so that you can partner with districts outside your state
- Check for secondary classes by searching by subject on the CILC Class Bulletin Board: http://cilc.org/c/education/classes_bulletin_board.aspx

Case Study

ECORS (Expanding Options for Rural Students) Southern Oregon Education Service District

Contact: Jay Matheson, jay_matheson@soesd.k12.or.us

Challenge: Southern Oregon ESD serves 13 school districts, over 100 buildings, 3,500 teachers and over 50,000 students across three rural counties — a 10,600 square mile geographic area. Poverty and distance often mean that students in some of SOESD's most rural schools have limited educational options. Many of these schools have higher-than-average dropout rates while others have low female enrollment in science, math and technology courses.

Solution: In 2005, SOESD was one of only 46 applicants selected for funding from the USDA Rural Development Distance Learning and Telemedicine Grant Program. SOESD's expanded network features the use of a TANDBERG custom, anchored, full-featured mobile IP video conferencing equipment package at eighteen elementary schools (K–6), three middle schools (6-8) and five combination junior/senior high schools (7–12). Using mobile Interactive Video Conferencing (IVC) equipment enables every room in each school to be a potential distance education end user. Innovative online support and training rewards teacher participation with EBUCK\$ that they can "spend" from an IVC Content Dollar Bank at the Center for Interactive Learning and Collaboration (CILC).

Results: In addition to new IVC high school courses now offered each year that enhance the learning options for hundreds of high school students, elementary and middle schoolers have, for the first time, gained access to the world of IVC curriculum enrichment. Virtual connections with scientists, engineers and other professionals have motivated and inspired students across the region. A pioneer in IVC use, Merrill Elementary School in rural Klamath County recently received the Celebrating Student Success Award for the second year in a row. This award is presented to select schools throughout Oregon where students perform and achieve at an exceptionally high level. Regarding the use of IVC at Merrill, Larita Ongman, principal, put it this way: "The students have shared their trips with their families. And, through the families, the whole little community knows about their trips to Hawaii, Australia and even Ann Arbor, Michigan. This is a wonderful program for our rural children. One of the reasons that IVC has worked so well is because of the assistance and support our teachers have received from the ESD."

Professional Development

Educators are required to obtain a specified number of professional development hours to maintain their certification, district requirements and NCLB requirements. This training may be internal to the district, such as training delivered by the central office or Regional Educational Service Center, or it could be external, which requires traveling to an off-site location or conference.

Traditionally, getting these hours may include costly travel expenses, loss of personal time and, most likely, a loss of classroom instructional time. All of the above have financial implications.

With interactive distance learning capabilities, educators may now access university continuing education and professional development programs at home or school at any time that is convenient for them. Additionally, many school districts are finding that they are able to stretch their professional development dollars a bit further because now that they can pull in expert resources remotely and save on the travel, lodging and travel time of presenters as well as share these programs with multiple schools or campuses and distribute the associated costs accordingly.



Content for Professional Development

The promising news about professional development content is that any individual or group that delivers content can become a distance educator. Information and materials that a school receives about off-site training should be kept and topics of interest noted. Schools are encouraged to make contact with the training source and inquire if they would consider conducting a training session via interactive distance learning. Should the training source not have its own videoconferencing equipment, it may be possible to find them a 3rd party location willing to allow them to use their facility and video communication technology for a fee or, in some cases, a bartered arrangement. Many subject-matter experts are pleased to find a way to minimize their time and travel commitment while still receiving payment for their services.

Tips for finding content and engaging in interactive distance learning professional development include:

- One of the best places to find a large collection of nationally recognized presenters is through the Professional Development Marketplace at www.cilc.org
- Approach outside training vendors and groups about their willingness to conduct training via interactive distance learning
- If there is a training resource applicable to the training content but does not have the required hardware or network for video conferencing, approach the local Service Center. It is possible the center may allow the trainer to use its equipment to conduct the training, and even possible that educators within that school district might be in need of similar training and could possibly participate as well. Most colleges and universities have video communications equipment. Contact the Distance Learning or Information Technology Department to inquire about access to their facilities
- Share the information with other schools within your district should they want to be involved in the training session and help share the cost
- Additional sources such as colleges, universities, libraries and public videoconferencing facilities can also serve as remote host locations for professional development presenters

Curriculum Enrichment

Curriculum enrichment is one of the most common uses of interactive distance learning. But we're talking about more than just a fun, feel-good program. Interactive distance learning programs taking place today are highly interactive, engaging and aligned with state and national academic content standards. Many of them are offered with comprehensive resource materials that assist classroom teachers in preparing students for the conference and reinforce core concepts being taught. There are two general categories of curriculum enrichment: programming offered by Content Provider Organizations and Teacher-Initiated Collaborative Projects.



Content Provider Organizations

Many arts, cultural, science, healthcare, government and community organizations have invested in video communication technology to better serve their mission and provide educational outreach programs to K–12 students on a regional, state and national basis. In some cases, these providers offer predesigned and packaged programs that are general curriculum offerings. Some higher education institutes have become content providers, using their intellectual resources to reach out to primary and secondary students. Content provider programs are usually offered on an “on-demand” basis and have support media and resource materials developed and available to classroom teachers. In almost all cases, these programs are aligned with national or state academic content standards, which are typically communicated on resource materials. There are some content providers who are willing to customize a program in order to better meet the specific needs of educators and support their curriculum. In fact, many now offer a view-only option so more students can share the experience.



Case Studies

Center for Puppetry Arts

Program: Anansi the Spider: A West African Folktale

Kinesthetics, dramatic play and brilliantly colored shadow puppets highlight the beloved African folktale character, Anansi, in this engaging program. As a culminating activity, all students engage in a hands-on activity by creating their very own Anansi shadow puppet.

The Cleveland Museum of Art

Program: Angles and Answers: Origami and Math

Students reinforce their knowledge of the vocabulary of geometry and recognize attributes of two- and three-dimensional shapes through an examination of selected geometric-themed works from the museum. Concepts are applied as students create an original origami figure in the shape of a ladybug during the videoconference.

NASA Ames Research Center

Program: Line Up With Math

How do air traffic controllers use proportional reasoning and distance-rate-time relationships to get airplanes to their destinations safely and on time? This program will show students how to apply proportional reasoning and distance-rate-time relationships to change plane routes and speeds, in order to bring planes to an intersection safely and on time.

National Science Center

Program: Careers in Math

Have you ever thought, “Why do I have to learn this?” The goal of the Careers in Math Program is to help students gain a better understanding of how “all that math” they learn in school is used in a variety of careers.

Each professional explains how they use mathematics at work. During the second half of the program, students have the opportunity to ask specific questions of the panel members.

New York Hall Of Science

Program: Chemistry Demonstration

Have you ever seen a balloon smashed into tiny pieces by a rock or someone making ice in less than thirty seconds? It may sound impossible, but these are just a few examples of experiments students will see live during the New York Hall of Science’s chemistry demonstration.

Royal Tyrrell Museum

Program: Secrets of the Lost Quarry

Journey into the Canadian Badlands and uncover an excavation site forgotten by paleontologists almost 100 years ago, without leaving your classroom! Collect and study the evidence in an effort to find the quarry location, and then discover who worked there and what they found. It’s an interactive adventure you’ll not soon forget!

Teacher-Initiated Collaborative Projects

There are many educators who are initiating their own interactive distance learning programs. In some cases, these educators are contacting potential content providers to see if they would be willing to connect with their class and share a particular resource or expertise, based on specific content being taught in the classroom. A rapidly expanding area of distance learning, class collaborative projects are an ideal way to help students become global citizens. It is quite easy to connect your class with a class across the country, or across the world, to work on a subject area of common interest. To view collaborative project opportunities or to post your own collaborative project ideas, visit the Collaboration Portal on the Resources page of the TANDBERG website — www.tandberg.com/education. In other cases, educators are designing their own programs to offer to other schools. Many times, the students are involved in the content design and delivery, which displays a high level of understanding and content mastery.



Stamford High School

Stamford, TX

Contact: Tommy Bearden,
bearden@esc14.net

Students from Stamford High School researched, prepared and produced a Virtual Field Trip that reinforced fundamental knowledge students already have in geography, history and science, while giving students hands-on insight into cotton and the growing/ginning process and the importance of this industry. A website was created to post resource materials and a packet of manipulatives was mailed to all participating schools.

White Plains City School District

White Plains, NY

Contact: Jody Kennedy,
jkennedy@wpcsd.k12.ny.us

Jody Kennedy, in conjunction with other teachers and students, created the Global Run Project to raise awareness and aid a village in Kenya with access to clean drinking water.

Global Run is a community of students and teachers engaged in international service-learning. Currently, participants from fourteen countries are using advanced technology to exchange information and ideas concerning relevant world issues. Teachers from participating countries are creating interdisciplinary lessons that reinforce the concept of learning through service.

Annual Contest

Recognizing the enormous amount of learning that occurs when users create their own content to share via interactive video communications, TANDBERG sponsors the Kids Creating Community Content (KC3) Contest with The Center for Interactive Learning and Collaboration (CILC). For more information on the contest, visit <http://kc3.cilc.org/index.html>.



Content for Curriculum Enrichment

Several content provider resources exist for schools to find content for curriculum enrichment programs. Some resources have minimal access fees given the nature and depth of the service, while others are free of charge. The quality and quantity of information varies between resources because of infrastructure capabilities and whether the service has dedicated resources to manage and update program information so that it is current. Some resources link directly to the content providers' websites. This is helpful when needing additional information, but can be challenging when trying to locate initial distance learning information for the first time on some comprehensive websites.

Key elements to look for in interactive distance learning content resources:

- Easy-to-use and find information
- Current information
- Interactive distance learning programs aligned with national or state academic content standards
- Educator/peer feedback about the relevance and quality of content within program directories
- Video clips posted online for viewing prior to program registration
- Dedicated resources to support distance educators
- Information about any supplemental materials available to prepare students for programming
- Other value-add services that support students and educators (i.e., collaboration listservs, specialized content offerings and discounts, professional development, etc.)

Interactive distance learning content and collaboration resources:

Source URL

Center for Interactive Learning and Collaboration www.cilc.org

New York Institute of Technology Enterprise Zone www.nyiteez.org/providers.htm

ATT Knowledge Network Explorer www.kn.pacbell.com/wired/vidconf/vidconf.html

Connect2Texas www.connect2texas.org



Special Services and Information Sharing

Video communication technology is being used in schools, universities and collaborating organizations for a variety of community-based and administrative purposes. In some cases, meetings and planning sessions are conducted in order to save on travel time and cost, as well as to encourage greater participation while maximizing efficiency and productivity. In higher education, video communication is being used to monitor student teachers in the field, defend dissertations and recruit new students. Busy board members are connecting with each other via personal desktop video solutions.



Educators are creative in how they plan and deliver their instruction. Curriculum specialists meet virtually to map curriculum, team teach and share best practices. Special programs and support services are also utilizing video communication technology to better service their constituents.

Examples of community-based and administrative applications include:

- Workforce retraining programs
- Health education and support programs
- Special education agencies assessing disabilities
- Special needs students being supported by interpreters and therapists
- Homebound students participating remotely
- Military personnel in the field connecting with their loved ones at home
- Adult learning or continuing education programs
- Emergency Preparedness
- Interpretive services for the deaf and hard-of-hearing community

Successful Implementation & Training

Video communication in itself is just a technology. What brings it to life and makes it an effective learning tool for students is the quality and relevance of the content and to what degree it promotes interaction between the students and the content, the instructor and with other students. Research indicates that a highly effective teacher will make a highly effective distance teacher.



Embracing Relevant Content

Every state has performance standards and indicators that teachers are required to teach and that students are expected to learn. While curriculum frameworks are the road maps that educators follow, it is relevancy and dynamic content that motivates students to take an active role in their learning. Video communication enables educators to think creatively about what and how they teach. No longer are educators limited to only the resources located within the boundaries of the school property. With all of the networks and technologies available today, the world can literally become an extension of the classroom. It's important to see video communication as a way to embrace new and otherwise unattainable experiences. Not only does this excite students and engage them in the learning process, but it also shows them real-life applications of the education they are receiving and connects them to the resources and people of the global community.

Perhaps the area that most impacts the success or the underutilization of interactive distance learning is a school's willingness and commitment to train those who will use the technology. Providing initial and follow-up training for personnel is imperative, but many schools tend to underinvest in this area despite the fact that the integration of this technology into the classroom relies on educator skill and interest.



Since teaching with video communications is not exactly the same as a traditional classroom, a new set of tools, skills and resources is necessary. With this in mind, TANDBERG created the T4 Program. T4, short for TANDBERG Teachers Training Teachers, is a 10-hour, 4-session professional development workshop delivered to schools and universities via video conference. Participants learn usable and applicable tactics and skills to effectively incorporate video communication into their curriculum and daily activities.

Training should involve learning how to facilitate small group activities and interaction between live and remote classrooms, how to motivate remote students and to revisit the need to incorporate multiple teaching methodologies, which most educators are already doing in a traditional classroom. Educators can add to their knowledge of interactive distance learning by attending conferences, participating on pertinent listservs, reading publications devoted to the topic of distance learning, collaborating with those who have the technology and sharing best practices and ways to overcome challenges.

Technology Adoption

Before investing in any type of video communication technology, a school must assess its current network capabilities, personnel and funding resources and its ability to enhance these areas if necessary. In essence, interested schools should conduct a needs assessment. During this initial planning, involve as many people as possible as personnel from all levels and departments will most likely be impacted by, or use, the technology. Be as detailed in the planning stage as possible. Establish goals and objectives for technology use and ultimately create a plan that includes an interactive distance learning introduction, process development, training, curriculum integration, evaluation, promotion and sustainability.

Interactive Distance Learning — Cost Considerations

- Video Communication Technology Solution
- Network Service Fees
- Training
- Content Costs
- Maintenance
- Programming and Content
- Technical Support

Trends in Action: A Survey of Video Usage in Education

As a follow-up to surveys conducted in 2004 and 2007, the following information outlines an extensive survey of how educators are using video conferencing and the impact it is having inside and outside the classroom.

This survey was conducted online between May 11 and May 17, 2009 by Wainhouse Research.

Survey Results and Analysis

1. Geographic location of respondents

A total of 25% of the respondents are based in the highly dynamic state of Texas (this may be influenced by how the various list memberships have been constructed over time). Another 8% are based in Florida, 7% in both New York and Ohio, respectively, and 5% are based in Pennsylvania.

2. Do you use videoconferencing in the classroom or school offices?

Almost all of the respondents, 96.3%, use videoconferencing in the classroom or school offices. Of the 3.7% who do not, we allowed their responses to later questions because they offered valuable input concerning how others in their districts are using videoconferencing and other technologies.

3. Which best describes your current position?

About two out of five respondents (41%) are technology coordinators, and one out of four (25%) are teachers or instructional designers. At least 10% are videoconferencing content providers, 4% are school administrators and 20%, one out of five, describe themselves as "other."

4. Why did your organization originally decide to get involved in distance learning?

The reasons K-12 educational organizations choose to adopt distance learning are fairly consistent, though the leading reason for 81.2% of respondents, curriculum enrichment, has increased a solid 9.2% as a factor from 2007 to 2009. Student-to-student interactions/global learners are the second most important factor, with almost 57% citing learner interactions as a key driver. Professional development remains high and relatively constant at 44%, as does the ability to offer shared courses for 36%. Administrative applications have increased slightly to almost 30%, up 5% from 2007. This is not surprising, as it also reflects upon another new reason identified in this survey: external factors e.g., the cost of gas and energy, environmental and economic issues (20.9%).

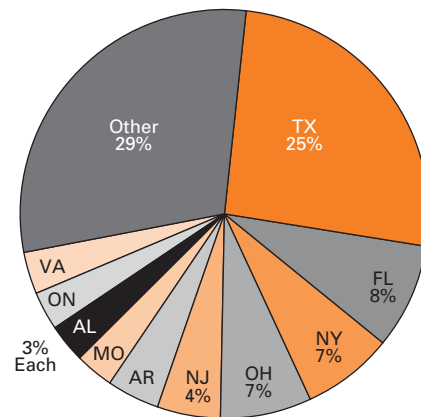


Figure 1: States of respondents

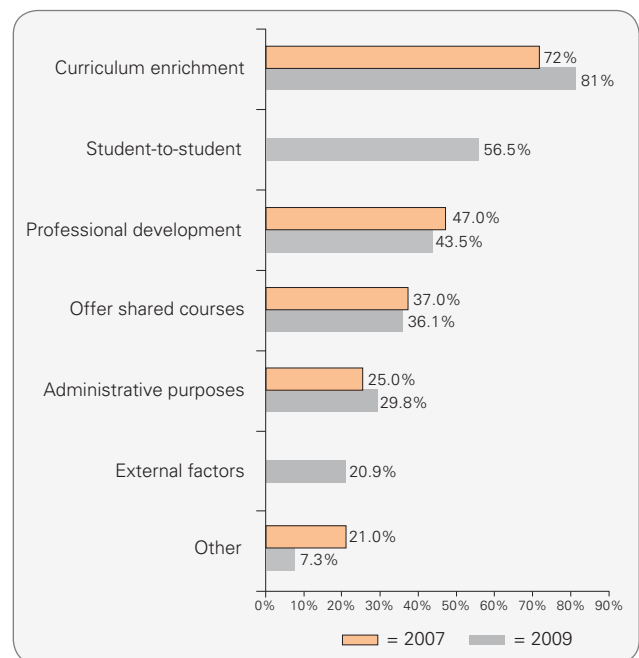


Figure 2: Why respondent originally got involved in DL

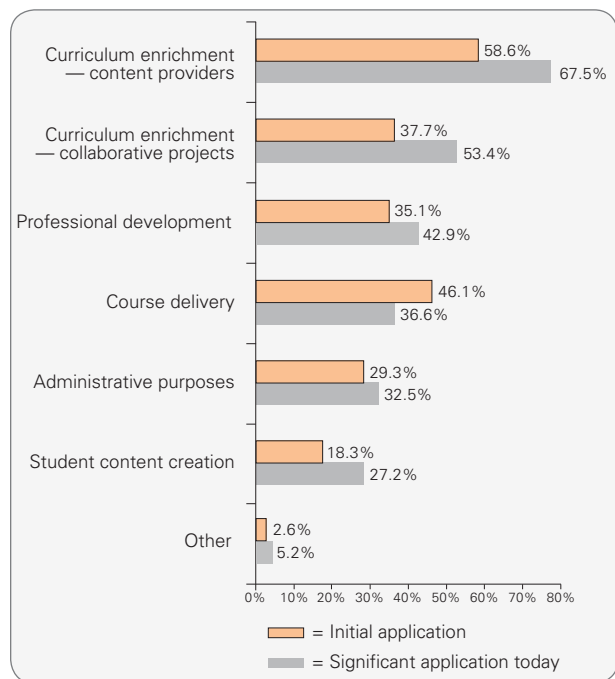


Figure 3: Initial and current significant applications

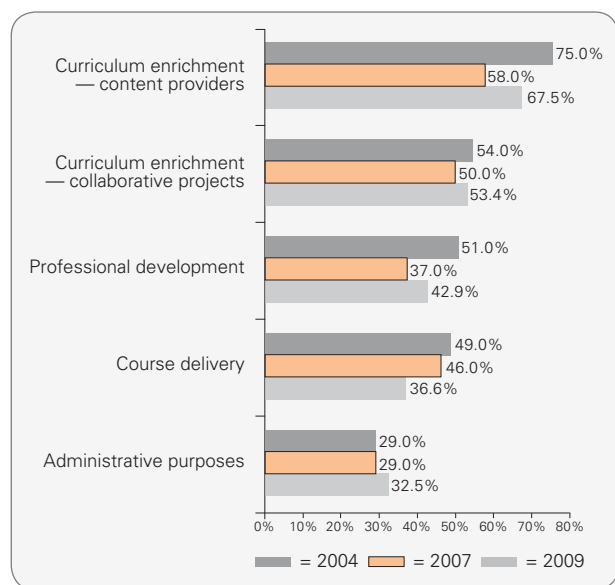


Figure 4: Applications 2004–2009

5. Which application(s) did your organization initially implement when you first used videoconferencing and what are the most significant application(s) your organization uses today?

The top reasons organizations have adopted *videoconferencing* for distance learning are relatively consistent, with a few “breakout” applications that clearly have increased over a two-year period. Because we added new questions to this year’s survey, we offer two charts. Figure 3 shows the relationship between initial applications and today’s significant applications. Figure 4, which includes data from previous surveys, shows the evolution of attitudes towards various applications over a five-year period .

Curriculum enrichment by accessing external videoconferencing-based content providers was and remains the single, top application from 2004 to 2007 to today. Note that this application has grown for many when we examine for how many it was an initial application (58.6%) to how many today find it invaluable (67.5%), an increase of 9%.

A similar increase occurs with curriculum enrichment via collaborative projects. It was an initial application for only 37.7% of respondents in the past, but today is important to 53.4%, increasing by 15.7%. Clearly, collaboration is becoming increasingly important to K–12 learners and educators.

Professional development remains important to more than two out of five respondents (almost 43%), as does course delivery (36.6%). (The drop in *course delivery* from *initial application* to *significant application* today is likely explained by the increase of the other applications, though we note that bell schedules remain a challenge to course delivery.)

Administrative purposes are up slightly at 32.5%. And, significantly increasing are student content creation applications, up to 27.2% from only 18.3% in 2007. One out of four respondents indicate that student content creation is increasing, and Wainhouse Research believes this number will continue to increase steadily over time.

6. How are you conducting or receiving professional development in your organization?

While traditional face-to-face training remains the top method of delivering professional development for four out of five respondents, the next most compelling method is large group videoconferencing, used by almost 54% of respondents. This is followed by web conferencing (33.5%), on-demand online courses (24.1%) and desktop videoconferencing (19.4%).



Some of the “other” methods cited are small classroom videoconferencing systems, Course Management Systems (Moodle), asynchronous online courses and conferences. Wainhouse Research believes that professional development remains a “favorite” face-to-face activity for two reasons: educators like to get some time out of the classroom and without administrator leadership on this issue change is slow to happen. While not radical to make this prediction, we do believe that professional development via web-based and videoconferencing tools will continue to increase over time, particularly as school districts continue to face budgetary constraints and climbing energy prices.

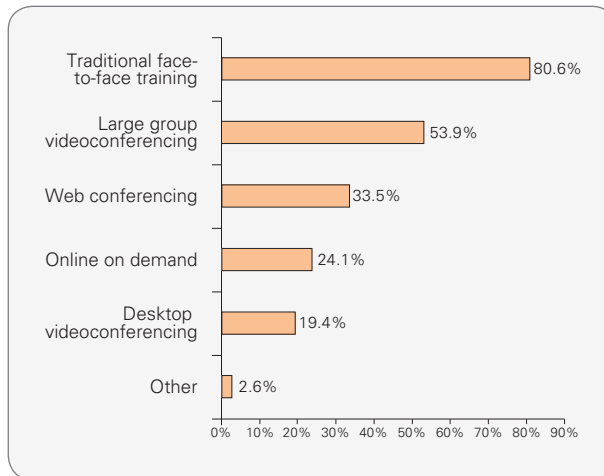


Figure 5: Methods for conducting professional development

7. Do you face any network connectivity issues pertaining to your videoconferencing systems?

Bandwidth has long been known to be an issue for many schools, and this survey reveals some of the complexities underlying how bandwidth affects videoconferencing-based education. Competition for bandwidth with other applications is the top challenge, significant for 20% of respondents — almost one in five. These educational users indicate that there are just too many educational applications drawing upon available bandwidth — which most likely impacts quality of experience.

The American Rehabilitation and Recovery Act (ARRA) stimulus funds may help address some of the issues in states that apply them wisely. Insufficient bandwidth due to last-mile connectivity is a factor for almost 17%. Cost of bandwidth affects 11.5% and the ability to connect outside their closed networks affects only 1.5%. This number is much changed from the past, showing how external connections have come to be understood as a prime benefit of educational videoconferencing.

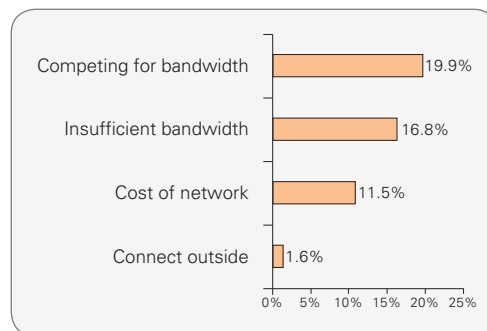


Figure 6: Network connectivity issues



8 & 9. To what extent are the following distance learning technologies being used in your district(s) TODAY? In TWO YEARS?

This very telling graph provides weighted averages of responses ranging from 1–3, demonstrating that videoconferencing is the top technology today for distance education among this survey group, and that it will move from medium use today (1.9) to medium-high use in two years (2.49). Video streaming makes a similar jump, from some-to-medium today (1.65) to medium use in two years (2.19). Video streaming makes a similar jump, from some-to-medium today (1.65) to medium use in two years (2.19). Several other technologies will increase approximately the same amount (roughly 0.6 to 0.7) over the next two years: web-based courses/content, web conferencing/webinars and Course Management Systems. Web cams show similar growth (0.65) over two years, but will only be in the some-to-medium use range (1.44). Simulation software/games, social networking technologies and virtual worlds all will be in the “some use” range, showing only slight increases of adoption. Remember, this group of respondents is a video-centric group, thus it does not speak for the larger market. Nonetheless, the lower expectations for simulations, social networking and virtual worlds reflects a natural caution about early-stage technologies are still finding their way.

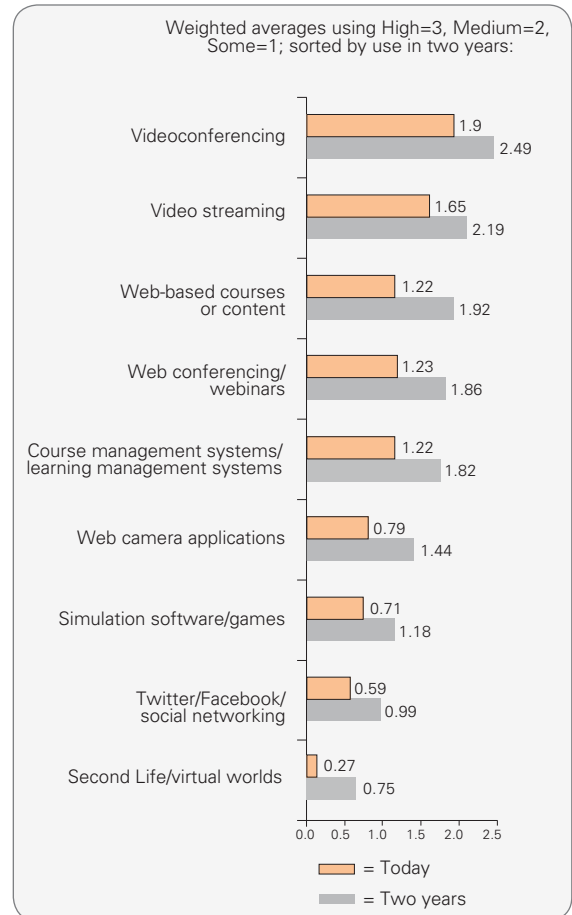


Figure 7: Technology use today and in two years

Comparison with the 2004 / 2007 Video Guide Survey data:

	2004	+5 years	2007	+5 years	2009	+2 years
Videoconferencing	83%	90%	91%	92%	96.8%	98.9%
Video streaming	54%	68%	59%	78%	86.3%	95.0%
Web-based courses or content	49%	80%	53%	83%	76.4%	91.3%
Web camera applications			18%		62.3%	83.2%
Web conferencing/ Webinars				84%	82.0%	92.5%

When we compare the thinking of today’s respondent to that of 2007 educators, we find that virtually every technology has been deployed faster than expected in 2007. We shortened the time horizon for this survey from five years to two years, yet the numbers are higher — even though a 2007 respondent was thinking about 2012, while a 2009 respondent was thinking about 2011. We note that the one lone exception is *Web-based courses or content*, which was predicted to be deployed in 83% of organizations by 2012 but has reached only 76% so far — though expectations are that it will be deployed in 91% of organizations by 2011, signaling a robust acceleration. The overall numbers suggest to us two things: First, adoption is taking place more quickly than users expected several years ago — the pace has quickened. In 2004, respondents predicted 90% penetration of videoconferencing by 2009, whereas the reality is almost 97% and 68% for streaming by 2009 whereas the reality is 86.3%. Web-based courses or content are only slightly down, from 80% to 76.4%, a relatively insignificant drop. The second thing to consider: No single technology will necessarily dominate and all have their place in the practice of distance education.

10. If you have participated in collaborative projects using videoconferencing, with whom did you partner?

More than three out of five educators (64%) partner with teachers in their district/region for collaborative projects. Second to this group are content providers and other teachers throughout the United States, which are tied at 58.1%. Partnerships with other regional teachers (in state/province) were 45.5%. International partnerships are conducted by 29.3%. And even partnerships with content providers from other countries are conducted by a full 17.8% — showing that one in five schools using videoconferencing are going international for their classroom enrichment from content providers. This number will very likely increase significantly in coming years.

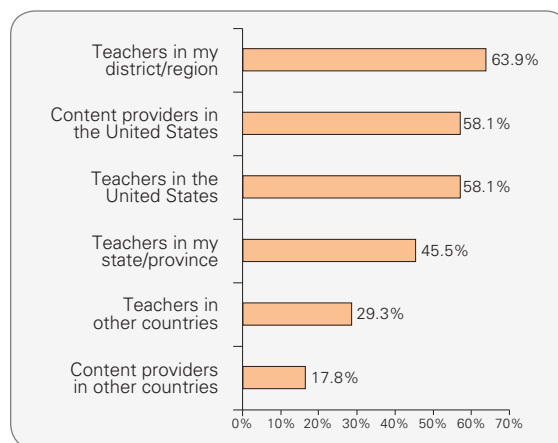


Figure 8 Partners for collaborative projects

11. Have your students been presenters or participants in a student-created content situation?

Slightly more than half of the respondents (53%) have enabled their students to present, collaborate or participate in a student-created content situation. This number is significant as it shows the extent to which learner-to-learner constructivist activity is being conducted. It also “maps” well to the 56.5% of respondents who cited learner-to-learner interactions as a reason their organizations originally adopted distance learning.

12. Do you use any of the following formal assessments of student performance to measure the effectiveness of distance learning instruction?

Instructor input and course feedback forms/student comments are the two top methods of formal assessments, tying at 47.6%. Almost half of all organizations use one or both of these approaches. Almost two out of five (29.3%) track grades and/or academic achievement. A total of 19.9%, or one out of five, monitor course attendance/attrition rates. Registration rates and course completion rates are monitored by 14.7% and 13.1%, respectively.

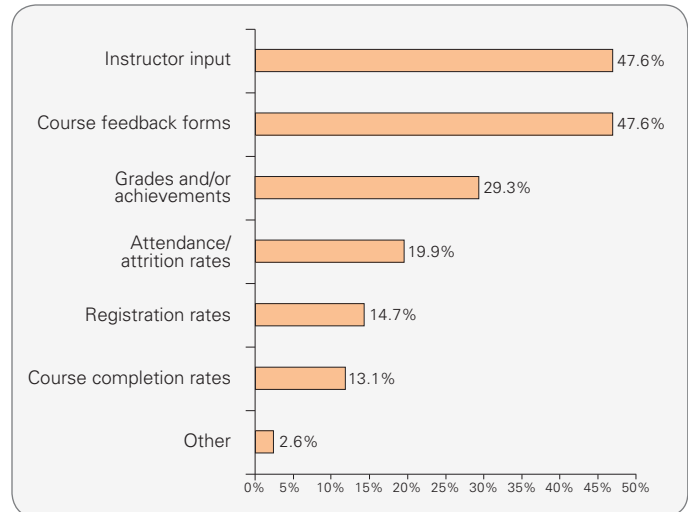


Figure 9: Methods to measure effectiveness of DL

13. What has been your greatest success (or challenge) with videoconferencing-based distance learning?

Success or Achievement	# of responses
Specific connections to content providers/ specific classroom enrichment	25
Students love it and become more involved	16
Getting equipment and/or specific classes to those who need it (especially rural/underserved schools)	15
Students gaining new perspectives/ points of view not otherwise available	14
Large collaborative projects/interactions between groups of teachers/learners	11
Ease of use/ease of getting teachers to learn and use	11

Classroom enrichment has educators excited the most. Note that not all of those citing this success are located in rural areas. One educator stated that a local field trip to a zoo was far surpassed by a video connection to a remote zoo, where the class learned from a curriculum well designed for interaction and specific learning goals. The level of excitement — particularly at the elementary school level, perhaps because these classes have less opportunity for engagement with the external world, and perhaps because secondary school educators are faced with the challenges of bell schedules — is palpable from the verbatim comments. And, the ability for learners to become excited through new perspectives and points of view — a visible behavior — is a big success for many organizations.



The challenges remain and many respondents cited both successes and challenges as a part of the experience of introducing videoconferencing to the classroom. The following table identifies challenges, ranked by incidence occurrence.

Challenge	# of responses
Technology limitations/challenges (bandwidth, interoperability, audio/video quality)	23
Bell schedules between schools or synchronizing schedules with content providers	21
Getting teachers to use the technology	21
Cost of equipment/funding issues	16
Having sufficient equipment to support all the needs	12
Finding the time to implement the technology/train	7
Finding specific content or free content	6
Finding specific other school with whom to partner	5

Bandwidth and equipment limitations (equipment may need replacement, for instance) has been and remains the single biggest challenge for videoconferencing-based education. In fact, getting teachers to use the technology is only the third-ranked challenge, following bell schedule/timing issues. Costs of equipment or having sufficient equipment follow close behind. And most notably, the challenge of finding content for middle and high schools mirrors the excitement elementary schools express about the technology.

14. What has been the greatest overall benefit from incorporating videoconferencing-based distance learning in your school(s)? (*Verbatim*)

Respondents are extraordinarily excited about the benefits of incorporating videoconferencing-based distance learning in their schools. Very few respondents failed to offer some type of benefits, but what is striking are the high numbers of certain irrefutable benefits. These are identified in the table, but elaborated on below:

- Delivering classes/resources not otherwise available is just the tip of the iceberg. That reason alone would be sufficient because of the ability to enhance curriculum, but one individual even stated that it allows smaller schools to remain open while meeting requirements
- Engagement with the outside world is the second top benefit. That engagement can be with other learners, nationalities or experts, but the opening up of the classroom walls is a key driver. Educators indicate this not only prepares learners to participate in a global world, but also enables them to think in broader terms. This is often mentioned alongside the next benefit
- Student engagement. Many of the verbatim comments reflect how excited the learners get when preparing for, attending and digesting videoconferences. One educator cited a remarkable improvement in boys' engagement with reading as a result of videoconferencing
- The amount of compelling content. We include here both specific content programs, as well as value of experts in various areas (writers, scientists, etc.) as having an impact on learners
- Again, the ability to share resources between schools is valuable at opening walls to external content sources while enabling programs not otherwise available

Most of the other benefits are self-explanatory. Worth mentioning is the educator who said the following: "Having someone else teach my students has been amazing because they listen to that person differently than they do to me." We recall the aphorism "familiarity breeds contempt." A dynamic occurs when an outside instructor/expert/learner engages with a classroom: the confluence of targeted content with established expert or peer with position as a "new" source of information combines to create another level of discourse. This discourse can likely lead to new opportunities for the local instructor who may otherwise find him/herself struggling to maintain a level of engagement with learners throughout the course of the year.

	# of responses
Provide access to classes/resources not otherwise available — "unlimited possibilities"	56
Offering learners the opportunity to discover thinking outside the classroom walls (whether global, national or regional)	47
Seeing students and even instructors engaged/excited, greater student retention	36
Engaging content (programs or individual presenters)	31
Sharing resources between schools	11

Interactive Distance Learning: Needs Assessment

The following needs assessment outlines some of the factors you may want to consider when planning your implementation of a video communication network.



- 1. Describe your school district's current network infrastructure.**
 - a. Network connectivity on WAN?
 - b. Network connectivity to regional or state networks?
 - c. How much bandwidth is available for video applications?

- 2. Identify your school district's interactive distance learning program needs.**
 - a. Do you have course delivery, professional development, curriculum enrichment, community or administrative needs?
 - b. Identify funds that can be allocated to support program content costs (budget reallocation and cost savings)
 - c. Identify training needs based on primary applications

- 3. Evaluate the extent to which the cost of acquiring, using and maintaining visual communication technology will be offset by savings that result from its use.**
 - a. Examine cost savings of having some professional development delivered via interactive distance learning instead of always onsite (hard costs, travel costs and time)
 - b. Examine cost savings of conducting administrative meetings over video versus attending onsite (travel and loss of productivity)
 - c. Compare current spending on off-site field trips and the number of students impacted versus the number of students who could attend virtual field trips and at what cost
 - d. Compare the cost to provide AP or regular courses out of district or by hiring part-time staff versus the cost to access them remotely
 - e. Are there community organizations who can utilize the video communication technology who, in turn, would pay a usage fee?
 - f. Compile all cost-savings information and compare it with a technology solution estimate that best supports the district's primary applications (set-top solution versus dedicated-room system)

- 4. Investigate the advantages that may not carry a financial benefit, but rather a quality-of-education or convenience benefit.**
 - a. Weigh the quantity and quality of interactive distance learning programming accessible to the district that would not otherwise be possible
 - b. Calculate the number of students who will be impacted by this type of relevant and engaging programming
 - c. Recognize that there may be an increase in personnel participating in professional development and administrative sessions that occur on personal time with the elimination of travel

- 5. Investigate your organization's funding options for acquiring and maintaining video communication technology.**
 - a. Explore your annual capital improvement budget and the reallocation of department dollars from areas that will generate cost savings from engaging in distance learning
 - b. E-Rate and other state, federal and private funding sources



The Five Primary Elements of Video Communication Technology

Educational organizations of every size and function are adopting video communication solutions. In order to adopt and implement a successful video communication system, thoughtful consideration must be given to the role video plays in education, along with how video systems are ultimately deployed.

It is important to build capacity and infrastructure of a video communication system from an organization-wide perspective. Solid plans must be established that are relevant to everyone's needs and requirements. Decision makers can make wise purchasing decisions to ensure long-term performance and provide maximum return on investment if they understand the primary elements of video communication technology, such as handling mixed ISDN and IP environments, firewall/security and dialing scheme issues, etc., as well as the foundation concepts (the importance of standards-based architectures, legacy and multi-vendor environment accommodation).

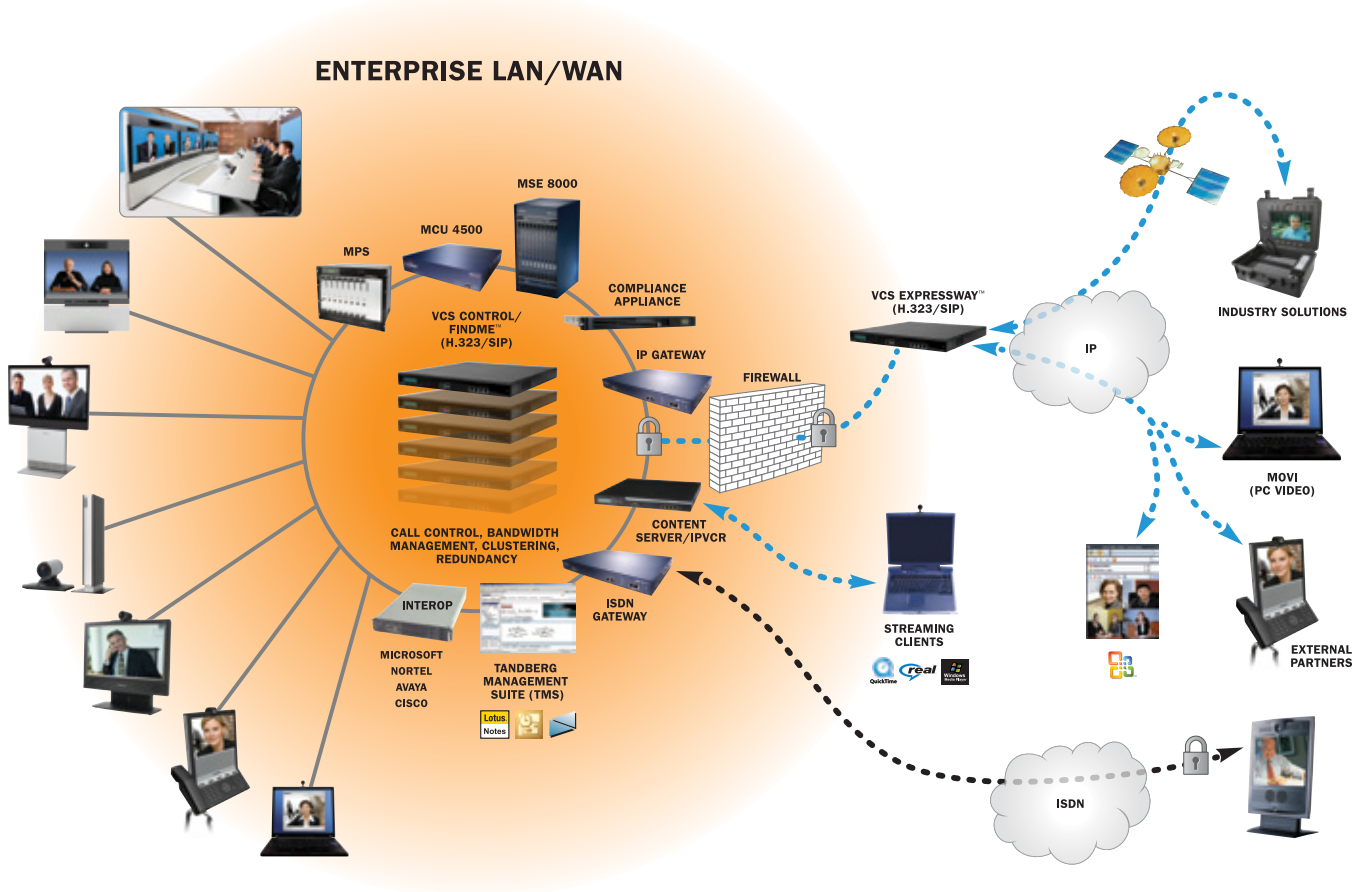
TANDBERG takes a unique approach to developing a comprehensive video communication system, offering the breadth and depth of complete, end-to-end solutions. TANDBERG was first to integrate the latest technologies across its entire product line. From endpoints to infrastructure, from management software to secure firewall traversal, TANDBERG continues to lead the education industry with innovative video communication solutions.

As noted in a recent paper titled "A Blueprint For Strengthening K-12 Videoconferencing in California," by the Los Angeles County Museum of Art:

Videoconferencing is a teaching tool that has unique value and potential for achieving equity of access to learning resources not otherwise available, for live collaborative learning among students (regionally, statewide, nationally and globally), for fostering understanding of different cultures and for enabling active learning.

With that in mind, it certainly behooves educators today to take a close and serious look at how they can adopt and implement a sophisticated video communication system at their schools. The task at hand begins with a keen understanding of at least five primary elements that are described below.





Five Primary Elements

There are five primary elements to understand when you are in the process of developing an effective video communication solution for your school: Management Development, Choice of Video Systems, Expert Services, Video Communication Peripherals and Applications and Network Infrastructure.

Management Development

A centralized management foundation is the core of any solution. It must ensure seamless deployment of video across the district or campus. Schools need to manage and control components from all vendors, schedule video resources and booking facilities, launch ad hoc meetings and monitor ROI.

Choice of Video Systems

From personal, mobile and small group systems to the fully integrated, robust room systems, schools should have the ability to choose the form factor that best fits the application and needs of each specific room or site. Some vendors offer only video systems designed specifically for distance learning.

Expert Services

Vendor support services are critical for seamless installation, adoption and usage. It is important to choose a vendor with solid programs in place to ensure investment protection and extend the lifetime of the products. Vendors should insure that professional development and technical training are always readily available.



Video Communication Peripherals and Applications

Video communication equipment has been greatly simplified in recent years. Manufacturers understand that combining core equipment into a few simple pieces and an easy-to-use interface is essential for a successful implementation. This is similar to what we are experiencing with consumer electronics, where the functions of stereos, televisions, VCRs and DVDs are built into simple components that are operated by a master control.

Custom systems enable schools to conduct two-way interactive distance learning sessions. However, just like in a traditional classroom, an educator must continuously incorporate multiple instructional strategies to accommodate various learning styles in order to engage students and transfer knowledge. In a traditional classroom, an educator has many tools and materials to accomplish this. In an interactive distance-learning classroom, the same or similar tools exist electronically, and in some cases are more effective. The peripherals that can comprise a video system, along with their applications, are listed below:



Peripheral (electronic tool)	Application (use)
Document Camera	Enables students to see objects and materials up close, such as a drawing, slide or three-dimensional object
DVD Player/Recorder	Enables content from these mediums to be sent through the video communication systems and integrated into the lesson
Electronic Whiteboards	Enables written information, typically what you would write on a traditional chalkboard, to be sent electronically, altered and saved remotely
Personal Computers	Any application running on a personal computer can be shared using a video communication system
Additional Cameras	A secondary camera provides remote learners with a different view of the instructor, on-site students and experts, or displays materials located elsewhere in the classroom or facility
Pressure-Sensitive Mats	When placed in strategic locations and stood upon, automatically move cameras to the predetermined location
System Control Source	Touch panel, which integrates all video communication equipment controls for ease of use
Streaming and Archiving	Enables live video content to be streamed over the web. Capability for access from any computer and provides access to this content for future use
Receivers/Decoders	Enables the integration of satellite, cable and other programming
Specialty Cameras	Enables the integration of images from such devices as microscopes, telescopes, surgical instruments and other tools that have internal cameras
T.120 Peripherals	Enables the integration of images from such devices as scanners and/or digital drawing pads and instruments

Peripherals can obviously enhance video communications, offering educators many more options to engage students and foster interaction. Educators can see the possibilities to dramatically enrich their curriculum by connecting to and sharing with other like-minded educators.

Network Infrastructure

Network infrastructure is at the heart of any distance-learning program. These products make it easier to connect outside the campus, facilitate multisite calls and enable the recording and archiving of classes, meetings and projects. Gatekeepers, Border Controllers and Content Servers help to make the technology transparent to the user and streamlined for the technology director.

For any video communication system to work, it must be connected to a network. There are different types of networks that use different protocols and afford varying degrees of bandwidth for video communication. Regardless of the type of network you have, there are products and services available that do a conversion and enable you to connect to other networks regionally, nationally and globally.

Types of Networks

ISDN (Integrated Services Digital Network)	ATM (Asynchronous Transfer Mode)
VPN (Virtual Private Network)	LAN and WAN (Local and Wide Area Networks)
HVEN (Halo Video Exchange Network)	

Protocol and Standards

The International Telecommunication Union — Telecommunication Standardization Sector (ITU-T) is the organization responsible for identifying quality standards (recommendations) for all telecommunications. This is vitally important so that different video communication systems can connect and interoperate. There are also recommended standards (shown below) for audio and video, which provide specifications for products being used with different networks and technologies in order to ensure the highest level of quality.

Network, Collaboration and Management Components

Codecs, monitors and microphones are only part of most distance learning solutions today. Manufacturers offer a variety of products that help schools, universities and regional consortia manage their video communication equipment, network and activities.

Some of these components include:

Content Server	Facilitates on-demand access to content via the internet lecture capture for video on demand
Gateway	Provides interconnectivity between different network types (i.e., ISDN or H.323 to IP or H.323)
Gatekeeper	Provides the ability to use aliases for easy dialing, policy control and call-admission functionalities to the video network
Image Compositing	Allows multiple sources and images to be manipulated on a single display
MCU	(Multipoint Control Unit) Enables multiple sites to connect simultaneously in single or multiple conferences. The number of sites is limited to the number of ports on the bridge, usually anywhere from 8 to 64, and the network capacity. Some codecs can bridge a few sites (4–6), either as part of their basic functionality or with a software upgrade
Firewall Traversal	Enables video communication equipment to connect into and off of the district network with ease, without having to open and close firewall ports
Conference Scheduling and Management	Enables network and application support personnel to schedule and manage conferences, launch calls, test systems and troubleshoot technical issues
Collaboration and Application Sharing	Many video communication equipment solutions have optional software upgrades that provide instant messaging (IM) and application sharing while in a video conference



K–12 Informal Learning Content Partners

The list below is a sampling of the type and quality of providers offering programming for K–12 schools. The website URL listed is the location within the provider’s site where distance learning program information can be found, and the name listed is the distance learning contact person.

Content Provider and Website

Alaska Sealife Center
www.alaskasealife.org

Ann Arbor Hands-On Museum
www.aahom.org/programs/distance_learning.htm

Center for Puppetry Arts
www.puppet.org/edu/distance.shtml

Challenger Learning Center-Brownsburg
challenger.brownsburg.k12.in.us/html/vc.html

The Cleveland Museum of Art
www.clevelandart.org/educef/distance/HTML/index.html

COSI Columbus
www.cosi.org/educator/videoconferencing

Ft. Worth Museum of Science and History
www.ftworthmuseum.org/educate/

Indianapolis Zoo
www.indyzoo.com/content.aspx?cid=267

National Science Center
www.nscdiscovery.org

New York Hall of Science
<http://nyscience.org>

Reef, HQ Australia
www.reefed.edu.au/reefhq/reef_video_conferencing/index.html

Rock and Roll Hall of Fame
www.rockhall.com/distancelearning

Royal Tyrrell Museum of Paleontology
www.tyrrellmuseum.com

Vanderbilt Virtual School
www.vanderbilt.edu/virtualschool

VOS Spain
www.vosspain.net

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Jan Zanetis, M.Ed., is a career educator with 20+ years in the primary and higher education classroom. Currently, she is the market manager for education at TANDBERG, the global leader in videoconferencing solutions. She came to TANDBERG from Vanderbilt University, where she served as the director of the Virtual School. At the Virtual School, she developed hundreds of hours of interactive video lessons for primary and secondary classrooms, featuring Vanderbilt faculty as presenters. During her directorship, the Virtual School became a leading distance learning provider.



Jan is well known for presenting professional development sessions for educators and has keynoted various education technology conferences. She has co-written two books published by the International Society for Technology in Education (ISTE), and has contributed several articles in various education journals. Jan currently serves on the board of directors of the U.S. Distance Learning Association, is the vice president of the Tennessee Distance Learning Association and is the president emeritus of ISTE's SIG-IVC special interest group.

John C. Ittelson, PhD.

Dr. Ittelson holds a Ph.D. in educational psychology and instructional design from Northwestern University. He has been appointed director of instructional technologies for the K–20 California Educational Technology Collaborative (K20CETC), a new consortium focused on helping students prepare for college. He is also working with the CSU Chancellors Office on an NSF Noyes grant for “Building Locally, Linking Globally: Networking Micro-Communities of New Science and Math Teachers Using the NSDL to Advance Instructional Excellence in High-Need Schools”. Additionally, he teaches a graduate course on instructional technology for CSUMB.



Dr. Ittelson has served as chair of the Application Coordination's Committee (ACC), one of two primary committees of the California High-Speed Network for K–12 schools. The role of the ACC was to deal with content issues for the network. During that same time, Dr. Ittelson held a contract to serve as the CSU liaison to the Digital California Project (DCP), a multi-million dollar effort designed to build the necessary network infrastructure needed to prepare California's K–12 schools to take advantage of tomorrow's advances in network technology.

About Wainhouse Research

Wainhouse Research (www.wainhouse.com) provides insight and intelligence into the global markets for audio, web (data) and video conferencing, real-time unified communications, enterprise streaming and webcasting, distance education and enterprise social networking. The company publishes public and private studies, speaks at industry events and private company events and provides strategic consulting to both industry vendors and end-user organizations. Wainhouse Research conferences in the U.S. and Europe provide a forum for the industry to discuss critical issues for industry growth.



Acknowledgements

It is with sincere appreciation and gratitude that we acknowledge the following organizations for their willingness to share information and insights that comprise the Case Studies and Technology Trends sections of this document. Their remarks and feedback provide a voice from the field and validate what many of us distance educators already know — video communication provides more opportunities and greater access while bringing the world a little closer to home.

Arkansas School of Math Science and Art

Center for Puppetry Arts

Cleveland Museum of Art

NASA Ames Research Center

National Science Center

New York Hall of Science

Royal Tyrrell Museum of Paleontology

Southern Oregon ESD

Stamford High School and Region 14 Education Service Center

White Plains City Schools

A special thanks to the many schools who participated in the Videoconferencing Utilization Survey. We received responses from classroom teachers, media specialists, district technology and instructional specialists, principals and superintendents, project coordinators and regional and state consortia leaders representing urban, suburban and rural communities. Your contributions have provided a fairly comprehensive data sampling from all geographic regions across the country, and your time and effort is greatly appreciated.

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