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Four creative minds.
Three time zones.
One science project.



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DISTANCE LEARNING VIDEO GUIDE

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DISTANCE LEARNING & YOUR CLASSROOM

From mobile phones to the internet, our society is built on technology, and information is more accessible than ever.

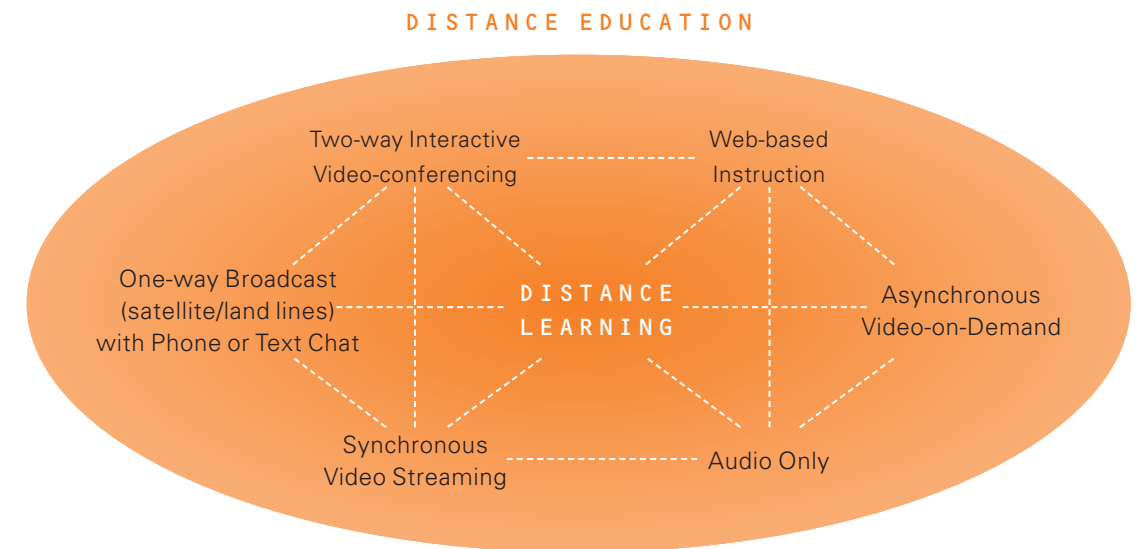
How can schools use this developing technology to create a climate of learning that inspires and motivates students while supporting teachers in their challenging roles as educators? How can this technology help reshape and transform education to keep up with the expanding and complex world in which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

Interactive distance learning opportunities and the visual 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 could not easily, and in some cases ever, support. Visual 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 visual 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 visual 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 VISUAL 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 visual communication providers today have incorporated a blended solution using multiple technologies in order to extend the learning experience and provide a vehicle for accessing support materials pre- and post-event.





This guide addresses visual communication, which most closely simulates a 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 desktop system may be preferred for meetings and administrative purposes and a set-top system is more conducive to small group exchanges or content receive locations. It is possible to upgrade a set-top system 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 a K-12 environment depending on the goals of each project.

WHY EMBRACE DISTANCE EDUCATION?

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

Challenges facing school districts and educators are vast and often daunting. State and federal budgets are being slashed, which can mean deficiencies in staffing, not being able to offer required courses or courses for special education and gifted/talented students, and increased difficulty in obtaining professional development training despite more accountability. 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 and bring new experiences to the classroom. 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 we recognize that the answer to achieving educational excellence, combating the day-to-day issues that educators face and introducing children to technology lies in distance learning opportunities.

WHAT ARE THE BENEFITS OF INTERACTIVE VISUAL COMMUNICATION?

Visual communication offers a variety of benefits to those who embrace and utilize it, including:

STUDENT BENEFITS

- Establishes a dialogue and exchange of ideas between students, educators, and subject matter experts who have different viewpoints, experiences and strengths
- Provides relevant examples of how classroom instruction takes on real-world application
- Extends educational resources into locations where few exist due to location or funding
- Prepares students for a future as a global citizen, proficient with 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 opportunities to collaborate with peers from many cultures and communities

EDUCATOR BENEFITS

- Combats teacher isolation for educators in remote regions or educators who are the only subject-matter expert in their school
- 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 interactions with colleagues
- Provides access to resources and information not traditionally available, resulting in more relevant and engaging learning experiences

SCHOOL DISTRICT BENEFITS

- Provides educational equity for schools 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 planning between schools
- Can be used for administrative purposes such as planned and ad hoc meetings, which results in reduced travel time and expense, and time away from classroom/building
- Expands curriculum offerings through remote instruction
- Enables schools to share resources and the cost of those resources
- Demonstrates district’s commitment to providing unique and equitable learning experience

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 with visual communication technologies
- Vehicle to build comprehensive learning experiences that extend beyond an on-site event and that support other offerings
- Another way to market on-site events and bring people to the institution
- Additional revenue stream

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 visual communication for a specific need they have, it doesn't take long 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

SCOTT COUNTY SCHOOLS HUNTSVILLE, TN

Contact: C. Michael Lay, mike@scottcounty.net

Challenge: A small school district in rural Tennessee, Scott County Schools lacked the resources to hire and retain advanced level teachers. With only one highly qualified algebra teacher at one middle school, children were being bussed — losing up to 45 minutes of instructional time in an already time-strapped schedule.

Solution: Distance learning was implemented to bring the algebra class to five campuses. Smaller video systems were placed at the schools, with more robust systems in the high school and board of education for facilitating classes and professional development.

In addition, a Multipoint Control Unit facilitates multisite calls, and a TANDBERG Content Server allows the district to record algebra classes for students to review.

Results: Since Scott County implemented the solution, the results have been dramatic. Students are saved hours of bus travel and still receive a highly personal, face-to-face educational experience. In fact, test scores have improved!

The distance learning program is so successful that Scott County is utilizing video in new and exciting ways — including putting a local museum online for virtual field trips, recording school board meetings, and more!

COURSE DELIVERY

Many schools and consortia use visual 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 visual communication as a solution to providing needed courses where there are few students or scarce resources available, than transporting students off campus and in some cases across county lines, or hiring another teacher. That is not to say that interactive distance learning is a way to replace teachers. 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 scarce Highly Qualified teachers, as well as now being able to 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 visual 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 can often make the difference in whether a student completes a course of study or not. Being able to access video course content on demand from the internet is another option that is rapidly gaining adoption by higher education students, regardless of whether they are on the main campus or not. It is helpful for students to be able to access class presentations and lectures as many times as they may require.

CONTENT FOR SECONDARY LEVEL COURSE DELIVERY

Available secondary level content for course delivery via interactive distance learning is perhaps the most challenging to find. No known national clearing house 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 their 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 and Arkansas.

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.

CASE STUDY

29-90 DISTANCE LEARNING CONSORTIUM AND THE DIGITAL DAKOTA NETWORK (DDN), SOUTH DAKOTA

Contact: Brian Dzwonek, brian.dzwonek@k12.sd.us

The Challenge: Due to the extreme rurality of the state of South Dakota, a need existed to provide research, analysis, procurement and distribution of programs and methods using educational technology in K-12 schools and classrooms, in an effort to provide equitable quality learning opportunities to all students and school personnel.

The Solution: Governor William Janklow was instrumental in driving the technology agenda in SD schools. In 1996, Wiring the Schools began the process of connecting our schools, and in the summer of 1997, Dakota State University hosted the first Governor's Technology for Teaching and Learning Academy in which 2,500 South Dakota educators have participated in these 4-week technology-rich experiences, and in 1999, Connecting the Schools project commenced, which established a state-wide intranet between all public schools, providing them with training, hardware and e-mail services. With the human and physical infrastructure in place and expectations articulated from the state, schools commenced in training and multi-faceted distance learning implementation.

The Results: In addition to dozens of courses offered each school year that service dozens of schools and hundreds of students, as well as numerous curriculum enrichment and community-based programs conducted daily, the DDN also offers professional development that support NCLB, brain research and various curriculum and instruction topics. The state has trained over half of all SD K-12 educators to effectively use visual communication to support classroom instruction.

Best stated by Brian Dzwonek, Director of the 29-90 Distance Learning Consortium, "In South Dakota there is a very real sense of community, in many ways the state feels collectively like a small town. There is a very real sense of duty and honesty that prevails in the culture and this removes many of the barriers that might exist in other areas. No single entity is solely responsible for the success of videoconferencing in the state. Prior to the statewide network, a handful of consortia established relationships between school districts and community organizations. Many of these relationships and consortia continue to operate, however with almost universal connectivity it is very easy to work together in much broader ways. With the state infrastructure in place, consortia and other collaborative organizations build and refine the tools and practice of videoconferencing."

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 has financial implications.

With interactive distance learning capabilities, educators may now access university continuing education and professional development programs delivered directly to the home or school at a time that is convenient for their schedule. Additionally, many school districts are finding that they are able to stretch their professional development dollars a bit further because now 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 districts 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 visual 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:

- Approach outside training vendors and groups about their willingness to conduct training via interactive distance learning.
- If a training source is agreeable to the training but does not have the required hardware or network, approach the local Educational Service Centers when applicable. 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 a remote host location 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 visual 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 pre-designed 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 offered usually on an “on-demand” basis and have had all the 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 usually communicated on marketing and 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.



CASE STUDIES

MUSEUM OF TOLERANCE
Program: Call to Tolerance

“Call to Tolerance” is an age-appropriate introduction to the Holocaust, utilizing learning strategies of critical thinking, observation skills, deductive reasoning and brainstorming. This history-based artifacts program focuses on issues of prejudice, individual responsibility and propaganda not only to promote understanding of the Holocaust, but also to underscore the relevance of these issues to our own contemporary lives.

CLARIAN HEALTH
Program: Food for Life

This interactive presentation will help students identify influences that affect our food choices. We will discuss the dietary guidelines, food guide pyramid and the importance of good nutrition to our health. The students will set goals to improve their eating habits by using the food guide pyramid. This program also addresses character education and community interests.

MOTE MARINE LAB
Program: Coastal Habitats

Why are estuaries important? Discover the value of coastal habitats to wildlife and how important they are to people, too. Estuaries of Florida will be used as examples.

- **Top 10 Estuary Facts presented.**
- **What is an estuary?**
- **Why are estuaries important?**
- **What is threatening them?**
- **What is MOTE’s research on estuaries?**
- **What can students do to help estuaries?**

CHALLENGER LEARNING CENTER
BROWNSBURG

Program: Captain Cosmic

Let your little stars shine by being part of the program. Join Captain Cosmic for a tour of the solar system. Captain Cosmic and students will share information (some classroom preparation is necessary) about the sun, moon, and each planet. Climb aboard with Captain Cosmic for a fun-filled adventure!

CLEVELAND INSTITUTE OF MUSIC

Program: Evolution and Revolution

Evolution and Revolution examines the process of change — political, economic and personal — through the study of great historical events such as the French and Russian Revolutions and through their relationship with music and culture. History comes alive in this series of three videoconferences, which feature live music and interactive activities with students.



In other cases, content providers have developed interactive distance learning programs in conjunction with visiting exhibits or experts. These special events are typically offered at a specific time and may have supplemental resource information depending on the content, presenter and lead time of the program. In many cases, these programs are only offered once, or possibly a couple times on a given day, based on talent availability, time restraints and costs associated with program delivery.



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 in becoming 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 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 reinforcing the concept of learning through service.

The advantages of curriculum enrichment programs are many. First and foremost, schools are now able to eliminate their classroom walls and access information and resources that may not otherwise be available to them. Students are able to experience new cultures, learn from experts in the field and collaborate with their peers across the world. This is not, however, at the expense of eliminating onsite field trips. Interactive distance learning is a way to provide more field trip experiences at a time when school travel budgets are shrinking as well as offering supplemental programming that introduces or builds upon the onsite learning experience.

CONTENT FOR CURRICULUM ENRICHMENT

Several 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 resource 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.sbc.com/wired/vidconf/directory.cfm



SPECIAL SERVICES AND INFORMATION SHARING

Visual 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, along with encouraging greater participation while maximizing efficiency and productivity. In higher education, visual 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 are meeting virtually to map curriculum, team teach and share best practices. Special programs and support services are also utilizing visual communication technology to better service their constituents.

Examples of community-based and administrative applications include:

- Workforce development 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 connected with their loved ones at home
- Adult learning or continuing education programs
- Speakers bureaus
- Interpretive services for the deaf and hard of hearing

SUCCESSFUL PROGRAMMING & CONTENT

Visual 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 content and the students, the instructor and the students with other students. Paying attention to these rules of engagement will help put a school on the path to distance learning success.

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. Visual 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 visual 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 peoples of the global community.

INTERACTIONS

Educators need to remember that successful learning hinges on participant interchange and sharing of thoughts in a distance learning environment just as in a traditional classroom. Visual communication technology enables all kinds of interactions to take place ranging from instructor to student, student to instructor and student to student. On a very basic level, but often overlooked, each student involved with an interactive distance learning program must also experience an interchange with the content itself. With the aid of video peripherals, educators are able to employ a variety of instructional strategies that not only encourage interaction but also accommodate a variety of learning styles.

TECHNOLOGY ADOPTION

Before investing in any type of visual communication technology, a school must assess its current technical 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
- Maintenance
- Programming and Content
- Technical Support

TRAINING IS KEY

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.

Training should involve learning how to facilitate small group activities and interaction between live and remote classrooms, how to motivate remote students, and revisit the need to incorporate multiple teaching methodologies, which most educators are already doing in a traditional classroom.

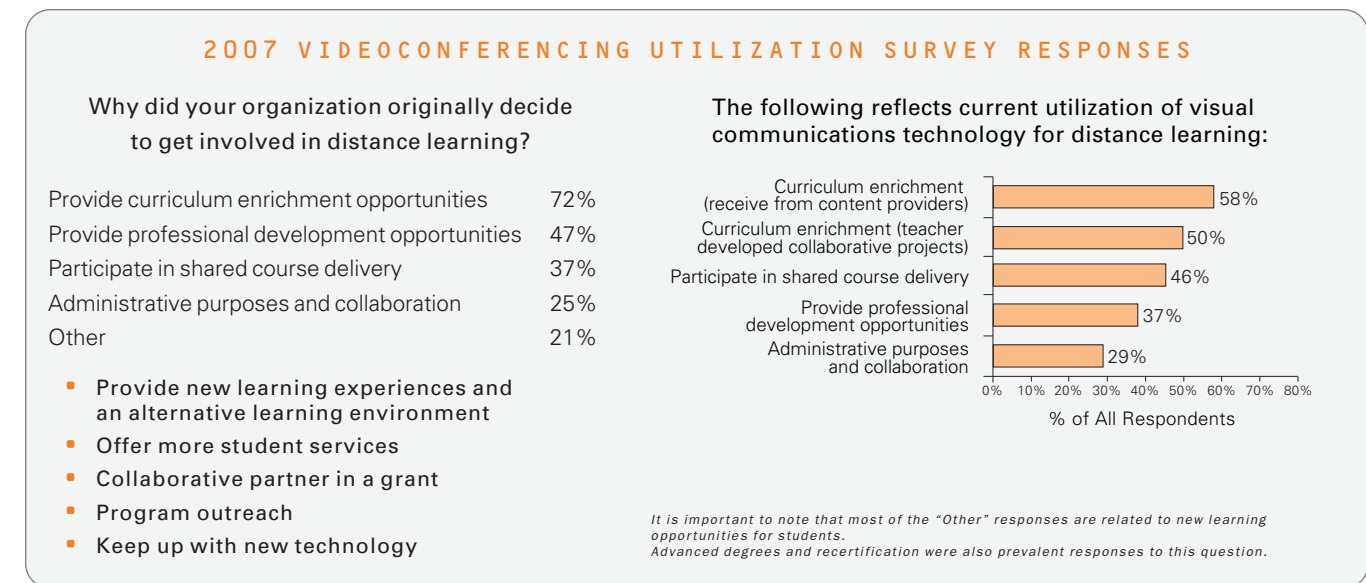
Educators can add to their knowledge of interactive distance learning by attending conferences, participating on pertinent listservs, reading publications devoted to the topic of distance learning, collaborating with those who have the technology and sharing best practices and ways to overcome challenges. Keeping these factors in mind, TANDBERG has developed a Professional Development program for educators. The T4 Program (TANDBERG Teachers Training Teachers Program) is a 10 hour, individualized program delivered over video in 4 separate stages. The program is designed to make it easy for staff to incorporate visual communications into daily activities and improve student learning.

DISTANCE LEARNING TRENDS: FEEDBACK FROM THE FIELD REVISITED

Initially administered in 2004, a Videoconferencing Utilization Survey was administered once again to distance learning consortium leaders, district administration, technology and curriculum leaders, teachers, media specialists and content providers in April, 2007. There were 98 respondents from at least 29 states and three countries, with almost 54% of the respondents representing rural schools, another 34% from suburban schools and almost 13% from urban schools. Data collected is a broad sampling from all geographic regions of the country and represent a variety of socio-economic backgrounds.

There were two primary objectives for administering the Videoconferencing Utilization Survey. First was to determine the initial motivation behind investing in visual communication technology, current and expected utilization, primary applications and the greatest benefits and challenges as described by end users. Secondly, the 2007 survey data was compared to data collected in 2004 to gain a better understanding of market trends and perceptions.

While some schools are brand new visual communications adopters, many schools have been involved in distance learning for over a decade. When all end users were asked the below questions, the following responses were given:



A couple of conclusions can be drawn from this data. End users have a pretty good idea what they intend to do with their distance learning technology once it is in place and seem to meet those expectations with relative ease. With the exception of professional development, in general, end users are doing more within each application category than they had initially thought. This is due in some part to the maturity of the market and also support services provided by districts, regional and state consortia, and supportive service organizations.

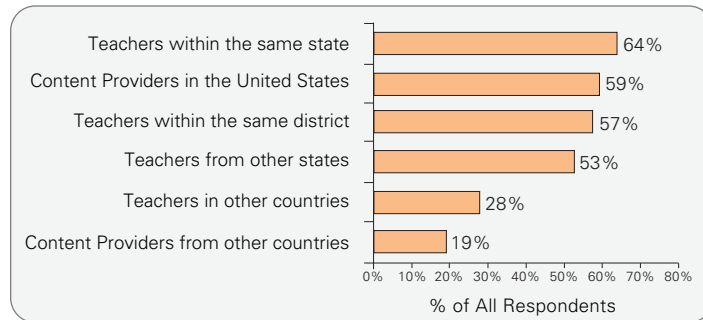
Curriculum enrichment is still the primary application for visual communications technology in schools. The 2007 survey looks at both the number of schools who participate in curriculum enrichment programs offered by content providers and programs and/or student collaboration projects developed by teachers. These numbers have come down somewhat from the data collected in 2004.

2004 VIDEOCONFERENCING UTILIZATION SURVEY RESPONSES

The following reflects current utilization of visual communications technology for distance learning:

Curriculum enrichment (receive from content providers)	76%
Curriculum enrichment (teacher developed collaborative projects)	54%
Provide professional development opportunities	51%
Participate in shared course delivery	49%
Administrative purposes and collaboration	29%
Other	29%

Schools are still very active in developing programs and student collaboration projects. The utilization percentage has not dropped that significantly in this category. This is in part due to the comfort level of teachers using the technology zero costs for collaborations, and also the fact that instruction and dialog can be tailored to meet specific curricular objectives. The survey responses also mention that some of the



favorite projects are those in which students have the opportunity to facilitate discussions and guide their own learning.

For those who have participated in collaborative projects using videoconferencing, the below data outlines with whom educators partnered.

There has been a drop in curriculum enrichment program participation being offered by content providers. The reason for this is evident in the responses given for distance learning challenges; funding, time and limited time slots when specialized programs are being offered. One obvious reason for this is that the instructional day is already full because teachers have a specific curriculum framework that must be followed. This leaves very little time for perceived extras or deviations from traditional instruction, in many cases. Also, at the secondary level in particular, it is still a challenge to pull students from various classes in order to participate in a program only being offered at a specific time. Many content providers have tried to combat this issue by offering some programs "on demand" when possible. Many content providers have also maintained a flat fee structure over the past few years, or instituted only a slight program fee increase. There is a continuous balance between assessing a program fee that schools can afford while also able to maintain a sustainable distance learning program.

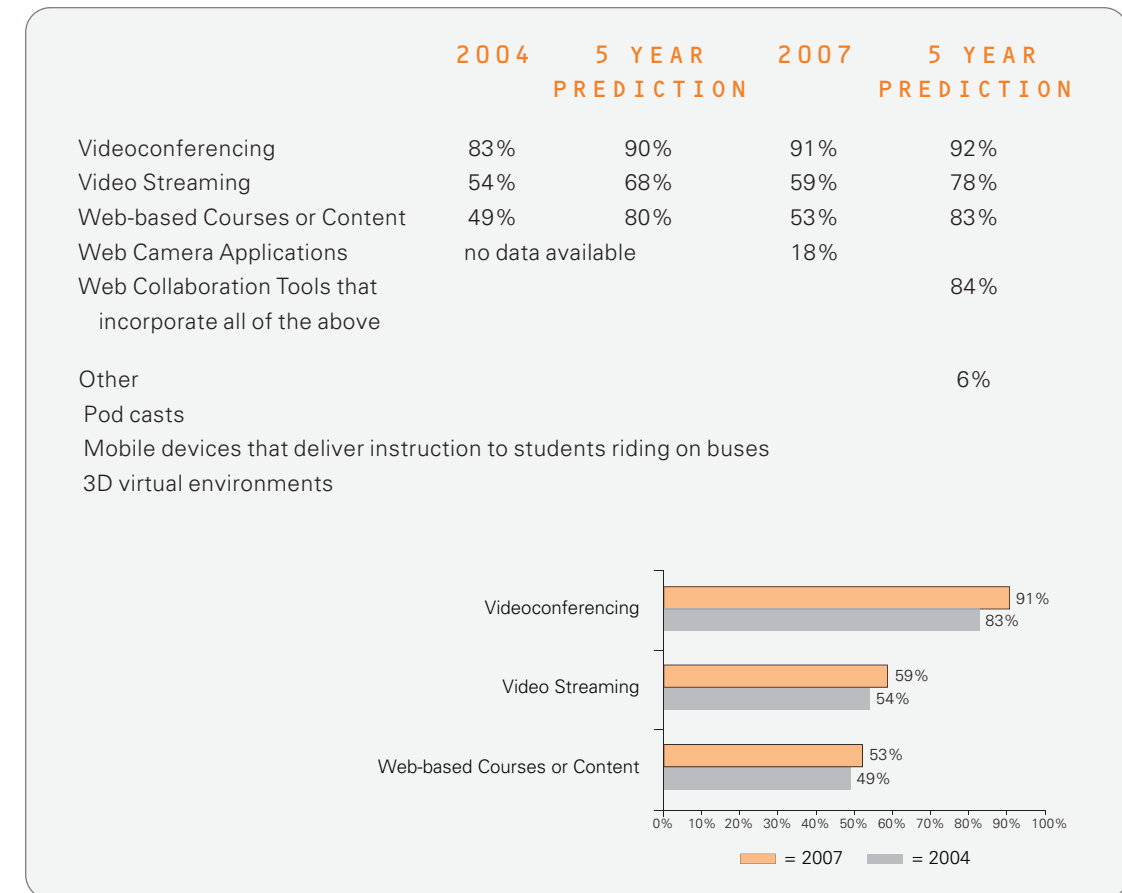
While there is a decrease in this category's utilization number, it is still the highest selected utilization response. It is also important to note that for many schools that have embraced distance learning and realized the benefits, creative ways to work around some of the funding and timing issues have and continue to be pursued.

OTHER TRENDS

When looking at network connectivity, 21% of the 2007 survey respondents connect via ISDN lines and 42% use the public Internet. Approximately 9% of the respondents have access to I2. There are still 3% of the schools surveyed that are part of a regional or state-wide ATM network. However, 25% of the respondents use some sort of a hybrid network solution, or have the choice to use ISDN, the public Internet or I2 for their connectivity.

These numbers are actually fairly consistent with the 2004 data. ISDN connectivity is up only 1%, from 20% to 21%, however public Internet connectivity increased 18%, from 24% to 42%. This increase is partially because in 2004, 49% of the surveyed schools stated they could connect using either ISDN or IP. The 2007 data shows that only 25% of schools use a hybrid solution which includes those with multiple network choices. It is likely that some of the schools from the 2004 data that could connect via ISDN or IP may have dropped their ISDN service and are connecting through the public Internet exclusively.

Education institutions were also asked to what extent different distance learning technologies are being utilized today versus what they predict it to be in five years. Interestingly, the 2007 data supports the five year predictions offered in 2004.



The obvious conclusion that can be drawn from the above data is that more and more distance learning technology is being utilized in educational institutions today. In 2004, end users were optimistic about their future distance learning technology utilization, and current trends support their predictions. While survey respondents are all primarily videoconferencing users, the data shows that videoconferencing utilization will remain consistently high, and other distance learning applications will continue to significantly increase. Below are comments that were made by survey respondents.

Challenges: troubleshooting inter-state and multi-site connections, firewalls, making exchanges more personal, continued funding, scheduling, communication, training, getting end users comfortable with technology, preparation time, administration buy-in and support, emphasis on standardized testing, having dedicated space for distance learning, available bandwidth, moving equipment to accommodate needs, permanent equipment location, network quality of service (QoS), and it has been hard to keep up with interest and demand.

Greatest Benefit: equal access to curriculum and instruction, ability to reach beyond traditional walls, unique and authentic learning opportunities, making the class experience real and relevant to global issues and student lives, money and time saved for professional development, students engaged and motivated to learn, increase in professional development enrollment, students are still able to take "field trips" electronically while bussing costs continue to soar, expanded course offerings, shared resources, ability to develop true global communities with international collaborations, expanded cultural understanding, cooperative distance learning programs help keep money in the district, communication and informed personnel, expert taught classes, and content can reach those who need it the most.

Contributions to Success: administration support, getting teachers comfortable with the technology, teachers who are willing to take a chance, teachers who want and have a need to communicate with someone, thinking outside of the traditional education box, introducing students to the technology and setting expectations, excellent communication, marketing, training and support, a variety of programs that meet curriculum needs and state standards, support organizations like CILC, cooperation among regional and state networks, ease of use and equipment reliability, moving to independent connectivity, state and/or federal funding, and commitment, persistence and hard work.

Note: Every effort was made to include all responses provided. Many responses were similar in nature and therefore exact wording may not be listed.

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 visual 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 being 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 visual 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 the school district's funding options for acquiring and maintaining visual communication technology
 - a. Explore annual capital improvement budget, 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

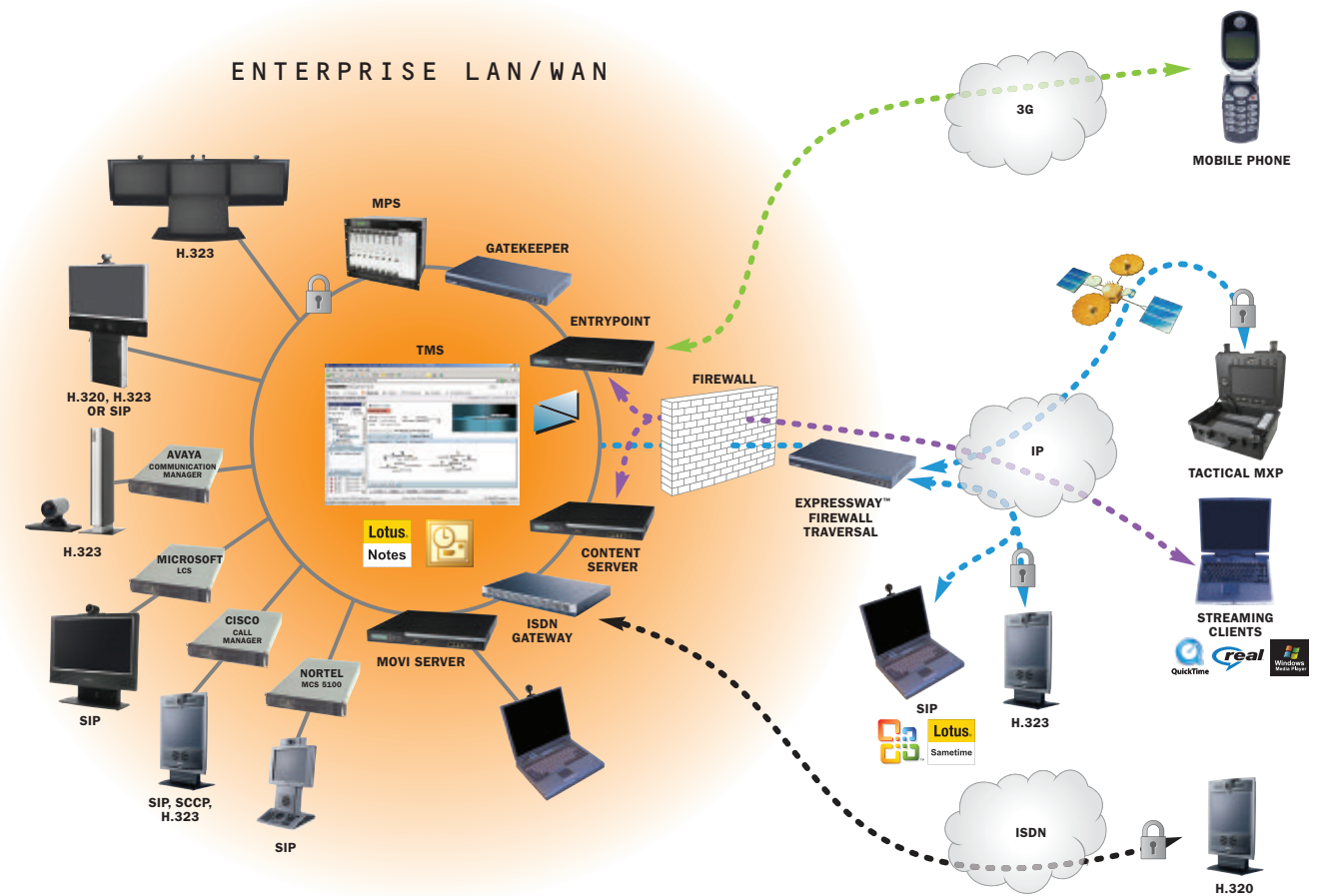


WHAT COMPRISES VISUAL COMMUNICATION TECHNOLOGY?

As educational organizations of every size and function adopt visual communication solutions, thoughtful consideration must be given to the role video will play in daily processes and productivity, the planned scope of deployment and the requirements these video solutions must meet in terms of current and anticipated user needs.

Looking at your video architecture from an organization-wide view is essential, enabling you to plan for the ongoing needs of your organization as you select video systems that are the best fit for your requirements. By keeping in mind some of the key challenges for the technology (such as handling mixed ISDN and IP environments, firewall/security and dialing scheme issues, etc.) as well as foundation concepts (the importance of standards-based architectures, legacy and multi-vendor environment accommodation), decision makers can make wise purchasing decisions that will ensure long-term performance and provide maximum return on investment.

The TANDBERG approach to developing a comprehensive video architecture is unique — only TANDBERG offers this breadth and depth in complete, end-to-end solution capability. From endpoints to infrastructure, from management software to secure firewall traversal, TANDBERG leads the industry with innovative solutions, and is historically first to integrate the latest technologies across its entire product line.



MANAGEMENT

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

VIDEO SYSTEMS

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

INFRASTRUCTURE

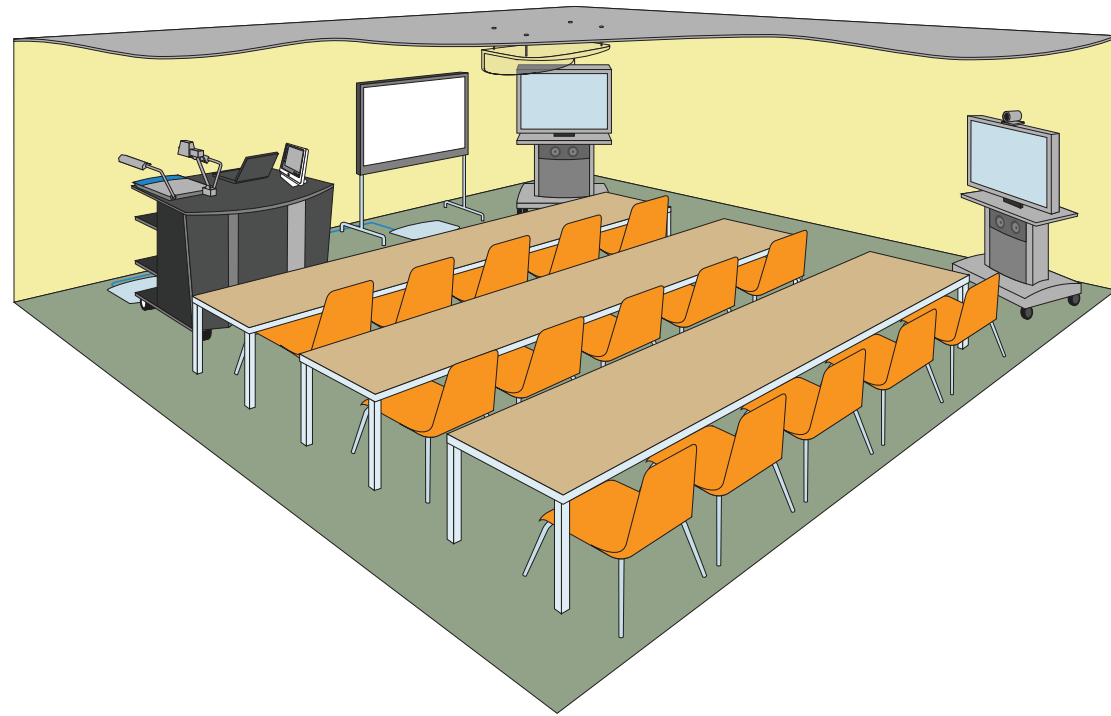
Network infrastructure is at the heart of any distance learning program. These products make it easier to connect outside the campus, facilitate multisite calls and allow the recording and archiving of classes, meetings and projects. Gatekeepers, Border Controllers and Content Servers help to make the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

SERVICES

For seamless installation, adoption and usage, vendor services are critical. It is important to choose a vendor with solid programs in place to ensure investment protection and extend the lifetime of the products. We insure that professional development as well as technical training is available.



The layout and arrangement of videoconferencing equipment in a classroom is one of the most important elements in the successful application of distance learning technology. In a typical room configuration, there are a variety of components, including a podium, a video touch screen, a document camera, locator mat(s), an electronic whiteboard, a microphone, a presentation computer and two video monitors with built-in cameras. The diagram below shows an example of an appropriate arrangement for a K-12 educational environment using various distance learning technologies.



In the front of the room is the instructor podium, which includes the video touch screen unit, document camera and space on the top surface for a computer monitor or laptop computer. Underneath the podium is space for a PC tower, instructional materials and additional equipment such as a DVD or VCR unit. The video touch screen unit is the main control panel for the system, enabling educators to control all aspects of the lesson, including peripherals, DVD players, etc.

To the right of the podium is the electronic whiteboard, which is capable of displaying the information written on it on the front and rear monitors, as well as on the monitor at one or more remote locations. The large front video monitor is intended for the students, allowing them to see the activity at the remote location, as well as the images used by the teacher. The instructor cart and monitor serves two purposes: 1) to enable the teacher to maintain eye contact with the onsite class and the students or participants at the remote location, and 2) enables the teacher to see the activity at the remote location and respond appropriately. This ensures real-time interaction, as teachers are engaged with both groups of students simultaneously.

A ceiling-mounted microphone enables the teacher to move around the room with ease. The locator mats, often found behind the podium and/or directly in front of the white board, allow the teacher to move during the presentation by automatically tracking the mounted cameras to actual teacher location.

While this scenario is typical for classes taught at a distance, it is by no means absolute and various system components can be rearranged based on the educational setting and student needs.

VISUAL COMMUNICATION ENDPOINTS AND PERIPHERALS

Visual 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.

These 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, but in some cases are more effective.

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/VCR Player/Recorder	Enables content from these mediums to be sent through the visual 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 visual communication system
Additional Cameras	A secondary camera provides remote learners with a different view of the instructor, on-site students and experts, or display materials located elsewhere in the classroom or facility
Pressure-Sensitive Mats	Placed in strategic locations, which when stood upon automatically move cameras to the pre-determined location
System Control Source	Touch panel, which integrates all visual communication equipment controls for ease of use
Streaming and Archiving	Enables live video content to be streamed over the web Archiving Capability for access from any computer and provides access to this content for future use

With peripherals, visual communication offers educators many options to engage students and foster interaction. Once educators see the possibilities and simply have an idea about how to support or enrich their curriculum, connecting to experts or other schools requires only pressing a few buttons.



NETWORK INFRASTRUCTURE

For any visual 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 visual 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)
- VPN (Virtual Private Network)
- HVEN (Halo Video Exchange Network)
- ATM (Asynchronous Transfer Mode)
- LAN and WAN (Local and Wide Area Networks)

PROTOCOL AND STANDARDS

The International Telecommunication Union — Telecommunication Standardization Sector (ITU-T) is the organization responsible for identifying quality standards (recommendations) for all telecommunication. This is vitally important so that different visual 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 visual communication equipment, network and activities.

Some of these components include:

- Content Server** Facilitates on-demand access to content via the internet and “casting” to mobile devices.
- Gateway** Provides interconnectivity between different network types (i.e., ISDN or H.320 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.
- MCU (Multi-point Control Unit)** Enables multiple sites to connect simultaneously in a single or multiple conferences. 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) as part of their basic functionality or a software upgrade.
- Firewall Traversal** Enables visual communication equipment to connect in to 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 and test systems, and troubleshoot technical issues.
- Collaboration and Application Sharing** Many visual communication equipment solutions have optional software upgrades that provide for 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 providers’ site where distance learning program information can be found, and the name listed is the distance learning contact person.

CONTENT PROVIDER AND WEBSITE

- Albany Institute of History and Art**
www.albanyinstitute.org/resources/distlearning.htm
- 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
- Cleveland Institute of Music**
www.cim.edu/dlPrograms.php
- The Cleveland Museum of Art**
www.clevelandart.org/educef/distance/HTML/index.html
- COSI Toledo**
www.cositoledo.org/programs/p_idl.htm
- Indianapolis Zoo**
www.indyzoo.com/content.aspx?cid=267
- Mote Marine Laboratory**
www.seatrek.org
- Reef, HQ Australia**
www.reefed.edu.au/reefhq/reef_video_conferencing/index.html
- Rock and Roll Hall of Fame**
www.rockhall.com/distancelearning
- University of Texas Institute of Texan Cultures at San Antonio**
www.texancultures.utsa.edu/education/video.html
- Vanderbilt Virtual School**
www.vanderbilt.edu/virtualschool
- VOS Spain**
www.vosspain.net

DISTANCE LEARNING CONTACT

- Tracy Grossner**
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- Distance Learning Coordinator**
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- Patty Petrey Dees**
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- Lorrie Bryant**
lbryant@brownsburg.k12.in.us
- Dr. Mark George**
axp99@case.edu
- Ms. Dale Hilton**
dhilton@clevelandart.org
- Andy Campbell**
campbell@cositoledo.org
- Distance Learning Coordinator**
dlearning@indyzoo.com
- Kasey Gaylord**
contact@seatrek.org
- Mr. Fred Nucifora**
education@reefhq.com.au
- John Goehrke**
education@rockhall.org
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ABOUT THE WRITERS**LINDA LENTZ**

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Linda Lentz brings 16 years of experience and leadership in the distance learning industry with expertise in K-12 education, informal learning and healthcare video applications. As the former Chief Learning Officer and co-founder of an Indiana based communications technology firm, Linda has created products and services that support clients with the deployment, integration and utilization of videoconferencing, video streaming and web conferencing solutions. Flagship projects include the design and development of custom web based content portals that include programming resources, collaboration tools, scheduling, billing and activity tracking capabilities for K-12 schools, content development for renowned academic, cultural and informal learning institutions across the country, development of a variety of end user training, planning, assessment and evaluation instruments for visual communications technology, and oversight and management of a state-of-the-art Telehealth project for a major Midwestern hospital and their affiliate critical access hospitals.

Linda received a B.A. in Elementary Education from Purdue University and an M. A. in Economic Education and Entrepreneurship from the University of Delaware. She serves on the Executive Committee for the Indiana Council for Economic Education, various education advisory councils for informal learning institutions and was a founding Board member of the Indiana Distance Learning Association (InDLA) where she is currently President Emeritus. Linda is pleased to participate in the International Society for Technology in Education (ISTE) SIG IVC Research and Resources Group.

**JAN ZANETIS**

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Jan Zanetis, a career educator, is the Market Development Manager for Education at TANDBERG, a 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 thousands of hours of interactive video lessons for K-12 classrooms featuring Vanderbilt faculty as presenters. The Virtual School became a leading distance learning provider in the U.S. during her directorship.

Jan became internationally known for presenting professional development sessions for educators. She co-wrote the book "Videoconferencing for K-12 Classrooms: A Program Development Guide" and is working on a companion book. She serves as the Chair of the Special Interest Group within I.S.T.E. that focuses on Videoconferencing in education. Jan serves on the board of the Tennessee Distance Learning Association and will be joining the Board of Directors of the U.S. Distance Learning Association in November, 2007.

ACKNOWLEDGEMENTS

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



29-90 Distance Learning Consortium and the Dakota Digital Network

Clarian Health

Cleveland Museum of Art

MOTE Marine Lab Challenger Learning Center in Brownsburg

Museum of Tolerance

Scott County Schools District

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 from 28 states and 3 countries representing urban, suburban and rural communities. Your contribution has provided a fairly comprehensive data sampling from all geographic regions across the country, and your time and effort is greatly appreciated.