



A Vaddio Whitepaper

Video In Education Paradigm Shift

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Today's students communicate with iPhones, iPads, and BlackBerrys. Integrators need to find new ways to move technology into classrooms and distance learning rooms.

The current generation publishes on the web, demands instant feedback, and lives in the world where they are free to be creative, innovative and autonomous. They are not dependent on time or place. Take away their communicators and you take away their ability for instantaneous communications.

The use of video in education offers a world of opportunities beyond the virtual field trip. Students are growing up in a digital age and are seeking innovative ways to learn and collaborate with others. They constantly multi-task, mixing a variety of media to serve their needs at a moment's notice. No longer do they wish to only rely on the talking heads of teacher's in a traditional classroom setting. Educators should be encouraging students to work together wherever and whenever they wish. This is called collaboration and it begins in the classroom.

Building a consistent front end will allow schools, colleges and universities to teach from a consistent platform. The "back end", or engine, may change with each new innovation. Consistency in the classroom will allow for the creativity, innovation and autonomy today's students seek. The objective is to understand that a consistent high-tech classroom can remain and grow. Tracking cameras for instructors, student camera and touch-to-talk microphones for remote students, video whiteboards, high definition document cameras, and fully integrated computers will drive the content and make it easier to communicate.

Given that new technologies and delivery systems will be introduced every year, why change the front end every time a new "engine" is developed? Add videoconferencing, streaming, video-on-demand, Skype, and cloud computing, but do not change everything just because students demand an addition to their communication inventory.

In this article, learn about the video paradigm shift, how the distribution of content is changing the way information is accessed, and how to make the best use of video technologies to engage students at school or wherever they might be located, and at any time, day or night.

The Education Marketplace Today

It is important to be aware that video today is not the video of the 90s. Early adopters of the technology grew up believing that one must pay attention on a video call, "see the whites of their eyes and watch them sweat". The digital generation doesn't view video the same way. Rather, video is another tool in an arsenal of tools used to exchange information. Students are constantly multi-tasking with their media tools, often using several tools at the same time. Video is a tool added to that mix and when it is important to view someone's reaction, or see visual content, they will pay attention to the video message. Video must be easy to use with zero learning curve, accessible

on a variety of platforms, and video calls must be able to be made on the fly, whether or not it is a one-on-one video call or a multipoint video call.

Because video today is available on a variety of platforms (think computer, personal hand-held device, television, appliance), can be accessed from many locations, is more flexible to set up, and easier to use, there are more widespread classroom opportunities, as well as having video available at home and at other locations outside the classroom for students and educators to access video as needed.

Unfortunately, organizations have not kept up with the rapid pace of change. Traditional videoconferencing environments focus on conference rooms or classrooms where the videoconferencing codec (brain of the system that codes and decodes the video signal) is viewed as the heart of the technology. Conference rooms and training rooms are still being built from a traditional audio visual and/or IT perspective. There is a rapid shift away from traditional rooms to podcasts, streaming rich media, and video on demand. AV and IT personnel need to be ready for this change and start paying attention to what 6th grade students are now using to communicate. The days of "Star Trek communications" are now here! Students are going to attend schools where technology is up-to-date and allows them the constant communications they use on a daily basis. Educational institutions who do not provide the tools, technology, and applications for their students risk becoming public housing.

Video communications need to be portable, easy to use, on-demand, wireless when necessary, and allow people to attend classes from anywhere at any time.

Communication Options

Integrating technology into the teaching and learning environment is changing how students learn. Video is more than talking heads. The technology now allows information to be accessed when needed, recorded for future reference, and streamed to many sites to view at the same time. Quality learning takes place when students connect with information and can internalize it in a way that alters or enriches their thinking.

Classrooms today are any locations where the convergence of instruction and learning can take place. These new classrooms include online sessions, collaborative sessions, and other virtual experiences, in addition to traditional teaching sessions. Students may also be working from home using computers, hand-held devices, and their home TVs to participate in video calls. Regardless of the setting, students and teachers expect to have access to resources that support the learning process.

Today applications reside on PCs and most technology has some form of a computer built into it. It is time to abandon the proprietary black box and hardware and purchase tools that can be reused as technology changes. Additionally, cloud computing technology is evolving where applications, as well as data, text, audio, video, etc. reside in the "cloud" reducing the processing and storage burden on local devices, (e.g. CPU computing power, memory size, local storage,

etc.). The drudgery of keeping up with the latest software through purchases and downloads will be minimized. The responsibility of policing phishing, viruses, piracy, etc. will be shifted to the "cloud" service provider. Compatibility and legacy of applications will become a service provider issue.

What Changes? What Stays The Same?

Technology continues to change at a fast pace and it is important to understand which aspects of video technology can be reused and which aspects need to be upgraded as technology changes. Purchase devices that can be reused as the black box changes or are software based and only require an upgrade.

These devices can be divided into two components: **front end** and **back end**.

Build a consistent and easy-to-use front end. Deploy auto tracking cameras for instructors, student cameras, and microphones. Embed the video whiteboards, place document cameras where needed and provide simple and easy use control systems. What changes is the fact that the entire room doesn't have to change when the engine changes.

Front End Components:

- Microphones
- Cameras
- Displays
- Control systems

Instructor and Student Microphones

At least one microphone is needed to be heard by the distant site. Many of the microphones are already built into the equipment being used. However, when many people are in the same room, the number of microphones selected will be determined by the number of people needing to be heard and the size of the room. Placement of microphones and type varies (i.e. hand-held, lapel, and table top). Quality audio is just as important as quality video, so do not skimp on microphones and their placement.

Instructor and Student Cameras

Video systems include at least one camera and, again, quality is an important factor to ensure clear images. There are a variety of camera options in videoconferencing including document cameras, presenter cameras, cameras that track the speaker, and multiple cameras to cover multiple angles in a room. Cameras are now appearing in many portable and hand-held devices (i.e. telephones, hand-held devices, flip-cams, etc.).

Displays

The images need to be viewed on a display which could be a monitor, screen (rear or front projection), and electronic writing surfaces. Speakers are also required for audio reception. Many systems use multiple displays to show images of people and graphics at the same time.

Control Systems

Video systems have some type of controller to operate the equipment. The controller can be a touch-screen panel or a hand-held device. The control of the system can also be

remotely done or transparent to the participants.

While all technology changes over time, video front end components tend to offer stability and need less updating.

Creating a strategy to standardize on a viable audio and video front end helps minimize constant changes. Select high quality microphones and cameras to ensure calls can be heard and people and data can be clearly seen. A versatile control system is also recommended with easy to use interfaces so users can participate in their calls with simple menu picks.

Once the proper front end devices are selected they can remain the same, and sites will only have to worry about the changes in the back end equipment (i.e. processors, carriers, storage and streaming).

Back End Components:

- Processors (codecs & bridges)
- Network providers
- Storage
- Streaming

Processors (codecs & bridges)

A codec (coder/decoder) is the heart of a videoconferencing system. It is a computer that handles the compression and decompression of the video and audio signal. Codec processing has rapidly changed in a short period of time, much as computers have changed. The codec is the device in the videoconferencing system that is most likely to need upgrading on a regular basis. It is recommended that facilities be designed to be codec agnostic so that any codec will work with the system.

A bridge is used to connect multiple sites together during audio, web and video calls. Bridging technology can be built into the video equipment, resident as a stand-alone device, or part of the network.

Network Providers

The "pipe" that carries the video from one point to another is delivered by a network provider, which today could be a cable company, a telephone company, or an independent provider of networking services. Video quality depends on the bandwidth quality and the delay or latency of the call. Calls going over multiple networks may cause more delay, and thus, poorer video quality. The variety of network types has changed over the years and continues to change as carriers develop and deploy new network offerings.

Storage

Many organizations now record and save their video conferences to allow review of the material at a later date or retrieval of the information by those unable to participate real-time. Instructors may also wish to make their lectures available as a podcast or have the information archived internally. This affords instructors and students the ability to receive information when it is most needed and save it to review again at a later date. The goal is for flexibility in accessing information whenever it is needed.

Streaming

Streaming video solutions combine high-end video and

audio with synchronized slides and interactivity to produce compelling messages to educate and inform. Streaming solutions have been designed as self-service offerings, eliminating the need for technical support. Educators can now share their courseware with students scattered in a variety of locations. The students can access the information real-time or on demand.

Remember, a video is only as good as its weakest link. This means if you spend a lot of money equipping a chancellor's office and less money in outlying classrooms, the call will only be as good as the outlying classroom. This adage is especially true for audio. If someone dials into a video call on a cell phone and they happen to be in a car driving on a noisy highway, that noise will be heard by all. Be sure to select the same quality of equipment to be deployed at all sites to ensure consistency. This also applies to camera images. Don't assume you can improve the quality of video images recorded on an expensive camera.

A number of schools are already aware of the value in keeping the front end consistent and are sharing their most recent applications for use of video in education.

Customer Applications

Stanford Graduate School of Business

Goal: To provide flexibility in the capture and use of video for instruction.

The Knight Management Center, the new home for the Stanford Graduate School of Business, opened its doors April 29, 2011. The Knight Management Center is composed of eight buildings "designed to meet diverse current instructional and technological demands, as well as future needs."

A new video infrastructure for distance learning, class capture and videoconferencing was installed in the new building. Fifteen classrooms have the ability to control cameras remotely. The facility is using Tandberg codecs, video capture provided by Digital Rapids, and Vaddio HD18 cameras.

Bryan McCann, Instructional Technology Manager at Stanford Graduate School of Business stated, "This infrastructure, including tools like the Vaddio cameras, will allow us to connect more effectively with the world outside the walls of the GSB, bringing in alumni and exploring the potential for distance learning and other modes of video based instruction."

Idaho State University

Goal: Reduce dependence on the need for system operators.

Idaho State University has 25 video classrooms in which 300 – 350 hours of distance learning classes are held each week between four major locations. Many of the distance learning rooms are booked from 7:30 a.m. – 10:00 p.m. each day. The school has 20 + years experience with distance learning and desires to reduce the overall dependence on system operators to manage the facilities.

Over the past several years, Idaho State University has implemented ProductionVIEW, ControlVIEW, MicVIEW, StepVIEW and IRVIEW products from Vaddio to help automate the distance learning classes. "Installing Vaddio equipment has allowed Idaho State University to reduce the number of system operators, which gives the university more money for other projects," stated Jim Dalley, Distance Learning Video Network Manager. He further explained that because of student schedules finding good operators is often difficult and once they are trained the school doesn't get enough time to use the students' expertise, since they graduate so quickly. As a result, Idaho State University plans to make more rooms fully automatic to ease the burden of trying to find operators. This will be done by deploying more Vaddio technology in these rooms that are not already fully automated.

University of Minnesota

Goal: Automatically record classes for an executive MBA program.

The Carlson School of Management at the University of Minnesota had a need to record classes for an executive MBA program without the involvement of a technical staff or an operator in the room. They selected the Vaddio TrackVIEW camera system to follow professors around the room and use the Vaddio MicVIEW and ControlVIEW to capture student questions.

Vikki Anderson, Classroom Technology Coordinator stated, "The technology is seamless. It has made everything so easy."

In addition to class capture, the technology is used to live stream seminars 4-5 times a semester for the schools MIS Research Center. This is done without the need to be there to set up equipment and lay down cables. Everything is now automated and all five rooms can be easily managed online.

The University of Minnesota would next like to add Vaddios Squiggle Video Whiteboard to allow students to see what is happening on the white boards during the lecture capture.

Summary

The paradigm is changing. Classrooms and training rooms are becoming an important part of the decision process for CIOs and IT departments. Building a consistent and easy-to-use front end will allow students and educators to benefit from changes in technology, with only the back end components needing change. Distance learning, streaming, recording, distribution via web links are all readily available technologies. The engines will change and grow, but the consistency of the front end classroom will remain the single most important piece of the solution. Carefully selecting, quality front end products will allow organizations to cost effectively reap the benefits of video communications for many years without the need to constantly change all aspects of technology as the engines change.

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About Vaddio

Vaddio, based in Minnesota, makes robotic camera technology easy to use and even easier to install. Vaddio serves integrators and operators with broadcast-quality PTZ cameras and control systems to deliver the performance needed with the convenience demanded. For more information, visit www.vaddio.com.