



A Guide to Implementing PowerPoint and Overhead LCD Projectors in Communication Classrooms

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Abstract

While a growing literature exists on the proper use (or abuse) of such software in supporting oral presentations, few studies report on exactly how to raise monies to purchase equipment, choose and install the proper technology for a specific type of classroom, and properly train faculty in using this equipment. This article address that gap by providing practical advice on incorporating PowerPoint into communication classrooms.

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Across the country, communication administrators and concerned faculty are coming to terms with what role technology—and specifically presentation software such as Microsoft's [PowerPoint](#)—should play in their department's curriculum. Scholars in the discipline ([Atkins-Sayre](#), Hopkins, Mohundro, & Sayre, 1998; [Daniels](#), 1999; [Downing](#) & Garmon, 2001; [Griffin](#), 1995; [Smilowitz](#), 1999; [Yook](#), Long, & Emmert, 1999), [Communication](#) Research and Theory Network (CRTNET) participants, and journalists ([Boss](#), 2000; [Denison](#), 2000; [Endicott](#), 2000; [Jaffe](#), 2000; [Maney](#), 1999; [Nunberg](#), 1999; [Stewart](#), 2001; [Zuckerman](#), 1999), have all argued the appropriateness of using such software to visually support oral presentations.

Prior research on instructors' use of PowerPoint suggests that students—especially visual learners and those for whom English is a second language—have an easier time taking notes and understanding the organization of course material from instructors who use presentation software ([Atkins-Sayre](#), Hopkins, Mohundro, and Sayre, 1998; [Daniels](#), 1999). Employer surveys ([Chalupa](#), 1997; [Davis](#), 1997; [Griffin](#), 1995; [North](#) & Worth, 1997) and government reports ([U.S. Department of Labor](#), 1992), also support communication faculty's efforts at training undergraduates in the appropriate use of presentation software and other related technologies. For instance, [Davis](#) (1997) surveyed 150 human resource professionals who regularly recruited at Cornell University. Eighty-three percent of respondents indicated computer competency skills as either "important" or "very important" in their hiring decision (p. 74). Additionally, most respondents in this survey (75%) wanted at least "basic" presentation software skills from their applicants.

Administrators face the key problem of exactly how to go about incorporating such technologies into their communication classrooms. Issues range from how to fundraise outside monies for equipment to making the most appropriate purchasing and installation decisions for their department. The focus of this essay is not centered on the debate on the appropriateness of PowerPoint, but instead it provides a "user's guide" to those faculty who plan to incorporate the use of presentation software into their curricula. Most important, this article addresses an existing gap in the literature about the use of presentation software in the classroom; namely, how to proceed in purchasing, installing, and maintaining such equipment. This installation began in September 1998 when both of the authors were faculty in the [Department of Communication](#) at [Western Kentucky University](#).

We first report our stimulus for the project, a recommendation made by our department's Advisory Board that we include PowerPoint training in our curriculum. Next, we describe the necessary fundraising process that enabled us to purchase the specific equipment to carry out the Advisory Board's request. Then we detail the equipment we purchased for our department, including the presentation software, the overhead projectors (including the types of cabling needed, and the hardware to ceiling mount the projector), the computer, and the different types of carts/computer consoles to house this computer. Next, we explain why selecting the appropriate type of mouse technology is paramount to a successful installation project. We then suggest processes for maintaining the equipment. Finally, we provide the three most important lessons we learned from this experience.

Recommendation for Instruction

Early in fall 1998, our department created an Advisory Board composed of employers who historically hire our undergraduate corporate and organizational communication alumni. One of their recommendations was that our faculty needed to teach our undergraduates how to use presentation software and how these students should incorporate this technology into their oral presentations. Our department decided that the most appropriate venue in our curriculum to teach PowerPoint was in our two basic communication courses. Since university student must take one of these two courses to fulfill their General Education requirements, we would, therefore, train all undergraduates.

Next, we conducted a literature review for "Best Practices" in the area of software implementation. A robust literature already exists in the Management Information Systems (MIS) literature on the success factors necessary to implement a new technology into an organization. Typically, these eight factors serve as predictive criteria leading to computer usage within organizations (Klein & Ralls, 1995):

- the technology quality and availability
- adequate training to use the software package
- user support within the organization
- top management support of the implementation
- user involvement/participation in decision-making regarding the decision to adopt the technology
- the time employees are given to experiment with the new technology
- the rewards (both intrinsic and extrinsic) the employees are given to use the technology
- the collaborative social norms that exist within the organization.

The authors met with interested departmental faculty and, out of these eight success factors, we developed our own shared set of objectives for the project, to include:

- Obtain the Dean's support for the project
- Solicit participation in decision-making across the varied departmental constituencies (students, part-time faculty, full-time faculty, support staff, and alumni)
- Learn lessons from similar installations around campus—especially around the choice of a projector
- Purchase state-of-the-art hardware, software, and peripherals
- Install the equipment in the General Education classrooms (where the greatest number of students can use it)
- Develop a reward and recognition system to encourage faculty to use the equipment
- Train all instructors, especially those who teach public speaking courses, in how to use PowerPoint, the projection equipment, and the importance of securing the equipment so it is not stolen
- Ensure that the equipment is easy for faculty to use
- Train support staff and a student technician to troubleshoot the equipment
- Develop an ongoing maintenance schedule to maintain the equipment and upgrade the software.

Accessing Necessary Resources

Heeding the advice of our Advisory Board, interested faculty, and select students we consulted, the authors searched for the funds necessary to install a computer (with presentation software) and an overhead projector in each of our five General Education classrooms. In total, we estimated this project would cost \$25,000. Knowing that the university could not provide this total sum, we asked our Dean to match any outside money we raised for this project. The Dean agreed to this match.

At this point we had to find real money for equipment. One of the authors called on her personal and professional contacts in the community and five individuals from local businesses pledged \$11,000 to our project. Outright gifts included \$6,000; for the additional \$5,000, the authors bartered onsite communication training at the company that pledged this gift.

We found that our successful fundraising depended on three principles: a personal relationship, a goal that could be clearly identified for the potential donor, and a low-key approach. We first identified individuals in our community with whom we had positive personal relationships, but who had no history of contributing to our university. These were also civic-minded individuals who employ our university graduates and recognize the value of a locally-educated workforce. Each of these persons understood the wide implication this technology would have on our undergraduate population so each realized the significant impact of their relatively modest donation.

In each approach to the donors, the authors presented a general discussion of the perceived value of such training to the students and their future employers. We gave each prospect a clear and concise chart of costs and uses for the money that demonstrated the number of students to be taught. We did not request any specific amount, but asked each business person to give at her or his comfort level.

Since one of the eventual donors was already recognized as a very successful fundraiser, we asked for his advice on how to structure our project. He not only gave cogent suggestions for the fundraising campaign, but also presented us a check!

With these funds in hand, we returned to our Dean who, true to his word, matched our \$11,000 pledge. A prominent alumni of our department (now a computer executive in Silicon Valley) pledged \$17,000 in equipment grant monies for the project; in total, we raised \$39,000 for this project.

Selecting Equipment

Money in hand, we now had to decide on the appropriate technology for our classrooms. With the exception of one campus expert who had just led a similar installation in his department, we found very little local guidance on this project. This experience spawned a primary goal for this article—to share with other communication departments the lessons we have learned from this experience. [Table 1](#) provides an overview of the specific equipment we purchased for this project; the rest of this paper details the buying decisions for each of these components.

Table 1: [Equipment Purchased for Communication Classrooms](#)

Equipment Description	Part #, if applicable	Cost	Source
Software			
Microsoft Windows 95			
Norton AntiVirus Corporate Edition 7.5			
Netscape Browser 4.73			

Microsoft Internet Explorer 5.5			
QuickTime 4.2.1			
WinZip 8.0			
Adobe Acrobat Reader 4.05c			
Microsoft PowerPoint 2000 Viewer			
Microsoft Word 2000 Viewer			
Norton Ghost 2001			
Boxlight DLP Projector and Accessories			
Boxlight DLP Projector	CD-450m	\$2,700	Tara Neuswanger, Boxlight Educational Specialist , 800-762-5757 x270
Boxlight 40' Video Cable	210	\$168	
Ceiling Mount for Projector		\$65	A machinist/welder from our facilities management group on campus created our mount; a ceiling mount kit is available from Boxlight for \$465
Kensington Master Lock (universal notebook security cable)	Mgt Part #: 64032	\$39	J & R Music World Computer World
Audio and Video Wiring (to Connect VCR to Projector)			
50' Shielded 20GA 3 CON Wiring (3 strand)	BEL-8772	\$10	
4 RCA Male Plugs (video)	GC-33-132-BU	\$2.10	Randolph, Hale & Meredith, Inc. , (270) 781-1460
2 Phono PIN Male Plugs (audio)	GC-33-131-BU	\$1.05	
Mobile Carts, Computer Carts, and Computer Consoles			
Luxor Mobile Cart (24" wide x 18" deep x 42" high)	Catalog #: AH-BW	\$199	K-Log Furniture, College Division , (800) 872-6611
Luxor Locking Cart (32" wide x 24" deep x 44.5" high); Model LTCS-40	Catalog #: BC-102	\$449	
Under-desktop keyboard drawer for locking cart	Catalog #: VKB-2	\$49	

Nova Workstation (choice of CPU on left or right-hand side of console)	85-0-1331	\$1,121	Nova Solutions , (800) 730-6682
Installation and Electrical Work			
Installation of ceiling mount, installing projector and cabling (with dedicated electrical switch for projector), and other electrical work		\$400	Work performed by our university's facilities management group
Computer and Remote Mouse			
IBM PC 300GL/6277 mini-tower model; 366 Mhz; 32MB, 4.2G Hard drive, 32X CD-Rom	IBM Part # 627735UO	\$1,149	IBM Corporation
16-Bit Sound Card	IBM Part # 76H1852	\$65	
Kingston 10bt Ethernet Adaptor	IBM Part # KINKNE 40T	\$27	
Remote Mouse (digital radio technology, not line-of-sight)	Logitech Trackman Live!	\$130	J & R Music World Computer World

Presentation Software

There are four presentation software packages available to consumers—PowerPoint [2002](#) for PC ([PowerPoint 2001](#) for Mac), Harvard Graphics [Pro Presentations II](#), Corel [Presentations 9.0](#), and [Astound 8.0](#). There are few differences between these software packages, but clearly PowerPoint is the leader in the industry ("[PowerPoint](#)," 1998).

Assuming that a department decides to use PowerPoint, one can either purchase PowerPoint 2002 (part of the [Office XP](#) Suite) for each classroom computer (approximately \$35/computer if the university purchases a site license) or one can download the free [PowerPoint Viewer 2000](#) program from Microsoft's Website. Installing this program on the classroom computer allows faculty and students to view PowerPoint (2002, 2000, 97, or 95 version) presentations without having the actual PowerPoint application on the computer.

Not only is this the less expensive option for a department, we have also learned that our faculty and students find it easier to open a presentation using this simpler Viewer program than using the PowerPoint application itself. The downside to using only the Viewer is that while the user can view and print PowerPoint presentations, the user cannot actually edit such files within the Viewer.

After a department has decided which presentation software package to adopt, it will need to purchase either an overhead LCD (Liquid Crystal Display) or DLP (Digital Light Processing) projector so the audience can view the presentation on a classroom's overhead screen.

Overhead Projectors

Buying an overhead projector for communication classrooms can be an overwhelming experience. In the early 1990s when this technology was originating, consumers had a choice between buying LCD Panels placed atop specially built and extremely bright overhead projectors (the kind used for overhead

transparencies) and a newer technology, the overhead LCD projector. The LCD Projector projects images to a size equivalent to a 80-inch large screen TV ([Kreitl, 1999](#)).

The LCD panel has practically been replaced by the LCD projector. To further complicate matters, an even newer technology called DLP (Digital Light Processing) was introduced in 1999 from [Texas Instruments](#). Today the market offers well over 200 different models of projectors from nearly 48 manufacturers. According to [McMillan](#) (1999), as of April 1999, [InFocus](#) had 56 percent of the market share for projectors sold through personal computer distributors. Its nearest rival was [Proxima](#) (17% market share), [Epson](#) (8%), and [Sony](#), (4%). These data were gathered by a market research firm in the Projector industry—the TFC.Net Corporation. After much research and discussion, our department purchased five projectors from the [Boxlight](#) Corporation.

Specifically, our department bought the [CD-450m](#) model:

- **Weight:** 7.4 lbs
- **Brightness:** 1000 lumens
- **Type of Projector:** DLP
- **Lamp Wattage:** 270 watt (1,000 hour bulb life)
- **Resolution:** SVGA, 800 x 600
- **Type of Zoom Lens:** Manual
- **Audio Capabilities:** 1 x 2.5 watt speakers
- **Educational Price:** \$2,700 (as of June, 2000)

In the following paragraphs, we discuss each of these features and how each feature is relevant to communication faculty.

In the consumer market for projectors, [Poor](#) (1999) states that weight tends to form the number one criterion for choosing a projector. This concern, however, should not be an issue for educators since most will not travel with the unit. Most projectors used in classrooms weigh between 15-20 pounds, though newer, three pound projectors are currently being introduced into the market ([Poor](#), 2001). Consumers, however, can pay up to a \$2,000 premium for these lighter projectors ([Bohannon](#), 2001; [Jantz](#), 2001).

Brightness emerges as the second most important feature to consumers when buying a projector ([Poor](#), 1999), and this feature is indeed crucial to educators. The brightness level of a projector is measured in lumens—the higher the lumen rating, the brighter the projector (and the higher its cost). In the current market, projectors range from 550 to 1400 lumens. Both [Jantz](#) (2001) and [International Communications Industries Association](#) representatives suggest that a 700 lumen projector provides bright enough light for most traditional classrooms; other reviewers ([Powell](#), 2000b) recommend purchasing a projector with at least 800 lumens. If the classroom does not have window shades, or if the artificial (overhead) lights do not have a dimmer switch, a projector with more than 800 lumens may be necessary. Studies indicate that the lumen rating needs approximately a 30% differential before the human eye can notice a difference in the brightness level of a projector. Thus, the human eye would have difficulty distinguishing the brightness of a 600 versus a 800 lumen projector, but would be able to see differences between a 700 and a 900 lumen projector.

If possible, your department should contact the educational sales representative for the projector you are interested in and arrange for a demonstration of different types of projectors in *each* of your classrooms. This way, you can gauge how many lumens are needed, given your specific environmental lighting conditions. Otherwise, you risk forever having students deliver presentations in darkened classrooms.

DLP Versus LCD Projectors

Closely akin to the projector's brightness—measured by its lumens—are the different types of internal engines that drive these projectors. Two types of projectors appear appropriate for communication

classrooms: DLP (digital light processing) and LCD (liquid crystal display), the same technology used by laptop computers. DLP projectors use the latest technology to offer a more accurate rendition of color and a sharper image than traditional LCD projectors (Patton & Burmark, 2000). One important difference between the two types of projectors depends on the type of lamp each uses.

DLP projectors use a higher watt bulb (270-watt lamp) than the LCD projectors (120-watt lamp). Product reviewers (Poor, 1999; Powell, 2000a) note that these 270-watt lamps project a good deal of heat from the projector (which can become a comfort issue in a small classroom) and, as result of this heat, the fan in the DLP projector can often be noisier than those in LCD projectors. Second, the lamp life on DLP units is typically 1,000 hours, compared with up to 2,000 hours from a LCD unit. Replacement lamps can cost up to \$400 each and, if the classroom is occupied all day (as in the authors' case where three of our classrooms are dedicated solely for General Education classes), long-term upkeep of these DLP projectors will be higher than LCD counterparts. The cost of the DLP projectors continues to drop, but one should carefully consider this tradeoff in purchasing this newer technology (versus the standard LCD projector).

Resolution of the Projector

The projector's resolution, or its ability to display fine details on the overhead screen, closely relates to the brightness of the projectors and the type of lamp it uses (120-watt versus 270-watt). The market offers two categories of resolution—SVGA (800 x 600 resolution) and the newer standard, XGA (1,024 x 768). Various product reviewers (Feierman, 2000; Powell, 2000b) agree that standard SVGA (800 x 600) resolution remains very popular today, and is appropriate for almost any classroom application. One would only upgrade to the more expensive XGA standard if the presenter were showing very detailed images, such as figures from an Excel spreadsheet, to class. For our purposes as communication educators, the SVGA standard should serve well. Currently, with the educational discount almost every distributor offers, educators can purchase a SVGA (800 x 600 resolution) DLP projector with 700-800 lumens (appropriate lighting for *most* traditional classrooms) for under \$2,500.

Size of the Classroom

Thus far we have assumed that a department will purchase the projector for a traditional classroom. In the case of usage in a larger lecture hall, a higher end projector—meaning more lumens and XGA (1024 x 1068) resolution—will be needed. Barco and Hughes/JVC manufacture these type of projectors. Such projectors often boast up to 2200 lumens of light, necessary since the image must be projected a greater distance in a large lecture hall than in a traditional classroom (a feature called *throw distance*). This type of a projector will cost two to four times as much as one for the regular classroom.

Mobile Cart or Ceiling Mounting

Initially at least, many, and perhaps most, academic departments may have the funds for only one projector available for faculty and students. This projector often resides on a mobile cart that faculty wheel into their respective classrooms. Various issues can arise from this setup: problems in scheduling, trying to get the unit to the next faculty member after a class (often on another floor of the building), the inevitable elevator failure which immobilizes the unit on some floor, and the unmanageable and unsightly tangle of computer and video wires protruding from the cart. Permanent storage when not in use is also a problem.

Our department had kept the unit in our faculty mailroom, perpetually under foot and in the way. For less than \$200, one can purchase a mobile cart (see Table 1). Because the particular model we recommend does not have locking cabinets to store a computer or monitor, it is a good idea to purchase two Kensington locks (\$35 each) to secure the computer and projector to the cart. Purchasing a cart that locks is slightly more expensive, although still under \$300. Another important mobile cart factor demands that it have sturdy wheels to provide maximum stability when rolled over bumps, as in the case of moving the cart into and out of elevators.

With a mobile cart, the projector's zoom lens feature is used to adjust the image to fit the overhead screen.

[Powell](#) (2000a) recommends buying a projector with a manual zoom lens. Power zoom lenses are more expensive, more mechanical, and heavier than manual lens. In addition, the power lens does not always provide pinpoint accuracy of the image, especially if the unit is not mounted to the classroom ceiling.

A solution to the hassles surrounding the use of a portable cart—and the solution reached by our department—is to ceiling mount the projector in a specific classroom. Tara Neuswanger, a sales associate from [Boxlight](#) Projectors, said that approximately 25% of schools that purchase projectors decide to ceiling mount the units (personal e-mail communication, October 28, 1999). To project an eight foot diagonal image on an overhead screen, the projector will typically need to be located from 12 to 17 feet from the overhead screen. The further back the projector is from the screen, the more uniform the image will be on the screen (called *keystoning*, ensuring that the image from a projector reflects perfectly square on the screen, regardless of the downward or upward angle of the projector). A ceiling-mount solves the problem of continually having to focus the projector's lens in different classrooms, but other issues arise.

Cabling from Computer to Projector

A ceiling mounted projector requires additional lengths of cable to connect the projector to the computer. In the case of a projector-and-computer-on-a-portable-cart option, the appropriate cable (usually, a three foot cable that connects the projector and the computer) is included in the purchase price of the projector. Additional lengths of these special cables are quite expensive; for our installation, a 40 foot extension cable purchased directly through [Boxlight](#) cost \$168. A 60 foot extension cable would have cost \$280.

In addition, a ceiling mount requires specific hardware which consists of a false ceiling plate attached to the ceiling of classroom. Metal extension pipe is welded at one end to this plate, and at the other end of the pipe to the projector plate that attaches to the projector.

This hardware mounting purchased from the [projector manufacturer](#) costs approximately \$470, plus the cost of installation. In our classrooms, we used a machinist from our university's facilities management department to custom weld a one piece part that included the ceiling plate, extension pipe, and projector plate. (The projector has mounting holes which should correspond with the projector plate.) The welder charged our department only \$75 per mount. Our facilities management group also recommended that we use safety wraps to strap the projector to the ceiling mount (there are already a series of 4 screws that attach the projector to this mount, but this strap would provide added protection against the projector actually falling off the projector plate, as well as providing an added theft deterrent for our projector).

Finally, the ceiling mount also requires installation and labor charges for an electrician to add a separate light switch (dedicated to operating the projector), run the wiring through the ceiling from the projector to the computer, and perform other associated installation and labor jobs. Our facilities management group charged \$500 per room for these services. We also asked the electricians to change our existing light switches in class so the front lights are turned off with one switch and the row of back lights with the other switch. This enables students adequate light to take notes, but sufficiently darkens the screen area for better visibility of the presentation.

A word of caution when ceiling mounting a projector. With the projector on, one should carefully measure how many feet back from the overhead screen/wall the projector needs to be located *before* installing the ceiling mounts. Also it is advisable to measure carefully so that the projector image is not to the left or right of the screen. Our facilities management team did not carefully measure these distances and only *after* the projector was mounted to the ceiling and all the wires were connected did they *then* test to ensure the projected image was centered on the screen. The image was not centered (half of the image was on the screen, and half projecting onto our chalkboard). Facilities management had to move our overhead screens in two classrooms to correct this problem. Measure twice and drill once, we learned from this experience.

Incorporating Audio and Video into the Installation

Most projectors have the capability to incorporate both audio and video signals, in effect turning a projector

into a large screen television set. These functions allow faculty to show videos on the larger overhead screen (traditionally 6 feet by 6 feet) versus using a traditional 27 inch television screen. Of course, sound capabilities also invite eager freshman public speaking students to use various audio effects—such as the screeching car every time a bullet point appears—throughout their presentation.

Integrating audio and video capabilities with our projectors was the most challenging part of our installation. We had trouble finding the correct type of electrical wiring, important because a special type of video cable has to carry the video signal a significant distance (in our case, about 35 feet) from the VCR to the projector.

Finding the correct audio cabling was easier, but we are still not satisfied with this part of our installation. Most projectors on the market have built-in speakers, but these speakers provide minimal wattage (in our case, 2.5 watts/channel) and, as we have discovered, are not sufficient as stand-alone speakers for a classroom. The sound emanating from the projector is clear at low volume, but when we turn the sound up so students in all parts of the classroom can hear, the audio becomes quite distorted. Perhaps a better technical solution would be to bypass the projector and feed the sound directly from a computer or VCR to other speakers and amplifiers in the classroom.

Computer, Storage Disks, and Remote Mice

Once we decided on a projector, including whether to ceiling mount it in a classroom or keep it on a portable cart and whether to incorporate audio and video capabilities into our system, we obviously needed a computer to hook up to the projector. Our university wired each of our classrooms with Internet access capabilities.

Our department used equipment grant monies to purchase an [IBM PC 300GL/6277](#) (mini-tower model) for each of our classrooms. This 366 Mhz computer has 32MB of memory, a 4.2G hard drive, a 32X CD-ROM, 16-bit sound card, and a Kingston 10bt Ethernet adaptor. This Ethernet card is necessary to connect our classroom computers to the Internet. Our department did not purchase monitors for our classrooms; now, almost two years after this installation, our instructors are evenly divided on whether we should have attached a monitor to each classroom computer. Each computer cost approximately \$1,200. We have found that the 366 Mhz processor speed with 32MB of memory is quite sufficient for our teaching purposes.

Storage Disk Options

Each computer has a CD-ROM and floppy drive; we did not purchase units with an internal Iomega [Zip Drive](#) because our university's computer labs do not support such devices. Zip disks hold 100 MB or 250 MB of data. Zip drives can also be purchased as an external drive that plug into either the Parallel or USB port on a computer. Purchasing such a drive—either as an internal or external unit—serves an important function because PowerPoint presentations can include audio, video, and, especially, large image files; thus, presentations often exceed the 1.44-2.0 MB capabilities of a 3.5 inch floppy drive.

PowerPoint includes a feature called "Pack and Go" that allows the user to "compress" these large presentations to save the presentation on a series of floppy disks and open the presentation on another computer at a later time. However, in our experience, this feature is confusing to students and, often times, even when the student tries to use "Pack and Go," a software glitch corrupts their file.

The presenter thus needs some way to store these large PowerPoint presentations. Writing this file to a CD-ROM is one option, though few people yet have equipment to burn their own CD-ROMs. This situation leaves the option of creating the presentation in PowerPoint and saving this large file to a Zip disk. If the classroom computer has a Zip Drive, this solves the problem. Another option available is opening an account with a web drive such as [freedrive](#), [xdrive](#), or [idrive](#) ([Randall](#), 2000). Most of these services offer up to 50 MB of remote file hosting and storage for free. The instructor can open a free account for his or her class, and then students can upload their PowerPoint presentation to this web drive. Assuming the classroom computer has Internet access, this service can be more reliable than the student using either "Pack

and Go" or saving their presentation to a CD-ROM.

Remote Mouse

Without a remote control device, the presenter is tied to the standard mouse installed on the computer. The use of a remote control unit with these projectors is confusing, but vitally important to understand. The remote control that comes with a projector operates features such as turning the projector on and off, putting the projector on standby (thereby darkening the screen), and controlling other projector functions such as the volume, contrast, etc. Software features in PowerPoint also allow the user to move through slideshows directly through the remote provided with the projector. Around 90% of projectors sold today come with remote mousing capabilities ([Feierman, 2000](#)).

On the face of it, using the remote control of the projector seems like a better solution than using the mouse that is physically plugged into a computer (typically, one cannot use both devices at once). Using the remote mouse supplied with the projector theoretically will permit operation of the computer and the projector anywhere in the room.

A significant problem is associated with most of these remote control devices supplied with a projector. Such devices operate on an infra-red, line-of-sight technology. Thus, if the presenter is in a large classroom (over 25 feet from the projector), or if something or someone physically impedes the signal between the remote and the projector, or even if the projector is ceiling-mounted and is subsequently at an angle (as in the case at our school), the remote control does not operate. Only after our faculty members stood *directly under each projector* and pointed the remote squarely at the infra-red receiving sensor did the remote control operate consistently.

Because of these problems, we have stopped using the remote control that came with the projector and are currently testing radio-signal types of remotes. One problem we face is that each projector has its own (pre-programmed at the factory) remote control so, unlike the "universal remote controls" that are available and can program many of the consumer electronic devices in a home, if the remote that comes with the projector does not work in specific circumstances, few options exist.

We have discovered a few ways around this problem. The primary benefit of using the remote control that came with our projector was that the faculty member can deliver a presentation, and then press standby on the remote and darken the screen, thus moving the student's attention from the PowerPoint slide back to the speaker. One way to do this without using the remote is to simply create a black slide at the end of each PowerPoint presentation. Michael Kramer, in his December 8, 2000 electronic post to the Communication Research & Theory Network ([CRTNET](#)) listserv (see CRTNET number [5608](#)), suggested to the list that, when using either the PowerPoint application or the free Viewer, hitting the "B" key on the keyboard temporarily blanks the screen. The slide returns when "B" is hit again. This is a good technique to teach faculty and students so the audience remains focused on the speaker instead of the overhead screen.

Another option is to use two remote controls in the classroom—one for the projector (that could be erratic, but has a sole function to put the projector on the standby mode), and another remote control that the speaker uses to navigate through the PowerPoint slides. There are two types of remote control devices that do not rely on this older line-of-sight technology: remote controls such as [Logitech's Trackman Live!](#) that operate via radio frequencies, or using a wireless keyboard. Logitech is a leader in wireless keyboards, and has a number of [products](#) currently on the market.

We purchased the Trackman Live! and have been very satisfied with the results. We have found that this remote works dependably up to 30 feet from the computer. We still, however, have the same problem with putting our projector in the standby mode, so we keep the projector's remote control available for this function and we use the Trackman Live! with PowerPoint. However, having two remote controls is a nuisance, and a very poor option for the long term. Our faculty have already lost one remote control for the projector (these cost \$95 each). Another department on our campus has used a wireless keyboard, with good results, although using the remote keyboard still will not operate the projector.

Storing the Computer: Stationary Computer Consoles versus Portable Carts

The next consideration is where to store the computer, on a portable cart (as mentioned [earlier in this article](#)) or in a stationary computer cabinet in the front of the classroom. With both options, security forms a primary concern. If the computer remains in the same classroom, the best option is to place the computer in a stationary computer cabinet and ceiling mount each projector. In our department, we purchased four of these stationary units to house each computer—two locking carts and three (of the more expensive) computer cabinets.

We purchased the two locking carts (32" wide x 24" deep x 44.5" high: Part # LTCS-4Q-KL06) from the College Division of the [K-log Company](#) for \$499/each. This particular model has two shelves, one locking door, and wheels (we removed the wheels to make the cart stationary). We also purchased an under-desk keyboard drawer (Part # VKB-2) from K-log for \$49. The height of the cart allows most types of computers (e.g., desktops, towers, mini-towers, ect.) to fit within the cabinet. It is important to measure the height of the computer before purchasing a cart; cart shelves should be adjustable and the CPU unit should fit into the new cart. One downside for us was that we had to drill holes in the back of each cart for our computer and video wiring.

We purchased our three computer cabinets (48" wide x 30" deep x 40" high: Part # 85-0-1321) from [Nova Solutions](#) for \$1,121 each. These computer cabinets are much heavier (291 pounds each), sturdier, and larger than the locking carts. Two useful features are the glass-recessed panel on top of the cabinet and, unlike our locking carts, the keyboard drawer that is standard. Also, there are pre-drilled holes on the top of the cart (for the mouse cord to connect to the computer) and the sides of the cart (for other wiring). If your department wants to attach a monitor to your classroom computer system, this is a good cabinet choice.

With each option—the locking cart or the larger computer cabinet, one should hire a locksmith and try to key all the carts/cabinets the same. This way, faculty do not have five different keys that are tied to five different carts or cabinets. Again, to ensure security, it is important to consider purchasing a [Kensington lock](#) (\$35) that cables the computer to some part of the console. The same type of cable lock can also be used to secure the projector to the projector plate. Such a lock will not make it impossible to steal either the computer or the projector, but the thief will have to rip up each device so badly in the process that this can serve as a deterrent. Another security option is to have the facilities management staff drill an eye bolt to the classroom wall. Then, using metal cabling, one can secure the computer cart/cabinet to this eye bolt.

Finally, it is important to make sure that the equipment—especially those expensive projectors—are covered by the department's/university's insurance policy in case of theft or fire damage. Since our installation last fall, one computer has already been stolen out of our classrooms.

Equipment Maintenance, Technical Support, and Training

Maintaining the Projector

Once a department has purchased and installed the necessary equipment to use PowerPoint in the classrooms, there are warranty maintenance issues to consider. Many projector manufacturers offer a standard two year parts and labor warranty—Boxlight offered us an extended warranty for \$599/projector, which we decided against purchasing. There is also the issue the projectors' upkeep. We already mentioned that each lamp costs \$330 dollars to replace; monies for such purchases must be figured into the annual departmental budget.

Technical Support and Training

Two of our most difficult challenges in this process were training our faculty and receiving support with the technical problems that inevitably arise in our day-to-day teaching. Because of the decentralized function of

our university's Academic Technology department—and the fact they are seriously understaffed—our department was forced to fend for ourselves when a technical issue arose (either with the computer or the projector). Because we received an equipment grant from [IBM](#) to purchase computers for our classroom and since our university did not officially support IBM machines, our department also has to find alternate technical support when our equipment breaks down.

Our department's most pressing routine maintenance issue has been curbing the unauthorized downloading of materials (e.g. [Napster](#)—when it was still in business, video games, and assorted browser plugins) on to our classroom computers. Students not only download materials during class (educating *faculty* has also been a problem, here), but students also access our computers *remotely* through our campus LAN. As a result, unauthorized files and programs have begun to cause system conflicts with these classroom computers.

When this began, our department had at least two technical options. The department could stop the unauthorized downloading of materials through the campus LAN by password-protecting each computer. (Before, the student would be able to anonymously log on, remotely, to each classroom computer). This solution was fairly expensive and would require our instructors to remember (and keep secret) a password. The solution we discovered was to install Symantec Norton [Ghost 2001](#). This software clones an entire hard disk on to another computer ([Alwang](#), 2000; [Mossberg](#), 2001). Using Norton [Ghost](#), each month a student worker or staff member copies our "clean" hard drive (installed with [Windows 95](#), Norton [AntiVirus Corporate Edition 7.5](#), Netscape [Browser 4.73](#), Microsoft [Internet Explorer 5.5](#), QuickTime [4.2.1](#), WinZip [8.0](#), Adobe [Acrobat Reader 4.05c](#), Microsoft [PowerPoint 2000 Viewer](#), and the Microsoft [Word 2000 Viewer](#)) on top of the existing hard drives in all five classroom. In effect, this deletes all unauthorized material on each computer and installs only those applications the department specifies. This solution has addressed routine maintenance problems, but not how we train our instructors and students on how to use PowerPoint, the computer, and the overhead projectors.

After an initial (hands-on) training session with our faculty, we found posting simple instruction sheets (rich with information graphics, and not text) with each unit to be very helpful to faculty. Faculty also need to be given basic training on how to troubleshoot problems with the equipment. For instance, our first recommendation when anything goes wrong is to turn off the equipment, and power it back up again. Office staff should also be able to troubleshoot common problems as well.

Training 1200-plus General Education students each semester in how to use PowerPoint has posed a more difficult problem. In a recent article, we addressed this training issue in greater detail ([Downing & Garmon](#), 2001). Results from that study indicate that training—regardless if it takes the form of a thirty minute hands-on PowerPoint training session delivered directly to the student in a computer classroom or, alternatively, the instructor only makes available a brief (seven) page [User's Guide to PowerPoint](#) that our department created—makes a difference in students' overall confidence level using PowerPoint. However, the hands-on computer training was not significantly more effective in raising students' confidence level using PowerPoint than was simply giving the students our User's Guide and having them learn the software package on their own time. The implication of that study was that making available to students our User's Guide to PowerPoint has become a viable alternative to delivering the more costly—in terms of both valuable classroom time and finding an available computer lab on campus to teach PowerPoint—hands-on PowerPoint training classes.

Implications, Limitations, and Conclusions

Our goal for this article was to address the gap in the communication literature regarding how to incorporate presentation software technology into a classroom. While a number of authors before us have outlined the promises and perils of using such technologies in the communication classroom, few, if any, have provided practical information on fundraising or on buying criteria for the purchase of such technologies. These processes are relatively complicated and time-consuming, but an organized, step-by-step decision-making process can yield very practical rewards for faculty and students. Our advice in this case study is often prescriptive, and the reader is advised that not all of our recommendations will apply to all colleges and

universities. Also, we urge the reader to find the latest product reviews to ensure they are installing the latest technologies in their classrooms.

In July 2001, as we look back now three years after the fundraising began for this project, the implementation has been a relative success. From our department's 10 initial [objectives for this project](#), we received strong support from our university's administration, and the different constituencies within our department felt that they had a voice in each decision. In retrospect, we made good choices with the specific hardware and software technologies we purchased for our classrooms, and we did well in simplifying the opening and closing of PowerPoint files; this minimized both faculty and student stress. By using [Norton Ghost 2001](#), the ongoing maintenance of computers in our classrooms was simplified, especially our ability to delete unauthorized programs that had been installed on these machines. Unfortunately, the success of our formal training programs was marginal because all faculty were not required to attend.

There are three important lessons we hope we can share with other departments undertaking such installations. First, it is crucial for administrators to develop a reward and recognition program to provide faculty an incentive to use these presentation technologies. As it turned out, some of our faculty, especially the graduate assistants and adjunct instructors, used and experimented with PowerPoint in their classes. Other faculty have not used the software, and probably will never do so.

Our second lesson is tied into the first. We found that one reason why faculty discontinued use of PowerPoint was not on philosophical or "rhetorical" grounds (although we did have those faculty amongst us that felt strongly that PowerPoint was debasing public speaking). What often happened was an instructor *tried* to use the equipment but encountered a technical problem either with the computer, projector, or in opening a PowerPoint file. Because of a lack of technical support within the department, the instructor became frustrated and, subsequently, never used PowerPoint again. The lesson here is to try to have someone, a graduate student or computer savvy undergraduate, perhaps, available during normal teaching hours to help troubleshoot equipment problems with faculty.

Our final lesson, and one that critics of PowerPoint have stated, is that students need to be taught not only technical features of the software (e.g. how to import images into a presentation), but also how to use the technology *appropriately*.

We hope the PowerPoint debate continues in our discipline, and that, as educators, we fulfill our dual mission of teaching students the basic technology and presentation software skills that employers are demanding, while teaching students visual and rhetorical strategies for using PowerPoint appropriately in classroom and workplace presentations.

Additional Web Resources

There are a number of credible Websites that offer technical advice on purchasing projectors: (1) [PresentersOnline](#), (2) [Presenters University](#), and (3) [Projector Central](#)

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