

THE MAGAZINE FOR SCHOOL MEDIA AND TECHNOLOGY SPECIALISTS

VOLUME 4 • NUMBER 6

NOVEMBER 1997

Technology Connection[®]

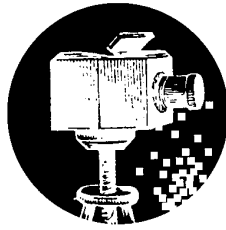
STAFF DEVELOPMENT



Staff Development: Getting Everyone On Board

**How To Get Your Faculty on
the Technology Bandwagon**

SPECIAL FEATURE:
Digital Cameras in the Classroom:
What to Choose and How to Use It



Educational Applications for Digital Cameras

By Terence Cavanaugh and Catherine Cavanaugh

A middle school science teacher watching a lunar eclipse takes out a digital camera and snaps a few shots of the eclipse through a telescope. Next the teacher pulls up the images on her personal computer. Using simple imaging software she creates a short animation of the eclipse and then enlarges one of the images to make a moon mapping worksheet.

The next morning in class, she distributes copies of the worksheet; then using her computer with an overhead projector and LCD panel, she shows her classes the eclipse.

While this scenario may seem like science fiction to some, it can easily be done with today's digital cameras, electronic devices that digitize images. Digital cameras have come a long way in affordability and ease of use, and students and teachers at all levels now are using them in just about every curriculum area. These cameras provide opportunities for uses not only in curriculum but also in support and assessment.

Advantages and Disadvantages

Advantages of digital cameras over film cameras include higher turn-around speed for production of useable images and instant availability of images for output to print, videotape, or an image file. A digital image can be used in printed documents and presentations such as *HyperStudio* or *PowerPoint*. It is also easy to duplicate a digital photograph; prints and computer files can be copied indefinitely at almost no cost. In addition, you can realize major savings since you won't need to buy film or pay for developing. Storage space is saved because images are stored in digital form. You can create photographic images using standard computer and printer hardware with no other special

equipment, and image appearance and quality can be easily controlled or adjusted using software included with cameras.

However, using digital cameras has its negatives. Compared to prints and slides, digital image quality is usually lower. In general, higher-quality cameras cost more, with standard photograph-quality cameras running into the thousands of dollars. Overall consumer models range anywhere from \$100 to \$3,000 and you must do all your own processing work.

Educational Uses of Digital Photography

Digital photography can assist in many areas of education. Identification photos or badges can easily be printed and updated, and photos can be produced for updating students' files and for school events. Photos of school property for record keeping, documenting crime or vandalism, and insurance inventory can be kept efficiently. Teachers and students can display digital photos in a variety of ways, including posters, multimedia displays, and presentations of student projects. Displays for open house, awards night, and fairs also can be created digitally. Anyone can take pictures for school newspapers and local broadcasts or

even a digital yearbook.

For curriculum, digital photography allows for electronic field trips, using stored images shown in the classroom, recorded onto a videotape, or uploaded to a World Wide Web page. In advance of a field trip, classes can preview images of a site, and after the field trip, teachers can review with pictures taken during the trip.

You can create assignments with pictures to illustrate the items and processes that are used in the class. Digital photos also are useful for sharing information with absent students, or e-mailing the images from the classes they missed.

Examples of classroom applications of digital imaging include photographing measurements, instruments, sports equipment or positions, recipe ingredients, and pictures for vocabulary or reading lessons; supplement worksheets with pictures specific to the course. Most digital cameras may be used with lenses or other optical instruments like microscopes and telescopes to make special images available to the entire class or to create animations or a time lapse photo series of processes, such as butterfly metamorphosis. Customize displays and bulletin boards with photos from school, lab, class-

room, or student performances. Classes can include pictures in their correspondence with donors, volunteers, business partners, guests, and parents.

In assessing learning, digital photography is effective in both traditional test construction and in production of alternative assessments. Including students' photos and images of their 3-D and performance work in portfolios allows documentation of a greater variety of work than would otherwise be included; creating more authentic evaluations including images of items or processes from class experience.

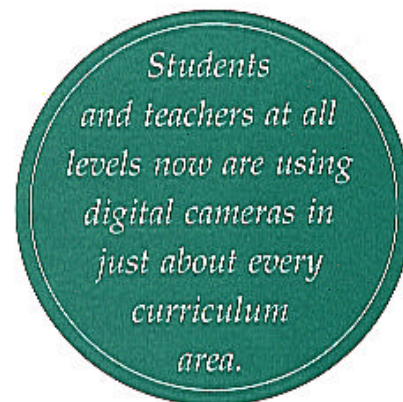
Using the Digital Camera

Taking pictures with most digital cameras is like taking pictures with a regular camera—point the camera at the subject and push the shutter button. Most digital cameras have viewfinders, but some have LCD (liquid crystal display) screens that display the image before recording. An advantage to the LCD is the ease of viewing or deleting stored images from camera memory without the need to connect the camera to a computer. Unlike standard cameras, which store pictures on film, the digital camera's storage memory may be in the form of flash chips, PCM-CIA cards, disks, or even hard drives. Memory limits on digital cameras vary and may be supplemented with memory cards or special storage disks. Adding a memory card usually costs more than \$200. All cameras have a delete feature, which may allow you to delete selected images or may require you to delete the entire memory. Some cameras allow images from a computer to be saved as photos in the camera for use in print or video applications.

Digital cameras usually connect and download to a computer running a camera/imaging program. Most cameras use the computer's serial or parallel ports. Some require an additional computer hardware card to be installed in the computer while others download through infrared, and some connect

directly into a computer slot. A few digital cameras have video output that allows the cameras to send a video signal directly through to a television or videocassette recorder.

All digital cameras save pictures in a digital file format, which may be camera-specific, or a standardized format such as TIF, JPEG, or BMP. The format used to save the pictures will determine the amount of disk space needed. Picture storage formats can be easily converted using a graphics program. If the camera has the ability to output a video signal, videotape can be used to show or archive pictures. Stored images can be printed using specialized photo printers or standard black-and-white or color printers.



Applications for Digital Images

After digital images have been transferred from the camera to a computer, they can be e-mailed as attachments or sent to any fax machine using the computer's fax/modem. Images can be incorporated into print, such as posters, signs, reports, banners, certificates, and any other publishable print document. Iron-on transfers allow images to be printed on items such as T-shirts, aprons, banners, and flags. Depending on the features of the camera, images can be recorded directly onto video for presentation without a computer. Images also can be added to word-processing documents and presentations and can be included on home pages for the World Wide Web after they have been converted in a browser

supported format such as GIF or JPEG.

Accessory Equipment

Almost any printer can print digital images, but for the best quality, a high-resolution inkjet or laser printer is recommended. New photo printers that use glossy photo paper are now available. Most cameras include their own cables for connection to either a PC or Mac platform computer, and some cameras include the cables for direct video output. Most cameras also include an image-handling software program. Depending on the software, the options may be as simple as view and save, or may have numerous picture editing capabilities. Pictures can be used with popular graphics and imaging software programs, such as *PhotoShop* or *Corel Graphics*. Since images often are large files, and saving them can use lots of disk space, it is possible to save the images in more compressed formats like JPEG or GIF to conserve your disk space. For saving many images, an external drive is recommended.

Comparing Digital Cameras and Other Digitizers

A flatbed or hand-held scanner is an alternative to a digital camera, but it is not portable and often involves more steps in getting a digital image. For anyone who digitizes few images and has access to a scanner, it is a reasonable option. Cameras such as the *QuickCam* must be physically connected to a computer to work. When taking pictures within sight of a computer, these cameras work well. Cameras tethered to computers are also useful for computer videoconferencing and can make short digital video files. Inexpensive video digitizers, such as the *Snappy*, can convert a signal from a video recorder or video camera and then digitize the images as stills or motion video. For converting standard slides and photos to digital format, a *Photo CD* can be produced commercially. However, the processing costs for

Continued on page 33

Smile and Say, "Digital!"

For anyone who uses a camera, the adjustment to digital cameras will be easy, and the rewards will be a richer educational experience with a fun and flexible tool. Now is an ideal time to learn to use a digital camera. Costs are on the decline, and the selection of features is on the rise. Some camera manufacturers provide extensive support through their help lines and World Wide Web sites. Certain manufacturers have responded to their popularity in education by investing in online libraries of digital camera lessons and classroom ideas. These lists, often contributed by educators, are accessible free on the Web. Picture your future with a digital camera, and you'll be inventing your own uses in no time at all. **tc**

Terence Cavanaugh is a Physics Teacher at Lely High School in Naples, Florida. Catherine Cavanaugh is a Coordinator at the Whitaker Center for Math, Science, and Technology in Naples.

For anyone who uses a camera, the adjustment to digital cameras will be easy, and the rewards are a richer educational experience with a fun and flexible tool.
