

Copyright and Copywrong

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When I was an undergraduate at Northwestern, many years ago, a prankster placed a sign on the lawn in front of the English department saying: "You can walk on the grass, but you may not." I think of this every time I download a clip art image from the Net, or look at a graph or table in a magazine that might enhance my presentation.

In a world where information is increasingly available in bits instead of atoms, the issue of copyrights deserves some close attention. As originally intended, copyrights were provided to insure that people didn't make unauthorized physical copies of books, works of art, or other forms of creative expression that could be represented in some "fixed" form. After all, what incentive would an author have to publish a book if it could be freely reproduced by people who wanted to have their own copy without purchasing it from the publisher?

The issue of software copyrights has been the subject of so many court cases, that almost everyone understands the rules against unauthorized disk copying.

These rules make sense. If you can copy a program for free, what incentive does the programmer have to provide new versions or improvements? Authors deserves compensation for their efforts, just as does anyone else who creates a good or service of value to others.

Where the issue gets clouded is when one small piece of a larger work is copied for use in another work, or when an original is purchased in order to use it in another setting. For example, if I purchase a CD-ROM filled with lovely images that I then use in one of my own creative works - as illustrations in a multimedia presentation - am I violating someone's copyright?

The answer is, "It depends." The factors that determine what does and what does not constitute copyright infringement are so Byzantine, that apparently judges even have a hard time sorting out these cases.

To take one example, suppose a student purchases a copy of a magazine and cuts out an illustration from the magazine to include in a written report. Has this student violated a copyright? What if this same image is downloaded from the magazine's web site?

Current law (as interpreted by numerous court cases) is quite cloudy to the neophyte. What seems legal to one judge appears (to the layman's eye) contradicted by other rulings.

The advent of the Communications Age, with the widespread dissemination of non-physical information - the exchange of bits, not atoms - seemed to be a golden opportunity to reexamine copyright law. By starting fresh, we could guarantee the rights of authors, clarify issues of "fair use" and generally create a clear road map for the future.

Instead, it appears that this will not happen. Bruce Lehman, the commissioner of patents and trademarks, has written a white paper on the topic in which he calls for modest changes to the existing law, rather than a complete rewrite based on technological realities that were never anticipated by the framers of the original law.

My fear is that this will leave us as muddled and confused as ever - especially in the arena of "fair use" for education.

If we are to help students become effective multimedia authors, we should provide them with the opportunities to develop their skills without having to worry about inadvertently violating someone's copyright. This is especially important in the area of visual images, since photographs and illustrations are very powerful tools for communication, and are very easy to incorporate in electronic documents.

Is there a solution?

I think so. Basically it works like this. Some clip art vendors are perfectly happy for you to use their images in your own creations, and say so right on the package. They will see their sales go up, while those who insist on royalties for every image see their business drop in the education arena.

Fortunately, immense image libraries of royalty-free artwork are available from government funded projects, such as all the images from NASA or from the Hubble Space Telescope.

And, for other images, students can create their own. In my opinion, strict interpretation of copyright law may be the greatest incentive for artistic creativity ever to penetrate a classroom.

The easiest tool to use for image creation is a simple camera. Color film is cheap, and cameras are found in most homes.

I think we should encourage students to take their own pictures - to create their own clip art libraries. When students go on field trips, several of them should be photographing virtually everything they see so the images can be used in multimedia reports, or become part of a shared image library. Once the images have been taken, they can be converted to digital form for use in various projects.

Why bother with film at all? Why not just use digital cameras like Apple's QuickTake, or the new digital cameras from Kodak, Casio, and others?

While digital cameras are getting better, they are still quite expensive, and only hold a few images at a time. Also, the image resolution and color depth is not (to my experience) close to what is captured on a standard roll of color film. Rather than be limited to 16 images of dubious quality taken with a \$600 digital camera, I'd rather students used a \$30 camera with a \$5 roll of color film.

There are several approaches to getting the images transferred from the film into digital form. Each has its merits and its limitations. Which one you choose will be based on the tradeoffs you are willing to make.

The classiest path to digital images is to have the film processed by someone who specializes in creating Kodak PhotoCD's. These \$20 CD-ROM's contain up to 100 color images stored at a variety of resolutions. The quality is superb, and this approach is being used by commercial photographers for their clip art. If several rolls of film are processed at the same time, all the images can be placed on a single CD. The problem with this approach is that every picture is on the CD, including the accidental shot of the student's foot as he advances the film.

A less expensive (but similar) alternative is provided by [Seattle Filmworks](#) and by some local drugstore film processors. When the film is processed, you can choose (for a few bucks) to get a floppy disk filled with compressed images of every picture on your roll. As with the PhotoCD approach, this eliminates the need for a color image scanner at your site, and saves a lot of time in image scanning. You do lose control over the scanning process though, and you still end up with images you don't want.

If you just get your film processed at a local 1-hour photo shop, you can then scan the images you want using a variety of tools.

The fastest way to get color images from film to your computer is to equip your computer with a video capture capability using a peripheral such as the ComputerEyes device from Digital Vision. This gadget lets you hook up a video camera so you can import video images into your computer where they can be saved to disk. If you hook up the Fujix FV-7 camera, for example, you'll have a device that lets you scan images directly from your negatives. You just place your negative strip in a special holder and hook the camera up to your video capture card. When you see the image you want (the FV-7 automatically turns negative images into positives!) you just save the image to your disk and get the next image ready.

This process goes very quickly. The downside is that your high-resolution photograph is saved as a (moderately) low-resolution video capture. This may be adequate for some purposes, but you probably want the ability to create higher quality images.

One very simple tool for this task is the [EasyPhoto](#) scanner from Storm Technologies. This \$250 device hooks up to the serial port of your computer and is set up to easily scan standard (4" x 6") color photographs. On the plus side, this device is easy enough for adults to use - basically you stick the photo into a slot and push the

only button on the device. The computer does the rest. The resultant image is automatically compressed using the JPEG algorithm. JPEG images are tremendously smaller than the originals, allowing lots of color images to be stored on a single floppy disk. Unfortunately, Storm doesn't allow the user to change the compression settings. The one they have chosen produces very small files, but the image quality suffers quite a bit. If they allowed a less severe compression ratio, the files might double in size, but they would be virtually identical in quality to an uncompressed (but massive) image.

The final approach is the most time consuming, but produces the finest results. This entails getting a high quality flat-bed color scanner (about \$900 in just about any mail order computer catalog) and using a high-quality program (like Ofoto 2) to scan the original photograph. While this is the most time consuming approach, the user has total control of the scanning process. Image resolution (dots per inch), compression method - all this and more is selected by the user. For the highest quality scans, this is the best approach to use for getting images from paper into the computer.

To see how these various approaches stack up, the following photographs show the same image as scanned by each of the approaches mentioned above.



Image as taken from the Seattle Filmworks disk.



Image as scanned from the negative with the Fujix FX-7 camera.



Image as scanned with EasyPhoto.



Image as scanned on a 3-pass flatbed scanner using Ofoto 2.

Once your photographs have been scanned, they can be edited with any of a number of image editing tools. The most sophisticated of these is Adobe's Photoshop. This powerhouse comes packaged with some flatbed scanners, and is worthy of serious consideration. Simplified programs that perform some of Photoshop's more common tasks include PhotoFlash (Storm software), PhotoFix (Miscrosoft), and the great shareware program, GraphicConverter.

If you are using a flatbed scanner, your images can be huge - several megabytes a piece! You'll probably edit them to a smaller size, and save them at a display resolution of 72 dots per inch - but even so, they can be quite large. Fortunately, Photo shop and other editing programs allow you to save your images in the highly compact JPEG format. If you set the image quality to "high" when saving a JPEG image, the results will be excellent, and the picture will take very little space on your disk drive. Even greater compression is possible, but (as the images from EasyPhoto and Seattle Filmworks show) the quality suffers. The quality choice is up to you.

When the time comes to incorporate your images into a multimedia project, you'll find that multimedia authoring tools like HyperStudio do an excellent job with JPEG images!

Once your images are scanned, you'll probably want to edit them somewhat. The most common tasks you'll

want to perform are image cropping and sharpening. A sharpened image highlights edges and makes features like text much easier to see.



An unsharpened image (left). A sharpened image (right)

Once you have collected your images, cataloging software can help you find just the right picture from your private collection when you need it. The champion cataloging tool is Fetch from Adobe (formerly from Aldus). This program builds indices of your images, and automatically uses file names and folder names as keywords for a search.

Seattle Filmworks provides their own image cataloging software - PhotoWorks. This package only works with their own picture format (apparently a special form of JPEG).

Whatever form your images take, you'll find that a home-made clip art library can bring an added level of creativity to the classroom, as well as keep the copyright police far from your door!

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