Selection and Purchase of Photography Equipment for a Small Studio

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Introduction

Petticoat Lane Antiques, a sole proprietor antique shop, is beginning to build a Web site to establish an Internet presence. The goal of the Web site is two fold, to provide advertising for the shop and to explore the possibility of selling antiques over the Internet. In addition, Petticoat Lane Antiques is interested in exploring the use of on-line auctions as a vehicle for purchasing material, developing supply contacts, and possibly selling merchandise.

The goal of the web site is to project a straightforward, honest dealing persona and to provide an on-line catalog of goods with photographic images showing the merchandise.

To provide images for the Web site catalog, the owner decided to invest in a small photographic studio as part of the equipment needed for Web site development. The photography studio would use the living room area of the owner's home so the equipment must be portable, easily setup, and easily broken down. The studio equipment was required to be easy enough to use so that an amateur could obtain reasonably good photographs suitable for viewing on a computer monitor.

Cost of the equipment was also a factor as the shop is undercapitalized and cash flow has not be good.

Method of Obtaining Information

Since the investigator had to first learn the basics of photography, the first step in obtaining information was a trip to the local library to obtain a couple of books on the subject. Using the books, the investigator compiled a basic list of requirements for the studio as well as became somewhat familiar with the basic concepts of studio work.

Using the library material, a basic list of photography studio components was developed.

The investigator then designed the work flow required for both a digital camera as well as a film camera. A sample of each type of camera was borrowed and the process was tested as a reality check.

Because the images are digitized in the end, some preliminary self training on some of the basic digital image tools such as Adobe Photoshop was performed by the investigator again to determine work flow and difficulty.

Pricing of cameras was checked using newpaper circulars from several of the leading stores (Best Buy, CompUSA, Office Depot) cross referenced against ads in Computer Shopper, a monthly magazine composed primarily of ads and some product reviews.

Web Sites Visited for Information

During the course of the investigation, the Web was used to obtain some information concerning cameras. The Web sites visited included:

- http://www.plugin.com/digitalcameraguide/index.html
- http://www.dcresource.com/

- http://photo.net/photo/digital/choosing.html
- http://www.cahners.com/

The Web sites were discovered by using http://www.dogpile.com/, a meta-search engine which uses other search engines and then compiles the results. Dogpile uses Yahoo, Excite, Lycos, Thunderstone, and the Mining Co among its search engines.

The Investigation

Preliminary Work

The preliminary work first required building a plan of action. The plan contained the following stages:

- Compile preliminary background information
- Build list of requirements
- Design work flow and processes
- Test work flow and process models against product samples
- Investigate alternatives and make buy/build decision
- Buy and build the studio and components

Background Information

Compile background information was needed since the investigator knew very little about studio photography. Background information was compiled by a trip to the local library to obtain a couple of books on photography with an emphasis on studio photography. The investigator also browsed several local book stores primarily sitting in the aisle and scanning chapters. A search on the Web found little information on photography studio work and the information found was too fragmentary to be used during the background information phase.

The investigator also spoke with people in his office concerning their experience with photography as well as with digital image tools. The investigator was also fortunate to be able to obtain some experience with a digital camera from the company, a Kodak DC-50, as well as with the digital image tool that was bundled with the camera.

Based on the background information, the investigator compiled a list of requirements for the studio equipment.

Major Components of a Digital Studio

A small yet capable studio has the following major components:

- Lighting stands that are capable of being moved and positioned
- Electrical outlets for lighting
- Table for supporting small objects for the photography session

- Sufficient depth of the studio to allow for enough distance from the object being photographed to reduce or eliminate distracting perspective effects in photographed objects
- Enough space around the photography center to allow the positioning of lights
- Camera tripod to reduce the possibility of an image blurred by movement and to allow the proper positioning of the camera for the image desired
- Storage space for equipment and props
- Access to a computer and the necessary equipment to digitize and manipulate the images primarily for color balance, contrast, and cropping

Major Considerations of a Camera

The camera must allow for a zoom capability with controls that allow for adjusting exposure. Both film and digital cameras were to be considered. The major criteria for selection was the camera's ability to create images of sufficient quality to be digitally displayed on a computer monitor and the difficulty and expense of delivering the image to the Web site.

Quality of a hardcopy of the image was deemed of low priority since the goal was to produce images to be used on a Web site.

A film camera requires the use of some mechanism to digitize the photograph. Part of the investigation into cameras was spent on an investigation into image scanners.

The technology of scanners and digital cameras is comparable as both use some kind of Charge Coupled Device (CCD) mounted in an array to capture the light intensity and color values of an image. The major consideration for product selection is the number of pixels used to capture the image and the CCD array dimensions, that is how many pixels high and how many pixels wide would the captured image be.

The pixel layout is important since the more pixels, the greater the resolution of the image hence the finer the detail of the image captured. The same consideration also applies to computer monitors. The image resolution needs to be sufficient to allow the display of images on a computer monitor allowing the viewer to grasp the larger details of the objects in the image. A large number of pixels also allows the image to be enlarged and cropped without unduly reducing the image clarity.

When a low resolution image is enlarged, the pixels in the image are essentially spread over a larger area and then additional pixels with appropriate intensity and color values are inserted into the image within the existing pixels. The intensity and color values of the new pixels are calculated through interpolation which basically means some kind of average of the surrounding pixels is used to determine the values of the new pixels.

The concept of pixels also applies to film. The granularity of the film's light capturing material as well as its speed of chemical change when exposed to light determines the film's resolution. The smaller the granularity, the finer the detail that can be captured by the film just as the more the pixels for a given area in a scanner or digital camera, the finer the detail of the digital image.

Since 640 by 480 pixels is a standard 14" monitor resolution (meaning that an image that is 640 by 480 pixels would completely fill the display) that resolution was determined to be the minimum resolution. This resolution would allow images of sufficient detail which would also be less than full screen on 15" and larger monitors which are normally used at 800 by 600 and larger resolutions. The minimum monitor size appears to be 15" with the drop in monitor prices. Many people now opt for a 17" monitor due to the small price difference between the 15" and 17" monitors now in the marketplace. With the improvements in video cards most people with a 17" monitor have their system set to a resolution of 1024 by 768 pixels or higher. This means that a user browsing a Web site page with a 640 by 480 pixel image will see the image taking up about 40% of their screen allowing for text as well as the image itself to be displayed.

Work Flow and Processes In the Studio

The work flow and processes for a studio session would basically follow:

- Setup the studio
- Arrange the objects to be photographed
- Position the lighting, checking for and eliminating dark spots as well as reflections
- Photograph
- Process the images
- Insert the images and accompanying text into the Web site
- Breakdown the studio

The major impact of camera technology to the workflow was in the task of processing the images. With a digital camera, the images could be immediately downloaded into a computer in the studio, checked for quality, and cleaned up if needed. The film camera required that the film be processed by a film developer, the photographs digitized and downloaded into the computer and then checked for quality and cleaned up if necessary.

The major advantage of the film camera over the digital camera was the quality and detail of the image, a point in its favor for a business in which customers would want to see details.

Testing Alternative Processes

The investigator performed tests with several alternative work flows built around the camera type. The purpose of the testing was to test the work flows themselves and not the actual cameras.

The investigator designed a light stand and built it from parts obtained through the local Home Depot store and a local Wolf Camera shop. Each light stand was made using a 20" round piece of 3/4" thick wood to which was attached a 1"x2" by six foot long piece of wood secured to the 20" round with screws and brackets. A set of cheap, clamp-on reflectors were added to the ensemble. Blue photo floods were purchased from Wolf Camera to provide the lighting after preliminary experiments showed that standard light bulbs as well as quartz halogen produced unwanted color changes tending toward yellow.

Next the investigator did a photo session using a film camera as well as a digital camera both of which were borrowed for the occasion. The film was processed through a Kroger film development drop. A Kodak photodisk containing the photographs was purchased as well as the actual photographs themselves to test that technology and the ability to bypass using a scanner to digitize images.

The digital camera images were downloaded from the camera into a computer where they were then converted into JPEG files.

An advantage of the digital camera became obvious since the images were immediately available for review and possible retake if they were unsatisfactory. The film required a two day turnaround. A one hour service could have been used but the expense was considerably more (about two times the cost per roll).

When the photographs were received along with the photodisk, the investigator then took the photographs down to a Kinkos where they were digitized creating JPEG files. The quality of the images were then compared.

The comparison indicated that the Kodak photodisk images were unacceptably low in resolution. There appeared to be no discernable difference in image quality between the scanned in photograph images and the digital camera images when viewed on a 17" monitor at 1024 by 768 pixels resolution. The image resolution was better with the scanned in image when the images were printed to an HP Color Ink Jet printer.

Based on these results, the investigator decided that the digital camera was the best technology due to:

- Immediate feedback and the opportunity to reshoot if appropriate
- Less time to go from photo shoot to finished image ready to insert into a web page
- The resolution and apparent detail of the digitial camera images was comparable to the scanned in photographs when viewed on a computer monitor
- With a cost per shoot of around $7 (roll of file $3 plus 4$ development cost) plus the expense of purchasing a scanner (around $150 for the low end of a mid-range product) a digital camera for less than $300 would be a reasonable purchase

Digital Camera Selection

The digital camera was the most expensive part of the setup. The price range ceiling was determined to be $300 because of basic ability to pay. The investigator then began to compare digital camera specifications along with prices.

The price ceiling ruled out a mega-pixel camera. This exclusion was deemed acceptable due to the target resolution of around 640 by 480 pixels. Greater resolution would create images that had to be scrolled back and forth as well as side to side and would also increase download time due to the greater file size of a mega-pixel image.

The Web site http://www.plugin.com/digitalcameraguide/index.html was used as a starting point to compare the basic specifications of the major brands of digital cameras. This Web page provides tables comparing various models and also provides links to the manufacturers' Web sites for more detailed information.

A selection of local stores were reviewed for pricing of cameras by reviewing their advertising circulars in the Sunday Atlanta Journal/Constitution over the course of several weeks. Prices were also checked against the mail order ads in the monthly magazine Computer Shopper.

During the course of comparison shopping, the investigator discovered that a number of the lowest priced digital cameras had an actual resolution lower than the reported resolution. These cameras used interpolation software within the camera so that the CCD array was actually smaller than the reported 640 by 480 and the camera interpolated the image to arrive at the advertised 640 by 480 resolution.

Finally, the Kodak DC-50 digital camera was selected. This camera has an actual resolution better than 640 by 480, it came bundled with software for basic image manipulation, there were additional add-ons that could be purchased such as lenses to enhance the basic camera, and the price from CompUSA was $250. This camera allows seven high resolution images in its basic configuration but an add on memory card can provide up to 40 depending on the size of the card. Because the camera would be used for studio work with immediate access to a computer, the extra memory card ($99) was deemed unnecessary. The DC-50 was a top of the line, over $600 digital camera about two years ago, another point in its favor.

Web Site Development

Web Site Design

The designer of a Web site must be concerned about the mechanics of the Web site as a part of the design. Usability is a concern as people will not return to a Web site that is not usable.

The Petticoat Lane Web site is built around the catalog of merchandise for sale. For easier navigation, there is a an introductory page which allows the user to pick a particular category of merchandise such as china or lamps and then browse that area.

Across the top of each page is a navigation menu to allow the user to jump from one area to another. The displayed images in a particular area are small with text to one side that describes the article in suitably poetic terms. The small image is clickable to allow the user to see a large version of the same image allowing for the user to see greater detail.

In addition to the catalog, there is a descriptive home page that provides an introduction to the business with links to the catalog as well as to other pages such as a map to the store location, terms and conditions of sale (including the process for Internet orders), and a couple of side pages with links to other Web sites. The e-mail address of Petticoat Lane Antiques is liberally sprinkled through the site to make it easy for the user to send an e-mail to the owners of the site.

Web Page Mechanics

Web site design and Web page design have several major usability requirements that need to be met:

- The page must download to the Web browser and display quickly
- People don't like to scroll around
- Most people are using 640 by 480 resolution or 800 by 600 resolution though this is changing as people upgrade their systems to better video cards and larger monitors
- Most people connect to an Internet Service Provider (ISP) over a dial up line using a 28.8K modem or a 56K modem (which depending on subscriber line quality may operate at 28.8K) so file size especially of images should be kepts as small as possible
- As the page contents download the user should see something as soon as possible as the tendency is to hit the stop button and go elsewhere during a slow loading page where nothing is displayed
- The page must be visually interesting though uncluttered and it should stick as close to pure HTML as possible without relying on Java applets or JavaScript which not only increase download time but may not function if the viewer has turned off that functionality in their browser or if the browser doesn't support the functionality
- Explict sizing of images and tables within the HTML code providing the brower the information it needs to format the page makes the page display faster without false starts
- Not everyone surfs the Web with image display enabled in their browser which means that image maps or other graphical navigation devices may not function as intended
- Don't rely on the latest HTML standard (4.0) because not all browsers support all parts of the new standard

Most of the above usbility requirements rollup into the following: rely on HTML text using HTML directives from HTML standard 2.0 or 3.2 for all navigation and information using images sparringly and appropriately while foregoing Java applets or JavaScript. Keep image files small as possible using small thumbnail images which link to a larger image. Crop images as much as possible to not only reduce file size but to also make to focus the viewer's attention on the pertinent part of the image.

A Typical Web Site Update

The Petticoat Lane Web site is updated as new merchandise arrives in. Not all merchandise in inventory is displayed on the site due to space considerations. Most of the items displayed are small items that can be shipped relatively inexpensively via UPS.

When new items are added to the site, the studio is setup and the objects photographed. The images are then transferred to the computer using the software that was bundled with the camera. The DC-50 uses a Kodak proprietary file format so the the software is also used to convert the Kodak format to a TIF format.

TIF is used as it is not subject to image degradation as is JPEG which is a compressed file format which is "lossy" because the compression algorithm removes some of the information from the image. TIF is a fairly standard format that is readable by most

image processing software as well as word processors. The TIF file generated is usually on the order of 1.2 megabytes of disk space when the JPEG may be only 150 kilobytes.

The TIF file is then pulled into Adobe PhotoDeluxe, an image manipulation program which provides greater functionality than the bundled software that came with the digital camera. PhotoDelux is a scaled down version of Adobe's industry standard PhotoShop software targeted at the consumer market.

The image is color corrected and cropped arriving at an image that shows the colors of the original object as well as possible. Two versions of this manipulated image are then created, a half sized thumbnail and the full size photo, both of which are saved as JPEG files. JPEG is used as most browsers will display JPEG files within the browser window without the need for a browser plug-in or supporting application.

Next a text file is created in the same directory as the JPEG files. This text file contains a writeup of the object in the image as well as several description lines that point to the files containing the images and the image sizes in pixels high and pixels wide.

This text file is read by a proprietary Web catalog generator written in PERL for Petticoat Lane Antiques. The generator builds the HTML files for the catalog using the information in the text files. The output of the generator is a complete hypertext document tree suitable for viewing with a Web browser.

The hypertext document tree is checked for accuracy. Most checking is performed on the new areas to ensure that the correct images are associated with the textual descriptions and that the navigation mechanisms work.

The hpertext document tree is then uploaded to the Petticoat Lane Web site using the file transfer protocol (ftp) program that came with the Mindspring software.

Summary

This project of selecting and setting up was an interesting exercise in procurement. The Web was found to be of help in reviewing the digital camera options but most of the information gathering used printed materials such as books, magazines, and advertising circulars.

I have used Web material when searching for components required in product design as a part of my work with Nortel Networks. That investigation usually required going to a manufacturer's web site and pulling down specification sheets much as I did with the digital camera search. But like the digital camera search, by the time I was using the Web, I had already completed the background information search and was now searching for specific material.

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