

Providing Web-Based Support for SAS® Users at NC State University

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ABSTRACT

Developing a website to support our SAS users requires time and research, but it is worth the effort. Our clients began using the website while it was still in its infancy. In this paper we report what we are learning about design concepts that increase attractiveness, usability, accessibility, visibility, ease of development, and ease of maintenance (ouch!). We are not experts, but we want to share experiences with others involved in developing similar sites.

INTRODUCTION

Our major goal in developing a SAS related website is to provide our clients with around-the-clock access to our SAS FAQ (frequently asked questions), sample programs, public data sets, online tutorials, and SAS class schedules.

This paper discusses web page design, website maintenance, testing, and special topics such as, Server Side Includes (SSI), and Cascading Style Sheets (CSS.) Scanning other websites influenced our original design decisions. As we researched website design, we became interested in providing better access to our web pages for people with disabilities. We found the guidelines developed by the World Wide Web Consortium (W3C) Web Accessibility Initiative (WAI) to be very helpful in directing our efforts. Their recommendations influenced many of our decisions including: using standard colors, avoiding fancy motion features, following HTML standards, and avoiding frames in HTML documents. The decision to provide some PDF files was partially based on the improved accessibility they provide.

Our website is a convenient mechanism for organizing and sharing SAS solutions and tools. While the website is useful, it is our opinion that it can't replace one-to-one consulting between a researcher and an experienced data analyst. Experienced data analysts can often identify and eliminate errors that may adversely affect the quality of the data analysis.

THE BEGINNING OF OUR WEBSITE

The first several pages we published were very elementary, but they satisfied the immediate need of distributing important site specific information. We wrote the HTML code within the SAS program editor.

We learned the necessary HTML tags by studying the HTML source code of selected pages. We frequently use the "View→ Source Code" browser feature to review HTML code. This method is simple and effective, but it led to some less than ideal HTML coding that we will discuss later.

After successfully publishing a number of pages, we began to think about the broader goals of website content, layout, attractiveness, manageability, navigation, accessibility, and site visibility. Obviously, in the beginning we got the cart before the horse. However, this process allowed us to quickly distribute information to our clients, and the success of this effort fueled our interest in developing our website further.

As we developed our plans, we realized building and maintaining a website is a time and labor intensive effort. We definitely do not want to pursue this goal unless we can continue to build and maintain a site that will contain current information. We are aware that this is no small commitment, because websites need constant maintenance and updating. We believe the results are worth the effort and are set to proceed.

CONTENT

The need for high quality content is obvious and we work continuously to improve the content of our website. We use links to other SAS related sites, and we develop our own pages when necessary. The pages we develop are often specific to our campus or our department.

Establishing links to other SAS sites is much quicker than publishing new pages, so this method is used when possible. Periodic searches of the Web are used to locate SAS related pages. Links are established to pages that can provide useful information to our clients. Routine checks of the established links are made to verify that they are still working. Seasoned web users are used to broken links, but each broken link degrades the value of a site, so we strive to maintain a site free of broken links.

We have a number of links to SAS Institute's Web pages and they are very helpful, but their site, like many others, is in a constant state of development. We find it beneficial to periodically review the SAS Institute website and update our links to reflect the

enhancements they have made.

The pages we develop usually address our clients' specific problems and questions. In addition, we develop pages that reflect information we gather from technical documents and SAS users group meetings that we regularly attend. Most of our sample programs are developed for the classes that we teach, but we are planning to add several new groups of sample programs that provide "Tips and Techniques". These programs will benefit students with the desire to learn more about SAS in preparation for future employment opportunities.

The list of pages we hope to add gets longer each day, but it is our desire to make some site development decisions before we create new pages. Here are some of the issues we are evaluating.

APPEARANCE

We prefer a simple uncluttered appearance. Too much movement and color are distracting and even irritating. On technical pages, fancy features interfere with the delivery of meaningful information. We desire a professional appearance that is heavily front-loaded with information, so site visitors can quickly find the information they need.

The Web Accessibility Initiative (WAI) Guidelines discourage flickering, blinking, movement, automatic refresh, and auto-redirect until user agents (browsers, screen readers, etc.) provide the ability to turn these features off. In addition to the above-mentioned concerns, screen flicker may cause seizures in users with photosensitive epilepsy.

COLORS

We considered using various background, text, and link colors including our campus colors, red and white. We decided that the standard white background, black text, and blue links are better for our purposes. We felt that the familiarity of the standard blue link removes any hesitation in identifying links, and increases user comfort. Also, the color blue is often a more easily identified color for users with limited color perception.

We tried using an off-white background and decided against it because it appeared pink on some browsers! Web-safe colors are displayed at <http://members.aa.net/~tgmoore/colors.htm>. These are colors that appear the same on all browsers. We intend to use these colors. When specifying colors, the WAI Guidelines encourage the use of the color numbers (RGB) rather than color names. Using the standard white background and black text minimizes printing problems. We are aware that our clients print

our pages, and we do not want to be the cause of their frustration.

WEB PAGE ACCESSIBILITY

The World Wide Web Consortium (W3C) Web Accessibility Initiative (WAI) provides a comprehensive checklist of development suggestions, <http://www.w3.org/TR/WAI-WEBCONTENT/full-checklist.html>. We hope that following these guidelines will improve the delivery of site content to disabled site visitors.

We strongly recommend that all web content developers review this checklist early in the process of developing their website. Many of the recommendations are fairly easy to employ. Certainly it is simpler to employ them from the beginning rather than having to update a medium to large site. Making web pages accessible is a worthwhile project. You never know who is trying to access your site, or how they are trying to access it. We want our pages to be available to anyone with the desire to use the information, whether they are using a browser, a screen reader, a Braille reader or other technologies.

We have a text heavy site, so not all the WAI Guidelines relate to our site. However, there are numerous standards suggested in the WAI Guidelines that do apply. Generally the standards we intend to incorporate include: providing text equivalent for all non-text elements, proper and appropriate use of structural HTML elements, clear mark up of lists and list items, markup of quotations, clear design of tables, appropriate use of style sheets for presentation features, careful structuring of navigational links, the use of the simplest possible language, and consistency across pages.

These topics are too numerous to detail in this paper, but we hope to present an example or two at the meetings. Anyone interested in more detail is encouraged to read the above mentioned guidelines. They provide a thorough and authoritative source of information. Studying these guidelines changed the way we look at HTML. Originally, we were satisfied as long as our pages looked okay on the screen. Now we realize that the method used to markup a document will determine the effectiveness of assistive technologies in presenting the information to the disabled audience. Appropriate use of HTML is much more important than we originally realized.

IMPROVING SITE NAVIGATION

We considered several methods for improving the navigation of our website, including additional internal links, the creation of an index, and the addition of a sitemap. We concluded that all three

would be beneficial.

Since our site is fairly simple, it was easy to pick the set of links that would meet the navigation needs of our users. The links we chose are: Home, FAQ, SAS Classes, Sample Programs, and Tutorials. These links cover all the major sections of our website. We also decided to include a link to our parent page, the Department of Statistics Home Page.

We debated several locations and methods for positioning the links on our pages. Many site developers use frames and tables to place navigation on the left. These methods are discouraged by the WAI Guidelines; we do not plan to use them. The WAI Guidelines encourage link descriptions that are not too general, providing title attributes, grouping links together into a logical set, providing a mechanism to skip over links, and providing keycodes to activate links for users who cannot use a pointing device. There are examples in the WAI Guidelines.

It is our intention to place our navigational links at the top and bottom of every page with Server Side Includes (SSI), but this method is not yet available to us. We hope to test this in time to report the results at the meetings. This is an exciting possibility, because it will allow the navigational links to be maintained in an external file that will be included into each page. This will provide an extremely efficient method of changing the links in the future without having to modify every individual HTML file.

We are researching other possibilities, as well. In the WAI Guidelines, a method is suggested that uses Cascading Style Sheets to position navigational links. It is our intention to test this method.

Learning Technologies Service (LTS), a focal point for educational technology activities at North Carolina State University, has volunteered to develop a template for us that will provide left side navigation. These templates will use SSI to incorporate header and footer files. It is not clear that this will be best, because the templates will use tables for structural layout, and this is discouraged by the WAI Guidelines.

After testing these methods, standard page layout for our site may be changed if the perceived site improvement is worth the required effort, and the changes do not adversely affect accessibility.

LEARNING ADDITIONAL HTML

As previously mentioned, we learned our initial HTML by studying online source code of other

published web pages. As a result, our HTML is very simple, and we developed some bad habits. For example, we didn't use META tags in our initial development phase. We have since added META tags to our pages in order to improve the likelihood that search engines will locate our pages and to aid the users of assistive technologies.

The WAI Guidelines provide suggestions about the appropriate use of HTML, especially as it relates to users of assistive technologies. Three online HTML resources we use in addition to the WAI Guidelines are:

<http://www.w3.org>

<http://werbach.com/barebones/barebone.html>

<http://www.ncsa.uiuc.edu/General/Internet/WWW/HTMLPrimerAll.html>

HTML OR PDF

In his SUGI24 paper "Publishing User Documentation: PDF or HTML", Michael Davis does an excellent job of summarizing the benefits of the two file types. He also provides instruction on using Adobe Acrobat and creating PDF files.

We do not see the need to create PDF versions of most of our web pages. However PDF versions of long documents, such as "Beginning SAS Tutorial", will be available. These PDF files can be quickly and easily downloaded and used locally. This removes the need to maintain an Internet connection. For the visually impaired the ability to enlarge fonts in PDF files up to eight times may be helpful as well.

We do not own the Adobe Acrobat PDFWriter, so we use Adobe Distiller to create PDF files from postscript files. This works quite well. Adobe Acrobat and Adobe Distiller can be downloaded from <http://www.adobe.com/supportservice/custsupport/download.html>.

FRAMES

Much of what we have heard about the use of frames is repeated in the following quote from the WAI Guidelines: "Frames as implemented today are problematic for several reasons: 1) Without scripting they tend to break the "previous page" functionality offered by browsers. 2) It is impossible to refer to the "current state" of a frameset with a URI; once a frameset changes contents, the URI no longer applies. 3) Opening a frame in a new browser window can disorient or simply annoy users." Printing difficulties are another problem caused by the use of frames. We have no plans to use frames.

MAINTENANCE

Websites need constant maintenance and

improvement. We hope that Server Side Includes (SSI) will make site development and maintenance of links easier. This should allow us to automatically include headers, footers, last modified date, and web address on every page.

Whether you can use Server Side Includes in your pages will depend on the web server you are using and how it is configured. We use an Apache web server, and our systems administrator is in the process of setting up these features for us. We look forward to testing them and reporting the results at the meetings.

SITE VISIBILITY

It is important that our target audience, SAS users at NC State University, knows about our site and can find us when they search the ncsu.edu domain. Therefore, we tested the search feature at the University website using the search strings "SAS+Consulting" and "SAS+FAQ".

At first we were very disappointed with the results. However, after reviewing the search results and reading the on-line "Authoring Tips", we modified our standard page design in ways that improved the results.

We include one of the search strings in the title and the first line of the body of every page, because matches in these areas are heavily weighted. The number of matches and their proximity to the top of the document are both used to assign document relevance rank. Relevance rank is used to order documents in the search results list.

We also add keyword and description META tags to every page. Currently the Verity search engine, as it is employed at NCSU, does not read these, but many other search engines do. Information in META tags may help to propel your pages closer to the top of the search results list. The search engine on our campus will use META tags in the near future. META tag information is read by some assistive technologies and may be a benefit there as well.

Our search engine doesn't read the text within images or alt tags, but this doesn't significantly affect our results because we do not use many images.

The above techniques help to move our pages to the top of the search result list, but we also want to improve the information about our pages provided in the search result list. Page titles are reported in search results. Thus, they can be a very effective place to provide information about page content and help users quickly locate pages that contain

information related to their needs. We review all of our page titles to be sure they effectively reflect page content.

The first few lines of the body of every document are reported as a page "summary" in the search results. Like the title, they need to summarize page content. We carefully reconsidered the first few lines of the body of our pages to be sure they accomplish this goal. We view the first few words as critical, because most people want to find information quickly, and they skim documents for keywords.

After studying the search results and the information in "Authoring Tips", we contacted the webmaster at our site. This was very valuable. He was able to eliminate archived documents from the search path and thereby improve the search result list significantly. He indicated that the Verity search engine will read META tags in the near future. He explained that the Verity search engine creates an index to the University website biweekly, and this index is searched when users request a search. It is helpful to know how quickly additions and changes will be reflected in search results.

We are currently satisfied with our much-improved search results. Clients who aren't aware of our pages or services will be able to easily locate us through web searches. We plan to continue to perform keyword searches in the future to monitor the results.

CASCADING STYLE SHEETS (CSS)

"Style sheets describe how documents are presented on screens, in print, or perhaps how they are pronounced" according to the information provided at <http://www.w3.org/People/howcome/>.

In theory this sounds very good, but in reality browser support for CSS specifications is incomplete. Support for CSS features varies between browsers and is summarized at: <http://webreview.com/wr/pub/guides/style/mastergrid.html>.

The website <http://www.w3.org/Style/CSS/Buttons/> lists the following benefits of CSS:

- 1) the HTML code becomes much simpler and more manageable
- 2) using relative measurements in your style sheet, you can style your documents to look good on any monitor at any resolution.
- 3) you have finer and more predictable control over presentation
- 4) you can define the look of a site in one place, and change the whole site by changing just the one file

- 5) people with older browsers can still see your pages
- 6) people with disabilities have better access to your pages.

According to the website

http://webreview.com/wr/pub/1999/06/25/style/index.html?wwwrrr_19990625.txt : "Between the promised release of two browsers with 100 percent support for CSS1, and the knowledge that the CSS working group is continuing to examine the specification for ways to enhance and improve the utility of CSS, the future of CSS seems better than ever."

We are planning to use CSS on our website. The benefits seem clear, even though support is currently incomplete. Also, the WAI guidelines encourage the use of CSS for controlling page style.

TESTING

We test our site to be sure that we have made good design decisions and are following the WAI Guidelines. While testing we look for problems with appearance, page width, links, download time, and compliance with WAI guidelines.

We occasionally test our site on AOL because they provide browser services to millions. We test on the Mac because it typically has a smaller font. We test on the PC with Netscape and Microsoft Internet Explorer because many of our audience use these browsers. We test on the NC State University Unix platform with the default browser, Netscape 4.05. We have also tested with LYNX, because it provides us with information on the text only version of our pages, with no sounds, images, or mouse.

We use the online tool, Bobby, <http://www.cast.org/bobby/> to test for WAI compliance. It identifies non-compliance and suggests improvements. Occasionally, we have had the opportunity to observe disabled users accessing our site. This provides insight into problem areas as well.

For testing links and HTML usage we submit our pages to Doctor HTML™ at <http://www2.imagiware.com/RxHTML/> and Dr. Watson™ at <http://watson.addy.com/>. Yahoo has a list of HTML validators at: http://dir.yahoo.com/Computers_and_Internet/Information_and_Documentation/Data_Formats/HTML/Validation_and_Checkers/

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