Paper SY14

A Different Approach to Learning SAS® Software

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ABSTRACT

This paper will focus on learning SAS® software on the Internet. Reviewing a number of Web sites, we will point out advantages and disadvantages of Internet-based learning.

Web sites offer education in SAS/Base, SAS/Stat, SAS/Graph, SAS/Macro and more. Selected sites are designed to simplify the process of learning SAS software. Many content developers improve their sites content from year to year. Some now use graphical, animated (Power Point) presentations or more sophisticated techniques, such as movies.

Detailed explanation and examination of selected sites will give us a better understanding of the current online environment for learning SAS software. This presentation will explore some choices to enhance effective online learning.

INTRODUCTION

It was early 1990 when the first version of Netscape became available. In fall 1993, came the next important milestone, the browsing tool, Mosaic, was introduced. Academia realized the enormous potential for learning on the Internet. A new tool for teaching and learning had arrived, and it was a very good one. Using the new technology seemed revolutionary and exciting.

I have a feeling that the basic concept that was setup in the early 1990's -- when you needed a desktop or laptop machine, a Web browser and an e-mail program, basic software and an Internet connection – is the same one we still use today, and will be the same one we continue to use in the foreseeable future, as the World Wide Web continues its explosive growth and popularity.

Changes have been made, to be sure, over the last decade:

- Microprocessors have grown from 5 or 8 MHz to several Ghz
- Computer memory has grown from tens of KB to several GB.
- Our Web browsers have evolved from Netscape to Internet Explorer, Mozilla, Opera and others.
- Our network connections have increased in speed from a few bytes per second to T Bone connections of hundreds of Mega Bits per second, with personal Internet usage changing from dial-up to cable, DSL or satellite.
- Our connections have become wireless.

But these are improvements on a basic concept that works.

Across academic circles in the late 1990's there were efforts to design a common environment for the most current tools of technology – Internet-assisted teaching and learning. Good examples of these are the efforts at MIT and at the University of Pennsylvania, who's Jim O'Donnell expressed the enthusiasm of many teachers thus: "I'm a working scholar and teacher who has found in these new tools the most exciting possibilities to enhance teaching that have come along in my twenty years in front of the classroom." (1)

The Internet is changing and growing rapidly. There are a lot of resources on the Internet, and there will be more and more. Since the Internet is so constantly changing, month to month and even second to second, we need to look frequently for new resources and for additions and corrections. (2) It is almost impossible to track all relevant sites, and we cannot be absolutely up-to-date on all the sites.

The Internet provides a lot of useful materials and resources: data tables, textbooks, electronic journals, applets and free software. You can find enormous lists of links that cover almost every area of interest. Technology transforms the ways we teach, learn and work in today's world.

Why is the Internet so attractive for teaching and for learning?

- It is cost-effective.
- It is more and more accessible – for the learner and the teacher.
- Hypertext language is not too hard to learn.

It is tremendous how the Internet changes the way we communicate. Now we can choose to take classes taught from places all over the world. For example, at the University of Newcastle in Australia, engineering professors have prepared lectures, including PowerPoint presentations, for students in Singapore. (3)

Many worldwide projects include online tutoring and helping students learn online. One example is the Online Tutoring Project funded by Scottish Higher Education. Carol Higgison (4) pointed out that one of the key attributes of online learning is the ability to reach people "around the block and around the globe", overcoming many barriers between languages and cultures.

In Europe, an e-workshop was organized under the name LOLA (Learning about Learning On-line). This highly successful project was a professional development course that trained faculty, instructors and staff in methods for developing online and distance learning courses at institutions of higher education.

In 1999, 467 teachers completed the NeedSnap survey, a survey of technology needs and beliefs.
Teachers rated the following three items highest on the survey:

- Technology can help accommodate different learning styles
- Teachers would attend Internet-based professional development activities
- Teachers believe that technology makes them better teachers.

The lowest-rated belief was that textbooks would be replaced by electronic media within 5 years.

One model for teaching with technology is Cary Academy, in Cary, North Carolina. Cary Academy has earned a place in Internet history. Headmaster Donald Berger says the incorporation of technology into the curriculum is important to the academy's goal of creating a learning environment that will serve as a model for all schools and that will support student and teacher learning. (5)

At Cary Academy, communication technology is a key component of learning, says Berger. Faculty members have their own Web sites on the Intranet where they post review sheets, study guides for tests, links to other relevant sites and detailed curricular materials as well as the week's assignments.

The Smithsonian Institute in Washington, D.C. has accepted the Internet -- a description of the Internet has become part of the permanent research collection on information technology at the National Museum of American History.

Of course there are opposing opinions about e-learning.
Among these are the opinions that:

- E-learning is not always easy learning
- We don't have proof that texts posted on the World Wide Web have passed any serious review
- Some students prefer a classroom setting where there is the possibility for immediate communication with the instructor.

We continue to find responses to all those objections.

An online approach to learning SAS Software, using Internet resources from around the world, helps us learn well, learn inexpensively, and learn conveniently. If we think in a positive way, and if we recognize the tremendous role of the Internet as so many academic groups do, I know that we should accept the wonderful opportunity technology has given us to teach and learn SAS software as integral parts of the World Wide Web.

With the growth of the Internet, opportunities to learn SAS have grown rapidly. So many links, Web pages, short courses and other important materials are available online that it has become quite possible to learn SAS using the Internet.

Of course, I can't say these Internet resources contain everything a programmer needs to know about SAS Software. The Web resources are just one way to learn SAS software. When additional training and support are needed the classes provided by SAS Institute are an excellent additional resource.

SELECTED WEBSITES FOR LEARNING SAS SOFTWARE

SAS INSTITUTE SITES

SAS Institute has a large and well developed Web site. Below are some selected SAS Institute Web pages. The resources available on their site are too numerous to cover thoroughly. Most pages contain several links to other helpful pages for learners. The search engine provided works quite well. SAS pages also come up very frequently in GOOGLE searches!

Free OnlineTutor Software
http://www.sas.com/apps/elearning/elearning_courses.jsp?cat=Free+Tutorials

On this site SAS offers tutorials on the essentials of SAS software. The tutorials provide step-by-step instructions. This site also provides direct links to other WEB pages that are especially helpful for beginners.

Getting Started with SAS (59269)
Getting Started with SAS Enterprise Guide (59271)
Getting Started with SAS Enterprise Miner (59345)
Getting Started with SAS/EIS (59272)
Getting Started with SAS/GIS (59347)
Getting Started with SAS/Warehouse Administrator (59346)

SAS OnLineTutor (license required)
http://support.sas.com/training/elearn/onlinetutor.html

SAS Online Tutor must be licensed, but if your site has it licensed it is a great resource. SAS Online Tutor, is very well designed. There is even a quiz at the end.

Documentation for SAS®9 Products (SAS OnlineDoc)
http://support.sas.com/documentation/onlinedoc/sas9doc.html

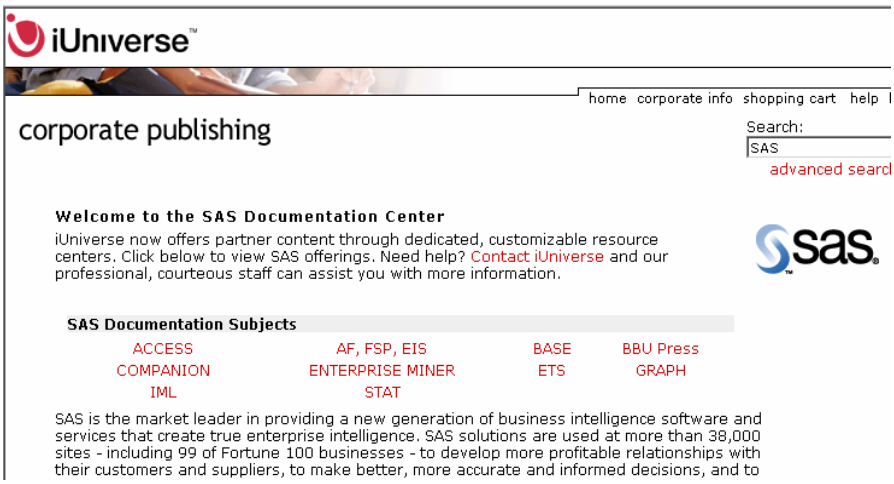
This page provides links to the SAS9 OnlineDocs in two formats, HTML and PDF. In addition there are links to SUGI proceedings, white papers, and other online resources.

SAS e-Learning
http://support.sas.com/training/elearn/

It is worthwhile to talk about e-learning -- using live Web classes that are designed to allow interaction with an instructor. Thanks to the Internet you can learn at any time convenient for you. Using a Web browser and a telephone, you will have an expert to guide you through your lessons, while you complete exercises at your desktop. Some of these products are free and others can be accessed with an individual or organizational site license.

SAS iUniverse and e-books
http://support.sas.com/publishing/epubs.html

Two years ago SAS Publishing joined with iUniverse to offer e-Books. SAS e-books -- reasonably priced with no delivery cost -- connect SAS users around the world. SAS e-books are in pdf format right on your desktop, accessible using Adobe e-reader.



Additional SAS Sites for Learners

SAS Learning Edition (cost $125 USD):	*http://support.sas.com/rnd/le/*
SUGI Proceedings:	*http://support.sas.com/usergroups/sugi/proceedings/index.html*
Technical Support Documents:	*http://support.sas.com/techsup/tnote/tnote_cindex.html*
White Papers:	*http://www.sas.com/apps/whitepapers/whitepaper.jsp*
SAS Communities:	*http://support.sas.com/rnd/intro.html*
Newsletters and Magazines:	*http://support.sas.com/documentation/periodicals/index.html*

SELECTED UNIVERSITY SITES
Many universities today have Web-based courses, instruction and classes. Using a combination of SAS Web sites and some of the well developed university Web sites you can gain a complete picture of this different learning style, over the Internet.

University of California at Los Angeles (UCLA)
http://www.ats.ucla.edu/stat/sas/notes2/

The UCLA SAS Web site uses a very sophisticated methods for learning SAS® Software that incorporate video created using Camtasia Studio Recorder created by Techsmith (see www.techsmith.com for more information).

You can download the data files for the SAS class as a Winzip file by clicking on SASdata.zip. The examples can be saved as files anywhere you like. You can listen to the instructor's explanations, see SAS on your desktop, and watch examples as a movie. You will see the program, log, and output, followed by the explanation. You can stop at any time, repeat the lesson, and repeat the exercises as often as you want. The nice feature of this Web site from the University of California is that you can watch a movie or you can read the text, which ever option suits you the best.

Even though you have a simulation of SAS® Software and you don't need a real one, it is a great resource for all beginners and for other SAS User who want to refresh their knowledge.

The presentation is organized in the following modules:

- Entering Data, view movie
- Exploring Data, view movie
- Modifying Data, view movie
- Managing Data, view movie
- Analyzing Data, view movie (part 1) and movie (part 2)

University of California (UCLA) – Additional SAS Materials
http://www.ats.ucla.edu/stat/sas/library/default.htm

On this Web page you will find an extensive library list of SAS related topics and code. Much of the content is provided by linking to other sites. Here are some examples:

Getting Started:

- The User Interface of SAS for Windows, adapted from materials created by Professor Oliver Schabenberger of Virginia Tech .
- Overview of the SAS Language, adapted from materials created by Professor Oliver Schabenberger of Virginia Tech
- Overview of SAS Procedures, courtesy of Professor Michael Friendly of York University

Additional topics include:

- Statistical Analysis in SAS
  - Regression Methods
  - Logistic Regression and Probit
  - ANOVA and Experimental Design
  - PROC MIXED
  - Categorical Data Analysis
  - Other
- SAS Programming
  - Reading Data/Data Transformation/Data Management
  - Procedures
  - Good Programming Practices
  - ODS
  - SAS Macros
  - Other
- Graphics
  - SAS/Graph
  - Other Graphical Methods
- Transferring Files
- Links to Other SAS Resources

Indiana University
http://www.indiana.edu/%7Estatmath/stat/sas/win/

John Samuel at Indiana University has created a Web based tutorial called, "Getting started with SAS 8 for Windows." He also makes this document available as a 19 page Adobe acrobat file that is convenient for printing. This document includes:

- Introduction
  - How to Use this Document
  - What is SAS?
  - Launching SAS
  - Windows in SAS for Windows
  - Menus in SAS
- Working within SAS
  - Using the Cursor
  - Using Icons
  - Using the Enhanced Editor
- Writing a SAS Program: the DATA Step
  - Organizing Your Data for Analysis
  - DATA Statement
  - INFILE Statement
  - INPUT Statement
  - DATALINES Statement
  - IF-THEN and SAS Functions
  - LABEL Statement
  - PROC FORMAT Statement
  - RUN Statement
  - Comment Statements
- Writing a SAS Program: the PROC Step
  - FREQ Statement
  - MEANS Statement
  - CORR Statement
  - ENDSAS Statement
- Writing and Executing a SAS Program
  - Writing a SAS Program
  - Executing a SAS Program
- Sample Data Sets
  - The CLAS Sample Data Set
  - Other SAS Sample Data Sets
- SAS Data Sets
  - Creating SAS Data Sets
  - Accessing SAS Data Sets
  - SAS Transport Files
- Using SAS/Graph

Sharing Content, the World Wide Web:
Many sites link to established sites, rather than developing their own content. For example, this University of Hong Kong site, http://www.hku.hk/cc/home/documentations/training.htm, links to the Indiana site developed by John Samuel that we referenced previously. You can often find many exciting new sites by following these links.

SELECTED COMPANY WEB SITES

Knowledge Systems Institute (KSI)
http://distancelearning.ksi.edu/demo/ma377/lecture.htm

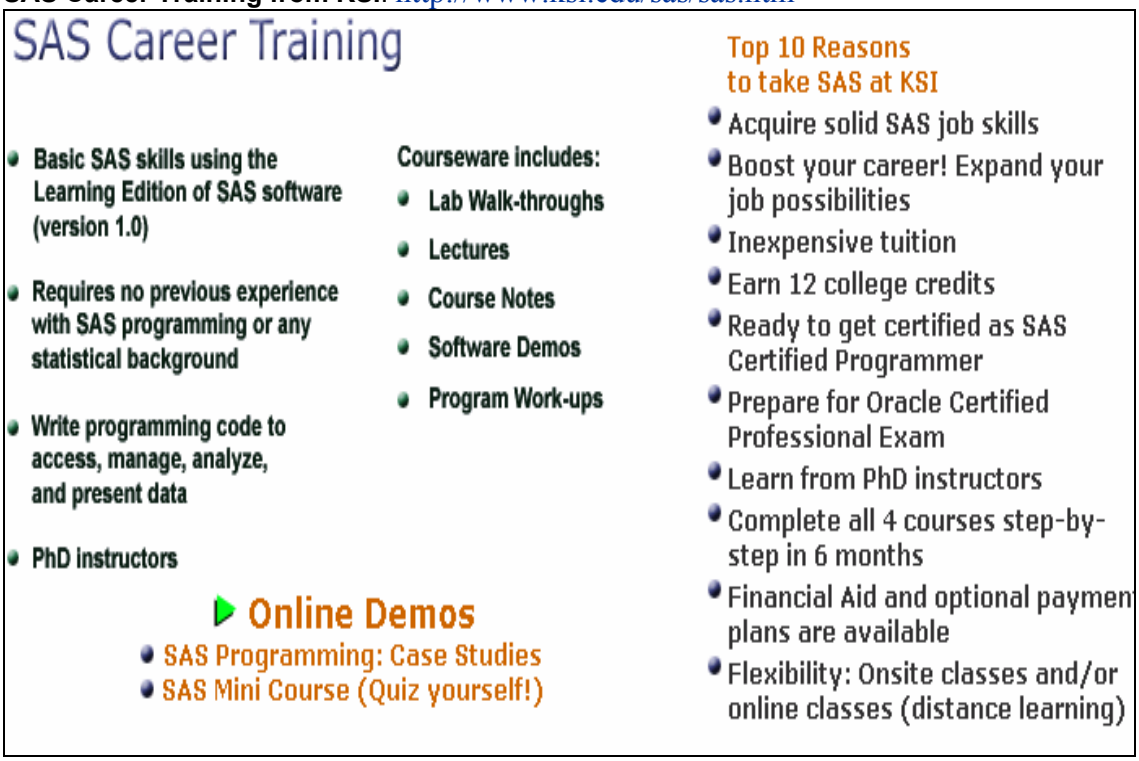
Knowledge Systems Institute (KSI) is a fully accredited graduate school of computer and information sciences. KSI offers online courses for students living out-of-state and for local students unable to attend on-site classes. You can find demonstration lectures and tests at the end of every lecture. Knowledge Systems Institute (KSI), was established in 1978 by Dr. Shi-Kuo Chang.

Online learning at KSI provides the opportunity to advance our SAS knowledge using the Internet as a powerful tool. The courses include multimedia presentations of the material plus online communication with professors. Samples of SAS code can be viewed or a video can played. We can listen to the voice of the professor as many times as we want.

A high speed connection is recommended for viewing the video. To complete the lessons, you need access to the SAS software. You can purchase the SAS Learning Edition from the SAS Institute for about $125(see the SAS links above for more information). There is tuition for the degree granting programs offered by KSI.

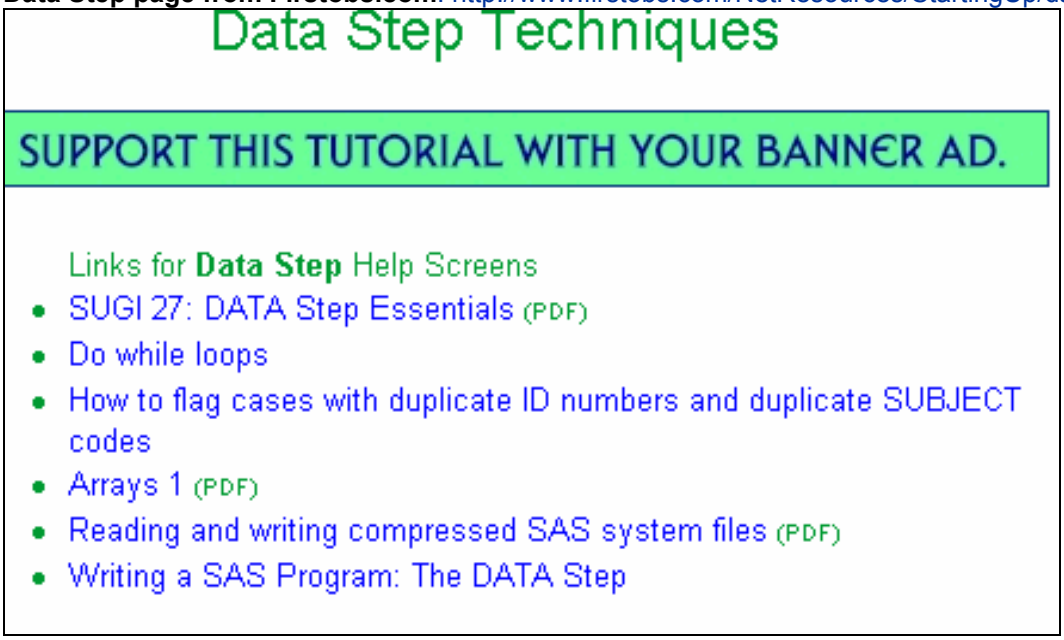
There are review questions (with answers), a sample test and sample test answers. One click on the button to play the video and we are in the environment of SAS classes with the professor and his SAS explanations. Innovative multi-media courses online bring SAS lectures to our desktops, and our own homes.

SAS Career Training from KSI: http://www.ksi.edu/sas/sas.htm



FirstObs.com
FirstObs.com was launched June 1, 2001. Its Web site offers free tutorials for learning SAS® Software. This site is growing and it is very useful for SAS programmers. It is supported by banner ads. Tutorials are especially well explained and organized. There are many links and connections to other SAS sites and the SAS programmers' community. This site could be our guidebook, providing good tutorials throughout the process of learning SAS Software.

Data Step page from Firstobs.com: http://www.firstobs.com/NetResources/StartingUp/data_step.htm



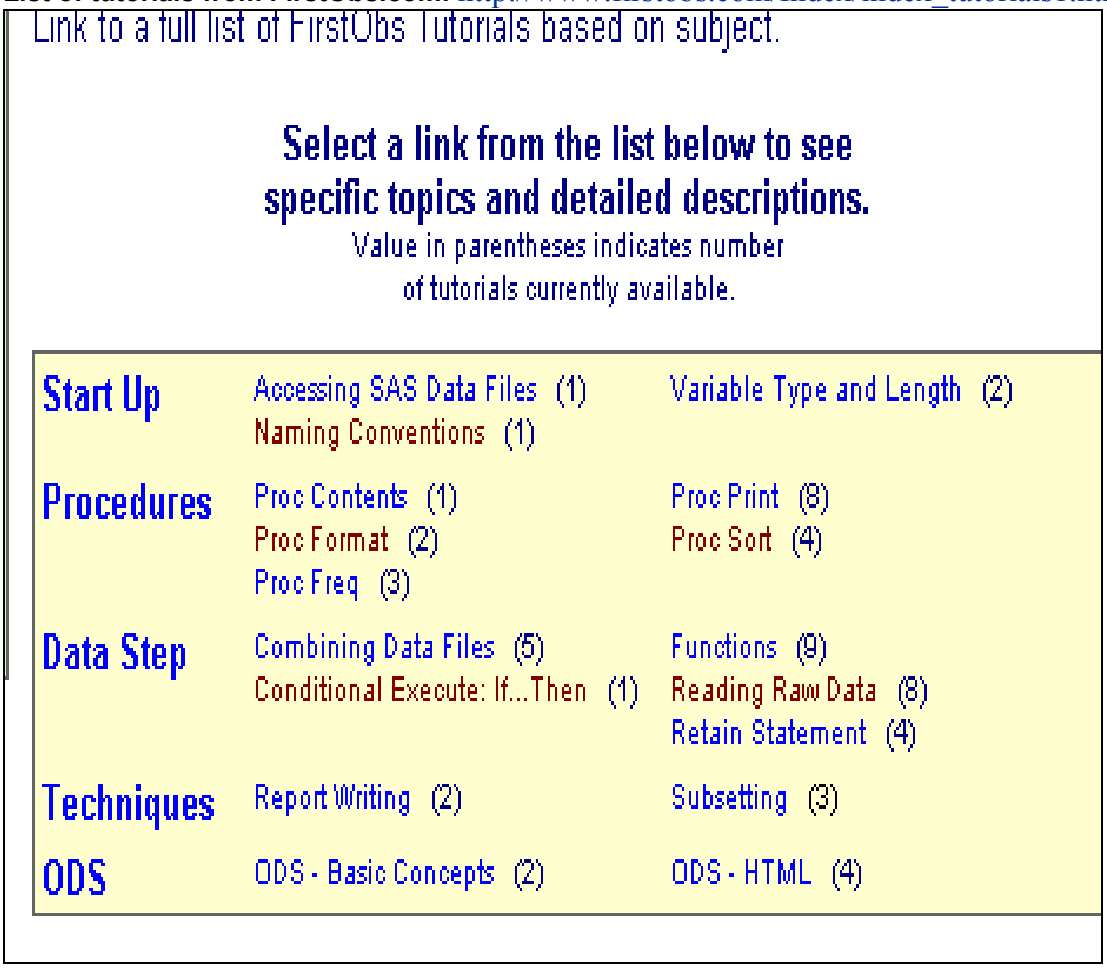
Data Step Techniques

SUPPORT THIS TUTORIAL WITH YOUR BANNER AD.

Links for **Data Step** Help Screens

- SUGI 27: DATA Step Essentials (PDF)
- Do while loops
- How to flag cases with duplicate ID numbers and duplicate SUBJECT codes
- Arrays 1 (PDF)
- Reading and writing compressed SAS system files (PDF)
- Writing a SAS Program: The DATA Step

List of tutorials from FirstObs.com: http://www.firstobs.com/Index/index_tutorials1.htm



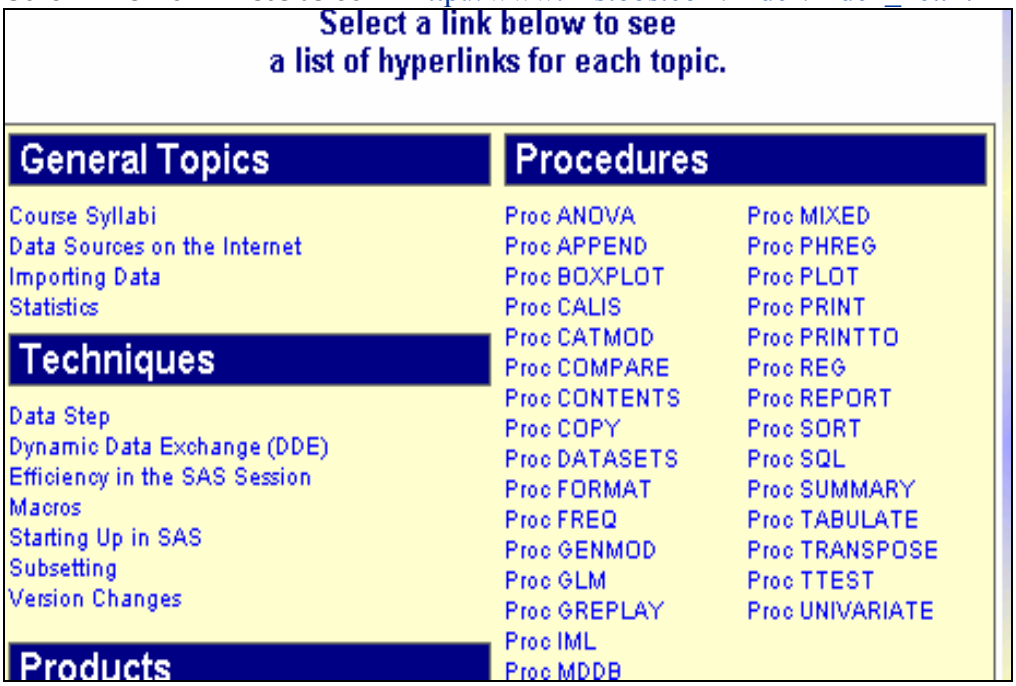
Link to a full list of FirstObs Tutorials based on subject.

Select a link from the list below to see specific topics and detailed descriptions.

Value in parentheses indicates number of tutorials currently available.

Start Up	Accessing SAS Data Files (1)	Variable Type and Length (2)
	Naming Conventions (1)	
Procedures	Proc Contents (1)	Proc Print (8)
	Proc Format (2)	Proc Sort (4)
	Proc Freq (3)	
Data Step	Combining Data Files (5)	Functions (9)
	Conditional Execute: If...Then (1)	Reading Raw Data (8)
		Retain Statement (4)
Techniques	Report Writing (2)	Subsetting (3)
ODS	ODS - Basic Concepts (2)	ODS - HTML (4)

Other links from FirstObs.com: http://www.firstobs.com/Index/index_net.htm



Section of SAS code with line by line explanations from this web site.

The top forty observations will be displayed with the Obs= data set option.

```
0001 proc print data=autos._93cars (obs=40) noobs d;
0002 run;
```

`line 1:` Proc Print reads the first forty observations from 'autos._93cars', then stops. Although the data file contains more observations, only the first forty are read into the Proc.

Click here to see the Proc Print output, recalling that the data file '_93 cars' contains 93 observations.

The Obs= data set option must be used with reference to its placement and syntax.

CONCLUSION

SAS learning online indeed comes from around the block and around the globe. There are many well designed and content filled Web sites for learning about SAS programming. Fees are charged for some online courses and materials, but many tutorials and sample programs can be found that are free. Much SAS content is available on SAS Institute and university sites. Much SAS content can be found using google.

Free Online Tutorial Software	http://www.sas.com/apps/elearning/elearning_courses.jsp?cat=Free+Tutorials
SAS OSASAS Online Tutor (license required)	http://support.sas.com/training/elearn/onlinetutor.html
Documentation for SAS®9 Products (SAS Online Doc)	http://support.sas.com/documentation/onlinedoc/sas9doc.html
SAS e-Learning	http://support.sas.com/training/elearn/
SAS Learning Edition	http://support.sas.com/publishing/epubs.html
SUGI Proceedings	http://support.sas.com/usergroups/sugi/proceedings/index.html
Technical Support Documents:	http://support.sas.com/techsup/tnote/tnote_cindex.html
White Papers:	http://www.sas.com/apps/whitepapers/whitepaper.jsp
SAS Communities	http://support.sas.com/rnd/intro.html
Newsletters and Magazines	http://support.sas.com/documentation/periodicals/index.html
University of California at Los Angeles (UCLA)	http://www.ats.ucla.edu/stat/sas/notes2/
University of California (UCLA), Additional SAS Materials	http://www.ats.ucla.edu/stat/sas/library/default.htm
Indiana University	http://www.indiana.edu/%7Estatmath/stat/sas/win/
University of Hong Kong,	http://www.hku.hk/cc/home/documentations/training.htm
Knowledge Systems Institute (KSI)	http://distancelearning.ksi.edu/demo/ma377/lecture.htm
SAS Career Training from (KSI):	http://www.ksi.edu/sas/sas.htm
Data Step page from Firstobs.com:	http://www.firstobs.com/NetResources/StartingUp/data_step.htm
List of tutorials from FirstObs.com:	http://www.firstobs.com/Index/index_tutorials1.htm
Other links from FirstObs.com	http://www.firstobs.com/Index/index_net.htm

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ACNOWLEDGEMENTS

I would like to thank all the people who created the tutorials and Web sites and made them public so we can learn about SAS software over the Internet. I would especially like to thank Dr. Susan Griffith, for her time helping me with suggestions and corrections to make this paper available for publication.

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