What's Hot, What's Not: Skills for SAS® Professionals

Kirk Paul Lafler, Software Intelligence Corporation, Spring Valley, California
Charles Edwin Shipp, Consider Consulting Corporation, San Pedro, California

Abstract

As a new generation of SAS® user emerges, current and prior generations of users have an extensive array of procedures, programming tools, approaches and techniques to choose from. This presentation identifies and explores the areas that are hot and not-so-hot in the world of the professional SAS user. Topics include Enterprise Guide, PROC SQL, PROC REPORT, PROC FORMAT, Macro Language, ODS, DATA step programming techniques such as arrays and hashing, business intelligence, sasCommunity.org®, JMP®, SAS/GRAPH®, SAS/STAT®, and SAS/AF®.

Introduction

As defined in The Free Dictionary by Farlex, 'skill' is defined as "the proficiency, facility, or dexterity that is acquired or developed through training or experience." Essentially, a skill is developed or enhanced over time, with the help of training resources and/or experience. A skill is demonstrated by the ability to perform a task, or set of tasks, well. SAS professionals frequently need a broad range of skills in order to contribute in the workplace and particularly to succeed in the technological society of the 21st century.

Critical success factors include assessing what your current skills and skill levels are, determining what skills are hot (in demand), as well as what skills are not, and identifying where and how to access resources to acquire or learn the necessary skills. As a SAS® professional, the skills you acquire will, perhaps, enable you to embark on a more rewarding journey leading to exciting opportunities, projects and better way of life. To assist in getting started, a self-survey questionnaire appears at the end of this paper to help you assess where you are and the skills needed to achieve those goals.

Take Inventory of Your Skills

Taking inventory of your skills is an important first step in understanding what you can provide clients and prospective clients is a valuable ingredient for success. First and foremost, the services you intend to offer should be perceived as adding value in an already highly competitive marketplace. Next, keep in mind that there will almost certainly be intense competition from other like-minded individuals. Taking inventory of your skills involves the following steps:

1. List your skills/services (e.g., DATA step programming, array processing, hash programming, macro design and programming, database design, technical support, systems analysis, strategic planning, market analysis, technical writing, etc.)

2. Perform the following rankings for each skill/service:
   a. Level of competence (e.g., up-to-date (current), competitive, and out-of-date)
   b. Income level production for the past 12 months (largest to smallest)
   c. Assess whether each skill/service is "Active" or "Passive" (e.g., Active---critical to clients you are pursuing, Passive--non-critical to prospective clients)
   d. Specify your skill rating as "Very proficient", "Productive", "Some working knowledge", "None".

3. Once ranked, categorize each skill by functional discipline (e.g., programming, design, analysis, teaching, consulting, marketing, etc.)

4. Capture comments including, strengths, weaknesses, successes, and failures about each skill. These comments, along with rankings, will be used to help you to better understand the direction(s) you should take.

Seek Your Level

Once you have determined the skills to pursue, consider the appropriate level and resource needed to succeed. Assess your skill level, including what your objective is, and what you like to do most. Your past experience doing similar things is critically important in this equation. You should also obtain the recommendations and advice of other professionals you know. One good way to begin gaining experience is to team with more experienced consultants.

Improve Skills/Expertise

Many professionals believe they have already mastered all the necessary skills to be successful. But as technology evolves, it becomes increasingly important to continue the process of learning, essentially evolving along with the areas you are pursuing. It may even involve splitting a large area of interest or endeavor into smaller pieces, a process known as specializing. Even if you consider yourself an expert at what you do with interests and abilities in several areas in the SAS software, specialization is becoming not only popular, but necessary. To assist with your skill building, consider additional training from the following sources:

1) **SAS-led courses (lecture / hands-on workshops)**

2) **Non-SAS Institute Instructor-led courses**

3) **Self-paced computer-based training (CBT)**

4) **Online SAS documentation in PDF and HTML format**

5) **User-written books from SAS Press, Books by Users (BBU)**

6) **"White" papers available from LexJansen.com, sasCommunity.org, support.sas.com, and other websites**

7) **User Group presentations and Hands-on workshops**

8) **Podcasts and webinars on sasCommunity.org and support.sas.com**

SAS professionals can improve or brush up on skills by attending instructor-led or hands-on workshop training courses. Training by experienced vendors is frequently available on a variety of topics and offered at local training centers and at conference events. For example, the SAS Global Forum (SGF), the annual regional SAS conferences (e.g., MWSUG, NESUG, PNWSUG, SCSUG, SESUG, and WUSS), and industry-specific SAS conferences (e.g., PharmaSUG) offer affordable half-day and full-day instructor-led training. Users can attend these cost-effective training sessions before and/or after the conference event. Also, many of the conferences offer "free" 80 – 120 minute hands-on workshop sessions for users to attend during the conference event. These can be very attractive ways to learn a topic of interest or brush up on the latest techniques from a leading expert in a hands-on environment.

As an alternative to attending a training class in person, self-paced computer-based training (CBT) modules are available for purchase or through subscription. From time to time, "free" limited trial access is available for evaluation purposes. All you need to access this treasure-trove of information and learning is a computer and Web browser (e.g., Internet Explorer, Netscape Navigator, Safari or Mozilla FireFox). SAS Institute, for example, offers topics that can be accessed and studied for a 90-day period on the Web.

sasCommunity.org

sasCommunity.org is an exciting and new collaborative online community for SAS users worldwide. This virtual online community supports technology for SAS users to collaborate with other users anywhere in the world; access SAS-based content including blogs, presentations, and code examples; learn about upcoming events, forums and user group conferences; and discuss anything and everything that is related to SAS software, from SAS users to SAS users. As organizations experience declining travel budgets, improved broadband and Internet technological advances, and a need for greater productivity, sasCommunity.org expands its presence among SAS professionals.

SAS Certified Professional Exams

To give your career a significant boost and to improve your prospects for success, the SAS Institute offers certification testing for users in three key areas: 1) SAS Programming, 2) Predictive Modeling and 3) Data Warehousing. These globally recognized certification tests are administered in more than 140 countries by a global leader in testing services in the IT industry, and are taken in a controlled environment.

Two credentials are offered by SAS Institute for SAS programmers to consider:
 1)   SAS Certified Base Programmer Credential for SAS 9
             a.   SAS Base Programming Exam for SAS 9

 2)   SAS Certified Advanced Programmer Credential for SAS 9
             a.   SAS Base Programming Exam for SAS 9
             b.   SAS Advanced Programming Exam for SAS 9
SAS Institute offers users a credential for predictive modelers to consider:
 1)   Predictive Modeling Using SAS Enterprise Miner 5.2 Credential
             a.   Predictive Modeling Using SAS Enterprise Miner 5.2 Exam

Two credentials are offered by SAS Institute for SAS data warehouse professionals to consider:
1) SAS Certified Warehouse Development Specialist Credential
    a. SAS Advanced Programming Exam for SAS 9
    b. SAS Warehouse Technology Exam
    c. SAS Warehouse Development Specialist Concepts Exam

2) SAS Certified Warehouse Architect Credential
    a. SAS Warehouse Technology Exam
    b. SAS Warehouse Architect Concepts Exam

SAS Alliance Partner Program

SAS professionals may want to consider applying to become a SAS Alliance Partner. Five core programs are available to choose from: 1) Technology Program, 2) Consulting Program, 3) Application Program, 4) Outsourcing Program, and 5) Reseller Program. Each program has three levels: 1) Platinum, 2) Gold and 3) Silver. For more information about Alliance partnership opportunities, prospective candidates should access and review the SAS Alliance Program Guide on the SAS Institute web site at http://www.sas.com/partners/programs/index.html.

What Skills, Techniques and Websites are Hot?

The following table illustrates many of the skillstechniques and/or websites, but not all, that the authors have found to be popular and in demand by SAS professionals.

- **Enterprise Guide – GUI point-and-click front-end application**
- **Hash Programming Techniques to produce "Fast" table lookups, sorts, merges, and joins**
- **Output Delivery System (ODS) to create RTF, PDF, HTML, XML, and Excel output**
- **ODS Statistical Graphics to produce high-quality plots, bar charts, histograms, maps, and other graphics**
- **PROC SQL to construct Queries, Tables, Views, Case Expression Logic, inner and outer Joins**
- **PROC REPORT to create Detail and Summary Reporting**
- **Macro Language to construct Reusable Code and Tools**
- **Dictionary Tables and SASHELP Views – Access SAS Environmental / Metadata**
- **Business Intelligence**
- **SAS® University Edition software – Base-SAS, SAS/STAT, SAS/IML, SAS/ACCESS for Windows and Studio**
- **Resource for Published SAS Papers – http://www.LexJansen.com**
- **SAS/XML – Share Structured Data as meta-data**
- **Technical Support, Online Documentation – http://support.sas.com**
- **Social Networking, Blogs, Tech Support – http://www.sasCommunity.org**
- **List Serve of archived Technical Support – SAS-L – http://www.listserv.uga.edu/archives/sas-l.html**
- **SAS Certification – SAS Certified Professional Exams**
- **JMP software to produce Statistical and Data Visualization**
- **JMP and JMP Genomics**

What Skills are Not so Hot?

The table below shows a few skills that the authors have found to be not as popular, or as they once were, by SAS professionals.

- **SAS/ASSIST® software**
- **SAS/FSP® software**
- **SAS/AF® software**
- **Screen Component Language® (SCL)**
- **DATA _NULL_ –> Monospace "Custom" Reporting**

Conclusion

There are many avenues to help determine what skills are hot and what are not in the world of the SAS professional. Follow the main websites www.SAS.com, the forums and blogs within http://support.SAS.com and the user interchange on www.sasCommunity.org to keep abreast of advancing technologies. Education and a desire to acquire new skills and experience are very important. Careful planning, preparation, organization, the ability to handle multiple tasks, and diligence are important factors for any SAS professional to possess and/or develop.

It's also important to identify and acquire specific techniques from others, along with their successes and failures, to improve the likelihood for greater success while enhancing your skills. Other professionals may be able to share their own expertise to help you acquire, or brush up on, specific skills, including resources like SAS-L, sasCommunity.org, and various web sites designed for SAS professionals. These resources include instructor-led and hands-on workshop training available at SAS user conferences, self-paced computer based training (CBT) or e-Learning applications, self-study web resources including "white" papers, published programming tips and techniques, and certification. Also, a good SAS programming and/or user-written technical book, or two, can provide a wealth of knowledge for the inquisitive, and self-starting, professional.

References

Barnes, Gregory S. (2000), *"SAS Skills for the Next Millennium: A Geek Peek into the Not so Distant Future",* Proceedings of the Twenty Fourth Annual SAS Users Group (SUGI) Conference - 2000.

Holtz, Herman, How To Succeed as an Independent Consultant, John Wiley & Sons, Inc., 1983.

Holtz, Herman, The Consultant's Guide to Proposal Writing, Second Edition, John Wiley & Sons, Inc., 1990.

Kishel, Gregory and Patricia Kishel, How to Start and Run a Successful Consulting Business, John Wiley & Sons, Inc., 1996.

Lafler, Kirk Paul and Charles Edwin Shipp (2014), *"What's Hot, What's Not – Skills for SAS Professionals",* Proceedings of the South Central SAS Users Group (SCSUG) Conference – 2014.

Lafler, Kirk Paul and Charles Edwin Shipp (2013), *"What's Hot, What's Not – Skills for SAS Professionals",* PharmaSUG 2013; San Diego SAS Users Group (SANDS) Meeting – March 2013; IowaSUG 2013; and NebraskaSUG 2013.

Lafler, Kirk Paul and Charles Edwin Shipp (2012), *"What's Hot, What's Not – Skills for SAS Professionals",* Proceedings of the MidWest SAS Users Group (MWSUG) Conference – 2012.

Lafler, Kirk Paul and Charles Edwin Shipp (2011), *"What's Hot, What's Not – Skills for SAS Professionals",* Proceedings of the South Central SAS Users Group (SCSUG) Conference – 2011.

Lafler, Kirk Paul and Charles Edwin Shipp (2011), *"What's Hot, What's Not – Skills for SAS Professionals",* Proceedings of the SAS Global Forum (SGF) Conference – 2011.

Lafler, Kirk Paul and Charles Edwin Shipp (2010), *"Connect with SAS Professionals Around the World with LinkedIn and sasCommunity.org",* Proceedings of the Annual MidWest SAS Users Group (MWSUG) Conference – 2010.

Lafler, Kirk Paul and Charles Edwin Shipp (2008), *"What's Hot, What's Not – Skills for SAS Professionals",* Proceedings of the Annual Western Users of SAS Software (WUSS) Conference – 2008.

Lafler, Kirk Paul and Charles Edwin Shipp (2008), *"Collaborate with SAS Users Around the World with sasCommunity.org",* Proceedings of the 2nd Annual SAS Global Forum (SGF) Conference – 2008.

Lafler, Kirk Paul and Charles Edwin Shipp (2007), *"Consulting: Critical Success Factors" – Awarded "Best Contributed Paper",* Proceedings of the Annual Western Users of SAS Software (WUSS) Conference – 2007.

Lafler, Kirk Paul and Charles Edwin Shipp (2001), *"SAS Consulting: New Beginnings" – Awarded "Best Contributed Paper",* Proceedings of the Ninth Annual Western Users of SAS Software (WUSS) Conference – 2001.

Nelson, Bob and Peter Economy, Consulting for Dummies, IDG Books Worldwide, Inc., 1997.

Schiffman, Stephan, The Consultant's Handbook, Adams Media Corporation, 1988.

Shenson, Howard L. Shenson on Consulting, John Wiley & Sons, Inc., 1994, 1990.

Shipp, Charles Edwin and Kirk Paul Lafler (1995), *"Training in a World of Cost-Cutting and Downsizing",* NESUG 1995; WUSS 1995; and SESUG 1995.

Shipp, Charles Edwin and Kirk Paul Lafler (1995), *"Training in a World of Cost-Cutting and Downsizing," - Awarded "Best Contributed Paper",* Proceedings of the Twentieth Annual SAS Users Group International (SUGI) Conference - 1995.

Simon, Alan R., How to be a Successful Computer Consultant, Third Edition, Mc-Graw-Hill, Inc., 1994.

The Free Dictionary by Farlex, http://www.thefreedictionary.com\skill, 2011.

Weinberg, Gerald M., The Secrets of Consulting, Dorset House Publishing, 1985.

Trademark Citations

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies.

About the Authors

Kirk Paul Lafler is consultant and founder of Software Intelligence Corporation and has been using SAS since 1979. He is a SAS Certified Professional, provider of IT consulting services, trainer to SAS users around the world, mentor, and sasCommunity.org emeritus Advisory Board member. As the author of six books including Google® Search Complete! (Odyssey Press. 2014); PROC SQL: Beyond the Basics Using SAS, Second Edition (SAS Press. 2013); PROC SQL: Beyond the Basics Using SAS (SAS Press. 2004); Kirk has written more than five hundred papers and articles, been an Invited speaker and trainer at four hundred-plus International, regional, special-interest, local, and in-house SAS user group conferences and meetings, and is the recipient of 23 "Best" contributed paper, hands-on workshop (HOW), and poster awards.

Charles Edwin Shipp is a programmer, consultant, mentor and author, and has been using the SAS and JMP software since 1980. He is credited in the original JMP manual for his roles in the early days. He has written more than one hundred papers and has been an invited speaker at more than one hundred International, regional, special-interest, local, and in-house SAS and JMP conferences and meetings, and is the recipient of 13 "Best" contributed paper and poster awards. Charlie is the co-author of three books including Google Search Complete! (Odyssey Press. 2014) and Quick Results with SAS/GRAPH Software (SAS Press. 1994). Currently, Charlie is involved as an eBook author, sasCommunity.org Advisory Board member, application developer, and consultant in JMP and SAS software.

Comments and suggestions can be sent to:

Kirk Paul Lafler
Senior SAS® Consultant, Application Developer, Data Scientist, Trainer and Author
Software Intelligence Corporation
E-mail: KirkLafler@cs.com
LinkedIn: http://www.linkedin.com/in/KirkPaulLafler
Twitter: @sasNerd
~~~
Charles Edwin Shipp
Senior SAS and JMP Consultant, eBook Developer, Programmer, Trainer and Author
Consider Consulting Corporation
E-mail: CharlieShipp@aol.com
LinkedIn: https://www.linkedin.com/in/charlieshipp
Twitter: @ShippAhoy

SAS® Professional Skills Survey

SAS Professional: _____

E-mail/LinkedIn: _____

1. How long have you been using SAS?   ____ < 1 Year   ____ 1 – 5 Years   ____ 6 – 10 Years   ____ > 10 Years

2. How would you rate the level of your SAS expertise?   ____ None   ____ Novice   ____ Intermediate   ____ Advanced (Expert)

3. Have you been certified as a SAS Professional by passing the certification exam?   ____ Yes   ____ No

4. Are you a SAS Alliance Partner?   ____ Yes   ____ No   If you answered 'Yes' to previous question, how long? _____ Years

5. What method(s) do you use to improve your SAS skills?   ____ CBT   ____ Instructor-led Training   ____ Podcasts

   ____ Hands-on Workshops   ____ User Group Presentations   ____ Webinars   ____ YouTube Videos

   ____ Computer Based Training (CBT)   ____ support.sas.com   ____ SAS Press Books/eBooks

   ____ SAS Online Documentation   ____ www.lexjansen.com   ____ MOOCs   ____ Other

6. Rate your SAS programming/skills in the following areas (0=None, 1=Novice, 2=Some Knowledge, 3=Very Good, 4=Expert):

	Currently	1-Year from Now	2-Years from Now
- Base SAS®	_____	_____	_____
- SAS Programming	_____	_____	_____
- SQL Programming	_____	_____	_____
- Macro Programming	_____	_____	_____
- DATA Step Hash Programming	_____	_____	_____
- Output Delivery System (ODS)	_____	_____	_____
- ODS Statistical Graphics	_____	_____	_____
- SAS/FSP®, SAS/AF® and SCL	_____	_____	_____
- SAS Enterprise Guide® (EG)	_____	_____	_____
- SAS Debugging Techniques	_____	_____	_____
- Business Intelligence	_____	_____	_____
- Statistical Consulting	_____	_____	_____
- SAS/IntrNet®	_____	_____	_____
- SAS/PC®	_____	_____	_____
- SAS/Connect®	_____	_____	_____
- SAS/ETS®	_____	_____	_____
- SAS/OR®	_____	_____	_____
- SAS/Graph®	_____	_____	_____
- SAS/XML®	_____	_____	_____
- Data Mining	_____	_____	_____
- Data Cleaning	_____	_____	_____
- Other _____	_____	_____	_____
- Other _____	_____	_____	_____

7. What makes your skills unique and/or successful? _____
   _____

8. What are your goals, directions, and future plans? _____
   _____
   _____
   _____
   _____

Please feel to use this form to assess and manage your own SAS Skills.

Figure 1.   Professional SAS Skills Survey