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## The Path to Developing Your Organization's SAS® Skills

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### ABSTRACT

As organizations try to leverage data assets and analytics as a means to achieving competitive advantages, it becomes imperative to develop the talent of the employees. This paper outlines the methodology that we employ to collaborate with SAS® to provide our users with a SAS training curriculum. This training path assumes little to no prior SAS experience and leads users through a series of courses that will teach them the SAS skills needed to reach that organizational goal.

### INTRODUCTION

In our role as SAS support and governance in a large organization with hundreds of SAS users, our responsibilities include enabling users to advance their SAS skillsets. The methodology presented is the reduction of all the things that have been tried and have worked well to aid our users. Many of the users who go through our curriculum are completely new to SAS but have experience with querying relational databases. Therefore, the challenge is to teach these users the very basics about SAS and help them quickly move along the path towards being proficient.

### CLASSIFICATION OF USERS AND SCHEDULING CLASSES

In order to develop a curriculum to train our users, we have classified them according to their skill levels and experience and offer classes accordingly. Because so many of our users are new to SAS, we differentiate our new users from our moderate and advanced users. We have also found it very helpful to publish an annual training calendar to help our users plan their attendance in accordance with their other work responsibilities.

January					<b>Standard Offering</b> SAS Café (1 hr.) Programming 1/2/3 (3 Days) Enterprise Miner (2 Days) Enterprise Guide (2 Days) SAS Add-in for Microsoft Office (1/2 hr.)
Monday	Tuesday	Wednesday	Thursday	Friday	
2	3	4	4	6	
9	10	11	12	13	
16	17	16	19	20	
23	24	25	26	27	
30	31				
February					<b>Specialty Course</b> Data Visualizations (2 days) Fraud Framework (1.5 Days)
Monday	Tuesday	Wednesday	Thursday	Friday	
		1	2	3	
6	7	8	9	10	
13	14	15	16	17	
20	21	22	23	24	
27	28	29			
March					
Monday	Tuesday	Wednesday	Thursday	Friday	
			1	2	
5	6	7	8	9	
12	13	14	15	16	
19	20	21	22	23	
26	27	28	29	30	

Figure 1. 1<sup>st</sup> Quarter 2012 Sample Training Calendar

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## NEW USERS

Because of its versatility, our organizational SAS tool of choice is Enterprise Guide®. It is relatively easy to transition to using the GUI features of Enterprise Guide when a new user already has experience with other GUI database tools. We have our new users enroll in a class entitled "Getting Started with Enterprise Guide." This regularly scheduled, single-day class serves as a crash course on all the basics of SAS and using Enterprise Guide. Smaller class sizes work the best with fifteen being an optimal number of attendees. We have found it best to teach this class ourselves rather than have SAS teach it for several reasons.

1. It is necessary to explain our SAS environment. Like snowflakes, it seems that no two SAS environments are perfectly alike. It is better to expose them to the environment they will be using on the job rather than to have them taught in a training environment and then try to reteach or relate what they have learned as it applies at work.
2. Doing the training in-house and in person provides a tremendous opportunity to meet and interact with the new users face-to-face, fostering future mentoring and support relationships.
3. Performing in-house training is much cheaper and more flexible than having SAS send a trainer or sending users to a publicly offered SAS course. The only expenses are the effort to host the class and the time away from work for the attendees.
4. Many new users are also new to the data. Therefore, in the "Getting Started with Enterprise Guide" class, limited-observation sample datasets are used that directly correspond to the actual data that are used at work. This provides a direct relationship between the things being learned in training and its application when the users return to their desks.
5. Because real data are being used in the class, the attendees are encouraged to bring scenarios encountered in their job, and the class can work through the answer together.

## GETTING STARTED WITH ENTERPRISE GUIDE CLASS

This is the first class to offer a new SAS user. We offer it to our users every other month. It is important to start with a discussion of the data; it is the foundation. Without proper understanding of the data, the relationships between datasets, and the location of the datasets, the ability to work in SAS is irrelevant.

After the data discussion, there are several key SAS specific concepts that need to be explained to the new users.

1. In Enterprise Guide, the libraries can be pre-assigned for the users, but it is still important to explain how to access libraries.
2. It is necessary to explain that the WORK library is a default temporary storage location for datasets that persists only for the duration of the current Enterprise Guide session.
3. The users need to have a firm understanding of SAS formatting, especially around how date values are stored and referenced.

Then, it is time to open Enterprise Guide. There are several key GUI features that ought to be shown to the new users.

1. Demonstrate how to move through the Process Flow Pane, the Task Status Pane, the Server List, and the SAS Folders.
2. This may have already come up when having the users log in to Enterprise Guide, but the users need to know how to modify their Connection Profile.
3. Show the users how to operate the Import and Export Wizards with several different file types.
4. Spend a significant amount of time demonstrating the features of the Query Builder such as joining tables, computed columns, changing formats, creating and combining filters, and setting the query to process against only a sample set. Also, highlight the fact that the GUI is writing PROC SQL behind the scenes for those who are familiar with SQL.
5. Show the users the many GUI driven procedures on the Task menu and quickly demonstrate building simple graphs and statistical procedures.
6. Show the users how to access the Options menus and mention helpful options such as unchecking the Automatically Open Data option.

After demonstrating a sample of the many GUI features in Enterprise Guide, have the users open a blank new program. New users should learn four basic pieces of SAS code.

1. Proc Contents is very simple and very important for new users who may not be familiar with existing datasets, so be sure to point out the useful information in the results like the number of observations, the created date, the owner, and the list of indexes.
2. Show the users how to add their own indexes to tables.

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3. Write a series of Data Steps that show the basic form and progressively add more complexity such as creating new variables, a WHERE statement, Keep= and Drop= statements, basic If-Then processing, etc.
4. Write a basic Proc Summary.

Having gone over the basics of using Enterprise Guide, reserve a significant amount of time for the users to present their actual business challenges. Then, as a class, work through a solution for each of the challenges that are brought forth. This will help solidify what was learned and will get the users in the mindset of applying their new skills to their work.

## **USING THE SAS ADD-IN FOR MICROSOFT OFFICE CLASS**

The SAS Add-in for Microsoft Office (AMO) is a very simple yet powerful addition to Excel for a SAS user. The class on the SAS AMO is a half-hour overview that focuses on bringing SAS data into Excel, querying it, using SAS tasks against Excel data, using Excel Functions that reference refreshable SAS data, and opening tables and OLAP cubes into Excel Pivot Tables. This class can be offered as a follow-up course to those who have taken the "Getting Started with Enterprise Guide" class or can be offered independently for those users who will access SAS data only using the AMO.

## **MODERATE - ADVANCED USERS**

As users progress in their SAS skills, they will need more training around specific tools and procedures. Our organization lacks the technical expertise internally to teach in-depth classes on the array of topics that are available. Instead of sending our users to publicly offered SAS courses, we have collaborated with SAS Training to bring instructors from SAS into our offices to host multi-day courses on various topics. This provides us with excellent value as it saves greatly on the per person costs for training and the travel expenses. By far, our most demanded class is our SAS Programming class.

## **SAS PROGRAMMING 1/2/3 CLASS**

We schedule this course once each quarter to help users who need to advance beyond the beginner level. This course is the combination of the "Programming 1," "Programming 2," and "Programming 3" courses that SAS offers. However, this class consolidates these three three-day courses into a single aggressive three-day course. This course also serves as preparation for the SAS Programming Certification.

## **SAS EBI FAST TRACK CLASS**

SAS teaches an excellent five-day course on their entire enterprise business intelligence suite of tools. This course covers everything from creating Stored Processes in Enterprise Guide and executing them using the AMO to using SAS OLAP Cube Studio, Information Map Studio, Web Report Studio, Information Delivery Portal, and BI Dashboard.

## **SAS ENTERPRISE MINER/TEXT MINER CLASSES**

A few times a year, we schedule SAS to teach "Applied Analytics Using SAS Enterprise Miner" for our advanced predictive modelers. In addition to the Enterprise Miner™ course, we schedule "Text Analytics with SAS Text Miner" for those advanced users who need to learn about text mining.

## **ADDITIONAL SAS COURSES**

SAS will send their instructors to teach any of the classes they offer at their standard training facilities at our offices, and the instructors we have worked with have been gracious enough to customize their training to fit our needs. Some additional courses that we have scheduled with SAS on an ad hoc basis are "Accessing Data in the SAS Scalable Performance Data Server," "Designing and Executing Marketing Campaigns with SAS Customer Intelligence Studio," and "Managing the SAS Marketing Automation Data Environment." As classes become more specialized, it becomes harder to find audiences large enough to justify the cost of having SAS send an instructor on-site. For these occasions, we still send individuals who need further training to SAS training facilities.

## **SAS CAFÉ PRESENTATIONS**

Paired along with our formal training classes, we offer SAS Café sessions scheduled one day each month, from noon until 1:00PM. These presentations are delivered over the web and focus on specific topics, tools, and best practices in SAS. We have collaborated with SAS to supply us with excellent subject matter experts to deliver these SAS Café presentations. There are literally hundreds of possible topics for these presentations, so we have prioritized our topics based on feedback from our users.

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## CONCLUSION

This curriculum was deployed a few years ago and is continually being improved and refined. We have had several hundred of our users enroll in our courses and benefit from the training. We have found that this methodology significantly reduces training costs while simultaneously reducing the amount of time it takes to advance a new user to a moderate level of proficiency. While not all organizations are large and can provide dedicated internal resources for SAS support and training, many of the ideas presented can be leveraged by organizations of all sizes to help develop the SAS skills of its members.

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