

SAS[®] Certification: Is it for You?

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ABSTRACT

The SAS Certified Professional Program was launched by SAS Institute, Inc. in 1999 to recognize users who can demonstrate an in-depth understanding of SAS software. The program consists of five certifications across a number of functional areas. There are several SAS courses which prepare users for the certification exams. To date many programmers have taken these courses, some experienced users just take the exams, and there are many other SAS savvy professionals who are experienced but not SAS certified!

This paper will review the benefits and limitations of the Certification Program for new SAS users as well as those who are more experienced and investigate whether it meets the needs of the user community. Why get certified? What's in it for you? The impact of the Certification Program on SAS jobs and its importance in industry vs. work experience and other SAS training courses will also be explored from an end user's perspective.

INTRODUCTION

In the last decade there has been a dramatic increase in the number of companies (Microsoft, Novell, Lotus) offering certification as part of their business partner program. In line with this growing trend the SAS Certified Professional Program was introduced by SAS Institute at SUGI in April of 1999.

Since being introduced over 6 years ago there have been over 5000 professionals certified across the globe in a number of different industries. Although most people know that SAS certification exists many are still unclear about the value of having this credential. This paper will provide a comprehensive review of the SAS certified professional program including the various training routes available to prepare for the programming exams. This review is based on my own personal experience as well as information obtained from other users. The benefit of the certification program will also be explored in terms of its current value to employers and employees and future impact on jobs.

In the last few years there have been several very good presentations given by SAS Institute Inc. and there is also quite a lot of information on the web. This paper offers an independent review of the SAS Certified Professional Program (with particular emphasis on the Base Programming credential) from an end user's perspective.

GENERAL OVERVIEW OF THE PROGRAM

As a SAS programmer or technical manager working in industry or academia you are probably aware of the available educational tools which would increase your SAS knowledge and enhance the career of your employees. SAS certification is one such qualification which is available to users today. Since its original inception the certified professional program has undergone several transformations. The exams were originally based on a particular SAS version however individuals are now evaluated at a job role level rather than a particular SAS release (1).

The SAS certified professional program currently offers five globally recognized certification tracks which are designed to test the skill set and knowledge base of SAS users across a number of specific areas. There are two SAS programming certifications (Base and Advanced) and three specialty tracks which focus on Web Development and Warehouse Technology. Each track requires successful completion of one or more certification exams before a programmer can become fully certified.

The following table provides a brief summary of the five certifications that are currently available along with the exams you need to take in order to complete a particular track:

CERTIFICATIONS	EXAMS REQUIRED
SAS Certified Base Programmer	SAS Base Programming
SAS Certified Advanced Programmer	SAS Base Programming SAS Advanced Programming
SAS Certified WebAF Developer: Server side	SAS Advanced Programming SAS WebAF Server-side Application Development
SAS Certified Warehouse Development Specialist	SAS Advanced Programming SAS Warehouse Technology SAS Warehouse Development Specialist Concepts
SAS Certified Warehouse Architect	SAS Warehouse Technology SAS Warehouse Architect Concepts

As you can see most of the tracks (apart from the Base Programmer certification) require completion of more than one exam. Completion of the Base Programmer certification is probably the best place to start as it is the easiest tracks. According to SAS you should have at least one year of programming experience before taking the Base Programming exam and a minimum of three years programming and data management experience before taking the SAS Advanced Programming exam. The three specialty tracks require more detailed knowledge in their specific functional area along with several years work experience. It is important to note that programming experience in the specific functional area is essential before taking any of the above exams.

Full details of all the above certification tracks can be found on the following website <http://support.sas.com/certify/>. This site also contains a whole host of other useful information regarding SAS certification and training, and includes a full list of all the possible SAS Institute courses you can take to prepare for an exam. I would encourage readers who are thinking about taking any of the above certification exams to visit this site first.

TRAINING AND EXAM PREPARATION

As a starting point for exam preparation if you are an experienced user and just want to know what the exam questions will look like, SAS has some sample test questions on their website. There are only 5-6 questions for each certification so it is not a very extensive list but it gives you an idea of what to expect in the different programming and specialty exams. These can be found at <http://support.sas.com/certify/samples.html>

For those who need to do more preparation, SAS also offer a practice exam for both the Base Programmer and Advanced Programmer certifications. This would highlight any areas that you may need to brush up on before taking the actual exam. I am not aware at this time of any training offered for the 3 specialty certification tracks.

There are however a number of different training options offered by SAS Institute as well as other training organizations which prepare users for the Base Programming and Advanced Programming exams. These training packages can be quite expensive (particularly if you choose to do all the training courses offered!) and include both traditional instructor led courses, live web classes as well as a number of online courses, so there is something for everyone. I have described the training options I found most useful below. However please note these are not mandatory and it really is up to the individual based on your SAS experience, preference and needs

SAS INSTITUTE E-LEARNING COURSES

As I have taken the 'SAS Certification: Base Programming' e-learning course I wanted to talk a little bit about this type of training first. Please also note there is an equivalent SAS Certification: Advanced Programmer course offered via e-learning and although I did not take this class the following comments can be applied to both courses.

The SAS Institute 'Base SAS' online course was very comprehensive and walks the user through a series of interactive exercises which test the skill set of the individual on a number of different topics. The course is divided into 23 chapters, each contain 30-60 pages of reading material which included examples and sample exercises followed by a short multiple choice test. The course ends with a full practice exam which gives the user a good idea of their level of expertise and areas which would need further revision and practice before taking the actual exam.

I found the e-learning course to be a fun and practical educational tool. The material was very well written, easy to follow and included lots of interactive exercises. It contains test data test sessions and test questions and is all inclusive which I found very useful. I liked the flexibility of being able to work on my own at my own pace, rather than attending an instructor led training course or having to book a live web class on a specific date.

As an experienced programmer I did not need to do all the exercises but the course was a good refresher of base SAS programming and allowed me to brush up on options and procedures I had not used in quite a while as well as learn some new Version 9 tricks. Each chapter also included a certificate of completion which you could print out. This made the course a little more fun to do!

On the downside this is a self-paced e-learning tool which is only available for 6 months (180 days) after registration. You therefore have to be extremely disciplined to ensure you actually complete the course within the 6 months. It may seem like a long time but if you have work commitments, family engagements, or are just not good at time management it can become a challenge! In addition there is no instructor so if you are studying at home you cannot ask anyone questions. I personally did not miss this aspect but a junior programmer may want to consider this.

DESTINY VIRTUAL LEARNING COURSES

In addition to the SAS Institute online courses, there are also other options available. If you want something a little lively and more engaging you may want to take a look at the Destiny Virtual Learning SAS training software.

These courses (known as v-learning) are available through the Destiny website www.vdestiny.com for a one year license period for each user. The virtual learning courses offer the benefit of a "virtual" instructor on a video screen who walks the user through each SAS lesson and talks you through live demonstrations of the software. The video presentation is particularly helpful if you are new to SAS or if you simply enjoy learning in a classroom environment but are unable to attend an instructor led SAS class in your area.

In addition to the virtual classroom environment these courses also include the option to call up an instructor with any questions you may have and provide a course book which again can be very useful if you are new to SAS. I also found the music and background scenery in the instructor led video very entertaining and colorful!

Full details of courses and pricing information is available on the Destiny website given above. I have listed the courses that would be most relevant for the Base and Advanced SAS certification exams in the table below:

CD ROM Course Title
Introduction to Programming Using SAS Software
Programming I: SAS Essentials
Programming II: Data Manipulation Using the Data Step
Programming III: Advanced Techniques
Macros in SAS Software
Output Delivery System (ODS) Basics
Report Writing: A Programming Approach
SQL Processing with SAS Software

SAS PREP GUIDE

In addition to the training courses mentioned above SAS also offer a book called "SAS Certification Prep Guide: Base Programming" which was published in August 2004. This book is a very useful reference for anyone who just wants a quick refresher rather than a full blown course before taking the SAS Base Programming exam. This book covers all the course material found in the SAS Base Programmer e-learning course and also includes a CD-Rom with test exercises that you can do in your own time. It can be a little tedious to read the whole book (a bit like reading a SAS manual!) so I would only recommend buying this if you just need to brush up on a few chapters.

THE EXAM

Once you have completed your training for a particular credential you are ready to take the exam. All certification exams are administered by Prometric, a Thomson Learning Company which has over 2500 testing centers in more

than 140 countries worldwide. Individuals may register for an exam by calling Prometric at (888) 895-5819 or online by logging onto their site at www.prometric.com. The Base SAS Programming exam contains 70 multiple choice questions and is 2 hours long. The advanced programming exam contains 65 multiple choice questions and is also 2 hours long. Full details of exam content and exam time allotted can be found on the SAS Certification webpage.

PRICING AND OTHER TRAINING INFORMATION

The cost of training and time taken to complete the program will vary depending on the package you choose. To give you an idea of cost I have listed the prices of some of the SAS Institute training materials available at time of writing this paper. However please note prices can change and full details of the price, course content and other training information offered by SAS Institute should be found on their website at <http://support.sas.com/certify/>

SAS Training Materials	Price (\$)
Practice Exam (SAS Base or Advanced)	40 / 180 days
SAS Certification Prep Guide (Book)	119
SAS Base Programming e-learning Course	300 / 180 days
SAS Advanced Programming e-learning Course	300 / 180 days

At present SAS do not offer a specific training course or book to prepare for the three specialty exams and there appears to be little information on the web. The SAS website includes a few sample questions on their certification page but as yet there are no official courses. I cannot therefore comment on training materials for these exams.

I would also like to mention that several universities also offer SAS training which can help an individual prepare for the base and advanced programming certification exams, however as I did not conduct any extensive research into their services I cannot comment on them here.

WHAT'S IN IT FOR YOU?

As an experienced SAS user the first question you may ask is, "what's in it for me?" You may be wondering what benefit certification will provide in terms of education, training, career enhancement and future employment.

To answer this question I decided to investigate the data already available on SAS certification as well as other certifications that are utilised today (such as Microsoft, Novell, Lotus). I also wanted to explore if there were any subgroups of users who would benefit more from SAS certification than others and investigate the impact it has made on jobs. Since very little data exists on the latter I decided to conduct a little research for this section.

The results for all the above investigations follow in the sections below:

FEEDBACK FROM SAS INSTITUTE

SAS Institute highlights the following benefits of becoming a SAS certified professional on their website:

- Increase career opportunity and marketability to employers
- Enhance credibility as technical professionals
- Assess knowledge of SAS software
- Earn industry recognition for their knowledge

For employers they also list the following reasons to support certification:

- Provide a reliable method of measuring an employee's knowledge of SAS
- Help managers differentiate the most qualified technical professionals
- Assist in defining employee learning paths
- Help to increase individual and workgroup productivity levels

The Education Division of SAS Institute also conducted a survey between February and May of 2001 to help plan the design of future programs and identify reasons for pursuing a SAS certification. This survey was completed by 832 SAS users out of whom 114 held a SAS certification. The two responses that were rated "most important" for pursuing certification were to "increase my SAS knowledge" and "assess my SAS knowledge". This survey represented users from across the globe in 34 countries. Full details can be found on the SAS website at <http://support.sas.com/certify/surveyresults/>. In addition the website also gave some examples of people who were successful in securing employment after obtaining SAS training and certification.

FEEDBACK FROM OTHER CERTIFICATION PROVIDERS

A 1998 study conducted by International Data Corporation (IDC) found that companies who invested in the Microsoft Certified Professional (MCP) program help IS departments and the companies they support to operate more efficiently and productively (2). This research was based on in-depth interviews with 150 IS managers responsible for NT sites all over the United States.

Another 'Certification and IT Professionals' research study conducted by Fairfield Research Inc and Certification magazine in 2000 also found that "certification can pave the way to better pay". This study consisted of an in-depth questionnaire completed by over 2,000 magazine subscribers who held various types of certifications (CompTIA, Novell, Oracle etc). However the majority of responders were again Microsoft certified professionals (over 40%). This data was presented in the December 2000 issue of the Certification magazine which can be found at the following website http://www.certmag.com/issues/dec00/feature_gabelhouse.cfm

The annual certification magazine salary survey also indicates that certification can provide significant benefits for employees including improved job security and increased compensation. However again, this data does not include any users who have taken the SAS certification and closer inspection of the results also show that employee salaries vary depending on the job role and type of certification. Full details of the 2004 survey results can be found on their website at http://certification.about.com/library/bl_salarysurveyresults04.htm

FEEDBACK FROM SAS USERS

For my research into SAS certification I sent a short questionnaire to SAS programmers, managers and consultants via email during December 2004 to find out the impact of certification on users in industry and its impact (if any) on jobs. I received feedback from approximately 30 people and although this was a very informal study with a very small sample size I was able to obtain data from a good cross section of users from a number of different industries. I also received some responses from people in academic institutions. The details of this survey are given below.

The following questions were discussed with SAS users:

1. Does SAS certification meet the needs of the user community?
2. Is there a relationship between certification and work experience?
3. Has SAS certification increased your employment opportunities?
4. Is there any value in experienced programmers getting certified?

The feedback indicated that SAS certification does meet the needs of graduates who are looking for an entry level position as well as junior programmers who are interested in augmenting their experience with an additional SAS qualification. The certification was also well received by university professors who teach SAS as part of their course. In all the above cases the certification programming exams were taken after completing a series of courses. I did not gain feedback from anyone who had taken the 3 specialty exams therefore I cannot comment on these credentials.

For consultants and experienced employees the response was more mixed.

Nearly all experienced programmers I spoke to who were not certified (both consultants and permanent employees) felt that SAS certification would add little value to their current qualifications as relevant experience carries more weight. Some were nervous about having to take the exam whilst others just viewed SAS certification as an indication of how well you've memorized SAS facts rather than how well you use good programming methodology. In addition many programmers felt no need to get certified as most employers do not require it. Most of these programmers knew little about the program and the available training or just had no interest in taking the exams.

In contrast most certified programmers felt the credential demonstrates SAS competency across a broad range of topics. In particular all programmers (junior and experienced) who took the SAS Base or SAS Advanced e-learning courses prior to their exam indicated that these courses enabled them to gain new skills and concepts that they would not have otherwise learned in their current job. One person also mentioned that he would like to see the Base and

Advanced SAS programming exams split into three exams as they contained too much information and he would also like to see a Statistics track added in the future!

A few consultants indicated that the certification exam was just something they needed to do to maintain an Alliance partnership with SAS Institute. These were experienced programmers who already had a broad range of skills.

For managers the following questions were discussed:

1. What are your thoughts on certification (exam format, content, benefits etc)?
2. Would you encourage your employees to get certified?
3. Would you be more inclined to hire a regular employee who was certified?
4. Would you be more inclined to hire a consultant who was SAS certified?
5. Do you think it adds value compared to on the job experience or other SAS courses?
6. Any suggestions on other methods that would provide a better measure of SAS understanding?

Please note this group consisted mainly of managers from the Biotech/Pharmaceutical industry who employed SAS programmers in their departments, none of them were SAS certified professionals.

All the managers had heard about certification and several were open to supporting an employee who wanted to study for it however this was not a job requirement. Most of the managers indicated that it would have little influence on their choice of candidate when hiring for a new position (some were more positive about this than others) however in general most agreed that relevant work experience, the ability to meet deadlines, work in a team, attitude and communication skills etc were all more important attributes which would contribute to a candidate securing a permanent or contract position. 'SAS certification alone is unlikely to tip the scale'. In general the feedback indicated that SAS certification has made some impact in the workforce but not much.

In addition most companies have their own SAS test which they gave to candidates at interview, and although this is not as comprehensive (or as long!) as the certification exams most managers felt this provided a more appropriate assessment of the candidate's technical ability for the particular programming position.

A few managers thought SAS certification would be beneficial to the department, to have an employee with a broader skill set allowing them to bring new or different perspectives to their work. However since the analysis of clinical trial data is such a specialized area with regards to FDA requirements and industry standards all agreed that relevant on the job experience is much more valuable in this particular industry.

DISCUSSION OF RESULTS

The above research provided some useful information on the perception of certification across all industries as well as how it is perceived within the Biotech industry. Certification magazine surveys seem to indicate that these credentials are well received and provide many positive benefits for users. However, this data did not include any SAS certified professionals and the focus was mainly on other service providers such as Microsoft, Novell and Lotus.

The SAS Institute survey conducted in 2001 indicated that most users completed SAS certification to increase their SAS knowledge and assess their skills. My own research although much smaller in size indicated that this is still the case but in addition many consultants also become certified to continue with their SAS Alliance Partnership.

SAS certification is viewed as a positive qualification by academic professors who teach SAS classes and certified professionals who have been able to secure a permanent position. It appears to have most benefit for new graduates, junior programmers and those who want to broaden their SAS knowledge or verify their skills. For junior programmers in particular this credential can provide some confidence of SAS knowledge to a prospective employer, which in the absence of relevant experience is a very valuable addition to their portfolio.

Discussions with other users also demonstrated that although most everyone has heard of SAS certification there are still a lot of experienced programmers and managers who do not know much about the program. In addition there are many experienced users who know a lot about SAS but do not test well or do not wish to take the exam!

For employees a key benefit of the certification program is that it can provide a broader view of SAS which is gained more through the course work you do to prepare for a particular certification, rather than passing the actual exam. This can benefit an employer as well as the employee and could be particularly useful for consultants who want to contract in different industries or for permanent staff who are interested in expanding their programming role.

In terms of job opportunities to date SAS certification has made some impact in the workforce. It has helped some

professionals, particularly new graduates to secure a job however other factors (such as relevant experience, team work, ability to meet deadlines, pass SAS interview test etc) also play an important role. Companies do not appear to specify certification as a mandatory job requirement but in the absence of experience it's a good starting point.

In addition within the Biotech and pharmaceutical industry there does not appear to be a requirement for staff at contract organizations to be certified other than those who are quality partners with SAS. This is unlikely to change across the industry unless the FDA suddenly decided that all SAS users working on clinical trials need to be SAS certified!

INTERESTING FACTS AND FIGURES

For those of you who are interested in how the certification exam was developed, a detailed and extremely comprehensive account of the testing process used by SAS Institute was presented at SUGI in April 2003 (3).

All of the SAS certification exams were developed according to defined international standards and based on survey results and feedback from SAS users. These exams are designed to assess SAS knowledge at a job role level and as such are intended to measure the application of SAS technologies to solving job role requirements.

There are over 5,00 SAS Certified Professionals spanning the globe in more than 40 countries. From this amount, 33% hold the SAS Certified Base Programmer credential. The remaining 67% are disbursed through the historic versioned exams of V6 and V8, the Advanced Programmer exam and the three specialty level exams.

With regards to the exams, data from SAS Institute indicate that 68% of first time users of the Base Programming exam are successful. Although SAS collect other demographic information as well the response is voluntary and many users choose not to feedback their response. The numbers are therefore not exact.

In addition as previously mentioned SAS certification is mandatory to become a SAS Alliance partner. There are three different levels of partnership; Platinum, Gold and Silver. All three levels require a certain number of certified professionals (Platinum - 3, Gold - 1, and Silver -1) within your organization.

For anyone who is preparing to take the Base or Advanced SAS programmer exams the following paper presented by 2 SAS users at NESUG 2004 contains a lot of useful hints and tips on training and exam preparation (4). It is an entertaining read, and provides several useful suggestions on how to evaluate whether you are ready for an exam and walks you through the entire exam process from start to finish, including the rules for retaking an exam.

CONCLUSION

The SAS certified professional program offers a comprehensive package of training, tutorials and books, which together with experience allows users to evaluate and increase their SAS knowledge. It is definitely more useful to specific subgroups of users than others and as the survey results indicate there are still many skeptics out there!

This research paper generated some interesting data with regards to the impact of SAS certification in the workforce. As my time was limited and the sample size was very small I could only provide a summary of broad based results from a small subgroup of users. I also did not receive feedback from anyone taking the three specialty exams.

A major concern from users and employers that I would like to note here is that in certification you are not presented with a business problem and asked to solve it, therefore it does not allow you to measure an employee's ability to analyze and solve a business problem with real world solutions. This is probably better achieved through work experience, attending a SAS class, discussion with other users or taking one of the Destiny virtual learning courses. I would recommend any of the above if you need more extensive training over and above certification.

In terms of future certification tracks, although the Base and Advanced Certification exams cover a broad range of programming topics the addition of a SAS GRAPH or Statistics track would also be useful, particularly to users who spend a lot of time analyzing data and generating charts or plots. In addition a specialized track (such as SAS Programming in the Pharmaceutical Industry) could also be of value as this is a highly regulated environment and there are quite a few SAS procedures and techniques that are commonly used just in this industry.

These topics could be investigated further in a future paper. In addition a much larger survey across a wider audience with more focused questions would probably produce a more robust set of survey results.

I hope this paper has given both the users and SAS Institute an independent review of the SAS certified professional program. I believe everyone should at least consider the program as it may just be the right educational tool for you.

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ACKNOWLEDGEMENTS

I would like to thank Lauren Haworth and Genentech Inc., for supporting this presentation. I would also like to thank my co-worker Sandra Minjoe for her invaluable feedback whilst proof reading this paper and all the users, managers and consultants who contributed to the survey. I appreciate everyone's thoughts, opinions and ideas. Last but not least I would also like to thank Bob Austin (SAS Certification Global Program Manager, SAS Institute) for providing me with a lot of the information presented in the 'Interesting Facts and Figures' section.

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