

Paper 149-30

SAS® Certification: An End User's Review

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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 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 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 Statistical Programmer Analyst working in the Biotech industry I am always interested in hearing about new opportunities and educational tools which would increase my SAS knowledge and enhance my career. SAS certification is one such qualification which is available to programmers today. Since its original inception this 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 AF Development and Warehouse Technology. Each track requires successful completion of one or more certification exams before a programmer can become certified.

The following table provides a brief summary of the five certifications that are 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 Base Programming SAS Advanced Programming SAS WebAF Server-side Application Development
SAS Certified Warehouse Development Specialist	SAS Base Programming 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 required for nearly all the other 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 experience. It is important to note that programming experience in the specific programming 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 courses you could 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 would like to do more preparation, SAS also offer a practice exam for both the Base Programmer and Advanced Programmer certifications which would highlight any areas that you may need to brush up on before taking the actual exam.

There are also a number of training courses offered by SAS Institute as well as other independent training organizations which prepare users for the Base Programming and Advanced Programming exams. However these are not mandatory and it really is up to the individual based on your SAS experience and comfort level.

SAS Institute offers a number of training packages specifically to prepare users for the Base Programmer and Advanced Programmer certifications. These training packages can be quite expensive (particularly if you choose to do all the training courses offered!) but include both traditional instructor led courses, live web classes as well as e-learning courses, so there is something for everyone, depending on your preference and needs.

MORE ABOUT E-LEARNING

As I have taken the 'SAS Certification: Base Programming' e-learning course I wanted to focus a little bit on this particular type of training preparation. There is also 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 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 an idea of their level of expertise and

areas which would need further revision 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 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.

SAS PREP GUIDE

In addition to the training courses SAS also offer a book called "SAS Certification Prep Guide: Base Programming" which was published in August 2004. This book is a 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. Full details of the test content and time allotted for each of the exams can be found on the SAS Certification webpage.

TRAINING COSTS AND OTHER INFORMATION

The cost of training and time taken to complete the program will vary depending on the package you choose. To help you I have highlighted the cost of some of the programming courses discussed. Full details of the course material and other training classes offered by SAS Institute can be found on their website <http://support.sas.com/certify/>

SAS Training Materials	Price (\$)
Practice Exam (SAS Base or Advanced)	39
SAS Certification Prep Guide (Book)	119
SAS Base Programming e-learning Course	249
SAS Advanced Programming e-learning Course	299

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 and independent consulting organizations also offer SAS training and e-learning software which can help an individual prepare for the 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 one would ask is, "what's in it for me?"

To answer this question I decided to investigate the data already available on SAS certification as well as other certifications that are available 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 this subject I decided to conduct a little research for this section.

The results for all the above investigations follow 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. I received feedback from approximately 30 people. 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 and also received some responses from people in academic institutions.

The following questions were discussed with 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 definitely 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 took the 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 expand their SAS knowledge or verify their skills. For junior programmers in particular this credential provides verification of SAS knowledge, 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.

For the biotech and pharmaceutical industry this is unlikely to change unless the FDA suddenly decided that all staff working on clinical trial data required SAS certification. In addition 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.

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.

As of November 2004, there are over 5,200 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 exam, data from SAS Institute indicates 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).

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 allow 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 subgroup of users. In addition there are several areas that I would have liked to explore further. Other than the Base SAS e-learning tool I did not have an opportunity to review any other training tools which are available through SAS Institute or independent consulting organizations which help prepare users for the certification exams or a future job. I also did not receive feedback from anyone taking the three specialty exams. 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 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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