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Introduction

Accessible software is designed to be usable by people who have diverse impairments or disabilities. These people often use assistive technologies to adjust a computer to meet their needs for help with visual, hearing, dexterity, cognitive, and speech disabilities.

SAS believes that we have a legal, economic, and moral imperative to deliver software that works with assistive technologies. In this way, SAS helps its customers meet their legislative requirements for accessibility compliance. By providing software that is usable by people who have disabilities, SAS promotes the employment prospects of a disadvantaged minority. By designing products that are usable by a broader range of individuals, SAS will also expand our customer base.

Accessibility Drivers

Demand for accessible software is driven by the following factors:

- Legislation and guidelines – U.S. legislation and international guidelines set standards for electronic information.
- Demographics – More people in the workplace have disabilities.
- Technology – The availability of increasingly sophisticated, assistive technologies empowers people who adapt to and use these new tools to overcome their sensory or physical impairments.

Federal Legislation and International Guidelines

Section 508 of the U.S. Rehabilitation Act of 1973, as amended, mandates that most purchases of electronic information and technology (EIT) that are made by the U.S. Federal Government must provide information and data access to federal government employees who have disabilities that is comparable to the access that is provided to federal government employees who do not have disabilities. In addition, the U.S. Federal Government is obligated to provide information and data access to members of the public who have disabilities that is comparable to the access that is provided to members of the public who do not have disabilities. As a vendor to the U.S. Federal Government, SAS is required to produce accessible software to remain competitive in this public sector market.

Internationally, the World Wide Web Consortium (W3C), through its Web Accessibility Initiative (WAI), promotes accessibility guidelines for Web or Internet browser-based content or applications. Many global institutions have adopted the W3C WAI Web Content Accessibility Guidelines (WCAG) as a standard for universal design. The proliferation of the World Wide Web has opened new paths for individuals who have disabilities to access information and resources through their computers. As Web distribution has become a standard channel for public information, the need to ensure equal access to the information for people who have disabilities becomes paramount. Just as curb cuts and wheelchair ramps are standard amenities in public areas, Web-based public information must be readily available to people who access the information by using screen readers, Braille devices, or other assistive technologies. Global customers who use our software to produce content for distribution on the Web depend on SAS to produce accessible output to meet international guidelines and requirements.

The regulations that were developed by the U.S. Federal Government to implement Section 508 generally require that U.S. government agencies purchase software solutions that are most

compliant with Section 508 requirements. In addition, other customers, including state and municipal governments and international bodies, increasingly require compliance with accessibility standards when making procurement decisions. SAS recognizes that the importance of accessible software is not only based on the need to meet federal and international standards—it's about improving overall usability throughout the marketplace.

An Aging Workforce

Key demographic trends combine to make accessible software a necessity in all market sectors. As the average life expectancy has risen, people are staying in the workforce longer. The U.S. Bureau of Labor projects that the number of civilians, age 55 and older, in the workforce will increase by nearly 50% from 2002 to 2012. This percentage is up from 12% in 1992. A global survey of economically active populations which was conducted by the International Labor Organization (ILO) shows comparable growth projections through 2010. SAS has also witnessed this trend. Figure 1 shows that the average age of SAS employees has risen steadily over the past two decades.

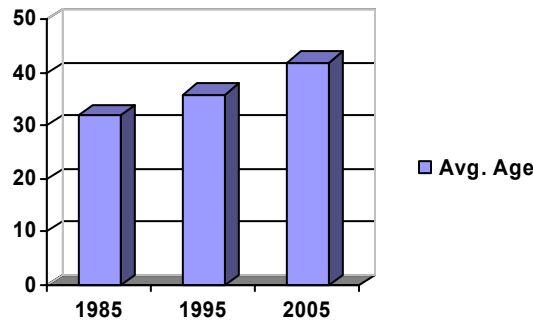


Figure 1. Increase in Average Age of SAS Employees since 1985

However, as the world's population is aging, it is also shrinking, as shown in Figure 2.

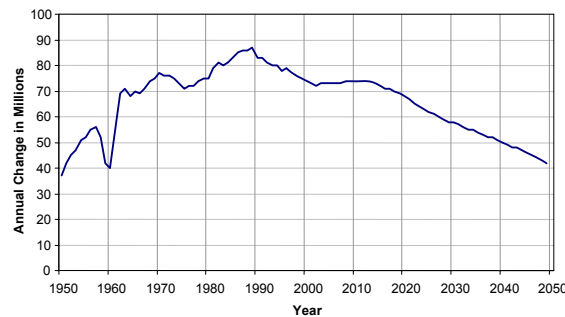


Figure 2. Projections of World Population Change: 1950-2050. Source: U.S. Bureau of the Census, International Data Base, September 30, 2004

With birth rates trending lower in industrialized nations, researchers predict a dwindling supply of trained, experienced workers and a rising battle for talent.

“As the pool of younger workers contracts, recruiting and retaining mature, experienced workers becomes increasingly critical for employers who seek to maintain a competitive edge in today’s marketplace.” (Barrington, 2004)

The incidence of disabilities that can impair computer use increases with age. The aging process diminishes visual and audio acuity and decreases manual dexterity. This means that, over time, a greater percentage of our customer base will have one or more disabilities. With people staying in the workforce longer; those who have impairments might use our software for a longer period of time. SAS responds to this expanding user group by designing software that is compatible with assistive technologies.

With accumulated years of domain knowledge, aging workers represent valuable resources to their employers. Companies can protect their investment in employees by providing tools to help these employees maintain their competitive edge in the workplace despite age-related impairments. SAS is experiencing this phenomenon first-hand.

Since its inception in 1976, SAS has benefited from the skills and commitment of exceptional people. SAS employees work in an environment that fosters and encourages the integration of the company’s business objectives with their personal needs. With enviable, low, employee-turnover rates, which have been consistently and significantly below the industry average, SAS reaps the rewards of employee loyalty.

As our own employees have aged, SAS has made increased efforts to help them continue to be productive employees and to preserve their professional dignity. This commitment is one of the reasons that SAS continues to receive wide news coverage and accolades for being a great place to work. SAS has been ranked among *Fortune* magazine’s list of “100 Best Places to Work” for seven consecutive years. Our most recent ranking is No. 8. As SAS works to retain valuable employees, our customers reap the benefits of the most talented minds in the software business.

Research Demonstrates Benefits of Assistive Technologies

Assistive technology benefits more than just those who have severe impairments. In early 2003, Microsoft Corporation commissioned Forrester Research, Inc., to conduct a comprehensive study to measure the current and potential market of accessible technology in the United States. Phase 1 of the study (Forrester Research, Inc., 2003) focused on people, 18- to 64-years old, and the computer users among them. Phase 2 of the study (Forrester Research, Inc., 2004) focused on how accessible technology is used today. The researchers investigated accessibility options that are built into products (such as options that change font size and color) and assistive technologies (such as specialty hardware and software such as screen readers and voice-recognition products). The study concluded that

“57 percent of working-age computer users in the U.S. between the ages of 18 and 64 (more than 74 million Americans) could benefit from accessible technology because of mild-to-severe vision, hearing, dexterity, speech, and cognitive difficulties and impairments that interfere with their ability to perform routine tasks—including their use of computers. Of the 74.2 million U.S. computer users who could benefit from accessible technology, 51.6 million have mild impairments and 22.6 million have more severe impairments. Another 56.2 million are unlikely to benefit from accessible technology because they experience either no difficulties or only minimal impairments.” (Microsoft Corporation, February 22, 2004) (See Figure 3.)

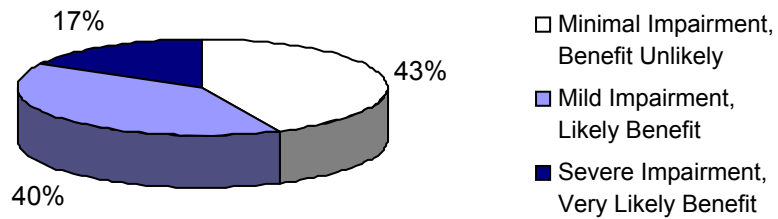


Figure3. Percentage of U.S. Population Likely or Very Likely to Benefit from Use of Assistive Technology

From our own usability research, SAS has found that accommodations for accessibility often contribute to overall ease-of-use. Coded to platform and industry standards for interaction, SAS software operates in a predictable and intuitive fashion. Technological advances in the field of accessibility have lagged advances in mainstream information technology, which creates an “accessibility gap.” By focusing on the standards, rather than following the latest assistive technology release, SAS ensures broader compatibility with subsequent and emerging technologies, which reduces the “accessibility gap.” SAS recognizes that universal design and accessibility contribute to usability and customer satisfaction.

Equal Employment Opportunities – The Human Imperative

The historical lag of accessibility behind mainstream information technology puts job seekers who have disabilities at a further disadvantage. They already face significant barriers, as evidenced by the high rate of unemployment among people who have disabilities. In 1996, the U.S. House of Representatives pronounced the rates “staggering.”

“Out of 12.6 million severely disabled persons (male and female combined), only 2.9 million are employed (23.2%). While employment rates for persons who have moderate disabilities are comparable with the non-disabled, employment rates for the severely disabled are drastically lower.” (U.S. House of Representatives, June 22, 1995)

All U.S. companies that employ more than 15 people are legally obligated to make “reasonable accommodations” for qualified disabled workers, unless such measures would cause undue hardship. With the proliferation of assistive technologies, undue hardships are increasingly rare. For people who have disabilities and are able to and want to work, as a society, we are ethically obliged to accommodate their needs in the workplace.

SAS has been proactive in working to meet the changing needs of its employees in the workplace. Our ergonomics department regularly assesses employees’ work spaces, and makes recommendations for devices and software to minimize discomfort and to enhance productivity. Because we benefit from accessible software and assistive technology in our own company, SAS embraces the expanding, global-accessibility initiative. It is consistent with our long-established role as a leading corporate citizen. Working locally, SAS has donated assistive technology software to disability re-training facilities, provided guidance to SAS programmers who developed disabilities and sought best practices to continue working, and performed outreach to educational organizations to help tomorrow’s designers understand the need for universal design.

Accessibility Integrated into Development Process

To successfully produce accessible software, developers must consider the requirements throughout the process. Attempts to retrofit accessibility compliance at the end of development are inefficient and costly, often producing inadequate results. For all new product development, SAS considers accessibility as part of a product's diffuse requirements. By addressing accessibility in design, development, and documentation, and carrying it through to technical support, SAS delivers accessible products that are universally easier to use.

Accessible Design and Development

Accessibility is a core design property; it cannot effectively be incorporated into software at the end of the development process. To ensure that accessibility is intrinsic to our products, SAS incorporates accessibility checkpoints throughout the software development life cycle. (See Figure 4.)

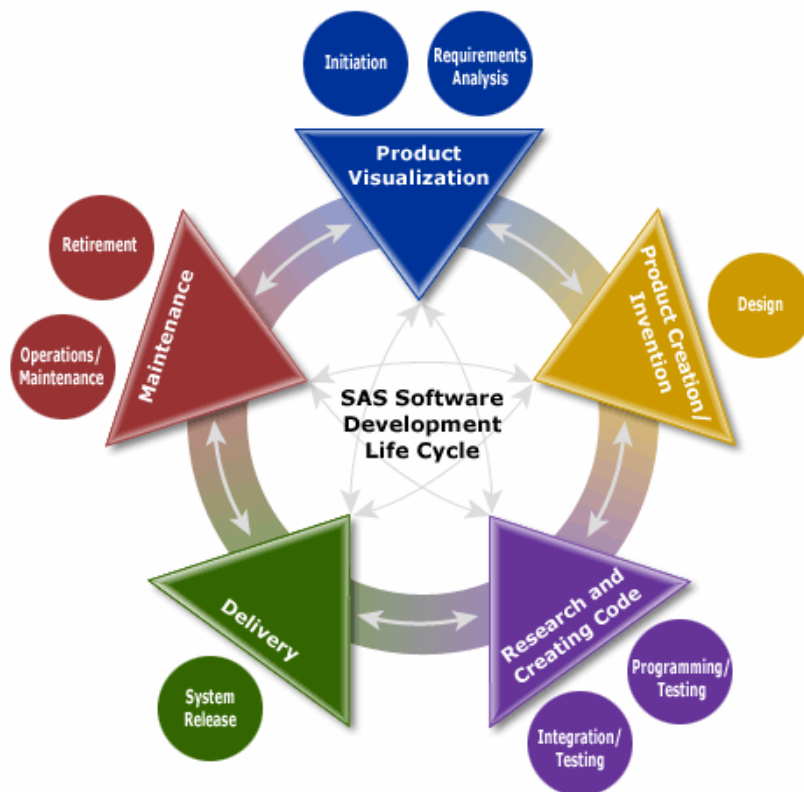


Figure 4. SAS Software Development Life Cycle

Product Visualization – When SAS initiates the development of new products or solutions, we start by clearly identifying the problem to be solved. We consider user profiles and target markets. If a proposed product will have broad use by general users or if it is targeted for the public sector, then we know that accessibility is especially important.

Product Creation/Invention – From that initial vision, we develop a set of design and functional requirements. While SAS provides dozens of solutions across market sectors, there are core non-

functional requirements that all products inherit: reliability, portability, interoperability, modifiability, and usability. The diffuse requirements for usability encompass accessibility and internationalization. SAS considers these to be universal design considerations.

Research and Creating Code – As a product moves from design to development, the development team must address how to make each aspect accessible. For standard software elements, SAS products inherit accessible behaviors. For custom controls, SAS programmers code the software's user interaction consistent with platform standards. For SAS software that will be used under Microsoft Windows, this means following the *Microsoft Windows User Experience* (Press Release, February 2004). For SAS products that are developed using Java technology by Sun Microsystems, this means adhering to the *Java Look and Feel Design Guidelines* (Sun Microsystems, 2001) or, for newer development, the *Eclipse User Interface Guidelines* (Edgar, et al, 2004). By coding to the same platform standard that is used by the assistive technology developers, SAS increases its success in working with existing and emerging technologies.

SAS testers, working from the design specifications, develop test plans to verify software performance. For desktop software, testers use a test plan template that maps to Section 508 1194.21 in the standards for Software Applications and Operating Systems. For Web-based software, the test plan template is based on a combination of Section 508 1194.22 and the W3C WAI WCAG P1-P2 checkpoints.

During the iterative development process, SAS testers perform accessibility testing, in addition to their regular functional and performance testing. They test keyboard navigation, setting the mouse aside and completing tests by using keyboard input only. The testers set color preferences for high contrast and navigate the application to ensure sufficient contrast between foreground and background colors, and verify that color alone is not used to convey meaning. In addition, SAS testers use the screen-reading software JAWS for Windows, from Freedom Scientific, to listen to its identification of all interface elements, their given state, and their functions.

If accessibility anomalies are found, testers log them with a special code in our Defects Tracking System. By coding all accessibility defects in this way, SAS is able to analyze trends and identify broad areas where we might need to focus our efforts, and we can measure our progress in later releases. Development managers and central testing assess and prioritize defects. After developers fix a reported accessibility defect, the tester who originally reported the incident verifies the fix.

Delivery – As products move into the pipeline for release, the SAS Accessibility Analyst works with the product management and sales teams to complete Voluntary Product Accessibility Templates (VPATs) (U.S. House of Representatives House Report 104-152, June 22, 1995). The U.S. General Services Administration, in partnership with the Information Technology Industry Council, developed VPATs to assist procurement officials in making preliminary assessments regarding the products and services that support the Section 508 accessibility criteria. Although VPATs were created specifically to address U.S. Section 508, the checkpoints map closely to the W3C WAI WCAG Priority 1 checkpoints (Thatcher, 2000-2002).

For each checkpoint, SAS indicates whether the software supports, supports with exceptions, or does not support the checkpoint, or whether the checkpoint is not applicable. Where there is support with exceptions, SAS identifies, in the remarks, where the exception occurs and any work-around, if available. The VPATs are completed by R&D and Sales, and then reviewed by the SAS Legal Department. After approval by the SAS Legal team, the VPATs can be provided to customers and prospective customers as part of the procurement process.

Maintenance – To ensure a complete cycle, any accessibility exceptions that remain are transferred as priority defects to the next release that is in development. Using this method, SAS continues to improve the design and accessibility of its software.

Accessible Publications

SAS recognizes the importance of quality technical publications to customer satisfaction. This importance is increased for customers who have disabilities, because they might need to use an assistive technology to use the documentation. Our Publications Division supports the SAS accessibility initiative by delivering documentation in accessible format and by documenting accessibility features of the software.

SAS writers work with developers throughout the software life cycle to research and document new features, document the software, convert the documentation to multiple formats, and then extensively test those formats for technical accuracy, usability, and accessibility. In the testing phase, the HTML documentation is evaluated against the checkpoints of Section 508 1194.22 and W3C WAI Web Content Guidelines v1.0 Priority 1 and 2 (W3C, 1999). The content is checked by using a combination of automated and manual testing.

Note: SAS is monitoring the development of version 2 of the W3C WAI Web Content Accessibility Guidelines, currently in the Working Draft phase (W3C, 2004). When, and if, these change the Recommendation status, SAS will modify its testing to incorporate the newer guidelines.

As part of our quality assurance testing, when accessibility issues are logged in our Defects Tracking System, the person who enters a defect sets a field to alert the documentation writer. The writer then tracks the issue to resolution to ensure that the accessibility issue is correctly documented.

In addition to printed and CD-ROM-based books, SAS produces accessible online documentation that is integrated with the software. In compliance with Section 508, SAS makes the online documentation accessible, documents the accessibility features, and provides alternate formats of other materials on request.

Accessible Technical Support

Because our customers who have disabilities might use assistive technologies, SAS technical support representatives also have access to specialized software (such as screen readers) to help diagnose and solve our customers' problems. If a customer who uses a screen reader contacts technical support, that customer's question is routed to the queue of a support representative who is familiar with using a screen reader with SAS software. This familiarity is essential to understanding and troubleshooting any problems between our software and the assistive technology.

SAS Delivers *The Power to Know*®

SAS believes that everyone deserves the opportunity to be a contributing member of society. To that end, we are committed to providing accessible software products and documentation through the ongoing evolution of our product lines. Recognizing that accessible software also provides ease-of-use, we incorporate universal design into our planning process.

As we develop our products, we test them with assistive technologies and with operating environment accessibility extensions to assess their compliance with applicable Section 508 and W3C WAI accessibility criteria. As accessibility methodologies evolve, SAS will continue our efforts to meet emerging accessibility requirements for people who have disabilities.

At SAS, our mission is to empower organizations around the world with superior software, solutions, and services that give them the power to know. Consistent with that mission, SAS is committed to extending *The Power to Know*® to all our customers.

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