Title: Commercial IT Blindness Accessibility Issues

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In a modern commercial environment, several blindness-related accessibility issues remain. Generally these issues can be grouped into lack of access to: graphical user interfaces (GUIs), graphically displayed data, and mathematically-based books and journals. I will focus primarily on the effects of not being able to access GUIs.

Bit Locker Encryption

In Microsoft Windows seven, Bit locker encryption is a Microsoft system for encrypting all the information on a computer’s hard disk. At power-up time, the user enters a personal identification number (PIN) and then the login proceeds. The PIN dialog screen is completely inaccessible. While my HumanWare Brailliant Braille display will beep when the pin dialog opens, if I make a mistake entering the pin, then I cannot recover from this error. I must power-off my machine, by holding down the power button, and try again. Often when a machine is abnormally stopped, it goes into a memory scan screen or setup screen. All these pre-login screens are inaccessible, even to Microsoft narrator. For this reason, a blind user cannot turn on their own machine if they make a Bit Locker PIN entry error. The only way out is to go find a sighted colleague who can enable the blind employee to login into their own computer.

The Linux Graphical User Interface (GUI)

Linux allows for computers, built out of many processors, to solve large problems. For this reason, most of the hard science problems are addressed using the Linux operating system. A commercially popular version of Linux is distributed by Red Hat (<http://www.redhat.com/>). Currently my company uses Red Hat version 5.7. Due to the need for an operating system to work well with all the company’s applications, and the need for a company to have a stable operating system, operating systems, within a company, change slowly. An employee’s desire to use company software, insures that the employee must use the company’s operating system. For this reason, the blind employee cannot choose which operating system they wish to use.

Graphical user interfaces allow users to use a wide variety of applications with ease. The GUI allows most of the parameters in an application to use defaults. Only a few parameters within an application need be set. Also context sensitive help allows the user to rapidly find out how to set those parameters. GUIs also allow a user to string many processes together into a dataflow so that complex tasks can be setup rapidly. For these reasons, the GUI has conquered computer space.

Character-based (also called command-line) interfaces are widely used for computer programming and system administration, and have provided many blind individuals with excellent career opportunities. While the character-based interface for Linux is wonderfully accessible, the Linux GUI is not. Based upon work by the now-bankrupt Sun Corporation, the Orca Linux screen reader is available in open source packages (https://help.gnome.org/users/orca/stable/). Orca is not automatically distributed with commercially popular Linux systems, and employees must go through a long risk-assessment process to have it added to their systems. Orca also accesses the Gnome desktop (http://www.gnome.org/)while most commercial organizations would prefer to use the KDE interface (http://www.kde.org/). Also since there is no commercial organization caring for Orca, there is no guarantee that it will work for any one application. People who work on Orca development, due it out of love of computer science, and as an effort to improve the world. The developers work on what interests them, and on what they can find time to accomplish. Also, Orca can only give access to programs running on the user’s machine. It does not allow users to logon to other remote machines using GUIs.

The Linux Graphical User Interface (GUI) Remote Access Issue

Linux GUI remote access represents another class of accessibility problems. As mentioned above, Orca can only give access to programs running on the user’s machine. It does not allow users to logon to other machines using GUIs. In modern industrial settings, the blind user will be sitting in front of a Microsoft Windows based machine. The user can have complete character-based access to Linux through programs such as SecureCRT (<http://www.vandyke.com/products/securecrt/>). However, the blind user is going to have to access several remote computers, using graphical user interfaces, to get their work done. While limited character-based work around exist for some of these applications, in general, the blind user will have to have their sighted counterparts do this part of their job, thus reducing the flexibility of the blind employee.

Java

Java (http://www.oracle.com/technetwork/java/index.html) is a programming language, supported by Oracle, to make applications portable on more than one operating system. The blind access Java applications through the Java Access Bridge (JAB) (for Windows (http://www.oracle.com/technetwork/java/javase/tech/index-jsp-136191.html), and for Linux (<http://linux.softpedia.com/progDownload/Java-Access-Bridge-Download-24104.html>). I have found that most Java programs are not very accessible due to the developer’s unawareness of the need to write accessible code.

Graphically Displayed Data

Often commercial Linux packages generate plots to help the user analyze the data in their processes. These plots are generated by GUI’s buried deep in the commercial packages. If the plots could be generated, and sent outside of the commercial application which generated them, then they could be sent to Braille printers for plotting. Without GUI access, the blind user cannot generate the plots, nor bring the plots to the outside world.

Mathematically Displayed Books and Journals

The news is a little better on the display of mathematically-based material. If the blind user can contact the author of a book, and if the author is willing to share their source files, then the blind user can read the book. The best way to get this book would be in Microsoft Word format where the author would have used the Design Science mathematical equation editor, MathType (http://www.dessci.com/en/), to write the equations. MathType makes mathematics in Microsoft word completely accessible. Another accessible mathematical language is Latex (<http://www.maths.tcd.ie/~dwilkins/LaTeXPrimer/>).

Mathematics on the web is still not reliable since bugs in the Microsoft Internet Explorer versions 10 and 11 have kept math from being displayed. I have heard that the Apple Safari browser can display math, but an accessible version of the Safari browser is not available for the Windows platform.

GUI Solution Issues

It is unclear how to approach the Linux GUI issue. If a blind user wishes to install Orca on a Linux workstation, the user will have several issues. 1. The blind individual will have to have a sighted individual install the software because the Linux GUI environment is inaccessible out of the box. Secondly, to be efficient, the blind user will need a Braille display. Braille drivers are not part of the standard Orca package, and separate software must be loaded for Braille displays. Thirdly, only system administrators will be allowed to load software on company computers. Lastly, bringing new programs into the environment requires risk assessments which can add months to introducing new software.

I am fortunate in that my company will purchase any accessibility system that exists; however experimenting with unknown solutions is very tedious and slow. Due to the size of commercial organizations, it can take up to two years to upgrade the operating systems of computers. Also, if a blind user installs Orca on one machine, the user has not achieved much, for the user cannot access other remote GUI-based processors, which contain the programs an employee will need. Lastly, stand-alone work stations are rapidly disappearing from our commercial environment. Our company is experimenting with remote graphic servers (RGS) (<http://en.wikipedia.org/wiki/Remote_Graphics_Software>) which are centrally-located graphics servers which are used remotely by windows-based users. Perhaps remote GUI accessibility can be built into such systems.

Conclusions

Both government and non-government blind employees are struggling with accessibility because currently no one is insisting that these systems be accessible. If the government would follow its own rules, then the accessible solutions would be available to all.