

It's Broke – Now What Do I Do?

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Abstract

This paper will focus on the technical computer support specialist in relationship to tasks associated with the faculty member teaching that content. The technical specialist is contrasted with the help desk person and statistics are given for the support field. Elementary computer troubleshooting concepts at a basic level will be described. References to software and manuals to help in the repair of system devices will be noted for faculty examination. A set of steps for problem solving and troubleshooting will be discussed and interspersed with experiences in covering broken devices.

Keywords: User support, system troubleshooting, technical concepts, hardware/software content

1. THE SUPPORT POSITION

Based on the Table 1 data, taken from Bureau of Labor Statistics on the growth from 1998 to 2008, the top five areas of job growth are computer related.

<u>Job Titles</u>	<u>Projected Growth</u>
Computer Engineers	108%
Computer Support Specialists	102%
Systems Analysts	94%
Database Administrators	77%
Desktop Publishing Specialists	73%

TABLE 1

The occupation of computer support specialist is projected to be the second fastest growing occupation over the 1998-2008 decade. The position can be divided into two areas being [1] technical support and [2] help desk. The help desk mainly functions as a “question and answer” area via the telephone or e-mail to solve guidance in using the hardware and/or software. Technical support specialists install, modify, clean, and repair computer hardware and software. In addition, the specialists oversee the daily performance of the computer system and evaluate software program for usefulness. Overtime may be necessary when unexpected technical problems arise. This also means that the specialist is susceptible to eyestrain, back discomfort and hand/wrist problems, such as carpal tunnel syndrome.

The help desk position has been a continuing part of the computer curriculum for several years but mainly in an

indirect manner. The support position has been a help person for mainframe system and now to the microcomputer. The help desk will continue to be needed based on user expertise. As an often quoted statistic noted in several sources, users only work with about 10 percent of the features available in most software. How to use the major computer software appears to be a task done within most academic programs either directly or indirectly by the students and its program faculty. That software used is related to the most popular application software which in turn is supported by many books and tutorials.

Business organizations will continue to demand computer professionals who are both knowledgeable about the latest technical concepts and able to apply this technology to business needs. As computers and software becomes more complex, support specialists will be needed to provide technical assistance to customers and other users. The courses to educate this support person are found in almost every program but mainly that content is integrated into existing courses without a specialized set of courses for the computer support person. Three groups can be contacted for career materials for support positions: Help Desk Institute [www.helpdeskinst.com], Association of Computer Support Specialists [www.acss.org], and the Association of Support Professionals [www.asponline.com].

Based on the *Infoworld* 2000 compensation data, the following characteristics were noted for the computer support position. An average salary \$44,973 was reported with 49% of the employees feeling that those in

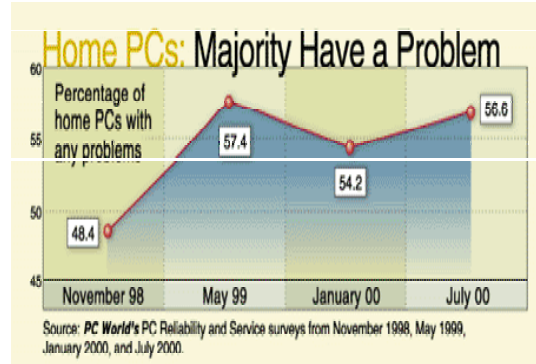
the support positions are fairly compensated. The average bonus for the support person was about \$2,100 with 50% of the workers receiving a bonus. Salary raises averaged 19% with over 76% of the individuals getting raises. The average work experience in IS was 8 years and the average experience with the current company was 4.5 years. While about 27% of the workers were high school graduates, the remainder of those reporting had completed at least an associated degree, but only 47% of the support people held some type of technology certification. Those individuals surveyed reported that the three most motivation factors for the computer support position were compensation, recognition from management and users, and working with cutting-edge technologies. Most support personnel worked about 43 hours per week.

2. WHO FIXES THE PROBLEM

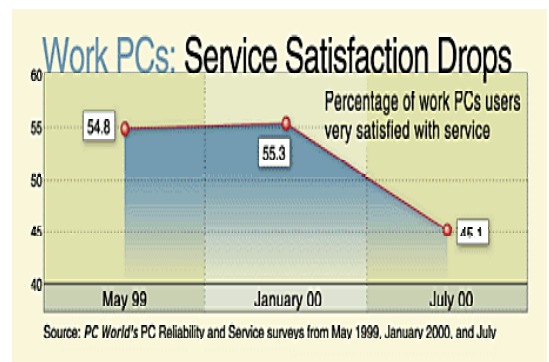
Determining corrective action and educating or training people to handle computer problems is an objective of the support curriculum within educational environments. Support data from vendors was heavily examined related to problems reviewed by the user, support person, or computer specialists. Dell Computing noted that customers download more than 2000,000 technical data files each week and their on-line natural-language search engine answers more than 400,000 questions monthly. When Toshiba launched its technical support line in March 1999, no one predicted that the support line would have over 1.5 million hits within its first six months of use. Phone support cost system makes roughly \$15-22 per call with 15 of the major vendors being rated at least fair.

We, as educators, are all saddled with the technical situation of not only the software use and the multitude of questions as to why something is not working in a particular manner, but also the personal computer (PC) system not working and then trying to determine why the hardware is functioning in a particular manner. No only do we educate or train support people, but we have to content with the multitude of colleagues and other workers as to computer problems in our institutional environment. This set of problems might be on our personal machine, but more often, this malfunction happens at the wrong time with the machine we are using in our educational setting. That guy called Murphy always is looking out for us - no matter our level of expertise in the computer field. The authors have been involved in the configuration of devices with multiple versions of software in the PC environment and the associated functions that plague the expected PC operations.

Since November 1998, according to a PC World survey, home computers seems to have a high rate of problems with the last three surveys having a rate of the 50 percent level.



In surveying the work setting, the level of satisfaction with machines has decreased and will probably continue based on computer costs. Many firms find that fixing the device is more than getting a new machine as a replacement for work devices after the warranty of the device expires.



In a survey completed by Consumer Reports on repair histories of thirteen products including the PC, the research noted that roughly 22 percent of computers break down each year. The only product with a greater problem rate was the riding lawn mower and lawn tractor. Subscribers report close to 2 problems each year with the home PC as opposed to one problem every 4-5 years with dryers and up to 7 years for every problem associated with the large appliances. Reliability and service of many PC products are declining just as expectations in those areas are rising.

3. REPAIR CHOICES

In dealing with computer systems as faculty members either in teaching or considering a machine ourselves, we have three choices:

1. Leave the machine broke -- probably not the correct choice, for you need the machine to work properly to teach classes.
2. Call the technician -- spend those college dollars on fixing the machine.
3. Fix the machine yourself -- get out that tool kit or just a plain Philips screwdriver.

This same set of three conditions is normally relayed to those people in our computer programs that we are at-

tempting to provide to industry to be used as support personnel.

Many people make the assumption that they are not technical enough to fix the computer problem and thus give up before even trying. In his book, End User Support, Fred Beisse noted that 93.3% of all PC problems turn out to be operator error. He also noted that most problems can be fixed by simply rebooting the computer. Thus you need to make sure everything is plugged in or the power is on. This may sound obvious, but this is the most common problem with PCs. The joke, being circulated during 2000, was the person that called technical support about the word processor not working. After the technician asked all the normal questions, the user noted that the power was out in the building. That technician then told the person to box up the machine and return it to the computer facility, for if the person was so dumb as to not understand that the machine needed power, they could not operate the word processing software.

The first troubleshooting that the authors have used is to turn the machine off and get a cup of coffee or a soda. After that time period of consuming the beverage, we then turn the machine back on and see what is the result. In doing this task in about 30 situations for the last six months, the error has been corrected and we have looked very good as technicians to the other faculty and users. We have even had to boot a machine 5-6 times for the error to be corrected, based on programs that were changed by the computer user without re-booting the system before further changes. Not to say that process is the correct all for repair situations for we have about 20 other situations that more troubleshooting was needed.

4. TROUBLESHOOTING STEPS

A set of standard troubleshooting fundamentals should be followed by anyone dealing with machine concerns. These fundamental include such entities as:

1. approach problem systematically;
2. do not overlook obvious;
3. check simple things first;
4. make no assumptions;
5. become a researcher;
6. write locations/print screen, paste, & save;
7. divide & conquer - isolate problem; and
8. above all, reboot & start over.

As a first level of defense for computer problems, the user should have a bootable system disk with selected MS-DOS command programs to re-start the device. Another needed entity is a diagnostic system software package for the support person to test computer components as to their viability. There are several diagnostic packages that can be downloaded from Internet shareware sites besides standard commercial software. The most popular commercial troubleshooting software has been the mainstay packages of First Aid or Utilities Deluxe [McAfee], CheckIt Diagnostics Suite [Touchstone Software], Nuts and Bolt [Network Associates],

and Norton Utilities or Systemworks [Symantec]. In reviewing the shareware realm, many no-cost shareware packages are available for the user or support person to use on a machine. In the same manner, low-cost shareware has been used from various sources from vendors and software developers. Even the Microsoft Windows software of regclean, scandisk, defrag, and system clean are helpful in tracking down situations.

5. THE NORMAL QUESTIONS

Included with these troubleshooting tasks are a set of normal questions that should be asked of whomever is considered the primary user of a system which is not working properly:

1. When did the problem start?
2. Were there any error messages or unusual messages on screen?
3. What programs or software were being used when problem happened?
4. Was computer moved recently?
5. Thunderstorm or electrical interrupt lately?
6. Have any hardware changes been done lately?
7. What software has recently installed?
8. Have there been any changes to configuration?
9. Has anyone else used computer recently?

The system evaluator can examine the stand tasks of opening the computer box; installing standard software [operating system, office suite, and utilities]; installing memory; changing the peripheral devices such as drives, CDROM, and sound cards; using the printer(s); and other tasks which might be asked by the audience. While the tasks are attempted more in a "closed box" mode, the course does more hardware examination via the "open the box" mode. Among the seven books found dealing with laboratory exercises, Clint Saxton's book, now in its third edition, *Enhanced Manual for Managing and Maintaining Your Computer*, (Course Technology, 2001) was considered best for the course environment. The other references available for the academic area are as follows:

01. Antonakos, J. and Adamson, T. *Microcomputer Repair, third edition*. Upper Saddle River, New Jersey: Prentice-Hall, 1999, 693 pages, ISBN: 0-13-893454-1.
02. Beeson, D. *Assembling and Repairing Personal Computers, second edition*. Upper Saddle River, New Jersey: Prentice-Hall, 2000, 458 pages, ISBN: 0-13-081949-2.
03. Evans, D. *A+ Complete Lab Manual*. Alameda, CA: SYBEX, Inc., 1999, 232 pages, ISBN: 0-7821-2591-3.
04. Mansfield, R. and Petroustos, E. *The PC Upgrade and Maintenance Lab Manual*, Alameda, CA: SYBEX, Inc., 2000, 279 pages, ISBN: 0-7821-2707-X.
05. Regan, P. *Troubleshooting the PC*. Upper Saddle River, New Jersey: Prentice-Hall, 2000, 655 pages, ISBN: 0-13-095796-8.
06. Schmidt, C. *The Complete Computer Repair Textbook, second edition*. El Granada, CA: Scott/Jones Inc, Publishers, 2000, 745 pages, ISBN: 1-57676-033-2.

Several reference style books are available that can be blended with the above noted workbooks to provide more details on the tasks requests as troubleshooting exercises. Most of the books listed include at least one CD-ROM with sample questions, video clips, software, and other references. The following list of materials seem to have had a positive influence on teaching the class:

01. Andrews, J. *A Guide to Managing and Maintaining Your PC*. Cambridge, MA: Course Technology, 2000, 1165 pages, ISBN: 0-619-00038-4.
02. Chase, K. *The IRQ Book*. New York: The McGraw-Hill Book Company, 1999. 324 pages, ISBN: 0-07-134698-8.
03. Johnson, D. and Stauffer, T. *Upgrading and Repairing Your PC: ANSWERS, Certified Tech Support*. Berkeley, CA: Osborne/McGraw-Hill, 1998, 496 pages, ISBN: 0-07-882463-X.
04. Lee, A. *Building Your Own PC: Buying and Assembling with Confidence*. Grand Rapids, MI: Abacus Software, Inc., 1998, 117 pages, ISBN: 1-55755-320-3.
05. Meyer, M. *A+ Certification Guide*. New York: McGraw-Hill Book Company, 2000, 966 pages, ISBN: 0-07-212266-8.
06. Minasi, M. *The Complete PC Upgrade and Maintenance Guide, ninth edition*. Alameda, CA: SYBEX, 1998, 1607 pages, ISBN: 0-7821-2357-0.
07. Mueller, S. *Upgrading and Repairing PCs, 11th edition*. Indianapolis, IN: Que Publishing, 1998, 168 pages, ISBN: 0-7897-903-7.
08. Olsen, M. [project manager]. *Sourcebook for the Help Desk, second edition*. Redmond, WA: Microsoft Press, 1997, 477 pages.
09. Rosch, W.L. *Hardware Bible, fifth edition*. Indianapolis, IN: Que Publishing, 1999, 1415 pages, ISBN: 0-7897-1743-3.

The Internet has provided many resources that are available for those teaching this content and those sites will be noted as a mode for presenting troubleshooting solutions. Some sites even take the learner in a step-by-step direction in accomplishing hardware changing tasks. We have found many web sites that also provide aid to the user and support person. Some of the sites are:

www.pcguides.com	computer specification
www.pctechguide.com	hardware guide
www.drivers.com	software device drivers

There are many sites to provide software drivers that can be used to acknowledge the addition of a hardware component or software bug patch, which might not be known to the common user. In the last week, eight more new sites appeared to provide useful insights to the troubleshooting process. The above noted sites have been the most used but are by far not the most popular to the technician.

6. SUMMARY

In teaching this content for over 5 years and providing repairs to hardware and software since the Apple II, the

knowledge has progressed from crude manuals and cryptic notes to detailed books and lab manuals plus web aids in accomplishing almost all tasks to keep the machine running. The faculty overhead for these tasks are very high and have to be constantly upgraded to keep up with the changes not only in hardware but software upgrades to even the office suites.

7. REFERENCE:

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- Lambrech, Judith J. "Developing End-User Technology Skills", *Information Technology, Learning, and Performance Journal*, 18(1), Spring 2000, pages 7-19.
- Lee, Katherine S. "Hot Job for IT Professionals in 2001", *Dr. Dobb's Journal*, April 2001, 26(4), S2-4.
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