

INSTRUCTIONAL STRATEGIES FOR IMPLEMENTING AND TEACHING OEIS 2 - COMPUTER USER SUPPORT

LINDA F. SZUL

LEANN WILKIE

The purpose of this article is to describe various teaching strategies that instructors can use to teach OEIS 2 - Computer User Support. After a description of how computer user support fits with current organizational trends, we explain the course content, including diagnosis and problem solving; installation, maintenance, and upgrade of hardware and software; help desk management; providing support and training; and software/hardware evaluation, acquisition, and site licensing. The teaching approaches designed to match the course content, include lecture, discussion, teamwork, hands-on activities, and a capstone case project (sample included). Additionally, we highlight the importance of a well-equipped computer lab for teaching OEIS 2.

Information technology (IT) is a vital component in business, education and government sectors. Fundamental changes in business practices resulting from the widespread use of the Internet have also led to the growth of IT jobs beyond traditional IT sectors into new areas, such as banking, government, insurance, and healthcare. As a result, the IT industry is one of the largest and fastest growing sectors of the U.S. economy and obtaining skilled IT professionals remains a challenge for employers. An integral part of an effective IT department, computer support professionals are critical to ensure smooth day-to-day organizational operations as every minute of downtime affects organizations in terms of lost productivity and revenues. The prevalence of end-user computing due to the growth of networked personal computers, the advent of user-friendly software (Yager, Schrage, & Berry, 2002), and the growing use of the Internet to conduct daily business present a management challenge in terms of providing effective computer user support. Computer user support is a growing field requiring specialists with an understanding of the entire range of the IT world (Melymuka, 2005, p. 36). A broad range of skills and knowledge is required, including an understanding of user needs; a clear understanding of problem analysis methodology; a team-oriented attitude combined with an ability

to communicate effectively; an ability to systematically evaluate software and hardware acquisition needs and site licensing requirements; applied skills for system installation, maintenance, repair and upgrades; training and consultation abilities; and help desk and operational management abilities.

According to the U.S. Department of Labor (2004-2005), industries employing the largest number of computer support specialists were professional and commercial equipment and supplies merchant wholesalers, software publishers, computer systems design and related services, management of companies and enterprises, and schools (p. 3). In smaller companies, a computer support specialist may also function as a network administrator, supporting an organization's local area network. Computer support professionals "are projected to be among the fastest growing occupations over the 2002-12 period" (U.S. Department of Labor, 2004-2005, p. 1). As organizations increasingly

Linda F. Szul is Professor, Department of Technology Support and Training, Indiana University of Pennsylvania, Indiana, Pennsylvania.

LeAnn Wilkie is Associate Professor, Department of Technology Support and Training, Indiana University of Pennsylvania, Indiana, Pennsylvania.

rely on technology, employment in this sector is expected to increase faster than the average for all occupations.

The rapid growth and continual evolution of technology is driving the demand for competent, computer support professionals. To maintain a competitive advantage in a global market economy, organizations will continue to recruit employees who possess knowledge and skills related to the newest technologies, as well as analytical problem-solving abilities. Training and consulting skills are also in demand as “many technology users don’t think they’re getting enough training in the software they use at work, whether it’s packaged applications or custom-developed apps” (Travis, 2005, pp. 72-73). Interpersonal communication skills are also a chief requirement of employers (U.S. Department of Labor, 2004-2005, p. 3).

To meet these challenges, the Organizational Systems Research Association (OSRA) has provided the new 2004 OEIS Model Curriculum to assist “collegiate educators in updating curricula and programs in end-user information systems” (OSRA, 2004, p. 1). The purpose of this article is to provide an overview of course content for OEIS 2 (Computer User Support) and to provide technology educators with instructional strategies that may be utilized to provide appropriate and effective instruction when implementing this course.

COURSE CONTENT

An effective course in computer user support requires that students learn and apply a variety of concepts and functional skills. Major course components include: diagnosis and problem-solving; installation, maintenance, upgrading and troubleshooting; help desk management; user relations; training and consulting; and software/hardware evaluation, acquisition and site licensing.

DIAGNOSIS AND PROBLEM SOLVING

In order to effectively diagnose and solve a problem, the student must first learn fundamental problem solving methodology. It is necessary to

gather information about the situation, which includes diplomatically interacting with the user, investigating the problem by systematically isolating the trouble, identifying possible solutions, investigating the impact of various solutions, and selecting and implementing the optimum solution.

INSTALLATION, MAINTENANCE, AND UPGRADE OF HARDWARE AND SOFTWARE

The student must acquire a conceptual understanding of a computer system. Once this understanding is acquired, the next step is applying the knowledge by performing hands-on tasks, including installing motherboards, memory modules, primary and secondary storage devices, and input and output devices. Through a variety of activities, the student learns to install operating systems and applications software. Finally, the student needs to apply problem solving methodology to solve hardware and software problems.

HELP DESK MANAGEMENT

The help desk has expanded beyond the traditional telephone-based support to contain automated support areas, including diagnostics, asset management, and electronic software distribution utilizing remote support tools. Students must learn to use interactive tools—(1) user forums and chat/instant messaging during remote support, (2) Web-based trouble-ticket generation, (3) e-mail auto response and suggest, (4) remote diagnostics, (5) screen-sharing, and (6) dynamic FAQs (Gilhooly, 2003, p. 24)—that provide collaborative capabilities and intelligent knowledge bases.

PROVIDING SUPPORT AND TRAINING

Support specialists must recognize the needs of the user and be able to assist in integrating new hardware and software into the work environment. This includes an understanding of designing, developing, and providing training to a diverse set of users. Trainers and support consultants must be skilled in managing working

relationships with customers, balancing resources against customer needs, accommodating multiple customer requirements, and establishing liaison communications with all users.

SOFTWARE/HARDWARE EVALUATION, ACQUISITION, AND SITE LICENSING

Because the technology environment is constantly changing, the support specialist must be guided to be a lifelong learner in order to remain current in the field. Additionally, s/he must present a cogent defense for new acquisitions in front of management. The requisite skills comprise the ability to (1) perform work flow and cost-benefit analyses, (2) compare and contrast factors including compatibility, ease of use, available technical support, documentation, and licensing agreements, and (3) develop a method for evaluating and testing the functionality of hardware and software.

TEACHING STRATEGIES

Several strategies can be implemented to deliver effective instruction related to computer user support. Since students often possess a fairly high degree of exposure to computers, they often want to immediately engage in hands-on activities with computer components. However, prior to direct, hands-on activities, learners should acquire a thorough understanding of underlying conceptual, and often rather abstract, concepts related to computer systems. One way to accomplish this goal is to combine lecture and class discussion on key concepts and troubleshooting methodology. Discussion should center on a basic understanding of the components, coupled with problem-based scenarios where troubleshooting scenarios can be further explored. This instructional strategy can be supplemented with hands-on or Web-based demonstration of computer components as the teacher introduces each concept throughout the course. Instructors should also encourage students to relate personal or others' experiences encountered related to hardware and software maintenance and troubleshooting problems and solutions.

The rapid, evolutionary nature of technology results in textbooks that often become out of date as soon as they are printed. Technology educators can address this problem by requiring students to perform individual or collaborative mini-research projects on particular hardware technologies or technology-related issues to add to the discussion of textbook material. A discussion-driven, collaborative atmosphere also encourages the development of interpersonal communication skills, which are a vital, career-building component.

Other activities to foster critical thinking should be employed to supplement lecture, discussion, and hands-on experiences. For example, each student should research and prepare a written and oral report on an emerging technology or technology-related issue. Findings should be shared with the rest of the class for discussion.

Additional instructional strategies that instructors can employ include discussion and small group activities, hands-on experience with tracking software and knowledge-based systems, individual and group presentations, group-based documentation projects, Internet-based research, and group-based report writing projects. (See Appendix A for a sample group project.)

Evaluation throughout the duration of the course should include written quizzes and tests on underlying concepts presented in lecture and discussion, hands-on skill tests in the computer lab, and rubric-based evaluations of projects and research papers. Evaluative methods should also include an appropriate degree of positive feedback to students to ensure transfer of learning as they progress through concept and skill learning activities.

WELL-EQUIPPED TEACHING LAB

After acquiring a conceptual understanding of requisite knowledge through lecture and discussion, students should be engaged in active, structured, applied activities to achieve concrete understanding of hardware and software systems and to apply the knowledge and concepts learned directly in the computer lab. These activities should be carried out in a computer lab;

computer lab tools, equipment, and materials may include:

- Dry erase board
- Locked storage cabinets for tools and components
- Appropriately designed lab furniture
- Complete computer system for each student
- Complete PC repair toolkits
- Electrostatic discharge kits or anti-static wristbands
- Digital multi-meters
- Hardware/software diagnostic tools
- Operating system installation media
- Access to on-line data base and technical support resources
- Replacement components and peripheral devices
- Written lab manual

Due to the inherent nature of a computer support course, it is Murphy's Law that components may be damaged while students are practicing hands-on activities. Replacement components, such as motherboards, video cards, keyboards, mice, and monitors should also be available. An alternative solution to having complete systems with replacement components is to purchase computer repair modules, which include a repairable computer, tool kit, and other materials. These systems can be quite costly with some costing almost \$5,000 per module.

CASE PROJECT

A computer support specialist needs to know more than just how computers work and how to maintain and repair them. It is also important to know how to apply this knowledge to the evaluation and recommendation of hardware and software solutions to fill the needs of individual users and organizations. A well-structured group project can serve as a culminating activity to bring together all of the acquired knowledge and skills. Students should work together to research and develop a solution to a given problem-based scenario, such as winning a bid to upgrade a

company's computer system. The final report can be delivered as both an oral presentation and a written report. This activity encourages critical thinking, teamwork and problem-solving, as well as the development of report-writing skills, project management skills, and interpersonal and group communication skills.

CONCLUSION

Skilled computer user support specialists must function effectively in a variety of environments with an array of users. To be successful, they must develop technical and communications skills, use a variety of software and hardware, and perform statistical analysis activities. Technology educators are uniquely challenged to produce IT support specialists with the competencies that enable adaptation to ever-changing technologies. The teaching strategies presented and suggested activities will help ensure that students gain the necessary knowledge and skills to implement computer systems and software, provide technical assistance, and manage information systems.

REFERENCES

- Gilhooly, K. (2003). First help is best. *Computerworld*, 37(36), 23-24.
- Melymuka, K. (2005). IT emergency room. *Computerworld*, 39(4), 36.
- Organizational Systems Research Association. (2004). *Organizational & end-user information systems curriculum model for undergraduate education*. Retrieved June 28, 2005, from <http://www.osra.org>
- Travis, P. (2005). Help desk meets worker expectations. *InformationWeek*, 1004, 72-73.
- U.S. Department of Labor, Bureau of Labor Statistics. (2004-2005). *Occupational Outlook Handbook, 2004-05 Edition*, Computer Support Specialists and Systems Administrators, on the Internet. Retrieved December 11, 2005 from <http://www.bls.gov/oco/ocos268.htm>
- Yager, S., Schrage, J., & Berry, R. (2002). Preparing end user support specialists. *Journal of Education for Business*, 78(2), 92-96.

Appendix A: Sample Group Project

Scenario

The law firm of Smith & Smith (the “Firm”), with its main office based in Indiana, is leasing a building to house its satellite office in Johnstown, PA. The satellite office is approximately 5,000 sq. ft. in size. Currently, the Johnstown office is staffed with 10 attorneys, 8 paralegals, 1 receptionist, and 1 office manager/accountant. The Firm also has two part-time staff to work in the mailroom as relief receptionists, runners, etc. It is anticipated that the firm will add additional attorneys and paralegals over the next five years. A floor plan of the Johnstown office is attached. In addition to offices for attorneys and cubicles for paralegals, the satellite office features a reception area, two conference rooms, a file room/mailroom and a kitchen.

The Firm would like to upgrade the satellite office to newer computers and eventually establish connectivity to the main office in Indiana. The satellite office currently has nine networked Pentium Pro personal computers. The office is wired with CAT 5 network cabling. Only the paralegals and the office manager have computers at present. Additionally, the Firm is leasing a new laser printer, fax machine and copy machine for three years. Software packages in current use are Tabs III, Quicken, HotDocs and Word Perfect 7. Presently, each user backs up and archives data onto external zip disks, which are then hand-carried over to the Indiana office for placement on a network drive. Legal documents, court filings, and accounting records are either delivered via zip disks or faxed to the Indiana office. Several disks have been lost due to careless handling by mail clerks and documents have been corrupted or lost in the process.

Request for Proposal (RFP) – Hardware and Software Upgrade

The Firm has issued this Requests for Proposal (RFP) to upgrade the Firm’s Johnstown satellite office facility. All written proposals must be submitted by _____.

The following hardware and software needs/requirements have been identified by the Firm:

- Replace existing desktop and server systems and upgrade operating system and applications software packages (*Note: The firm does not want to switch to a different word processing program*)
- Install desktop computers in attorney offices, the library, the receptionist’s desk, and the mail room. (Your proposal should anticipate future needs of the Firm as well.)
- Devise a more reliable method of transferring and backing up data and files to Indiana.
- Attorney C. Smith would like to purchase PDAs for all the paralegals. Research and compare prices and features for at least three different brands of PDAs.
- Attorney A. Smith has heard about tablet PCs. Explain how tablet PCs work, how they might be beneficial to a law firm, and compare and recommend three tablet PCs currently on the market. Comparisons should include price, special features, processor, hard drive, style, display resolution, FireWire or USB ports, optical drives, etc.

Written Proposal Components should contain the following information:

I. Management Summary, including, but not limited to:

- Summarize existing situation.
- Prepare a general “purchasing guide” (important questions one should ask when purchasing a new computer or upgrading an existing computer).
- Summarize your company’s proposed solution, including a summary of total costs for each category.

II. Hardware Requirements

- Locate and provide a detailed description of a custom desktop computer system proposed to be built by your company. Information should include, but is not limited to:
 - Motherboard and processor
 - Memory
 - Magnetic drives
 - Optical drives
 - Input/Output devices (monitor, video card, mouse, keyboard, speakers)
 - Other Peripheral devices
 - Special ports or expansion cards
 - Warranty and support
 - Documentation
 - Price
 - Other (any other information you deem important to make an informed purchasing decision)

Appendix A: Sample Group Project (Continued)

- Compare your custom-built system to two different commercial desktop systems. Information should include, but is not limited to:
 - Motherboard and processor
 - Memory
 - Magnetic drives
 - Optical drives
 - Input/Output devices (monitor, video card, mouse, keyboard, speakers)
 - Other Peripheral devices
 - Special ports or expansion cards
 - Warranty and support
 - Documentation
 - Price
 - Other (any other information you deem important to make an informed purchasing decision)
- Based on the above comparison and your purchasing guide, make a specific recommendation regarding which desktop system the Firm should buy and why.
- Locate and provide a detailed description of a combination Web, file, and print server. You may propose a commercially built system or custom-built server. Include, at a minimum, the same information listed above for the desktop system. The system should be powerful enough to meet the demands of the Firm.
- Recommend a better method of transferring and backing up files to Indiana.

III. Software Requirements

- Operating system, including site licensing for both server and desktop systems, must be compatible with the systems you are recommending.
- Applications software, including site licensing, must be compatible with the systems you are recommending.
- Other (any other software you recommend to improve productivity, network management, etc.)

IV. Cost analysis and supporting documentation

- Line-item budget for hardware and software purchases, including a grand total cost for entire proposal. (Don't forget to include site licensing fees, cost of installation, and your company's consulting fees!)
- Bibliography of sources (listed in APA style)
- Attach copies of **all** supporting documentation (Web resources, photographs, brochures, excerpts from books, magazine articles, interviews with experts, etc.) as an Appendix.

V. Packaging

- Attractive and well-organized packaging, including:
 - Cover page
 - Table of Contents
 - Introductory letter to the Firm featuring a company logo, describing your company, and "selling" the merits of your company (why the Firm should choose your company); be sure to use proper business letter format.
 - Tabs separating the major categories outlined above

****Review the written proposal grading rubric in your course packet prior to proposal submission****

Material published as part of this journal, either on-line or in print, is copyrighted by the Organizational Systems Research Association. Permission to make digital or paper copy of part or all of these works for personal or classroom use is granted without fee provided that the copies are not made or distributed for profit or commercial advantage AND that copies 1) bear this notice in full and 2) give the full citation. It is permissible to abstract these works so long as credit is given. To copy in all other cases or to republish or to post on a server or to redistribute to lists requires specific permission and payment of a fee. Contact Donna Everett, d.everett@moreheadstate.edu to request redistribution permission.