# Computer User Support
for
Help Desk and Support Specialists

Sixth Edition

Fred Beisse

: Hello
Good afternoon how can I help ...
r: I have a problem with ....
Customer Details
Gender: Female
Name: Mrs Smith
Operating System: Yes
Current Customer: Yes

SIXTH EDITION

A GUIDE TO COMPUTER USER SUPPORT FOR HELP DESK & SUPPORT SPECIALISTS

FRED BEISSE

Lane Community College

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Preface

My goal for this sixth edition is to address the needs of readers who want to learn about the user support field and need resources to help them learn. This edition introduces a broad range of topics about which an entry-level user support specialist is expected to know. The responsibilities of support positions vary widely; however, armed with the foundation of topics and activities covered in this book, workers entering the support industry will be better prepared to meet employers' expectations.

Learning about user support requires access to trade books, vendor manuals, and websites, but these materials are often not designed for students or entry-level support workers. First-time learners need textbooks with features to guide their learning, such as learning objectives, key term definitions, chapter summaries, discussion questions, hands-on activities, and case projects to help them practice and apply their new knowledge. In the years since the first edition of this book, many aspects of user support have changed as technology and business practices have evolved. I am grateful that Cengage Learning gave me the opportunity to update this book again to reflect recent changes in the user support field.

The Intended Audience

This book is primarily intended for three kinds of readers:

- Readers who are considering career opportunities in user support and who want an introductory look at the field. This book describes the kinds of knowledge, skills, and abilities they need to find employment in the support industry.
- Readers who work in a field related to technology use, but find themselves in a position with growing user support responsibilities. They can use this book to acquire additional breadth and depth in the support field. This audience includes programmers, network administrators, customer support representatives, and computer applications specialists.
- Readers who are taking a course in user support as part of a related degree program, such as network administration. They can use this book to tie together knowledge and skills introduced in other courses. These readers will especially benefit from the end-of-chapter activities and case projects that provide practical skills and experiences they will use on the job.

The Approach

A Guide to Computer User Support for Help Desk and Support Specialists is designed as an introduction to each of the topics covered. I believe that a user support textbook should emphasize basic concepts and a beginning perspective, lead each reader into the field, and point them toward appropriate knowledge, skills, and resource materials. But to derive maximum benefit from this book, each reader must be an active participant in the learning process.

The end-of-chapter discussion questions and hands-on activities are specifically designed to develop your knowledge and skills. The hands-on activities encourage interaction with school or work colleagues to strengthen readers' learning experiences. Learning to work with others in project teams is important preparation for the collaborative work environment of the 21st century. Many end-of-chapter activities are designed to acquaint readers with information resources and technical tools that are essential to function effectively in a support position.

Assumed Knowledge

This textbook is written for readers who already have a background in the following areas, either through coursework, independent study, or work experience:

- Basic computer concepts (computer literacy)
- Word processor, spreadsheet, and database applications
- Internet, email, and web access

Overview of This Book

The organization of this book is based on the knowledge, skills, and abilities commonly found in user support position descriptions and on the tasks employers expect entry-level support workers to be able to perform.

CHAPTER 1: INTRODUCTION TO COMPUTER USER SUPPORT briefly discusses the history of end-user computing, how users increase their productivity with technology use, the resources users need to be productive, and common problems they encounter. It also covers the kinds of help that support workers provide and the variety of ways organizations have found to support technology users. The chapter includes information about the knowledge, skills, and abilities a successful applicant for a support position needs, and it concludes with a description of alternative career paths and professional development opportunities for support workers.

CHAPTER 2: CUSTOMER SERVICE SKILLS FOR USER SUPPORT AGENTS describes the communication and customer service skills user support workers need. It also outlines ways to develop an incident management strategy and handle difficult support situations. The sixth edition includes a new section on useful conflict resolution strategies for working in teams and with end users.

CHAPTER 3: WRITING FOR END USERS examines the many types of written communications a support specialist may be assigned to prepare, and explains how to plan, write, and evaluate end-user documents. It covers the strategies and tools technical writers use and offers pointers on how to avoid common writing problems.

CHAPTER 4: SKILLS FOR TROUBLESHOOTING TECHNOLOGY PROBLEMS describes eight problem-solving strategies that a user support specialist can apply to a troubleshooting situation. It also discusses standard tools and methods troubleshooters use to solve problems with technology.

CHAPTER 5: COMMON SUPPORT PROBLEMS approaches technology problems from a practical perspective. It describes examples of several types of common problems and shows how to apply problem-solving strategies to real-life situations pulled from the experiences of support workers. The end-of-chapter activities are designed to help readers build their own problem-solving skills and abilities.

CHAPTER 6: HELP DESK OPERATION introduces a multilevel support model and the incident management process. It provides an overview of the features of help desk software packages. The chapter includes expanded coverage of ITIL industry best practices in help desk operation, information about dealing with help desk job stress, and features LBE Desktop Helpdesk to illustrate typical features of help desk software.

CHAPTER 7: USER SUPPORT MANAGEMENT discusses responsibilities and perspectives of support managers and supervisors that support workers need to understand. It describes the mission of support groups and how to staff and train them. The sixth edition expands the coverage of industry certification, including providing some sample certification questions, and includes a new section of examples of ethical scenarios and dilemmas that confront information technology workers.

CHAPTER 8: PRODUCT EVALUATION STRATEGIES AND SUPPORT STANDARDS describes strategies support specialists use to evaluate technology products and define product standards for an organization. It includes updated pointers to information resources and decision-making tools for evaluating and selecting technology products. The chapter also includes examples of technology product standards in use at University of Texas Arlington.

CHAPTER 9: END-USER NEEDS ASSESSMENT PROJECTS provides tools to help support workers analyze and assess user needs for technology solutions, including hardware devices, software applications, and network products and services. An extended case study throughout the chapter illustrates the steps in assessment projects. The sixth edition features Microsoft® Project Professional 2013 to illustrate the use of project management software tools in assessment projects. Some activities in the chapter are based on a trial version of the software, which can be downloaded from Microsoft's website following the steps described in the chapter appendix.

CHAPTER 10: INSTALLING AND MANAGING END-USER TECHNOLOGY covers the steps to prepare a user's site and install hardware, operating systems, network connectivity, and application software. It describes the role and contents of a site management notebook as well as tasks support workers often perform to help users manage their technology. The sixth edition updates many of the installation checklists from previous editions, and provides a new checklist of configuration issues with mobile technology.

CHAPTER 11: TECHNOLOGY TRAINING FOR USERS explains how to plan training activities targeted at end users; how to prepare training materials; and how to present, evaluate, and improve training activities. The chapter describes several learning strategies, including role-playing as a training activity. (Each chapter includes a role-playing scenario designed to give readers an opportunity to apply what they learn to a work situation.)

CHAPTER 12: A USER SUPPORT UTILITY TOOL KIT emphasizes the importance of utility software to diagnose, resolve, and repair the variety of technology problems support specialists encounter. It suggests over 30 software utilities that can be used as a starting point for building a support resource tool kit. Many of the utilities described can be downloaded, installed, and used without cost to help you get experience with utility software. For this edition, a new section on utilities to support mobile technology has been added. The chapter includes an extended case study to illustrate how some of the utilities can be used in support situations.

APPENDIX A: ANSWERS TO CHECK YOUR UNDERSTANDING QUESTIONS provides answers to the end-of-chapter self-check questions.

APPENDIX B: HANDS-ON WITH LBE DESKTOP HELPDESK provides a step-by-step tutorial with hands-on activities to help readers get experience with help desk software. A 45-day version of LBE Desktop Helpdesk can be downloaded for the tutorial exercises.

APPENDIX C: USER SUPPORT PRESENTATIONS AND MEETINGS recognizes that, as part of their job responsibilities, support workers often need to prepare and deliver effective presentations to users, managers, and work colleagues. The appendix is included due to requests from instructors for coverage of presentation skills. The appendix concludes with strategies for making meetings of support workers more productive.

Features

Several features in this book are designed to aid readers' understanding of technology support concepts and improve its value to learners.

CHAPTER OBJECTIVES Each chapter begins with a list of the important concepts presented. This list orients readers with a quick reference to the contents of the chapter and is a useful study aid.

FIGURES AND TABLES Figures and illustrations in each chapter help readers visualize concepts and examples. Summary tables list conceptual items and examples in a visual and readable format.

BULLETED FIGURES Selected figures contain bullets that summarize important points. They provide an overview of upcoming discussion points and help you review material when you need to recall chapter topics.

ON THE WEB These features point readers to the web for more information about a topic, an example related to what was learned in the chapter, or additional information resources that are useful to readers and professionals alike.

VIDEOS These features direct readers to videos on the web that provide more information about a topic.

TIPS These features offer readers practical tips and comments from the author to expand on the information in a nearby paragraph.

NOTES These features point readers to where they can find additional material related to a topic elsewhere in the book.

INFORMATION RESOURCES These features point readers to additional information resources on the book's companion website.

ROLE-PLAYING SCENARIOS Each chapter features at least one role-playing scenario designed to give readers an opportunity to apply what they learn. These scenarios are based on the experiences of actual support workers and are included to give readers an opportunity to gain insight into real-world applications of the topics and to build support skills. Scenarios are designed to build skills in both telephone and face-to-face communications.

CHAPTER SUMMARIES A summary of chapter concepts concludes each chapter. These summaries are a convenient way to recap the main ideas in each chapter and help readers review chapter contents to prepare for quizzes and hands-on activities.

KEY TERMS Each chapter includes a list of the terms introduced in the chapter and a short definition of each. This key term list is a convenient way to review the user support vocabulary in the chapter.

CHECK YOUR UNDERSTANDING End-of-chapter assessment begins with a set of approximately 20 review questions that reinforce the main ideas introduced in the chapter. These questions gauge whether you have mastered the concepts and provide examples of questions you might encounter on a quiz or exam. Answers to these questions are provided in Appendix A.

DISCUSSION QUESTIONS Discussion questions are designed to supplement and extend the chapter topics and provide an opportunity for readers to formulate and discuss their positions on issues they are likely to encounter in the support field.

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HANDS-ON ACTIVITIES Although the vocabulary and concepts in user support topics are important, no amount of vocabulary can substitute for actual experience. To supplement conceptual explanations, each chapter has approximately ten Hands-On Activities to help readers build experience with user support tasks. Some activities involve researching information from local workers in the support industry, printed resources, and the web. Other activities let readers work with software used by support agents in the workplace. Because Hands-On Activities ask readers to go beyond the boundaries of the text, they provide practice in real-world research as performed in a user support position.

CASE PROJECTS The end of each chapter includes several Case Projects. These projects are longer and more open-ended than Hands-On Activities and are designed to help readers apply what they have learned to business situations. They provide an opportunity to independently analyze, synthesize, and evaluate information, examine potential solutions, and make recommendations—as one would in an actual business situation. The Case Projects section of each chapter has been updated and expanded in the sixth edition.

HELP DESK SOFTWARE This edition features LBE Desktop Helpdesk to introduce the use of a software package aimed at help desk operations and their workers. Readers can download a 45-day trial version to gain hands-on experience with representative help desk software tools and operational procedures such as those described in Chapter 6. Appendix B is a step-by-step tutorial on LBE Desktop Helpdesk version 4.0.

PROJECT MANAGEMENT SOFTWARE Readers can download a trial version of Microsoft® Project Professional 2013, which can be used to help plan user needs assessments and other special projects such as those described in Chapter 9.

Instructor Resources

The following supplemental materials are available to instructors when this book is used in a classroom setting. All instructor teaching tools, outlined below, are available at **sso.cengage.com** to instructors who have adopted this text.

INSTRUCTOR’S MANUAL The Instructor’s Manual follows the text chapter-by-chapter to assist in planning and organizing an effective, engaging course. The manual includes learning objectives, chapter overviews, lecture notes, ideas for classroom activities, and additional resources. A sample course syllabus is also provided.

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POWERPOINT® PRESENTATIONS PowerPoint slides are provided for each chapter. Slides are included to guide classroom presentation and discussions, make available to students for chapter review, or print as classroom handouts. Instructors may add to the slides to cover additional topics and customize the slides with access to the complete figure files from the text.

Visit the Author's Website

To extend the information in this book, pointers to many websites are provided throughout the book. Over time, these sites change or are replaced with newer information. In some cases, a URL in the book may result in a "Web address not found" message. To reduce the amount of typing to enter lengthy URLs and to provide alternate web resources for obsolete links, an author-maintained website is available to readers at **www.cusweb.com**. The following features can be found on the book's website:

- Shortcut links to web resource URLs in each chapter
- Replacement URLs for obsolete links
- Modifiable content from some chapters that readers can download for selected end-of-chapter exercises
- Errata for the book and Instructor's Resources
- An email link for readers and faculty to provide feedback and report broken links

Acknowledgments

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The person who labored most intently, day-by-day, during the development work on the fourth, fifth, and sixth editions is Mary Pat Shaffer. Mary Pat means so much more to me and this project than the title Development Editor can ever describe. In the three editions on which Mary Pat and I have collaborated, her contributions to the book are enormous. She is at the same time a strategist, a professional editor, a designer par excellence, and a careful wordsmith. Her touches can be found on every page in every chapter. I hope these words convey how much I appreciate our association on this book.

I also very much appreciate faculty members, Lisa Bock, Pennsylvania College of Technology; and Ronald Koci, Madison Area Technical College, who reviewed chapter rewrites in the sixth edition and made useful suggestions on the book's contents, information resources and

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hands-on activities. The software featured in this book has the potential to materially aid readers' understanding and job preparation skills. John Blessing, of LBE Software, provided valuable assistance during the development of materials in Chapter 6 and Appendix B.

I want to dedicate this sixth edition to the next generation of technology users who are much affected by, but largely undaunted by, the impacts of technology on their lives. This generation is represented in our own lives by our granddaughters, Sena Beyer in Japan and Rachel Mok in Singapore.

Fred Beisse
Eugene, Oregon

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CHAPTER 1

Introduction to Computer User Support

In this chapter, you will learn about:

- How changes in computer technology over time have affected computer use
- Ways to classify end users
- Resources computer users need
- Major categories of end-user software
- Common problems encountered by users
- Job market demand for user support workers
- Common ways to organize and provide support services
- Typical position descriptions for user support staff
- Knowledge, skills, and abilities for entry-level support positions
- Career paths for user support workers

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The computer industry has been changing continuously since it began over 60 years ago, and it will undoubtedly continue to change in the future. One result of this ongoing transformation is that computer industry professionals rarely work with the same hardware, software, networks, operational procedures, and job descriptions they learned about in school or training courses. To prepare for future positions in the computer industry, students today need to learn about more than just current technology. They also need to learn how to keep up with constant change and how to make learning new technologies a part of their day-to-day work routine.

The purpose of this book is to help you learn about and prepare for information technology jobs, with a focus on the problems that your coworkers or clients will encounter when they attempt to make effective use of technology. The book includes information on what you need to know and what you need to be able to do in order to work in the field of computer user support. Chapter 1 provides an overview of information technology from two perspectives. We will look at computer use from the perspective of end users—your coworkers and clients who use technology for work or personal activities. We will also introduce computer user support as a career field, and discuss how you can prepare for work as a computer support professional. To help you understand the context of end-user computing within the computer industry and the need for computer user support workers, we will begin with a brief overview of the past 60 years of developments in computer technology.

Historical Changes in Computer Use

End-user computing refers to the use of computer technology for both business and personal use. At every level within organizations, workers today use personal computers (PCs) and mobile technology to accomplish their work. Furthermore, most people also have computers and related devices in their homes or use computer technology in public places such as libraries, schools, and government offices. However, when computer technology was first used in business, most workers did not have computers on their desks nor did they use computers themselves—at least not directly. The highlights of changes in computer technology and the developments that led to end-user computing and user support are summarized in Table 1-1.

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Decade	Primary Types and Uses of Computer Systems
1940s	● Invention of central processing units and peripheral devices
1950s	● Early use of computers in large corporations
1960s	● Widespread use of large-scale computer systems ● Early use of smaller, workgroup computers
1970s	● Widespread use of workgroup computers ● Terminal access by workers to large-scale and workgroup computers ● Early use of personal computers
1980s	● Widespread use of home and business personal computers ● Availability of mass-market application software and GUI personal computer operating systems ● Early use of data communications and networks to connect personal computers to each other and PCs to larger systems
1990s	● Widespread use of data communications and local area and wide area computer networks ● Growth of distributed computing ● Rapid growth of the Internet as a global network
2000s	● Increased use of the Internet for electronic business and business-to-business transactions ● Availability of very low-cost PCs ● Development of wireless communication technologies
2010s	● Widespread use of a variety of mobile devices and technologies for business and personal use ● Increased use of the Internet as a backbone for cloud computing

Table 1-1 Milestones in the adoption of computer technology

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ON THE WEB

A detailed timeline of events in the history of computers is available at The History of Computing Project website (**www.thocp.net**). The Internet Society website contains a variety of information resources on the history of the Internet (**www.internetsociety.org/internet/what-internet/history-internet**).

Or, view a short video on the history of the Internet at **www.youtube.com/watch?v=9hIQjrMHTv4**.

Follow the history of 100 years of computer technology in an infomercial for IBM prepared to celebrate the company's 100th birthday in 2011 (**www.wimp.com/ibmachievements**).

Instead of entering the lengthy website addresses in the "On the Web" features in this book, use the book's companion website (**www.cusweb.com**) to link to the address of each resource described in the book.

The 1950s and 1960s: Early Computers

In the 1950s and 1960s, computer use in business and government was highly centralized. Early computers were very large and very expensive to buy and operate. Because of this, they were installed in secure central locations. These computer systems (called *mainframes*) were programmed and operated, not by end users, but by computer professionals. The primary goal of early computer use was to increase business productivity by automating manual tasks. Employees used these early, large-scale systems by transporting trays of punched cards that recorded business transactions to a central site for processing.

The 1970s: The First Steps Toward Decentralized Computing

During the 1970s, computer use in many organizations gradually became decentralized. Two trends in computing encouraged the transition:

- The introduction of terminals (integrated keyboards and display screens) that were located on workers' desks and could be connected directly to large computers
- The development of smaller, less expensive computers that reduced the cost of ownership to businesses and government agencies; these systems were more affordable for smaller businesses and were used by departments or workgroups in larger organizations.

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The 1980s and 1990s: The Growth of Decentralized Computing

It was not until the 1980s and 1990s that large numbers of workers in many companies began to use computers on a daily basis—a trend that ushered in the era of end-user computing. Several trends converged in the 1980s to make the widespread transition to decentralized end-user computing possible. These trends are summarized in Figure 1-1.

- The backlog of requests for new computer applications
- An increase in the number of knowledge workers
- The availability of inexpensive personal computers
- The availability of inexpensive productivity software
- The development of user-friendly graphical user interfaces

Figure 1-1 Major reasons for the growth of decentralized computing

Applications Backlog

The **applications development backlog** refers to the excess demand for computer applications (programs) that could not be met by the existing supply of computer professionals available to develop them. The widespread backlog problem was well known during this period and was a source of frustration for professional data-processing staffs and business departments that demanded new applications.

More Knowledge Workers

A **knowledge worker** is an employee whose primary job is to collect, prepare, process, and distribute information. The growth in the number of knowledge workers has corresponded with shifts in the United States and world economy from agricultural and industrial to automated work tasks that rely on computer technology.

ON THE WEB

The demand for knowledge workers continues today. An examination of the number and types of positions listed on Internet job search sites attests to the unmet demand for knowledge workers in many industries, even during challenging economic times. To learn more about knowledge workers, read the classic article "The Age of Social Transformation" by Peter Drucker (who invented the term in 1959) on the *Atlantic Monthly* website (**www.theatlantic.com/past/docs/issues/95dec/chilearn/drucker.htm**).

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Declining Personal Computer Costs

Another reason for the rapid growth of end-user computing during the 1980s and 1990s was a dramatic drop in the cost of providing computer technology to workers. As computer costs decreased, technology capabilities (especially semiconductor power and capacity) doubled every 18 to 24 months due to advances in microcomputer technology. A **microcomputer** is a complete computer (often called a personal computer, or PC) built on a smaller scale than large-scale or workgroup systems, with a microprocessor as the central processing unit (CPU). During the 1980s, the first microcomputers in an organization were often acquired by individual workers who made unauthorized purchases, despite warnings by computer professionals that money should not be wasted on these "toy" computers.

ON THE WEB

Moore's Law is a popular rule of thumb in the computer industry. Intel cofounder Gordon Moore predicted in 1975 that the capabilities of the technology (CPU speed, for example) would double every two years. Read a 2005 interview with Gordon Moore at **news.cnet.com/Gordon-Moore-on-40-years-of-his-processor-law/2008-1006_3-5657677.html**.

Inexpensive Productivity Software

While early mainframe hardware was expensive, developing application software was even more costly. During this time period, many organizations reported that they actually spent more on programming custom software applications than on hardware. However, the development of inexpensive mass-market application software (such as WordStar, VisiCalc, Lotus 1-2-3, and dBASE) meant that many organizations, and sometimes even individual workers, could afford not only personal computers but also the software that would make their employees more productive knowledge workers. As a consequence, many end users were no longer dependent on computer professionals (and the frustrating application development backlog) to automate their work tasks.

User-Friendly Graphical User Interfaces

Users of early computer systems communicated with a computer's operating system by typing commands at a terminal keyboard. During the 1980s and 1990s, many of the programs written for personal computers instead incorporated menus and **graphical user interfaces (GUIs)**, or screen images that enable users to access program features and functions intuitively. GUIs and point-and-click devices made programs much easier to use than command-oriented software.

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ON THE WEB

For more information about the development of the graphical user interface, including a timeline of highlights, see **toastytech.com/guis/guitimeline.html**.

The Late 1990s and 2000s: The Era of Distributed and Network Computing

Innovations in the way computers were used continued during the late 1990s and into the 2000s. Large-scale and workgroup computers were not replaced by end-user personal computers in many organizations; rather, the two were joined through the technology of computer networks. **Distributed computing**, a term that describes an environment in which the needs of an organization and its workers determine the location of its computer resources, became common during this time. Organizations frequently required large-scale and workgroup computers, acting as network servers, to perform enterprise-wide transaction processing and information storage. Workers relied on desktop tools to increase their personal productivity at each workstation. Distributed computing relies on servers, wired, wireless, and Internet network technology to link workers and clients in a small business or throughout an entire enterprise.

The 2010s and Beyond: Cloud Computing

In the early years of the 2010s, a new era of integrated and converging technologies began. Computer technology is now embedded in a variety of business and personal technologies and devices, including smartphones, tablets, music and video players, gaming systems, Global Positioning System (GPS) navigation devices, televisions, digital cameras, electronic book readers, text and video messaging, and home security systems. In this book, the term *technology* is used to refer to all of these—and other devices that are based on computer processors and data communication. Advances in microprocessor technology now permit very small devices to store and process large amounts of information, and wireless communication technology permits these devices to communicate with each other as well as to access the Internet.

In addition, the trend of the 1980s and 1990s toward decentralization of computing has begun to swing back to a more centralized infrastructure called **cloud computing**. In cloud computing, powerful servers store and process data remotely—delivering information, communication tools, and software applications (also called *apps*) on demand to local devices via the Internet. Technology users today may connect to the cloud from a variety of desktop and mobile devices. The cloud provides processing power, application software, data storage, and even support services. Cloud computing is already having a significant impact on the delivery of support services to end users, as we will see in Chapter 6.

Many computer industry forecasters think the next big trend in technology will be “The Internet of Things.” In addition to the smart devices available today, the future will see a wide array of devices that can connect to the Internet, including automobiles that can analyze traffic patterns and suggest safer routes to destinations, home appliances that can suggest recipes and can be controlled remotely, and medical devices that can be operated by specialists at a distant location. In short, the Internet will be embedded in an even wider variety of technologies, all of which will require at least some degree of support services.

Changes in computer technology over the past 60 years have been accompanied by organizational changes. What was formerly known as the Data Processing (DP) Department in the 1960s and 70s has been renamed **Information Systems**, **Information Services (IS)**, or **Information Technology (IT)**. The name change reflects the broader role of information and technology in organizations and an increased emphasis on providing services to knowledge workers. Many IS or IT departments now operate distributed corporate networks that include large-scale workgroup, desktop, laptop, tablet, and wireless systems as well as individual communications devices, such as smartphones.

Classifying End Users

To understand the variety of environments and situations in which organizations provide technical support to their knowledge workers, it is helpful to recognize the different types of end users. Who are end users? Where are they located? Do they use computers in a business or home environment? How do they use computers? Technology users can be classified in many ways; Figure 1-2 lists some common classifications.

- **Environment**: Personal (home) user or work (corporate, organizational, enterprise) user
- **Skill level**: Novice, semiskilled, or expert
- **Frequency of use**: Occasional, frequent, or extensive
- **Software use**: Word processing, email, accounting, or others (see “End-User Application Software” in this chapter)
- **Features used**: Basic, intermediate, or advanced (power users)
- **Relationship**: Internal user (coworker) or external user (client)

Figure 1-2 Common categories of end users

Environment

It can be helpful to distinguish between people whose primary use of computers occurs at home with non-business-related applications and those whose primary use occurs at work with business-related applications. Of course, many users fall into both groups at different times.

Skill Level

Computer users span a range from novices (who have little or no computer experience, difficulty with basic technology literacy, and many questions) to highly skilled users who may be largely self-sufficient. However, users who are highly skilled with one application may be novices in another application.

Frequency of Use

Some people use technology only occasionally; they may not use a computer or a smartphone every day or even every week. Other users make frequent, often daily or hourly, use of technology. Some knowledge workers make almost continual use of a computer.

Software Used

Users can be classified according to which software applications they use. For example, home users may primarily work with word-processing and email programs, and play computer games for entertainment. Business users often work with spreadsheet and database applications or software designed for a specific business function, such as a specialized healthcare accounting system. And most users rely on a variety of communication devices and apps to keep in touch with family and coworkers.

Features Used

Some people may use only basic software features. They may only know how to perform a limited set of simple tasks using common features of a program. Others may use more features, including some that are intermediate in their power and complexity. Users who are knowledgeable about advanced software features have learned to use the full power of the software in order to be very productive; they are sometimes called *power users*.

Relationship

Another way to classify end users is by their relationship to the support provider. Some are **internal users** who work in the same organization that provides technical support services. Support departments sometimes refer to internal users as *in-house clients*. In this context, a coworker who telecommutes from home is an internal user. Others are **external users** who