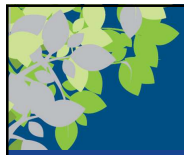


Learning Objectives (1)

- Understand the different types of intellectual property rights and how they relate to computer use.
- Explain what is meant by the term *ethics* and provide several examples of unethical behavior in computer-related matters.
- Describe some possible physical and emotional health risks associated with the use of computers.
- Discuss the impact that factors such as nationality, income, race, education, and physical disabilities may have on computer access and use.

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Learning Objectives (2)

- Suggest some ways computer users can practice green computing and properly dispose of obsolete computer equipment.
- Discuss the current status of legislation related to intellectual property rights, ethics, access, and the environment in relation to computers.

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3

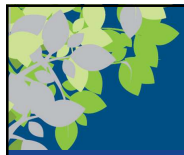


Overview

- This chapter covers:
 - Various types of intellectual property rights
 - A discussion of ethics, including ethical use of copyrighted material, ethical uses of resources and information, unethical use of digital manipulation, and ethical business practices and decision making
 - The impact of computers on our physical and emotional health
 - Issues related to equal access to technology
 - The impact of computers on our environment
 - A look at legislation related to these issues

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Intellectual Property Rights

- **Intellectual property rights** are rights to which creators of original creative works are entitled
 - Indicate who has the right to use, perform, or display a creative work
 - Indicate how long the creator retains rights to the property
- Examples of intellectual property:
 - Music and movies; paintings, computer graphics, and other works of art; poetry, books, and other types of written works; symbols, names, and designs; inventions
- Copyrights, trademarks, and patents are issued by individual countries

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Copyrights

- A **copyright** is a form of protection available to the creator of original artistic or literary works
 - Last until 70 years after creator's death
 - For corporate copyrights or anonymous works, last 95 years from date of publication or 120 years from date of creation, whichever is shorter
 - Can be registered with U.S. Copyright Office
 - Fair use exception
 - Recent issue: Termination rights granted to musicians and songwriters - can request music rights back after 35 years
 - Buying a copyrighted item does not change the copyright protection granted to the creator

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6



Examples of Copyrights

FIGURE 13-1
Copyright statements. Are often included on books, Web sites, and other original copyrighted works.

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BOOK COPYRIGHT NOTICES


© 2015 San Diego Zoo Global

WEB SITE COPYRIGHT NOTICES

Source: San Diego Zoo Global

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Copyright Protection

- Technology can be used to protect rights
 - **Digital watermarks** involve the subtle alteration of digital content that is not noticeable but can identify the copyright holder
 - Can be used with images, music, movies, etc.
 - **Digital rights management (DRM) software** can be used to protect and manage the rights of creators of digital content such as art, music, photographs, movies
 - Can control use of downloaded content (number of devices a file can be copied to, if a document can be printed or copied, expiration of video-on-demand movie, etc.)

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Example of a Digital Watermark

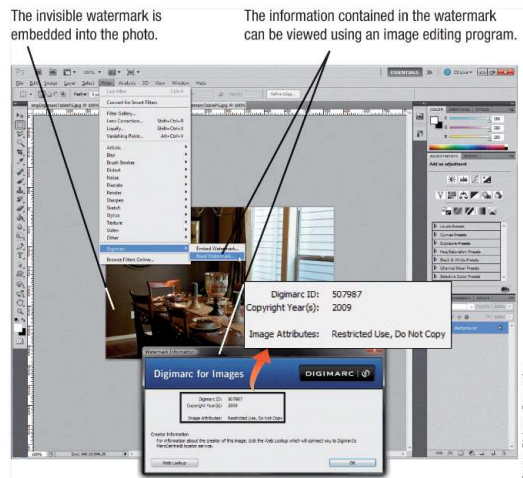


FIGURE 13-2
Digital watermarks.

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Inside the Industry

New Applications for Digital Watermarking

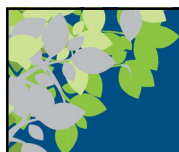
- Digimarc Discover enables mobile devices to recognize media in your immediate surroundings to provide related online content
 - Product ads, songs, articles
- Can be implemented without taking up valuable space on resource like is required with a QR code



Digimarc Discover enables your smartphone or tablet to recognize media such as newspapers, magazines, product packaging, television shows, and music.

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Trademarks

- A **trademark** is the word, phrase, symbol, or design that identifies goods or services
 - Used to identify a service is called a service mark; service marks claimed but not registered may use the SM mark
 - If claimed but not registered, may use the TM mark; registered trademarks use the [®] mark
 - Includes protection for domain names
- Domain name disputes can be brought to the World Intellectual Property Organization (WIPO)
- **Cybersquatting** is registering a domain name with the intent to profit from the goodwill of another trademark
- Typosquatting is registering a domain name that is similar to another but misspelled in hopes people will accidentally visit

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Examples of Trademarked Logos



Source: McDonald's Corporation; SONIC; eBay Inc.; Microsoft Corporation

FIGURE 13-3
Examples of
trademarked logos.

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Patents

- Patents protect inventions
 - Last for 20 years
- Can also protect a practice or procedure
 - Google’s for “pay-for-gaze” advertising
 - Amazon.com’s one-click purchase procedure
- Expensive and difficult to obtain but can be very lucrative

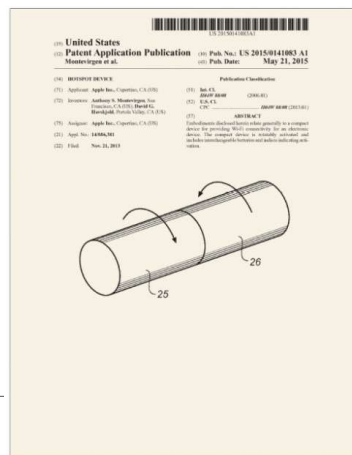


FIGURE 13-4
Patents. The patent shown here is for a new hotspot device.

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Quick Quiz (1)

1. Copyrights are valid for 70 years after the _____.
 - a. creation of the work
 - b. publication of the work
 - c. death of the creator
2. True or False: Unlike the names of companies or products, logos cannot be trademarked.
3. _____ are used to protect inventions.

Answers:

1) c; 2) False; 3) Patents

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Ethics

- **Ethics** refers to overall standards of moral conduct
 - Can vary with individual and religious beliefs, country, race, or culture
- Personal ethics
 - Guide an individual's personal behavior
- **Business ethics**
 - Guide an individual's workplace behavior
- Computer ethics
 - Concern moral conduct related to computer use
- Individuals and businesses need to make ethical decisions every day

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Technology and You

Virtual Currency—Real or Not?

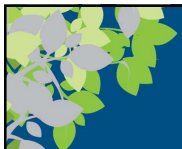
- Virtual currency is a digital representation of value used in the virtual world
 - Linden dollars, World of Warcraft gold, Facebook Credits,
- Convertible virtual currency can be used as real currency
 - Nintendo Points, Amazon Coins, Bitcoins, etc.
- Issue: Is it real currency and subject to existing laws?
- Recent decision: Bitcoins are a form of money, like gold and silver
- Taxability of virtual profits is another issue
 - Some countries tax it



Virtual currencies are most often used online.

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Ethical Use of Books and Web-Based Articles

- Copyright law protects print-based books, e-books, Web-based articles, etc.
 - Need to properly credit sources to avoid plagiarism
- **Plagiarism** is the act of presenting someone else's work as your own
 - Both a violation of copyright law and an unethical act
 - Strict consequences for plagiarism at school and work
 - Online tests for plagiarism are available and widely used by schools

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Examples of Plagiarism

PLAGIARISM	NOT PLAGIARISM
A student including a few sentences or a few paragraphs written by another author in his essay without crediting the original author.	A student including a few sentences or a few paragraphs written by another author in his essay, either indenting the quotation or placing it inside quotation marks, and crediting the original author with a citation in the text or with a footnote or endnote.
A newspaper reporter changing a few words in a sentence or paragraph written by another author and including the revised text in an article without crediting the original author.	A newspaper reporter paraphrasing a few sentences or paragraphs written by another author without changing the meaning of the text, including the paraphrased text in an article, and crediting the original author with a proper citation.
A student copying and pasting information from various online documents to create her research paper without crediting the original authors.	A student copying and pasting information from various online documents and using those quotes in her research paper either indented or enclosed in quotation marks with the proper citations for each author.
A teacher sharing a poem with a class, leading the class to believe the poem was his original work.	A teacher sharing a poem with a class, clearly identifying the poet.

FIGURE 13-5
Examples of what is and what is not normally considered plagiarism.

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Ethical Use of Music and E-Books

- Many issues related to the ethical and legal use of music over the years
 - Napster (first P2P music sharing site)
 - Concerns still exist about P2P file sharing sites
 - Downloading a music file from a P2P site without compensating the artist and record label is violation of the copyright law and an unethical act
- Copying purchased songs for personal, non-commercial use to another device is usually considered fair use
- Wide variety of legal options to stream and download music

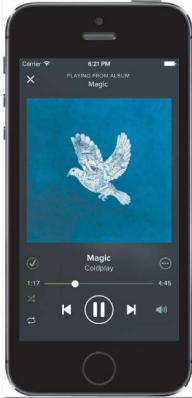


FIGURE 13-7
Music apps. Allow you to legally listen to music on demand on your devices.

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Ethical Use of Music and E-Books (cont'd)

- DRM controls can impact the use of downloaded files, purchased CDs, etc.
- Many downloads today are DRM-free MP3 formats
- RIAA is suing individuals and download sites for illegal downloads
- Royalty issues with digital music
- E-book use is growing and similar legal and ethical issues
 - In 2011, sales of e-books at Amazon.com exceeded print books
 - Piracy of e-books is growing quickly

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Ethical Use of Movies

- Movie piracy is rampant
 - Illegal copies
 - Camming at a movie theater
 - Distributing bootleg copies of movies is illegal and unethical
 - Often happens via the Internet
- Many legal online alternatives are available
 - Often contain DRM tools to prevent unauthorized use
- New issues such as sharing VOD movies or recorded TV show



FIGURE 13-8

Netflix. Allows you to legally stream movies and TV shows to your TV, computer, or mobile device.

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Ethical Use of Software

- Software piracy is the unauthorized copying of a computer program
 - Illegal copies of programs
 - Installing more copies than allowed by the EULA
 - Affects both individuals and businesses
- Legal downloads make legal software more convenient
- Antipiracy techniques try to make pirated software unusable so individuals will buy the licensed software

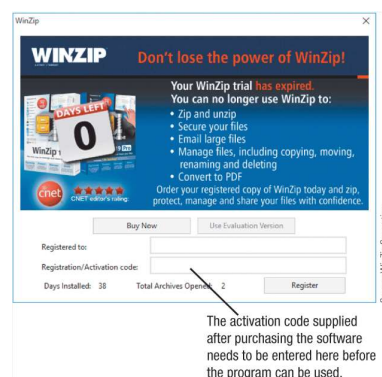


FIGURE 13-9

Activation codes.

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How It Works

Digital Counterfeiting

- High-quality, full-color imaging products has made digital counterfeiting easier
- Measures for prevention include using RFID tags, digital watermarks, smart labels, raised printer, and other difficult-to-reproduce content



Digitally counterfeited documents (left); smart labels (right).

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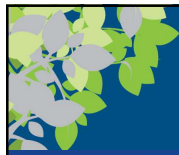
23

Ethical Use of School or Company Resources

- **Code of conduct**
 - Policy that specifies allowable use of resources by students or employees
 - Students and employees should be familiar with what is considered acceptable
- **Code of ethics**
 - Policy, typically for an industry or organization, that specifies overall moral guidelines adopted by that industry or organization
- Whistleblowers have some protection under the law

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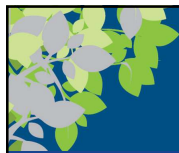


Ethical Use of Employee and Customer Information

- Businesses need to adhere to the law but there are gray areas where decisions regarding ethical use of employee and customer information need to be made
- Need to weigh initial benefits (revenue, etc.) with potential costs (loss of good will, reduced customer support in the long run)
- Emerging issue: Who owns employee work-related social media accounts?
- Most business schools are incorporating business ethics courses into the curriculum

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Cheating and Falsifying Information

- Cheating at all levels of school is rampant
 - Includes texting answers during exams, storing notes on smartphones, etc.
 - Can be reduced by academic honor codes
- Résumé padding is considered unethical by most companies
 - Many companies will terminate employees who were hired based on falsified résumés or applications
 - Other possible consequences include blacklisting from a industry or being sued for breach of contract
- For personal situations (online profiles, chat rooms, etc.) there are differing opinions about how ethical providing inaccurate information is

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Online Hoaxes

- An **online hoax** is an inaccurate statement or story spread through the use of computers
 - Often sent via e-mail or social media
 - Often related to viruses, health issues, impending terrorist attacks, etc.
 - Consider researching before passing on to others

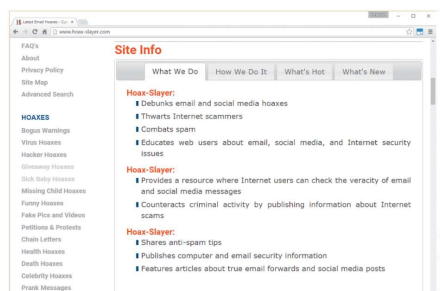


FIGURE 13-12
Hoax-Slayer. This is one site that can be used to research possible online hoaxes.

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Digital Manipulation

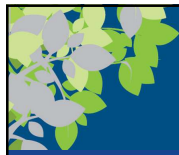
- Digital manipulation** refers to digitally altering text, images, photographs, music, and other digital content
 - Copyright concern
 - Can be used to misquote people, repeat comments out of context, or create false or misleading photographs
 - Some beneficial ethical uses (missing children, altering photos of wanted criminals, etc.)
 - Use by media is controversial



FIGURE 13-13
Digital manipulation. The digitally manipulated photo (bottom) added sleeves and a higher neckline to the real photo (top) of Michelle Obama.

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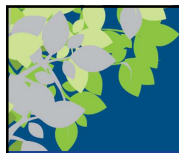


Ethical Business Practices and Decision Making

- Fraudulent reporting and other scandalous activities
 - Forced Enron and WorldCom into bankruptcy
 - Resulted in the passing of the Sarbanes-Oxley Act of 2002
 - Includes provisions to improve the quality of financial reporting, independent audits, and accounting services for public companies
- Ethics-related business decisions
 - Whether or not to implement a business process or decision that is ethically questionable
 - Marriott blocking Internet access to conference attendees to force them to buy Internet access from the hotel
 - Customer privacy decisions
 - Plastic surgery photos posted online, etc.

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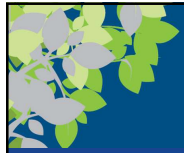


Ethically Questionable Products or Services

- Businesses need to make decisions regarding selling products or services some individuals find objectionable
 - Controversial or sensitive (ivory, Nazi memorabilia, etc.)
- Should businesses that allow users to upload content to their Web sites monitor the content posted?
 - YouTube video flagging
- Legal and ethical decisions about adult products sold via the Internet
 - Age-verification procedures
 - Requiring users to click a statement that they are 21
 - Age-verification services such as Veratad or Jumio are more reliable

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Workplace Monitoring

- Most businesses monitor employees to some extent
 - Most believe there is an ethical responsibility to inform employees of the types of monitoring that may occur
 - Notification is especially prevalent in countries other than the United States (the EU has limits on the types of monitoring that can be done without employee notification)
 - Social media scrutiny/monitoring
 - Often done during hiring process
 - Requiring full access to social media is considered by many to cross the ethical line

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Cultural Considerations

- Ethics vary within a country as well as from country to country
 - Some acts may be legal or ethical in one country but not another
 - Individuals and businesses need to consider both legal and ethical issues in global transactions
 - Some business schools and corporations are including diversity and cross-cultural training



FIGURE 13-15

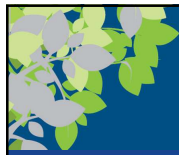
Cultural

considerations.

In some countries, bootleg copies of music CDs and movie DVDs are sold openly.

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Quick Quiz (2)

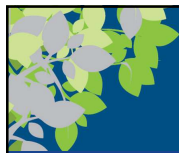
1. An inaccurate statement or story spread though the use of computers is referred to as a(n) _____.
 - a. digital divide
 - b. online hoax
 - c. trademark violation
2. True or False: Most legal experts agree that a legally obtained audio CD or MP3 file can be transferred to another device for personal use under the concept of fair use.
3. Altering digital content, such as editing a digital photo, is referred to as _____.

Answers:

1) b; 2) True; 3) digital manipulation

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Computers and Physical Health

- Computer use can cause physical injuries
 - **Repetitive stress injury (RSI)** – hand, wrist, shoulder, or neck pain associated with repetitive movements
 - **Carpal tunnel syndrome (CTS)** – painful and crippling hand and wrist condition from keyboard use
 - **DeQuervain's tendonitis** painful condition affecting tendons on the wrist from the use of mobile device keyboards
 - Computer vision syndrome (CVC) – eye fatigue, blurred vision, burning eyes, headaches, etc.
 - Gorilla arm and iPad shoulder

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Computers and Physical Health (cont'd)

- Other physical concerns
 - Heat from laptops
 - Hearing loss from headphones
 - 60/60 rule
 - Noise reduction headphones
- Texting or otherwise using phone while driving
 - Illegal in most states
 - Apps can be used to prevent use of phone while the car is in motion
- Possible radiation risks from wireless devices (smartphones, Wi-Fi devices, etc.)



FIGURE 13-16
Safe driving apps.
Restrict mobile phone use when the car is in motion.

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Ergonomics

- **Ergonomics** is the science of fitting a work environment to the people who work there
- Workspace design is the design of a safe and an effective computer workspace
 - Proper placement and adjustment of furniture
 - Ergonomic chairs, standing desks, sit/stand desks, etc.

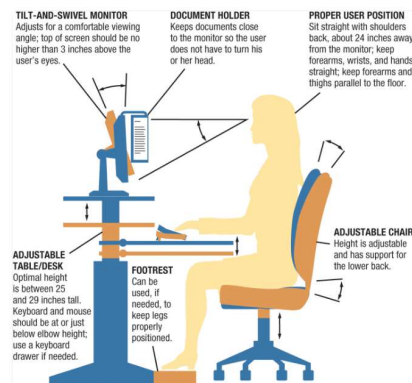
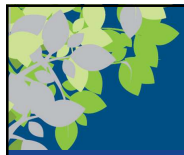


FIGURE 13-17
Workspace design.
Shown here are some guidelines for designing an ergonomic workspace.

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Workspace Design for Mobile Users

- Ergonomics is more difficult with portable computers and mobile devices, but possible to improve work environment
 - Travel mice and travel keyboards can help while on the go
 - **Docking station**: Designed to connect a portable computer to peripheral devices more easily
 - **Notebook** or **tablet stand**: Elevates a notebook/ tablet to the proper height; some can also connect peripherals
 - Smartphone docks connect smartphone to a monitor, keyboard, mouse, etc.

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Examples of Docking Stations and Device Stands



FIGURE 13-19
Docking stations and device stands.

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Ergonomic Tips for Mobile Users

TIPS FOR MOBILE USERS

Sit with the device on a desk or table (use a notebook or tablet stand whenever practical to attain the proper display screen height); use a separate keyboard and mouse when possible.

Elevate the device so the screen is at the proper height and distance, or connect the device to a stand-alone monitor if possible; in either case, adjust the screen to the proper viewing angle and distance.


Use a separate keyboard and mouse, either attached directly to the device or to a docking station or notebook stand; when traveling, bring a folding keyboard and travel mouse with you. Tablet users may choose to use a *keyboard folio* case that has an integrated keyboard instead.

When purchasing a new device, pay close attention to the size and clarity of the display screen, as well as the ease of connecting the device to a docking station or stand and additional hardware; if you will be using the device frequently while on the go, pay close attention to the total weight of the system.

FIGURE 13-20
Ergonomic tips for portable computer and tablet users.

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Ergonomic Hardware

- **Ergonomic hardware** can help avoid physical problems or alleviate discomfort of existing problems
 - Ergonomic keyboards
 - Keyboard folios
 - Trackballs
 - Tablet arms
 - Document holders
 - Antiglare screens
 - Keyboard drawers/trays
 - Computer gloves

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Examples of Ergonomic Hardware

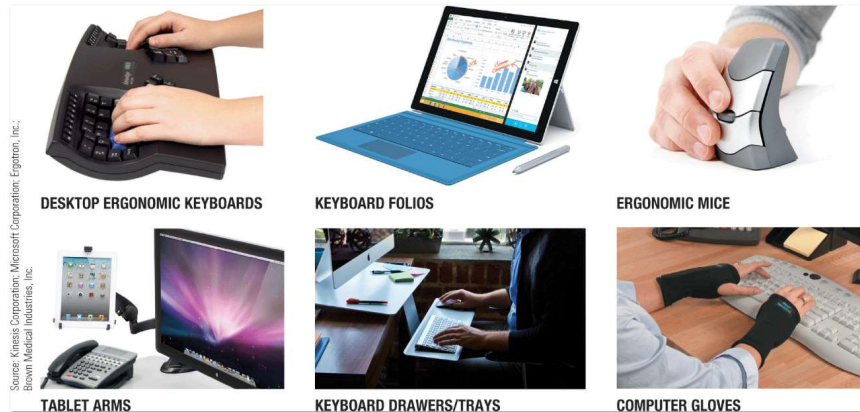


FIGURE 13-21
Ergonomic hardware.

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Good User Habits and Precautions

- Finger and wrist exercises
- Frequent breaks
- Rotating tasks
- Close curtains
- Refocus eyes
- Increase font size and light levels
- Computer glasses

FIGURE 13-22
Good user habits. These preventative measures can help avoid discomfort while working on a computer or mobile device.

CONDITION	PREVENTION
Wrist/arm/hand soreness and injury	<ul style="list-style-type: none"> Use a light touch on a keyboard and touch screen. Rest and gently stretch your fingers and arms every 15 minutes or so. Keep your wrists and arms relaxed and parallel to the floor when using a keyboard. When using a touch screen for extended periods of time, place the device more horizontally than vertically. When using a device with a small keyboard, type short messages, take frequent breaks, and use a separate keyboard whenever possible. Use an ergonomic keyboard, ergonomic mouse, computer gloves, and other ergonomic devices if you begin to notice wrist or hand soreness.
Eyestrain	<ul style="list-style-type: none"> Cover windows or adjust lighting to eliminate glare. Rest your eyes every 15 minutes or so by focusing on an object in the distance (at least 20 feet away) for one minute and then closing your eyes for an additional minute. Make sure your display's brightness and contrast settings are at an appropriate level and the display is placed at an appropriate distance from your eyes. Use a larger text size or lower screen resolution, if needed.
Sore or stiff neck	<ul style="list-style-type: none"> Use good posture; never hunch over a keyboard or device. Place your display and any documents you need to refer to while using your device directly in front of you. Adjust your display to a comfortable viewing angle with the top of the screen no higher than 3 inches above your eyes. Use a headset or the phone's speakerphone function if you spend a significant amount of time on the phone; never prop a phone between your face and shoulders.
Backache; general fatigue	<ul style="list-style-type: none"> Use good posture and adjust your chair to support your lower back; use an ergonomic chair, if needed. Use a footrest, if needed, to keep your feet flat on the floor. Walk around or stretch briefly at least once every hour. Alternate activities frequently. When traveling, carry only essential, lightweight devices.
ringing in the ears; hearing loss	<ul style="list-style-type: none"> Turn down the volume when using headphones (you should be able to hear other people's voices). Wear over-the-ear headphones instead of earbuds. Limit the amount of time you use headphones or earbuds. Use external speakers instead of headphones when possible.
Leg discomfort or burns	<ul style="list-style-type: none"> Use a laptop desk, cooling stand, or other barrier between a portable computer and your legs when using a computer on your lap.

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Computers and Emotional Health

- Increased use of computers and mobile devices in the home and office has raised concerns about emotional health
- Stress
 - Knowledge of and ability to use technology is becoming a necessity in many jobs
 - Technology is increasingly used in jobs where it wasn't before
 - Technology changes at a rapid pace so workers must regularly learn new skills which can create stress for many individuals

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Examples of Ever-Growing Computer Use



FIGURE 13-23

Ever-growing computer use. Many jobs and tasks that did not require computer use in the past require it today.

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Impact of Our 24/7 Society

- Ability to be in touch constantly can be a source of great stress for some people
 - “On call 24/7” and can never get away
 - Hard to relax when on vacation and available 24/7
 - Many employees are expected to be available while on vacation
- Concerns of using bright screens in bed (distraction and can impact sleep)




FIGURE 13-24
Our 24/7 society. With smartphones, tablets, and portable computers, many individuals are available 24/7.

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Information Overload

- Overwhelming amount of information available today
 - Internet, news broadcasts, newspaper and magazine articles, e-mail, phone calls, etc.
- Good searching techniques are essential for Internet content
 - Do not try to read everything written on a subject
- Efficiently managing your e-mail can help from becoming overwhelming
 - Use e-mail filters, flags, reminders, and other tools
 - Check messages and updates only periodically
 - Turn off phone notifications as well

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Options for Organizing Your Gmail Inbox

FIGURE 13-25
Gmail stars and the Tasks list can help you organize your Inbox.

Click to view your Tasks list.

Click to star a message.

Click to highlight all starred messages.

Click to create a task for each selected message.

Click to specify task details for this message.

Specify a due date and other task details here.

Source: Google Inc.

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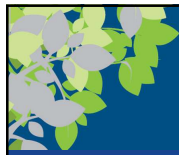
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Burnout

- **Burnout** is a state of fatigue or frustration brought on by overwork
- Early signs
 - Feelings of emotional and physical exhaustion
 - No longer caring about a project that was once exciting
 - Irritability or feelings of resentment about amount of work to be done
- Suggested solutions
 - Reevaluate schedule, priorities, and lifestyle
 - Take a break or get away for a day
 - Say no to additional commitments
 - Develop healthy food and exercise routines

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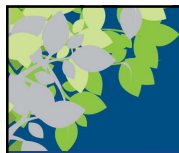


Internet and Technology Addiction

- **Internet addiction** refers to the problem of overusing, or being unable to stop using, the Internet
 - Can affect anyone
 - Can involve e-mailing, texting, online shopping, online gambling, social media, online gaming, cybersex, etc.
 - May have significant consequences, such as relationship problems, job loss, academic failure
 - Increasingly being tied to crime and even death
 - Can be treated, similar to other addictions
 - Some countries have Internet addiction boot camps
 - United States has inpatient treatment centers

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Signs of Internet Addiction

SIGNS OF INTERNET ADDICTION

Do you feel preoccupied with the Internet (think about the previous online activity or anticipate the next online session)?

Do you feel the need to use the Internet with increasing amounts of time in order to achieve satisfaction?

Have you repeatedly made unsuccessful efforts to control, cut back, or stop Internet use?

Do you feel restless, moody, depressed, or irritable when attempting to cut down or stop Internet use?

Do you stay online longer than originally intended?

Have you jeopardized or risked the loss of a significant relationship, job, educational, or career opportunity because of the Internet?

Have you lied to family members, a therapist, or others to conceal the extent of involvement with the Internet?

Do you use the Internet as a way of escaping from problems or of relieving a dysphoric mood (e.g., feelings of helplessness, guilt, anxiety, depression)?

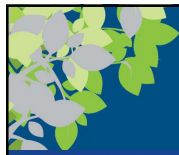
Courtesy of Dr. Kimberly Young, Director of the Center for Internet Addiction Recovery

FIGURE 13-26

Questions to help identify Internet addiction. You may be addicted to the Internet if you answer "yes" to at least five of these questions.

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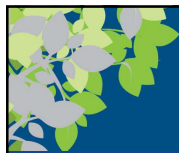


Access to Technology

- The **digital divide** refers to the gap between those who have access to technology and those who don't
 - Can have digital divide within a country, as well as between countries
 - The U.S. digital divide
 - Shrinking, but individuals with a higher level of income or a higher level of education are still more likely to go online
 - Younger people using technology more
 - Some people choose not to use technology

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Key U.S. Internet Use Statistics

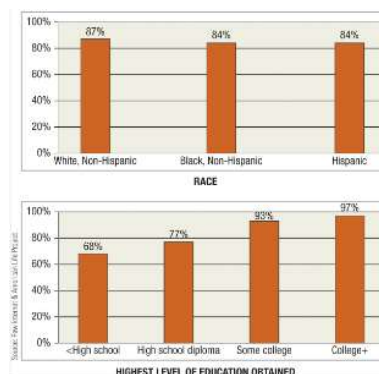
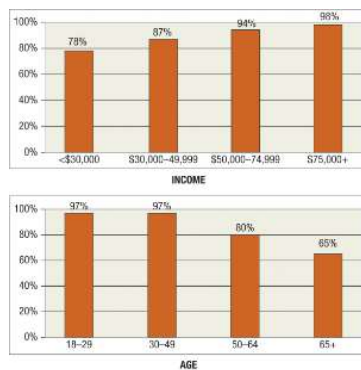
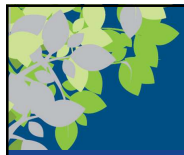


FIGURE 13-27
Key U.S. Internet use statistics. Shows the percentage of individual in each category who use the Internet.

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The Global Digital Divide

- Some countries have more access to technology than others
- Perhaps more dramatic than the U.S. digital divide
 - More than 3.2 billion people world-wide are online (45% of the world's population)
 - 88% of the North American population is online
 - 27% of Africa's population is online
- Technology can bridge the global digital divide
 - Smartphones with solar-rechargeable batteries can provide telemedicine and education to remote areas

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One Laptop Per Child (OLPC) Project

- New projects are emerging that may help to reduce the global digital divide
 - One Laptop Per Child (OLPC) project
 - Goal is to provide every child in the world with access to a personal connected laptop
 - XO laptop
 - XO tablet is available to the general public

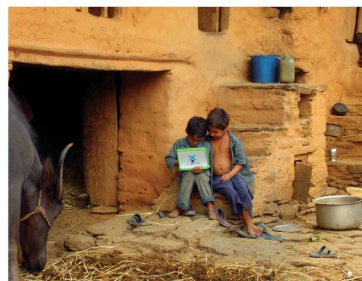
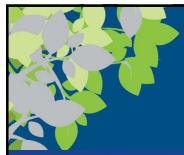


FIGURE 13-28
The OLPC XO laptop.

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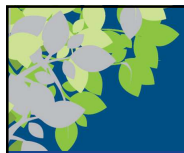


Assistive Technology

- **Assistive technology** refers to hardware and software designed for use by individuals with physical disabilities
- Much improvement in assistive technology has occurred in recent years
- American with Disabilities Act (ADA) requires companies with 15 or more employees to make reasonable accommodations for known physical or mental limitations of otherwise qualified individuals, unless doing so results in undue hardship for the company
- Apps and devices can help people with disabilities with day-to-day tasks

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AAC Systems

- Augmentative and alternative communications (AAC) tablets
 - Help people who cannot use verbal speech communicate with others
 - Also available as AAC apps for conventional tablets

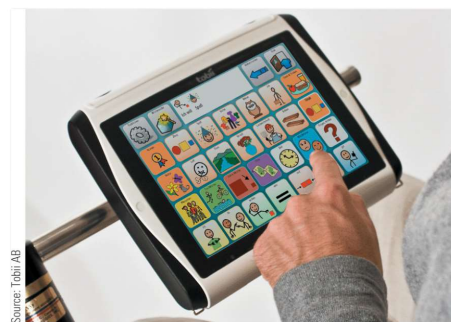


FIGURE 13-30
AAC systems help individuals with speech disabilities communicate with others.

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Assistive Input Systems

- Braille keyboards for visually-impaired users
- Keyguards for users with limited hand mobility
- One-handed keyboards
- Speech recognition systems allow hands-free input
- Switches can be activated with hand, foot, finger, or face movements, as well as with sips and puffs of air
- Scanners can input documents to be read aloud or printed in larger print
- Assistive pointing devices
 - Foot controlled mice, head pointing systems, eye tracking systems

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Examples of Assistive Input Devices



BRaille KEYBOARDS

The keys on this keyboard contain Braille overlays.



ONE-HANDED KEYBOARDS

Each key on this half keyboard contains two letters (one set for the keys normally on the right half of the keyboard and one set for the left half) so all keys can be reached with one hand.



EYE TRACKING SYSTEMS

Cameras track the user's eye movements, which are used to select icons and other objects on the screen.

FIGURE 13-31
Assistive input devices.

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Assistive Output Systems

- For blind or visually-impaired users
 - Screen readers read all screen output aloud
 - Braille displays convert screen output to Braille form
 - Braille printers (Braille embossers) print embossed output in Braille on paper
- Windows and OS X include accessibility features for both input and output
 - Screen reader, on-screen keyboard, speech recognition capabilities, screen magnifiers, etc.

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Examples of Assistive Output Devices



SCREEN READER SOFTWARE

BRAILLE DISPLAYS

BRAILLE PRINTERS

FIGURE 13-32
Assistive output
devices.

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Quick Quiz (3)

1. Which of the following is *not* an assistive input device?
 - a. Braille display
 - b. head pointing system
 - c. one-handed keyboard
2. True or False: Internet addiction affects only teenagers.
3. A device designed to connect a portable computer to conventional hardware such as a keyboard, mouse, and printer is called a(n) _____.

Answers:

1) *a*; 2) *False*; 3) *docking station*

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Environmental Concerns

- **Green computing**
 - The use of computers in an environmentally friendly manner
 - Energy and paper consumption are key concerns today
 - **ENERGY STAR** program
 - Developed to encourage the development of energy-saving devices
 - **Eco-labels** also used in other countries



FIGURE 13-33
Eco-labels.

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Energy Consumption and Conservation

- Power consumption and heat generation by computers are key concerns for businesses
 - More powerful computers use more energy and run hotter, increasing cooling costs
 - Servers are especially power-hungry
- Some energy-saving features
 - Server consolidation and virtualization
 - Low-power sleep mode when not in use
 - More energy-efficient hardware
 - Powering down devices when not in use
 - Energy vampires
 - Smart charging stations

FIGURE 13-34
Energy usage monitors. This monitor displays in real time the amount of electricity (in kilowatt-hours or approximate cost) a connected device is using.



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Alternate Power

- Solar panels convert sunlight into direct current (DC) electricity, which is then stored in a battery
 - Thin-film solar panels make solar power more affordable
 - Thin, flexible panels with printed nanoparticles
 - Available for a number of applications
 - Solar panels built into computer and tablet cases, backpacks, etc.
 - Future applications
 - Transparent solar panels
 - Solar buildings
- Hand-powered chargers can be used with portable computers, smartphones, and other mobile devices

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Examples of Alternate Power Devices



SOLAR COMPUTER AND TABLET BAGS



SOLAR BACKPACKS



HAND-POWERED CHARGERS

FIGURE 13-35

Alternate power.
Solar and hand power can be used to power smartphones, GPS devices, portable computers, and other devices.

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Green Components

- Computers are being built to run quieter and cooler
- Computers are using more recyclable hardware and packaging
- Manufacturers are reducing the amount of toxic chemicals being used in computers
- Smartphones are going green as well
 - Being made out of recycled plastics
 - Including built-in solar panels
 - Including green apps like pedometer and CO₂ emission calculators

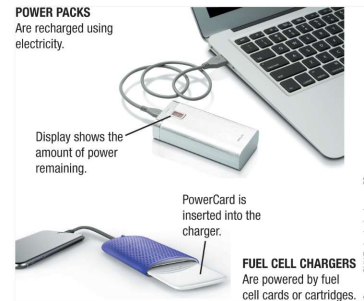
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Trend

Power to Go

- Portable power devices can power your portable computers and mobile devices
- Power pack devices
 - Charge via USB port or wall outlet
 - Power via USB port
- Fuel cell chargers
 - Uses fuel cell technology
 - Power via disposal fuel cards or cartridges



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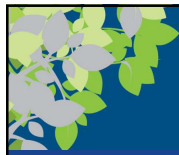
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E-Waste

- **E-waste** (e-trash) includes:
 - Discarded computers, phones, and other consumer devices
 - Paper (at least 40% of harvested wood ends up as paper)
 - Utilities like GreenPrint can help reduce paper consumption
 - Used toner cartridges, discarded DVDs, etc.
- Current hardware contain a variety of toxic and hazardous materials
 - Global concern is where it all eventually ends up
 - Laws and programs are resulting in manufacturers being more responsible for the entire life cycle of products, including recycling
 - Increasing use of environmentally friendly components

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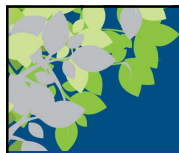


Proper Recycling and Disposal of Computing Equipment

- Some recycling centers will accept computer equipment
- Many computer manufacturers have voluntary take-back programs
- Used toner and ink cartridges can sometimes be returned to manufacturer or exchanged when purchasing new cartridges
 - Using recharged printer cartridges saves consumers' money and helps reduce e-waste in landfills
- Obsolete equipment can be donated to schools and other organizations or repurposed (personal Web server, etc.)
 - For security and privacy reasons, all data should be completely removed before disposal or donation

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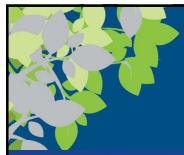


Related Legislation

- Legislation to protect intellectual property rights
 - Family Entertainment and Copyright Act of 2005
 - U.S. Anticybersquatting Consumer Protection Act of 1999
 - Digital Millennium Copyright Act (DMCA)
- Ethical legislation is more difficult to pass
 - The Individuals with Disabilities Education Act of 1997 ensures a free public education for all students with disabilities
 - The 1998 amendment to Section 508 of the Rehabilitation Act requires federal agency information be accessible to persons with disabilities

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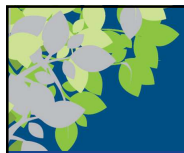


Related Legislation (cont'd)

- Environmental legislation
 - No federal laws, but federal agencies are required to purchase energy-efficient electronic products
 - The Sarbanes-Oxley Act and HIPAA established privacy and data protection standards for disposal of computing hardware
 - Some states have implemented laws related to electronic waste

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Quick Quiz (4)


1. Today's solar panels are typically _____ solar panels, which are thinner and less expensive than older technology.
 - a. flat-panel
 - b. ENERGY STAR
 - c. thin-film
2. True or False: E-waste is no longer a concern today since modern computers contain very few toxic materials.
3. Using computers in an environmentally friendly manner is referred to as ____ computing.

Answers:

1) c; 2) False; 3) green

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Summary

- Intellectual Property Rights
- Ethics
- Computers and Health
- Access to Technology
- Environmental Concerns
- Related Legislation

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