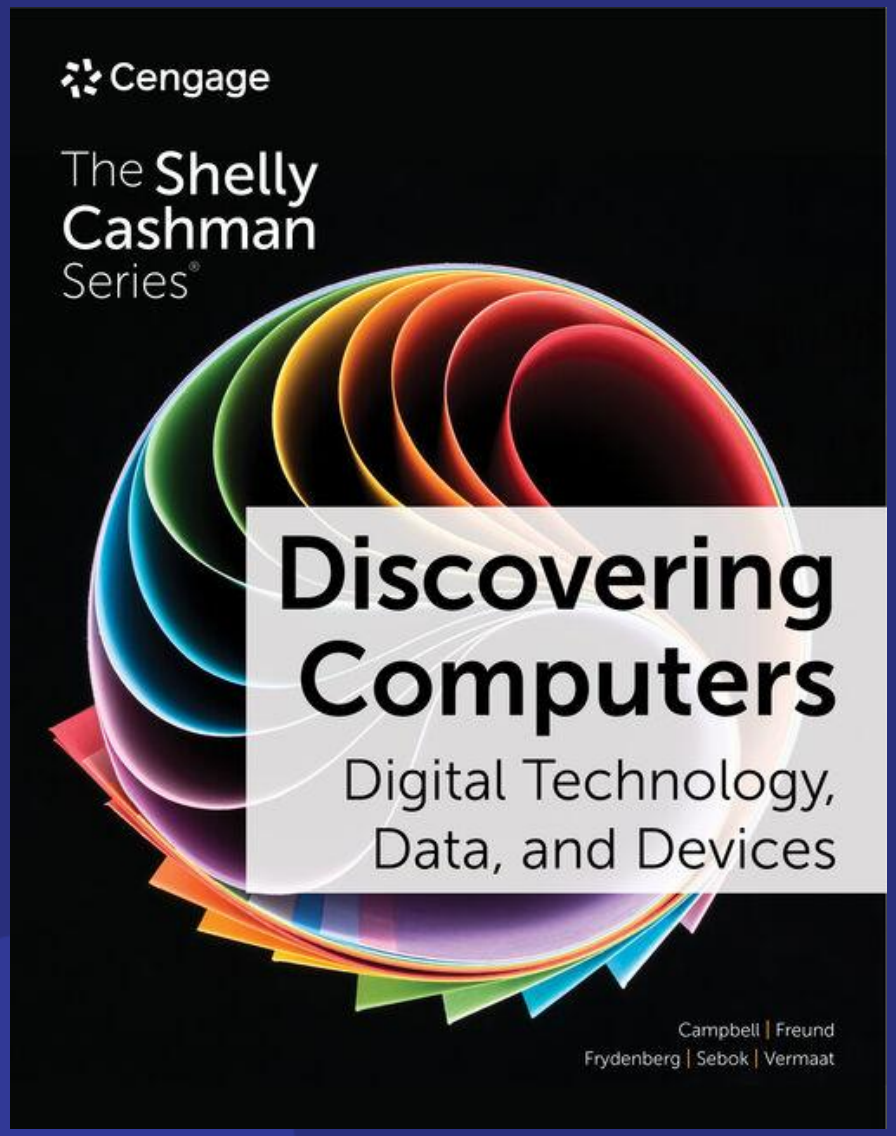

CS 110 – Introduction To Computing

Unit 1: Introduction (Being a Digital Citizen: At Home, School, and Work)

Module Objectives

By the end of the module, you should be able to:

- Define digital literacy
- Explain society's reliance on technology
- Describe how to protect your personal information
- Explain the role of technology in the professional world
- Use technology to find a career
- Define convergence
- Describe the legal and ethical responsibilities of a digital citizen
- Identify the uses of assistive technologies

How Technology Impacts You (1 of 4)

- **Digital literacy** means acquiring current knowledge and understanding of computers, mobile devices, the web, and related technologies.
- A **digital citizen** is a person familiar with how to use technology to become an educated and productive member of the digital world.
- A **computer** is an electronic device that operates under the control of instructions stored in its memory and can accept and process data to produce information for future use.
- **Memory** consists of electronic components that store instructions waiting to be executed by the processor, data needed by those instructions, and the results of processing the data into information.

How Technology Impacts You (2 of 4)

- The **Internet** is a global collection of millions of computers linked together to share information.
- A **network** is a collection of two or more computers connected to share resources.
- **Wi-Fi** (short for wireless fidelity) is a wireless data network technology that provides high-speed data connections and is not attached to any device. It is used for mobile devices.
- A **server** is a powerful, high-capacity computer you access using the Internet or other networks; it stores files and "serves" them, that is, makes the files available to users; usually grouped at a location called a data center.

How Technology Impacts You (3 of 4)

- An **online social network** is an online community where users can share their interests, ideas, stories, photos, music, and videos with other registered users via a social networking website, such as Facebook, Google Plus, Twitter, Instagram, or Snapchat.
- **Big data** is a term that refers to the large and complex data sources that defy easy management with traditional data processing methods.

Figure 1-1 Knowledge of online social networks is a key component of digital literacy.

How Technology Impacts You (4 of 4)

- On the way to and from work, you check the public transportation app on your phone to get directions to the nearest subway station.
- Once there, you scan your phone to pay your fare and access the terminal.
- A screen in the station displays an alert when the train is incoming.

Figure 1-2 You can use apps to find out information about public transit options.

How Technology Impacts Society (1 of 8)

- The first generation of computers used vacuum tubes, which are cylindrical glass tubes that control the flow of electrons.
  - ENIAC (Electronic Numerical Integrator and Computer)
  - UNIVAC (Universal Automatic Computer)
- Their use and availability were constrained by:
  - their large size
  - the amount of power they consumed
  - the heat they generated
  - how quickly they wore out

Figure 1-3 Electronic digital computer with vacuum tubes.

How Technology Impacts Society (2 of 8)

- In 1978, Steve Jobs and Steve Wozniak of Apple Computer Corporation introduced the Apple II, a preassembled computer with color graphics and popular spreadsheet software called VisiCalc.

Figure 1-4 Apple II computer.

How Technology Impacts Society (3 of 8)

- The **Internet of Things** (IoT) is an environment in which processors are embedded in every product imaginable (things), and these things, in turn, communicate with one another via the Internet or wireless networks.
- **IoT-enabled devices** are often referred to as smart devices because of their capability to communicate, locate, and predict.
- Smart devices often have associated apps that control and interact with them.

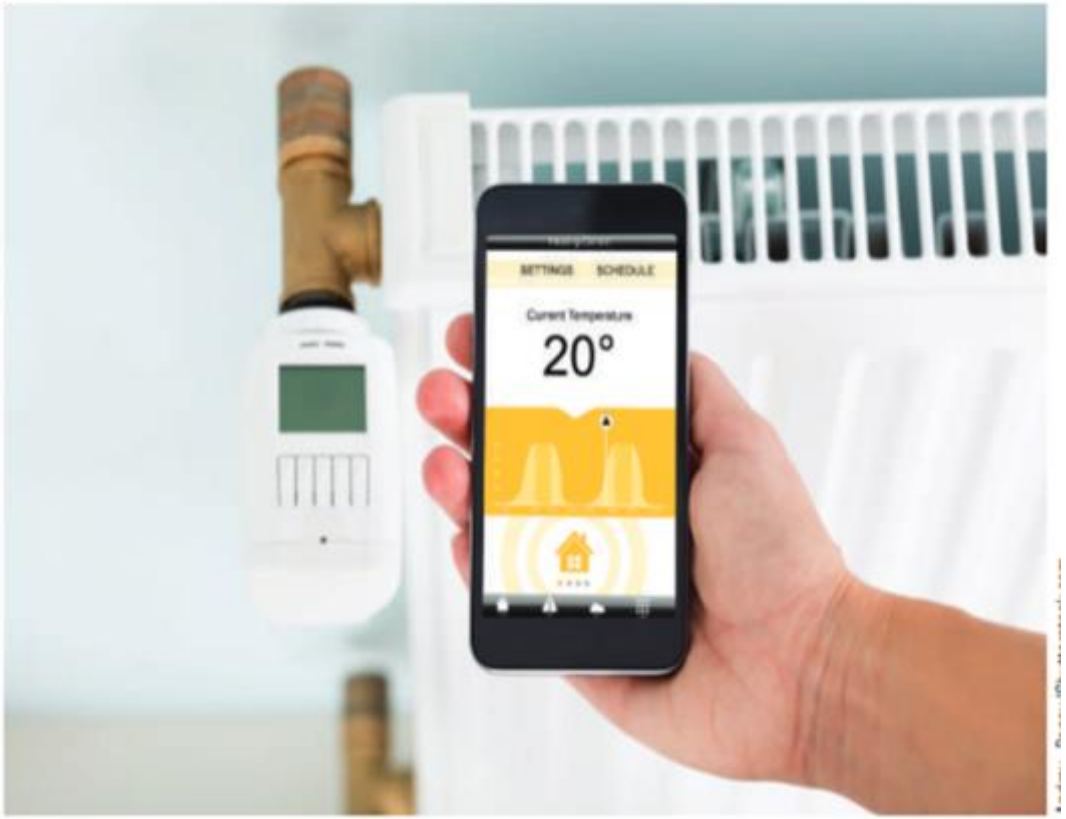

Figure 1-5 Smart devices use IoT to control home functions, such as a thermostat.

How Technology Impacts Society (4 of 8)

- Embedded computers are a part of the IoT.
- An embedded computer is a computer that functions as one component in a larger product and has a specific purpose.
- Embedded computers are small and have limited hardware on their own but enhance the capabilities of everyday devices.
- Embedded computers perform a specific function based on the requirements of the product in which they reside.

How Technology Impacts Society (5 of 8)

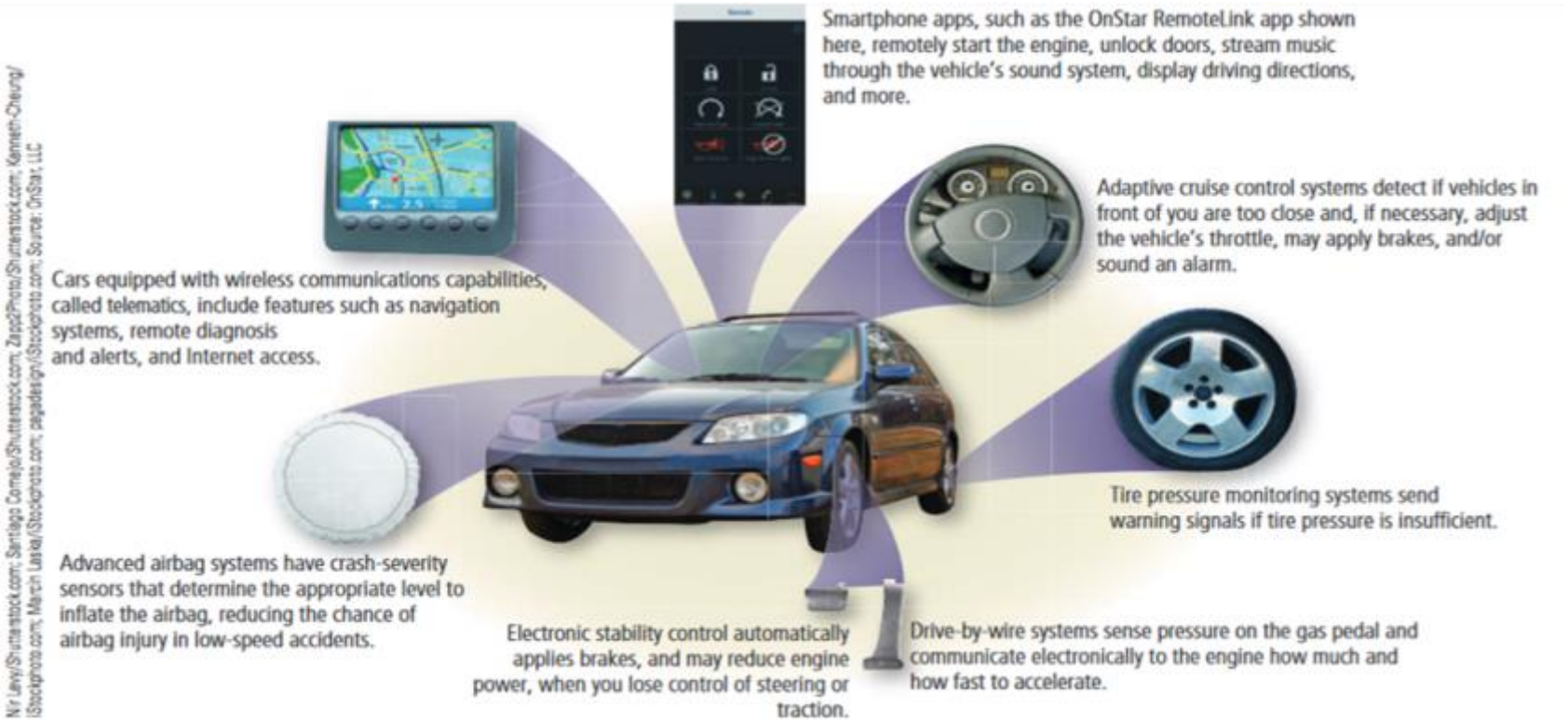

Figure 1-6 Some of the embedded computers designed to improve safety, security, and performance in today's vehicles.

How Technology Impacts Society (6 of 8)

- Automated teller machines (ATMs) are one of the more familiar uses of the IoT.
- ATMs are a type of kiosk, or freestanding booth, usually placed in a public area.
- IoT enables you to manage devices remotely in your home, such as starting the washing machine at a certain time, preparing a grocery list, viewing potential intruders via a webcam, or adjusting the room temperature.

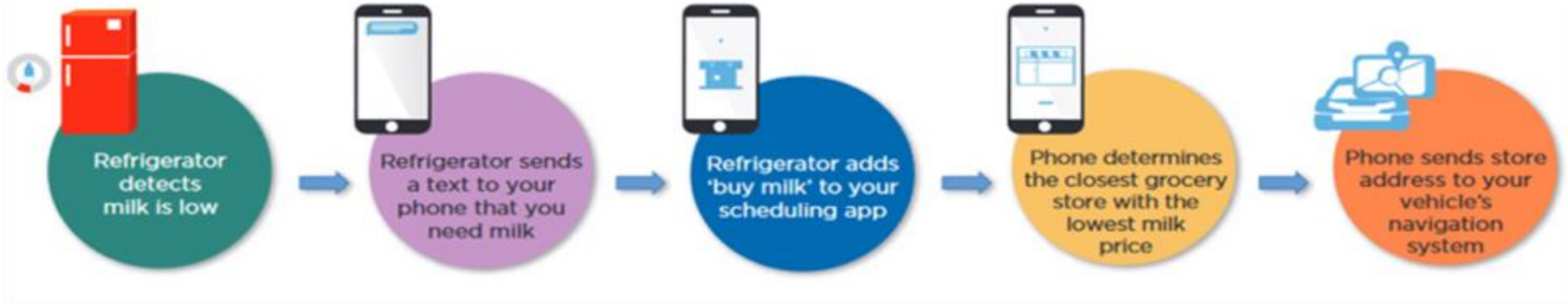

Figure 1-7 IoT devices can help you with daily tasks, such as grocery shopping.

How Technology Impacts Society (7 of 8)

- Manufacturing can use sensors to monitor processes and increase the quality of finished goods.
- Robotic arms can help ensure precision during the manufacturing process.
- Retail can use sensors to track inventory or send coupons to customers' phones while they shop.
- Shipping companies can track the mileage and location of their trucks and monitor driving times to ensure the safety of their drivers.

Figure 1-8 Manufacturers can use a tablet to control a robotic arm.

How Technology Impacts Society (8 of 8)

- A healthcare provider can use IoT to:
  - ✓ Connect to a patient's wearable blood pressure or glucose monitor.
  - ✓ Send prescription updates and changes to a pharmacy and alert the patient of the prescription.
  - ✓ Track and store data provided by wearable monitors to determine necessary follow-up care.
  - ✓ Send the patient reminders about upcoming appointments or tests.
- The **digital divide** is the gap between those who have access to technology and its resources and information, especially on the Internet, and those who do not.
- Socioeconomic and demographic factors such as age, income, location, and education contribute to the digital divide, which can impact individuals, households, businesses, or geographic areas.

Secure IT: Protect Your Privacy (1 of 5)

- **Privacy** is defined as the state or condition of being free from public attention to the degree that you determine.
- Privacy is freedom from attention, observation, or interference, based on your decision.
- Privacy is the right to be left alone to the level that you choose.
- **Identity theft** involves using someone's personal information, such as their name, Social Security number, or credit card number, to commit financial fraud.
- The victim is charged for the purchases and suffers a damaged credit history that can lead to being denied loans for school, cars, and homes.

Secure IT: Protect Your Privacy (2 of 5)

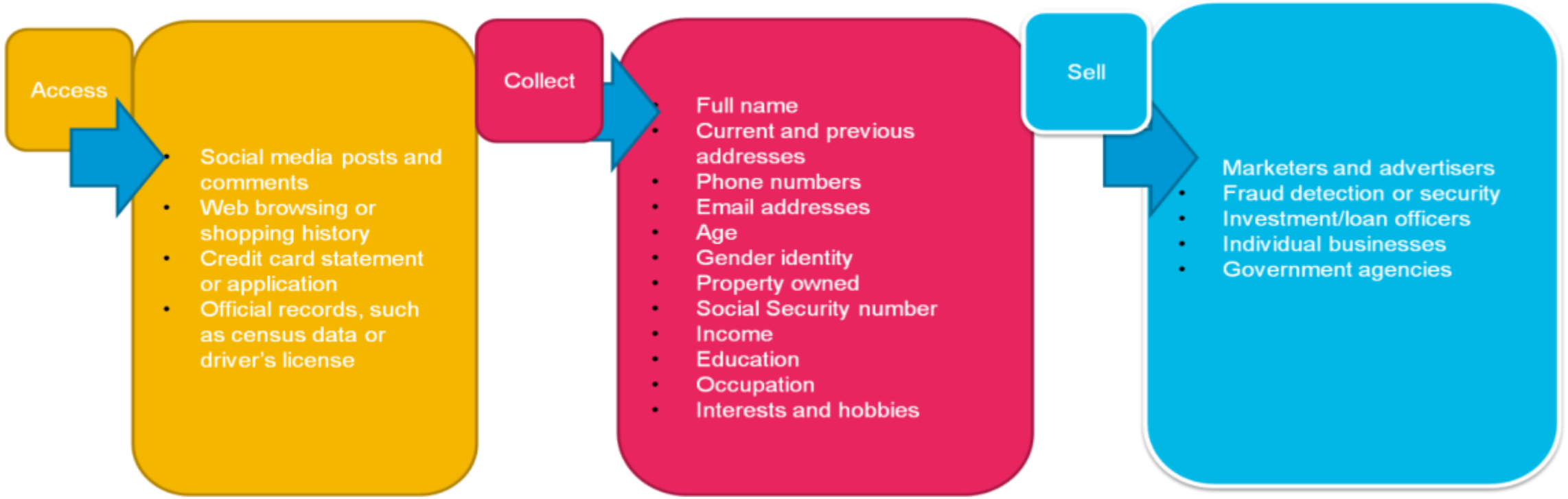

Figure 1-9 Ways your data can be accessed, collected, and sold.

Secure IT: Protect Your Privacy (3 of 5)

Table 1-1 How Personal Information Is Stolen.

Technique	Explanation
Dumpster diving	Personal information from discarded credit card statements, charge receipts, and bank statements can be retrieved after being discarded in the trash.
Phishing	In phishing, attackers attempt to deceive you into revealing personal or financial information when you respond to an email message or visit a website.
Change of address form	Using a standard change of address form, the attackers divert all mail to a post office box so that the victim never sees the charges made.
Pretexting	An attacker who pretends to be from a legitimate research firm asks for personal information.
Stealing	Stolen wallets and purses contain personal information that can be used in identity theft.
Data mining	Attackers attempt to guess your passwords or password security questions by soliciting a response to a query on an online social media site that prompts you to enter information such as a pet's name, home state, and more.

Secure IT: Protect Your Privacy (4 of 5)

Consider the following safeguards to protect your privacy:

- Do not carry passwords/access codes in a wallet or write them on a check.
- Do not provide personal information either over the phone or through an email message.
- Keep personal information in a secure location in a home or apartment.
- Give cautious notifications before permitting a website or app request to collect data.
- Be cautious about what information is posted on social networking sites and who can view your information.
- Carefully review financial and billing statements each month as soon as they arrive.

How Technology Impacts the Professional World (1 of 6)

- An intelligent workplace makes use of technology to connect employees to the company's network, communicate with one another, use productivity software and apps, meet via web conferencing, and more.
- Companies use online collaborative productivity software to enable employees to share documents, and to make edits or comments.
- Schools use social networking tools to promote school events, work cooperatively on group projects, and teach concepts such as anti-bullying.
- Online productivity software enables students to work collaboratively on projects and send the finished assignment to the teacher using email, reducing the need for paper printouts.

How Technology Impacts the Professional World (2 of 6)

Figure 1-10 Interactive whiteboards allow teachers to use a mouse or touch to manipulate, edit, or add data to a screen.

How Technology Impacts the Professional World (3 of 6)

- A college or university might use a **learning management system** to set up web-based training sites where students can check their progress in a course, take practice tests, and exchange messages with the instructor or other students.
- The **mobile health (mHealth)** trend refers to health care professionals using smartphones or tablets to access health records stored on the cloud, and patients using digital devices to monitor their conditions and treatments, thereby reducing the need for visits to the doctor's office.
- Health care also uses **3-D printers** to manufacture skin for burn patients, as well as prosthetic devices and casts.

How Technology Impacts the Professional World (4 of 6)

- **Telemedicine** is the use of telecommunications technology, including secure web-based videoconferencing, to diagnose and treat patients remotely, which provides rural or remote patients access to doctors when an in-person medical visit is not possible.

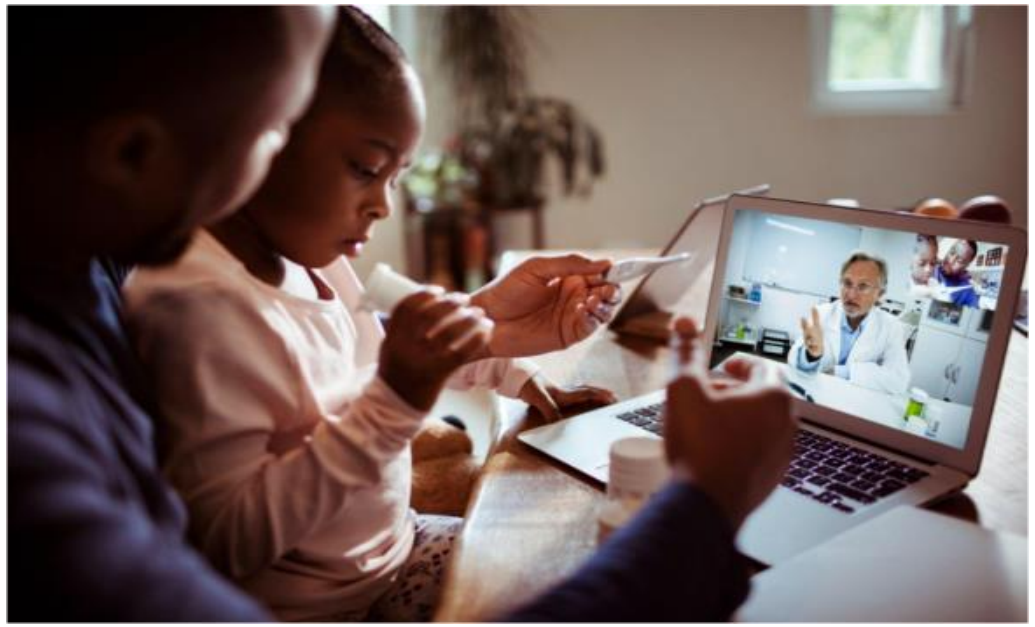

Figure 1-11 Telemedicine appointments can be useful when in-person medical visits are not possible.

How Technology Impacts the Professional World (5 of 6)

- Transportation workers use handheld computers to scan the codes on packages before loading them for shipping.
- Computers find an efficient route for the packages and track their progress.
- Drivers use GPS to navigate to the delivery destination, avoiding traffic and hazardous conditions.

Figure 1-12 The transportation industry uses code scanning to track packages.

How Technology Impacts the Professional World (6 of 6)

- Manufacturers use **computer-aided manufacturing** (CAM) to streamline production and ship products more quickly.
- With **CAM**, robots perform tasks that are too dangerous, detailed, or monotonous for people.
- A company's computers monitor assembly lines and equipment using machine-to-machine communications between machines, equipment, and devices to perform tasks.
- By creating a profile on a career networking site or creating a personal website that showcases your talents, hiring managers can learn more about you beyond what you can convey in a traditional, one-page resume.
- You can use social media and job search websites to learn about technology careers and to promote yourself to potential employers.

How to Use Technology in Your Job Search (1 of 2)

Create a Professional Online Presence

- Your professional online presence is often the first thing a recruiter or interviewer will see.
- Online professional networks can help you keep up with former coworkers, instructors, potential employers, and others with whom you have a professional connection.
- **LinkedIn** is a social networking site designed to provide business and employment-oriented services.

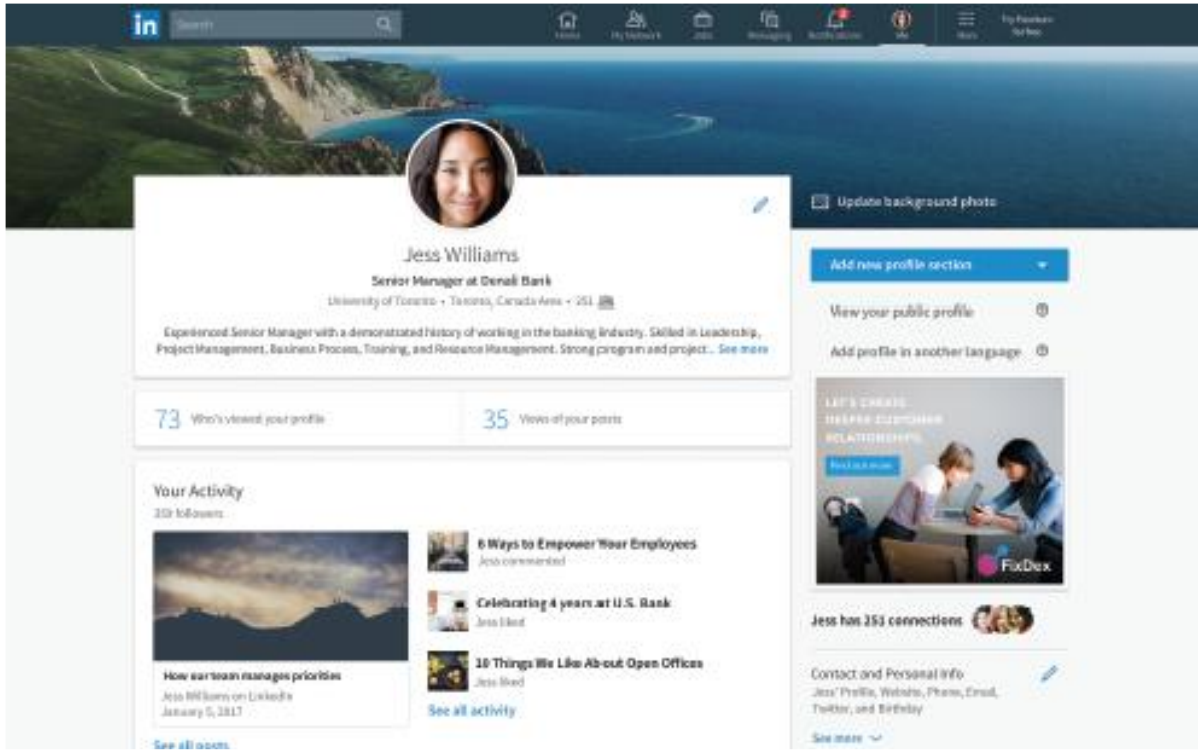

Figure 1-13 LinkedIn is a career-based online social networking site.

How to Use Technology in Your Job Search (2 of 2)

Consider the following tips when creating an online presence:

- Avoid humorous or informal names for your account profiles, blogs, or domain names.
- Include a photo that shows your best self.
- Upload a PDF of your resume.
- Include links to videos, publications, or digital content you have created.
- Proofread your resume, blog, website, or profile carefully to avoid spelling and grammatical mistakes.
- Enable privacy settings on your social media accounts and never post anything online that you would not want a potential employer to see.

How Convergence Impacts Technology (1 of 6)

- A computer is an electronic device operating under the control of instructions stored in its memory.
- Computers can accept data (input), process the data according to specified rules, produce information (output), and store the information for future use.
- Electronic components in computers process data using instructions, which are the steps that tell the computer how to perform a particular task.
- A set of coded instructions that tell a computer or device what tasks to perform is referred to as **software**, a **program**, or an **app**.
- **Convergence** is the increasing integration of technological capabilities into a growing number of previously unrelated devices. For example, you can access some of the same email, social networking, and gaming apps and accounts on your laptop, tablet, and smartphone.

How Convergence Impacts Technology (2 of 6)

- A **laptop** is a thin, lightweight mobile computer with a screen on its lid and a keyboard on its base.
- **Notebook** is another term for laptop.
- A **tablet** is a thin, lightweight mobile device that has a touch screen and is often associated with eBook readers.
- An **eBook** reader, or **e-reader**, is a mobile device that is used primarily for reading digital media.

Figure 1-15 Laptops are portable computers that you can use for school or work.

How Convergence Impacts Technology (3 of 6)

- A **desktop**, or **desktop computer**, is a personal computer designed to be in a stationary location where all its components fit on or under a desk or table.
- Another type of desktop, called an **all-in-one,** does not contain a tower and instead uses the same case to house the display and the processing circuitry
- A **mobile device** is a portable or handheld computing device.
- A **smartphone** is an Internet-capable phone that usually also includes a calendar, an address book, and games, in addition to apps.

How Convergence Impacts Technology (4 of 6)

- Users often purchase a set of **earbuds**, which are small speakers that rest inside each ear canal, to listen to phone calls or media without disturbing those around them.

Figure 1-16 Earbuds enable you to listen to your devices without disturbing others.

How Convergence Impacts Technology (5 of 6)

Media and Gaming Devices

- A **digital camera** is a camera that creates a digital image of an object, person, or scene.
- A **digital media player** is an application that lets you play audio and video files; most tablets and smartphones include media players.
- One can download digital media to your device, or you can play the media while it streams.
- **Streaming** is a way of receiving audio and video content on your device as it is being downloaded from the web.
- A **wearable device**, or **wearable**, is a small, mobile computing consumer device designed to be worn.

How Convergence Impacts Technology (6 of 6)

Media and Gaming Devices

- An **activity tracker** is a device that monitors heart rate, measures pulse, counts steps, and tracks sleep patterns.
- A **smartwatch** can communicate with a smartphone to make and answer phone calls, read and send messages, access the web, play music, work with apps, such as activity trackers and GPS, and more.
- A **game console** is a hardware device that allows you to play video games, either single player or multiplayer.
- A **handheld game** device is small enough to fit in one hand, making it more portable than a game console.

What Does it Mean to be a Digital Citizen? (1 of 13)

Digitally literate people know how to copy and paste information from one source into another. Digital citizens, however, know when it is appropriate to copy and paste information, how to properly credit the source, and the ramifications of violating copyright restrictions.

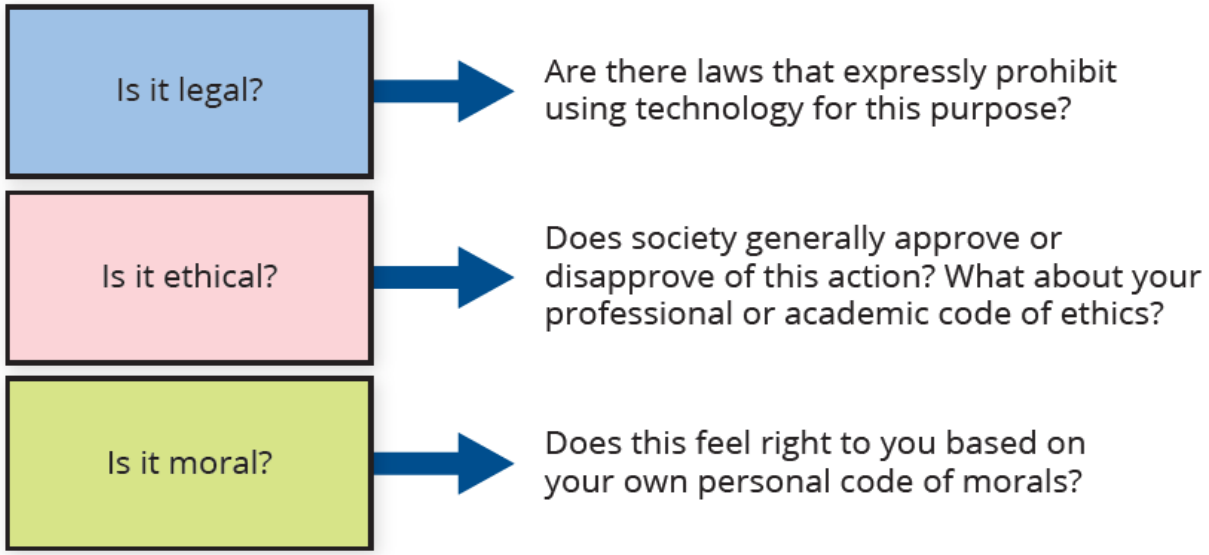

Figure 1-17 Determining how to use technology involves several gray areas.

What Does it Mean to be a Digital Citizen? (2 of 13)

- **Netiquette** is a term that describes the rules of Internet etiquette.
- Netiquette includes the code of acceptable behaviors users should follow while on the Internet; that is, it is the conduct expected of individuals while online.
- Netiquette includes rules for all aspects of the Internet, including the web, social media, Internet messaging, chat rooms, online discussions, and methods to transfer or store files.

What Does it Mean to be a Digital Citizen? (3 of 13)

Legal and Ethical Responsibilities of a Digital Citizen

- **Digital ethics** is the set of legal and moral guidelines that govern the use of technology, including computers, mobile devices, information systems, and databases.
- **Cyberbullying** is a form of bullying that involves digital devices and platforms such as social media sites, online forums, messaging apps, and email.

What Does it Mean to be a Digital Citizen? (4 of 13)

- ✓ Is it ever acceptable to use a fake name online?
- ✓ Can I throw my old smartphone in the trash?
- ✓ Who is responsible for validating information before sharing it online?
- ✓ Can I use a company-issued device for personal communications?
- ✓ Why is digital inclusion an important ethical issue?
- ✓ What should I do to protect my privacy when using IoT-enabled devices? Is it ever acceptable to copy and paste webpage content?
- ✓ Should I do a regular digital detox?
- ✓ Can I use a wiki for research?
- ✓ How can I make sure my website is accessible?

Figure 1-18 Technology raises many ethical and legal questions.

What Does it Mean to be a Digital Citizen? (5 of 13)

Legal and Ethical Responsibilities of a Digital Citizen

- **Adherence to the cyber security laws.** Zambia like other nations has statutes that protect against cyberbullying. Cyberbullying can be defined as bullying "through the transmission of a communication, including but not limited to, a message, text, sound, or image by means of an electronic device."
- **Distracted driving** means driving a vehicle while focusing on other activities, typically involving an electronic device such as a cell phone.

What Does it Mean to be a Digital Citizen? (6 of 13)

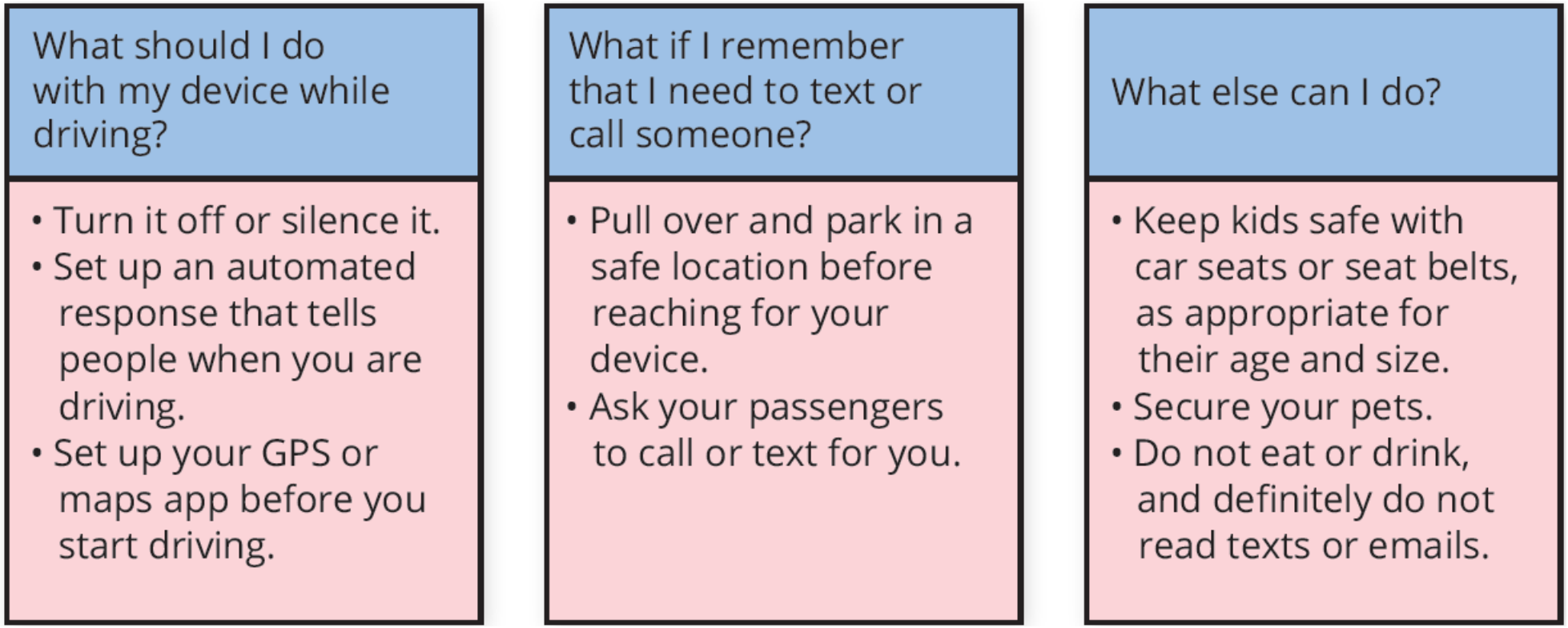

Figure 1-19 Tips for avoiding distracted driving.

What Does it Mean to be a Digital Citizen? (7 of 13)

How Companies and Schools Can Protect Themselves

- Schools, businesses, and organizations have an obligation to protect themselves, their employees, their customers, and their information. One method organizations use to lay out their expectations and rules for digital citizenship is by enacting **Acceptable Use Policies (AUPs).**
- An **AUP** is a document that lists guidelines and repercussions of using the Internet and other digital company resources, including network storage and email servers.
- An **AUP** is distributed in part to reduce an organization's liability and to clarify what is and is not a fireable offense.

What Does it Mean to be a Digital Citizen? (8 of 13)

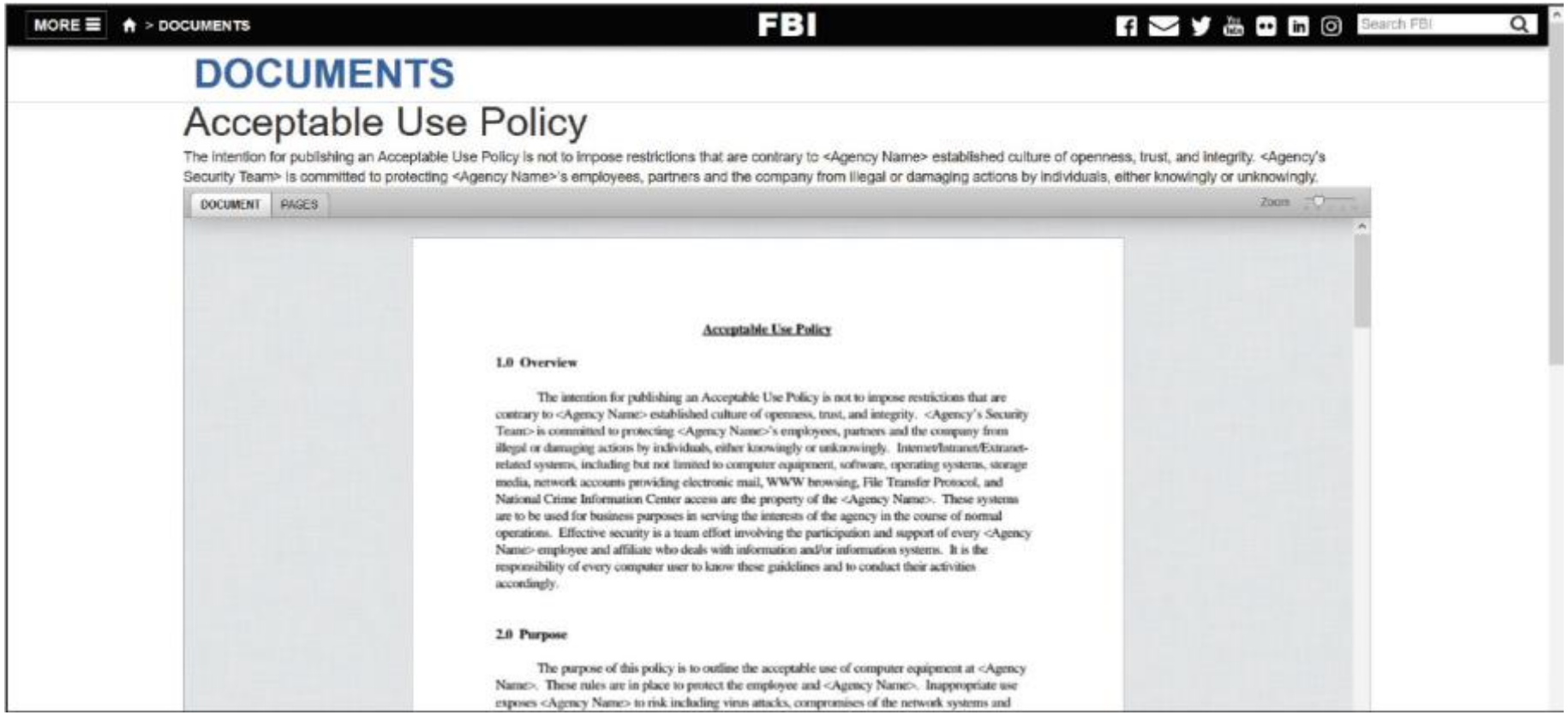

Figure 1-20 Acceptable use policies outline rules for using technology.

What Does it Mean to be a Digital Citizen? (9 of 13)

How Companies and Schools Can Protect Themselves

- The Internet makes it easier to **plagiarize**, which is copying or using someone else's work and claiming it as your own.
- Cyberbullying, which is known to be extremely harmful to its victims, is an issue that schools, students, families, and communities are struggling to deal with.
- To help discourage plagiarism of other people's work, teachers often require students to submit papers using a service, such as Turnitin, that automatically checks for plagiarized passages; Turnitin can also help students check for uncited passages and more before submitting.

What Does it Mean to be a Digital Citizen? (10 of 13)

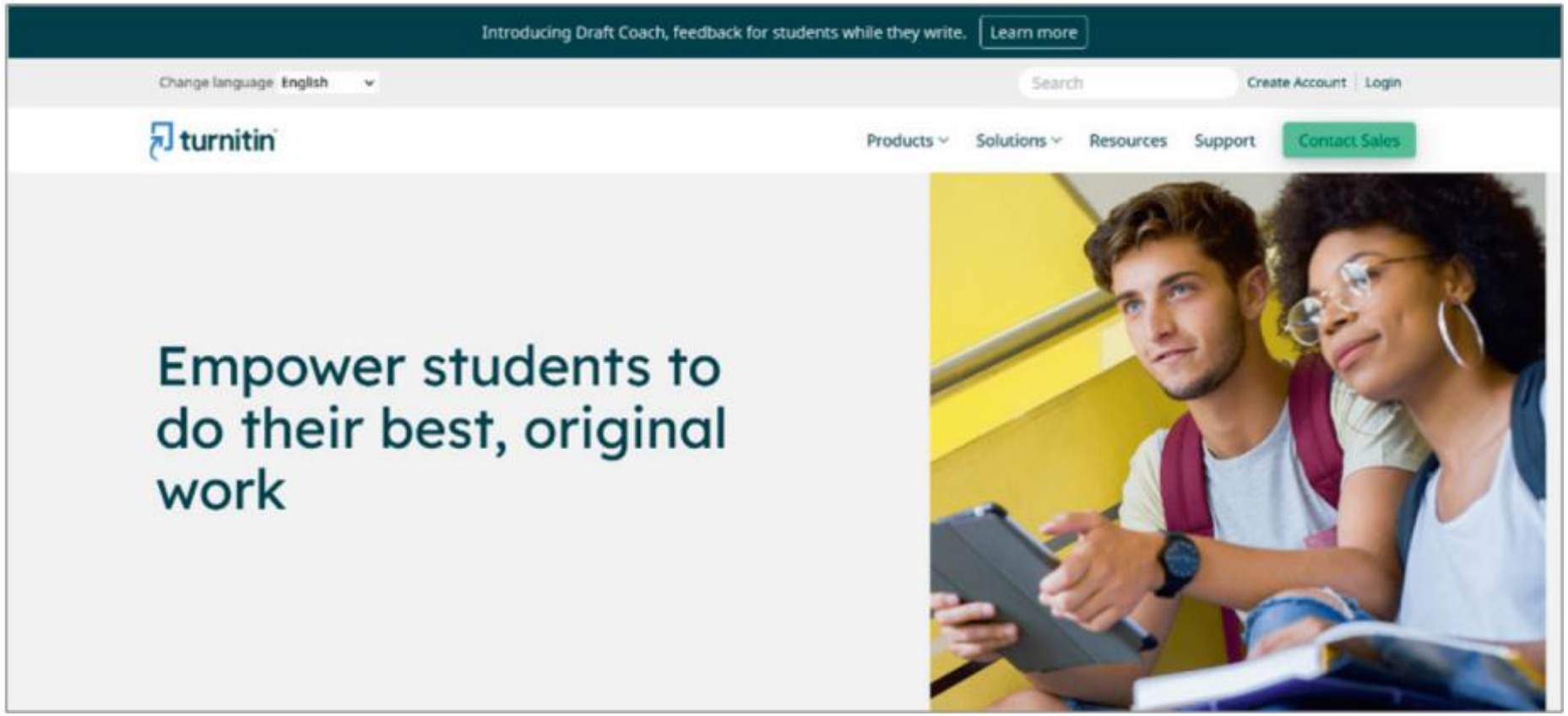

Figure 1-21 Schools use technology to predict and prevent plagiarism.

What Does it Mean to be a Digital Citizen? (11 of 13)

- The practice of **green computing** involves reducing electricity consumed and environmental waste generated when using computers, mobile devices, and related technologies.

Figure 1-22 Look for the ENERGY STAR logo when purchasing appliances or devices.

What Does it Mean to be a Digital Citizen? (12 of 13)

- You can avoid electronic waste by not replacing devices every time a new version is released and by recycling devices and products such as ink and toner cartridges when they no longer provide value.
- Your green computing efforts should include:
  - Purchasing and using products with an ENERGY STAR label
  - Shutting down your computers and devices overnight or when not in use.
  - Donating computer equipment
  - Using paperless communication
  - Recycling paper, toner and ink cartridges, computers, mobile devices, and printers
  - Telecommuting and using videoconferencing for meetings

What Does it Mean to be a Digital Citizen? (13 of 13)

- Organizations can implement a variety of measures to reduce electrical waste, such as:
  - ✓ Consolidating servers
  - ✓ Purchasing high-efficiency equipment
  - ✓ Using sleep modes and other power management features for computers and devices
  - ✓ Purchasing computers and devices with lower power consumption processors and power supplies
  - ✓ Recycling or properly disposing of obsolete or discarded technology
  - ✓ Using outside air, when possible, to cool the data center or computer facility
  - ✓ Allowing employees to telecommute in order to save gas and reduce vehicle emissions

Ethics and Issues: Who Is Responsible for Providing Assistive Technologies? (1 of 5)

- The ever-increasing presence of computers in everyone's lives has generated an awareness of the need to address computing requirements for those with limitations, such as intellectual disabilities, mobility issues, and hearing and visual disabilities.
- Accessibility is the practice of removing barriers that may prevent individuals with disabilities from interacting with data, a website, or an app.

Ethics and Issues: Who Is Responsible for Providing Assistive Technologies? (2 of 5)

- **Assistive technology** is any device, software, or equipment that helps people work around their challenges.
- **Visually impaired** people can change screen settings, such as increasing the size or changing the color of the text, to make the words easier to read.
- Changing the color of text also can address the needs of users with certain types of **color blindness**.
- A **screen reader** is a technology that uses the audio output to describe the contents of the screen.

Figure 1-23 Individuals with visual challenges can use a Braille printer.

Ethics and Issues: Who Is Responsible for Providing Assistive Technologies? (3 of 5)

- A screen reader will read the **alternative text** aloud so that the user understands the image and its purpose.
- Hearing-impaired people can instruct programs or apps to display words or other visual clues instead of sounds, such as for a notification from an app.
- Mobility issues can impact a user's ability to interact with hardware, such as a keyboard or a mouse.

Figure 1-24 Screen readers use alt text to describe an image.

Ethics and Issues: Who Is Responsible for Providing Assistive Technologies? (4 of 5)

- Users with **limited hand mobility** can use an on-screen keyboard, a keyboard with larger keys, or a hand-mounted pointer to control the pointer or insertion point. Alternatives to mouse buttons include a hand pad, a foot pedal, a receptor that detects facial motions, or a pneumatic instrument controlled by puffs of air.
- Users with **intellectual disabilities** might struggle with reading words on a screen, handwriting, or retaining information. Technologies that help these users learn or perform tasks include:
- Speech recognition programs so that the user can input data or information verbally
- **Graphic organizers** enable a user to create an outline or structure of information
- Audio books to read information aloud to the user instead of reading it on a printed page or on the screen.

Ethics and Issues: Who Is Responsible for Providing Assistive Technologies? (5 of 5)

Legal Requirements

- The **Americans with Disabilities Act (ADA)** is a law that requires any company with 15 or more employees to make reasonable attempts to accommodate the needs of physically challenged workers.
- The **Individuals with Disabilities Education Act (IDEA)** is a law that requires that public schools purchase or acquire funding for adaptive technologies.
- These laws were put in place to ensure that people with disabilities can access resources, information, and services using the appropriate technology.