



# To the Future and Beyond

## Exploring Cyber Careers

### Summary

As technology continues to evolve, opportunities for careers are also changing quickly.

In this unit, you will explore different career options, examine the possible future impacts of technology on education, and contemplate how technology may evolve in the future.



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# Chapter 16

## Cyber Careers and the Future of Technology



### Overview

What does the future hold? No one can say for sure, but scientists and engineers have ideas for new technologies that will change the world. In this lesson, you will learn about the cyber careers of today and tomorrow, weigh the future effects of technology on education, and take a look at the evolution of technology.



### Key Terms

- Cyber career
- Virtual careers
- Software engineer
- Website manager
- Systems analyst
- Database administrator
- Computer support specialist
- Social media management
- Cybersecurity
- Sustainability experts
- Carbon footprint
- Statisticians

## What's Next?

While there is no way to fast-forward and see what technologies might exist 100 years from now, we can use the past to predict that our future will include rapid technological change. Never in the history of the world has technology evolved as quickly as it does today. And as technology changes, so will the careers of people who work in that field.

## Technology's Rapid Evolution

1980s

2000s

2010s

Cameras



**Disposable Cameras:** They became available in the 1980s. They come pre-loaded with film. The whole camera is dropped off at the photolab, and the photos are ready in days.



**Digital Cameras:** They became available in the 1990s. They do not require film, and photos are available immediately. By the mid-2000s, digital cameras had largely replaced film cameras.



**Smartphones:** By the beginning of the 2010s, smartphones came with an integrated digital camera that could shoot both photos and videos.

Data Storage



**3.5" Diskette**  
Mid-1980s

**Capacity:**  
360 kilobytes  
to 1.44 megabytes



**CD-ROM**  
Mid-1980s

**Capacity:**  
680 megabytes

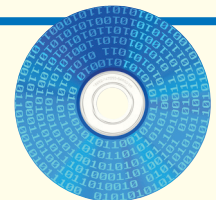
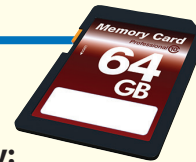


**Flash Drive**  
2000

**Capacity:**  
8 to 128 megabytes  
(Today: 32 to 256  
gigabytes)

**SD Card**  
1999

**Capacity:**  
2 gigabytes  
(Today: 16 megabytes  
to 256 gigabytes)



**Blu-ray**  
2002

**Capacity:**  
25 gigabytes  
(Today: 100 gigabytes)

Wearables



**Neuromancer:**  
William Gibson's  
cyberpunk masterpiece  
features humans who  
are implanted with  
computers.



**Fitness Tracker:**  
When you wear a fitness  
tracker, it measures your  
activity level and your  
vital statistics.



**Smartwatch:**  
Modern smartwatches  
are basically wearable  
computers. They have  
many similarities to  
smartphones.



# Cyber Careers

Did you know that many of today’s technology–based careers didn’t exist even just a few years ago? The rapid pace of technological development has created these new jobs. A **cyber career** is a career that deals with technology, especially technology that involves the Internet and the World Wide Web. Cyber careers include a wide variety of jobs, from developing new technologies to maintaining existing ones. Some of the most common cyber careers are listed in **Table 16.1**, shown below.

The development of certain software and communications programs has enabled the creation of **virtual careers**, or careers that are not anchored to a typical multi–employee workplace. For example, many freelance writers and photographers work from home, performing the same jobs that once required working in an office. Such careers include virtual assistants, virtual website designers, and even virtual doctors and lawyers. People who have virtual careers do their jobs by using a multitude of software programs, from word–processing to graphics to data–compiling, as well as communications programs, such as Skype, FaceTime, and web conferencing.

Virtual careers are not anchored to a typical workplace.



Table 16.1

Today’s Common Cyber Careers	
Job Title	Job Description
<b>Software engineer</b>	A <b>software engineer</b> helps design, create, and test new software. Software engineers also analyze what users need and how they use software in order to develop and design products that best meet users’ needs.
<b>Website manager</b>	A <b>website manager</b> helps build, manage, and maintain websites, as well as fix any problems that may arise. Website managers can be employed as consultants or work at larger companies to regularly maintain the company’s websites.
<b>Systems analyst</b>	A <b>systems analyst</b> helps businesses make important technology decisions by recommending hardware and software that will best meet a company’s needs. System analysts analyze how companies use technology and then advise on how to implement the technology in the most cost–effective way.
<b>Database administrator</b>	Every company has data that needs to be stored and managed. Databases keep data organized and safe. A <b>database administrator</b> manages the data and may also assist with computer security and protection.
<b>Computer support specialist</b>	When users need assistance in operating their computer, they turn to a <b>computer support specialist</b> , who helps install programs and software. These specialists also diagnose problems when something goes wrong, assist in fixing the problems, and work to prevent them from reoccurring.



## Careers of Tomorrow

While cyber careers are plentiful today, researchers predict that even more cyber careers will be created as new technologies are developed. **Listed below are several emerging cyber careers that will be in high demand in the future:**



### ● Social Media Management

As companies move online, presenting and maintaining a presence through social media is an emerging field. From managing Facebook pages or Twitter feeds to orchestrating campaigns to advertise products in innovative ways, **social media management** will be an important part of the future of many companies.



### ● Cybersecurity

Every day, hackers and the makers of viruses and other malware are finding new ways to infiltrate computers. Company after company is in the news after a major data breach that puts the private information of its customers and clients at risk. **Cybersecurity** is expected to be a rapidly growing and changing field in the future, as businesses, consumers, and the government will require ongoing protection from these computer threats.



### ● Sustainability Experts

As more companies recognize their impact on the environment, they are increasingly hiring **sustainability experts**, people who can help companies be environmentally friendly. Many technology companies use a lot of electricity. They have a large **carbon footprint**; in other words, their use of fossil fuels to make electricity puts a large amount of carbon dioxide into the air. Sustainability experts help companies reduce their carbon footprint. They also help companies adhere to government environmental standards.



### ● Statisticians

In Chapter 14, you learned about digital trails. Everyone leaves a digital trail behind when he or she uses the Internet. There is a lot of data on those trails—everything from users' favorite clothing on retail websites to the television shows users "like" on Facebook to the most popular destination on travel websites. **Statisticians**, or people who compile, manipulate, and analyze data, help companies understand the information they have collected and learn how to use it to offer consumers better products (and to increase their profits).



# Future Effects of Technology on Education

Is the future looking bright because of technology? Experts disagree on the answer to this question. Many think that certain aspects of technology will benefit people but that other aspects will harm society. Most experts agree that technology has had an influence—both positive and negative—on education, literacy, and learning. Read the information in **Table 16.2** to see what researchers are saying about how technology is influencing education. You will recognize some of the information from its presentation earlier in this book.

Table 16.2



Will Technology Make the Future Bright?	
Yes	No
<b>Access</b> The nearly limitless opportunities for information access through the Internet can increase opportunities for learning.	<b>Dependence</b> Many people rely on technology to perform both simple and complex tasks, which could lead to technology dependence.
<b>Number of sources</b> There are billions of websites on the World Wide Web. The sheer number of possible sources increases learning opportunities.	<b>Lack of communication skills</b> More time spent with technology may mean a loss of communication skills as face-to-face interactions become less common.
<b>Variety</b> Technology comes in a large variety of applications and styles. The variety of ways in which information is communicated can help meet the needs of many different learning styles.	<b>Lack of reliability</b> Since anyone can post anything on the Web, the accuracy and credibility of the information we find there is questionable.
<b>Motivational factors</b> Some experts argue that students are motivated by technology and that some learn better when using it. Experts also say that online communities can help build students' self-esteem.	<b>Health problems</b> Health issues resulting from technology overuse—such as sleep disorders, social anxiety, and obesity—can impact learning. Students have trouble learning if they are overtired, malnourished, or unable to work in groups.
<b>Collaboration</b> Technology creates opportunities for collaboration through online communication tools and forums, such as wikis.	<b>Lack of productivity</b> Multitasking through technology can lead to unproductive time management that may ultimately limit time otherwise spent learning.
<b>Self-expression</b> Technology can provide many outlets for creative thought and self-expression.	<b>Addiction</b> For some people, technology can become an addiction that interferes with their real life.
<b>Language</b> Technology can assist in language development because exposure to more information offers more chances to build language skills.	<b>Critical thinking</b> Because it is so easy to look things up on the Web, people are using their critical thinking skills less often, which means that they get less practice thinking for themselves.



▲ **Holographic screens are becoming more common as the technology develops.**

## The Evolution of Technology

Have you ever visited a building with a revolving door? As one person enters, another exits from the other side as the door stays in motion. The evolution of technology can be seen as operating in much the same way. As one technology (such as pagers) exits, a new one (such as cell phones) enters, bringing new possibilities. However, it is important to remember that new technologies don't just "appear." To reach their "aha" moment, their inventors build on knowledge slowly accumulated by other scientists and engineers. **Scientists and engineers who develop new technologies have two goals:**

- 1 Creating new ways to **communicate and connect**
- 2 Creating new tools to increase **efficiency and productivity**

Today, people often complain that technology's rapid pace of development makes new technology obsolete within just a few years. It is true that the rapidity with which new technology is developed can strain the average person's wallet. However, it is also true that newly developed technology can better meet our needs. For instance, just a few years ago cell phones did not have the same versatility that they have today. Engineers continue to improve the modern smartphone, adding feature-rich components to increase productivity, provide entertainment, and enhance communication. What do you imagine mobile devices will look like 20 years from now?



**Remember:**  
**New technologies don't just "appear." To reach their "aha" moment, their inventors build on knowledge slowly accumulated by other scientists and engineers.**





## The Future

If technology already meets so many of our needs as consumers, what else can it add to our lives? In the very near future, many experts think, most devices will operate with touchscreens, and people will no longer need mice to operate computers. Already we are seeing wearable technology that is embedded in glasses, headsets, earrings, and watches. Some experts predict that technology implants in our bodies will take the place of laptops, tablets, and smartphones—although others urge us to consider that this melding of human and machine may not be in our best interests.

The development of new technologies doesn't stop with computers. Non-computer products, such as appliances and cars, have more built-in computer technology than ever before, and technology is continually changing the way we do business, bank, shop, and live our lives. For instance, we can now transfer money between bank accounts online, and we can use a smartphone to remotely close a garage door. Who know what daily tasks will become easier as technology evolves?

### Science Fiction—or Soon-to-Be Reality?

The predictions of some experts seem more like science fiction than reality—yet landing on the moon also once seemed like science fiction, and humankind achieved that goal in 1969. So, perhaps one day soon we'll have technology body implants, “wearable robots” that will give mobility back to people who are paralyzed, and robots that take our place in performing dangerous tasks, such as fighting fires. Maybe, one day, technology will be able to transport us anywhere in the world in a matter of seconds.

There is no telling if transporters, or flying cars, or robots with artificial intelligence will be in our future. But we can say that technology will continue to advance. Just as countless scientists and engineers worked to bring us the computer, inventors will continue to expand what technology can do for society.

Who can say what the future will bring?



# Chapter 16 Assessment

## What Do You Think?

Write a reflection of two to five paragraphs on what you believe technology will look like in the future. Your paragraphs should answer the following questions:

- 1 When was the first time you used technology, such as television or a mobile device? Why did you use the technology?
- 2 How has the technology changed since your first use? How do you imagine it changing in the future?
- 3 In what ways do you see technology shaping the future of humankind?
- 4 Do you think the evolution of technology is positive, negative, or both? Why?

## Challenge: What Would You Do?

In this chapter, you learned about the future of technology. Now, apply what you have learned. Read the scenarios below. Then, write one paragraph for each, explaining what you think would happen. Use what you have learned in the chapter to justify your reasoning.

- 1 Imagine if everyone in the world had a smartphone.  
**How would the world operate differently?**  
**Would it be a positive or negative advancement? Why?**
- 2 What would happen if everyone could get online anywhere, anytime, for free?  
**How would the world operate differently?**  
**Would it be a positive or negative advancement? Why?**
- 3 What would happen if the Internet suddenly ceased to exist?  
**How would the world operate differently?**  
**Would it be a positive or negative advancement? Why?**
- 4 In what ways could technology help solve problems such as drunk driving?  
**How would the world operate differently?**  
**Would it be a positive or negative advancement? Why?**



## Extension Activities



### Activity 1 Key Terms

For each term, write a definition in your own words.

Database administrator

Carbon footprint

Website manager

Social media management

Cybersecurity

### Activity 2 True or False?

Using the information from this chapter, determine whether each statement is true or false.

- 1 Advocates for technologies as learning tools say that technology is motivating and that it builds self-esteem.
- 2 Virtual careers are the “pretend” careers that avatars pursue in video games.
- 3 Experts predict that all electronics will operate through touchscreens in the near future.
- 4 Many of today’s cyber careers did not exist just a few years ago.
- 5 Since World War II, technology has changed very little, and its evolution continues to be slow.

### Activity 3 Short Answer

Write a one- or two-sentence response to each of the prompts below.

- 1 Explain how technology evolves.
- 2 Describe a technology that experts predict will be developed in the future.
- 3 Describe one positive and one negative impact of technology on education.
- 4 Explain why cybersecurity will be a rapidly growing and changing field in the future.
- 5 Describe the technology that makes virtual careers possible.

*continued*



## Extension Activities

### Activity 4 Multiple Choice

Read the questions below. Use what you have learned in this chapter to help you choose the correct answer.

- 1 What is a cyber career?
  - A. A career that doesn't exist today but will in the future
  - B. A career that involves technology
  - C. A career that studies human thoughts and behaviors
- 2 Which will be a growing technology field in the future?
  - A. Statistics
  - B. Pager repair
  - C. Laptop development
- 3 Which describes a virtual career?
  - A. Does not allow employees to work from home
  - B. Allows employees to work from anywhere, performing jobs that once required working in an office
  - C. Is performed only within a traditional office
- 4 Which is a negative effect of technology on education?
  - A. The variety of technology applications
  - B. The sheer number of online sources available
  - C. The increase in health issues such as sleep disorders
- 5 Which does NOT describe a goal of the scientists and engineers who develop new technologies?
  - A. Creating new ways to avoid face-to-face communication
  - B. Creating new tools to increase efficiency and productivity
  - C. Creating new ways to communicate and connect



## Hands-On



### Explore Cyber Careers

Have you ever wondered what it takes to pursue a cyber career? In this activity, you'll explore cyber career choices and learn about the different qualifications needed for each.

- Step 1** Create a table similar to **Table 16.3**.
- Step 2** Visit <http://www.bls.gov/ooh/> to review the Occupational Outlook Handbook. This handbook describes hundreds of different occupations, including the education needed to obtain a job in a particular field, as well as salary information.
- Step 3** Search the handbook for three cyber careers that interest you.
- Step 4** Record your findings for each career that interests you in your table.
- Step 5** After gathering all of your research, determine which career you would be most interested in pursuing.
- Step 6** Write one reflective paragraph explaining the following:
- Why the career interests you
  - What you will need to do to reach your goal (for example, the amount of schooling and experience required)

Table 16.3

Cyber Career Exploration			
Name of Career	Education Requirements	Experience Requirements	Salary Information
Job Duties	Advantages	Disadvantages	Other

*continued*





## Hands-On

### Time Line

Researching the past helps prepare us for the future, especially when it comes to inventions and advancements in technology. Using computer design software or paper and colored pencils, create a graphical time line highlighting at least 10 important inventions that have shaped the cyberworld over the last five decades. Below are some tips to help you get started:

- See **Figure 16.1** for an example of a time line.
- Be creative. Draw images and use colors to show the importance of each milestone. You can also use presentation software and animate the time line.
- Remember to think about all inventions that have influenced the cyberworld—not just computers. For example, without the invention of the telephone, we wouldn't have smartphones today.

To learn about different technological advancements, use Web search strategies that you learned in Chapter 2 to do research on the Internet. You can also use the websites listed below:

- [Computerhistory.org](http://Computerhistory.org)
- [Greatachievements.org](http://Greatachievements.org)
- [History-timelines.org](http://History-timelines.org)
- [PBS.org](http://PBS.org)

**Figure 16.1**

