

TECHNOLOGY 14E

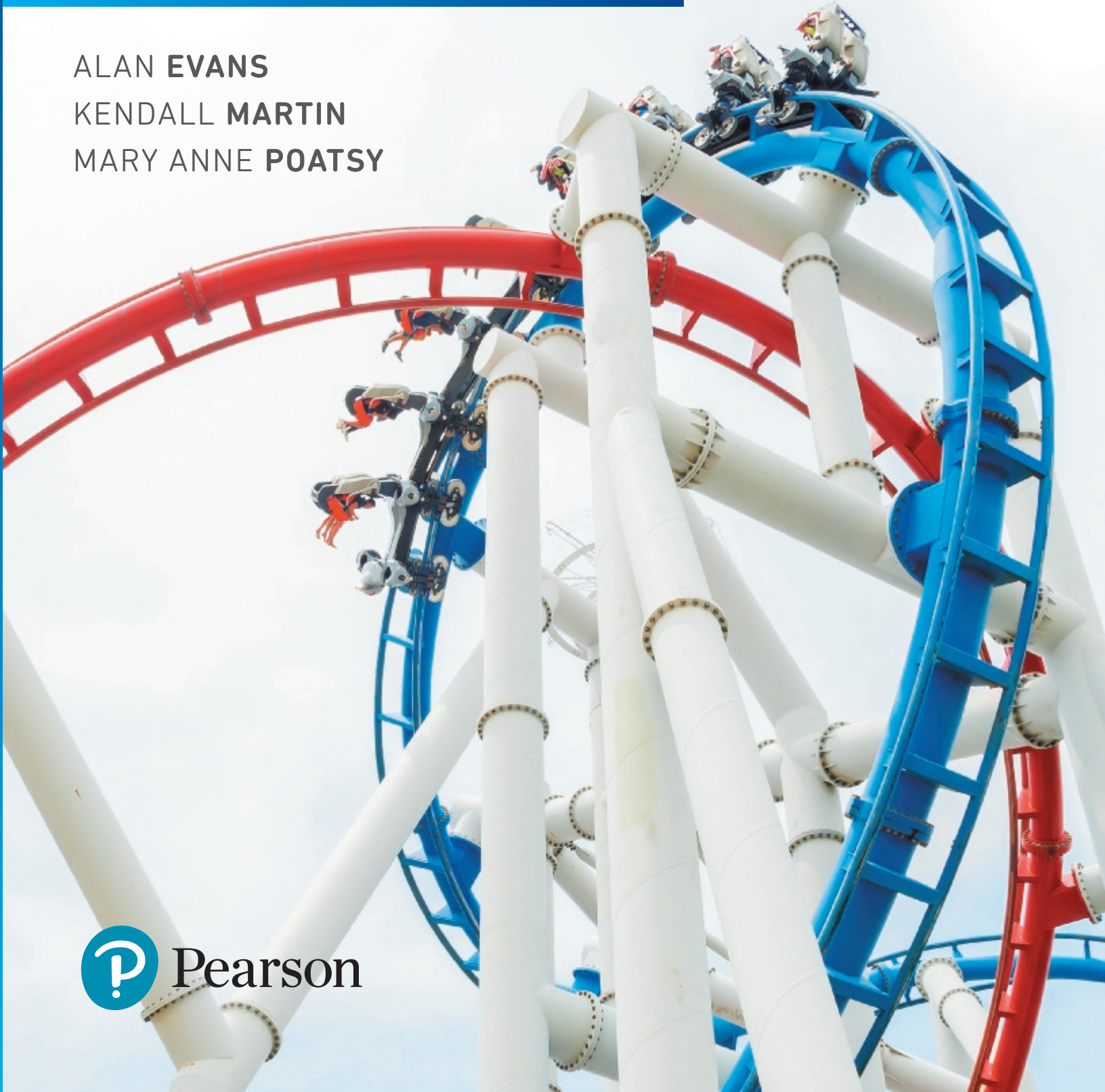
IN ACTION

COMPLETE

ALAN EVANS

KENDALL MARTIN

MARY ANNE POATSY



Don't just read about technology, interact with it.

ACTIVE HELPDESKS

These highly-interactive, almost game-like simulations let you take the role of a helpdesk staffer where you answer computer technology questions from customers. These simulations help reinforce the book content in a fun, engaging way.

CHAPTER 1

NONE

CHAPTER 2

Understanding Bits and Bytes
Using Output Devices
Exploring Storage Devices
and Ports

CHAPTER 3

Doing Business Online
Getting Around the Web
Evaluating Websites

CHAPTER 4

Buying and Installing Software
Choosing Software

CHAPTER 5

Starting the Computer: The
Boot Process
Organizing Your Computer:
File Management
Using Utility Programs

CHAPTER 6

Evaluating Your CPU and RAM
Evaluating Computer System
Components

CHAPTER 7

Understanding Networking
Connecting to the Internet

CHAPTER 8

Understanding Intellectual
Property and Copyright

CHAPTER 9

Understanding Firewalls
Avoiding Computer Viruses

CHAPTER 10

Understanding Software
Programming

CHAPTER 11

Using Databases

CHAPTER 12

Using Servers

CHAPTER 13

Understanding IP Addresses,
Domain Names, and
Protocols
Keeping E-Mail Secure

SOUND BYTES

These multimedia lessons demystify complex computer concepts with short audio, animation, or video. The Sound Bytes now also include integrated learning objectives, a summary, and a quiz.

CHAPTER 1

Virtual Computer Tour
How to Debate Ethical Issues

CHAPTER 2

Binary Numbers Interactive
Smartphone Are Really Smart

CHAPTER 3

Blogging
Finding Information on the
Web

CHAPTER 4

Where Does Binary Show Up?
Programming for End Users

CHAPTER 5

Using Windows Task Manager
to Evaluate System
Performance
Hard Disk Anatomy

CHAPTER 6

Installing RAM
Installing an SSD Drive

CHAPTER 7

Setting Up a Home Computer
Network
Securing Wireless Networks

CHAPTER 8

Enhancing Photos with Image-
Editing Software
Plagiarism and Intellectual
Property

CHAPTER 9

Protecting Your Computer
Managing Computer Security
with Windows Tools

CHAPTER 10

Using the Arduino
Microcontroller
Programming with the
Processing Language

CHAPTER 11

Creating and Querying an
Access Database
Analyzing Data with Microsoft
Power BI Suite

CHAPTER 12

Network Topology and
Navigation Devices
A Day in the Life of a Network
Technician

CHAPTER 13

Client-Side Web Page
Development
Creating Web Pages with
Squarespace

14th Edition

Technology in Action

Complete

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Dedication

For my wife, Patricia, whose patience, understanding, and support continue to make this work possible ... especially when I stay up past midnight writing! And to my parents, Jackie and Dean, who taught me the best way to achieve your goals is to constantly strive to improve yourself through education.

Alan Evans

For all the teachers, mentors, and gurus who have popped in and out of my life.

Kendall Martin

For my husband, Ted, who unselfishly continues to take on more than his fair share to support me throughout this process, and for my children, Laura, Carolyn, and Teddy, whose encouragement and love have been inspiring.

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And finally, we would like to thank the reviewers and the many others who contribute their time, ideas, and talents to this project. We appreciate their time and energy, as their comments help us turn out a better product each edition. A special thanks goes to Rick Wolff, a wonderfully talented infographic designer who helped by creating new infographics for this edition of the text.

Letter from the Authors

Our 14th Edition—A Letter from the Authors



Why We Wrote This Book

The pace of technological change is ever increasing. In education, we have seen this impact us more than ever recently—the Maker movement, MOOCs, touch-screen mobile delivery, and Hangouts are now fixed parts of our environment.

Even the most agile of learners and educators need support in keeping up with this pace of change. We have responded by integrating material to help students develop skills for web application and mobile programming. We see the incredible value of these skills and their popularity

with students, and have included Make This exercises for each chapter. These exercises gently bring the concepts behind mobile app development to life. In addition, there is a Solve This exercise in each chapter that reinforces chapter content while also reinforcing Microsoft Office skills. These projects help to promote students' critical thinking and problem-solving skills, which employers highly value.

Based on feedback from professors, we have streamlined our content, moving information from our mini-chapters (Technology in Focus features) to other parts of the text. The content from the ethics Technology in Focus feature has been integrated into Chapters 1, 3, and 8. Details about the inner workings of hardware (from the Under the Hood Technology in Focus feature) have been integrated into Chapters 2 and 6. The History of Computing and the Careers Technology in Focus features have been retained as appendices.

We have integrated content on mobile devices, previously found in Chapter 8, into Chapter 2 to emphasize the importance of mobile computing in today's lifestyle. The second half of Chapter 8 now features expanded coverage of intellectual property, protection of digital rights, plagiarism, and other key ethics issues facing today's students.

Our combined 50 years of teaching computer concepts have coincided with sweeping innovations in computing technology that have affected every facet of society. From iPads to Web 2.0, computers are more than ever a fixture of our daily lives—and the lives of our students. But although today's students have a much greater comfort level with their digital environment than previous generations, their knowledge of the machines they use every day is still limited.

Part of the student-centered focus of our book has to do with making the material truly engaging to students. From the beginning, we have written *Technology in Action* to focus on what matters most to today's student. Instead of a history lesson on the microchip, we focus on tasks students can accomplish with their computing devices and skills they can apply immediately in the workplace, the classroom, and at home.

We strive to keep the text as current as publishing timelines allow, and we are constantly looking for the next technology trend or gadget. We have augmented the text with weekly technology updates to help you keep your classroom on top of the latest breaking developments and continue to include a number of multimedia components to enrich the classroom and student learning experience. The result is a learning system that sparks student interest by focusing on the material they want to learn (such as how to integrate computing devices into a home network) while teaching the material they need to learn (such as how networks work). The sequence of topics is carefully set up to mirror the typical student learning experience.

As they read through this text, your students will progress through stages and learning outcomes of increasing difficulty:

1. Thinking about how technology offers them the power to change their society and their world and examining why it's important to be computer fluent
2. Understanding the basic components of computing devices

3. Connecting to and exploring the Internet
4. Exploring application software
5. Learning the operating system and personalizing their computer
6. Evaluating and upgrading computing devices
7. Understanding home networking options
8. Creating digital assets and understanding how to legally distribute them
9. Keeping computing devices safe from hackers
10. Going behind the scenes, looking at technology in greater detail

We strive to structure the book in a way that makes navigation easy and reinforces key concepts. We continue to design the text around learning outcomes and objectives, making them a prominent part of the chapter structure. Students will see the learning outcomes and objectives in the chapter opener, throughout the text itself, as well as in the summary so they understand just what they are expected to learn.

We continue to structure the book in a “spiraling” manner, intentionally introducing on a basic level in the earlier chapters concepts that students traditionally have trouble with and then later expanding on those concepts in more detail when students have become more comfortable with them. Thus, the focus of the early chapters is on practical uses for the computer, with real-world examples to help the students place computing in a familiar context.

For example, we introduce basic hardware components in Chapter 2, and then we go into increasingly greater detail on some hardware components in Chapter 6. The Behind the Scenes chapters venture deeper into the realm of computing through in-depth explanations of how programming, networks, the Internet, and databases work. They are specifically designed to keep more experienced students engaged and to challenge them with interesting research assignments.

In addition to extensive review, practice, and assessment content, each chapter contains several problem-solving, hands-on activities that can be carried out in the classroom or as homework:

- The **Try This** exercises lead students to explore a particular computing feature related to the chapter.
- The **Make This** exercises are hands-on activities that lead students to explore mobile app development.
- The **Solve This** exercises integrate and reinforce chapter concepts with Microsoft Office skills.

Throughout the years we have also developed a comprehensive multimedia program to reinforce the material taught in the text and to support both classroom lectures and distance learning:

- The **Helpdesk training content**, created specifically for *Technology in Action*, enables students to take on the role of a helpdesk staffer fielding questions posed by computer users.
- Exciting **Sound Byte multimedia**—fully updated and integrated with the text—expand student mastery of complex topics.
- The **TechBytes Weekly updates** deliver the latest technology news stories to you for use in your classroom. Each is accompanied by specific discussion topics and activities to expand on what is within the textbook materials.

This book is designed to reach the students of the twenty-first century and prepare them for the role they can take in their own community and the world. It has been an honor to work with you over the past 14 years to present and explain new technologies to students, and to show them the rapidly growing importance of technology in our world.

What's New

Technology in Action, 14th Edition

Welcome to the Fourteenth Edition of *Technology in Action*!

Technology in Action 14th edition is a timely and essential update to this best-selling computer concepts text. Focusing on the topics and skills students need to be digitally literate, *Technology in Action* engages students with practical content and hands-on interactive simulations and lessons. The 14th edition has a new single-column design, providing a more open and linear flow to improve comprehension and understanding. The content has been updated and reorganized for a more connected approach to key topics and broader coverage of the important topic of ethics throughout the book. As part of the organizational changes, the Technology in Focus sections Under the Hood and Ethics in IT have been integrated into relevant chapters, while the History of Computers and Careers in IT were moved to the appendices. For a more engaging and quick overview of history, we also created a History of Computing video.

Additionally, for those using *Technology in Action* with MyITLab, students can now earn a Digital Competency badge. This badge represents that students have the basic digital understanding to enter the workforce and be savvy consumers. Also available in MyITLab are all of the digital resources and simulations, including the newly redesigned and updated Sound Bytes. The new design improves the usability and flow of these interactive audio/visual lessons. And the eText is the Pearson eText 2.0, which is fully accessible and interactive.

Highlights of What's New

- New design—single column, linear flow
- Reorganized and updated content with expanded ethics coverage
- Newly redesigned Sound Bytes provide easier interface, updated content, summaries, integrated quizzes, and five completely new lessons
- New Pearson eText 2.0 provides full accessibility and interactive learning
- New Digital Competency badge available in MyITLab
- New infographics provide graphical view of important data

Explore the Hallmarks and New Features of *Technology in Action*, 14th Edition

INSTRUCTION: Engage all types of learners with a variety of instructional resources

- **Pearson Text 2.0** students interact with the learning resources directly and receive immediate feedback.
- **Chapter Overview Videos** provide students with a quick look at what they will learn in the chapter.
- **PowerPoint and Audio Presentations** can be used in class for lecture or assigned to students, particularly online students, for instruction and review.
- **TechBytes Weekly** is a weekly newsfeed that keeps your course current by providing interesting and relevant news items and ready-to-use discussion questions.
- **Make This! Projects** provide activities where students build programs that run on their mobile devices. Most of the chapters use App Inventor to build Android apps that can be installed on any Android device or emulated for students using iOS devices. Each project includes instructions and a how-to video.

Annotated Instructor Chapter Tabs provide teaching tips, homework and assessment suggestions, brief overviews of each chapter's Try This, Make This, and Solve This exercises, as well as select Sound Byte talking points and ethics debate starters.

PRACTICE: Hands-on resources and simulations allow students to demonstrate understanding

- **Try This Projects** are hands-on projects students complete to practice and demonstrate proficiency with important topics. Each project is accompanied by a how-to video.
- **Solve This! Projects** put the concepts students are learning into action through real-world problem solving using Microsoft Word, Access, and Excel. Grader versions of some of these projects are in MyITLab.
- **Helpdesks** are interactive lessons based on chapter objectives. Students play the role of a helpdesk staffer assisting customers via a live chat, decision-based simulation.

- **Newly Redesigned Sound Bytes** provide an audio/visual lesson on additional topics related to the chapter, including a brief quiz at the end.
- **IT Simulations** provide 12 individual scenarios that students work through in an active learning environment.
- **Windows 10** training simulations allow students to explore Windows in a guided environment that provides feedback and Learning Aids (Watch and Practice) if they need help.

REVIEW: Self-check resources keep learning on track

- **Chapter Overview Videos** for Parts 1 and 2 of the chapter provide an objective-based review of what students should have learned. Videos have a short quiz and can be accessed from mobile devices for a quick review.

14th Edition Content Changes

In addition to these changes, all chapters have been updated with new images, current topics, and state-of-the-art technology coverage. Some of the chapter changes are listed here:

Chapter 1

- Learning Outcomes and Learning Objectives have been revised.
- Throughout the chapter, text, figures, and photos have been updated.
- We have focused on ethics right from the start with material on evaluating your personal ethics and looking at the challenges technology brings to ethical conduct.
- New Point/Counterpoint guidelines have been incorporated into the chapter to help lead well-structured debates on challenging ethical topics.
- A new Sound Byte has been included to provide guidance on how to debate ethical issues.
- We have placed a new focus on the impact of social media tools.

Chapter 2

- Learning Outcomes and Learning Objectives have been revised.
- Throughout the chapter, text, figures, and photos have been updated.
- Material on how computers process data has been expanded by incorporating information previously found in the Under the Hood Technology in Focus feature.
- Material on mobile computing, previously found in Chapter 8, has been integrated throughout the chapter to reflect the importance of mobile computing in today's society.
- A new Bits&Bytes, "Today's Supercomputers: Faster Than Ever," has been added.

- **Check Your Understanding Quizzes Part 1 and 2** provide a self-check covering objectives in each part of the chapter so that students can see how well they are learning the content.

ASSESSMENT: Measure performance with ready-to-use resources

- **Chapter Quiz** provides a way for students to test that they have learned the material from the entire chapter.
- **Critical Thinking Questions** require that students demonstrate their understanding through written answers that are manually graded.
- **Testbank Exams** provide customizable prebuilt, autograded, objective-based questions covering the chapter objectives.

Chapter 3

- Learning Outcomes and Learning Objectives have been revised.
- Throughout the chapter, text, figures, and photos have been updated.
- A new Bits&Bytes, "Useful Wikis," has been added.
- The material on how cloud computing works has been moved to this chapter from Chapter 4.
- A new Bits&Bytes—"Looking for Extra Money? Try a Side Hustle"—has been added.
- We have updated the Trends in IT, adding in content about linked data.
- New ethics topic of digital activism has been added.
- New ethics topic of digital harassment has been added.

Technology in Focus: The History of the Personal Computer

- This has now moved to an appendix.

Chapter 4

- Learning Outcomes and Learning Objectives have been revised.
- Throughout the chapter, text, figures, and photos have been updated.
- The chapter has been restructured to highlight modern distribution systems for software.
- New material covering app creation software and digital multimedia software has been added.

Chapter 5

- Learning Outcomes and Learning Objectives have been revised.
- The chapter incorporates content that once was in Chapter 8 on mobile operating systems.
- A new Bits&Bytes—"Open Source Software: Why Isn't Everyone Using Linux?"—has been inserted here (it was revised from a Trends in IT piece).

- Moving to this chapter from Chapter 6 is the Sound Byte “Using Windows Task Manager to Evaluate CPU Performance.”
- We have added a new Trends in IT: “Are Personal Computers Becoming More Human?”

Technology in Focus: Information Technology Ethics

- This has now been integrated into other chapters in the book, especially Chapters 1, 3, and 8.

Chapter 6

- Learning Outcomes and Learning Objectives have been revised.
- Throughout the chapter, text, figures, and photos have been updated.
- Material from Technology in Focus: Under the Hood has been integrated throughout the chapter.

Chapter 7

- Learning Outcomes and Learning Objectives have been revised.
- Throughout the chapter, text, figures, and photos have been updated.
- New How Cool Is This? on HaLow Wi-Fi has been added.
- A new Bits&Bytes, “The Rise of Wearable Technology,” has been added.
- The Dig Deeper “P2P File Sharing” has moved to this chapter from Chapter 8.
- A new Trends in IT feature—“How Smart Is Your Home?”—has been added.
- Mobile broadband content has been expanded, incorporating content from Chapter 8.

Technology in Focus: Under the Hood

- This content has been incorporated into Chapters 2, 6, and 8.

Chapter 8

- Learning Outcomes and Learning Objectives have been revised.
- Throughout the chapter, text, figures, and photos have been updated.
- New content on plagiarism and ethical computing has been added.
- New content on intellectual property and copyright has been added.

Chapter 9

- Learning Outcomes and Learning Objectives have been revised.

- Throughout the chapter, images and text have been updated.
- The coverage of multifactor authorization has been revised.
- A new Bits&Bytes on hacking to defend national security has been added.

Technology in Focus: Careers in IT

- This content is now updated and included as an appendix.

Chapter 10

- Learning Outcomes and Learning Objectives have been revised.
- Throughout the chapter, text, figures, and photos have been updated, including coverage of latest programming technologies like Swift and JSON.
- A new Bits&Bytes on creating a coding portfolio has been added.

Chapter 11

- Learning Outcomes and Learning Objectives have been revised.
- Throughout the chapter, text, figures, and photos have been updated.
- A new Sound Byte, “Analyzing Data with Microsoft Power BI Suite,” has been added.
- A new Trends in IT feature, “Mobile Business Intelligence,” has been added.

Chapter 12

- Learning Outcomes and Learning Objectives have been revised.
- Throughout the chapter, text, figures, and photos have been updated.

Chapter 13

- Learning Outcomes and Learning Objectives have been revised.
- Throughout the chapter, text, figures, and photos have been updated.
- Two new Sound Bytes on Squarespace and CodePen have been added.
- A new Bits&Bytes on free cloud-based servers has been added.
- A new Bits&Bytes on CodePen has been added.
- Coverage of the ethical debate on federal agencies forcing corporations to break encryption schemes has been added.

Visual Walk-Through

Topic Sequence

Concepts are covered in a progressive manner between chapters to mirror the typical student learning experience.

CHAPTER 2

Storing Data and Information

CHAPTER 6

Evaluating Other Subsystems and Making a Decision

Evaluating the Storage Subsystem

The History of the Personal Computer

Early Personal Computers

Appendices

Hardware First Introduced
Chapter 2 is the first time students read about introductory hardware. It's covered at the beginning level because this is students' experience level at this point of the book.

Hardware Taught in More Depth in Additional Chapters
In later chapters, students read about hardware in greater depth because they're more experienced and comfortable working with their computers.

Appendices
Appendices cover the history of the PC and careers in IT.

Student Textbook

Try This and Make This
Hands-on activities found between
Parts 1 and 2 of each chapter.

End of Chapter Quiz

Multiple Choice, True/False, and Critical Thinking questions at the end of each chapter help students assess their comprehension of chapter material.

Chapter Quiz // Assessment

For a quick review to see what you've learned, answer the following questions. Submit the quiz as requested by your instructor. If you are using MyITLab, the quiz is also available there.

multiple choice

- Which of the following functions of a computer is mostly responsible for turning data into information?
 - processing
 - storage
 - input
 - output
- In a computer, each _____ can represent one letter, number, or symbol.
 - bit
 - byte
 - integrated circuit
 - megabyte
- Apple _____ is a laptop computer that can convert into a tablet-like device.
 - ultrabook
 - Chromebook
 - 2-in-1 PC
 - ultra-thin PC
- Touch-screen devices usually feature _____.
 - keyboards
 - laser projection
 - optical
 - virtual
- All of the following are sensors found in certain smartphones EXCEPT _____.
 - gyrometer
 - accelerometer
 - magnetometer
 - barometer
- Ergonomics is an important consideration _____.
 - only for desktop computers
 - only for laptop computers
 - only for laptop and desktop computers, but never for mobile devices
 - for all computing devices
- The most common output device for soft output is a _____.
 - laser printer
 - display screen
 - inkjet printer
 - scanner
- _____ printers work by spraying tiny droplets of ink onto paper.
 - Laser
 - cloud-ready
 - inkjet
 - large-format
- The fastest computer port is the _____ port.
 - USB
 - Thunderbolt
 - expansion
 - VGA
- Which component of a computing device drains the battery the fastest?
 - display screen
 - hard drive
 - WiFi adapter
 - Bluetooth adapter

true/false

- Data and information are interchangeable terms. _____
- SATA is nonvolatile storage. _____
- SSD drives are superior to conventional disk drives because they have no moving parts. _____
- A touch pad is a pointing device usually found in tablets. _____
- The "brain" of the computer is the CPU. _____

80 Chapter 2 Looking at Computers: Understanding the Parts

Try This

Creating and Publishing a Movie

You've just taken some video and photos at the zoo, and you'd like to organize the media and put it on your YouTube channel. What should you do? In this Try This, we'll explore kind. For more step-by-step instructions, watch the Chapter 8 Try This video in MyITLab. Before starting, do the following:

- Make sure you have video clips and photos available. If you don't have any you can find free images and video clips at sites like [shutterstock.com](http://www.shutterstock.com).
- Download **Evvid**, a free video editor from www.evvid.com. Click on the **Get Evvid Now** link to download the installation file. Once installed, type **Evvid** in the search box to launch.

Step 1 Click the **add pictures or video** button. In the dialog box that displays, browse to where your media files are saved, select the files you want to import, and then click the **Open** button. The files you've selected will appear on the media timeline.

Step 2 Click and drag your media to the spot in the timeline where you want it to appear.

Step 3 To create a new slide, click the **add text** button. In the dialog box that displays, type the text you want to appear, change the text color, background color, and font, and then click the **Finish** button to add the text slide to your timeline. Click and drag the text slide where you want it to appear.

Step 4 To adjust the length of time a piece of media appears, click the media and then adjust the width of the clip. Add a video title, description, and category as the appropriate items. Select a thumbnail from the ones provided or use your own.

Step 5 To preview your movie, click **Play**. When you've finished, click the **upload to youtube** button. If you don't have a new project in your Evvid, your project will automatically be saved.

Make This

TOOL: AI VideoPlayer

Make: A Video-Playing App
Do you want to run video clips inside your app?

In this exercise, you'll continue your mobile app development by using the Video Player component in **App Inventor** to run video clips inside your app. Using the component, you can play clips stored on your device, clips that you've recorded with the built-in camera, or clips on the Internet.

The Video Player has controls to pause, play, and fast forward or rewind and lets you manipulate the size of the video screen as well as the volume. So decide how you will make your applications more media-intensive using the Video Player component in App Inventor! The Video Player component allows you to display video inside your app.



APP Inventor ©

For the instructions for this exercise, go to MyITLab.

Check Your Understanding

Quizzes Provide an auto-graded self-check covering objectives in each part of the chapter.

Check Your Understanding // Review & Practice

For a quick review to see what you've learned so far, answer the following questions.

multiple choice

- Which is NOT an event associated with the beginning of the Internet?
 - The U.S. Department of Defense creates ARPANET.
 - TCPIP protocol was developed that allowed different computers to communicate with each other.
 - Amazon.com was one of the first websites on the Internet.
 - The first e-mail program was written by Ray Tomlinson.
- Which of the following would be best for synchronous text-based communication?
 - e-mail
 - texting
 - blogging
 - instant messaging
- Which of the following would be an example of a CSC business?
 - Netflix

Solve This

Exercises that put the concepts students are learning into action using a Microsoft Office application.

Solve This

MyITLab

Create a Report: Conducting Research on the Web

You and a partner have been asked to write a report on alternatives to using the Google search engine, as well as how to evaluate a website for a research paper. The paper needs to cite references within the body of the text, and include a list of your works cited at the end of the report. Your partner has begun the report. You are going to modify what has been started.

You will use the following skills as you complete this activity:

• Use Find and Replace	• Insert a Hyperlink
• Format Bulleted Lists	• Add Sources
• Insert SmartArt	• Insert Citations and Bibliography

Instructions:

- Start Word. Open **TIACH03_Start** and save it as **TIACH03_Laeriffert**, using your last and first names.
- Using **Find and Replace**, find all instances of **research** and replace them with **meta-search**.
- At the third paragraph at the end of the second paragraph of text under **Alternative Search Engines**, insert a **Vertical Box List SmartArt graphic**. Open the text pane. If necessary, with the cursor active in the first bullet, type **Google Scholar** (do not include the period) in the **text** pane. Press **Tab**, and then type **Searches exclusively there**. (Do not include the period.)

Sound Bytes

Newly redesigned multimedia lessons with video, audio, or animation.



The interface shows a woman's face on the left and a grid of icons representing different binary topics on the right. A 'For device' button is at the bottom.

Learning Objectives are integrated throughout the Sound Bytes.

A quiz at the end tests that students have learned key concepts.

Helpdesk

Interactive training that puts the student in the role of a helpdesk staffer fielding questions about technology.

Supervisor available to assist students.



The interface features a woman wearing a headset, representing a helpdesk staffer. Text on the screen includes a welcome message and instructions for using the helpdesk.

Features textbook references within each Helpdesk and assessment at the end.

MyITLab

MyITLab for *Technology in Action* with the Enhanced eBook personalizes learning to help your students better prepare and learn—resulting in more dynamic experiences in the classroom and improved performance in the course. Specific features include:

- **NEW Badging:** A Digital Competency badge is now offered to allow students to demonstrate their digital knowledge. This badge represents that students have the basic digital understanding to enter the workforce and be savvy consumers.
- **Adaptive Learning:** *A way to enable personalized learning at scale.* Not every student learns the same way and at the same rate. MyITLab with Adaptive Learning continuously assesses student performance and activity in real time, and, using data and analytics, personalizes content to reinforce concepts that target each student's strengths and weaknesses.
- **A powerful homework and test manager:** MyITLab lets you create, import, and manage online homework assignments, Helpdesk and Soundbyte activities, quizzes, and tests that are automatically graded. The bottom line: MyITLab means less time grading and more time teaching.
- **Comprehensive online course content:** Filled with a wealth of content that is tightly integrated with your textbook, MyITLab lets you easily add, remove, or modify existing instructional material. You can also add your own course materials to suit the needs of your students or department. In short, MyITLab lets you teach exactly as you'd like.
- **Robust Gradebook tracking:** The online Gradebook automatically tracks your students' results on tests, homework, and practice exercises and gives you control over managing results and calculating grades. And, it lets you measure and document your students' learning outcomes.
- **Easily scalable and shareable content:** MyITLab enables you to manage multiple class sections, and lets other instructors copy your settings so a standardized syllabus can be maintained across your department.

The media is available in MyITLab, including Helpdesks, Sound Bytes, Chapter Overview Videos, Chapter Grader Projects, and the IT Simulations.



- MyITLab • **The interactive Pearson eText 2.0** in MyITLab provides an interactive environment that allows students to use technology as they learn. They don't have to stop reading to find the activities such as Helpdesks, Sound Bytes, and Chapter Overview Videos—they just click on them and immediately experience the activity.
- MyITLab • **IT Simulations:** These fully interactive, scenario-based simulations allow students to demonstrate their understanding of the chapter topic in an experiential learning environment.
- MyITLab • **NEWLY REDESIGNED Sound Bytes:** These multimedia lessons provide a multimodal approach to instruction in which topics are presented with audio, video, and interactive activities. The topics covered in the Sound Bytes expand on the coverage in the book to dive into newer technology or more depth on a specific subject.
- **Helpdesks:** These highly interactive, engaging activities provide students with a realistic experience in the role of a helpdesk staffer answering technology questions. These formative assessments cover core objectives in the chapter. As students assume the role of the helpdesk staffer, they apply what they are learning in a new environment. The assessment questions after each Helpdesk provide instructors with a tool to gauge and track students' progress.
- **Make This** projects address the hot area of mobile app creation! Each chapter includes a Make This mobile app project, most of which use App Inventor. By the end of the course, students will have completed 13 small projects that provide them with new skills they can use to create their own apps. And if they don't have an Android device, they can use the emulator and still learn the skills.
- **Solve This** projects put the concepts students are learning into action through real-world problem solving using a Microsoft Office application or other technology tool. For Word and Excel projects, there is also a Grader version in MyITLab.
- **Chapter Overview Videos:** The Chapter Overview Videos provide an author-narrated video preview/review of each chapter part in an easy-to-use format students can view on their phones, tablets, or computers.
- **With TechBytes Weekly, every week is new!** This weekly newsfeed provides two timely articles to save instructors the prep time required for adding interesting and relevant news items to their weekly lectures. TechBytes Weekly also features valuable links and other resources, including discussion questions and course activities.

Annotated Instructor Chapter Guides

Provided for each chapter are guides that can be printed and inserted in your copy of the text. Sample contents are shown below.

FRONT OF CHAPTER TAB

On the front side of each chapter tab, you'll find the following categories:

IN THE CLASSROOM: Activities you can use in a classroom or in online classes, including:

- PowerPoint Presentations
- Discussion Exercises
- Helpdesks
- Sound Bytes

HOMEWORK: Activities used out of class for assessment or preparation for the next chapter, including:

- Web Resource Projects
- Helpdesks
- Sound Bytes

ASSESSMENT:

- Blackboard
- WebCT
- TestGen
- MyITLab
- Student Text Test Bank
- Sound Byte Test Bank
- Helpdesk Test Bank

The back side of each chapter tab includes notes about that chapter's Try This, Make This, and Solve This exercises.

ETHICS TAB

On the Ethics tab, you will find the following:

OPPOSING VIEWPOINTS TABLE: Outlines ethics topics that you can use to debate in the classroom.

KEYWORDS: Provides you with additional words with which to search the Internet for more information related to the ethics topic.

Chapter 3

Using the Internet:

Making the Most of the Web's Resources

In the Classroom	
PowerPoint Presentation (located on the IRC)	Chapter 3 Consider using the PowerPoint presentation as a lecture guide, weaving it throughout the entire class. You can also customize it with additional art images from the IRC.
Audio PowerPoint Presentation (located on the IRC)	Can be used for online courses. Audio content expands on topics covered in the presentation.
Clicker PowerPoint Presentations (located on the IRC)	Ready interactive PowerPoint presentations.
Discussion Exercise	Evaluating Websites After reviewing the online tutorial at www.widener.edu/about/campus_resources/widgram_library/evaluate or library.acadiau.ca/tutorials/webevaluation , show students three examples of good websites and three examples of bad websites. Ask them to explain what makes the sites good or bad based on the material in the tutorial.
Active Helpdesk (located on MyITLab)	Evaluating Websites This Helpdesk presents a topic that students need to master: how to evaluate websites as appropriate to use for research. As you run the Helpdesk, have a browser open so that you can expand on what's discussed.
Homework	
Chapter Assessment	Chapter Assessment Check Your Understanding with Multiple Choice Questions, Chapter Summary and Key Terms, Chapter Quiz, Team Time Project, Ethics Project, Solve This Project
Writing Exercise (located on MyITLab)	Making the Transition to ... the Workplace Exercise 1: Online Resume Resources Have your students work through this exercise and discuss their results in class.
Preparing for the Next Technology in Focus	Writing Exercise: Computer Survey Have students conduct a survey of their parents or other family members as to the first computer each person remembers using. Have them ask such questions as, What were the features they most remember, and why? How much did the system cost? How big was the monitor? How much memory did it include? Which of these technologies are now considered to be legacy technologies?
Assessment	
Test Bank (located on the IRC)	To test student comprehension, use the Test Bank questions for Chapter 3 general content. You can include questions from the Helpdesk and Sound Byte Test Banks, as well. This week, design the quiz as a timed, one-attempt quiz with some essay questions included.

ethics in Action

How Important Is It to Use Ethical Search Engine Optimization Strategies?

If you take the time to build a website, you want customers to find it. Since many people find websites by using search engines, you want your website to rise to the top when searches are conducted. Search engine optimization (SEO) is using certain techniques and technologies that make search engines rank your site high on their results list when customers or potential customers do a search for your kind of business. Increasing your search engine rankings is not that easy, so most companies incorporate some search engine optimization strategies as a way to help bring customers in through the Internet. Some practices are more ethical than others. Do ethics matter with SEO strategies?

Conduct a debate or discussion using the opposing viewpoints in the table below. Keywords have been supplied to help you search the Internet for more information on the topic.

Proponents of SEO Strategies Argue	Opponents of SEO Strategies Argue
Exploiting SEO strategies can attract more users to your website.	Instituting practices such as stuffing lots of key words into the site's content may turn off users of the site once they do arrive there.
As long as the strategy meets the intent of the search engine guidelines, it's okay to push the boundaries.	Poorly executed SEO strategies can lead to long-term harm to a business's online presence by reducing overall traffic flow.
Just get people to the site by any means at all; then you can deliver an ethical representation of your product.	Manipulating small quirks in search engine strategies shifts the efforts of your company from a basic focus on quality.

search:

engine optimization, white hat SEO, black hat SEO, grey hat SEO, SEO code of ethics

Instructor Resources

Online Instructor Resources are available in MyITLab or at pearsonhighered.com/technaction.

- PowerPoint Presentations
- Student Text Test Bank
- Sound Byte Test Bank
- Help Desk Test Bank
- End of Chapter Answer Keys
- Rubrics
- Web Resources
- Image Library
- Sample Syllabi
- Additional Web Projects
- What's New in 14e
- Transition Guide
- TestGen



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Kendall Martin
Mary Anne Poatsy

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Using Technology to Change the World



For a chapter overview, watch the [Chapter Overview Videos](#).

PART 1

How Will You Put Technology in Action?

Learning Outcome 1.1 You will be able to discuss the impact of the tools of modern technology on national and global issues.



Technology on the World Stage 4

Objective 1.1 Describe various technological tools being used to impact national and global issues.

Objective 1.2 Describe various global social issues that are being affected by technology.



Technology and Our Society 7

Objective 1.3 Describe how technology is changing our cognitive processes.

Objective 1.4 Explain how technology is expanding the ways we collaborate.

Objective 1.5 Summarize how technology has impacted the way we choose and consume products and services.

Sound Byte: Virtual Computer Tour

PART 2

Personal Technology and Ethical Computing

Learning Outcome 1.2 You will be able to discuss personal impacts technology can have on your life and your career and how technology creates new ethical debates.



Technology at Home 14

Objective 1.6 Characterize computer literacy, and list some of its benefits.



Technology and Your Career 17

Objective 1.7 Evaluate the impact computer literacy has on a variety of careers.



Technology and Your Ethics 23

Objective 1.8 Define ethics and describe various ethical systems.

Objective 1.9 Relate influences on the development of your personal ethics.

Objective 1.10 Present examples of how technology creates ethical challenges.

Sound Byte: How to Debate Ethical Issues

MyITLab

All media accompanying this chapter can be found here.

Make This



Make: A Virtual Assistant on **page 13**



How Cool Is This?

Want to **make a difference with technology**? The good news is that learning about technology has never been easier. For example, **Massive Open Online Courses (MOOCs)** offer **free instruction** from top universities on programming, algorithm design, and hardware. And **hackathons** organized by various student groups around the country bring together thousands of students to program with one another in marathon weekends, building everything from **crazy contraptions to life-saving devices**. You can follow the projects made at hackathons using tools like **Devpost and GitHub**, where info about hackathons and the actual code produced is freely available. Meanwhile, **civic hacking events**, like one called **Random Hacks of Kindness**, are helping people create apps to track lobbyists in government, to map the locations of murals in a city, and to help organize people to dig out fire hydrants after snowstorms. Want to make a difference in the world? Just get started!

(Luke MacGregor/Bloomberg/Getty Images)

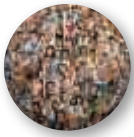
How Will You Put Technology in Action?

Learning Outcome 1.1 You will be able to discuss the impact of the tools of modern technology on national and global issues.

Ask yourself: Why are you in this class? Maybe it's a requirement for your degree, or maybe you want to improve your computer skills. But let's step back and look at the bigger picture.

Technology today is not just a means for career advancement or merely a skill set needed to survive in society. It's a tool that enables us all to make an impact beyond our own lives. We've all seen movies that dangle the dream in front of us of being the girl or guy who saves the world—and gets to drive a nice car while doing it! Whether it's *The X-Men* or *Batman v Superman*, we are drawn to heroes because we want our lives and our work to mean something and to benefit others.

Technology can be your ticket to doing just that by influencing and participating in projects that will change the world. We'd like to ask you to think about how your talents and skills in technology will let you contribute on a larger scale, beyond the benefits they will bring to you personally.



Technology on the World Stage

Recent national and global issues are showing that technology is accelerating change around the world and galvanizing groups of people in new ways. Let's look at a few examples.

Impact of Tools of Modern Technology

Objective 1.1 Describe various technological tools being used to impact national and global issues.

Social Media Tools

We're all familiar with **social media** tools like Twitter, Facebook, and Instagram that enable people to connect and exchange ideas. These same tools are also bringing together people facing similar problems to fight for social change. For example, the Twitter hashtag #BlackLivesMatter was used to galvanize a movement to protest the use of excessive and even deadly force against African Americans by law enforcement personnel in the United States. Videos streamed live over Facebook from cell phones, and released video captured from officers' body cameras went viral, highlighting the abuses. In this way, technology brought to light an important social issue and was a key means for fostering national discussion.



Figure 1.1 The Brexit referendum, which resulted in Britain leaving the European Union, was a close decision with fierce debate conducted on social media. (Momius/Fotolia)

Social media has also proven to be an effective way of motivating people to vote. For example, Ireland has a socially conservative heritage, not decriminalizing homosexuality until 1993. In a national vote on same-sex marriage equality, Irish nationals living abroad—many young and with liberal views—were not allowed to mail in a ballot. Thousands traveled back to Ireland to cast a “yes” vote in support of same-sex marriage, encouraging each other with a Twitter feed #HomeToVote. Facebook posts for the “Yes Equality” page topped 1.6 million. With a large voter turnout, Ireland became the first country to legalize gay marriage through a popular vote.

Britain's Brexit vote (see Figure 1.1)—to exit or remain in the European Union—was fought in large part on social media battlegrounds. The most frequent posters, however, were *bot accounts*, automated programs retweeting news stories and quotes. As you can see, how we conduct informed political discussion in the age of social media is still developing.

Social media tools are also providing a level of instant connection and information distribution that is reshaping the world—both positively and negatively. Although social media has brought important issues to light, as more people get the majority of their news from unsubstantiated, incomplete reports on social media, there can be negative consequences, too. Knowing how to use and critically evaluate social media will be an important skill now and in the future.



Figure 1.2 Ushahidi crisis-mapping software has been used to identify areas of violence against women in India. (Ushahidi, Inc., www.ushahidi.com)

Crisis-Mapping Tool

Another example of the interaction of technology and society is the software tool Ushahidi. Following a disputed election in Kenya, violence broke out all over the country. Nairobi lawyer Ory Okolloh tried to get word of the violence out to the world through her blog, but she couldn't keep up with the volume of reports. However, two programmers saw her request for help and in a few days created Ushahidi (Swahili for "testimony"). It is a **crisis-mapping tool** that collects information from e-mails, text messages, blog posts, and Twitter tweets and then maps them, instantly making the information publicly available. The developers then made Ushahidi a free platform anyone in the world can use (see Figure 1.2). It has since been used in several international disasters. When a tsunami brought Japan to the brink of a nuclear catastrophe, Ushahidi let anyone with a mobile phone find locations with clean water and food. It has been used to coordinate the anti-apartheid movement in Palestine and to raise awareness about violence against women and children in India. It also has been used in the United States during weather emergencies, such as "Snowpalooza" in Atlanta. In what other ways will technology help us face times of crisis?

Global Issues

Objective 1.2 Describe various global social issues that are being affected by technology.

Trends from mobile devices to new levels of computing power have changed how we live in the world. Let's look at the different global social issues that are being affected by technology.

Health Care

Infectious diseases account for about one-fifth of all deaths worldwide. Researchers say the odds of a flu pandemic occurring in the next century are nearly 100%. Could technology help us develop and deliver vaccines in a way that saves lives? Could our own mobile devices help report the location of illness and help track the geographical pattern of an outbreak? With newer scientific visualization tools, scientists are developing antibodies for flu viruses and even HIV, viruses that are difficult to target because they continually change shape. Computationally intense modeling software is helping researchers increase the pace of vaccine production, saving lives.

Retinal prosthetics are another example of global health concerns being addressed with technology. Macular degeneration and retinitis pigmentosa are two diseases that destroy the retina of the eye; they account for the majority of blindness in developing nations. Sheila Nirenberg of Cornell

University is working on a microchip that can replace the function of the retina, translating incoming light into the electrical pulses the brain needs for vision. These biomedical chips could restore quality vision to the blind.

As we learn more about the terrible consequences of concussion injuries, technology is playing a part in providing a solution. Researchers now know that even without an actual concussion, athletes can sustain serious damage from repeated impacts of their brain against the skull. Many college teams now use helmets with embedded sensors that can report the precise location and force of an impact to the head, providing team physicians access to important information. Using computer simulation and collecting impact data from sensors in current football helmets, startup company VICIS has been able to design an impact-reducing football helmet.

The Environment

What if every cell phone in the world had built-in atmospheric sensors? Then millions of points of air and water quality data from around the world could be constantly acquired. Tagged with geographical information, the data could alert scientists to new trends in our environment. Ideas like these are being explored by Mark Nieuwenhuijsen of the Center for Research in Environmental Epidemiology in Barcelona, Spain.

Smart Internet-connected water sprinklers are another technology that is saving water in California and other dry areas of the country. The sprinkler system checks the weather forecasts so it won't use water when rain is coming the next day. It can adjust the watering schedule based on the season and can adjust the times of watering to encourage root growth. The system is showing a 30% reduction in water usage.

The Digital Divide

There is a great gap in the levels of Internet access and the availability of technical tools in different regions of the world. The term coined for this difference in ease of access to technology is the **digital divide**. One danger of a digital divide is that it prevents us from using all the minds on the planet to solve the planet's problems. But this challenge created by technology is also being answered by technology.

The Next Einstein Initiative (NEI) is a plan to focus resources on the talented mathematical minds of Africa (see Figure 1.3). By expanding the African Institute for Mathematical Sciences (AIMS) across the continent, the future of Africa can be profoundly changed. Cambridge professor Neil Turok

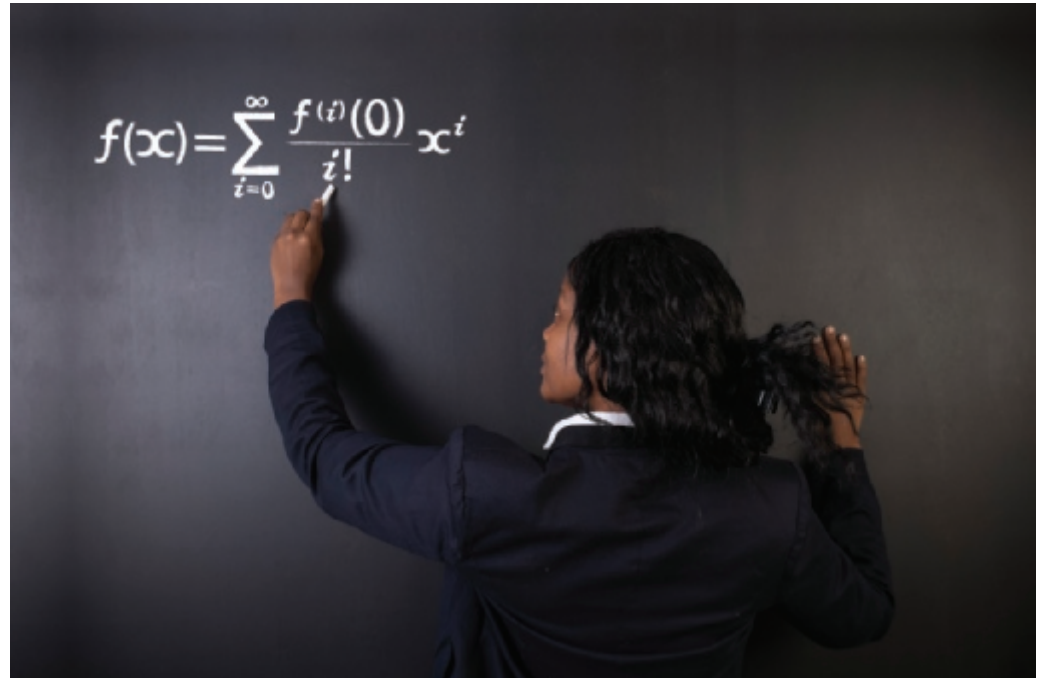


Figure 1.3 The Next Einstein Initiative (NEI) is rallying the support of the world to identify mathematical genius. (Stock Photo/Alistair Cotton/123RF)

Figure 1.4 Technology in Action: Taking On Global Problems

Person/ Organization	Global Problem	Technology Used	Action	Find Out More ...
Peter Gabriel/ The Witness Project	Human rights abuses	Video cameras	Provide video documentation of human rights abuses; the project contributed to the arrest of warlords in the Democratic Republic of the Congo for the recruitment of child soldiers.	The Witness Project: witness.org
SolarRoad/ Netherlands	The need for a renewable, nonpolluting energy resource	Solar cells	Solar cells are integrated into the asphalt roadway. They collect solar energy and distribute electricity all day.	Netherlands SolaRoads: solaroad.nl
United Nations World Food Programme (WFP)	One in seven people in the world do not get enough food to eat	GIS (geographical information systems) and mobile devices	The WFP can analyze the location and need for food, positioning food where it will help the most.	World Food Programme: wfp.org
e-NABLE	Need for inexpensive, easily maintained prosthetic hands	3D printing	This group of engineers, parents, and artists work to print and assemble hands for people they may never meet.	e-NABLE: enablingthefuture.org

founded AIMS to bring together the brightest young minds across Africa with the best lecturers in the world. The NEI has won funding from Google’s Project 10¹⁰⁰, an initiative to award \$10 million to a set of five projects selected by open public voting. By capturing the enthusiasm of the world with presentations distributed through TED (**ted.com**) and Project 10¹⁰⁰, there is now a push to create 15 additional AIMS centers across Africa.

Figure 1.4 shows additional examples of people putting technology into action to impact the world. How will you join them?



Technology and Our Society

Technology is also allowing us to redefine very fundamental parts of our social makeup—how we think, how we connect with each other, and how we purchase and consume products.

Technology Impacts How We Think

Objective 1.3 Describe how technology is changing our cognitive processes.

What We Think About

What do you think about in your free time? In the late twentieth century, a common trend was to think about what to buy next—or perhaps what to watch or listen to next. Information and products were being served up at an amazing rate, and the pattern of consumption became a habit. As more and more web applications began to appear that allowed each individual to become a “creator” of the web, a new kind of Internet came into being. It was nicknamed **Web 2.0**, and it had a set of new features and functionality that allowed users to contribute content easily and to be easily connected to each other. Now everyone could collaborate internationally at the click of a mouse.

Web 2.0 has fostered a dramatic shift across the world, from simply consuming to having the ability to volunteer and collaborate on projects. In his book *Cognitive Surplus: Creativity and Generosity in a*



BETTER PERFORMANCE & SATISFACTION

Connected Age, author Clay Shirky created the term **cognitive surplus** to mean the combination of leisure time and the tools to be creative. The world's population has an estimated 1 trillion hours a year of free time. When coupled with the available media tools and the easy connectivity of Web 2.0, and with generosity and a need to share, projects like Ushahidi and the Witness Project (see Figure 1.4) emerge.

But why would anyone bother to work on projects like these in his or her free time? Modern theories of motivation show that what pushes people to apply their free time in altruistic causes, for no money, is the excitement of autonomy, mastery, and purpose (see Figure 1.5):

Autonomy: the freedom to work without constant direction and control.

Mastery: the feeling of confidence and excitement from seeing your own skills progress.

Purpose: the understanding that you are working for something larger than yourself.

Together, these three factors play into how we are fundamentally wired and can produce incredibly motivated behavior. The combination of motivation, technology, and a cognitive surplus is leading to powerful projects that are changing the world.

Figure 1.5 What motivates us can play a role in our use of technology to impact society. (Bonninturina/Fotolia; Izzi/Fotolia/Fotolia; Drobot Dean/Fotolia)

Technology Impacts How We Connect

Objective 1.4 Explain how technology is expanding the ways we collaborate.

Connecting Through Music

In many societies, people connect by creating and sharing music. Blend (**blend.io**) is a site that allows people to exchange the songs they have written as well as the electronic data and settings they used to create the song. People can explore different musical styles and techniques on the site and immediately download the components that made a song and begin to modify it. There is also a Blend blogging community that trades musical ideas among its readers. In addition, Blend is a publishing house, distributing and selling its users' digital music for them through all major outlets like iTunes, Spotify, and Google Play. If you can get 100 likes from the community for your song, it is qualified for release on the Blend label!

Connecting Through Business

One of the most profound ways we can connect with each other is to support other people's dreams. Kickstarter (**kickstarter.com**) helps us connect in this way by allowing people to post their ideas for community projects, games, and inventions and to ask for funding directly. Donors are given rewards for different levels of pledges, such as a signed edition of a book or a special color of a product. This style of generating capital to start a business is known as **crowdfunding**, asking for small donations from a large number of people, often using the Internet. Successful Kickstarter projects have included ice chests with integrated blenders, DNA analysis machines that could inexpensively diagnose disease, and many entertainment projects. In total, over \$2.5 billion of funding for businesses has been raised using Kickstarter. Business ideas are not the only projects benefiting from crowdfunding. Sites like GoFundMe allow people in need to crowdfund to raise money for things such as medical bills or tuition.

Technology Impacts How We Consume

Objective 1.5 Summarize how technology has impacted the way we choose and consume products and services.

Technology is changing all aspects of how we decide what we'll purchase and how we actually buy goods and services—from strategies for convincing you to purchase a certain product to the mechanics of how you buy and own things.

Sound Byte MyITLab®

Virtual Computer Tour

In this Sound Byte, you'll take a video tour of the inside of a desktop system unit. From opening the cover to locating the power supply, CPU, and memory, you'll become more familiar with what's inside your computer.

Marketing



New strategies in marketing are counting on the fact that most people have a cell phone with a camera and Internet access. **Quick response (QR) codes** like the one shown here let any piece of print host a direct link to online information and video content. And studies show 82% of shoppers use their cell phone to go on the Internet before they make a purchase. They are often using so-called *location-aware* price comparison tools, programs that take advantage of the GPS chip in smartphones to know your location. Apps like ShopSavvy and RedLaser scan the bar code of the item and then compare prices with those of nearby stores and with the best prices available online. Techy shoppers can then get “mobile coupons” (or *mobi coupons*) delivered to their cell phones, thanks to sites like SnipSnap and apps from individual store chains. The future promises specialized coupons created just for you based on your location and past buying preferences.

Marketers also have to be aware of the phenomenon of **crowdsourcing**—checking in with the voice of the crowd. Consumers are using apps like ScanLife to check people’s verdicts on the quality of items. Forward-thinking companies are using this input to improve their products and services. AT&T, for example, has an app called Mark the Spot that lets customers report locations of dropped calls to help the company improve coverage.

Access Versus Ownership

Even the idea of ownership is evolving, thanks to new technologies. Items like cars and bikes can become “subscriptions” instead of large one-time purchases. For example, Zipcar allows hundreds of thousands of people to use shared cars. With Zipcar, a phone call or online reservation activates your personal Zipcar. The Zipcar mobile app allows you to open the door of the car you have reserved, and away you drive. GPS technology is used to track where the car is, whether it has been dropped off at the right location, and how far it has been driven. Call a Bike is a bike-sharing program in Germany. Racks of Call a Bikes are located at major street corners in large cities in the country. Simply call the phone number printed on the bike and it texts you a code to unlock the bike. When you’ve finished riding the bike, simply relock it and you’re billed automatically. The New York City version of this program, Citi Bike, has already seen riders take over 25 million trips (see Figure 1.6).



Figure 1.6 New York City’s Citi Bike program uses digital technology to change our lifestyle from one of ownership to one of subscription. Riders are now taking over one million trips per month.

(Tim Clayton/Contributor/Corbis Sport/Getty Images)