Information Systems
chapter 1 Summary and Quiz

• IS Framework for Business Professionals.
The IS knowledge that a business manager or professional needs to know is illustrated in Figure 1.2

and covered in this chapter and text. This knowledge includes (1) foundation concepts: fundamental behavioral, technical, business, and managerial concepts like system components and functions, or competitive strategies;
(2) information technologies: concepts, developments, or management issues regarding hardware, software, data management, networks, and other technologies;
(3) business applications: major uses of IT for business processes, operations, decision making, and strategic/competi- tive advantage;
(4) development processes: how end users and IS specialists develop and implement business/IT solutions to problems and opportuni- ties arising in business; and
(5) management challenges: how to manage the IS function and IT resources effectively and ethically to achieve top performance and business value in

support of the business strategies of the enterprise.

• Business Roles of Information Systems. Information systems perform three vital roles in business firms. Business applications of IS support an organization's business processes and operations, business decision making, and strategic competitive advantage. **Major application categories of information systems include: operations support systems,** such as transaction processing systems (TPS), process control systems, and enterprise collaboration systems; and **management support systems**, such as management information systems, decision support systems, and executive information systems. **Other major categories are expert systems,** knowledge management systems, strategic information systems, and functional business systems.

However, in the real world, most application catego ries are combined into cross-functional information systems that provide information and support for decision making and also performing operational information processing activities. Refer to Figures 1.7, 1.9, and 1.11 for summaries of the major application categories of information systems.

• **System Concepts. A system is a group of interrelated components, with a clearly defined boundary, working toward the attainment of a common goal by accepting inputs and producing outputs in an organized transformation process.**

Feedback is data about the performance of a system. Control is the component that monitors and evaluates feedback and makes any necessary adjustments to the input and processing components to ensure that proper output is produced.

• Information System Model. An information system uses the resources of people, hardware, software, data, and networks to perform input, processing, output, storage, and control activities that convert data resources into information products. Data are first collected and converted to a form that is suitable for processing (input). Then the data are manipulated and converted into information (processing), stored for future use (storage), or communicated to their ultimate user (output) according to correct processing procedures (control).

• IS Resources and Products. Hardware resources include machines and media used in information processing. Software resources include computerized instructions (programs) and instructions for people (procedures). People resources include information systems specialists and users. Data resources include alphanumeric, text, image, video, audio, and other forms of data. Network resources include communications media and network support. Information products produced by an information system can take a variety of forms, including paper reports, visual displays, multimedia documents, e-messages, graphic images, and audio responses.

These are the key terms and concepts of this chapter. The page number of their first reference appears in parentheses.

1. Computer-based information system (8)
For example, most retail stores now use computer-based information systems to help their employees record customer purchases, keep track of inventory, pay employees, buy new merchandise, and evaluate sales trends.

2. Control (26) - - l involves monitoring and

evaluating feedback to determine whether a sys- tem is moving toward the achievement of its goal.

3. Data (32) - The word data is the plural of datum, although data com- monly represents both singular and plural forms. Data are raw facts or observations, typically about physical phenomena or business transactions. For example, a spacecraft launch or the sale of a hamburger each generate a lot of data describing those event

Then we can define information as data that have been converted into a meaningful and useful context for specific end users.

4. Data or information processing (33)

Let's take a closer look now at each of the basic data or information processing activities. You should be able to recognize input, processing, output, storage, and con- trol activities taking place in any information system you are studying. Figure 1.21 lists business examples that illustrate each of these information system activities

Processing of Data into Information

Data are typically subjected to ***processing*** activities, such as calculating, comparing, sorting, classifying, and summarizing. These activities organize, analyze, and manipulate

Information System Activities
• **Input.** Optical scanning of bar-coded tags on merchandise.
• **Processing.** Calculating employee pay, taxes, and other payroll deductions.
• **Output.** Producing reports and displays about sales performance.
• **Storage.** Maintaining records on customers, employees, and products.

FIGURE 1.21
Business examples of the basic activities of information systems.

5. Data resources (31) -

Data are more than the raw material of information systems. The concept of data resources has been broadened by managers and information systems professionals. They realize that data constitute valuable organizational resources. Thus, you should view data just as you would any organizational resource that must be managed effectively to benefit all stakeholders in an organization.

6. Developing successful information system solutions (18)

Developing successful information system solutions to business problems is a major challenge for business managers and professionals today. As a business professional, you will be responsible either for proposing, assisting with development, or developing new or improved uses of information technologies for your company. As a business

manager, you will frequently manage the development efforts of information systems specialists and other business end users. Most computer-based information systems are conceived, designed, and imple- mented using some form of systematic development process.

FIGURE 1.13
Developing information systems solutions to business problems can be implemented and managed as a multistep process or cycle.

7. E-business (11)- the use of Internet technologies to work and empower business processes, e-commerce, and enterprise collaboration within a company and with its customers, suppliers, and other business stakeholders.

8. E-business applications (11)

9. E-commerce (12) -
the buying, selling, marketing, and servicing of

products, services, and information over a variety of computer networks.

10. Enterprise collaboration systems (11) -
involve the use of software tools to support communication, coordination, and collaboration among the members of networked teams and workgroups.

11.
Extranet (11) - between an enterprise and its trading partners

12. Feedback (26) -
is data about the performance of a system. For example, data about sales performance are feedback to a sales manager. Data about the speed, altitude, atti- tude, and direction of an aircraft are feedback to the aircraft's pilot or autopilot.

13. Media (30) -tangible objects on which data are recorded, from sheets of paper to magnetic or optical disks.

14. Information (32)
Then we can define information as data that have been converted into a meaningful and useful context for specific end users. Thus, data are usually

subjected to a value-added process (data processing or information processing) during which (1) their form is aggregated, manipulated, and organized

a. Information products (34)
. The goal of information systems is the production of appropriate information products for end users. Common information products include messages, reports, forms, and graphic images, which may be provided by video displays, audio responses, paper products, and multimedia.
15. Information system (6)
(IS) can be any organized combination of people, hardware, software, communications networks, data resources, and policies and procedures that stores, retrieves, transforms, and disseminates information in an organization.

16. Information system activities (33)

• Input. Optical scanning of bar-coded tags on merchandise. • Processing. Calculating employee pay, taxes, and other payroll deductions. • Output. Producing reports and displays about sales performance. • Storage. Maintaining records on customers, employees, and products. • Control.

Generating audible signals to indicate proper entry of sales da

a. Input (33)

. Input typically takes the form of data entry activities such as recording and editing. End users usually enter data directly into a computer system or record data about transactions on some type of physical medium such as a paper form.

b. Processing (33)

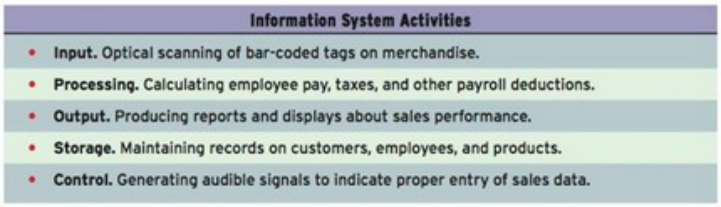
processing activities, such as calculating, comparing, sorting, classifying, and summarizing.

c. Output (34) - Information in various forms is transmitted to end users and made available to them in the output activity. The goal of information systems is the production of appropriate information products for end users. Common information products include messages, reports, forms, and graphic images, which may be provided by video displays, audio responses, paper products, and multimedia.

d. Storage (34) - Storage is the informa- tion system activity in which data are retained in an organized manner for later use.

e. Control (34) - l involves monitoring and evaluating feedback to determine whether a sys- tem is moving toward the achievement of its goal.

An important information system activity is the control of system performance. An information system should produce feedback about its input, processing, output, and storage activities. This feedback must be monitored and evaluated to determine whether the system is meeting established performance standards. Then appropriate system ac- tivities must be adjusted so that proper information products are produced for end users.



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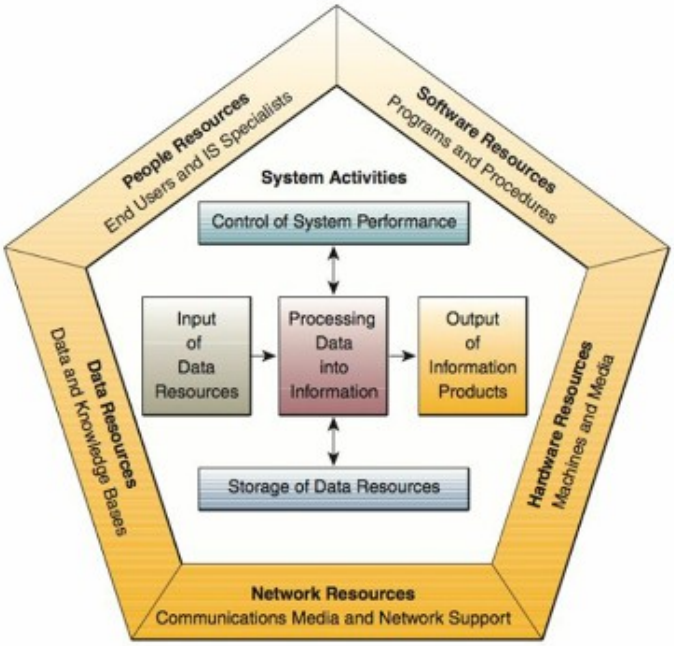
• **Control.** Generating audible signals to indicate proper entry of sales data.

FIGURE 1.21
Business examples of the basic activities of information systems.

17. Information system model (28) - expresses a fundamental conceptual framework for the major components and activities of information systems.

FIGURE 1.19
The components of an information system. All information systems use people, hardware, software, data, and network resources to perform input, processing, output, storage, and control activities that transform data resources into information products.



18. Intranet (11) -Internet inside the enterprise

19. Knowledge workers (29)
(End Users) people who spend most of their time communicating and collaborating in teams and workgroups and creating, using, and distributing information.

20. Management information systems (14)
information system applications focus on providing information and support for effective decision making by managers

21. Network resources (33)

emphasizes that communications technologies and networks are fundamental resource components of all information systems. Network resources include: • Communications media. Examples include twisted-pair wire, coaxial and fiber-optic cables, and microwave, cellular, and satellite wireless technologies. • Network infrastructure. This generic category emphasizes that many hardware, software, and data technologies are needed to support the operation and use of a communications network. Examples include communications processors, such as modems and inter-network processors, and communications control software, such as network operating systems and Internet browser packages

22. People resources (29) - People are the essential ingredient for the successful operation of all information systems. These people resources include end users and IS specialists.
a. IS specialists - people who develop and operate information systems. (29)
b. End users (29) - people who use an information system or the information it produces.

23. Roles of IS in business (8)

a. Support of business processes and operations (8)
As a consumer, you regularly encounter information systems that support the business processes and opera- tions at the many retail stores where you shop. For example, most retail stores now use computer-based information systems to help their employees record customer purchases, keep track of inventory, pay employees, buy new merchandise, and evaluate sales trends. Store operations would grind to a halt without the support of such information systems.

b. Support of business decision making (8)
Information systems also help store managers and other business professionals make better decisions. For example, decisions about what lines of merchandise need to be added or discontinued and what kind of investments they require are typically made after an analysis provided by computer-based information systems. This function not only supports the decision making of store managers, buyers, and others, but also helps them look for ways to gain an advantage over other retailers in the competition for customers. Support of Strategies for Competitive Advantage over others retailers in the competition for customers.

c. **Support of strategies for competitive advantage** (8)

Gaining a strategic advantage over competitors requires the innovative application of information technologies. For example, store management might make a decision to install touch-screen kiosks in all stores, with links to the e-commerce Web site for online shopping. This offering might attract new customers and build customer loyalty because of the ease of shopping and buying merchandise provided by such information systems. Thus, strategic information systems can help provide products and services that give a business a comparative advantage over its competitors

24. Software resources (31) a. Programs (31) b. Procedures (31)

The concept of software resources includes all sets of information processing instructions. This generic concept of software includes not only the sets of operat- ing instructions called programs, which direct and control computer hardware, but also the sets of information processing instructions called procedures that people need. '

25. System (25) - a system is defined as a set of interrelated components, with a clearly defined boundary, work- ing together to achieve a common set of objectives by accepting inputs and producing outputs in an organized transformation process.

26. **Types of information systems** (12)
, several types of information systems can be classified either as operations or management information systems. Figure 1.6 illustrates this conceptual classification of information systems applications

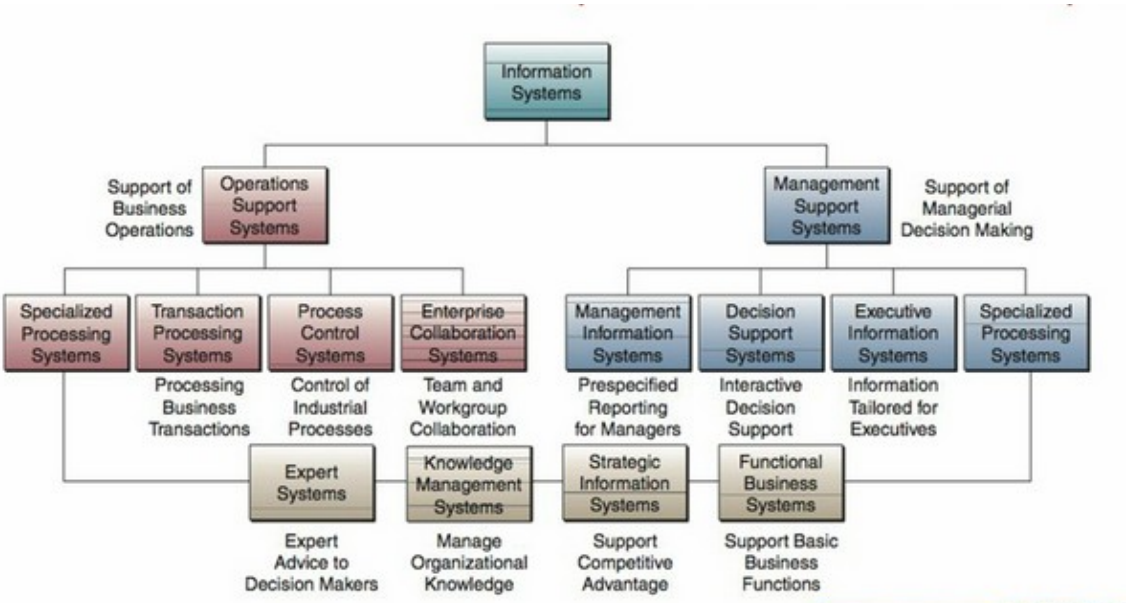


FIGURE 1.6
Operations and management classifications of information systems. Note how this conceptual overview emphasizes the main purposes of information systems that support business operations and managerial decision making.

nformation products that can best be used by managers. Further processing by nanagement information systems is usually required. The role of a business firm's ɔperations support systems is to process business transactions, control industrial ɔrocesses, support enterprise communications and collaborations, and update corpo- ate databases efficiently. See Figure 1.7.

Transaction processing systems are important examples of operations support ystems that record and process the data resulting from business transactions

a. Cross-functional informational systems (15)
Integrated information systems designed both to produce information and to support decision making for various levels of management and business functions, as well as perform record-keeping and transaction-processing chores.
b. Management support systems (14)
information system applications focus on providing information and support for effective decision making by managers
c. Operations support systems (12)
process business transactions, control industrial processes, support enterprise communications and collaborations, and update corpo- rate databases efficiently.
d. Functional business systems (15)
s apply information technology to a firm's products, services, or business processes to help it gain a strategic advantage over its competitors. Example - accounting or marketing
e. Transaction processing systems (13)
are important examples of operations support systems that record and process the data resulting from business transactions. They process

transactions in two basic ways. In batch processing, transactions data are accumulated over a period of time and processed periodically. In real-time (or online) processing, data are processed immediately after a transaction occurs. For example, point-of-sale (POS) systems at many retail stores use electronic cash register terminals to capture and transmit sales data electronically over telecom- munications links to regional computer centers for immediate (real-time) or nightly (batch) processing.

f. Process control systems (13)

monitor and control physical processes. For example, a petroleum refinery uses electronic sensors linked to computers to monitor chemical processes continually and make instant (real-time) adjustments that control the refinery process.

g. Enterprise collaboration systems (13)

s enhance team and workgroup communications and productivity and include applications that are sometimes called office automation systems.

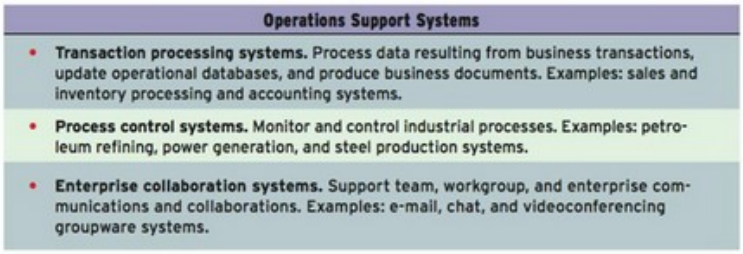


FIGURE 1.7
A summary of operations support systems with examples.

Match one of the previous key terms and concepts with one of the following brief examples or definitions. Look for the best fit for answers that seem to fit more than one key term or concept. Defend your choices.

1. People who spend most of their workday creating, using, and distributing information.

2. Information systems support an organization's business processes, operations, decision making, and strategies for competitive advantage.

3. Using IT to reengineer business processes to support e-business operations.

4. Using Web-based decision support systems to

support sales managers.

5. Using information technology for e-commerce to gain a strategic advantage over competitors.

6. A system that uses people, hardware, software, and network resources to collect, transform, and disseminate information within an organization.

7. An information system that uses computers and their hardware and software.

8. Anyone who uses an information system or the information it produces.

9. Applications using the Internet, corporate intranets, and interorganizational extranets for e-business operations, e-commerce, and enterprise collaboration.

10. The buying, selling, marketing, and servicing of products over the Internet and other networks.
11. Groupware tools to support collaboration among networked teams.

12. A group of interrelated components with a

clearly defined boundary working together toward the attainment of a common goal.

13. Data about a system’s performance.

14. Making adjustments to a system’s components so that it operates properly.

15. Facts or observations.

16. Data that have been placed into a meaningful context for an end user.

17. Converting data into information is a type of this kind of activity.

18. An information system uses people, hard- ware, software, network, and data resources to perform input, processing, output, storage, and control activities that transform data re- sources into information products.

19. Machines and media.

20. Computers, disk drives, video monitors, and printers are examples.

21. Magnetic disks, optical disks, and paper forms are examples.

22. Programs and procedures.

23. A set of instructions for a computer.

24. A set of instructions for people.

25. End users and information systems professionals.

26. Using the keyboard of a computer to enter data.

27. Computing loan payments.

28. Printing a letter you wrote using a computer.

29. Saving a copy of the letter on a magnetic disk.

30. Having a sales receipt as proof of a purchase.

31. Information systems can be classified into operations, management, and other categories.

32. Includes transaction processing, process control,

and end-user collaboration system.

33. Includes management information, decision support, and executive informa- tion systems.

34. Information systems that perform transac- tion processing and provide information to managers across the boundaries of functional business areas.

35. Internet-like networks and Web sites inside a company.

36. Interorganizational Internet-like networks among trading partners. 37. Using the Internet, intranets, and extranets to empower internal business operations, e-commerce, and enterprise collaboration. 38. Information systems that focus on opera- tional and managerial applications in support of basic business functions such as account- ing or marketing. 39. Data should be viewed the same way as any organizational resource that must be man- aged effectively to benefit all stakeholders in an organization. 40. A major challenge for business managers and professionals today in solving business problems. 1. How can information technology support a com- pany’s business

processes and decision making and give it a competitive advantage? Give examples to illustrate your answer. 2. How does the use of the Internet, intranets, and extranets by companies today support their busi- ness processes and activities? 3. One major issue in the Real World Challenge outlined in the chapter was the lack of upgrades and new applications undertaken ever since the company was founded and the original IT infrastructure put in place. How does a company ever get to the place where Crescent is in the opening to this chapter? What do you think prevented them from taking action earlier? 4. Why do big companies still fail in their use of in- formation technology? What should they be doing differently? 5. How can a manager demonstrate that he or she is a responsible end user of information systems? Give several examples. 6. Refer to the Real World Solution in the chapter. Has Crescent Healthcare applied the “three steps for the upgrading of legacy systems” outlined in 41. Examples include messages, reports, forms, and graphic images, which may be provided by video displays, audio responses, paper products, and multimedia. 42. These include communications media and network infrastructure. 43. People who develop and operate information systems. 44. The

execution of a set of activities in order to convert data into information. 45. Those systems implemented in order to direct physical conversion processes, such as oil refinement. 46. The second stage of information systems evolution, focused on providing managerial users with information relevant to decision making in the form of predefined reports. 47. A type of operation support systems geared toward the recording and process- ing of data captured as a result of business transactions. 48. A type of operation support systems that en- hance team and workgroup communication and productivity

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2. How does the use of the Internet, intranets, and extranets by companies today support their busi- ness processes and activities?

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implemented in order to direct physical conversion processes, such as oil refinement. 46. The second stage of information systems evolution, focused on providing managerial users with information relevant to decision making in the form of predefined reports. 47. A type of operation support systems geared toward the recording and process- ing of data captured as a result of business transactions. 48. A type of operation support systems that en- hance team and workgroup communication and productivity. the chapter? Which of those have been done in more or less detail? Can you fill in the blanks for any that you see lacking? 7. What are some of the toughest management chal- lenges in developing IT solutions to solve business problems and meet new business opportunities? 8. Why are there so many conceptual classifications of information systems? Why are they typically integrated in the information systems found in the real world? 9. In what major ways have information systems in business changed during the last 40 years? What is one major change you think will happen in the next 10 years? Refer to Figure 1.4 to help you answer. 10. Refer to the Real World Case on eCourier, Cablecom, and Bryan Cave in the chapter. Jay Bregman, CTO and cofounder of

eCourier, notes that the company hopes their innovative use of technology will become a differentiator in their competitive market. More generally, to what extent do specific technologies help companies gain an edge over their competitors? How easy or difficult would it be to imitate such advantage

Complete the following exercises as individual or group projects that apply chapter concepts to real-world business situations. 1. Understanding the Information System The Library as an Information System A library makes an excellent information systems model. It serves as a very large information storage facility with text, audio, and video data archives. Look up the definitions for each term listed below and briefly explain a library's equivalents. a. Input b. Processing c. Output d. Storage e. Control f. Feedback The Library of Congress, occupying three buildings in Washington, D.C., is the largest library in the world. a. Use a Web browser and a search engine to locate the home URL (Web address) of the Library of Congress and access that page. What is the URL (home page) of the Library of Congress? b.

ExaminetheCollectionHighlights;howmany types of data can be accessed directly from that page? Locate and select one collection of in- terest to you and write a one-page synopsis of that collection. Be sure to include the URL (Web address) of that collection. 2. Careers in IT Are You Ready? If you are looking for a job in information tech- nology, it helps to know what's hot. Read the CIO article "IT Graduates Not 'Well-Trained, Ready- to-Go'" (http://bit.ly/h9GAw7), and answer the questions below. a. What four skills from higher-education insti- tutions are in demand? b. For each skill above, list the associated course numbers and names offered by your college or university. Use bold italics to denote courses required for all business majors; use bold to denote courses required for all information technology majors. c. Are the required courses sufficient to give you the competitive edge you need (given your major)? Explain. d. List three required general education or "core curriculum" courses you believe provide you with the least value in the job market. Justify your answers. 3. Skydive Chicago: Efficiency and Feedback Digital Data Skydive Chicago (www.SkydiveChicago.com) is one of the premier skydiving resorts in the United States, serving skydivers ranging in skills from first-time

jumpers to internationally competitive freefly teams. Each student in Skydive Chicago's training program makes a series of progressive training jumps under the direct supervision of a U.S. Para- chute Association–rated jumpmaster. The training program gears each jump in the series toward teaching one or two new skills. Jumpmasters videotape their students' jumps. Students use the feedback these videos provide to identify mistakes. They often copy their videos onto a personal com- puter or DVD for future reference. Jumpmasters may also copy well-executed student skydives to the facility's video library. All students are given access to the drop zone's train- ing room and are encouraged to watch video clips in preparation for their next training jump. This saves jumpmasters, who are paid per jump, consid- erable time. Jumpmasters also use these videos to evaluate their training method's effectiveness. a. How can this information system benefit the skydiving student? b. How can this information system benefit Skydive Chicago? c. Draw the information systems model (Figure 1.19, the information system model). Fill in your diagram with people, hardware, software, and other information from this exercise. 4. Are Textbooks History? Trends in Information Systems The wealth of free

information available via the Internet continues to grow at incredible rates. Search engines such as Google make it easier to locate use- ful information. This textbook often explores the Internet's impact on various industries, and the text- book industry is no exception. Is it possible that free Internet content might one day replace textbooks? a. Go to www.google.com and use the search box to look up "End-user." Were any of Google's first five search results useful with respect to this course? b. Go to www.wikipedia.com and use the search box to look up "Knowledge worker." Compare Wikipedia's article to the information provided